



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at [wvOASIS.gov](http://wvOASIS.gov). As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at [WVPurchasing.gov](http://WVPurchasing.gov) with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 1

List View

General Information | Contact | Default Values | Discount | Document Information | Clarification Request

Procurement Folder: 1047657

Procurement Type: Central Purchase Order

Vendor ID: 000000206512

Legal Name: TERRADON CORPORATION

Alias/DBA:

Total Bid: \$0.00

Response Date: 06/23/2022

Response Time: 9:01

Responded By User ID: aasbury1

First Name: Ashley

Last Name: Asbury

Email: ashley.sodosky@terraddon.co

Phone: 3047558291

SO Doc Code: CEOI

SO Dept: 0313

SO Doc ID: DEP2200000016

Published Date: 6/22/22

Close Date: 6/23/22

Close Time: 13:30

Status: Closed

Solicitation Description: EOI - 2022 AML Contract 7 Project North

Total of Header Attachments: 1

Total of All Attachments: 1



Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	Professional Svcs - Weston (Curtis) Landslide				0.00

Comm Code	Manufacturer	Specification	Model #
81100000			

**Commodity Line Comments:** Qualifications

**Extended Description:**

Professional Svcs - Weston (Curtis) Landslide

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Professional Svcs - Upland Run (Harrison) AMD and Drainage				0.00

Comm Code	Manufacturer	Specification	Model #
81100000			

**Commodity Line Comments:** Qualifications

**Extended Description:**

Professional Svcs - Upland Run (Harrison) AMD and Drainage



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

State of West Virginia  
 Centralized Expression of Interest  
 Architect/Engr

<b>Proc Folder:</b> 1047657			<b>Reason for Modification:</b> Addendum #1 issued to publish agency responses to vendor questions.
<b>Doc Description:</b> EOI - 2022 AML Contract 7 Project North			
<b>Proc Type:</b> Central Purchase Order			
<b>Date Issued</b>	<b>Solicitation Closes</b>	<b>Solicitation No</b>	<b>Version</b>
2022-06-22	2022-06-23 13:30	CEOI 0313 DEP2200000016	2

**BID RECEIVING LOCATION**

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

**VENDOR**

**Vendor Customer Code:**  
**Vendor Name :**  
**Address :**  
**Street :**  
**City :**  
**State :** **Country :** **Zip :**  
**Principal Contact :**  
**Vendor Contact Phone:** **Extension:**

**FOR INFORMATION CONTACT THE BUYER**

Joseph E Hager III  
 (304) 558-2306  
 joseph.e.hageriii@wv.gov

Vendor  
 Signature X

**FEIN#** 55-06872626

**DATE** 06-23-2022

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

**ADDITIONAL INFORMATION**

The Acquisitions and Contract Administration Section of the Purchasing Division is soliciting an Expression of Interest ("EOI" or "Bids") for the West Virginia Department of Environmental Protection, Division of Land Restoration, Office of Abandoned Mine Lands and Reclamation (WVDEP-DLR-AML), from qualified firms to provide architectural/engineering services per the attached specifications and terms and conditions.

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

Line	Comm Ln Desc	Qty	Unit Issue
1	Professional Svcs - Weston (Curtis) Landslide		

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81100000			

**Extended Description:**  
Professional Svcs - Weston (Curtis) Landslide

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Line	Comm Ln Desc	Qty	Unit Issue
2	Professional Svcs - Upland Run (Harrison) AMD and Drainage		

Comm Code	Manufacturer	Specification	Model #
81100000			

**Extended Description:**  
Professional Svcs - Upland Run (Harrison) AMD and Drainage

**SCHEDULE OF EVENTS**

<u>Line</u>	<u>Event</u>	<u>Event Date</u>
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**SOLICITATION NUMBER:**  
**Addendum Number:**

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

**Applicable Addendum Category:**

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

**Description of Modification to Solicitation:**

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

**Terms and Conditions:**

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

# ATTACHMENT A



**RFI: Questions from vendors for CEOI DEP 22\*16 AML Contract 7 Project North**

**Q.1.** Will the DEP AML be providing guidance, templates, and expectations as to the requirements and procedures necessary to perform landowner contact/communication, negotiation, and contracting to the DEP's satisfaction?

**A. Yes**

**Q.2.** What is the legal documentation necessary to substantiate ownership that is referenced?

**A. Whatever legal documents made of record that transferred ownership to the current owner via deed, will, estate settlement, fiduciary record and/or court orders; as well as Exploratory Rights of Entry (EROE) and Construction Rights of Entry (CROE) agreements.**

**Q.3.** Has contact already been made with the landowners affected by the listed projects about the proposed work?

**A. Yes, for the two projects under this contract. Initial ownership had been previously established and EROE's obtained. Although, all will need to be rechecked and verified, and monitored throughout the entire length of the project (through to the Final Warrantee Inspection and project release).**

**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.

TERRADON Corporation

\_\_\_\_\_  
Company



\_\_\_\_\_  
Authorized Signature

06-23-2022

\_\_\_\_\_  
Date

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

Revised 6/8/2012

June 22, 2022

Subject: CEOI 0313 DEP2200000016, 2022 AML – Contract 7 Project North

Attn: Mr. Joseph E. Hager, III  
Department of Administration, Purchasing Division  
2019 Washington Street, East  
Charleston, WV 25305

Dear members of the selection committee:

TERRADON is pleased to submit the enclosed package to provide engineering design and consulting services for the Office of Abandoned Mine Lands and Reclamation "Contract 7 Project – North". The included package details the TERRADON team's qualifications, expertise, management and staffing capabilities, prior experience, and required documentation for consideration.

TERRADON is prepared to provide engineering, geotechnical services, environmental and permitting services, and construction inspection and QA/QC certification services for the following:

Project 1: Weston (Curtis) Landslide, Lewis County, WV

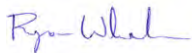
Project 2: Upland Run (Harrison) AMD and Drainage, Lewis County, WV

The TERRADON Team will be the division's partner through every phase of the conceptual design and planning of the proposed project. As your consulting team, our goal is to provide the full realm of engineering services that the division needs to successfully complete these projects. TERRADON is a full-service engineering firm headquartered in Poca, WV with offices in Lewisburg, WV and Fayetteville, WV, and Washington, PA. TERRADON maintains qualified AML engineers and designers as well as ancillary services that may be needed for this contract.

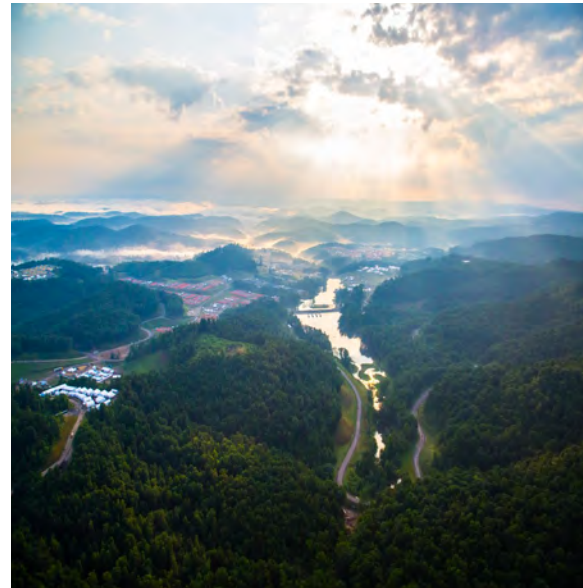
The TERRADON team plans to lead these projects under the management of Joe Saunders, PE. Saunders and his team have multