

## WV Department of Environmental Protection Office of Abandoned Mine Lands and Reclamation



Department of Administration  
Purchasing Division  
2019 Washington Street East  
Charleston, West Virginia 25305-0130



Due: July 10, 2018

### Professional Engineering Services Pine Bluff (Wilson) Refuse

07/10/18 08:57:46  
WV Purchasing Division

July 10, 2018

Ms. Brittany E. Ingraham  
Department of Administration  
Purchasing Division  
2019 Washington Street East  
Charleston, West Virginia 25305-0130

Dear Ms. Ingraham:

Subject: Proposal for Professional Engineering Services  
Solicitation No. CEOI 0313 DEP1800000004  
EOI – Pine Bluff (Wilson) Refuse – EPAM16038  
CEC Project: 182-852

Civil & Environmental Consultants, Inc. (CEC) is pleased to submit this Expression of Interest (EOI) to West Virginia Department of Environmental Protection (WVDEP) for the reclamation of Pine Bluff (Wilson) Refuse, Harrison County, West Virginia. Our preparation of this proposal is based the Expression of Interest (EOI) dated May 15, 2018 and Addendum 1 received June 7, 2018.

CEC is uniquely qualified for the Pine Bluff (Wilson) Refuse reclamation with a substantial history of completing abandoned mine lands (AML) projects in West Virginia and Pennsylvania, familiarity of the regional geology, regional mining geochemistry, and extensive experience developing each project component. CEC employs geochemists with esoteric knowledge of the chemical properties of refuse and mine water aquifers and extensive experience in passive and active mine water remediation. CEC has the internal capability to collect aerial photography and LiDAR data for use in topographic, volumetric, and hydrologic analysis. CEC is a market leader in application of natural stream design methodology and installation of geo-synthetic liners for water conveyance on abandoned mine lands (AML). CEC routinely completes WVDEP National Pollutant Discharge Elimination System (NPDES) Construction Stormwater and West Virginia Department of Transportation (WVDOT) MM-109 permitting.

Appendix A of the attached enclosure includes a detailed conceptual design for the Pine Bluff (Wilson) Refuse project. The conceptual design identifies existing site conditions, geotechnical boring locations, borrow area, toxic material disposal area, final grading plan, and hydrologic conveyances. Section 3.0, Part 1, describes in detail CEC's capability to complete the following tasks: aerial photography, LiDAR scanning, planimetric surveying, geotechnical investigation, hydrogeological investigation, soil and water chemical assessment, hydraulic and hydrologic assessment, material handling plan, grading plan and access road design, construction drawings and

specifications, liner installation, revegetation plan, erosion and sediment control plan, and permitting. Section 3.0, Part 2, describes CEC's ecological restoration capabilities. CEC routinely constructs natural stream design on reclaimed AML in place of rock-lined swales. Natural stream design in combination with a native non-invasive revegetation plan improves aquatic and ecological health through proper sediment transport, habitat development, and vegetative protected riparian corridor. Part 2 is included as an option for review by WVDEP Office of Abandoned Mine Lands and Reclamation (WVDEP/AML), but is not required for CEC to complete traditional AML reclamation techniques.

For this project, Timothy (Tim) Denicola will be the project manager and primary point of contact. Nathan (Nate) Ober will serve as the Principal and Quality Manager. Tim and Nate work together in CEC's Bridgeport, West Virginia office and can be reached at the information provided below.

**Civil & Environmental Consultants, Inc.**  
600 Marketplace Avenue, Suite 200  
Bridgeport, WV 26330

**Nathan S. Ober, PG**  
Principal  
Office: (855) 488-9539 x7106  
Email: [nober@cecinc.com](mailto:nober@cecinc.com)  
Cell: (304) 841-4531

**Timothy A. Denicola, CFM**  
Project Manager  
Office: (855) 488-9539 x7133  
Email: [tdenicola@cecinc.com](mailto:tdenicola@cecinc.com)  
Cell: (304) 838-8475

We appreciate the opportunity to submit this EOI to you and look forward to working with WVDEP/AML. We believe the scope of services outlined in the attached proposal will address the project's technical needs in a cost effective manner. If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

  
Timothy A. Denicola, CFM  
Project Manager

  
Nathan S. Ober, PG  
Principal

# Professional Engineering Services Pine Bluff (Wilson) Refuse

WV Department of Environmental Protection



EOI / SOQ

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## 1.0 Firm Overview

Civil & Environmental Consultants, Inc. (CEC) is recognized for providing innovative design solutions and integrated expertise in air quality, civil engineering, ecological sciences, environmental engineering and sciences, planning, survey, transportation engineering, waste management, and water resources. Headquartered in Pittsburgh with 22 additional offices throughout the United States and more than 9000 employees, CEC has worked with hundreds of municipalities and public sector agencies on a wide range of projects.

### Safety First

CEC believes that all accidents are preventable and is committed to creating an accident and incident free workplace for employees and subcontractors through training, safe work practices, and processes for assessing project hazards. CEC strives for safety excellence throughout our entire organization and holds employees and subcontractors accountable for the safe performance of their work. Safety is a key element of CEC's Strategic Plan and is represented by our Accident and Incident Free program.

### Market Oriented

Multi-disciplined Industry Consulting Groups (ICGs) are derived from the primary practice areas to strategically focus on the business challenges and drivers of the manufacturing, mining, natural gas, power, public sector, real estate and solid waste markets. Each of these diverse teams is a conduit to the latest thinking and advancements in the markets we serve, allowing CEC to provide clients with concise, timely information and regulatory updates to facilitate informed decision-making.

### Multi-Disciplined

CEC is an expanding company with:

- Civil Engineers
- Geotechnical Engineers
- Transportation Engineers
- Structural Engineers
- Environmental Scientists
- Environmental Engineers
- Chemical Engineers
- Geologists
- Hydrogeologists
- Hydrologists
- Ecologists
- Biologists
- Wetland Scientists
- Threatened & Endangered Species Experts
- Agronomists/Soil Scientists
- Emissions Testing Professionals
- Chemists
- Archaeologists
- Construction Managers & Inspectors
- Environmental Technicians
- Treatment Plant Operators
- Land Surveyors
- Landscape Architects
- GIS Analysts & Programmers



### PROJECT CONTACT

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Principal  
Office: (855) 488-9539 x7106  
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### CEC OVERVIEW

CEC Corporate Headquarters  
333 Baldwin Road  
Pittsburgh, PA 15205  
P: 800-365-2324  
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FOUNDED: 1989

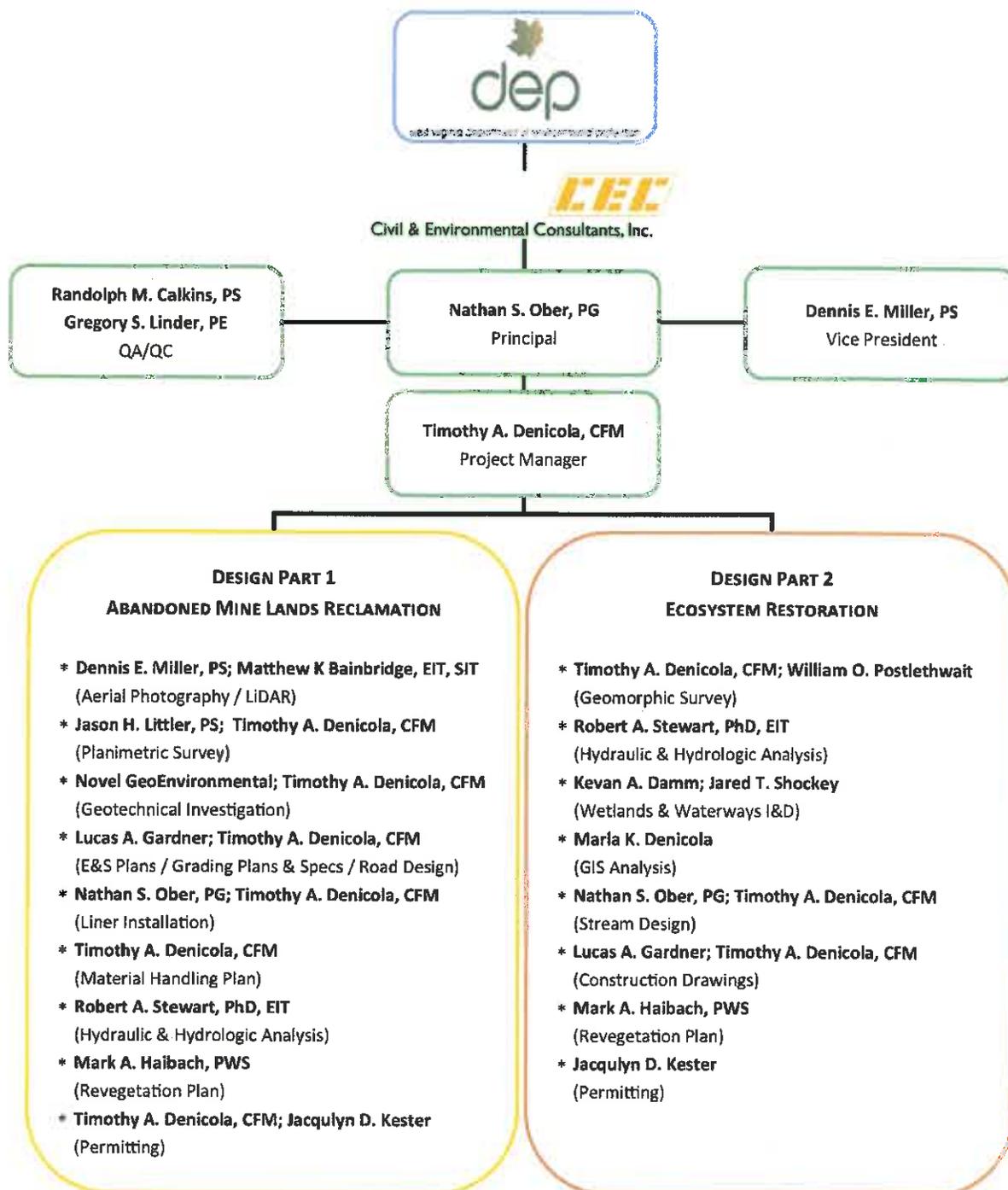
EMPLOYEES: 800+

### LOCATIONS:

- Austin, TX (2)
- Boston, MA
- Bridgeport, WV
- Charlotte, NC
- Chicago, IL
- Cincinnati, OH
- Columbus, OH
- Export, PA
- Greenville, SC
- Indianapolis, IN
- Irvine, CA
- Knoxville, TN
- Lake Havasu City, AZ
- Nashville, TN
- Oklahoma City, OK
- Philadelphia, PA
- Phoenix, AZ
- Pittsburgh, PA
- Sayre, PA
- Sevierville, TN
- St. Louis, MO
- Toledo, OH

## 2.0 Key Personnel & Sub-consultants

The following key personnel will assist the Pine Bluff (Wilson) Refuse project. Each of the individuals included on the project team have the technical knowledge, professional experience and project understanding to support the West Virginia Department of Environmental Protection Office of Abandoned Mine Lands and Reclamation (WVDEP/AML) with the reclamation of the Pine Bluff (Wilson) property.



Our project team has over 75 years of combined experience in AML Reclamation and Construction, Ecosystem Restoration, and Clean Water Act Permitting.

**Nathan Ober, PG** will serve as the Principal. Mr. Ober has more than 15 years of experience within the fields of fluvial geomorphology, natural channel design, construction management, bathymetric survey, and post-restoration monitoring with numerous project completed on abandoned mine lands.

**Timothy Denicola, CFM** will act as the Project Manager. Mr. Denicola has a diverse background including expertise in geochemistry, geology, and hydrology. His environmental experience includes mine water remediation, stream restoration, and regulatory compliance. Specific capabilities include watershed based planning, site assessments and recommendations, design of passive and semi-active treatment systems, design of stream restoration corridors, hydrologic and geotechnical analysis, construction quality assurance, environmental compliance audits, and development of various spill control plans. Mr. Denicola will oversee geotechnical analysis and will conduct water quality and soil chemical sampling. Mr. Denicola will oversee all CEC personnel and sub-consultants utilized on the project.

**Randolph Calkins, PS** will act as a Senior Consultant in the development of the refuse reclamation designs. Mr. Calkins has over 40 years in abandoned mine land reclamation in the Appalachian coal fields and has completed over 80 AML projects. Skills include geologic and hydrogeological analysis, extensive grading, and design of hydrologic conveyances on AML.

**Gregory Linder, PE** will serve as a CEC Engineer on this project. He is a West Virginia licensed civil and site engineer with over 13 years of experience in land development. Mr. Linder will oversee all land reclamation aspects of the project. Mr. Linder will oversee all grading and hydraulic aspects of the project, along with Mr. Calkins. Mr. Calkins is experienced in all environmental aspects of mining and reclamation with 40 years of experience in mass grading, mining remediation, and project management.

**Mark Haibach, PWS** has over 30 years of experience preparing environmental documentation for NEPA studies, FERC certificates, and federal Section 404/Section 10 permits and state Section 401 water quality certifications and wetland permits.

Sub-contractor John Nottingham P.E. with **Novel GEO-Environmental, LLC (NGE)** will provide geotechnical investigation services including drilling investigation and technical reporting of findings.

Abbreviated resumes for the above-listed key personnel, including certifications, registrations and project experience have been included in **Appendix D**.



## SUB - CONSULTANTS

### **Novel Geo-Environmental, LLC (NGE)**

Since inception in 2003, NGE has performed geotechnical engineering and/or geotechnical drilling services on over 110 West Virginia DEP AML projects. Engineering services include the following:

- Design of landslide repairs including design of retaining walls.
- Analysis and design of highwall reclamation.
- Analysis and design of coal refuse pile reclamation.
- Design of mine seals.
- Design of surface and subsurface drainage measures.
- Development of plans and specifications.

Geotechnical drilling services for AML projects have included the following services:

- Soil drilling and sampling using hollow-stem augers and split-spoon sampling.
- Rock coring using a NQ-wireline system to collect continuous samples of bedrock.
- Installation of piezometers into mine voids to allow for water level determination and water sampling.
- Installation of inclinometers to allow for prolonged monitoring of slope movements.

Minority Business Enterprise Program:

CERTIFICATION: MBE/DBE/SBE  
NAICS CODE: 541330  
SERVICE(S): ENGINEERING SERVICES

CERTIFICATION: MBE/DBE/SBE  
NAICS CODE: 541620  
SERVICE(S): ENVIRONMENTAL CONSULTING SERVICES

### **Reliance Laboratories, Inc.**

Reliance laboratories is a full service commercial environmental laboratory specializing in water and wastewater analysis. Reliance Laboratories provides environmental sampling and analyses for inorganic - organic compounds, and microbiological constituents essential for compliance with the Safe Drinking Water Act, USEPA NPDES program, RCRA program as well as many research based and voluntary monitoring programs. The staff possess technical capability and experience in environmental chemistry, analytical chemistry, biochemistry, geology, microbiology, mathematics, statistics and project management. Reliance Laboratories serves Maryland and West Virginia from its two facilities located in Bridgeport and Martinsburg, WV.

### **Sturm Environmental Services**

Since its establishment in 1979, Sturm Environmental Services, Inc. (SES) has grown from a small water, soil, and overburden testing facility into one of the most advanced, full-service consulting and laboratory services group with a diverse staff of degree-holding professionals. A competent in-house staff consists of individuals in the fields of agronomy, aquatic biology, biology, chemistry, ecology, forestry, geochemistry, geology, hydrology, and mining.

Services include:

- Soil and overburden assessments
- Surface and groundwater hydrology
- Aquatic and benthic surveys
- Safe drinking water determinations
- Wastewater analysis
- Leaching studies
- Problematic evaluation of acid-mine drainage
- Complete inorganic analysis

## 3.0 Project Approach / Scope of Services

### DESIGN PART I: ABANDONED MINE LANDS RECLAMATION

#### Abandoned Mine Land Services

CEC supports both government agencies and private industry responses to environmental and safety impacts of abandoned mine lands (AML), and often return the AML to productivity. CEC and its personnel have performed projects on AML sites over the last four decades to address concerns such as landslides, mine and refuse fires, abandoned mine drainage (AMD), subsidence, stream sedimentation, hazardous highwalls and portals, and unvegetated and poorly graded disturbed lands and refuse sites. Our success is founded on our experience with active mining projects that have included permitting and design services to support new mines, existing mines, surface portals, processing and storage facilities, beltlines, treatment plants, access roads, and coal refuse disposal facilities.

The disciplines of our personnel include:

- Mining, Civil, Geotechnical, Environmental, Solid Waste, Forensic, & Sanitary Engineers
- Professional Geologists, Hydrogeologists & Environmental Scientists
- Threatened and Endangered Species Experts, Ecologists, Biologists & Wetland Scientists
- Agronomist/Soil Scientists
- Construction Inspectors & Environmental Technicians
- CAD Designers & Technicians
- Registered Land Surveyors
- Registered Landscape Architects
- Geographic Information System Analysts and Programmers
- Archaeologists & Cultural Resources Professionals

CEC assists the mining industry with the development of cost-effective, construction phase-oriented site designs for mines, quarries, refuse/tailings disposal areas, preparation and processing plants, and transportation facilities. Those designs have been prepared for active, inactive, and abandoned sites. CEC integrates all of the design elements and civil engineering aspects required to complete a successful mining reclamation project. We have experience managing the design, approval and onsite construction processes associated with reclamation projects. CEC has provided AML-related services for private industries so they can reclaim and beneficially reuse disturbed lands.

CEC's capability is summarized as having experience in the following fields of the mining industry:

- Coal Refuse Site Reclamation
- Mine Subsidence
- Mass Grading
- Vegetation and Erosion Protection
- Hydrologic and Hydraulic Design
- Mine and Refuse Fires
- Delineation of Water Bodies and Wetlands
- Slope Stability and Geotechnical Exploration
- Construction Support Services
- Private Land Users as End-Point Client

### **Aerial Photography / LiDAR / Planimetric Survey**

CEC will collect up-to-date topographic survey of the project site consisting of mixed-vegetated land. This survey will provide the existing contour mapping of the site at the time of the Small Unmanned Aerial System (sUAS) Flight.

CEC will utilize a sUAS supplemented with ground control points for survey data acquisition of the project area. The sUAS system will consist of the DJI Matrice 600 Pro unmanned aerial unit, the Zenmuse X5 Camera, and the Velodyne HDL-32E LiDAR sensor. The Zenmuse X5 Camera will produce the HD aerial imagery creating a geometrically corrected image to depict uniform distances that can be used for measurements. The Velodyne HDL-32E LiDAR sensor will obtain the topographic survey data and planimetrics to produce the 1' contour base mapping. The LiDAR data will be acquired within the United States National Map Accuracy Standards (no more than 10% of the elevations tested shall be in error more than one-half of the contour interval). CEC will establish ground control consisting of geodetically controlled points and ground targets to tie the collected data to the specific project location. Ground checks will be performed to ensure accuracy. CEC will provide a Pilot in Command (PIC) and a visual observer for sUAS operations who will perform a preflight inspection, including control station system checks, to ensure safe operations. The sUAS system will remain within the visual line-of-sight of the PIC or visual observer at all times.

Due to the current nature of the technology and FAA oversight, weather can be a factor in our ability to operate the sUAS. The data collection will occur providing the following conditions are not present:

- Prevailing winds in excess of 22 mph
- Precipitation over a light mist
- Thunderstorms in the immediate vicinity
- Less than 3 miles visibility from the PIC's point of view

The final go/no-go decision will be made at the discretion of the CEC project team. Your verbal or written authorization to proceed authorizes CEC to conduct sUAS operation on the subject property. WVDEP/AML understands that any individuals on site during sUAS operations will be considered a participating person as per Federal Aviation Administration (FAA) regulations.

Traditional survey techniques will be utilized to collect planimetric details to supplement aerial photography and LiDAR. Equipment will include Topcon RTK-GPS and Total Robotic Station. Project deliverables will consist of an AutoCAD Civil 3D 2018 topographic surface along with a georeferenced orthographic image of the existing site.

### **Geotechnical Investigation / Soil and Water Chemistry**

CEC will develop and implement a subsurface drilling program to quantify and qualify onsite materials needed for backfilling and grading disturbed areas. NGE, a Minority and Women Business Enterprise (MBE/WBE), will be subcontracted to complete the geotechnical investigation. Novel Geo-Environmental will drill a total of seven (7) holes to assess for physical and chemical properties of unreclaimed refuse and spoil, and to determine depth to shallow aquifer. Drilling will utilize a 3.25" I.D. hollow-stem auger and 140-lb auto hydraulically operated penetration testing hammer with split spoon sampler. Standard penetration testing (SPT) and sampling will be performed in each boring at 2.5 ft. intervals from the ground surface to the boring termination depth or refusal on bedrock in accordance with ASTM D1586 test procedures. The drilling subcontractor will record depth to groundwater for each boring.

Auger and split spoon samples will undergo laboratory testing for physical and chemical parameters. Physical parameters will include moisture content, Atterberg liquid and plastic limits, grain size sieve analysis and standard Proctor moisture-density tests. Physical parameters will be sampled at 2.5 ft. intervals and utilized to develop a structurally competent grading plan and to identify suitable clay material for toxic material encapsulation. Chemical

parameters will include soil pH, specific conductivity, acid-base accounting, total pyritic sulfur, and nutrient content. Chemical parameters will be sampled at 5 ft. intervals and be utilized to identify toxic material and determine lime and fertilizer application rates for revegetation.

Water quality samples will be collected from surface waters and field identified groundwater seeps to quantify and qualify contaminant loads in the shallow aquifer. Water quality parameters will include field temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential. Laboratory parameters will include acidity, alkalinity, total iron aluminum and manganese, dissolved iron aluminum and manganese, calcium, magnesium, and sulfate. Discharge measurements will be collected from GIS and field identified surface waters using a SonTek FlowTracker 2 Acoustic Doppler Velocity Meter.

The results of the geotechnical, chemical, and hydrogeological investigation will be incorporated into a Hydrogeological and Geotechnical Investigation Report. CEC will submit a digital \*.pdf and three (3) paper copies of the Preliminary Hydrogeological and Geotechnical Investigation Report to WVDEP/AML. WVDEP/AML will review and comment. Following incorporation of all agreed-upon revisions, CEC shall submit a digital \*.pdf and three (3) paper copies of the Final Hydrogeological and Geotechnical Investigation Report to WVDEP.

#### **Clearing, Grubbing & Sensitive Area Protection (Environmental Resources & Cemetery)**

CEC will design and develop a Clearing and Grubbing plan to remove all woody vegetation, accumulated trash, concrete and block structures, and other mining debris and equipment from the Project areas; Delineated wetlands and waterways will be protected by biodegradable filter sock. The upslope portions of the existing cemetery will be protected by super-silt fence and access roads will be constructed and maintained to eliminate impacts to the adjacent cemetery. Timber removal will be managed per landowner request.

#### **Grading Plan and Specifications, Access Road Construction**

CEC will complete the layout of the reclamation of the disturbed areas and establish the proposed final elevations and grades for the site.

- CEC will complete a site visit to review existing features, site limitations, and understand the natural landscape. The findings of this site visit will be incorporated into the layout and design of the restoration and management practices.
- CEC will finalize the site plan for the proposed development in accordance with the WVDEP/AML requirements. The plan will show the proposed grading features, access, and dimensions.
- CEC will prepare the final site grading plan, to include one-foot contours to represent all proposed site grading and spot elevations within the proposed disturbance.
- CEC will attempt to provide a balanced earthwork cut-to-fill ratio, and will prepare an adjusted earthwork volume calculation for cost estimating purposes. However, due to limiting site constraints, an earthwork balance may not be possible and some import of soil or soil haul-off may be necessary.

Information gleaned from onsite observation, the Geotechnical Investigation, LiDAR, and Aerial Photography will be entered into AutoCAD Civil 3D 2018. Surfaces will be used and manipulated to create a balance in cut/fill quantities in disturbed refuse and spoil areas. Grading plans will show 1' contours and will provide an estimated cut/fill quantity for grading activities.

Preliminary plan sheets for work done within the Abandoned Mine Lands Division – Design Part I may include:

Design Part I Sheet Descriptions	Scale	No. of Sheets
Title Sheet	NTS	1
General & Special Notes	NTS	1
Quantities	NTS	1
Overall Site Plan	1"=500'	1
Existing Conditions Sheets and Erosion/Sediment Controls	1"=100'	3
Access Road Improvements	1"=100'	3
Cemetery Protection	1"=100'	1
Material Handling Plan / Disposal Area Details	1"=100'	1
Final Grading Design	1"=30'	3
Cross Sections	1"=20'	4
Ditch Details	NTS	1
Miscellaneous Details	NTS	2
<b>Total Estimated Number of Sheets</b>		<b>22</b>

CEC will design access road improvements to provide all-weather construction access to the project areas. Design details will include appropriate geotextile, gravel base and surface, and will include hydrologic controls to effectively convey stormwater without road degradation. Access road construction will avoid the adjacent cemetery and will utilize existing grades present on the Project Site to ensure road stability while reducing earthwork quantities. The selected construction contractor will repair driveways, access roads, and county roads, as well as other landowner constructed appurtenances affected by construction activities.

CEC shall submit a digital \*.pdf and three (3) paper copies of Preliminary Contract Plans for permitting and construction to WVDEP/AML. WVDEP/AML will review and comment. Any comments and all agreed-upon revisions shall be incorporated prior to submission to permitting agencies. Following permitting agency approval, consultant shall submit a digital \*.pdf and three (3) paper copies of the Final Contract Plans and Specifications to WVDEP/AML. Specifications shall also be submitted in Microsoft Word \*.docx format. This includes specifications for all proposed work and an engineer's opinion of probable cost for construction.

The Project Schedule will deliver preliminary design documents within sixty (60) calendar days of issuance of the Purchase Order.

#### Liner Installation

CEC will review the geotechnical data collected, locate soil within the borrow area containing a high clay content. Based on our experience working on abandoned mine lands it is unlikely that soil suitable for a homogeneous clay liner will be available within the mine refuse. Therefore, we are prepared and propose to use a Bentonite Enriched Soil (BES) mixture or a Geo-Synthetic Bentonite Liner to convey surface flows to Bingamon Creek and/or its tributaries and prevent the loss of surface water into unconsolidated spoil or into the subsurface mine working. We anticipate approximately 300 feet of liner keyed beyond top of berm for the proposed conveyances to convey the surface flows down gradient. The liner will be designed to allow groundwater from hydrostatic pressure to flow into the channel during high groundwater conditions. Bentonite is a natural material formed from the weathering of volcanic ash which will not affect the water quality of Bingamon Creek or the revegetation of the riparian corridor.

The process for applying a BES mixture is as follows:

Support media amendment or commonly termed Bentonite Enriched Soils (BES) is a processed mixture of powdered bentonite clay with a support media. The support media should be free of peat or bulk organic material, logs or tree stumps, any industrial, commercial or domestic waste material, materials susceptible to spontaneous combustion, material in a frozen condition, any material likely to have a detrimental effect on the performance of the BES mixture.

The material for sealing is comprised of a homogenous blend of the support media and powdered bentonite with the addition of a bentonite slurry to create a substrate with enhanced low permeability characteristics. The performance standards required by this application are a material with permeability  $1 \times 10^{-6}$  cm/sec and a slump of 0-1".

In order to prepare a mix design for this material, laboratory bench tests should be performed for the various gradations of the support media. The support media will be dry blended with powdered bentonite to create a homogenous mixture of material and then add a bentonite slurry consisting of water and bentonite powder mixed to create a viscosity of 40 seconds using a Marsh Funnel Viscometer and yielding a unit weight of at least 64 lbs./cu. ft. and create a clay-like material with an 0-1" slump. This mixture should yield a material with sufficient plasticity to preclude the necessity to require direct compaction efforts. Laboratory permeability testing (ASTM-05084-00) will be performed periodically to ensure proper consistency.

Laboratory results should be recorded and placed with gradation curves and bentonite content percentages to be used in field to assure proper mix ratios. Field staff will be equipped with soil gradation screens and scales to accurately assess the gradation percentage of bulk material. Bentonite slurry will be prepared using a colloidal mixture and tested only after full hydration has occurred. Thickness of the BES shall be determined during the design process.

#### **Material Handling Plan**

CEC will develop and design a plan to neutralize exposed or excavated coal refuse prior to backfilling or entombing the refuse "high and dry". Geotechnical and soil chemical data will be used to identify toxic material. Data collected during LIDAR topographic mapping and processed via AutoCAD Civil 3D 2018 will quantify volumes of toxic material requiring onsite disposal. The ideal area identified as above local drainage during the hydrogeological investigation will serve as the toxic material disposal area. Data collected during soil physical property analysis will identify sufficient quality clay material to be utilized in toxic material encapsulation. Considering the anticipated low quality of onsite borrow material, we are prepared and propose to use the BES mixture or Geo-Synthetic Bentonite Liner to encapsulate toxic material. Water diversion structures will be designed to divert surface water around or over toxic material disposal areas. Clay enriched encapsulation material will be filled under minimum one (1) foot of sufficient topsoil material to ensure sufficient revegetation.

#### **Hydraulic & Hydrologic Assessment/Stormwater Management & Conveyance Structures**

The purpose of this task is to prepare a stormwater management plan for collection, conveyance, and detention measures for post development conditions in accordance with the requirements of WVDEP/AML.

- CEC will perform a preliminary pre- and post-development hydrologic and hydraulic analysis to determine stormwater management requirements for post-development conditions.
- CEC will perform detailed engineering analysis and design for any stormwater collection, conveyance, and detention systems required for the site. CEC will prepare design drawings for the stormwater drainage

system design to include plan view layout, cross sections (as needed) and construction details in accordance with WVDEP standards.

CEC will design open flow limestone ditches to capture surface runoff and ground water and direct that flow around or through the Project site. Every effort will be made to divert uphill runoff around proposed grades. All designed ditches will have engineered linings to provide stability and retard erosive forces. Limestone will be specified for all riprap lined ditches to add alkalinity to captured waters. Design pipes to transport captured ditch flows where necessary. CEC will design subsurface drains (where necessary) to safely convey ground water into constructed ditches or directly into receiving streams;

### **Revegetation Plan**

CEC will develop temporary and permanent revegetation plans for disturbed areas. Revegetation plans will utilize either mining reclamation standard revegetation specifications or a more diverse native non-invasive planting scenario including grass seed mixes, woody and herbaceous shrubs, and hardwood trees.

### **Permitting**

CEC will prepare and submit the following permit applications:

- West Virginia Department of Environmental Protection Division of Water and Waste Management (WVDEP-DWWM) National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit; and
- West Virginia Department of Highways (WVDOT) MM-109 Encroachment Permit.

The scope of services for these permit applications and clearances is described below:

### **NPDES Construction Stormwater**

CEC will prepare an erosion and sedimentation control program and Site Registration Application for a NPDES general permit coverage for the proposed site construction activities, in accordance with the requirements and regulations WVDEP. Additionally, the E&S Plan will identify protective measures for the adjacent cemetery and cemetery access road. The development of the overall project is anticipated to disturb greater than three acres of land. Therefore, a NPDES general permit for discharges of stormwater from a construction activity will be required for the site work activities.

- CEC will perform the design work required to develop the proposed E&S program, including the E&S Plan, construction details, narrative, construction sequence, Site Registration through e-permitting website, and supporting documentation, and submit the information to WVDEP/AML for review and approval;
- Coordinate with the local regulatory agencies during their review of the plans and permits, and respond to comments to facilitate plan and/or permit approval. CEC will respond to one round of review comments from WVDEP/AML; and
- Prepare an NPDES Notice of Termination (NOT) form at the end of the project. These forms are required by WVDEP in order to assign responsibility for implementation of the NPDES permit regulations from the owner to the parties responsible for the earthmoving.

### **WVDOT MM-109**

CEC will complete the West Virginia Department of Transportation (WVDOT) Division of Highways (DOH) MM-109 Encroachment Permit to enter upon, under, over or across the state roads of West Virginia. The Encroachment Permit allows construction of the site access road/construction entrance onto County Road 8/6 (Nutter Run Road), Harrison County, WV. The required WVDOT MM-109 Bond will be the responsibility of WVDEP/AML or the selected

Construction Contractor. CEC will prepare all required engineering drawings, details and specifications required for WVDOT for acquisition of the MM-109 Permit.

## **DESIGN PART II: ECOSYSTEM RESTORATION**

### **Ecosystem Restoration Services**

CEC understands the complex nature of ecosystems and employs a multidisciplinary approach to ecosystem restoration. Our staff is comprised of more than 90 scientists who are dedicated to our Ecological Practice and the restoration of streams and wetlands. Working closely with our Civil/Site Engineering and Water Resources practices, our aquatic ecologists, botanists, geomorphologists, wetland scientists, biologists, and engineers provide a synergy that brings cost-effective solutions to our clients with a functional ecological uplift to our projects. Our experience shows a strong emphasis on watershed-based restoration projects. Cooperatively, our 23 offices have completed more than 100 ecosystem restoration projects for a total of 2,500 acres of wetlands and 70 miles of streams.

As an industry-focused consulting firm, we identify the balance between development and environment; therefore, we are dedicated to providing businesses with peace of mind through the state and federal permitting process. Our ecological team has the in-depth knowledge of regulatory requirements and up-to-date project experience to produce positive, timely results.

CEC's Ecosystem Restoration services include:

- Stream and Wetland Restoration Design
- Site Selection and Evaluation
- Fluvial Geomorphology
- Natural Channel Design
- Wetland Water Budgets
- Mitigation Planning
- Riparian and Wetland Planting Specifications
- Landscape Restoration
- Geomorphic Restoration
- Agronomic Evaluations
- Revegetation of Disturbed Landscapes
- Invasive Plant Management
- Watershed Planning
- Regulatory Permitting
- Aquatic Biological Monitoring (Fish and Benthic Macroinvertebrates)
- Rare and Endangered Species Surveys (Plants, Bats, Birds, Fish, Mussels)
- Geographic Information and Database Management Systems

The CEC stream and wetland restoration team will use natural channel design to create a functional, self-sustaining stream system that provides valuable hydraulic, geomorphic, and ecologic functions. We incorporate wetland restoration into our stream restoration designs by retaining ox-bow and back channels from channel relocations, designing overbank floodways to connect and enhance floodplain wetlands, and creating depressional wetlands and vernal pools from soil borrow areas. The CEC stream and wetland restoration team is uniquely qualified because all of our scientists have input into the designs, producing restoration that identifies aquatic life history, wildlife, riparian vegetation, sediment transport, fluvial geomorphology, and hydrology. We have performed functional assessments

on many of our restoration projects, and documented which have proven to produce ecological uplift to the community and improvements in aquatic life use. Each phase of a CEC stream and wetland restoration will have specialized staff performing the tasks, and those key individuals will have input throughout the life of the project.

We have the capabilities to provide our clients with ecosystem restoration services from project conception, through design and construction, to obtaining final release by agencies. The following section presents our approach to delivering restoration services for these various phases of project development.

### **Geomorphic Survey**

A Rosgen Level III Morphological Assessment will be conducted in accordance with the methodologies presented in "A Classification of Natural River Systems" (Rosgen, 1994). During the morphological assessment, CEC will document observed bankfull indicators and will survey them both in cross-section and profile, where possible. It may be necessary to utilize other means to verify bankfull stage throughout the project. Estimates of bankfull discharge will then be determined using standard open channel flow equation(s). Other hydraulic parameters will be calculated to further analyze existing conditions and to provide an evaluation tool during the restoration design phase. Additional geomorphic features such as inner berms, thalweg, top of banks, and water surface will be surveyed to complete a detailed stream survey that can be merged with the aerial LiDAR of the floodplain proposed in Aerial Mapping and Photography section.

Reference reaches of similar stream types may be identified and surveyed to establish reference conditions for design criteria. The reference reaches may be upstream and/or downstream of impaired reaches or on unimpaired streams in the same physiographic province. Geomorphic features such as bankfull, inner berms, thalweg, and water surface will be surveyed to complete a detailed reference survey.

### **Hydraulic and Hydrologic Assessment**

Hydrologic and hydraulic modeling will be completed for the project reach and tributaries scheduled for restoration. The objectives for the stream hydrologic and hydraulic modeling are as follows:

- Evaluate detailed pre vs post-project bankfull and flood event shear stress and velocities for stream restoration design.
- Calibrate stream restoration design discharge validation tools.
- Produce detailed comparative depth grid inundation mapping based on the pre and post-project conditions.
- Produce detailed comparative shear stress, velocity, and water depth mapping based on the pre and post-project conditions.
- Assess scour and deposition trends including backwater situations from island bars, bridge/culvert crossings, and other obstructions.

CEC will develop Two-Dimensional (2D) Hydraulic conditional models to compute the baseline hydraulic conditions for normal flow, typical precipitation frequency floods, and simulated bankfull events. Precipitation data will be estimated utilizing publicly available data in the subject watershed. This data will be used to create peak flows and hydrologic runoff hydrographs to generate unsteady peak and continuous flows for 24-72 hour flood simulations. To calibrate the hydraulic model, hydrologic analysis of the watershed would be completed using multiple data sets to determine flood stages and recurrence interval. Examples of methods that may be used include, Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS), United States Geological Survey (USGS) regression equations, USGS stream gage data, or other published sources. CEC will determine if the restoration designs will have adverse impacts on the floodplain and implement iterative changes within the design criteria to reduce impacts.

CEC routinely implements 2D models to add modeling detail to overbank flooding flows in the floodplain and non-traditional channel flow conditions. 2D hydraulic model use the depth-averaged equations of motion to provide outputs of hydraulic characteristics at each cell in the computation mesh. Hydraulic outputs including depth and shear stress are displayed on maps providing for more detailed stage and flow information compared to One-Dimensional Modelling calculated at individual cross sections. The mapping of the 2D flow areas are based on the detailed underlying terrain providing for an increased level of detail. 2D flow animations and 3D conceptual rendering animations can be used for public meetings and education outreach presentations to bring the restoration reach to life.

CEC will summarize the hydrologic and hydraulic analysis in report format to support the stream design plan including, executive results summary, conditional narrative, tabular data results, watershed maps, inundation maps including depth grids, velocity, and shear stress, modeling expectations and limitations. The technical report will also include modeling simulation videos displaying the flow regime trends, peak flow inundation and velocity particle tracing.

#### **Wetlands and Waterways Identification and Delineation**

CEC will identify, classify, and delineate streams and other waters at the Project Site. Streams and other waters, such as ponds, seeps, springs, etc., will be identified by the presence of an ordinary high water mark. An "ordinary high water mark" is defined at 33 CFR Part 328.3(e) Guidance for identifying the ordinary high water mark (OHWM) in streams and other water bodies is given in USACE Regulatory Guidance Letter No. 05-05. Streams will be classified as perennial, intermittent, and ephemeral as defined in the "2012 Nationwide Permits, Conditions, District Engineer's Decision, Further Information, and Definitions" published in the Federal Register on February 21, 2012.

CEC aquatic biologists will investigate potential streams within the Site to locate the approximate upstream and downstream limits of perennial, intermittent, and ephemeral stream reaches. In the absence of established federal or state regulatory protocols for stream classification, CEC will use multiple lines of evidence and field indicators to determine perennial, intermittent, and ephemeral stream reaches, including estimated stream flow, water depth, channel dimensions (bankfull and OHW width and depth), evidence of groundwater seepage and sustained high water levels in the channel (e.g., water marks, silt deposits, scour and wrack lines, etc.), fluvial geomorphic features (riffles, pools, point bars, active floodplains, etc.), substrate composition, and observations of vegetation, aquatic macroinvertebrates, and fish.

Stream and waters determination data will be recorded on field data forms and each stream segment and water will be photographed. For streams and linear water features less than 15 feet wide, CEC will mark, with labeled surveyors flagging, the center of the channel or linear feature and the approximate location of a change in classification or type (e.g., perennial, intermittent, etc.). For streams and features greater than 15 feet wide, CEC will mark both banks of the stream to define the channel and both sides of the linear feature. For other waters, CEC will mark the limits of the OHW mark.

#### **Wetlands**

CEC will identify and delineate wetlands at the site in accordance with the routine determination methodology described in the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE Manual), supplemented by the following procedures and information: 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (USACE Supplement), 2014 National Wetland Plant List, and USDA 1991 Hydric Soils of the United States.

CEC will conduct a site inspection to determine wetland presence based on the dominance of hydrophytic plant species, the presence of hydric soil indicators, and evidence of wetland hydrology as described in the USACE Manual

and Supplement. CEC will perform the following activities: (1) identify plant communities on the site; (2) select a representative test site within each plant community and identify the dominant plant species within each plant stratum (trees, sapling/shrubs, ground cover, and woody vines); (3) sample soils using a tile spade or auger; (4) inspect the test site for indicators of wetland hydrology; and (5) determine if the area meets the criteria for a wetland. If an area is determined to be a wetland, an additional non-wetland test site will be sampled to determine the wetland-non-wetland boundary.

Dominant plant species, soils descriptions, and hydrology indicators used in making the wetland determination will be recorded on routine wetland determination data forms for both wetland and non-wetland test sites. CEC will prepare a sketch map of each wetland, and photograph each wetland and representative views of non-wetland plant communities. CEC will delineate the boundaries of each wetland using changes in topography, vegetation, soils, and hydrology, and will mark the boundary with consecutively-numbered surveyor's ribbon.

#### **Identification of Boundary Locations**

During the field delineation, CEC will locate the boundaries of wetlands, streams, and other waters marked in the field using aerial topographic mapping and Trimble® Geo-XT or Geo-XH Global Positioning System (GPS) equipment. CEC will check the GPS data to determine if the horizontal precision is suitable for delineating wetland and waters boundaries. If not, CEC will notify you that the boundaries will need to be located by surveyors and will provide a separate scope and cost for this service. The GPS boundary locations will be used to prepare preliminary mapping for site planning purposes.

#### **Reporting**

After completing the field delineation and classification of streams and wetlands within the study area, CEC will prepare a wetland and stream delineation report. The report will include a description of the classification and delineation methods, stream determination and wetland delineation field data forms and photographs, tabulation of the type and lengths of each stream, wetland area tabulation, and a stream and wetland delineation map showing the location, extent, and classification of each stream or wetland within the Site. These forms will be provided on DVDs to the agencies who will accept that in lieu of a hard copy in order to reduce report production costs.

#### **GIS Analysis**

GIS analysis will be completed following the collection of the LiDAR and aerial imagery. From the LiDAR, Digital Elevation Models (DEM) will be used to create surfaces, hillshade for topographic relief, flow accumulation grids, etc. This will allow CEC the ability to accurately estimate cut and fill volumes and perform terrain analysis while developing surface water conveyances and stream and wetland designs.

#### **Stream Design**

A detailed stream assessment of the existing conditions will be conducted to determine the most suitable approach for a sustainable project. All of our projects come complete with geomorphic, biologic, and hydraulic/hydrologic assessments. For stream restoration projects, CEC routinely collects samples of macroinvertebrates, fish communities, aquatic macrophytes, and riparian vegetation, though this is not anticipated on the Pine Bluff (Wilson) Refuse project.

CEC will implement a geomorphic approach to the natural channel design project. Dimension, Pattern, profile, are surveyed and evaluated to determine the channel evolution pattern. Reference reach data gathered during the geomorphic survey task will be used as a "blueprint" for producing design criteria. The geomorphic data is then evaluated along with aquatic species life history and habitat surveys to produce ecologically-functional design criteria.

Sediment transport will be evaluated during the design phase to model the transport capacities and discharge. CEC uses the nationally-recognized RIVERMorph<sup>®</sup> stream restoration software to analyze sediment transport. CEC has a full complement of hydrologic and hydraulic modeling software including, but not limited to: SRH2D, HEC-HMS, HEC-RAS, HEC-2, HydroCAD, Hydraflow, HY-8, TR-20, USGS-NFF and VTPSUHM.

USGS regression equations, stream gage data, and regional curves are used and produced as validating tools for design capacity and discharge.

Detailed grading plans and three-dimensional (3D) stream designs will be completed in AutoCAD Civil 3D 2018 to provide accurate earthwork quantities and precision during construction. The 3D stream design will include multi-faceted surfaces detailing the stream riffles, pools, point bars, flood plain, and terraces. The 3D design will be provided in AutoCAD .dwg format for use by the successful contractor to use on GPS-enabled construction equipment. Additionally, one site inspectors may want to retain the files for construction quality assurance to check lines and grades using survey grade GPS.

### Construction Drawings

CEC will use the approved design criteria to prepare preliminary design plans that are suitable to permit the proposed restoration project. Technical specifications and installation instructions will be included with the details.

The preliminary design documentation will include: the morphological data; an assessment photograph log; the summaries pertaining to the sediment transport analysis (method, rationale, and results) and hydrology and hydraulics; and an opinion of probable construction cost.

CEC shall submit a digital \*.pdf and three (3) paper copies of Preliminary Contract Plans for permitting and construction to WVDEP/AML. WVDEP/AML will review and comment. Any comments and all agreed-upon revisions shall be incorporated prior to submission to permitting agencies. Following permitting agency approval, consultant shall submit a digital \*.pdf and three (3) paper copies of the Final Contract Plans and Specifications to WVDEP/AML. Specifications shall also be submitted in Microsoft Word \*.docx format. This includes specifications for all proposed work and an engineer's opinion of probable cost for construction.

Preliminary plan sheets for work done may include:

Design Part II Sheet Description	Scale	No. of Sheets
Title Sheet	NTS	1
General & Special Notes	NTS	1
Quantities	NTS	1
Overall Site Plan	1"=500'	1
Existing Conditions Sheets and Erosion/Sediment Controls	1"=100'	4
Grading, Profile, and Typical Sections	1"=30'	9
Planting Plan and Planting Specifications	1"=30'	4
In-Structure Details and Specifications	NTS	4
<b>Total Estimated Number of Sheets</b>		<b>25</b>

### **Ecological Permitting**

Ecological permitting associated with incorporation of natural stream design methodology into the Pine Bluff (Wilson) Refuse reclamation project may include:

- USACE Regional General for AML or Nationwide 27;
- Endangered Species Act Section 7 and National Historic Preservation Act Section 106 Clearances;
- NPDES Construction Stormwater;
- WV Department of Natural Resources Stream Activity and Stream Crossing;

In the instance that WVDEP/AML desires to apply natural stream design methodology to reclamation of the Pine Bluff (Wilson) Refuse project, CEC will develop a scope to complete additional ecological permitting. CEC is extensively experienced with ecological permitting associated with stream restoration projects in West Virginia, including stream restoration projects constructed on AML.

## **FINAL DOCUMENTATION / SUBMISSIONS**

### **Design Part I and II: Final Design Drawings**

CEC will revise the preliminary design of both Part I and Part II based on compilation of written comments provided by WVDEP/AML and the permitting agencies. Revisions will be made to the preliminary design plan sheets and will primarily consist of finalizing design items (i.e. final structure locations, stream geomorphic data, project sequencing, etc.), technical details and specifications, construction quantities (line item details will be provided at this stage), and an estimate of the probable cost of construction. CEC will then submit three (3) paper copy sets of full-size (22" X 34") plan sheets and a digital copy in \*.pdf to WVDEP/AML along with AutoCAD files that may be used for machine control construction. CEC will also provide one (1) paper copy and a digital copy in \*.pdf and Word (\*.docx) of the revised technical specifications, quantities estimate, and opinion of probable cost for construction.

## 4.0 References

We encourage WVDEP to contact the following client contacts to discuss our previous performance on similar projects.

**Ecosystem III Credit Co., LLC**

Troy Anderson, CERP  
5550 Newbury Street, Suite B  
Baltimore, MD 21209  
(608) 212-6607

**Friends of the Cheat, Inc.**

David Petry  
1343 North Preston Highway  
Kingwood, WV 26537  
(304) 329-3621, Ext. 4

**Highland Engineering & Surveying, Inc.**

John Sanders, P.E.  
1426 Memorial Drive  
Oakland, Maryland 21550  
P: (301) 334-6185  
(Reference letter available upon request)

**Appalachian Stream Restoration & Reclamation Specialists**

Jason White  
48 Wandling Road  
Sumerco, West Virginia 25567  
P: (304) 756-3066  
C: (304) 784-6216

**West Virginia Conservation Agency**

John Nelson  
Lewisburg Field Office  
179 Northridge Drive  
Lewisburg, West Virginia 24901  
P: (304) 941-5519

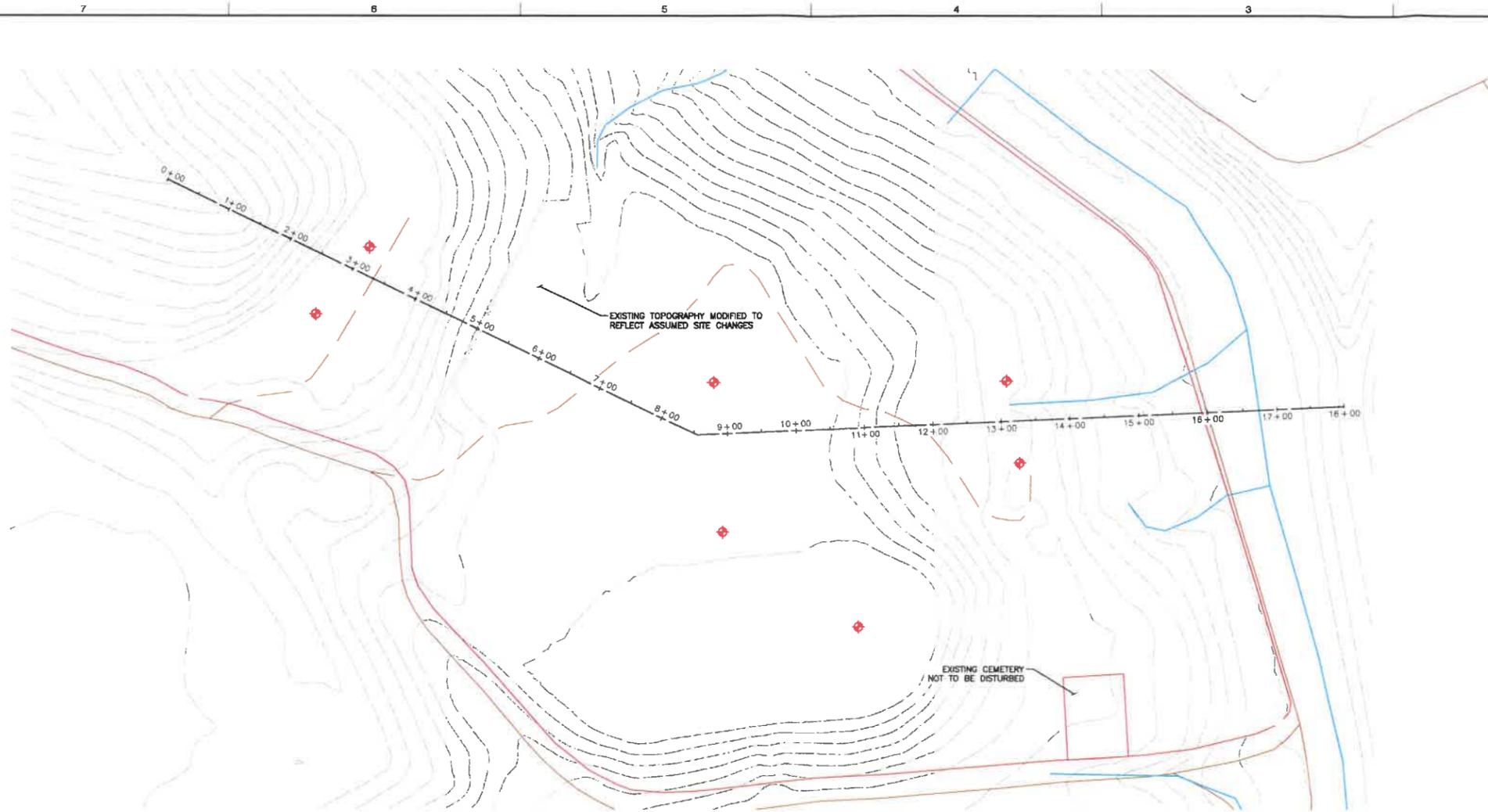
**City of Frostburg**

John Kirby  
59 East Main Street  
Frostburg, Maryland 21532  
P: (301) 689-6000

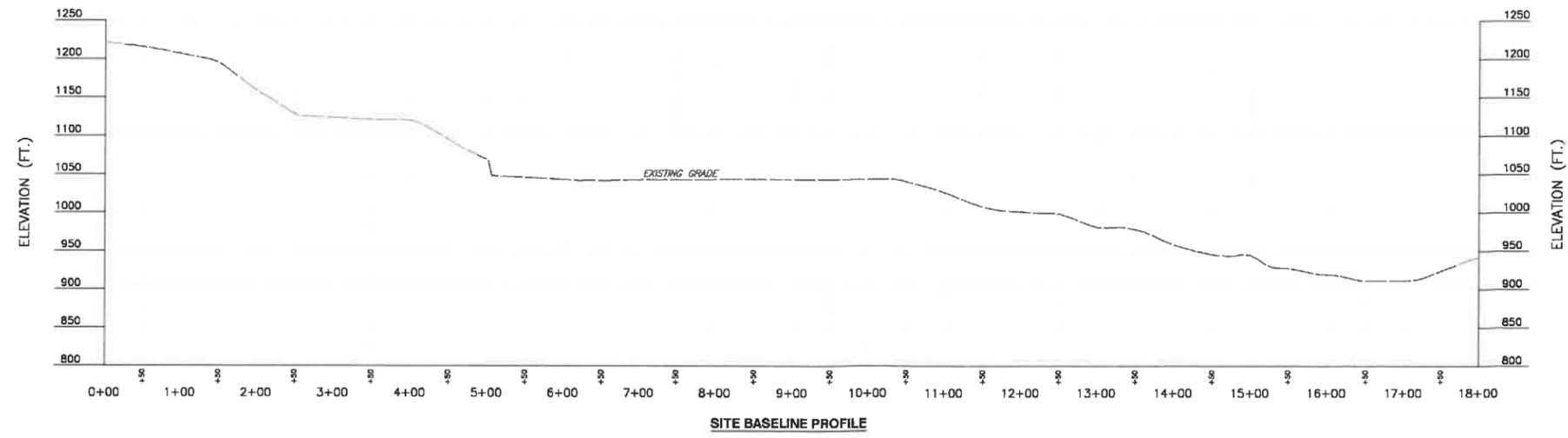


**LEGEND**

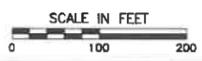
- EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- EXISTING PARCEL BOUNDARY
- EXISTING COUNTY ROUTE
- EXISTING CONSTRUCTION ROAD
- EXISTING STREAM
- PROPOSED CONTOUR (MAJOR)
- PROPOSED CONTOUR (MINOR)
- PROPOSED BORE LOCATION



**PLAN VIEW**



**SITE BASELINE PROFILE**



**CONCEPTUAL**

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REVISION RECORD	
NO.	DATE

**Civil & Environmental Consultants, Inc.**  
 600 Marketplace Ave · Suite 200 · Bridgeport, WV 26330  
 Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327  
 www.cecinc.com

**WV DEPT. OF ENV. PROTECTION  
 PINE BLUFF (WILSON) REFUSE  
 HARRISON COUNTY  
 WEST VIRGINIA**

EXISTING SITE TOPOGRAPHY	
DATE	JULY 2018
DRAWN BY	LAG
DWG SCALE	AS SHOWN
CHECKED BY	192-852
PROJECT NO.	192-852
APPROVED BY	DRAFT

DRAWING NO. **1**



**Appendix B**

**Attachment B – AML Consultant Qualification Questionnaire (CQQ)**

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

Attachment "B"

PROJECT NAME <b>Pine Bluff (Wilson) Refuse</b>		DATE (DAY, MONTH, YEAR) 9th July 2018	FEIN 25-1599565
1. FIRM NAME <b>Civil &amp; Environmental Consultants, Inc.</b>		2. HOME OFFICE BUSINESS ADDRESS 333 Baldwin Rd, Pittsburgh PA 15205	3. FORMER FIRM NAME N/A
4. HOME OFFICE TELEPHONE 412.429.2324	5. ESTABLISHED (YEAR) 1989	6. TYPE OWNERSHIP <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Joint-Venture	6a. WV REGISTERED DBE Disadvantaged Business Enterprise)  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE  
Bridgeport Office | 600 Marketplace Ave., Suite 200, Bridgeport, WV 26330 | 304.933.3119 | Timothy A. Denicola

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Kenneth Miller   PE   CEO Dan Szwed   PE   COO Dennis Miller   PS   Vice President & Office Lead	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS Nathan Ober   PG Principal   Ecological   855-488-9539 x7106 Steven Cain   PE Principal   Civil Engineering   855-488-9539 x7156
---	---

9. PERSONNEL BY DISCIPLINE

86	ADMINISTRATIVE	65	ECOLOGISTS	11	LANDSCAPE ARCHITECTS	5	STRUCTURAL ENGINEERS
1	ARCHITECTS		ECONOMISTS		MECHANICAL ENGINEERS	101	SURVEYORS
18	BIOLOGIST		ELECTRICAL ENGINEERS		MINING ENGINEERS	5	TRAFFIC ENGINEERS
54	CADD OPERATORS	151	ENVIRONMENTALISTS		PHOTOGRAMMETRISTS	30	OTHER
1	CHEMICAL ENGINEERS		ESTIMATORS		PLANNERS: URBAN/REGIONAL		
270	CIVIL ENGINEERS	47	GEOLOGISTS	1	SANITARY ENGINEERS		
25	CONSTRUCTION INSPECTORS		HISTORIANS	1	SOILS ENGINEERS		
	DESIGNERS		HYDROLOGISTS		SPECIFICATION WRITER	<b>872</b>	<b>TOTAL PERSONNEL</b>

TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE:  
6 WV Professional Engineers in Bridgeport (28 companywide)

\*RPEs other than Civil and Mining must provide supporting documentation that qualifies them to supervise and perform this type of work.

10. HAS THIS JOINT-VENTURE WORKED TOGETHER BEFORE?  Yes  No

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

<p>NAME AND ADDRESS:                  Novel Geo-Environmental, LLC                  650 MacCorkle Avenue West                  St. Albans, WV 25177</p>	<p>SPECIALTY:                  geotechnical investigation services including drilling investigation and technical reporting of findings</p>	<p>WORKED WITH BEFORE  <input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:                  Reliance Laboratories, Inc.                  2044 Meadowbrook Road                  Bridgeport, WV 26330</p>	<p>SPECIALTY:                  Full service commercial environmental laboratory specializing in water and wastewater analysis</p>	<p>WORKED WITH BEFORE  <input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:                  Sturm Environmental Services                  Brushy Fork Road                  Bridgeport, WV 26330</p>	<p>SPECIALTY:                  Full service commercial environmental laboratory specializing in soil and overburden analysis</p>	<p>WORKED WITH BEFORE  <input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>
<p>NAME AND ADDRESS:</p>	<p>SPECIALTY:</p>	<p>WORKED WITH BEFORE  <input type="checkbox"/> Yes  <input type="checkbox"/> No</p>

12. Experience

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

**YES Description and Number of Projects:**

1. Island AMD Passive Treatment System (non-BFS) - iron oxidation, acid neutralization, metal precipitation/collection, hydrologic conveyances
  2. North Taylor AMD Passive Treatment System (non-BFS) - acid neutralization, mixing basin, aerobic wetlands, hydrologic conveyances, revegetation
  3. Virginia DMME AMD Passive Treatment System (non-BFS) - sulfate reducing bioreactor, settling pond, aerobic wetlands
- CEC personnel have successfully completed 20 acid mine drainage evaluation and abatement design projects.

NO

B. Is your firm experienced in Soil Analysis?

**YES Description and Number of Projects:** CEC has routinely completed soil analysis for the Oil & Gas Industry focusing on VOCs, PAHs, Phthalate Esters, Petroleum Compounds, Metals, Anion, and Radionuclides. CEC has routinely completed soil analysis on AML for stream restoration focusing on ABA, Pyritic Sulfur, and Nutrient Content. CEC has completed soil analysis on approximately 50 projects.

NO

C. Is your firm experienced in hydrology and hydraulics?

**YES Description and Number of Projects:**

1. Shinns Run Portals (WVDEP) - field surveying, subsurface investigations of impounded mine pools, records review, HEC-RAS hydrologic evaluation, streambed seals, ditchwork, piping, subsurface drains, stream bank protection, roadbed protection, soil testing, preliminary and final designs / construction plans, dewatering operation, mine drainage treatment, opinion of cost, bid schedule, calculation brief, meeting attendance
2. Pageton (Lambert) Portals (WVDEP) - Reclamation design of coal refuse pile with 51,000 cubic yards of excavation, 24 wet mine seals, 13,700 L.F. sediment control, 1,600 L.F. ditchwork, piping, streambank protection, 24 acres revegetation, topographic surveying, construction mapping, soil testing, hydraulic studies and design, preliminary and final design, construction plans and specifications, engineers cost estimate, bid schedule, calculations brief, onsite preliminary design/pre-bid/pre-construction meetings, reporting and invoicing
3. Birds Creek Number 4 (WVDEP) - Reclamation design of coal refuse pile with 35,000 cubic yards of excavation, 8 wet mine seals, 5 bat gate designs, 18 acres revegetation, topographic surveying, construction mapping, soil testing, hydraulic studies and design, preliminary and final design, construction plans and specifications, engineers cost estimate, bid schedule, calculations brief, onsite preliminary design/pre-bid/pre-construction meetings, reporting and invoicing.

CEC personnel have successfully completed numerous hydrology and hydraulics projects associated with bridges, box culverts, piping, ditchwork, and sediment ponds. CEC personnel have completed 60 AML related hydrology and hydraulics projects.

NO

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

**YES Description and Number of Projects:** CEC routinely collects LIDAR topographic data and aerial photography on minimum 200 projects. LIDAR data is processed into contour mapping with 1.0 ft. resolution.

NO

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

**YES Description and Number of Projects:** CEC completes extensive water transfer projects for the oil & gas industry and municipal water supplies on approximately 50 projects.

NO

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

**YES Description and Number of Projects:** CEC routinely assesses AMD and designs passive and active treatment management practices for treatment of acid mine drainage. CEC has completed approximately 20 AMD remediation projects. CEC employs mining geochemists with nearly 30 AMD remediation projects in prior employment.

NO

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Ober, Nathan S., PG</b> Bridgeport, WV Office	7	15	

Brief Explanation of Responsibilities  
Mr. Ober is a Principal with in CEC's Bridgeport Office and will be responsible for contractual aspects as well as monitoring project progress.

EDUCATION (Degree, Year, Specialization)  
B.S., Geology, 2002, West Virginia University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS Pennsylvania Council of Professional Geologists	REGISTRATION (Type, Year, State) Professional Geologist, Pennsylvania, [REDACTED]
---	--

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Calkins, Randolph M., PS</b> Bridgeport, WV Office	40	40	

Brief Explanation of Responsibilities  
Mr. Calkins will act as Senior Consultant in the development of the refuse reclamation designs.

EDUCATION (Degree, Year, Specialization)  
A.S., Surveying Engineering, The Pennsylvania State University

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State) Professional Surveyor, West Virginia 627
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NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Linder, Gregory S., PE</b> Bridgeport, WV Office	8	13	

Brief Explanation of Responsibilities  
Mr. Linder will serve as an Engineer on this project. He will oversee all land reclamation aspects of the project.

EDUCATION (Degree, Year, Specialization)  
B.S., Civil Engineering, West Virginia University  
B.S., Biology, Fairmont State College

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS	REGISTRATION (Type, Year, State) Professional Engineer, 2003, West Virginia Professional Engineer, 2006, Pennsylvania Professional Engineer, 2006, Kentucky
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NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Denicola, Timothy A., CFM</b> Bridgeport, WV Office	5	8	
<p>Brief Explanation of Responsibilities</p> <p>Mr. Denicola will serve as the Project Manager / Geochemist and will manage the bulk of mining reclamation tasks including the following project aspects:</p> <ul style="list-style-type: none"> <li>• Managing existing conditions aerial, topographic, and planimetric surveys</li> <li>• Managing personnel through all project components</li> <li>• Collecting water quality, soil quality, and hydrologic data</li> <li>• Preparing conceptual, preliminary, and final engineering designs</li> <li>• Preparing construction specifications and bid documents</li> <li>• Preparing quantity and probable cost estimates</li> <li>• Completing regulatory permitting application packages and submissions</li> <li>• Conducting construction oversight</li> <li>• Conducting post-construction monitoring</li> </ul>			
<p>EDUCATION (Degree, Year, Specialization)</p> <p>M.S., 2013, Geology, West Virginia University</p> <p>B.S., 2006, Chemistry, Clarion University of Pennsylvania</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>Member of several northern WV non-profit watershed associations</p>		<p>REGISTRATION (Type, Year, State)</p> <p>Erosion and Sediment Control Responsible Personnel (Green Card), 2015, Maryland, No. RPC004062</p> <p>State Highway Administration Erosion and Sediment Control (Yellow Card), 2015, Maryland, No. 15-477</p> <p>Association of State Floodplain Managers (ASFPM) Certified Floodplain Manager (CFM), No. US-18-10271</p>	
NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
<b>Miller, Dennis E., PS</b> Bridgeport, WV Office	25	25	
<p>Brief Explanation of Responsibilities</p> <p>Mr. Miller is a CEC Vice President responsible for administration of aerial, topographic, and planimetric surveying of properties related to mining reclamation.</p>			
<p>EDUCATION (Degree, Year, Specialization)</p> <p>A.S., 1989, Surveying, Glenville State College</p>			
<p>MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS</p> <p>West Virginia Contractor's Association</p> <p>West Virginia Association of Land Surveyors</p> <p>West Virginia Associated Builders</p> <p>Upshur County Chamber of Commerce</p>		<p>REGISTRATION (Type, Year, State)</p> <p>Registered Professional Surveyor, 1994, West Virginia</p>	

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

1. AutoCAD Civil 3D
2. ESRI ArcGIS
3. Topcon, Nikon, and Trimble Robotic Total Stations
4. Topcon, Trimble RTK-GPS
5. Leica Terrestrial LIDAR 3D Scanner
6. Velodyne Mobile LIDAR (ground and aerial based)
7. DJI small unmanned aircraft system (sUAS)
8. Topcon, Nikon automatic levels
9. Trimble GeoExplorer 6000 Series
10. YSI ProPlus Multi-parameter Probe
11. Marsh McBirney Flow Meter
12. Hanna HI 98703 Turbidity Meter
13. Hanna HI 99121 Direct Soil pH Meter
14. Submersible and Peristaltic Pumps
15. Mini RAE 3000 Portable Handheld VOC Monitor
16. Corel 98 Suite
17. Microsoft Office Suite
18. North American Green Erosion Control Blanket Software
19. KY Pipe Water and Sewer Line Software
20. Bentley MicroStation with InRoads

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

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	NATURE OF YOUR FIRM'S RESPONSIBILITY	ESTIMATED CONSTRUCTION COST	PERCENT COMPLETE
Oxbow Mitigation Bank	EIP III Credit Co., LLC 5550 Newbury St, Ste B Baltimore, MD 21209	Aerial/topographic/planimetric surveying, aquatic resource determinations/delineations, natural stream design, engineering design, construction specifications, regulatory compliance, construction quality assurance	\$5,999,095	Design 100% Construction to begin July 2018
Snake Run Adaptive Management Stream Restoration	West Virginia Conservation Agency 179 Northridge Drive Lewisburg, WV 24901	Topographic & planimetric surveying, natural stream design, engineering design, construction specifications, construction quality assurance	\$100,000	Design 100% Construction 100%
Lower Dempsey Stream Restoration on AML	Ecosystem Investment Partners, LLC 5550 Newbury St, Ste B Baltimore, MD 21209 Canaan Valley Institute, Inc. 494 Riverstone Rd Davis, WV 26260	Aerial/topographic/planimetric surveying, aquatic resource determinations/delineations, natural stream design, engineering design, construction specifications, regulatory compliance, construction quality assurance	\$5,200,000	Design 100% Construction 100%
Howards Creek Stream Restoration	West Virginia Conservation Agency 179 Northridge Drive Lewisburg, WV 24901	Aerial photography, LIDAR topography, planimetric surveying, natural stream design, engineering design, construction specifications, construction quality assurance	\$385,440	Design 100% Construction to begin Fall 2018
Five Additional Mitigation Banks	Various confidential clients	Aerial/topographic/planimetric surveying, aquatic resource determinations/delineations, natural stream design, engineering design, construction specifications, regulatory compliance, construction quality assurance	\$30,000,000	Design 100% Construction 50%
Beaver Creek at Auman Road Passive AMD Treatment	Friends of Cheat, Inc. 1343 N Preston Hwy Kingwood, WV 26537	Topographic/planimetric surveying, water quality monitoring, geochemical modeling, passive treatment design, construction drawings, bid documents, technical specification, construction oversight, permitting	\$200,000	Design 90% Construction to begin Fall 2018
TOTAL NUMBER OF PROJECTS: 6			TOTAL ESTIMATED CONSTRUCTION COSTS: \$36,484,535	

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

PROJECT NAME, TYPE AND LOCATION	NATURE OF FIRMS RESPONSIBILITY	NAME AND ADDRESS OF OWNER	ESTIMATED COMPLETION DATE	ESTIMATED CONSTRUCTION COST	
				ENTIRE PROJECT	YOUR FIRMS RESPONSIBILITY
Brushy Fork Mitigation Bank, Harrison County, WV	Construction staking and layout of restoration corridors	North State Environmental Inc. 2889 Lowery St. Winston-Salem NC 27101	2018	\$4,500,000	Survey \$70,000
Jackson County Middle School - Site Development	Site development, civil engineering	Omni Associates 207 Jefferson St. Fairmont, WV 26554	2018	TBD	Civil Engineering
Wesco Building Renovation, Site Development	Site development, civil engineering	Omni Associates 207 Jefferson St. Fairmont, WV 26554	2018	TBD	Civil Engineering
WVSP Wetlands Mitigation Design	Conceptual design, surveying, construction drawings	Omni Property Companies 23205 Mercantile Rd Beachwood OH 44122	2018	TBD	Ecological Resources
Bridgeport Rec Center, Site Development	Geotechnical engineering, surveying, stormwater evaluation, site design	Omni Associates 207 Jefferson St. Fairmont, WV 26554	2019	TBD	Geotechnical and Civil Engineering

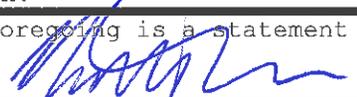
16. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
Shinns Run Portals	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$730,357	2013	Yes
Camden (Hartley) Dangerous Landslide	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$500,000 - \$3,000,000	2013	Yes
Arlington (Gain) Highwall	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$500,000 - \$3,000,000	2014	Yes
McAlpin Portals and Drainage	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$500,000 - \$3,000,000	2014	Yes
TS&T Site Phase II Assessment	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$500,000 - \$3,000,000	2015	Yes
Huff Creek Watershed Stream Restoration	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$460,055	2015	Yes
Hodgesville (Wright) Mine Blowout	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$500,000 - \$3,000,000	2015	Yes
Jefferson County Leachate Tank Study	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	NA	2015	Yes
Tub Run Highwall and Refuse Phase III	WVDEP, Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	TBD	2017	No

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

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH
Pageton (Lambert) Portals	WVDEP Office of Abandoned Mine Lands 601 57th St. SE, Box 20 Charleston, WV 25340	\$17,595	2013	Yes	Stantec, Inc.
Little Coal River Restoration	West Virginia Conservation Agency Southern District 463 Ragland Road Beckley, WV 25801	\$35,000	2013	Yes	Stantec, Inc.
Cane Run Bathymetric Survey	Confidential	\$7,500	2014	Yes	Stantec, Inc.

18. Use this space to provide any additional information or description of resources supporting your firm's qualifications to perform work for the West Virginia Abandoned Mine Lands Program.  
 Civil & Environmental Consultants, Inc. (CEC) personnel have experience with esoteric aspects of mine land reclamation and mine water remediation. CEC does not employ generic remediation strategies, but assesses and evaluates critical details of water chemistry, reaction dynamics, soil properties, hydrologic properties, regional geology, and client and landowner needs. CEC personnel have decades of experience in the reclamation community, familiarity with modern reclamation techniques, and access to a suite of engineering design/geochemical software. Site grading, volumetric analysis, and hydraulic assessments constitute a bulk of work completed by CEC Bridgeport. CEC presents an interdisciplinary team utilizing a data and client driven approach to mine land reclamation and mine water remediation.

19. The foregoing is a statement of facts.

Signature:  Title: Principal

Printed Name: Nathan S. Ober, PG

Date: July 9, 2018

## **Appendix C**

### **Attachment C – AML and Related Project Experience Matrix (RPEM)**

**AML and RELATED PROJECT EXPERIENCE MATRIX**

PROJECT	Exp. Basis C=Corp. P=Personal	Additional Info Provided In Section (s) **	PROJECT EXPERIENCE REQUIREMENTS														PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional						
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/ Mitigation/ Replacement	Construction Inspection/ Management	Water Treatment	Equipment/ Structure Removal	Stream Restoration	Geotechnical/Stability	Greg Linder, P.E. Principal	Dennis Miller, P.S. Designer	Randy Calkins, P.S. Designer	Jason Jitter, P.S. Staff Engineer	4 Survey Crews	5 CADD Operators
McAlpin Portals and Drainage	C		X	X	X	X				X		X	X			X	X	M			P	P	P
Hodgesville (Wright) Mine Blowout	C		X	X	X	X				X		X	X					M			P	P	P
Arlington (Gain) Highwall*	C		X			X					X						M	P		P	P	P	
Camden (Hartley) Dangerous Landslide*	C		X			X					X	X				X	M			P	P	P	
Shinns Run Portals*	C			X	X	X				X		X	X			X		M	P		P	P	P
Special Rec. Multiple Projects****	C		X	X	X	X				X		X	X				X	M			P	P	P
Norton Highwall #1*	P		X	X	X	X					X		X	X				M	P	P	P	P	P
Tub Run Highwall and Refuse Phase II*	P		X	X	X	X				X		X	X								P	P	P
Tub Run Highwall and Refuse Phase I*	P		X			X					X		X								P	P	P
Newburg Waterline Feasibility Study*	P					X					X		X					M					P
Point Mtn. Waterline Feasibility Study*	P					X					X		X					M					P
Greenbrier Hollow Refuse*	P		X	X	X	X				X		X	X								P	P	P
Sauls Run (Carpenter) Landslide*	F		X	X	X	X				X		X	X			X			M	P	P	P	P
Pageton (Lambert) Portals*	P		X	X	X	X				X		X	X								P	P	P
Birds Creek #4*	P		X	X	X	X				X		X	X								P	P	P
Church Creek/Manown Highwall*	P		X			X	X			X		X	X			X					P	P	P
Racine (Bradshaw) Portals*	P			X	X	X				X		X	X								P	P	P
Hampton #4 Maintenance*	P		X			X				X	X				X	X		M	P	P	P	P	
Howesville Sites*	P		X	X	X	X				X	X	X			X	X	X	M			P	P	P
Sandy Run Highwall and Portals*	P		X	X	X	X				X	X	X			X	X	X	M		P	P	P	P
Wisie-Rosedale Waterline Feasibility I.D. # 324*	P					X					X		X			X							P
Laurel Valley (Daniels) Landslide*	P		X			X				X						X		M	M	P	P	P	P
Price Hill Airshaft/Buildings*	P			X	X	X				X	X		X	X		X			M		P	P	P
Glady Fork AMD Trmt. Plant****	P			X		X				X	X	X			X			M		P	P	P	
Weaver Portals, Ph. I & II*	P		X	X	X	X				X		X	X			X	X	M	M	P	P	P	P
Nixon Run AMD*	P		X	X	X	X				X		X			X	X		M		P	P	P	



**Appendix D**  
**Key Personnel Qualifications & Resumes**

## Nathan S. Ober, P.G.

### Principal

Nathan Ober is the ecosystem restoration services lead at Civil & Environmental Consultants, Inc. As a geomorphologist, Mr. Ober has managed and designed 50+ miles of stream restoration projects, drawing from more than 15 years of experience in fluvial geomorphology, natural channel design, construction management, and post-restoration monitoring. Mr. Ober has worked extensively with the Tennessee Department of Transportation to grow a natural channel design program, as well as developing 8 miles of in-lieu fee projects in Tennessee. He has also managed and designed the largest stream mitigation bank in West Virginia developed by Ecosystem Investment Partners, and designed a 16.5 mile fishery enhancement of the Little Coal River for the West Virginia Conservation Agency. Due to the success of these and other projects, Mr. Ober has been asked to present at a number of regional and national conferences and workshops. Mr. Ober continues to provide ecosystem restoration services in the Mid-Atlantic, Southeast, and Mid-Western United States.

### PROJECT EXPERIENCE

#### Stream Gage Installation, Fayette County, Tennessee (Monitoring)

Mr. Ober worked with the Tennessee Stream Mitigation Program (TSMP) to collect discharge measurements and install a stream gage at a completed stream restoration site designed by Stantec. To facilitate in the analysis of the stream restoration, the quantity and duration of flood events was necessary to determine project success. Mr. Ober installed a pressure transducer in a two inch PVC casing and anchored it to the bed and bank of the stream to record water depth, temperature, and pressure at a set time interval. Flow measurements were collected at the stream gage using a Marsh McBirney T2000 flow meter and plotted against stage to develop a stream gage rating curve. Geomorphic cross sections and a profile were surveyed, and pebble counts collected at the stream gage to estimate bankfull discharge at subsequent stages that could not be measured with the flow meter. The stream gage recorded measurements every 30 minutes and the data was downloaded after three months. The pressure transducer data was calibrated with the rating curve and plotted as a function of discharge verses time to create a hydrograph. Three months of data collection indicated that four storm events caused flows to reach or exceed the banks of the stream demonstrating sufficient data to analyze success.

#### Hydrological Stream Flow Assessment Study, Greene County, Pennsylvania (Monitoring)

This project was designed for determining flow loss of undermined streams located in Greene and Washington Counties, Pennsylvania. Mr. Ober established flow monitoring stations at designated areas within the study area using topographic mapping and Trimble GeoXT GPS navigation. Flow measurements were acquired using a Marsh-McBirney Model T2000 Flow Meter and digital photographs were taken at over 200 stations. Flow-monitoring stations were monitored monthly at a minimum and daily at a maximum basis. Field mapping and visual observations of geologic outcrops and mining-related anomalies were conducted throughout the length of the monitored streams. Field data was entered and organized into a client accessible web-based GIS data system.

#### Ely and Puckett Creeks, Lick Branch Site - Stability and Mine Seal Investigation Analysis, Lee County, Virginia (Geologist)

Mr. Ober conducted the evaluation of a failing mine seal at an acid mine drainage, SAP Cell treatment facility. Discharge of high concentration of metals combined with low PH from the failing mine seal required emergency action to detain pollution to downstream waterways. Emergency oversight of construction and on site design for temporary containment was conducted along with measurements for a permanent design.

#### Visual Monitoring Program, Greene and Washington Counties, Pennsylvania (Monitoring)

As the Lead Geologist, Mr. Ober mapped visual observations of surface water flows and macro invertebrate life of streams overlying proposed and existing deep mine workings in compliance with the PA Department of Environmental Protection regulations. Digital photographs were taken and data was organized in a Microsoft Excel spreadsheet.

### EDUCATION

*B.S., Geology, West Virginia University*

### REGISTRATIONS

*Professional Geologist  
PA [REDACTED]*

### PROFESSIONAL AFFILIATIONS

*Pennsylvania Council of Professional Geologists*

### TRAINING

*OSHA-HAZWOPR Initial- 40-Hour & 8-Hour Refresher*

**Hydrologic Flow Assessment Study, Washington County, Pennsylvania (Monitoring)**

Mr. Ober monitored surface water flows at established stations overlying proposed and existing deep mine workings using a Marsh-McBirney Model T2000 Flow Meter.

**Willows Branch Stream Enhancement, Warren County, Tennessee (Restoration Design)**

During the development of roadway plans for the Tennessee state route one highway, Mr. Ober managed and designed the relocation of 1100 feet of Willows Branch. Mr. Ober was responsible for all levels of the stream design including but not limited to the geomorphic assessment of the impaired reach, sediment transport calculations, construction quantity calculations, and channel design using RIVERMorph Natural Stream Design software. Mr. Ober was retained for construction services and 5 years of monitoring services.

**Furnace Branch Stream Mitigation, Wayne County, Tennessee (Project Manager/Restoration Design)**

On site stream mitigation was required as part of the widening of Tennessee State Route 15 and subsequent encapsulation of a "Tennessee Exceptional Waterway." Site selection and geomorphic assessment of the impaired stream was conducted by Mr. Ober for the restoration of an entrenched reach of Furnace Branch. Mr. Ober completed the design of a priority three incised stream restoration for a total of 1200 feet of channel. A sediment transport model was developed using the Flowshed/Powershed module of the RIVERMorph Natural Stream Design software to evaluate bed stability. Additional tasks included: the identification and geomorphic survey of a reference reach, sediment samples and sieve analysis, construction quantity calculations, and hydraulic calculations. Further challenges included the channel design through bedrock constraints.

**Branham Hollow Stream Mitigation, Fentress County, Tennessee (Project Manager/Restoration Design)**

As Project Manager, Mr. Ober led the design of 500 feet of stream relocation for the bridge replacement at State Route 52, Fentress County. As field crew chief, Mr. Ober used RTK survey grade GPS equipment to collect the geomorphic and topographic surfaces. A three dimensional design was completed using AutoCAD Civil 3D and combined with the roadway design. Natural Stream Design software was utilized for sediment transport and shear stress calculations. Mr. Ober managed the preparation of the construction plans in Microstation and Geopak and his services were retained for the construction, which was completed in the winter of 2011. Mr. Ober has completed 2 years of monitoring services for the project.

**Statewide Stream and Wetland Monitoring Services, Multiple Sites, Tennessee (Program Manager)**

Mr. Ober performed monitoring services at over 40 sites for the Department of Transportation to meet state and federal permit requirements at various locations across the state of Tennessee. Streams were assessed for stability, function, and the survival of riparian vegetation. Wetlands were evaluated for hydric soils indicators and classified using Munsell soil color, and surveying for the survival of wetland vegetation. Mr. Ober reviewed documents containing roadway design plans, state, and federal environmental permits, and ecological studies to determine the performance standards and monitoring requirements for each site. Deficiencies were documented and corrective measures quantified within the reports.

**Katy Prairie Conservancy Stream Mitigation, Harris County, Texas (Stream Assessment)**

As part of a four person design team, Mr. Ober surveyed topographic contours and detailed stream surveys using RTK survey grade GPS for 10,000 feet of stream restoration design. Geomorphic assessment and surveys were performed in the field for stability analysis. Mr. Ober completed conceptual stream designs and alignments in AutoCAD Civil 3D.

**Stream Mitigation / Restoration Project, Greene County, Pennsylvania (Lead Geologist)**

As the Lead Geologist Mr. Ober conducted oversight and inspection of construction to repair dewatered streams overlying deep mine workings. Responsibilities included mitigation planning, mitigation design, construction management, and assisted project management. Technical tasks included, but not limited to stream surveying, channel design, surface and groundwater monitoring, geotechnical drilling, mapping and report generation using GIS, and hydrologic modeling using GIS. Heavy equipment and machine familiarity includes the following: track-hoe,

front-end loader, bulldozer, track dump, air drill, air compressor, grout pump, mechanical and pneumatic grout packer, and trash pumps.

**Unnamed Tributary to Pendleton Run Stream Restoration, Tucker County, West Virginia (Restoration Design)**

Pendleton Run is a pristine, Tier III stream in West Virginia which flows into Blackwater Falls State Park. This project was designed to retain and convey the discharge from a 160 acre watershed over abandoned deep mine working. A valley was designed in conjunction with a natural stream design and a geosynthetic liner to meet our objectives. Mr. Ober was responsible for the all levels of the restoration including reference reach selection and identification and geomorphic assessment of the impaired reach. Additionally, environmental and geotechnical samples were obtained and logged from the mine spoil.

**Kinniconick Creek Stream Restoration Project, Lewis County, Kentucky (Construction Observation)**

Mr. Ober conducted oversight and inspection of the construction and installation of in-stream boulder cross vanes, boulder j-hooks, root wads, and habitat enhancements. Survey and stake out of alignment was completed in the field as part of construction oversight.

**On-Call Stream Restoration & Monitoring, Tipton, Hardin, and Crockett Counties, Tennessee (Stream Monitoring)**

As part of a four person team, Mr. Ober conducted Level III monitoring assessments of streams in the Mississippi Loess Plains and the Tennessee Southeastern Plains. Field work included: geomorphic surveys, Wolman pebble counts, Pfankuch river stability evaluation, vegetation surveys, and photo documentation.

**Unnamed Tributary to Big Brush Creek Stream Restoration, Sequatchie County, Tennessee (Construction Observation)**

As part of a surface mine reclamation project Mr. Ober provided consulting services for the design and construction of a stream restoration on a tributary to Big Brush Creek. Surface and groundwater retention was designed using a geosynthetic liner. The total restoration included 2500 feet of channel and 6 acres of wetlands. A coal mining dragline excavator was used to remove 180 feet of overburden during the active open pit mining. The bedrock valley was replaced with unconsolidated mine tailing causing subsurface flow loss and water contamination. Mr. Ober designed a stream restoration capable of supporting surface flows over the unconsolidated fill using a geosynthetic liner made of bentonite. The hydrologic design included perching water above the liner allowing surface water retention in pools and wetlands during the low flow periods. Natural channel design methodology was used in the development of the stream design to distribute energy and stabilize sediments located above the liner. Mr. Ober was retained during construction of the project to educate the contractor on the installation of the geosynthetic liner and construction of the natural channel design. This project has been monitored for 3 years and has successfully achieved stability and surface flow retention. The project was nominated for an Office of Surface Mining Award.

**Unnamed Tributary to Wolf Creek Stream Mitigation, Fayette County, Tennessee (Construction Observation)**

This restoration encompassed the relocation of over 8000 feet of an incised tributary to the Wolf River in Tertiary sands and silts of the Southwestern Plains of Tennessee. As the onsite inspector Mr. Ober conducted oversight of all phases of construction including the installation of log vanes, root wads, log weirs, boulder cross vanes, boulder step pools, and constructed riffles. Weekly reports were generated, an as-built survey was completed, and a Level III Monitoring Plan was established.

**Little Coal River Restoration Design/Build, Boone County, West Virginia (Project Manager/Restoration Design)**

While working for Stantec, Mr. Ober teamed with North State Environmental and Green Rivers, LLC to complete a design build, "turn key" stream restoration for the Patriot Coal Company in Boone County, WV. Boulder and wood natural channel design structures were used to stabilize banks and promote habitat enhancements for fisheries and recreational boating opportunities. 7,500 feet of enhancement design was completed and built in the fall of 2011 and winter of 2012.

**Little Coal River Restoration, Boone and Lincoln Counties, West Virginia (Project Manager/Restoration Design)**

Mr. Ober managed and designed 15 miles of stream enhancement on the Little Coal River in West Virginia for the West Virginia Conservation Agency. A Rosgen Level III geomorphic assessment was completed on the entire 15 miles, along with an aquatic survey for fish populations and habitat indices. The project was designed to tie into the Patriot Coal project to encompass an entire length of 16.5 miles of stream enhancement design completed by Stantec. Mr. Ober was involved with all phases of the project.

**Langford Branch Stream Mitigation, Lewis/Maury County Tennessee (Project Manager)**

As Project Manager, Mr. Ober led the design of 1900 feet of stream relocation for the roadway improvements at SR-99. Langford Branch is listed as a "TN High Quality Water" for exceptional biological diversity and required proactive measures for restoration and relocation of the stream. The project was completed on-time and on budget and was successful permitted with the assistance of Mr. Ober. Construction is scheduled for 2013.

**North Fork of the South Branch of the Potomac River, Pendleton County, West Virginia (Restoration Design)**

As the lead designer, Mr. Ober worked with the West Virginia Conservation Agency to provide a natural channel design alternative for stream bank stabilization of a "Rosgen C" stream type in an agricultural setting. Sediment transport issues caused aggradation and lateral migration of the channel with subsequently caused loss of available land for farm use. The design utilized on-site materials to decrease costs. The project challenges include a limited budget and a narrow corridor for construction limits.

**Middle Fork Stream Restoration, Henderson County, Tennessee (Restoration Design)**

Mr. Ober served as the lead designer for approximately 2 miles of restoration design for the Tennessee Stream Mitigation Program. The project site is located in a rural setting within the Southeastern Plains of Tennessee and is part of the South Fork Forked Deer River watershed. The main stem of Middle Fork as well as the three unnamed tributaries (UT1, UT2, and UT3) have been adversely impacted by historical agricultural practices. These highly entrenched and channelized head water channels were restored using priority I, II, and III incised river design approaches. Mr. Ober utilized survey grade GPS and conventional survey methods to complete a level III geomorphic survey in the field. He design the project using AutoCAD Civil 3D, HEC-RAS 4.1.0, RIVERMorph stream restoration software, and additional in-house design tools. The project was constructed through the fall of 2011 until the summer of 2012.

**Blockhouse Run Stream Restoration, Greene County, Pennsylvania (Restoration Design/QAQC)**

Mr. Ober implemented natural channel design and three dimensional modeling on 2500 feet of Blockhouse Run to repair subsidence pooling overlaying longwall coal mining. A geomorphic survey of the streams was completed across three longwall mine panels and a mini bankfull regional curve developed for the watershed.

**Tenmile Creek E23 Panel Stream Restoration, Washington County, Pennsylvania (Restoration Design)**

Longwall coal mining activities subsided approximately 1300 feet of Tenmile creek in Washington County PA. As the lead designer Mr. Ober utilized natural stream channel design principles to restore approximately 1,900 feet of the affected stream reach to a stable pattern, profile, and dimension. The stream channel was improved to support favorable hydraulics, geomorphic stability, and aquatic functions. Design criteria were developed using reference stream reaches, USGS stream gage data, and a regional curves that were developed by CEC for streams in Greene County, Pennsylvania. Mr. Ober completed the design and grading plan in three-dimension using AutoCAD Civil 3D and provided the contractor with machine control GPS layout files.

**Crabapple Creek Stream and Wetland Mitigation, Greene County, Pennsylvania (Restoration Design)**

Mr. Ober worked with CONSOL Energy, Inc. to design a restoration project to offset the impacts associated with development of a 4-mile overland conveyor in Greene County, Pennsylvania. Construction of the overland conveyor resulted in impacts to 5,700 linear feet of stream and 0.76 acre of wetland. To offset the loss of ecological functions at the impact site, CEC developed a mitigation plan to restore 4,400 linear feet of highly degraded stream, establish and/or preserve wooded riparian buffers, and create 1.25 acres of diverse wetland habitat. The project included restoration of 1,100 feet of the main stem of Crabapple Creek and 3,300 feet of second-order tributaries to

Crabapple Creek. Mr. Ober designed the restoration of the streams to a stable dimension, pattern, and profile based on surveyed reference conditions of nearby streams. Stream functions were maximized by incorporating in-stream habitat enhancement and grade control structures. Native herbaceous and woody vegetation were planted along banks and riparian buffers to provide long-term bank stabilization and wildlife habitat

**North Fork Fishing Creek Stream Mitigation, Wetzel County, West Virginia (Project Manager/Restoration Design)**

Mr. Ober worked with MarkWest Liberty Midstream & Resources, LLC to develop stream mitigation plans during the construction of the Mobley gas plant. The project included 3200 feet of headwater restoration on high gradient Rosgen A2/B3 streams and 1400 feet of North Fork Fishing Creek, a Rosgen C4 stream. CEC teamed with specialty contractors Frontier Environmental and North State Environmental to complete the project as a design build team. Due to the confinement of the headwaters streams and regulatory concerns with equipment impacts to the watershed the construction was completed by hand for 1400 feet. Mr. Ober conducted construction quality assurance with survey grade GPS and three dimensional layout files. Drastic changes in the weather and high volumes of flows presented challenges throughout the project. Reiterations to the design were completed on-site to accommodate underground utilities located during construction. The erosion and sediment control plan incorporated phasing for active drilling near the stream restoration activities.

**Southern West Virginia Stream Mitigation Bank: Ecosystem Investment Partners/Canaan Valley Institute. (Project Manager/Stream Restoration Design)**

Southern West Virginia Stream Mitigation Bank: Ecosystem Investment Partners/Canaan Valley Institute. (Project Manager/Stream Restoration Design) An Umbrella Stream Mitigation Bank located in the Gauyandotte and Tug Fork River watersheds of West Virginia is being proposed for three sites totally nearly 10,000 acres and over 85 miles of stream. The purpose of the project is to protect and restore entire watersheds that have been heavily impacted by mining. To accomplish these goals, CEC had to conduct watershed studies, stream and wetland determinations, geomorphic and existing condition surveys, create detailed mitigation reports and construction plans, permit documents, and construction observation. As the project manager and geomorphologist, Mr. Ober managed all phases of the project including; the assessment of 85 miles of stream on 9800 acres of property, the design of nearly 15 miles of streams, and the implementation of construction at all the sites. Mr. Ober worked with the project team to develop the mitigation banking instrument including crediting scenarios for stream restoration on abandoned mine lands. Construction level design drawings for the mitigation plans were created using a custom application, designed by Mr. Ober; using AutoCAD Civil 3D to enable rapid 3D design and detailed grading plans.

**Baxter Bottom Stream Restoration, Tipton County Tennessee (Restoration Design)**

Mr. Ober worked with the West Tennessee River Basin Authority to restore an aggraded reach of stream on Baxter Bottom near Mason, Tennessee. The sand bed stream system was not capable of efficiently transporting the sediment load from the upstream headwaters which caused aggradation and the development of a valley plug. The valley plug caused the stream to braid into a multi-stem channel which caused unfavorable flooding to the adjacent landowners. Mr. Ober completed a geomorphic and topographic survey of the reach followed by a restoration design in AutoCAD Civil 3D. Natural channel design techniques were implemented to restore the stream to a stable pattern, profile, and dimension. Sediment transport calculations were applied to balance the sediment loads.

**Gilmer Creek Stream Restoration, Madison County, Tennessee (Construction Observation)**

Mr. Ober worked with the West Tennessee River Basin Authority (WTRBA) to repair the upstream tie-in of a stream restoration in Madison County Tennessee. Immediately following construction a series of large storm events degraded the first meander bend of Gilmer's Creek Stream Restoration. Mr. Ober worked with the contractors at the WTRBA to repair the stream bank with toe-wood and live brush layering.

## Timothy A. Denicola, CFM

### Project Manager I - Geologist/Geochemist/Hydrogeologist

Mr. Denicola is a project manager whose multi-disciplined background includes expertise in geochemistry, geology, and hydrology. His ecological/environmental experience includes mine water remediation, stream restoration, and regulatory compliance. Specific capabilities include watershed based planning, site assessments and recommendations, design of passive and semi-active treatment systems, design of stream restoration corridors, hydrologic and geotechnical analysis, construction quality assurance, environmental compliance audits, and development of various spill control plans. Mr. Denicola manages projects from conceptual through final completion in collaboration with a qualified team of personnel.

Mr. Denicola is adept at managing ecological/environmental projects with personal experience in water quality and soil sampling, field hydrologic data collection, laboratory analysis, software based geochemical and statistical evaluations of empirical data, watershed based plan development, funding source identification and management, regulatory permitting, construction specification, cost, and bid package preparation, erosion and sediment control management, and geotechnical rock exploration drilling. Mr. Denicola has managed technical, administrative, and educational components related to watershed restoration, managed project and institutional budgets for non-profit, public and private clientele, communicated with landowners and local, state and federal agencies. Mr. Denicola has managed environmental regulatory compliance including aboveground storage tank (AST) inspections and preparation of Spill Prevention and Response Plans (SPRP), Spill Prevention Control and Countermeasure Plans (SPCC), Groundwater Protection Plans (GPP), and Stormwater Pollution Prevention Plans (SWPPP).

### PROJECT EXPERIENCE

#### Beaver Creek at Auman Road Passive Treatment Project, Preston County, WV

A tributary to a cold water fishery (CWF) is impacted by acidic, aluminum contaminated water emanating from an abandoned coal surface mine. Mr. Denicola designed two passive mine water treatment systems consisting of flushing limestone beds (FLB), settling ponds, and aerobic polishing wetlands. Each FLB utilized an automatic dosing siphon, large diameter limestone, and trench drain conveyance to reduce loss of substrate porosity and increase alkalinity generation and flushing velocities. Settling ponds utilize perforated stand-pipes to regulate the effluent rate and achieve particle settling velocities. Aerobic wetlands were designed with thick, native, non-invasive grasses, woody shrubs and wetland trees to facilitate final polishing while increasing ecological habitat. Extensive chemical, hydrologic, and volumetric calculations were utilized to ensure optimal cost-effective performance.

#### Herods Run Passive Treatment Project, Upshur County, WV\*

Herods Run is impacted by acidic, iron contaminated water emanating from an abandoned coal surface mine. Mr. Denicola prepared the winning conceptual design, developed the preliminary and final engineering design drawings, and prepared the construction specifications, cost estimates, and bid package. Mr. Denicola prepared permit application packages for the U.S. Army Corps of Engineers (USACE) Regional General for AML permit and WV Department of Natural Resources (DNR) Stream Activity permit. Throughout the project Mr. Denicola facilitated open communication between a non-profit watershed association, various landowners, and a private energy company owning easements.

### EDUCATION

*M.S., Geology, West Virginia University*

*B.S., Chemistry, Clarion University of Pennsylvania*

### REGISTRATIONS

*ASFPM Certified Floodplain Manager (CFM)*

### CERTIFICATIONS

*Maryland Erosion & Sediment Control Certification  
No. RPC004062*

*Maryland State Highway Administration E&S Control Certification No. 15-477*

### TRAINING

*Rosgen Level 1 – Applied Fluvial Geomorphology*

*Rosgen Level 2 – River Morphology & Applications*

*PEC/Safeland Training, 8-Hour Course, ID# PEC100784550*

*MSHA Part 46 New Miner Surface Metal/Non-Metal Training (40-Hr)*

*Advanced AMDtreat Mine Drainage Cost Calculation Software, U.S. Office of Surface Mining. (15-Hour)*

**Trout Unlimited Technical Assistance Grants Program, PA Statewide\***

Mr. Denicola participated as one of several on-call consultants for the Trout Unlimited (T.U.) Technical Assistance Grants (TAG) Program. Each year various entities request assistance from T.U. to complete existing abandoned mine water (AMD) treatment system assessments with recommendations for improvements, rapid AMD characterizations, and rapid watershed snapshots, develop conceptual designs for AMD treatment systems, conduct construction oversight of AMD treatment systems, develop monitoring plans. Mr. Denicola completed all tasks associated with each request totaling approximately six per year.

**Brinkerton Semi-Active AMD Treatment, Sewickley Creek, Westmoreland County, PA\***

The Brinkerton Semi-Active AMD Treatment project was affected by a high volume of alkaline mine water discharge and the existing passive treatment system required refurbishment. Mr. Denicola assisted in redesign of a Maelstrom Oxidizer, pond berm stabilization, incorporation of top flow weirs to allow collection of chemical and hydrological data, and conversion of a smaller acidic mine water collection area into an anoxic limestone drain. Mr. Denicola also performed construction oversight at various stages of project completion.

**Broad Top Township AMD Treatment, Bedford County, PA\***

Various active and passive AMD treatment systems currently operate within Broad Top Township. Mr. Denicola conducted geochemical calculations that directly translated into several passive system designs, conducted chemical and hydrological sampling as part of an assessment and recommendations study, and conducted the post-construction final inspection of the most recently construction AMD treatment system.

**Brubaker Active AMD Treatment Conceptual Design, Clearfield County, PA\***

Mr. Denicola developed the winning conceptual design for active treatment at the abandoned Dean Clay Mine discharge in the Brubaker Run watershed. The design utilized calculations for acid neutralization and sludge production rates. The design included active treatment BMPs, surface water diversion and high flow bypasses, and a proposal for an on-site sludge disposal assessment requiring a geotechnical study of the nearby mine workings.

**Buck Mountain #2 and Lausanne Tunnel AMD Assessments and Recommendations, Eastern Pennsylvania\***

Several passive AMD treatment systems required an assessment and recommendations report to evaluate treatment efficacy. Mr. Denicola conducted chemical and hydrological sampling and completed an assessment of each location including recommendations and associated costs. Development of the recommendations required calculations of acid and metal loads, alkalinity generation and acid neutralization rates, ferrous iron oxidation rate, sludge volume, and BMP sizing for necessary hydrologic retention time.

**Lehigh River Basin Watershed Assessment\***

Mr. Denicola was provided chemical data from approximately two dozen AMDs in several impaired subwatersheds of the Lehigh River. Utilizing spatial and statistical software, Mr. Denicola prepared an assessment and recommendations report identifying priority AMDs and priority subwatersheds for remediation. Based on geochemical calculations, site-specific treatment options were recommended including associated engineering and construction costs.

**Kanes Creek South Site #3, Preston County, WV\***

Several acid mine discharges impairing Dills Run, required development of a passive remediation system. Mr. Denicola oversaw the final stages of system design, construction stormwater permitting, and West Virginia Non-Point Source (NPS) 319 and Office of Surface Mining (OSM) Watershed Cooperative Agreement (WCAP) grants management, as well as conducted construction oversight and completion of pre- and post-construction monitoring. The final system ultimately consists of a flushing limestone bed followed by two settling ponds in series. The system is successfully neutralizing all acidity, introducing residual alkalinity, and is removing all metals to analytical minimum detection limits.

**Satcher Pre-Treatment Pond (SPTP)\***

The SPTP was constructed to handle severe AMD characterized by high acidity, iron, and aluminum. In 2013, the system required refurbishment. Chemical and hydrologic assessment, funding acquisition, design, and construction were completed by Mr. Denicola and the landowner. The resulting system is an improved flushing limestone bed with improved hydrologic capacity, acid neutralization, and metals removal.

**Slabcamp Tributary AMD Remediation, Preston County, WV\***

Four severe AMDs are impairing a tributary to Slabcamp Run and a 5.4-acre wetland. Mr. Denicola completed pre-construction monitoring, execution of landowner right-of-entry agreements, acquisition of an environmental consulting firm, communication with USACE regarding wetland and waterways permitting, communication with the State Historic Preservation Office (SHPO) to complete a Section 106 review, communication with West Virginia DNR to complete a National Environmental Policy Act (NEPA) review and composed an Environmental Assessment (EA), communicated with Region VI Planning and Development Council for the necessary consultation letter, and assisted development of a conceptual design.

**Ingrand Mine AMD Remediation, Preston County, WA\***

Two severe AMDs impairing Dills Run required development of a passive remediation system. Mr. Denicola oversaw pre-construction monitoring, completion of land purchase through execution of a subdivided land deed, acquisition of an environmental consulting firm, communication with the USACE, SHPO, NEPA, and Region VI, and assisted development of a final design with associated specifications, bid, and contract documents. The passive treatment system utilizes a flushing limestone leach bed, two settling ponds, an anaerobic vertical flow wetland (AVFW), and a polishing wetland and is successfully reducing contaminant loads to Dills Run and Kaneshaw Creek.

**Valley Point #12 Refurbishment, Kaneshaw Creek South Site #1 and Valley Highwall #3 Upgrades\***

After years of successful acid neutralization and metals load reductions at numerous systems within the Deckers Creek Watershed, system efficacy had reduced at several systems and refurbishments were necessary. Mr. Denicola oversaw extensive system assessments and coordinated with landowners and the Deckers Creek Restoration team to facilitate improvements. The result was award of funding for two projects, a completed design for one, and a funding request for the final system.

**Successive Alkalinity Producing System and Active Lime Doser Assessments\***

As a responsibility of project management, Mr. Denicola thoroughly audited all existing systems within the Deckers Creek watershed. The most extensive audits were conducted at a successive alkalinity producing system (SAPS) that utilizes flushing limestone leach beds, settling ponds, and an AVFW. Chemical, hydrologic, and redox potential data were collected, and geochemical software was utilized to evaluate the iron reducing capability of the AVFW, which ultimately proved to be highly successful. The SAPS was receiving AMD with pH=2.6 and high ferric iron and aluminum concentrations and was discharging water of circum-neutral pH with metals below minimum detection limits. The AVFW alone displayed a redox potential of -0.093 V and conversion of all ferric iron into the ferrous form. In addition, the Deckers Creek watershed utilizes two active tipping bucket lime dosers for neutralization of severely degrading AMD. Mr. Denicola thoroughly audited both active systems through a series of geochemical sampling and evaluation techniques. The results of the audits substantiated the necessity of future funding for refurbishment.

**Richard Mine Geotechnical Study\***

The Richard Mine discharges 400 gallons per minute of water characterized by pH=4.0 and high iron and aluminum concentrations. The discharge emanates from a partially flooded mine pool within a 2,300-acre mining complex. Treatment will require a full-scale active facility. To assess the design requirements, Mr. Denicola oversaw acquisition of an environmental consulting firm for successful installation of a 342-foot-deep monitoring well. To facilitate the project Mr. Denicola executed a notarized landowner entry agreement, obtained and evaluated mine maps, and utilized field pumps and transducers to monitor water level and chemistry of the Richard Mine pool.

**Clean Creek Program, Deckers Creek, WV \***

Since 2002, the Friends of Deckers Creek has participated in the Clean Creek Program (CCP) which consists of quarterly chemical, biological, and flow sampling at 13 key locations along the 24-mile length of Deckers Creek. In addition, collected data are compiled into an annual State of the Creek Report for distribution to community members and funding agencies. Mr. Denicola took an active role in performing CCP duties, funding acquisition, and report writing.

**STREAM RESTORATION****Snake Run Stream Restoration, Greenbrier County, WV**

The Snake Run Stream Restoration project addressed a 1,000 foot stream corridor displaying extensive aggradation and lateral migration across agricultural land. Mr. Denicola completed a geomorphic and topographic survey to collect bankfull, channel, berm, and thalweg data. From empirical data, Mr. Denicola produced a longitudinal profile and cross-sections, calculated appropriate bankfull area, shear stress, and stream power, and designed a restoration corridor including hydraulic structures and floodplain to return Snake Run to proper pattern, profile, and dimension.

**Oxbow Mitigation Bank, Ritchie County, WV**

The Oxbow Mitigation Bank will restore approximately 26,000 feet and enhance approximately 48,000 feet of heavily degraded stream corridor. The property has been heavily timbered and traversed with access routes resulting in excess sedimentation, disconnected stream channels, and reduced biological diversity. Off road vehicle traffic and the county right-of-ways utilize the stream corridor resulting in substantial geomorphic degradation. Mr. Denicola has managed and/or completed stream restoration designs, geotechnical rock drilling exploration, oil & gas infrastructure relocations, county right-of-way decommissioning, and contractor coordination to facilitate successful project completion.

**Brushy Fork Mitigation Bank, Harrison, Barbour, Taylor Counties, WV**

The Brushy Fork Mitigation Bank will restore approximately 95,000 feet of streams and 9.5 acres of wetland. Portions of the property were extensively coal mined and streams will be constructed into poor quality spoil with the potential for acid generation and iron precipitation. Mr. Denicola has conducted extensive chemical and hydrologic data collection to characterize the construction material and has selected various mitigation techniques to prevent negative spoil influences on water quality. A combination of alkaline reagent, organic compost, aerobic wetlands, impermeable liners, and spoil excavation will be utilized to ensure acceptable water quality beneficial to establishment of aquatic habitat post-construction.

**Kanawha Mitigation Banks (Sapsucker Run and Yeager Fork), Mason County, WV**

The Kanawha Mitigation Banks will restore, enhance, and preserve a combined 61,000 feet of stream and 1.1 acre of wetlands. The properties were heavily timbered and traversed by access routes. Surface disturbances have heavily altered hydrology and impacted stream corridor geomorphology, floodplain, vegetation, and ecological function. Mr. Denicola has completed geotechnical rock drilling exploration to identify suitable material for stream restoration hydraulic structures, composed site SWPPPs and filed the application paperwork for the NPDES Construction Stormwater Permit, and coordinated county right-of-way decommissioning.

**Indian Creek Mitigation Bank, Ritchie County, WV**

The Indian Creek Mitigation Bank will restore 12,000 feet of stream and 0.66 acre of wetlands. Mr. Denicola reviewed the USACE Section 404 Permit Application and managed completion of credit projections and associated supporting information to ensure conformance to 33 CFR 332.

**Howards Creek Stream Restoration, Greenbrier County, WV**

The Howards Creek Stream Restoration will address a 4,000 foot stream corridor displaying impacts from urban development and channelization. Mr. Denicola oversaw aerial mapping to collect high resolution LIDAR and orthoimagery, and personally completed a geomorphic survey to collect water surface and thalweg data. High-resolution LIDAR imagery was used to identify bankfull and berm features. All empirical data will be utilized to

calculate bankfull area, shear stress, and stream power, and to compose a stream enhancement plan. Stream enhancement will achieve greater flood management in an area where standard restoration techniques are restricted by development.

**REGULATORY COMPLIANCE****Antero Regulatory Compliance, Doddridge County, WV**

Antero Treatment, LLC, operates a water treatment facility that requires onsite storage and handling of industry wastewater and regulated reagents. Mr. Denicola became intimately familiar with site-specific processes and oversaw completion of AST fit-for-service inspections. Mr. Denicola personally developed the SPRP and SPCC Plan in conformance with 47 CSR 63 and 40 CFR 112, respectively. Mr. Denicola prepared spill compliance training documentation and administered training to Antero personnel.

**Antero Treatment, LLC - Water Quality Monitoring, Doddridge County, WV**

Mr. Denicola performed stream and site-specific water quality and hydrologic monitoring in support of company operations. Monitoring included collection of field chemical parameters and laboratory samples for analysis of volatile organic compounds, poly-nuclear aromatic hydrocarbons, phthalate esters, petroleum related oils, metals, anions, and radionuclides. Monitoring required analysis of gases including methane and dihydrogen sulfide. Flow data was collected using a USGS Wading Rod with a Marsh-McBirney flow meter and cross-sectional area method.

**Regulated Mining Property AMD Treatment and Refuse Research Study, Sequatchie County, TN\***

An extensively reclaimed, regulated mining property treats acidic groundwater emanating from various locations. Mr. Denicola conducted an assessment of various treatment options ultimately identifying a potentially more cost-effective method of meeting NPDES compliance at several discharge points. In addition, Mr. Denicola was involved with a treatment test cell study to assess techniques for mitigating acid production in mine spoil, in attempt to eliminate the need for long-term AMD treatment.

**Watershed Based Plan and Quality Assurance Protection Plan\***

As a responsibility of project management, Mr. Denicola composed a Watershed Based Plan (WBP) and Quality Assurance Protection Plan (QAPP) for approval by the United States EPA. The WBP identifies priority remediation sites to meet compliance with West Virginia DEP Total Maximum Daily Loads (TMDL) requirements for the WV 303(d) list of impaired streams. In addition, Mr. Denicola composed a QAPP to ensure that the U.S. EPA-accepted sampling and data handling protocols were being utilized universally across all staff members and sampling events within the watershed.

*\* Work performed prior to joining CEC*

**WORKSHOPS**

Construction Oversight Workshop to aide watershed remediation project managers in addressing the critical details of AMD treatment system construction, West Virginia DEP (8-Hour)

Action Planning Workshop to aide non-profits in project development, West Virginia DEP (8-Hour)

**PRESENTATIONS**

West Virginia Mine Drainage Symposium, Morgantown, West Virginia; March 2018: Stream Restoration in Mining Impacted Watersheds, WV. Civil & Environmental Consultants, Inc., Bridgeport, WV.

Mid-Atlantic Stream Restoration Conference, Baltimore, Maryland; September 2017: Stream Restoration on Coal Mining Impacted Properties, West Virginia. Civil & Environmental Consultants, Inc., Bridgeport, WV.

In Proceedings, Geological Society of America, Denver, Colorado; October 2013: Geochemistry of Mine Pool Discharges in the Pittsburgh Coal Basin. Paper No. 245-9. Denicola, T. 2013.

## Randolph M. Calkins, P.S.

### Senior Consultant

Mr. Calkins has 40 years of experience specializing in abandoned mine lands reclamation as both a project manager and principal designer. He has completed more than 80 abandoned mine lands projects in Ohio and West Virginia, 11 of which involved groundwater studies to determine if local aquifers had been impacted by past mining operations. Investigations involved groundwater sampling and reporting, overburden sampling, delineating the extent of past mining operations, geology and hydrology of the study area, and developing mitigation alternatives for affected residents.

Mr. Calkins is experienced in reclaiming drastically disturbed mine lands for both small and large, more-complex abandoned mine lands sites. One project included more than 300,000 cy (cy) of regrading, 15,000 linear feet (lf) of drainage conveyances and an estimated construction cost of nearly \$3 million.

Mr. Calkins has designed sixteen passive acid mine drainage treatment systems ranging from simple limestone beds to complex interactive systems that boost AMD pH to precipitate metals, settle and filter dissolved metals, and polish effluent water with alkalinity prior to release of near neutral waters from project areas. His expertise includes coal mine, 404/401, and NPDES permitting, overburden and water sampling, coal reserve studies, surveying, road construction, dam construction, and ALTA surveys. Mr. Calkins is skilled with AutoCAD, SurvCAD, Haestads, HydroCAD, HY8, and AMD Treat.

### PROJECT EXPERIENCE

#### Norton Highwall #1, Randolph County, WV.

Project Manager on this \$2,200,000 abandoned mine lands reclamation project. The reclamation design eliminated 8,900 lf of highwall with 170,000 cy of earthwork. The project had 53 acres of clearing and grubbing and revegetation, 11,145 lf of drainage ditches, and 940 lf of installed pipes of varying sizes. The project had fifteen (15) wet mine seals, seven subsurface drains totaling 1,500 lf, and involved sediment and erosion control with an approved NPDES permit. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation with five (5) piezometers set to monitor the mine pool during initial investigations, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

#### Tub Run Highwall and Refuse Phase II, Tucker County, WV.

Project Manager on this \$2,800,000 abandoned mine lands reclamation project. The reclamation design eliminated 12,500 lf of highwall with 309,000 cy of earthwork. The project had 114 acres of clearing and grubbing and revegetation, 11,400 lf of drainage ditches, and 9,500 feet of constructed access road. The project had four (4) wet mine seals and involved sediment and erosion control with an approved NPDES permit. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation with one (1) piezometer set to monitor the mine pool during initial investigations, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

#### Tub Run Highwall and Refuse Phase I, Tucker County, WV.

Project Manager on this \$2,300,000 abandoned mine lands reclamation project. The reclamation design eliminated 10,000 lf of highwall with 265,000 cy of earthwork. The project had 74 acres of clearing and grubbing and revegetation, 9,900 lf of drainage ditches, four (4) pipes, an 8-foot by 8-foot box culvert installation, stream bank protection, and 8,500 feet of constructed access road. The project involved sediment and erosion control with an

### EDUCATION

A.S., Surveying Engineering, The Pennsylvania State University

### REGISTRATIONS

Professional Surveyor

WV No. [REDACTED]

### AWARDS

1998 Associated Builders and Contractors Award of Excellence for Zebs Creek Highwall AML Design.



approved NPDES permit and ACOE permit to install the box culvert and associated stream bank protection. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Greenbrier Hollow Refuse, McDowell County, WV.**

Project Manager on this \$834,000 abandoned mine lands reclamation project. The reclamation design removed a cast-over-the-hill coal refuse pile located directly behind the First Baptist Church of McDowell to a stable configuration that involved 51,000 cy of earthwork. The project included two (2) wet mine seals and 8 acres of vegetation. The project had 1,015 lf of drainage ditches, two (2) manholes, and a temporary stream crossing. The project involved extensive coordination with utility companies having lines inside the project area. The project involved treating AMD during mine dewatering and construction, and a sediment control plan and approved NPDES permit to control construction runoff. Other permits completed for the project included MM109 permits to work in the right-of-way of State roads and a USACE permit for the stream crossing. The project involved topographical surveying to supplement project mapping, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Sauls Run (Carpenter) Landslide, Lewis County, WV.**

Project Manager on this \$450,000 abandoned mine lands reclamation project. The reclamation design involved mitigation of a landslide within five feet (5') of the Carpenter residence. The project involved assessing mitigation alternatives with stabilizing the slide as the preferred alternative. The project involved 40,000 cy of earthwork. The project involved 7 acres of vegetation and had 610 lf of drainage ditches, three (3) pipes, one (1) manhole, and subsurface drains to transport groundwater from the slide area. The project involved extensive coordination with utility companies having lines inside the project area. The project involved topographical surveying to develop project mapping, a subsurface investigation with eight (8) boreholes to delineate the slip plane and monitor groundwater levels. The project involved a sediment control plan, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Pageton (Lambert) Portals, McDowell County, WV.**

Project Manager on this \$1,100,000 abandoned mine lands reclamation project to remove a cast-over-the-hill coal refuse pile to a stable disposal area that involved 56,500 cy of earthwork. The project included twenty three (23) wet mine seals and one (1) dry mine seal installation with drainage pipes and 24 acres of vegetation. The project had 840 lf of drainage ditches, one (1) permanent pipe, nine (9) temporary pipes, and a temporary stream crossing. The project involved extensive coordination with utility companies having lines inside the project area. The project involved treating AMD during mine dewatering and construction, and a sediment control plan and approved NPDES permit to control construction runoff. Other permits completed for the project included MM109 permits to work in the right-of-way of State roads and a USACE permit for the stream crossing, stream bank protection, and channel upgrading. The project involved topographical surveying to supplement project mapping, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Birds Creek Number Four, Preston County, WV.**

Project Manager on this \$920,000 abandoned mine lands reclamation project. The reclamation design eliminated 4,300 lf of highwall with 34,600 cy of earthwork. The project included nine (9) mine seals, including four (4) wet mine seals, four (4) bat gate mine seals, and one (1) dry mine seal installation with drainage pipes and 28 acres of vegetation. The project had 5,210 lf of drainage ditches, two (2) pipes, an AMD treatment plan during mine dewatering and construction, and a sediment control to control construction runoff. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation with four (4)

piezometers installed to monitor mine pools during initial investigations, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Church Creek/Manown Highwall, Preston County, WV.**

Project Manager on this \$2,600,000 abandoned mine lands reclamation design to eliminate 11,800 lf of highwall with 220,600 cy of earthwork. The project included twenty six mine seals, including 21 wet mine seals, two dry mine seals, and two bat gate installations with drainage pipes and 85 acres of vegetation including 17 acres of reforestation complying with the ARRI five step process. The project had 14,882 lf of drainage ditches, one pipe, an AMD treatment plan during mine dewatering and construction, and a sediment control to control construction runoff. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation with nine piezometers to monitor mine pools during initial investigations, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Racine (Bradshaw) Portals, Boone County, WV.**

Project Manager on this \$445,000 abandoned mine lands project. Several abandoned deep mine entries are located near a group of homes along County Route 94. The reclamation design involved six non-contiguous sites requiring approximately 2,500 cy of earthwork to backfill the sites to approximate original contours and 5 acres of revegetation. Sixteen abandoned mine entryways had mine seals installed, including six wet mine seals, two dry mine seals, and eight bat gate installations with drainage pipes. Most of the abandoned mine entryways were located across Short Creek that required an Army Corps 404 permit to gain construction access. The project had 1,062 lf of drainage ditches, nine pipes, an AMD treatment plan during mine dewatering and construction, and a sediment control plan to control construction runoff. The project involved topographical surveying to supplement project mapping, soil and refuse testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Hampton Number Four Maintenance, Boone County, WV.**

Project Manager on this \$970,000 abandoned mine lands project. An abandoned sidehill coal refuse fill center ditch has failed resulting in coal refuse washing into Spruce Laurel Fork, a trout fishery. The reclamation design involved filling the erosion breach (up to forty feet deep in spots) with soil borrow material and installing a six foot flat bottom ditch lined with a concrete filled fabric liner. Other project highlights include removal of petroleum contaminated soil, construction of 2,927 lf of ditches with engineered lining, grout filled fabric streambank protection, 25,000 cy of earthwork, upgrading an existing bridge to allow construction traffic, 4,180 lf of sediment control, and revegetation of 16 acres. The project involved topographical surveying to supplement project mapping, a subsurface and geological investigation, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Howesville Sites, Preston County, WV.**

Project Manager on this \$1,580,000 abandoned mine lands project. The reclamation design involved two non-contiguous sites with approximately 4,000 linear foot of highwall requiring 63,000 cy of earthwork to backfill. The reclamation design involved 5,676 lf of ditches with engineered lining, 91 lf of pipe from 12" to 24" in diameter, grouted riprap streambank protection, 11 wet mine seals, 4 wet mine seals with bat gates, AMD treatment plan during mine dewatering and construction, 17,700 linear foot of sediment control, and revegetation of 35 acres. The project involved topographical surveying of 46 acres to develop project mapping, a subsurface and geological investigation with four piezometers set to monitor mine pools during initial investigations, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Sandy Run Highwall and Portals, Preston County, WV.**

Project Manager on this \$1,026,000 abandoned mine lands project. The reclamation design involved approximately 1,850 lf of highwall requiring 47,200 cy of earthwork to backfill. The project also included 4,148 linear foot of designed ditches with engineered lining, 258 lf of pipes ranging from 18" to 36" in diameter, a drop inlet, grouted riprap streambank protection, 6 wet mine seals, AMD treatment plan during mine dewatering and construction, 8,800 linear foot of sediment control, and revegetation of 17 acres. The project involved topographical surveying of 22 acres to develop project mapping, a subsurface and geological investigation, water and soil testing, preliminary designs, final designs, specifications, calculation brief, bid schedule, engineer's estimate of probable construction costs, pre-bid and pre-construction conferences, and monthly reports, and invoicing.

**Laurel Valley (Daniels) Landslide, West Milford, Harrison County, WV.**

Project Manager on this Emergency abandoned mine lands Project. Due to the emergency classification, fieldwork and generation of construction plans and specifications was on an accelerated time frame. Cast-over-the-hill mine spoil had slipped against a single family dwelling in the Laurel Valley Subdivision. The project involved removing slipped material to a stable slope configuration and placing excavated spoil against a nearby orphan highwall. The \$ 217,000 reclamation project included 13,000 cy of excavation; elimination of approximately 500 lineal feet of highwall; hydraulic and hydrologic design of 181 lineal feet of ditches, 801 lineal feet of pipes, three (3) drop inlets, and a manhole. Drainage control from the reclaimed site was problematic on this project and required collection of storm water runoff and ground water into a 615 foot long pipe that was constructed along Oak Street to the nearest existing drainage system. Construction of this piping system projected along a road through a subdivision. Other project highlights include a sediment control plan, subsurface drains, and a revegetation plan.

**Weaver Highwall and Mine Drainage - Barbour & Randolph Counties, WV.**

Project Manager on this \$2,500,000 abandoned mine lands Project. The project involved approximately 4,200 lf of highwall varying in height from 25 feet to 50 feet; at least 20 collapsed openings, thirteen (13) of which were 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 impacted down gradient residents. Historic water data estimates of acid mine drainage flowing from the seeping collapsed portals was 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 cy 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 USACE Nationwide 27 Permit was obtained for the construction Project.

**Sauls Run Strip and Landslide Emergency, Lewis County, WV.**

Project Manager on this \$985,000 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, and included 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 threatening three (3) homes located in Lewis County, West Virginia. The project also involved removing and regrading approximately 50,000 cy 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 (2) reclamation

plans. One plan stated to 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.

**Dillsworth Landslide, Tunnelton, West Virginia.**

Project Manager on this \$200,000 Emergency abandoned mine lands Project. The abandoned Kingwood Gas, Coal, and Iron Company was impacting the Dillsworth residence. A small outbuilding located behind the Dillsworth garage has collapsed due to excessive soil pressures from upgradient saturated, unstable slopes. In addition, the Dillsworth basement and garage were constantly being inundated with alkaline mine water. The project involved installation and construction of an 84-foot long by 18-foot high Gabion Basket Retaining Wall and three (3) Subsurface Drains to capture and divert uncontrolled deep mine drainage, groundwater, and surface water around the Dillsworth basement and garage.

**Ohio Abandoned Mine Lands Projects, ODNR - Flint Run Acid Mine Drainage Reclamation Project, Jackson County, Ohio.**

Project Manager on this \$1.3 million abandoned mine lands Reclamation Project. 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 cy of material to install and construct site drainage conveyance structures through and around the Project area. An additional 207,600 cy 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 cy of material will be moved to construct passive acid mine drainage treatment systems and approximately 42,143 cy 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 lf of vegetation lined "vee" bottom ditches, 4,200 lf of rock riprap "vee" bottom ditches, and 8,750 lf of flat bottom and broad crested spillway rock riprap channels. A 24-inch, twin 30-inch and 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.

## Gregory S. Linder, P.E.

### Principal

Mr. Linder's project experience has included the design, inspection, evaluation, and rehabilitation of highway and railroad bridges; secondary responsibilities have included all aspects of roadway design, hydrologic and hydraulic analyses, civil/site engineering, and permitting.

Mr. Linder has been involved with the engineering design and/or inspection of numerous 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 bridge design, Mr. Linder has been involved with roadway design, floodplain evaluation projects, streambank protection projects, site development projects, and environmental projects.

### PROJECT EXPERIENCE

#### Mining

##### Permit D-35-82, Gladly Fork Mining Inc., Upshur County, WV

Project Manager responsible for oversight, design, and plan preparation for the design of an acid mine drainage treatment facility. The project involves the civil, structural, process, mechanical, and electrical engineering design of a remotely operated 2,000 gallon per minute treatment facility. The facility includes intake boreholes, flow control, mechanical aeration basins, variable speed flocculators, chemical injection buildings, settling basins, sludge thickeners, and sludge removal equipment. The project also includes design of two access roads with a bridge over the Right Fork of Stonecoal Creek.

##### ICG/Arch Coal Sentinel Mine, Philippi, WV

Project manager responsible for oversight, design, and plan preparation for structure modifications at the Sentinel Mine. The project consisted of: column and beam strengthening of a building to increase hoist capacity from 10 to 15 tons; repairing/strengthening columns on the refuse bin and installing reinforced concrete barriers to guide trucks through the loadout without impacting the support columns; installing new cables on the wash thickener to re-plumb the drive unit.

##### ICG/Arch Coal Tygart Mine, Grafton, WV

Project manager responsible for oversight, design, and plan preparation for new structures at the Tygart Mine. The project consisted of: design of 400 linear feet of tunnel extension; design of a stacked tubes; and design of a radial stacker pad.

##### ICG/Arch Coal Wolf Run and Bismark Mines, Sago and Bismark, WV

Project manager responsible for oversight, design, and plan preparation for the structural design of a beltline extension at the Bismark Mine. The project consisted of: structural inspection of the beltline tube at Wolf Run prior to relocation to Bismark; tower and foundation design at the Bismark Mine; floor slab and foundation design for the drive assembly.

##### Laurel Mountain Wind Farm Operation and Maintenance Building, Elkins, WV

Project manager responsible for oversight, design, and plan preparation for the structural design of a beltline extension at the Bismark Mine. The project consisted of: structural inspection of the beltline tube at Wolf Run prior to relocation to Bismark; tower and foundation design at the Bismark Mine; floor slab and foundation design for the drive assembly.

### EDUCATION

B.S., Civil Engineering, West Virginia University

B.S., Biology, Fairmont State College

### REGISTRATIONS

Professional Engineer

• WV

• PA

**Glady Fork Alkaline Mine Drainage Treatment Plant, Buckhannon, WV**

Project manager responsible for oversight, design, and plan preparation for the reinforced concrete of the following elements at the Glady Fork plant: aeration basin tank, flocculator tanks, control building floor slab, settling basin tanks, sludge thickener tank, and geotube slab.

**Hampton AML Site, Boone County, WV**

Structural Engineer responsible for the bridge inspection, rating, and strengthening of an existing bridge located on the road accessing the reclamation site.

**Stream Restoration and Streambank Protection****Laurel Lake Sediment Removal Project, Mingo County, WV**

Project Manager responsible for oversight, design, and plan preparation for the sediment removal project. The project involves the removal of seven (7) feet of sediment in the upper portion of the lake to restore recreational benefit. The project also includes 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.

**Parchment Valley Streambank Protection, Jackson County, WV**

Project Manager responsible for oversight, design, and plan preparation for a streambank protection project near Ripley, WV. The project involved geotechnical investigation and riprap revetment design.

**Berger Slope Failure, Brooke County, WV**

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

**Fisher Landslide Stabilization, Jackson County, WV**

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

**Cairo Streambank Protection, Ritchie County, WV**

Project Manager responsible for oversight, design, and plan preparation for a streambank protection project in Cairo, WV. The project involved structure stabilization to a commercial business and a riprap revetment design.

**Barkers Creek Streambank Protection, Wyoming County, WV**

Project Manager responsible for oversight, design, and plan preparation for a streambank protection project in Bud, WV. The project involved structure stabilization to a local residence and a riprap revetment design.

**Structural-Bridge****US Route 35, Mason County, WV\***

Project manager responsible for oversight, design, and plan preparation for structures carrying US Route 35 over Threemile Creek and Twomile Creek near Point Pleasant, WV. The Threemile Creek bridge consists 414.5' dual plate girder structures that are both 44.5' wide. The bridge substructure consists of integral abutments and cap and column piers supported on pile foundations. . The Twomile Creek bridge consists 106.75' dual plate girder structures that are both 44.5' wide. The bridge substructure consists of integral abutments.

**Mile Branch Truss Bridge, McDowell County, WV**

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

**Upper Tract Bridge, Pocahontas County, WV**

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

**SR4027 over Bentley Creek, Bradford County, PA\***

Project manager responsible for oversight, design, and plan preparation for the design build project. The project consisted of superstructure replacement of the 159-foot, continuous P/S adjacent box beam bridge crossing Bentley Creek. The project also involved 412' of new two-lane roadway design.

**Mon/Fayette Expressway, S.R. 0043, Section 52G, Washington County, PA**

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

**Allegheny County Bridge Inspection Program, Allegheny County, PA**

Staff Engineer responsible for conducting National Bridge Inspection Standards (NBIS) inspections and load ratings for approximately 20 bridges comprised of a variety of structural forms and materials, including steel, concrete, and wooden elements. Regional Transit Authority\* Inspection Team Leader responsible for the in-depth inspection of three railroad bridges and three culverts. Two of the bridges were twin, rolled-beam structures; and the other bridge was a twin, built-up girder structure. Two of the culverts consisted of 96" corrugated metal pipes and the other culvert was a 371' twin box culvert.

**Star City Bridge (WV Route 7) Over the Monongahela River, Monongalia County, WV\***

Assistant Investigator 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.

**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), Allegheny County, PA**

Project Engineer. The project included structural inspection for each bridge and preparation of the inspection reports. After evaluation, it was determined XC01 and LC09 would need replaced. CT03 would need rehabilitated. Plans and construction sequences for emergency repairs were developed for XC01 and LC09. Subsequent to the structural inspection and emergency repairs, preliminary design was performed for the replacement of XC01 and LC09, and the rehabilitation of CT03. Responsibilities included the preparation of Erosion and Sediment Control Plans, and Hydrologic and Hydraulic Reports for each structure, and preliminary design.

**Transportation****Enterprise/I-79 Connector, U.S. Route 19 to I-79, Environmental Assessment, Marion County, WV**

Staff Engineer 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-foot lanes and two 8-foot shoulders. Plans, profiles, and preliminary construction cost estimates were prepared for each alternative alignment. The environmental assessment will contain discussion of the impacts associated with each alternative and will identify the preferred alternative.

**Enterprise/I-79 Connector, U.S. Route 19 to I-79, Biological Assessment, Marion County, WV**

Staff Engineer 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 is expected to issue a Biological Opinion.

**Meldahls Undercut Site, Wood County, WV**

Staff Engineer responsible for providing environmental services for track rehabilitation. The existing embankment was to be removed and backfilled with engineered fill. The existing soil was sampled and tested for contaminants before disposal. Responsibilities included reviewing laboratory analyses of soil samples taken within the railroad right-of-way, documenting the findings, and providing recommendations in report format.

**U.S. Route 35, Mason County, WV\***

Project Manager responsible for oversight, design, and plan preparation for the 1.85 mile section of four-lane divided highway. The section of highway also includes dual 414.5' bridges over Three Mile Creek and dual 106.75' bridges over Two Mile Creek. In addition, the project includes 0.62 miles of side road relocation, a reinforced concrete box culvert carrying an access road over Twomile Creek, waterline relocation plans, and natural stream design.

**Appalachian Corridor H, Davis to Bismark, Tucker and Grant Counties, WV\***

Project Manager responsible for oversight, design, and plan preparation for the 1.61 mile section of four-lane divided highway near Davis, WV.

**Weatherford Industrial Access Road, Upshur County, WV\***

Project Manager responsible for oversight, design, and plan preparation for the 0.56 mile industrial access road in Buckhannon, WV.

**King Coal Highway, Mingo County, WV**

Staff Engineer responsible for designing the roadway and drainage system for a 3.2-mile section of the 96-mile, four-lane divided highway.

**TRAINING**

OSHA-Construction Training (10-Hour)

## Dennis E. Miller, P.S.

### Senior Principal

Mr. Miller has 28 years of experience in Abandoned Mine Land & Land Restoration, Acid Mine Drainage, Airport Surveying, Geodetic Control Surveys, High Accuracy Monitoring. He has worked on both private and public sectors and has noteworthy experience in the policies and procedures within WVDEP, WVDOT, FHWA, FAA.

### PROJECT EXPERIENCE

#### West Virginia Department of Environmental Protection

Mr. Miller was the Program Coordinator for the planning, development and implementation of the work plan to successfully survey & map abandoned mine sites in West Virginia. This project included the aerial photography / aerial mapping, by both film and LiDAR, geodetic ground control which included over one-hundred-twenty observation points, photo control points, ground surveying and mapping and quality control. The final mapping was used by various design consultants for the abatement of abandoned mine sites throughout WV.

#### West Virginia Department of Transportation (Independent Payment Verification)

Mr. Miller was the Program Coordinator/Project Manager and served as a field crew member for the past five years on the independent payment verification for the King Coal highway Red Jacket Section. He was responsible for the Independent Payment Verification Reconciliation Report as required by WVDOT and the FHA on 11.37 miles of four lane divided highway which is an active coal mining & construction site. Mr. Miller organized a team of professionals and developed a strategy for the project. The first year the team collected over 23,000 points of conventional & GPS survey data in four days and the second year over 27,000 points of conventional & GPS data was collected in four days. This project is the first FHA sponsored project that the post mining land use from the coal mining activity is a four lane divided highway; this is a public private partnership.

#### Project Impact Randolph Tucker Partnership

Mr. Miller was the office manager and served as project manager on the planning, development and implementation of the work plan to successfully install and blue book sixty-five (65) new USGS bench mark monuments within Randolph and Tucker Counties in West Virginia. This project was completed in forty-five (45) days to comply with the funding mechanism and involved three offices and over fifteen employees.

#### Source Water Assessment Program

Mr. Miller was responsible for the overall project management of the Source Water Assessment and Protection Program (SWAP). The purpose of the project was to complete source water assessments and protection plans for fifteen (15) communities in West Virginia, public water supply systems utilizing surface waters to determine past and present possible contaminants. Mr. Miller managed the inventory of all field and researched data including, agency database research, windshield surveys data, field & office GIS & GPS data collection on each site and sub-site, chemical & biological water quality monitoring results for each site, and the development of the Arc View - Access data management tool, and final report compilation. Responsibilities included data collection (which consisted of visiting several sites throughout West Virginia to GPS possible source water contaminants within a pre-determined zone of critical concern), compiling information from various water treatment plants throughout the state, report compilation and assistance with the development of GIS mapping.

#### Charleston Newspaper Parking Garage Design Build

Mr. Miller was the Principal in Charge and overall civil/surveying project manager and civil/survey point of contact for the Design Build of the 340 space parking garage. The design build team had to be able to overcome the physical limitation of the site and maintain the budgetary requirements. The 4-story above ground and 1-story below grade parking garage presented several design and construction challenges for the civil/survey group. The City of Charleston stormwater management required that stormwater discharge into the existing system - a six inch or smaller pipe. The design required an eighteen inch pipe. The civil group developed stormwater storage throughout

### EDUCATION

A.S., Surveying, Glenville State College

### REGISTRATIONS

Professional Surveyor

- WV
- SC

### PROFESSIONAL AFFILIATIONS

Contractors Association of West Virginia

Ohio Oil & Gas Association



the system and achieved the desired discharge without additional cost to the client. Mr. Miller was able to meet the design and construction schedule on budget while meeting the city of Charleston's storm water collection requirements. The overall success of this design build project was having strong communication and coordination between all the stakeholders associated with this project.

**West Virginia Health Right**

Mr. Miller was the Principal-in-Charge and overall civil/surveying project manager and civil/survey point of contact for the Design Build of the 14,000 SF Health Right clinic. West Virginia Health Right treats around 135 patients per day and is a free clinic; they needed a new facility and had limited funding. This was a very unique project, the contractor offered to perform services at cost without profit, and when we were asked to participate we agreed to do the same. Mr. Miller organized a team of civil and survey staff to complete the project in a short timeline with minimal cost to the client resulting in a successful design build project.

**West Virginia Midstream & Phase I Environmental Site Assessment, WV**

Mr. Miller is experienced in pipeline and well connects turnkey development. Work included GIS desktop review, pricing and proposals, routing, surveying & mapping, GIS preliminary alignment sheets. Mr. Miller possesses an understanding of NWP 12 & PCN's (2012) regional conditions effecting environmental ECO stream and wetland delineations and reporting, phase 1 environmental site assessments, coordination with cultural resources sub-consultant on due diligence reporting, alignment sheets, understanding of Align DB, and LOD or ROW stake out, property surveys, as-built surveys, WVDOT coordination and access road permitting.

**West Virginia Upstream Well Pad Development, WV**

Mr. Miller served as surveyor in charge and signed over 100 well plats in West Virginia for various oil and gas companies. Work included geodetic control, topographical mapping and boundary determination or verification for well plat and pad development. He performed pre-drill water sampling for oil and gas well permitting. Mr. Miller prepared pricing and proposals, surveying and mapping, oversight of well pad design and plan development, well plat development, construction observation, well pad as-built, oversight of fresh water pond design and plan development, fresh water pond construction observation and as-built.

**Ohio Upstream Well Pad Development and Permitting**

Mr. Miller is experienced in well pad development and permitting. Work included pricing and proposals, surveying and mapping, well pad design and plan development, well plat development, construction observation, well pad as-built, fresh water pond design and plan development, fresh water pond construction observation and as-built, NWP -12 environmental due diligence reporting, phase 1 ESA's, cultural resources due diligence reporting requirements.

**Ohio Midstream Eco Services**

Mr. Miller is experienced in pipeline and well connects turnkey development including GIS desktop review, pricing and proposals, routing, surveying & mapping. He possesses an understanding of NWP 12 & regional conditions effecting environmental ECO stream and wetland delineations and reporting, alignment sheets, LOD or ROW stake out. Work included property surveys, ODOT coordination, prepared alignment sheets for six (6) pipelines totaling approximately 29 miles. Mr. Miller worked with the design team submitting construction documents for six (6) CDP sites and preliminary design and ECO services for four (4) CF facilities.

**Buckhannon Upshur Airport Surveying, Buckhannon, WV**

Mr. Miller was the party chief and project manager responsible for field surveying and construction layout efforts on this airport project in Buckhannon.

**Nationwide WAAS Airport Obstruction Surveying, Nationwide**

Mr. Miller was the program coordinator and project manager, responsible for the overall program development for nationwide WAAS surveying. Mr. Miller performed all field surveying associated and described in AC 150 5300 16A, 17B & 18B including PACS & SACS reestablishment, photo control, runway end, runway centerline, NAVAIDS surveying, UDDF submission.

## Matthew K. Bainbridge, E.I.T.

### Project Manager II

Mr. Bainbridge possesses a background in civil engineering and land surveying. He has worked on everything from boundary surveys to large scale design projects.

### PROJECT EXPERIENCE

#### Two Lick Dam Removal, West Fork River, Clarksburg, WV

Set Geodetic Control, perform LiDAR Scan of Bridge Structure and surrounding topography, and produce Bridge Stabilization Drawings showing As-Built conditions of Suspension Bridge prior to Dam Removal downstream. A LiDAR Scan post dam-removal will be performed to assess any changes in the bridge.

#### County Road Improvements for Well Pad Project Lidar Scan, Confidential Client, Pennsboro, W

LiDAR Scan of Bunnell Run Run Road in support of a Well Pad Project. Terrestrial LiDAR data was collected along approximately 1 mile of rural roadway and basemapping created for design of the necessary improvements to the county road in Richie County, WV.

#### County Road Improvements for Well Pad Project Lidar Scan, Confidential Client, Fairmont, Marion County, WV

LiDAR Scan of County Road in support of a Well Pad Project. Terrestrial LiDAR data was collected along approximately 1 mile of rural roadway and basemapping created for design of the necessary improvements to the county road in Marion County, WV.

#### WV RT 50 Lidar Scan,, Confidential Client, WV

iDAR Scan of approximately 1 mile of WV Route 50 and intersecting roads, and basemap and surface compiled for turn lane design and road improvements as a result of a Natural Gas Client's development in that area.

#### Low Altitude UAV LiDAR As-Built, Rum Creek Connector WVDOH, Logan, WV

UAV-based acquisition of LiDAR and georeferenced Photography for As-Built of the 8 mile highway project prior to the grand opening in Logan, WV. Involved the collection of 2.5 billion LiDAR data points along an 8 mile highway corridor including hill cuts upwards of 700-feet in elevation relief.

#### UAV LiDAR – Various Highway improvement projects, Various, WV

UAV-based acquisition of LiDAR and georeferenced Photography for detailed mapping of proposed highway upgrade projects across the state of West Virginia. Collection of data over more than 30 miles of roadway throughout the entire state over a 3 month time period using UAV data exclusively to produce detailed existing conditions mapping.

### Aerial LiDAR and Mapping

#### Low Altitude LiDAR Well Pad As-Built, EQT, Cameron, Wetzel County, WV

UAV-based acquisition of LiDAR and Photography of existing well pads, and production of As-Built drawing sets.

### Building and Site Design

#### Pharmacy Site and Revit Building Design, White Hall Pharmacy, White Hall, Marion County, WV\*

Design of Building and Site for Whitehall Pharmacy in Fairmont WV.

#### Grant Avenue Site and Building Design, Rod Everly, Morgantown, Monongalia County, WV\*

Design of Building and Site for Grant Ave Apartment Complex in Morgantown WV

#### UFCU Site and Building Design, UFCU, Morgantown, Monongalia County, WV\*

Design of Building and Site for two Locations of United Federal Credit Union in Morgantown WV

### EDUCATION

*B.S., Civil Engineering Technology, Fairmont State University*

*B.S., Mathematics, Fairmont State University*

### REGISTRATIONS

*Engineer in Training*

WV [REDACTED]

*Surveyor Intern*

WV [REDACTED]

### PROFESSIONAL AFFILIATIONS

*American Society of Civil Engineers*

**Oil and Gas**

**Oil and Gas Infrastructure Design and Permitting\***

Design of Well Pads and Roads, Mapping of Oil Fields, and Permitting of existing and new drilling for shallow horizontal and vertical wells

**Marcellus Well Plats, Southwestern Energy Company, Valley Grove, Ohio County, WV**

Production of well plat package with ownership for Marcellus Well 6A1 permit.

**Survey and Land Subdivision**

**Potomac Valley Overlook Subdivision, North American Land, Milam, Pendleton County, WV\***

Survey and Subdivision of 2000+ Acres of Potomac Valley Overlook in Grant and Pendleton Counties, WV. E&S Design, Permit Drawings and NPDES Permit Applications for 9 individual phases of construction.

**Terrestrial LiDAR Survey and 3D Modeling**

**Owens Corning LiDAR and Modeling, Varo Engineers, Newark, Licking County, OH**

Terrestrial LiDAR acquisition of 14,000 SQ FT Furnace at the Owens Corning Fiberglass plant. LOD300 3D Model created in AutoCAD from Point Cloud, and adjusted to plant control.

**Marble Cliff - LiDAR Subsidence Analysis, Marble Cliff Apartments, Columbus, Columbus County, OH**

Terrestrial LiDAR scan of Interior and Exterior of multiple apartment buildings that were experiencing significant subsidence. Floor elevation maps created showing the specific areas and extent of subsidence.

**New Castle Power Plant - LiDAR As-Built, Mitsubishi Hitachi Power Systems, New Castle, PA**

Establishment of Plant Control and LiDAR As-Built scan and 3D model for Natural Gas Conversion of the power plant. Pipes and Structural Steel objects were created and delivered in Microstation DGN format at the client's request.

**Joliet Dolomite Mine - LiDAR As-Built, Q4 Impact Group, LLC, Joliet, IL**

LiDAR Scan of entire Dolomite Mine 500 foot below ground in complete darkness. Produced as-built model of conditions of 100-foot tall pillars. Cross sections of pillars delivered to client for structural analysis.

**Compressor Facility LiDAR As-Built, Eureka Hunter Pipeline, Pine Grove, WV**

Terrestrial LiDAR As-Built of 40 acre compression facility, basemap and as-built 3D model creation. Created an asset management inventory that dynamically linked to truvIEWS in an ArcGIS Online map environment with attribute data on all valves such as detail photographs, serial number, manufacturer, and inspection data.

**Nestle Purina LiDAR As-Built and 3D Modeling, Varo Engineers, Zanesville, OH**

LiDAR As-Built of 4 story Nestle Purina facility and 3D model produced of the structure and all equipment inside for the client to use for design.

**LiDAR As-Built of Stream Restoration, Ecosystem Investment Partners, LLC, Logan, Logan County, WV**

As-Built Survey of over 20 miles of constructed natural stream channel using Terrestrial LiDAR and production of As-Built surfaces and breaklines. Truview Global creation and linking via QR code to As-Built sheet sets.

*\* Work performed prior to joining CEC*

**PRESENTATIONS**

Bainbridge, M. K. "Low-Altitude Aerial LiDAR in dense canopy and steep terrain." WVDOH 2017 Survey Conference. Canaan, WV May 15, 2017

Bainbridge, M.K. "Terrestrial LiDAR for Asset Management." HxGN Live 2016, Anaheim, CA June 5, 2016



## Jason H. Littler, P.S.

### Senior Project Manager

Mr. Littler has over 19 years of experience with responsibilities including such positions as Roadway Designer and Survey Project Manager. He has performed roadway design, site civil design, drainage computations, construction layout, earthwork volumes, topographical surveys, aerial mapping control surveys, boundary surveys, WVDOH right of way plan development, courthouse research, deed work maps, survey plats, survey descriptions, earthwork volume computations, hydrology computations, WVDOH waste permits, plan preparation, subdivision plats, cell tower surveys, oil and gas landowner exhibits, pipeline as-built, pipeline alignment sheets, pipeline routing, fine grade computations, and survey field crew management.

He has been in direct charge with as many as 8 survey crews, which all reported to him and were supervised by him for direction and client satisfaction. He has been in professional charge of several boundary surveys ranging in size from small lot and partition surveys to large multi-tract 1000 acre surveys. He has performed numerous ALTA/NSPS land title surveys all throughout West Virginia for various banks, title insurance companies and development companies.

### PROJECT EXPERIENCE

#### Surveys / Geomatics

#### WVDEP Office of Abandoned Mine Lands and Reclamation Northern Mapping Services, Northern WV Counties \*

Mr. Littler served as Survey Project Manager in charge of surveying and mapping on these individual Projects with the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands. This contract consisted of a 3 year assignment with the WVDEP and involved surveying and mapping services to be used for the design and construction of Abandoned mine lands projects located throughout the northern counties of West Virginia. Currently in the Northern contract, Mr. Littler has been in charge of the successful completion of the mapping for 40 individual projects with a total mapped acreage of 5,800 acres. Mr. Littler was responsible for the client maintenance, field visits, billing, invoicing and oversight for this three year assignment.

#### WVDEP Office of Abandoned Mine Lands and Reclamation Southern Mapping Services, Southern WV Counties

Mr. Littler served as Survey Project Manager in charge of surveying and mapping on these individual Projects with the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands. This contract consisted of a 3 year assignment with the WVDEP and involved surveying and mapping services to be used for the design and construction of Abandoned mine lands projects located throughout the southern counties of West Virginia. Currently in the southern contract, Mr. Littler has been in charge of the successful completion of the mapping for 53 individual projects with a total mapped acreage of 5,000 acres. Mr. Littler was responsible for the client maintenance, field visits, billing, invoicing and oversight for this three year assignment.

#### Pine Bluff Tipple Complex, Pine Bluff, WV\*

This project is a Bond Forfeiture site located in Pine Bluff, WV. Mr. Littler produced all original ground sections and monthly pay volumes for submittal to the State of West Virginia. He also constructed an as-built map of the completed site.

#### Robinson Run Overland Conveyor Project, Harrison County, WV

Mr. Littler served as Survey Project Manager in charge of surveying on this 4.1 mile, overland conveyor belt line being constructed for Consol Energy. This project consisted of the survey layout, volume computations, and as-built mapping of the 4.1 mile overland conveyor along with over 4 miles of access roads and over 500,000 cubic yards of excavation. Mr. Littler was responsible for the crew scheduling, reviewing of all data, final cross section data, checking of all computations.

### EDUCATION

*B.S., Engineering Technology -  
(Survey Emphasis), West Virginia  
Institute of Technology*

*A.S., Civil Engineering Technology,  
West Virginia Institute of  
Technology*

### REGISTRATIONS

*Professional Surveyor*

• WV # [REDACTED]

### CERTIFICATIONS

*Transportation Engineering  
Technician*

### PROFESSIONAL AFFILIATIONS

*Ohio Oil & Gas Association*

*West Virginia Society of  
Professional Surveyors*

**Robinson Run Preparation Plant, Harrison County, WV\***

Mr. Littler served as Survey Project Manager in charge of surveying on this 2200 TPH coal preparation plant being constructed for Consol Energy. This plant was built to replace the existing plant which had served its time. This project was unique in that the new prep plant was positioned directly behind the existing plant and the existing conveyor feed line to the plant was to only be extended from the old plant into the new plant. The tolerances on alignment tie in was minimal and final tie-in between the old conveyor feed line and the new conveyor feed line was accomplished in a couple of days with no misalignment problems.

**Tygart Valley Dam, Grafton, WV\***

Served as survey crew chief producing as-built surveying diagrams of piping within the dam. Surveying was conducted inside the dam for all as-built locations. Information was to be used for realignment of new pipes being replaced. Also performed original ground topography surveying for an access road leading to the base of the dam for access of equipment.

**Dolphin Communications, Bridgeport, WV\***

Mr. Littler performed a complete boundary survey of this tract and produced original ground mapping for the proposed road location to the new KISS FM radio station. Mr. Littler acquired all necessary permits and contracted all state agencies necessary for the construction of this road. He also performed runoff calculations and sized all culverts along the road.

**Taylor Creek Impoundment, Widen, WV\***

Mr. Littler was involved in this Abandoned Mine Land (AML) project. The project consisted of two (2) sites of which all original ground sections were produced and monthly pay volumes were submitted for approval.

**WVDOH-Red Jacket Postal Facility ALTA Survey, Mingo County, WV\***

Performed an ALTA/ASCM land title survey for this project. Mr. Littler served as Survey Project Manager coordinating all survey crews and managing the daily field collection of data in accordance to ALTA survey procedures along with utility coordination, record research and computations.

**Oil and Gas****Panhandle Gas Gathering System, Brooke, Ohio, and Marshall County, WV\***

Project Manager in charge of the development of the natural gas infrastructure for this gathering system located in WV. Was responsible for leading the surveying and engineering efforts for all gathering lines and well connects and associated CDP's and compressor stations associated with this system. Work consisted of route development, engineering alignment sheets, NWP 12 permit compliance, survey LOD stakeout, and survey as-built. Managed the conceptual through final design of these pipelines for operations in the Marcellus Shale. Individual projects included a broad range of permitting, civil engineering and construction oversight. Maintained close interaction with project team members (route development, land, permitting, construction, environmental, etc.) to ensure all engineering aspects of the project were considered, evaluated, and incorporated into the final pipeline design documentation. Coordinate survey staking with client, land department, engineering and surveying and surveying sub consultants. Worked with construction to answer and resolve engineering related questions or concerns, as well as changes that may occur during pipeline construction. Reported progress, hurdles, and road blocks to the client weekly so that solutions could be identified quickly to keep the project on a fast track schedule. Scheduled route development and environmental teams to meet client demands and project timelines. Supervised the survey layout and survey as-built of compressor facilities, CDP's, and natural gas pipelines. Total Project consisted of approximately 200 miles of pipeline route development, in which 150 miles was permitted for construction, 3 compressor stations and a CDP. Project consisted of 2 year time frame of development.

**Wheeling Pipeline, Access Midstream Partners, L.P., Wheeling, WV**

Survey Project Manager in charge of the as-built surveying of 4.7 miles of 12-inch gathering line in Ohio County, WV. In charge of the survey crews for collecting of the pipe tally information from actual pipe strung on the ground and

through pipe tally notes. Managed the generation of the pipeline tally report based upon data collection procedures performed in the field and data was produced on an approved client provided weld map spreadsheet template. Survey crews collected all attributed data required which was reported in the spreadsheet. The survey crew then obtained pipeline as-built data (x,y,z coordinate locations) at major PI's, OB's, Sag's, Weld joints, bends, valves, etc. along the Pipeline. Was an integral part of the office management quality control before final submittal.

**West Alexander Pipeline, Access Midstream Partners, L.P., Tridelpia, WV**

Survey Project Manager in charge of the Limits of disturbance stakeout of 2.4 miles of 12-inch gathering line in Ohio County, WV. In charge of the survey crew coordination of the stakeout, creating stakeout drawing files, and quality control of field stakeout data and progress meetings with the client.

**Cross Creek Pipeline and Well Connects, Access Midstream Partners, L.P., Tridelpia, WV**

Survey Project Manager in charge of the as-built surveying of a 2.0 miles of 6-inch gathering line, 2,000 feet of 6-inch well connect pipeline, and 2,800 feet of 6-inch well connect pipeline, all in in Brooke County, WV. In charge of the survey crews for collecting of the pipe tally information from actual pipe strung on the ground and through pipe tally notes. Managed the generation of the pipeline tally report based upon data collection procedures performed in the field and data was produced on an approved client provided weld map spreadsheet template. Survey crews collected all attributed data required which was reported in the spreadsheet. The survey crew then obtained pipeline as-built data (x,y,z coordinate locations) at major PI's, OB's, Sag's, Weld joints, bends, valves, etc. along the Pipeline. Was an integral part of the office management quality control before final submittal.

**Panhandle Pipeline Phase III, Access Midstream Partners, L.P., Wheeling, WV**

Survey Project Manager in charge of the as-built surveying of a 5.4 mile 12-inch gathering line in Brook County, WV. In charge of the survey crews for collecting of the pipe tally information from actual pipe strung on the ground and through pipe tally notes. Managed the generation of the pipeline tally report based upon data collection procedures performed in the field and data was produced on an approved client provided weld map spreadsheet template. Survey crews collected all attributed data required which was reported in the spreadsheet. The survey crew then obtained pipeline as-built data (x,y,z coordinate locations) at major PI's, OB's, Sag's, Weld joints, bends, valves, etc. along the Pipeline. Was an integral part of the office management quality control before final submittal.

**Midstream Gathering Pipelines, Antero Midstream, Various Counties, WV**

Project Manger overseeing the route development, alignment sheets, NWP 12 permit compliance coordination, survey LOD stakeout, and survey as-built of various natural gas pipelines throughout Doddridge and Ritchie Counties, WV. Pipelines consisted of approximately 1.68 miles of 20-inch, 2.96 miles of 16-inch, and 1.00 mile of 12-inch. The pipeline right-of-way consisted of a maximum 100-foot-wide construction easement with a typical 75-foot-wide permanent easement. The purpose of the Projects were to transport natural gas from existing well pads to valve tie-ins. Managed the conceptual through final design and peremitting of the pipeline for operations in the Marcellus Shale.

**Power****Laurel Mountain 138/34.5kv Substation, W.R. Casteel Co., Inc. Renewable Energy Services, Barbour and Randolph Counties, WV**

Survey Project Manager responsible for oversight of all survey layout and client management for the construction of this 138/34.5kv power substation which served as the collection point for the 65 turbine wind at the Laurel Mountain Wind Power Project. Project is scheduled for completion this year.

**Laurel Mountain Wind Power Project, Tennessee Valley Infrastructure Group, Barbour and Randolph Counties, WV\***

Survey Project Manager responsible for oversight of all surveying for the construction of this 65 turbine wind energy project. Located in the mountains of West Virginia the terrain is exceptionally challenging and surveying consisted of road layout, clearing limits stakeout, met tower layout, and centerline stakeout for 10 miles of access roads and associated spur roads. This project is scheduled for completion this year.

**TrAIL Co., Various Counties, WV\***

Worked with the design team on design, and plan preparation for the civil engineering design of approximately 12,500 LF. of access road, surveying and eventual survey layout of these roads for this transmission line that runs from Virginia, through West Virginia and into Pennsylvania. Performed survey layout for earthwork on the proposed tower locations.

**Greenland Gap Substation, Nedpower Mount Storm Wind Project, Grant County, WV\***

Project Manager in charge of surveying and scheduling for the layout of all elements of the Substation, which services the 138 Turbine wind farm discussed above. Professional Surveyor in Charge of quality control and checks and balances for the accurate location of all foundations on this 7 Acre Substation site.

**Nedpower Mount Storm Wind Project, Grant County, WV\***

Worked with the design team on design, and plan preparation for the civil engineering design for an 82 turbine wind farm project. The project includes 14.2 miles of access road design, drainage system design, and an erosion and sediment control plan. A phase 1A and Phase II have also been included on this project which consisted of an additional 56 wind turbines and over 8 miles of additional access road design. Also served as survey project manager performing all mapping, volume, boundary, etc which came about during the life of the project. Responsible for all day to day activities associated with the management of this project along with communications with all parties involved with the development of this large wind farm.

**Blacksville #2 Powerline, Greene County, PA\***

Survey Project Manager in charge of centerline surveying of approximately 17,500 feet of a proposed overhead transmission line for Consol Energy. Provided original ground centerline, 25 foot left, and 25 foot right profiles for wire clearances. Also in charge of clearing limits and property line locations along centerline. End product consisted of Plan and Profile sheets showing centerline, 25 foot left and 25 foot right original ground profiles. Project also consisted of field surveying of wire height sag of an existing 500 KV transmission line for identification of the lowest wire to ground clearance so the location of the proposed line met clearance requirements.

**Cambell's Run to 11D Air Shaft, Marion County, WV\***

Survey Project Manager in charge of center line surveying of approximately 10,200 feet of a proposed overhead transmission line for Consol Energy. Provided original ground center line, 25 foot left, and 25 foot right profiles for wire clearances. Also in charge of clearing limits and property line locations along center line. End product consisted of Plan and Profile sheets showing center line, 25 foot left and 25 foot right original ground profiles.

*\* Work performed prior to joining CEC*

## Robert Stewart, Ph.D., E.I.T.

### Project Consultant

Mr. Stewart is a hydraulic engineer who has worked to resolve issues relating to quantity, quality, and distribution of water and its constituents. He has an emphasis on hydraulics and sediment transport processes in open channel flows. Mr. Stewart's specific expertise in water resources can be summarized to include hydrology, hydraulics, sediment transport, and channel restoration design. Mr. Stewart has created hydraulic and sediment transport models to develop innovative solutions constrained by site-specific constraints to meet project goals. Mr. Stewart's work history includes development and modification of civil designs using hydraulic modeling, proposal writing for funding from state and federal agencies, collection of topographic surveys, geomorphic assessment of streams, and writing project reports.

### PROJECT EXPERIENCE

#### Deep Gulch, US Bureau of Reclamation, Junction City, Trinity County, CA\*

Mr. Stewart worked with public land managers as well as private property owners during the design and implementation of this salmon habitat restoration project. Mr. Stewart used AutoCADD and hydraulic modeling to create a surface that provided appropriate depth and velocity characteristics for juvenile Chinook salmon while ensuring that the project would be self-sustaining into the future.

#### Sediment Transport in the Trinity River, CA: Data Synthesis, TRRP, Weaverville, Trinity County, CA\*

Mr. Stewart collaborated with a fluvial geomorphologist to summarize a decade of fine and coarse sediment transport monitoring efforts. This analysis identified spatial temporal trends in transport rates and described how these trends relate to sediment management objectives.

#### Dutch Creek, California Department of Water Resources, Junction City, Trinity County\*

Mr. Stewart provided engineering support to propel the Dutch Creek project from a conceptual level design to a completed peer-reviewed 30% design report. Project objectives include providing appropriate depth and velocity characteristics for juvenile Chinook Salmon, establishing a self-perpetuating channel morphology, and creating floodplains to naturally recruit riparian vegetation. To meet these objectives Mr. Stewart analyzed local hydrology and determined the range flows most commonly experienced by juvenile Chinook salmon. The hydrologic analysis also identified flows that should be targeted during the riparian recruitment window. Surfaces were graded in AutoCAD and analyzed using a hydraulic model to evaluate the ability of the proposed surface to meet objectives.

#### Trinity River Delta Monitoring, Trinity River Restoration Program, Weaverville, Trinity County, CA\*

Mr. Stewart designed and implemented a survey routine to monitor tributary derived coarse sediment delivery to the Trinity River. This monitoring effort reduced uncertainty in coarse sediment delivery down from a factor of about 17 to around 15%.

#### Trinity River Delta Monitoring, Trinity River Restoration Program, Weaverville, Trinity County, CA\*

Mr. Stewart designed and conducted a survey routine to monitor tributary derived coarse sediment delivery to the Trinity River. This monitoring effort reduced uncertainty in coarse sediment delivery down from a factor of about 17 to around 15%.

\* Work performed prior to joining CEC

### PUBLICATIONS

Gaeuman, D., Stewart, R. L., & Pittman, S. (2018). Toward the prediction of bed load rating curve parameter values: The influence of scale, particle size, and entrainment threshold. *Water Resources Research*, 54. <https://doi.org/10.1002/2017WR021627>

### EDUCATION

*Ph.D., Civil Engineering, University of Kentucky*

*B.S., Civil Engineering, Tennessee Technological University*

*M.S., Civil Engineering, University of Kentucky*

### REGISTRATIONS

*Engineer in Training*

*TN [REDACTED]*

### PROFESSIONAL AFFILIATIONS

*American Geological Society*

*American Society of Civil Engineers*

- Stewart, R. L., & Fox, J. F. (2017). Outer region scaling using the freestream velocity for nonuniform open channel flow over gravel. *Advances in Water Resources*, 104, 271-283.
- Stewart, R. L., & Fox, J. F. (2017). Light Attenuation Model for Waters: Linear and Nonlinear Dependencies on Suspended Sediment. *Journal of Hydraulic Engineering*, 143(9), 04017033.
- Schmandt, B., Gaeuman, D., Stewart, R., Hansen, S. M., Tsai, V. C., & Smith, J. (2017). Seismic array constraints on reach-scale bedload transport. *Geology*, 45(4), 299-302.
- Gaeuman, D., Stewart, R. L., Schmandt, B., & Pryor, C. Geomorphic response to gravel augmentation and high-flow dam release in the Trinity River, California. *Earth Surface Processes and Landforms*.
- Gaeuman, D., Stewart, R. L., Schmandt, B., & Pryor, C. (2017) Geomorphic response to gravel augmentation and high-flow dam release in the Trinity River, California. *Earth Surface Processes and Landforms*.
- Schmandt, B., Gaeuman, D., Stewart, R., Hansen, S. M., Tsai, V. C., & Smith, J. (2017). Seismic array constraints on reach-scale bedload transport. *Geology*, 45(4), 299-302.

**PRESENTATIONS**

- Stewart RL, Gaeuman D. Geomorphic Response of Trinity River Tributary Deltas under High Flow Restoration Hydrology, In AGU Fall Meeting Abstracts , San Francisco CA, 2016 Feb.
- Stewart, R. L., & Gaeuman, D. Examination of High Resolution Channel Topography to Determine Suitable Metrics to Characterize Morphological Complexity. AGU Fall Meeting, San Francisco California, December 2015
- Stewart R. L., Fox J. F., and Harnett C. K., Time Average Velocity Characteristics of Decelerating Open Channel Flows, Kentucky Water Resources Annual Symposium, Lexington, KY, March 10, 2014
- Stewart R. L., Fox J. F., Harnett C. K., and Husic A., Environmental Sensor Network for Watershed Monitoring Louisville, KY, Oct 17, 2013 KY EPSCoR Annual Conference
- Stewart R. L., Fox J. F., and Harnett C. K., Dimensionless Light Attenuation Number for Modeling Suspended Sediment Concentration in Open Channels, 2013 World Environmental & Water Resources Congress, EWRI, ASCE, Cincinnati, Ohio, May 19-23, 2013
- Fox, J. F. and Stewart, R. L., Scaling of the Outer Region for Turbulent Open Channel Flow Modeling over Gravel Beds, 2013 World Environmental & Water Resources Congress, EWRI, ASCE, Cincinnati, Ohio, May 19-23, 2013
- Stewart R. L., Fox J. F., and Harnett C. K., Velocity Bend Sensor Results for Modeling Mean Velocity and Turbulence in Open Channels, 2013 World Environmental & Water Resources Congress, EWRI, ASCE, Cincinnati, Ohio, May 19-23, 2013
- Stewart R. L., Fox J. F., and Harnett C. K., Sensor Network for Suspended Sediment Monitoring, Kentucky Water Resources Annual Symposium, Lexington, KY, March 18, 2013
- Stewart, R. L., Fox, J. F., and Harnett, C. K., Sediment Transport Measurements for Intelligent Sensor Networks, Hydraulic Measurement and Experimentation Meeting 2012, ASCE Hydraulics Division, Snowbird, Utah, August 12-15, 2012
- Stewart, R. L., Lawrence, T., Fox, J. F., and Harnett, C. K., Laboratory Calibration of Experimental Velocity and Sediment Concentration Sensors to Monitor Water and the Environment, Kentucky Water Resources Annual Symposium, Lexington, KY, March 19, 2012

## Mark R. Haibach, PWS

### Senior Principal

Mr. Haibach performs applied ecological studies, including wetland determinations, delineations and functional evaluations; stream biomonitoring, habitat assessment and impact studies; water quality evaluations; ecological risk assessments; flora and fauna surveys; and wildlife habitat assessments. He designs ecological restoration programs including wetland restoration, replacement and mitigation plans; natural stream channel design, habitat enhancement and bank stabilization; and restoration of disturbed landscapes using native vegetation. Mr. Haibach also designs wetland treatment systems for stormwater, landfill leachate, and sewage effluent. He prepares environmental documentation for NEPA studies, FERC certificates, and federal Section 404/Section 10 permits and state Section 401 water quality certifications and wetland permits.

Mr. Haibach has conducted ecological studies for a wide variety of projects, including parks, recreational trails, water resources projects, surface and deep mines, natural gas pipelines, utilities, industrial and brownfield sites, roads and bridges, commercial and residential developments, wastewater facilities, and solid and hazardous waste management facilities. His ecological experience spans fifteen states, including PA, OH, WV, NY, NJ, MD, DE, VA, TN, NC, SC, GA, AL, MS, and FL. In addition to ecological consulting work, he has served as a full-time environmental inspector for two natural gas pipeline construction projects, conducted air sampling and modeling of VOC emissions from wastewater treatment and sludge composting facilities; assisted in preparing county comprehensive land use plans and solid waste management plans; prepared and taught a 40-hour wetland delineator certification course; and represented clients at public meetings and hearings. For his graduate studies, Mr. Haibach researched the effects of phosphorus and metals on algae in the Great Lakes and several rivers in the southeastern U.S.

### PROJECT EXPERIENCE

#### Ecological Monitoring and Restoration

##### Nine Mile Run Greenway Project, Pittsburgh, PA

Performed plant species evaluation, selection, and testing for restoring native vegetation and plant communities to high pH, slag-dominated soils and slopes along the Nine Mile Run urban stream corridor and greenway park connecting to the Monongahela River.

##### Keating Summit Train Derailment and Hazardous Material Release, Wetland and Stream Restoration, Emporium, PA

Managed and performed stream and wetland assessments, fish and benthic surveys, 404/401/PA Ch 105 permitting, stream and wetland restoration design and construction, and post-restoration monitoring for train derailment and sodium hydroxide release into two wild trout streams (Big Fill Hollow and Portage Creek), 0.83 acre of Exceptional Value wetlands, and a river supporting a wild smallmouth bass and stocked trout fishery.

##### Longwall Coal Mines, Stream Restoration Design and Monitoring, CONSOL Energy, Greene & Washington Counties, PA

Managed and/or prepared restoration designs for 27 stream reaches affected by subsidence pooling from longwall mining activities. Restoration methods include natural channel design, bioengineering and vegetative bank stabilization, substrate replacement, and in-stream habitat enhancement structures. Nine projects have been constructed to date and CEC is performing post-restoration benthic, fish, vegetation, habitat, and channel stability monitoring.

##### Longwall Mines, Washington and Green Counties, PA

Long-term Stream and Wetland Biological Monitoring of Longwall Mines.

### EDUCATION

*M.S., Oceanography, University of Michigan*

*B.S., Biology, Gannon College*

### CERTIFICATIONS

*Professional Wetland Scientist*

### TRAINING

*MarkWest Safety Training*

*Williams Safety Training*



**Enlow Fork and Dunkard Fork, Greene County, PA**  
Stream Assessment and Restoration.

**Woodward Creek, Summit County, OH**  
Stream and Riparian Habitat Restoration and Wetland Mitigation.

**Lorain County Landfill Northern Expansion, Lorain County, OH**  
Stream and Wetland Mitigation Plan.

**Crooked Creek, Armstrong County, PA**  
Watershed Stream Restoration and Wetland Replacement.

**Boggy Creek Swamp, Orange County, FL**  
Wetland Mitigation and Stream Restoration Plan.

**Zemel Road Landfill, Charlotte County, FL**  
Wetland Mitigation Plan.

**Ecological Assessment of Streams, Wetlands, and Endangered Species, Bradley County, TN**  
Ecological Assessment of Streams, Wetlands, and Endangered Species.

**Laurens Bypass Project, SC**  
Wetland Mitigation Plan.

**Bahia Vista Roadway Improvement Project, Sarasota County, FL**  
Wetland Mitigation Plan.

**Woodberry Road Widening Project, Hillsborough County, FL**  
Wetland Mitigation Plan.

**Aquatic Assessment Studies, Various Locations**  
Aquatic assessment studies in Pennsylvania, Ohio, New Jersey, Michigan, North Carolina, Georgia, and Florida.

**Ecological Risk Assessments**

**Breslube-Penn Superfund Site Ecological Risk Assessment, Coraopolis, PA**  
Ecological Risk Assessor. Evaluated ecological risk to terrestrial and aquatic receptors as part of an environmental remedial investigation and feasibility study for a five-acre inactive fuel oil recycling and solvent recovery facility located in southwestern Pennsylvania. The U.S. EPA previously implemented a removal action of the waste materials, wherein approximately 6,374 tons of PCB and lead-containing filtercake waste was removed from the Site and the facility structures were demolished. CEC's work included completing an RI, human and ecological risk assessment, and FS.

**LTV Steel Eliza Act 2 Brownfield Redevelopment Ecological Risk Screening, Pittsburgh, PA**  
Ecological Risk Assessor. Evaluated ecological risk to terrestrial and aquatic receptors at the LTV Steel Company's 130-acre Hazelwood Coke Plant and adjoining 46-acre Eliza Furnace Parcel. The coke plant parcel was historically the site of a by-products recovery coke battery and various bar mills. The Eliza Furnace Parcel included blast furnaces, an asphalt plant, and a locomotive roundhouse. CEC identified several areas of the site that required remediation, including a section with a 6-foot layer of coal tar and light non-aqueous phase liquids (LNAPL). We conducted a detailed risk assessment of impacts from volatilization of contaminants from LNAPL in groundwater using a flux chamber to measure real-time soil gas readings, and exposure to ecological receptors. CEC prepared a cleanup plan to address the remaining migration pathways at the site that included limited remediation, site use restrictions, and other activity and use limitations. The plan was approved by the Pennsylvania DEP and implemented and relief of liability was granted under the Pennsylvania Act 2 program.

**McCullough Farm Act 2 Remediation Site, Imperial, Pa**  
Ecological Risk Assessment.

**Goodyear Tire and Rubber Company Facility, St. Marys, OH**  
Ecological Risk Screening.

**Longwall Coal Mines, Stream and Wetland Biological Monitoring and Impact Assessment, CONSOL Energy, Inc., Southwest, PA**

CEC designed and implemented long-term biological monitoring of streams and wetlands overlying four longwall coal mines. To date, CEC ecologists have classified and mapped over 400 miles of streams, performed over 600 fish surveys, collected and identified thousands of benthic macroinvertebrate samples, and surveyed almost 63 square miles of land area for wetlands and identified and delineated over 1,100 wetlands totaling 216 acres. Data are maintained in a GIS.

**NEPA Studies, Environmental Planning, and Permitting**

**Big Sandy Pipeline Project, KY**  
NEPA Cumulative Effects Analysis

**Methane Gas Pipelines, Wells, Compressor Stations and Treatment Plants, Pennsylvania and West Virginia**  
Section 404/Section 401/Chapter 105/NPDES Permits and ESC Plans.

**400-Mile Millennium Pipeline Project, NY**  
Environmental Surveys.

**Line VM-108 Replacement Project, VA**  
Environmental Report and Permits.

**Artemas Suction Loop Project, PA**  
Environmental Report.

**Eagle Loop Project, PA**  
Environmental Report.

**Wellsville Intermodal Industrial Park, Columbiana County, OH**  
Categorical Exclusion Evaluation and Section 404 Permit.

**Stream Crossings, Seneca Resources Corporation, Kane, PA**  
Section 404/Chapter 105 Permits for Stream Crossings on a 25,000-acre Timber Tract.

**Conemaugh Power Station, Reliant Energy, Inc., Indiana County, PA**  
Section 404/Chapter 105 Dredging Permits for Water Intake Structure.

**Pittsburgh International Airport, Allegheny County, PA**  
Stream Classification Study for Airport-wide Environmental Assessment.

**Kittaning By-pass, Armstrong County, PA**  
Mitigation Report.

**SR 910 Widening Project, Allegheny County, PA**  
Categorical Exclusion Evaluation.

**Sarah Heinz Pedestrian Bridge, Pittsburgh, PA**  
Categorical Exclusion Evaluation.

**30-acre Industrial Park, Washington, PA**  
Ecological Assessment.

**U.S. Route 219 Upgrade, Giles County, VA**  
Wetland Functional Analysis.

**Beaver Drive Extension, Dubois, PA**  
Wetland Assessment.

**SR 66 Bridge over Piney Creek, Clarion County, PA**  
Emergency Chapter 105 Permit Application.

**Monongahela River Comprehensive Recreational Plan, WV**  
Monongahela River Comprehensive Recreational Plan.

**Village of Valley Grove, WV**  
Market Feasibility Study for privatization of wastewater infrastructure.

**Harford County, MD**  
Solid Waste Management Plan.

**Route 234 Manassas Bypass, VA**  
Wetland Assessment for the Environmental Impact Statement.

**NC 16 Relocation, NC**  
Ecological Studies for the Environmental Impact Statement.

**Davidson-Cornelius Bypass, NC**  
Wetland and Protected Species Studies for the Environmental Assessment.

**Laurens Bypass Project, SC**  
Wetland Delineation, Assessment, and Permitting.

**U.S. Route 17A Santee River Bridge, SC**  
Ecological Studies for the Environmental Assessment.

**Fairwold Connector Railroad Relocation, Consolidation and Grade Crossing Elimination Project, Phase 3, Richland County, SC**  
Environmental Reassessment.

**Route 157 Roadway Widening, AL**  
Wetland and Protected Species Studies for the Environmental Assessment.

**Birmingham Northern Beltline, AL**  
Ecological Studies for the Environmental Impact Statement.

**U.S. 64, NC**  
Ecological Studies for the Environmental Impact Statement.

**Oak Road Relocation Project, Gwinnett County, GA**  
Section 404 Permit and Section 401 Water Quality Certification Applications.

**State Road 50 Expansion Project, Hernando County, FL**  
Wetland Delineation and Permitting.

**Howard County, MD**  
Solid Waste Facility Siting Studies.

**Abandoned Mine Land (AML) Sites, PA**  
Environmental Sampling and Analysis.

**Solid Waste Management Facilities, Montgomery County, MD**  
Ecological Studies.

**Site B Landfill, Frederick County, MD**  
Wetland Identification and Forest Conservation Permitting.

**Buncombe County, NC**  
Landfill Siting Study.

**Central Solid Waste Facility, Kent County, DE**  
Wetland Study.

**Kalama Specialty Chemicals Study Area, Beaufort, SC**  
Wetland Delineation.

**Fleming Island Development, FL**  
Ecological Community Mapping and Wetland Delineation.

**Ottawa County Landfill Expansion, Ottawa County, OH**  
Prepared wetland delineation and functional assessment, obtained Individual 404/401 permits and an Ohio Isolated Wetland permit, and designed a wetland mitigation project for a landfill expansion. The wetland mitigation included restoration of 16 acres of forested and emergent wetlands and preservation of an 8-acre riparian wetland along Lacarpe Creek, a Lake Erie tributary.

**Marcellus Shale Natural Gas Development Projects, Multiple Natural Gas E&P and Midstream Clients, Armstrong, Bedford, Bradford, Butler, Greene, Sullivan, Susquehanna, Washington, and Wyoming Counties, PA**  
Principal. Reviewed stream and wetland delineations, PNDI/Section 7 clearances, and CWA Section 404 and PA Chapter 105 permitting; Water Management Plans for Marcellus Shale wells.

**Protected Species Surveys and Assessments**

**Rancocas Pointe Development, Mount Laurel, NJ**  
Bog Turtle Survey and Habitat Assessment.

**Various State and Federally Protected Species Surveys-Florida, Alabama and Georgia**  
Surveys for State and Federally Protected Species for Transportation, Solid Waste and Development Projects.

**Davidson-Cornelius Bypass, NC**  
Surveys for Schweinitz's Sunflower for the Environmental Assessment.

**270-acre Landfill Site, Bradley County, TN**  
Protected Species Surveys.

**Bird No. 2 and No. 3 Mines, PA**  
Preliminary design for AMD treatment wetland.

**North Princeton and New Lisbon Developmental Centers, NJ**  
Sewage Sludge Drying Beds.

**PRESENTATIONS**

M. Haibach, B. Benson, J. Silvis, D. Lanoue, M. DeSanzo, D. Parise, D. Maltese. 2011. Mitigation for Mine Subsidence Effects on Streams. Presented at the PCMIA/SME Annual Joint Meeting, October 27-28, 2011, Canonsburg, PA.

## Jacquelyn D. Kester

### Senior Project Manager

Ms. Kester is the Ecological Services Lead for CEC's Bridgeport, West Virginia Office. She has extensive experience in the attainment of stream and wetland data for various baseline reporting and permitting projects. She is knowledgeable of permitting at the local, state, and federal levels for temporary and permanent aquatic resource impacts associated with transmission lines, compressor stations, and natural gas processing facilities. Ms. Kester's project management experience includes proposal preparation and cost estimate of billable hours. She manages multiple projects concurrently according to the terms and conditions of proposals. Career commitments are to deliver excellence in project management, providing exemplary team leadership and motivation, while continually finding ways to add value to clients and achieve optimal technical and financial performance for each and every project.

### PROJECT EXPERIENCE

#### Permitting, MarkWest Liberty Midstream & Resources, West Virginia and Ohio

Performed stream and wetland delineations for natural gas processing facilities and transmission lines. Completed the Ohio Rapid Assessment Method for wetland assessments and the Primary Headwater Habitat Evaluation Form for stream assessments as required by the Ohio Environmental Protection Agency (EPA). Performed stream assessments utilizing the USEPA's Rapid Bioassessment Protocols. Completed benthic macroinvertebrate sampling and collected in situ water quality data to complete the West Virginia Stream Valuation Metric. Served as environmental inspector during construction activities to avoid unauthorized impacts to aquatic features. Prepared a Joint 404/401 Individual Permit application for the Sherwood Natural Gas Processing Facility which included permanent impacts to 9.3-acres of wetlands and 2,052 linear feet of streams. Performed electrofishing of the on-site pond for relocation of fish and turtle species prior to the placement of fill material. Facilitated an In-lieu fee payment of \$2,102,237.91. Attended multiple agency/client meetings throughout the development of the project. Prepared a Nationwide Permit 12 with a 401 Water Quality Certification for the Sherwood 138kV Powerline Project which incorporated a substation and associated access roads. The project included permanent impacts to 756 linear feet of streams and 0.01-acre of one wetland. Facilitated an In-lieu fee payment of \$586,986.04.

#### Permitting, Dominion Hope, West Virginia

Performed stream and wetland delineations for pipeline replacements, well stimulations, and county road upgrades. Prepared Nationwide Permit Packages for temporary and permanent impacts to streams and wetlands. Agency coordination for Section 7 consultation under the Endangered Species Act (ESA) with the USFWS and the West Virginia Division of Natural Resources (WVDNR), and Section 106 consultation under the National Historic and Preservation Act (NHPA) with the West Virginia Division of Culture and History (WVDCH) for those projects that did not meet the terms and conditions of Dominion's current blanket agreements. Preparation of Stream Activity Application through the Office of Land and Streams. Met Dominion representatives in the field to provide immediate permitting guidance on navigating the regulatory program for proposed project plans.

#### Permitting, EQT Production Company

Prepared and sent out request for proposals and managed subcontractors for project development. Performed stream and wetland delineations for numerous well pad projects. Measured topsoil thicknesses for appropriate stockpile calculations. Prepared the appropriate NWP Packages for temporary and permanent impacts to streams and wetlands. Agency coordination for Section 7 consultation under the ESA and Section 106 consultation under the NHPA. Preparation of Stream Activity Applications through the OLS. Prepared WVDEP Set-back Waivers.

#### Permitting, XTO Energy, Inc., West Virginia

Perform Section 404/401 compliance reviews of shallow gas well sites and made remediation recommendations to bring sites back into compliance. Conducted stream and wetland delineations for oil and gas related projects. Prepared the appropriate Nationwide Permit Packages for temporary impacts to streams and wetlands per the Mandatory Environmental Plan issues as part of their federal Consent Decree through the USEPA. Agency

### EDUCATION

*B.S., Environmental Sciences, West Virginia University*

### PROFESSIONAL AFFILIATIONS

*Society of Wetland Scientists*



coordination for Section 7 consultation under the ESA and Section 106 consultation under the NHPA. Preparation of Stream Activity Applications through the OLS.

**Permitting, Antero Resources Corporation, Doddridge and Ritchie Counties, West Virginia**

Preliminary routing and development for several gathering lines. Performed stream and wetland delineations and bat habitat assessments for federally listed threatened and endangered species. Prepared Nationwide Permit 12 applications for temporary impacts to streams and wetlands. Agency coordination for Section 7 consultation under the ESA and Section 106 consultation under the NHPA. Preparation of Stream Activity Applications through the OLS. Prepared Stormwater Pollutions Prevention Plans. Attended weekly status update meetings.

**Permitting, Mountaineer Keystone and MK Midstream Holdings, LLC**

Serves as client contact and prepared weekly status updates of active projects for submission to client. Prepared and sent out request for proposals and managed subcontractors for project development. Prepared the appropriate Nationwide Permit Packages for temporary and permanent impacts to streams and wetlands. Agency coordination for Section 7 consultation under the ESA and Section 106 consultation under the NHPA. Preparation of Stream Activity Applications through the OLS.

**Permitting, American Electric Power**

Prepared Joint 404/401 Individual Permit application for the Mitchell Excess Soil Disposal Area, which included permanent impacts to 3,023 linear feet of streams and 0.025 acre of wetlands. Facilitated a permittee responsible mitigation project to compensate for impacts.

**Stream and Wetland Delineations, Paramount Coal Company, Virginia \***

Performed stream and wetland delineations on a 1300-acre surface mine project in Virginia. Developed a Quality Assurance and Project Plan for benthic sampling and biological monitoring in wadeable streams and rivers as required by the Virginia Department of Environmental Quality.

**Permitting, Hancock County Board of Education, West Virginia \***

Performed stream and wetland delineations for the development of a new elementary school located in West Virginia. Assisted in sampling benthic macroinvertebrates and biological monitoring. Prepared a Nationwide Permit 39 Pre-construction Notification with a joint 401 Water Quality Certification. Completed a jurisdictional determination site visit to receive a waiver from the District Engineer for impacts exceeding 300 linear feet of stream. Developed an onsite, out-of-kind permittee responsible mitigation plan to compensate for permanent impacts; the plan was designed to incorporate the mitigation project into the school's science curriculum.

**Permitting, Jay Bee Oil and Gas, West Virginia**

Following an EPA Administrative Order for Compliance on Consent, Docket Number: CWA-03-2016-0063DW, Ms. Kester developed an Environmental Management System (EMS) for Jay Bee's Marcellus gas operations in West Virginia for EPA review and approval. The EMS served to enhance overall environmental performance at Jay Bee's multiple operations, and to assist their future operations in complying with applicable regulations. The EMS incorporated multiple Mandatory Environmental Plans for compliance with Sections 10, 401, 402, and 404 of the Federal Clean Water Act. Additional components developed for the EMS included environmental awareness training, an internal compliance audit plan and forms, and a corrective and preventative action system.

**Permitting, Ecosystem Investment Partners**

Served as Ecological Project Manager for the development of large scale mitigation banking projects. Coordinated the field effort for completion of stream and wetland delineations and stream assessments. Performed reviews of data collection and report preparation. Proposal preparation and budget control for Indiana bat habitat assessments and conservation plans. Coordinated with and managed sub-consultants for cultural resource studies. Attended on-site agency meetings with the EPA, USACE, DEP, and DNR.

*\* Work performed prior to joining CEC*

## William O. Postlethwait

### Project Manager I

Mr. Postlethwait served as a Stream Restoration Specialist on Canaan Valley Institute for over 13 years and joined the Civil and Environmental Consultants, Inc. staff November 2017. During his time with CVI, worked with watershed groups, state and federal agencies and private sector clients to identify restoration sites, raise funds and implement projects. He is skilled in technical field assessment procedures including stream channel, bed, bank and stability assessment, and stream and wetland habitat assessment. He's experienced to use this information to design stream and wetland restoration projects, develop mitigation plans and permits, and has overseen numerous projects through the construction and monitoring phase.

Mr. Postlethwait employs engineering, architectural, and GIS skills in site evaluation and project design, as well as surveying skills which include the use of a total station and/or GPS-RTK systems. He has been trained by Wildland Hydrology and David Rosgen through Levels I-IV and has assisted in field training for Wildland Hydrology courses as well as other courses offered through CVI.

### PROJECT EXPERIENCE

#### Lower Dempsey Watershed Restoration Project, Environmental Investment Partners, Logan, Logan County, WV\*

Collaborating with an Environmental Investment Partners, CEC and multiple state and federal agencies, Canaan Valley Institute identified this 702 acre watershed for restoration. This watershed was highly impacted by gas extraction, coal mining, and timber harvest. A massive mining bench that ringed the watershed and more than 35 miles of logging and mining roads remained on site intercepting head water streams causing drainage issues. Project consisted of over 135,000 feet of road decommission, over 26,000 feet of stream restoration, and over 6,000 feet of stream reconnection. Responsibilities include communication with landowners, government agencies, stream and watershed assessment, mitigation plan, design, permit preparation, project meetings, and construction supervision. Due to the size of the project CVI worked with sub-contractor CEC to complete planting plans, construction drawings and specifications. Canaan Valley Institute was the prime on this project.

#### Cherry Glade Run Daylighting Project, Garrett County, MD., Oakland, Garrett County, Md\*

Collaborating with Highland Engineering, a local engineering firm in conjunction with their site grading, road and bridge project. This site, formally a Maryland DOT maintenance yard, is being reclaimed into business lots. A secondary road and bridge will be constructed through the site. Working to day light over 500 linear feet of culverted stream channel and return it to a more natural state. Responsibilities include communication with landowners, government agencies, stream assessment, design, planting plans, construction drawings and specifications, permit preparation, project meetings, and construction supervision.

#### Tuscarora Dam Removal Design/Build Project, WV DEP, Martinsburg, Berkley County, WV\*

The dam to be removed was a remnant of an orchard irrigation system from the early 1900's. This project restored 600 linear feet of stream to by-pass the dam. The dam had become a fish barrier and stream heating source. As lead designer for this project, responsibilities included: stream survey and assessment of existing conditions, reference reach survey and assessment, conceptual design, permitting, final design, stake out, construction oversight, as-built survey and drawings, and monitoring.

#### Savage River Dam By-Pass Design/Build Project, MD DNR, Inland Fisheries, Frostburg, Garrett County, MD\*

This project restored 600 linear feet of stream to by-pass a dam, and converted the reservoir into 0.5 acres of wetland. The dam had become a fish barrier and stream heating source, and was decommissioned by the city of Frostburg. As lead designer for this project, responsibilities included: stream survey and assessment of existing conditions, reference reach survey and assessment, conceptual design, permitting, final design, stake out, construction oversight, as-built survey and drawings, and monitoring.

### EDUCATION

*B.S., Civil and Environmental Engineering Technology, Fairmont State University*

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

**Tygart Valley River Stream and Wetland Design, EarthMark/EBX, Elkins, Randolph County, WV\***

This project restored a total of 2,990 linear feet on two unnamed intermittent tributaries, 11 acres of wetland, and enhanced 2 acres of wetland and 9 acres of upland buffer on the Tygart Valley River floodplain. As lead designer for this project, responsibilities included: stream survey and assessment of existing conditions, reference reach survey and assessment, conceptual design, mitigation plan and permitting, final design, stake out, construction oversight, as-built survey and drawings.

*\* Work performed prior to joining CEC*

## **Kevan A. Damm**

### **Project Scientist**

Mr. Damm is a Project Scientist with the Ecological Services Practice Area in CEC's Bridgeport Office, where he focuses on oil & gas projects. He is responsible for conducting stream and wetland delineations, preparing reports, agency correspondence, and permit applications for both production and midstream clients. Mr. Damm has over three years of experience in stream and wetland assessments and in West Virginia and Ohio, as well as knowledge of state and federal regulations regarding permanent and temporary impacts associated with well pad and pipeline projects.

### **EDUCATION**

*B.S., Wildlife Ecology & Management, West Virginia University*

### **PROJECT EXPERIENCE**

#### **Stream and Wetland Delineation, Antero Resources Corporation, WV**

Conducted stream and wetland delineations in West Virginia for pipeline projects and assisted with road improvement projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the U.S. Fish and Wildlife Service (USFWS) and the West Virginia Division of Natural Resources (WVDNR) in accordance with Section 7 under the Endangered Species Act (ESA). Consulted with West Virginia Division of Culture and History's (WVDCH) State Historic Preservation Office (SHPO) in accordance with Section 106 of the National Historic Preservation Act (NHPA) and assisted with archaeological site assessments and Phase 1 archaeological investigations. Prepared Stream Activity Applications for the WVDNR's Office of Land and Streams (OLS). Conducted habitat assessments for federally listed threatened and endangered species. Collected soil samples for freshwater impoundments/frac pit closure and remediation.

#### **Stream and Wetland Delineation, MarkWest Liberty Midstream & Resources, LLC, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects and assisted with road improvement projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS. Conducted habitat assessments for federally listed threatened and endangered species.

#### **Stream and Wetland Delineation, CNX Gas Company LLC, WV**

Conducted stream and wetland delineations in West Virginia for pipeline projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS.

#### **Stream and Wetland Delineation, Trianna Energy, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS.

#### **Stream and Wetland Delineation, EQT Production Company, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS. Conducted habitat assessments for federally listed threatened and endangered species.

#### **Stream and Wetland Delineation, XTO Energy, Inc., WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects and assisted with road improvement projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and



permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS.

**Stream and Wetland Delineation, Southwestern Energy, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS.

**Stream and Wetland Delineation, Williams, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA. Prepared Stream Activity Applications for the WVDNR's OLS.

**Stream and Wetland Delineation, Mountaineer Keystone, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas projects. Prepared findings reports and appropriate Nationwide Permit packages for temporary and permanent impacts to streams and wetlands. Consulted with the USFWS and the WVDNR in accordance with Section 7 under the ESA. Consulted with WVDCH SHPO in accordance with Section 106 of the NHPA and assisted in Phase I archaeological investigations. Prepared Stream Activity Applications for the WVDNR's OLS. Conducted habitat assessments for federally listed threatened and endangered species.

## Jared T. Shockey

### Assistant Project Manager

Mr. Shockey is an Assistant Project Manager with the Ecological Services Practice Area in CEC's Bridgeport, West Virginia office. He is responsible for conducting stream and wetland delineations, stream habitat evaluations, endangered species habitat assessments, water purveying services, and project permitting. Jared is experienced in collecting and applying the environmental data necessary for project reports, GIS mapping and database management, regulatory agency consultations, due diligence documentation, and impact permitting.

Jared has over five years experience of environmental consulting throughout the mid-Atlantic region. He is knowledgeable of the environmental regulatory compliance requirements that are necessary for the development of various facets within the oil/gas and natural resource industries. Jared also has experience in assisting with Environmental Management Systems development projects (EPA Consent Decree), riparian restoration projects, mitigation banking projects, endangered species habitat mitigation projects, invasive species management and timber-stand improvement, botanical surveys, environmental inspections, construction inspections, and sub-surface water infiltration investigations.

### PROJECT EXPERIENCE

#### Antero Resources Corporation, WV\*

Conducted stream and wetland delineations in West Virginia for well pads, pipeline projects, and road improvement projects. Conducted 404 Release re-flags in accordance to Antero's reflag policy. Prepared GIS mapping for various reports and assessments. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Prepared Myotid habitat mitigation plans and completed on-site mitigation activities. Prepared aquatic impact permitting for incidental releases, frack-outs, and landslides.

#### Antero Resources Corporation, OH

Conducted stream and wetland delineations in Ohio for well pads, pipeline projects, and road improvement projects. Conducted 404 Release re-flags in accordance to Antero's reflag policy. Prepared GIS mapping for various reports and assessments. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service and the Ohio Environmental Protection Agency.

#### Jay Bee Oil and Gas, WV

Assisted with the development of Jay Bee's Environmental Management System (EMS) for the mandated USEPA consent decree. Produced internal and contractor environmental awareness training materials and other supporting forms/documents for the EMS.

#### Cabot Oil & Gas, WV

Conducted stream and wetland delineations in West Virginia for well pads, pipeline projects, and road improvement projects. Prepared GIS mapping for delineations, habitat assessments, and permits. Prepared after-the-fact stream and wetland impact permitting for emergency landslide repairs. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Prepared Myotid habitat mitigation plans and completed on-site mitigation activities.

### EDUCATION

*B.S., Natural Resources and Environmental Science, West Virginia University*

### TRAINING

*40-Hour Wetland Delineation Training*

*Wetland Delineation and Regional Supplement Training*

*Adult First Aid with CPR/AED/BBP*

*10-Hour Construction Safety (OSHA)*

*Safeland USA- PEC Safety*

*Advanced Wetland Plant Identification (USFWS- NCTC)*

*CSP3200 Stream Habitat Measurement Techniques (USFWS- NCTC)*



**CNX Gas Company, LLC., PA\***

Conducted soil infiltration testing and sub-surface soil analyses for Pennsylvania General Permits. Conducted stream and wetland delineations in Pennsylvania for well pads, pipeline projects, and road improvement projects. Prepared appropriate General Permit packages for proposed impacts to streams and wetlands. Provided regulatory consultations with the U.S Fish and Wildlife Service.

**CNX Gas Company, LLC., WV**

Conducted stream and wetland delineations in West Virginia for well pads, pipeline projects, and road improvement projects. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Conducted water purveyor surveys and pre-drill water sampling.

**Chesapeake Appalachia, WV\***

Conducted EPA consent decree inspections. Conducted preliminary routing for proposed waterline projects. Conducted stream and wetland delineations in West Virginia for waterlines, pipeline projects, and road improvement projects. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams.

**XTO Energy, Inc., WV\***

Conducted EPA consent decree inspections. Conducted stream and wetland delineations in West Virginia for well pads, pipeline projects, and road improvement projects. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Prepared Myotid habitat mitigation plans and completed on-site mitigation activities.

**Rice Energy, Inc., PA\***

Conducted soil infiltration testing and sub-surface soil analyses for Pennsylvania General Permits. Conducted stream and wetland delineations in Pennsylvania for well pads and road improvement projects. Prepared appropriate General Permit packages for proposed impacts to streams and wetlands. Provided regulatory consultations with the U.S Fish and Wildlife Service.

**Eclipse Resources, OH\***

Conducted stream and wetland delineations in Ohio for well pads and pipeline projects. Prepared GIS mapping for various reports and assessments. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S Fish and Wildlife Service and the Ohio Environmental Protection Agency.

**Dominion Transmission, Inc., WV**

Conducted stream and wetland delineations in West Virginia for pipeline repair projects. Prepared GIS mapping for various reports and assessments. Conducted bat habitat assessments for federally listed threatened and endangered species.

**Hope Gas, Inc., WV**

Conducted stream and wetland delineations in West Virginia for pipeline projects. Prepared GIS mapping for various reports and assessments. Conducted bat habitat assessments for federally listed threatened and endangered species.

**EQT Production Company, WV**

Conducted stream and wetland delineations in West Virginia for well pads and pipeline projects. Prepared GIS mapping for various reports and assessments. Conducted preliminary pipeline and waterline routing. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Conducted bat habitat assessments for federally listed threatened and endangered species. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Conducted water purveyor surveying and field investigations for multiple projects including GLO169, HUN106, GRT82, PFS16, PDC1, LIT18, LIT60, FOL165, SHR104, SHR107, GLO79, and LIT62. Prepared due diligence documentation for temporary stream impacts resulting from emergency pipeline and well pad repairs.

**MarkWest Liberty Midstream & Resources, WV**

Conducted stream and wetland delineations in West Virginia for oil and gas related projects, including the Sherwood to Mobley pipeline and the Mobley to Majorsville pipeline. Conducted bat habitat assessments for federally listed threatened and endangered species. Prepared Myotis Bat Conservation Plans and provided supplemental mapping. Conducted on-site habitat mitigation in accordance to the Myotis Bat Conservation Plan.

**Mountaineer Keystone, LLC., WV**

Conducted stream and wetland delineations in West Virginia for oil/gas related projects. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams. Conducted water purveyor surveys and pre-drill water sampling.

**Southwestern Energy Company, WV**

Assisted in routing of temporary waterline projects to ensure avoidance of aquatic resources. Conducted stream and wetland delineations in West Virginia for various projects. Prepared ACOE Nationwide Permit packages for stream and wetland impacts. Provided regulatory consultations with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, and the West Virginia Division of Culture and History. Prepared Stream Activity Applications through the Office of Land and Streams.

**Genesis Partners, WV**

Conducted wetland and stream delineations and stream assessments on a proposed mitigation site in West Virginia utilizing the USEPA's Rapid Bioassessment Protocols. Completed D-frame kick net benthic macroinvertebrate sampling and collected in situ water quality data to complete the West Virginia Stream Valuation Metric.

**Cass Scenic Railroad and Rail Trail, Durbin and Greenbrier Valley Railroad, WV\***

Conducted stream and wetland delineation for a 20 mile expansion of the Cass Scenic railroad through the Gaudineer wilderness area. Prepared mapping for delineations, habitat assessments, and permits. Conducted Northern Flying Squirrel habitat assessments for and consulted with the U.S. Fish and Wildlife Service and the West Virginia Division of Natural Resources. Assisted with the preparation of the Phase I Environmental Impact Assessment and assisted with public comment forum meetings.

**U.S Forest Service, WV\***

Completed timber and spruce stand release projects throughout the Monongahela National Forest to fulfill the Management Prescription Plans.

**U.S Forest Service, OH\***

Completed timber stand release projects throughout the Monongahela National Forest to fulfill the Management Prescription Plans.

**U.S Army Corps, MD\***

Completed annual herbicide applications to the Jennings Randolph Lake dam and Kitzmiller City Bridge to fulfil invasive species control plans.

**Bear Knob Holdings, WV\***

Assisted in the collection and planting of live stakes for riparian restoration on stream and wetland mitigation bank properties. Applied herbicide for invasive species control on aquatic restoration projects. Assisted in stream bank and topography surveying for stream mitigation design. Conducted Myotid habitat assessments, and assisted with consultation and mapping for Indiana Bat habitat conservation banking properties throughout Doddridge and Tyler counties, West Virginia.

**U.S Fish and Wildlife Service, WV\***

Assisted in completing freshwater mussel relocation for the West Fork River dam removal and flow restoration project.

**Brushy Fork Mitigation Project, Ecosystem Investment Partners, LLC, WV**

Conducted stream and wetland delineations at the Brushy Fork Mitigation Project. Conducted the bat habitat assessment for federally listed threatened and endangered species and prepared a Myotid habitat mitigation plan.

*\* Work performed prior to joining CEC*

## Marla K. Denicola

### Assistant Project Manager

Mrs. Denicola has experience performing field CQA at stream mitigation construction sites and geotechnical landslide repair construction sites. She has experience creating quantity tables for construction of stream mitigation projects. She has collected approximately 2000 linear feet of LiDAR data using a terrestrial LiDAR scanner. She has also collected kick-net benthic samples and pre-SWVM assessments of streams.

### EDUCATION

*B.S., Geology, West Virginia University*

*B.S., Psychology, West Virginia University*

*M.S., Geology, West Virginia University*

### PROJECT EXPERIENCE

#### Lower Dempsey Stream Mitigation Site, Logan County, WV

Completed As-Built surveys at Lower Dempsey Mitigation Site using terrestrial LiDAR scanner, GPS, and total station. Provided weekly Construction Quality Assurance at Lower Dempsey Stream Mitigation Site. Produced quantity tables for in-stream structures and construction supplies for mitigation projects at Lower Dempsey.

#### Miller Creek Mitigation Repair, Logan County, WV

Provided on-site CQA. Used a laser level to measure grade of in-stream structures.

#### Marsden Landslide Evaluation, Doddridge, WV

Provided on-site CQA for repair of landslide. Measured movement of toe of landslide.

#### Indian Creek Stream Mitigation Bank, Ritchie County, WV

Produced the first draft of the mitigation plan. Created GIS maps and Figures for the mitigation plan. Produced flow accumulation grid for the project site. Produced GIS maps of WV Stream and Wetland Valuation Metric Scores/HGM Scores, service area, and vicinity map for IRT meeting in December 2015. Collected ~2000 linear feet of LiDAR data along Indian Creek using Leica ScanStation C10. Calculated all credits generated by restoration efforts using the WV Stream and Wetland Valuation Metric.

#### NKU Scrubgrass Stream Restoration Design, Highland Heights, KY

Created quantity tables for in-stream structures and construction materials for NKU Scrubgrass Stream Design.

#### Huff Creek Watershed Stream Restoration, Logan County, WV

Wrote the initial draft for the IRT meeting in December 2015. Produced maps of the service areas, landuse, mining, vicinity map, roads in and around site, soil survey, and SWVM sample sites. Produced flow accumulation grid of project site. Completed kick-net benthic sampling of Huff Creek and some of its tributaries. Completed pre-SWVM assessment of water chemistry and physical state of Huff Creek and some of its tributaries.

#### EIP Northern WV Mitigation Bank, Wetzel County, WV

Completed initial assessment of site with Ian Turner. Created the photo location map for the site assessment.

#### Charles Pointe Phase 3 Mitigation, Bridgeport, WV

Completed the initial site assessment with Nate Ober. Created a photo location map for the site assessment. Created a site location map that included areas under active mining permits on site.

#### Wetzel Tract Mitigation Project, Ecosystem Investment Partners, Reader, WV

Worked on geomorphic survey in the field. Created easement maps through private property owner parcels for Phase 2 of the project. Created the quantities table for Phase 1 of the project. Provided GIS support for the project.

#### Copperas Mine Fork Stream Mitigation Site, Ecosystem Investment Partners, WV

Completed As-Built surveys at Copperas Mine Fork Mitigation Site using terrestrial LiDAR scanner, GPS, and total station. Surveyed ground surface of valley fill at Copperas Mine Fork for use in designing stream using Topcon Total Station base and rover. Produced quantity tables for in-stream structures and construction supplies for mitigation projects at Copperas Mine Fork.

**Long Branch Stream Mitigation Bank, Ecosystem Investment Partners, WV**

Completed As-Built surveys at Long Branch Mitigation Site using terrestrial LiDAR scanner, GPS, and total station. Surveyed the ground surface at Little Day Camp for use in stream designing using a total station and GPS.

**Brushy Fork Stream Mitigation Site, Ecosystem Investment Partners, WV**

Worked on 4 person crew to delineate streams and wetlands on this site. Managed all GPS data from stream and wetland delineation. Created and managed the GIS maps for the stream and wetland delineation. Used aerial LiDAR to evaluate the anthropogenic disturbances and related landslides at this site.

**MarkWest C2 Pipeline Sections 2 and 3, ICG, Mobley, WV**

Created landslide map along Right of Way for pipeline.

**EP Market Expansion, ICG, Charleston, WV**

Created DEMs from LiDAR. Used DEMs to create slope maps of the pipeline right of way. Mapped landslides along right of way.

**PUBLICATIONS**

Yates, Marla K and Kite, Steven J. (Digital Cartography and map Compilation by Gooding, Sarah E.) 2014, Surficial Geologic Map of the Bluestone National Scenic River Area, West Virginia: West Virginia University and West Virginia Geological and Economic Survey, Open File Map 1401, scale 1:12000. (GRI Source Map ID 76008).

Yates, Marla K. and Kite, J. Steven. "Anthropogenic landforms within New River Gorge National River, southern West Virginia." Geological Society of America Abstracts with Programs, v. 45, no. 7, p.123, 2013.

Yates, Marla K. and Kite, J. Steven. "LiDAR and field-based surficial geology and geomorphology mapping of Bluestone National Scenic River and Pipestem State Park, southern West Virginia." Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 257, 2012.

Yates, M. "Investigation of LiDAR for geomorphological mapping: a West Virginia case study." Geological Society of America Abstracts with Programs, v. 43, no. 1, p. 167, 2011.

**Appendix E**  
**Related Project Experience & Slicks**

# Lower Dempsey Stream Restoration on AML

Logan County, West Virginia

### Owner Objective

The Lower Dempsey Stream Mitigation Bank is located in Logan, West Virginia and demonstrates an innovative approach to restoration of abandoned mine lands and silvicultural practices. This stream mitigation bank was developed by Ecosystem Investment Partners, LLC (EIP) in partnership with Canaan Valley Institute (CVI) and Civil & Environmental Consultants, Inc. (CEC).

### CEC Approach

The restoration includes streams across highwall mine benches; mine access roads built in the stream or its floodplain; failing or "hanging" pipe culverts; and severe erosion and down-cutting. Some project challenges included restoration of steeply sloping headwater streams, reclamation of mined landscapes and valleys, the construction of alluvial fans, and surface and subsurface hydrological improvement. Geo-synthetic liner was utilized to ensure effective surface water conveyance over unconsolidated fill. Natural stream design methodology was utilized to ensure geomorphic stability and reestablishment of aquatic ecosystem. A diverse, native, non-invasive revegetation plan ensured ecological improvements, riparian stability, and less thermal impact to surface waters.

### OWNER/CLIENT

Ecosystem Investment Partners, LLC  
Canaan Valley Institute, Inc.

### CEC SERVICES

- Topographic and Aerial Mapping
- Stream and Wetland I&D
- WV Stream and Wetland Valuation Metric (SWVM)
- Boundary Retracement Survey
- Geomorphic Survey
- Geotechnical Investigation
- Erosion & Sediment Control Plan
- Access Road Design
- Mitigation Plan and Design
- Construction Drawings
- Site Grading / Earthwork Analysis
- Hydrologic Assessment
- Ecological Permitting
- Construction Quality Assurance (CQA)
- As-Built Surveying
- Long-Term Performance Monitoring

AML Highwall



AML Highwall Grading



Liner installation

Reconnected Headwater Tributary



Restored Stream Corridor

## Reclamation of Four Bond Forfeiture Sites

### Northern West Virginia

#### Owner Objective

Stantec, Inc. is an international professional services company in the design and consulting industry that has more than 400 locations in North America and 7 locations internationally. Stantec was seeking assistance with reclamation projects at five bond forfeited sites in northern West Virginia. The sites include three RobLee Coal Company mines, one Energy Marking Company mine and one Buffalo Coal Company mine.

#### CEC Approach

Stantec awarded CEC the contract to develop reclamation plans for the five bond forfeited sites. CEC began the project by obtaining rights-of-entry from 12 different landowners as well as having those landowners sign waivers for access roads and ponds constructed by the mine operations. In addition, CEC was tasked with developing and implementing subsurface investigations, obtaining aerial photography with field control surveys, supplementing aerial photography with onsite field surveys, obtaining soil and refuse analyses, and reclamation design.

CEC performed topographic surveying and generated construction plans and specifications for the five project sites prior to construction. Improvements to 2.5 miles of access roads also had to take place before construction could begin.

The projects involved the design of approximately 1,080,000 cubic yards of balanced earthwork, three mine seals, rock toe drains, and approximately 3,500 feet of subsurface drains. During remediation, approximately 23,500 feet of ditches were constructed, 13 sediment control ponds with outlet structures were re-constructed, and approximately 830 feet of piping was installed. CEC also managed the revegetation of approximately 165 acres.

Three of the sites have been built successfully. The fourth site is currently under construction.



#### OWNER/CLIENT

*Stantec, Inc.*

#### CEC SERVICES

- *Site Grading/Earthwork Analysis*
- *Stormwater Management/BMP Design*
- *Hydrogeology and Groundwater Modeling*
- *Groundwater/Surface Water Remediation Systems*
- *Coal Refuse and Pavement Neutralization*
- *Landowner Negotiations*
- *Topographic Surveys*
- *Calculation Brief*
- *Construction Plans and Specifications*
- *Bid Estimate and Engineer's Cost Estimate*

## Shinns Run Portal

Shinnston, West Virginia

### Owner Objective

The West Virginia Department of Environmental Protection (WVDEP) was seeking assistance with the reclamation design of the Shinns Run Portals Abandoned Mine Lands located near Shinnston in Harrison County, West Virginia. Past deep mining operations have captured stream flows, impacted Harrison County Route 13, and resulted in the formation of fifteen open, partially collapsed, or totally collapsed mine openings. The deep mined Pittsburgh coal seam is located in close proximity to several area homes, within the right-of-way of Harrison County Route 13, and within four vertical feet of Shinns Run Stream.

### CEC Approach

CEC was awarded the contract to perform engineering services for the reclamation design of the Shinns Run Portals project. CEC performed field surveying tasks to complement aerial mapping supplied by the WVDEP; developed and implemented a subsurface investigation to quantify and qualify impounded mine pools; and performed a detailed preliminary investigation to include public and private records. The preliminary investigation obtained available deep mine maps, interviewed affected landowners, evaluated construction and drill access, and evaluated sources for materials to be used in reclamation of the project.

The project involved submittal and approval of an Army Corps of Engineers permit and a Hydraulic Engineering Center-River Analysis System (HEC-RAS) hydrologic evaluation of Shinns Run to determine potential flood impacts to residents' homes from installation of low water crossings in order to successfully seal all mine openings. CEC developed plans to seal two streambeds now flowing into the abandoned mine works through subsidence features. In addition, CEC led boring and jacking operations to place a pipe beneath Harrison County Route 13 and provide hydraulic relief to an area home. Approximately 900 linear feet of ditches, 1,000 linear feet of subsurface drains, 450 linear feet of stream bank protection, and 75 feet of roadbed protection were designed by CEC.

CEC performed topographic surveying; generated construction mapping; analyzed soil test results to determine soil amendments for vigorous vegetative growth; performed hydraulic and hydrologic studies and designed ditches and pipes; developed preliminary and final design construction plans and specifications; designed mine pool dewatering operations and mine drainage treatment plans; developed an engineer's cost estimate, bid schedule, and calculation brief; attended initial on-site, preliminary design, and final design meetings.

This project is currently under construction.

### OWNER/CLIENT

*West Virginia Department of  
Environmental Protection*

### CEC SERVICES

- *Site Grading/Earthwork Analysis*
- *Stormwater Management/BMP Design*
- *Hydrogeology and Groundwater Modeling*
- *Groundwater/Surface Water Remediation Systems*
- *Topographic Surveys*
- *Calculation Brief*
- *Construction Plans and Specifications*
- *Bid Estimate and Engineer's Cost Estimate*



## Camden (Hartley) Dangerous Landslide

Camden, West Virginia

### Owner Objective

The West Virginia Department of Environmental Protection (WVDEP) was working towards reclamation of the Camden (Hartley) Dangerous Landslide Abandoned Mine Lands, located near Camden in Lewis County, West Virginia. A pre-SMCRA cast-over-the-hill mine spoil was slipping and threatening four houses.

### CEC Approach

CEC was awarded a contract to perform engineering services for the reclamation design of the Camden (Hartley) Dangerous Landslide Abandoned Mine Lands Project. CEC performed field surveying tasks to complement aerial mapping supplied by the DEP; developed and implemented a detailed subsurface investigation to determine the stability of the cast-over-the-hill mine spoil in the project area; and performed a detailed preliminary investigation to include public and private records. The preliminary investigation obtained available mine maps, interviewed affected landowners, evaluated construction and drill access, and located sources for materials to be used in reclamation of the project.

CEC developed reclamation cost alternatives that compared installation of a retaining structure by removing cast-over-the-hill spoil to a stable configuration. CEC designed approximately 500 linear feet of ditches; 200 linear feet of subsurface drains; and hydraulic and hydrologic analyses for project area pipes. CEC also performed topographic surveying; generated construction mapping; analyzed soil test results to determine soil amendments for vigorous vegetative growth; developed sediment control design as well as submitted an NPDES permit for the project; developed preliminary and final design construction plans and specifications; designed mine pool dewatering operations and mine drainage treatment plans; developed an engineer's cost estimate, bid schedule, and calculation brief; attended initial on-site, preliminary design, and final design meetings.

The project was completed in September 2014.

### OWNER/CLIENT

*West Virginia Department of  
Environmental Protection*

### CEC SERVICES

- *Site Grading/Earthwork Analysis*
- *Stormwater Management/BMP Design*
- *Hydrogeology and Groundwater Modeling*
- *Groundwater/Surface Water Remediation Systems*
- *Topographic Surveys*
- *Calculation Brief*
- *Construction Plans and Specifications*
- *Bid Estimate and Engineer's Cost Estimate*

## Arlington (Gain) Highwall

Arlington, West Virginia

### Owner Objective

The West Virginia Department of Environmental Protection (WVDEP), Office of Abandoned Mine Lands oversees and facilitates the resolving of public safety issues as mine fires & subsidence, hazardous highwalls, mining-impacted water supplies, open shafts and portals, and other dangers resulting from mining before 1977. Such practices were established by the Surface Mining and Control Act and the creation of the Office of AML&R in 1981. The Office of Surface Mining provides oversight to the Office of AML&R.

The WVDEP, Office of Abandoned Mine Lands requested proposals to provide design services to eliminate falling/entrapment hazard from a previous reclamation operation.

### CEC Approach

CEC performed a field visit to identify the problem area and make recommendations for elimination of the hazard. CEC provided GPS field survey tasks to map the problem area.

The project involved 570 linear feet of sediment control; 210 feet of ditches; 260 feet of pipes; 130 linear feet of subsurface drains; one manhole; one drop inlet; one headwall; one acre of Revegetation; topographic surveying to generate project mapping; hydraulic studies and design for ditches and pipes; sediment control design; revegetation plan; preliminary and final design; construction plans and specifications; engineers cost estimate, bid schedule, and calculation brief; initial on-site, preliminary design, pre-bid meeting; monthly reports and invoicing.

The project was completed in June 2015.

### OWNER

*West Virginia Department of  
Environmental Protection*

### CEC SERVICES

- *Site Grading/Earthwork Analysis*
- *Stormwater Management/BMP Design*
- *Hydrogeology and Groundwater Modeling*
- *Groundwater/Surface Water Remediation Systems*
- *Topographic Surveys*
- *Calculation Brief*
- *Construction Plans and Specifications*
- *Bid Estimate and Engineer's Cost Estimate*

## McAlpin Portals

Bridgeport, West Virginia

### Owner Objective

The McAlpin Portals Abandoned Mine Lands, located near Bridgeport in Harrison County, West Virginia, consisted of approximately 3,400 linear feet of high wall ranging from 30 to 50 feet in height, and ten collapsed mine entries, five of which were discharging acid mine drainage. The uncontrolled mine drainage runs over the hill causing further slope instability and threatening five homes located downhill.

### CEC Approach

CEC was awarded a contract by the West Virginia Department of Environmental Protection (WVDEP) to perform engineering services for the reclamation design of the abandoned mine lands. CEC designed and implemented a drilling program to define slip limits and testing of spoil properties for slope stability. CEC also supplemented WVDEP mapping with field surveys of important project features such as seep, slip, coal refuse boundaries, and collapsed portal locations.

CEC provided Retaining Wall/Earth Moving Design Alternatives for four slips; reclamation design with 42,000 cubic yards of excavation; 9,200 linear feet of erosion and sediment control; 5,325 linear feet of ditches; 247 linear feet of pipes; 1,317 linear feet of subsurface drains; one manhole; a Gabion Basket Retaining Wall; subsidence hole mitigation; stream bank protection; five mine seals; 23 acres of revegetation; topographic surveying to supplement existing mapping; soil physical properties testing for slope stability; hydraulic studies and design for ditches and pipes; sediment control design; revegetation plan; preliminary and final design; construction plans and specifications; dewatering and AMD Treatment Plan.

This project is currently in the final review/approval stage with the WVDEP and will be let for bid in 2018.

### OWNER/CLIENT

West Virginia Department of  
Environmental Protection

### CEC SERVICES

- Geotechnical Engineering
- Site Grading/Earthwork Analysis
- Slope Stability/Retaining Structure Design
- Stormwater Management/BMP Design
- Hydrogeology and Groundwater Modeling
- Soil/Groundwater Remediation Systems
- Topographic Surveys
- Calculation Brief
- Construction Plans and Specifications
- Bid Estimate and Engineer's Cost Estimate
- Landslide Remediation



# Hodgesville (Wright) Mine Blow-Out

Hodgesville, West Virginia

## Owner Objective

The West Virginia Department of Environmental Protection (WVDEP), Office of Abandoned Mine Lands oversees and facilitates the resolving of public safety issues as mine fires & subsidence, hazardous highwalls, mining-impacted water supplies, open shafts and portals, and other dangers resulting from mining before 1977. Such practices were established by the Surface Mining and Control Act and the creation of the Office of AML&R in 1981. The Office of Surface Mining provides oversight to the Office of AML&R.

The WVDEP, Office of Abandoned Mine Lands requested proposals to provide design services to mitigate problems associated with an unexpected mine blow-out. This project was deemed an emergency project with a very short time frame for document submittal and awarding of the construction contract. The problem area was located approximately 300 feet behind a residence. On or about March 17, 2015 a mine blowout sent uncontrolled high flows of mine water down an existing ditchline. The uncontrolled flow sent mud, debris, and sediment down the ditchline plugging an existing drop inlet and pipe beneath US Route 20 and submerging US Route 20 beneath 10 inches of water for a period of time causing the road to be closed to traffic. After the initial surge, a 25-foot diameter pool approximately three feet deep developed directly adjacent to US Route 20 with the overflow directed down the east road ditchline. The West Virginia Department of Highways had removed debris from atop the drop inlet and re-established flow through the road pipe. The outlet end of the road pipe is submerged with mud and debris with water conveyed by the road pipe welling-up out of the ground and sheet flowing into nearby ditches

## CEC Approach

CEC's reclamation design included 12,500 cubic yards of excavation; two wet mine seals; 1,900 linear feet of sediment control; 531 linear feet of ditches; 116 feet of pipes; 355 linear feet of subsurface drains; one manhole; four acres of revegetation; topographic surveying to develop project mapping; soil testing; hydraulic studies and design for ditches and pipes; sediment control design; revegetation plan; preliminary and final design; construction plans and specifications; dewatering and AMD Treatment Plan; engineers cost estimate, bid schedule, and calculation brief; initial on-site, preliminary design, pre-bid meeting; monthly reports and invoicing.

The project was completed in November 2015.

## OWNER

*West Virginia Department of  
Environmental Protection*

## CEC SERVICES

- *Site Grading/Earthwork Analysis*
- *Stormwater Management/BMP Design*
- *Hydrogeology and Groundwater Modeling*
- *Groundwater/Surface Water Remediation Systems*
- *Topographic Surveys*
- *Calculation Brief*
- *Construction Plans and Specifications*
- *Bid Estimate and Engineer's Cost Estimate*

## Arkwright Slurry Impoundment

Monongalia County, West Virginia

### Owner Objective

After the closure of the Arkwright mining complex near Morgantown, West Virginia, CONSOL Energy, LLC (CONSOL) opted to develop the site for commercial use. CONSOL contracted CEC to generate a closure plan for an inactive fine coal refuse (FCR) slurry impoundment. FCR is material contained within a slurry generated by the coal preparation process that settles and consolidates over time.

### CEC Approach

CEC performed a geotechnical investigation and analysis, and provided a closure plan for the inactive FCR slurry impoundment. Piezo-Cone Penetrometer Testing (CPTU) was performed in the impoundment to assess the stability and compressibility of the FCR materials, and piezometers were installed within the impoundment and embankment.

CEC's investigation and analysis of the CPTU data determined that the impoundment and FCR was well-drained and that the FCR materials would compress up to 3.5 feet under the backfill placed during the closure of the impoundment. Consequently, no specialized treatments (such as grouting or wick drains) were needed to stabilize the FCR materials prior to development. Some areas, depending on the post-development use, received fill surcharges to induce settlements prior to development. Settlement monitoring data was collected and analyzed in these areas prior to surcharge removal and final site development activities.

Closure of the impoundment entailed a complete breach of the embankment, and excavation and placement of approximately 1,300,000 cubic yards of fill. At completion, the site provided approximately 40 acres of level development area within the former mine waste disposal facility, of which approximately 30 acres were purchased by Wal-Mart Stores, Inc. for the construction of a new Wal-Mart Supercenter and Sam's Club.



Mon-View Development

### OWNER

CONSOL Energy, LLC/CNX Land Resources

### CLIENT

Mon-View LLC

### CEC SERVICES

- Cone Penetrometer Testing
- Geotechnical Investigation
- Settlement Evaluation
- Flood Routing
- Site Grading Analysis
- Closure Plan
- Revegetation
- Construction Support

## Beech Hollow Power Project Coal Refuse Mining and Reclamation Design and Permitting

Robinson Township, Pennsylvania

CEC performed detailed geotechnical and civil engineering analyses for a 300 mW co-generation power plant facility, which included coordinating, performing and managing all aspects of the investigation, subsurface exploration, laboratory testing, development of soil and rock design parameters, foundation and construction design recommendations, slope stability analyses, retaining wall design, and road design.

Concurrently, CEC performed the coal refuse disposal permit modification for the existing 600-acre Champion Processing, Inc. (Champion) coal refuse disposal facility. The purpose of this project was to reclaim the coal refuse for fuel in the adjacent Air Products co-generation power plant facility and disposal of the ash back on the Champion coal refuse disposal area. CEC services included the design and permitting of the coal refuse reclamation and ash disposal operations, preparation of all permit application forms, acquisition of all necessary geologic and hydrogeologic data required for the application, developing coal refuse and ash strength properties and performing interim and long-term slope stability analyses, erosion & sedimentation and storm water management facility design, and coordination of the permit submittal and review process with the Pennsylvania Department of Environmental Protection.

### CLIENT

*Champion Processing, Inc.*

### CEC SERVICES

- *Geotechnical and Civil Engineering*
- *Coal Refuse Reclamation and Ash Disposal Permitting*
- *Geologic and Hydrogeologic Characterization*



# Reclamation and Closure Services for the Mining Industry

CEC provides a range of engineering and environmental services to all sectors (aggregate, coal and hard rock) of the mining industry for the safe reclamation and closure of mines and processing facilities.

When mining companies need to close mine sites, CEC provides the environmental and engineering services necessary to do so safely and in a manner that complies with all applicable state and federal environmental laws and regulations while also optimizing the company's cost considerations. The asset retirement obligations could include demolition of buildings and structures (including storage tank closures), filling in mine openings (for facilities with underground mines), earthwork to restore the site to approximate original contour or another desired configuration, revegetation, and post-closure water treatment.

CEC's services include the following:

## *Environmental*

- Environmental characterization and facility liability assessment
- Closure plan development (building demolition plans, mine sealing plans, backfill/grading plans)
- Agency interface for closure plan approval
- Mine site soil covering and revegetation plan development
- Decommissioning work plan preparation and alternatives evaluation: mothball, remediate and mothball, remediate and dismantle equipment (adaptive reuse), and complete demolition

## *Engineering*

- Removable and salvageable asset inventories
- Bid package development and bid support
- Asset retirement obligation estimating
- Construction management (owner's representative) and contractor oversight
- Construction quality assurance
- Surveying and field engineering support



## *Waste Management*

- Asbestos
- Lead
- Polychlorinated biphenyls (PCBs)
- Oil and oily water
- De-ionization resins
- Mercury and mercury components
- Fluorescent lights and ballasts
- Miscellaneous chemicals

## *Post-closure Mine Water Evaluations*

- Groundwater / surface-water interaction model recalibration
- Groundwater monitoring and remediation system design and operation
- Groundwater / surface-water levels and quality monitoring
- Dewatering and supply well design
- Dewatering quantification and management

## *Impacted Water*

- Assimilate capacity studies
- TMDL effluent limits
- Active water treatment
- Passive water treatment

## PRACTICES

- Air Quality*
- Civil Engineering*
- Ecological Sciences*
- Environmental Engineering and Sciences*
- Planning*
- Survey*
- Waste Management*
- Water Resources*

## INDUSTRIES

- Manufacturing*
- Mining*
- Oil & Gas*
- Power*
- Public Sector*
- Real Estate*
- Solid Waste*

# Crafts Creek Stream Flow Restoration Project

Morris Township, Washington County, Pennsylvania

## Owner Objective

CNX Resources Corporation was looking to restore and maintain flow of Crafts Creek, overlaying the E18 Enlow Fork Mine longwall mining panel, to a stable and ecologically functional stream channel. The Pennsylvania Department of Environmental Protection (PADEP) is requiring flow be restored to the streams' pre-mining condition.

## CEC Approach

CEC was hired to perform a stream flow restoration project on an approximately 1,000 feet section of Crafts Creek. A stable stream channel was designed utilizing geosynthetics, geotextiles, an alluvial amendment method, and natural stream channel design principles to seal the underlying fractured bedrock and thus help restore and maintain stream flow.

The stream channel grading plan was designed with reference reach data collected along Sawhill Run in East Finley Township, Washington County, Pennsylvania as well as using regional curve equations for stable stream channel characteristics such as drainage area; bankfull depth, width, and cross-sectional area; meander length; radius of curvature; and floodprone area width. The stream bankfull capacity was designed for a 2-year storm event.

The geosynthetic stream liner system utilized a geosynthetic clay liner (GCL) overlain by a Geoweb cellular confinement system to provide a barrier to infiltration into the underlying fractured bedrock. The stream liner system was designed to resist erosion from a 100-yr storm event and was installed in the upstream section of the stream restoration reach. A detailed hydrologic and hydraulic analysis was performed to determine the velocities, shear stress and stream power in order to confirm the natural channel and stream liner design geometry and stability.

The alluvial amendment method used the addition of bentonite to the subsurface alluvium and soils to create a more cohesive and lower permeable substrate soil that can improve stream flow conveyance. This method was used in the downstream section of the stream restoration reach.

An erosion and sediment control design, that minimized the impacts to water quality during construction, was provided in compliance with PADEP Chapter 102 requirements for the project. Construction monitoring and quality assurance was performed to ensure the restoration activities were built in accordance with the construction drawings and specifications. Final planting was completed in 2013.

A detailed stream restoration compliance monitoring program, which included regular field visits for five years to document the progression of the stream back to a naturally functioning and stable stream channel, was performed for the stream restoration reach following construction.

## OWNER/CLIENT

CNX Resources Corporation

## CEC SERVICES

- Natural Stream Channel Design
- Liner Design
- Hydrology and Hydraulic Analysis
- Erosion and Sediment Control Design
- Construction Monitoring
- Construction Quality Assurance
- Survey Services



# Marytown Stream Mitigation Bank

McDowell County, West Virginia

## Owner Objective

The Marytown Stream Mitigation Bank is one of West Virginia's largest stream mitigation banks, spanning 4,508 acres with a little over 28 miles of streams. This stream mitigation bank was developed by Ecosystem Investment Partners, LLC (EIP) in partnership with Canaan Valley Institute (CVI) and CEC. The Marytown Stream Mitigation Bank provides credits for unavoidable impacts in the Upper Guyandotte, Twelvepole, Big Sandy, Upper New, and Tug Fork watersheds of West Virginia's McDowell and Logan Counties.

The restoration objectives of this mitigation bank are to reconnect, reestablish, and enhance ephemeral, intermittent, and perennial streams disturbed and disconnected by mine benches, road crossings, logging, and pipeline infrastructure. Some project challenges included the reclamation of abandoned mine lands and the restoration of headwater streams with bankfull slopes reaching 70 percent.

## CEC Approach

CEC was retained to provide ecological planning, assessment, stream design, and permitting services. CEC performed the stream and wetland delineations and conducted a jurisdictional determination site visit with the Interagency Review Team (IRT). CEC also performed water quality, benthic macroinvertebrate sampling and habitat scoring of streams to determine baseline conditions for credit computations using the WV Stream and Wetland Valuation Metric. Geomorphic survey data was collected for stream restoration reaches to determine appropriate natural channel design approaches for restoration. CEC prepared construction-level design drawings for the mitigation plans with its custom stream design application using AutoCAD® Civil 3D® software, which enables rapid design adjustments to stream grading plans. CEC also assisted EIP and CVI in preparing the prospectus, MBI, and mitigation plans and with agency negotiations for the Clean Water Act 404 and 401 permits.

The project team developed innovative mitigation credit options for re-forested, steeply sloped sites and presented the options to the USACE and IRT. The IRT is currently considering these options as a model for mitigation projects on other similar sites. The project was completed in 2016 and all mitigation credits have been released to date.



*Before Stream Restoration*



*After Stream Restoration*

## OWNER/CLIENT

*Ecosystem Investment Partners, LLC*

## CEC SERVICES

- *Stream & Wetland Delineation*
- *Stream Assessment and Valuation Metric Computation*
- *Geomorphic Assessment*
- *Natural Channel Design*
- *Mitigation Prospectus, Banking Instrument, Plan, and Permit*
- *Construction Drawings and Specifications*
- *Construction Oversight*

## DATES OF SERVICE

*2013 to Present*

## ENGINEERING FEES

*\$953K*

## CONSTRUCTION FEES

*\$4.5M*

## CONTACT

*Mr. Nick Dilks*

*Ecosystem Investment Partners, LLC*

*5550 Newbury Street, Suite B*

*Baltimore, MD 21209*

*443-921-9441*

# Templeton Fork Stream and Wetland Mitigation

Washington County, Pennsylvania

## Owner Objective

CEC worked with CONSOL Energy, Inc. to design a watershed-based restoration project to offset the impacts associated with development of a coal refuse disposal facility in Greene County, Pennsylvania. Development of the refuse area resulted in impacts to 32,000 linear feet of stream and 5.9 acres of wetland - the largest stream and wetland impacts approved by the USACE Pittsburgh District to date.

## CEC Approach

To offset the loss of ecological functions at the impact site, CEC developed a mitigation plan to restore 40,000 linear feet of highly degraded stream, establish and/or preserve a minimum of 25' wooded riparian buffers, create 6.7 acres diverse wetland habitat, and preserve 1.3 acres of riparian wetland.

The project started in the headwaters of Templeton Fork and addressed stream and riparian stressors as they were encountered working in a downstream manner. CEC restored stable stream channels by grading banks, installing habitat enhancement structures, planting native vegetation, and excluding cattle. Wooded riparian buffers and perpetual conservation easement were established along the entire length of the project. CEC established a 15-year monitoring program to evaluate channel stability through longitudinal profiles and monumented cross-sections. CEC is also monitoring physical stream and riparian habitat using USEPA methodologies and is evaluating benthic macroinvertebrate response to restoration using an index of biological integrity.

CEC was able to provide contiguous restoration and hydrologic connectivity between existing restoration projects in order to maximize the physical and biological potential of all projects. CEC worked in collaboration with CONSOL's land agents to obtain access and conservation easements from nine different landowners.



## CLIENT

CONSOL Energy, Inc.

## CEC SERVICES

- Section 401/404 Permitting (delineation, T&E surveys, application preparation)
- Development of the conceptual mitigation plan
- Assisting with landowner agreements for the mitigation sites
- Preparing NPDES permit applications for the mitigation sites
- Providing construction oversight and weekly E&S inspections for the mitigation sites
- Preparation and submission of as-built



Before



After

# LIDAR

CEC provides a wide range of land surveying services with a full complement of cutting-edge technology, including 3D laser scanners using terrestrial Light Detection And Ranging (LiDAR) scanning to create spatial imaging.

CEC utilizes the latest technology in ground-based 3D laser scanning with GPS to provide solutions to clients' unique survey needs.

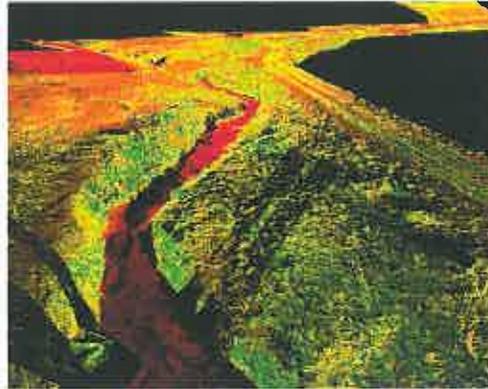
Using LiDAR, CEC can create an extremely detailed and dimensionally accurate 3D image using millions of acquired intelligent data points on a project site. Downloaded directly to a laptop at the site, LiDAR generates the 3D model in real time allowing immediate decision-making ability.

## Mobilization

With ease of portability and setup, and decreased data processing and clean-up time, LiDAR scanning provides significant time savings versus traditional land surveying techniques. The use of LiDAR technology also enables increased safety by minimizing the need to send crews into dangerous spaces or high-traffic areas and roadways. Plus, the data can be revisited and new survey information can be retrieved based on client needs without remobilizing to the field.

## Broad Application

Through the use of LiDAR, CEC can efficiently capture high-definition field data that enhance a broad range of land surveying and engineering projects from architectural and building surveying to industrial mapping of intricate sites and structures to forensics and accident reconstruction.



- As-builts for architectural and commercial projects, industrial facilities, landfills, water treatment plants, power plants, electric substations, and oil and gas well pads and pipelines
- Horizontal and vertical clearances for roadways, bridges, and structures
- Detailed earthwork volumes and quantities
- Before-and-after dredging scans to calculate quantity for dry basins and ponds
- DOT surveys for traffic and highway structures, installations, and appurtenances
- Tunnel and mine scanning

## Technology

CEC utilizes both "Phase Based Scanners" and "Time of Flight Scanners." The performance of these scanners can capture objects up to and more than 1,000 feet away, and in direct sunlight. Typical deliverables are intensely accurate and include:

- 2D CAD Data in plan, elevation, or cross-sectional view
- 3D CAD Data
- Animated fly-throughs of the point cloud
- Text, RCS, DXF, TIN, or XML file of the point cloud

## PRACTICES

*Air Quality*  
*Civil Engineering*  
*Ecological Sciences*  
*Environmental Engineering and Sciences*  
*Survey*  
*Waste Management*  
*Water Resources*

## INDUSTRIES

*Manufacturing*  
*Mining*  
*Oil & Gas*  
*Power*  
*Public Sector*  
*Real Estate*  
*Solid Waste*

# 3D Stream Design

To efficiently create precise stream designs, CEC employs the use of various three-dimensional (3D) technologies in its process. Our experts have developed custom tools that enable our stream designers to better meet client project needs.

### Three-Dimensional (3D) Stream Design

To improve efficiency and precision of stream restoration designs, CEC developed custom tools (for high-gradient and low-gradient streams) for use within AutoCAD® Civil 3D® Corridors to handle the complex transitions of stream geometry. CEC's 3D stream designs contain facet slopes of natural rivers, which can be adjusted to maintain channel stability or to provide favorable slopes for spawning habitat. Utilizing Corridors for stream modeling inherently and dynamically links the three components of a stream (pattern, profile, and dimension), allowing a designer to make iterative changes with instantaneous and accurate 3D updates. CEC's process provides optimization and balancing of earthwork volumes, accurate grading plans and quantities, precision construction grades, and cost savings during design and construction. Additionally, CEC's customized tools and processes allow for accurate, early-stage design decisions.

CEC's 3D designs are provided to contractors for use on GPS-guided construction equipment or to use for their



3D As-Built Scan of a Cross Vane

own conventional construction layout. Additionally, CEC's construction inspectors use these files to provide quality assurance on client projects. In the instance that satellite signal is poor, CEC will use a Robotic Total Station to provide the same service with the 3D layout files.

### Three-Dimensional (3D) Stream Surveying

CEC employs the latest 3D laser-scanning technology for topographic surveying to create detailed geomorphic surveys and stream restoration as-builts. The laser-scanning equipment increases efficiency while capturing high-resolution data. The technology enables the rapid capture of detailed bank profiles for quick and accurate BEHI calculations, precise topographic surveys, vegetation identification, detailed cross-sections, exact locations and size of in-stream structures, and much more. The stream survey is then augmented with underwater survey shots to create a seamless surface for topographic and geomorphic surveys.



3D TIN Surface

### PRACTICES

- Air Quality
- Civil Engineering
- Ecological Sciences
- Environmental Engineering and Sciences
- Survey
- Waste Management
- Water Resources

### INDUSTRIES

- Manufacturing
- Mining
- Oil & Gas
- Power
- Public Sector
- Real Estate
- Solid Waste

# GEOTECHNICAL ENGINEERING & DRILLING SERVICES



## Geotechnical Engineering

Geotechnical engineering is one of NGE's core areas of practice. Our highly qualified and experienced staff of geotechnical engineers, geologists, and technicians enables us to provide practical and economic solutions to a variety of geotechnical problems. We are especially experienced and qualified in dealing with the types of geotechnical issues typically encountered in the Appalachian region.

Some of the geotechnical engineering services NGE provide include:

- Commercial development geotechnical investigations and reports
- Shallow and deep foundation analysis
- Highway and bridge geotechnical studies
- Well pads and compressor stations geotechnical investigations
- Water storage tank investigations
- Freshwater and wastewater impoundment investigations
- Slope stability studies
- Fill embankment analysis and design
- Cut slope analysis and design
- Retaining wall design
- Landslide investigations and remedial designs
- Laboratory soil testing
- Geotechnical instrumentation
- Mine subsidence investigations
- Pile drivability studies
- Groundwater and seepage studies

## Geotechnical Drilling Services

In addition to geotechnical engineering services, NGE also offers geotechnical drilling and exploration services with in-house experienced drilling personnel. Equipment available for use includes track-mounted drill rigs which can be used to access most sites, portable hand-operated equipment for difficult to reach sites, and dynamic cone penetrometer equipment. Some of the drilling and exploration services offered include:

- Test borings with Standard Penetration Sampling
- Rock coring and sampling
- Shelby tube sampling
- Piezometer and monitoring well installation
- Slope inclinometer installation
- Dynamic cone penetrometer testing
- Portable drilling equipment for difficult site access

### OFFICES:

**West Virginia Office:**  
650 MacCorkle Avenue West  
St. Albans, WV 25177  
(304) 201-5180  
John Nottingham, P.E.  
jnottingham@ngeconsulting.com

**Pennsylvania Office:**  
171 Montour Run Road  
Moon Township, PA 15108  
(412) 722-1970  
Jim Henry, P.E.  
jhenry@ngeconsulting.com



# GEOTECHNICAL ENGINEERING & DRILLING SERVICES



All of NGE's drill rigs are equipped with hollow stem augers, Standard Penetration Testing and Sampling equipment, wireline rock coring equipment, AW and NQ drilling rods. NGE's current drilling equipment includes the following:

- Diedrich D-50 rubber track mounted drill rig
- Two CME 45 rubber track mounted drill rigs
- Acker Soil Scout rubber track mounted drill rig
- Acker portable tripod mounted drill rig
- Wildcat portable dynamic cone penetrometer
- AMS portable auguring and sampling equipment
- Casing advancer system
- Three drill rig haul trucks (tilt-bed and tractor/trailer)
- Water haul trucks and trailers
- Three off road utility vehicles
- Numerous water pumps, hose, and portable storage tanks



Diedrich D-50 Rubber Track Mounted Drill Rig

## Construction Inspection Services

NGE has a staff of well trained and highly experienced construction technicians who work under the supervision of licensed professional engineers. Our technicians are trained and have WVDOH certification in the areas of soil compaction, concrete, aggregate and bituminous materials. Some of the construction materials testing services provided include:

- Fill placement monitoring and soil compaction testing
- Concrete sampling and testing
- Aggregate sampling and testing

- Examination and verification of foundation bearing soils
- Pile driving inspection
- Drilled pier inspection

In addition to the above services, NGE also provided **cross-hole sonic logging** of drilled shafts. This is a non-destructive means for testing and verifying the integrity of drilled shafts used in bridge and building foundations.



Crosshole Sonic Logging Equipment



**Appendix F**  
**CEC Engineering Authorizations**

# CERTIFICATE OF *Authorization*

STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

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

**CIVIL & ENVIRONMENTAL CONSULTANTS, INC.**  
**C02231-00**

*Engineer in Responsible Charge: STEVEN A CAIN - WV PE 015264  
has complied with section §30-13-17 of the West Virginia Code governing  
the issuance of a Certificate of Authorization. The Board hereby notifies you of its  
certification with issuance of this Certification of Authorization for the period of:*

**January 1, 2018 - December 31, 2019**

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

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



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

A stylized, handwritten signature in black ink, consisting of several sweeping strokes.

BOARD PRESIDENT

WEST VIRGINIA BOARD OF PROFESSIONAL SURVEYORS



*Certificate of Authorization*



Civil & Environmental Consultants, Inc.

Bridgeport, West Virginia

**CERTIFICATE OF AUTHORIZATION # 18-5847**

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

**January 1, 2018 through December 31, 2018**

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

In witness whereof I have put my hand, this 15<sup>th</sup> day of December, 2017

R. Michael Shepp, P.S., Chairman

James T. Rayburn, P.S., Member

**2018**



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

Sefton R. Stewart, P.S., Member

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

## **Appendix G**

**Addendum Acknowledgment Form, Disclosure of Interested Parties to Contracts,  
Purchasing Affidavit, Vendor Preference Certificate**

**ADDENDUM ACKNOWLEDGEMENT FORM  
SOLICITATION NO.:**

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

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

**Addendum Numbers Received:**

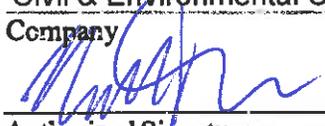
*(Check the box next to each addendum received)*

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

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

Civil & Environmental Consultants, Inc.

Company

  
Authorized Signature

July 9, 2018

Date

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

50

**West Virginia Ethics Commission**  
**Disclosure of Interested Parties to Contracts**

(Required by W. Va. Code § 6D-1-2)

**Contracting Business Entity:** Civil & Environmental Consultants **Address:** 600 Marketplace Ave, Ste 200  
Bridgeport, WV 26330

**Authorized Agent:** Nathan S. Ober, PG **Address:** (same)

**Contract Number:** CEOI 0313 DEP180000004 **Contract Description:** Pine Bluff (Wilson) Refuse

**Governmental agency awarding contract:** West Virginia Department of Environmental Protection

Check here if this is a Supplemental Disclosure

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below (attach additional pages if necessary):

1. Subcontractors or other entities performing work or service under the Contract

Check here if none, otherwise list entity/individual names below.

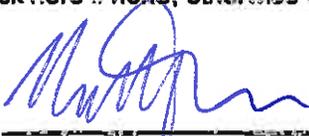
Novel Geo-Environmental, LLC, Reliance Laboratories, Inc., Sturm Environmental Services

2. Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)

Check here if none, otherwise list entity/individual names below.

3. Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)

Check here if none, otherwise list entity/individual names below.

Signature: 

Date Signed: 7/9/2018

**Notary Verification**

State of West Virginia, County of Harrison

I, Nathan S. Ober, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

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

  
Notary Public's Signature

**To be completed by State Agency:**

Date Received by State Agency: \_\_\_\_\_

Date submitted to Ethics Commission: \_\_\_\_\_

Governmental agency submitting Disclosure: \_\_\_\_\_



Revised October 7, 2017

STATE OF WEST VIRGINIA  
Purchasing Division  
**PURCHASING AFFIDAVIT**

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

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

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

**DEFINITIONS:**

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

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

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

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

**WITNESS THE FOLLOWING SIGNATURE:**

Vendor's Name: Civil & Environmental Consultants, Inc.

Authorized Signature: [Signature] Date: July 9, 2018

State of West Virginia

County of Harrison, to-wit:

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

My Commission expires September 29, 2022

AFFIX SEAL HERE

NOTARY PUBLIC

[Signature]  
Purchasing Affidavit (Revised 01/19/2013)



**Appendix H**  
**Schedule of Terms and Conditions**

**GENERAL TERMS AND CONDITIONS:**

**1. CONTRACTUAL AGREEMENT:** Issuance of a Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

**2. DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

**2.1. "Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

**2.2. "Bid" or "Proposal"** means the vendors submitted response to this solicitation.

**2.3. "Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

**2.4. "Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.

**2.5. "Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.

**2.6. "Award Document"** means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.

**2.7. "Solicitation"** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

**2.8. "State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

**2.9. "Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

**3. CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

**Term Contract**

**Initial Contract Term:** This Contract becomes effective on \_\_\_\_\_ and extends for a period of \_\_\_\_\_ year(s).

**Renewal Term:** This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be delivered to the Agency and then submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to \_\_\_\_\_ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

**Alternate Renewal Term** -- This contract may be renewed for \_\_\_\_\_ successive \_\_\_\_\_ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

**Delivery Order Limitations:** In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

**Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within one thousand ninety-five (1,095) calendar days.

**Fixed Period Contract with Renewals:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within \_\_\_\_\_ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for \_\_\_\_\_ year(s) thereafter.

**One Time Purchase:** The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

**Other:** See attached.

**4. NOTICE TO PROCEED:** Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.

**5. QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

**Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

**Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.

**Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

**One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

**6. EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute a breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

**7. REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

**BID BOND (Construction Only):** Pursuant to the requirements contained in W. Va. Code § 5-22-1(c), All Vendors submitting a bid on a construction project shall furnish a valid bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

**PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of \_\_\_\_\_. The performance bond must be received by the Purchasing Division prior to Contract award. On construction contracts, the performance bond must be 100% of the Contract value.

**LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable. Notwithstanding the foregoing, West Virginia Code § 5-22-1 (d) mandates that a vendor provide a performance and labor/material payment bond for construction projects. Accordingly, substitutions for the performance and labor/material payment bonds for construction projects is not permitted.

**MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

**LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section entitled Licensing, of the General Terms and Conditions, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications prior to Contract award regardless of whether or not that requirement is listed above.

**8. INSURANCE:** The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below prior to Contract award. Subsequent to contract award, and prior to the insurance expiration date, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies mandated herein, including but not limited to, policy cancelation, policy reduction, or change in insurers. The insurance coverages identified below must be maintained throughout the life of this contract. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed in this section.

Vendor must maintain:

**Commercial General Liability Insurance** in at least an amount of:  
\$1,000,000.00

**Automobile Liability Insurance** in at least an amount of: \$1,000,000.00

**Professional/Malpractice/Errors and Omission Insurance** in at least an amount of:  
\$1,000,000.00

**Commercial Crime and Third Party Fidelity Insurance** in an amount of:

**Cyber Liability Insurance** in an amount of:

**Builders Risk Insurance** in an amount equal to 100% of the amount of the Contract.

**\$2,000,000.00 Aggregate**

**9. WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

**10. [Reserved]**

**11. LIQUIDATED DAMAGES:** This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

\_\_\_\_\_ for \_\_\_\_\_

Liquidated Damages Contained in the Specifications

**12. ACCEPTANCE:** Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

**13. PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification.

**14. PAYMENT:** Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.

**15. PURCHASING CARD ACCEPTANCE:** The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract unless the box below is checked.

Vendor is not required to accept the State of West Virginia's Purchasing Card as payment for all goods and services.

**16. TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

**17. ADDITIONAL FEES:** Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

**18. FUNDING:** This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

**19. CANCELLATION:** The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

**20. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.

**21. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.

**22. COMPLIANCE WITH LAWS:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

**SUBCONTRACTOR COMPLIANCE:** Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

**23. ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

**24. MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Purchasing Division and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

**25. WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

**26. SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

**27. ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments. Notwithstanding the foregoing, Purchasing Division approval may or may not be required on certain agency delegated or exempt purchases.

**28. WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

**29. STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

**30. BANKRUPTCY:** In the event the Vendor files for bankruptcy protection, the State of West Virginia may deem this Contract null and void, and terminate this Contract without notice.

**31. PRIVACY, SECURITY, AND CONFIDENTIALITY:** The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.

**32. YOUR SUBMISSION IS A PUBLIC DOCUMENT:** Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

**DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.**

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

**33. LICENSING:** In accordance with West Virginia Code of State Rules § 148-1-6.1.e, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

**SUBCONTRACTOR COMPLIANCE:** Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

**34. ANTITRUST:** In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

**35. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

**36. VENDOR RELATIONSHIP:** The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

**37. INDEMNIFICATION:** The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

**38. PURCHASING AFFIDAVIT:** In accordance with West Virginia Code § 5-22-1(i), the contracting public entity shall not award a contract for a construction project to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees. Accordingly, prior to contract award, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

**39. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE:** This Contract may be utilized by other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts ("Other Government Entities"). Any extension of this Contract to the aforementioned Other Government Entities must be on the same prices, terms, and conditions as those offered and agreed to in this Contract, provided that such extension is in compliance with the applicable laws, rules, and ordinances of the Other Government Entity. If the Vendor does not wish to extend the prices, terms, and conditions of its bid and subsequent contract to the Other Government Entities, the Vendor must clearly indicate such refusal in its bid. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

**40. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

**41. REPORTS:** Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at [purchasing.requisitions@wv.gov](mailto:purchasing.requisitions@wv.gov).

**42. BACKGROUND CHECK:** In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a "substantial labor surplus area", as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

**45. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE:** W. Va. Code § 6D-1-2 requires that for contracts with an actual or estimated value of at least \$100,000, the vendor must submit to the Agency a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre-award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. "Interested parties" means: (1) A business entity performing work or service pursuant to, or in furtherance of, the applicable contract, including specifically sub-contractors; (2) the person(s) who have an ownership interest equal to or greater than 25% in the business entity performing work or service pursuant to, or in furtherance of, the applicable contract; and (3) the person or business entity, if any, that served as a compensated broker or intermediary to actively facilitate the applicable contract or negotiated the terms of the applicable contract with the state agency: Provided, That subdivision (2) shall be inapplicable if a business entity is a publicly traded company: Provided, however, That subdivision (3) shall not include persons or business entities performing legal services related to the negotiation or drafting of the applicable contract. The Agency shall submit a copy of the disclosure to the Ethics Commission within 15 days after receiving the supplemental disclosure of interested parties.

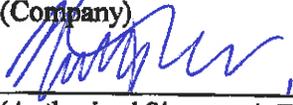
**ADDITIONAL TERMS AND CONDITIONS  
(Architectural and Engineering Contracts Only)**

- 1. PLAN AND DRAWING DISTRIBUTION:** All plans and drawings must be completed and available for distribution at least five business days prior to a scheduled pre-bid meeting for the construction or other work related to the plans and drawings.
  
- 2. PROJECT ADDENDA REQUIREMENTS:** The Architect/Engineer and/or Agency shall be required to abide by the following schedule in issuing construction project addenda. The Architect/Engineer shall prepare any addendum materials for which it is responsible, and a list of all vendors that have obtained drawings and specifications for the project. The Architect/Engineer shall then send a copy of the addendum materials and the list of vendors to the State Agency for which the contract is issued to allow the Agency to make any necessary modifications. The addendum and list shall then be forwarded to the Purchasing Division buyer by the Agency. The Purchasing Division buyer shall send the addendum to all interested vendors and, if necessary, extend the bid opening date. Any addendum should be received by the Purchasing Division at least fourteen (14) days prior to the bid opening date.
  
- 3. PRE-BID MEETING RESPONSIBILITIES:** The Architect/Engineer shall be available to attend any pre-bid meeting for the construction or other work resulting from the plans, drawings, or specifications prepared by the Architect/Engineer.
  
- 4. AIA DOCUMENTS:** All construction contracts that will be completed in conjunction with architectural services procured under Chapter 5G of the West Virginia Code will be governed by the AIA A101-2007 and A201-2007 or the A107-2007 documents, as amended by the Supplementary Conditions for the State of West Virginia, in addition to the terms and conditions contained herein. The terms and conditions of this document shall prevail over anything contained in the AIA Documents or the Supplementary Conditions.
  
- 4A. PROHIBITION AGAINST GENERAL CONDITIONS:** Notwithstanding anything contained in the AIA Documents or the Supplementary Conditions, the State of West Virginia will not pay for general conditions, or winter conditions, or any other condition representing a delay in the contract. The Vendor is expected to mitigate delay costs to the greatest extent possible and any costs associated with Delays must be specifically and concretely identified. The state will not consider an average daily rate multiplied by the number of days extended to be an acceptable charge.
  
- 5. GREEN BUILDINGS MINIMUM ENERGY STANDARDS:** In accordance with West Virginia Code § 22-29-4, all new building construction projects of public agencies that have not entered the schematic design phase prior to July 1, 2012, or any building construction project receiving state grant funds and appropriations, including public schools, that have not entered the schematic design phase prior to July1, 2012, shall be designed and constructed complying with the ICC International Energy Conservation Code, adopted by the State Fire Commission, and the ANSI/ASHRAE/IESNA Standard 90.1-2007: Provided, That if any construction project has a commitment of federal funds to pay for a portion of such project, this provision shall only apply to the extent such standards are consistent with the federal standards.

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

Timothy A. Denicola, Project Manager  
 (Name, Title)  
Timothy A. Denicola, Project Manager  
 (Printed Name and Title)  
600 Marketplace Avenue Suite 200 Bridgeport WV 26330  
 (Address)  
304-838-8475 / 304-933-3327  
 (Phone Number) / (Fax Number)  
tdenicola@cecinc.com  
 (email address)

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

Civil + Environmental Consultants, Inc.  
 (Company)  
 PRINCIPAL  
 (Authorized Signature) (Representative Name, Title)  
NATHAN OBER, PRINCIPAL  
 (Printed Name and Title of Authorized Representative)  
July 9, 2018  
 (Date)  
304-841-4531 / 304-933-3327  
 (Phone Number) (Fax Number)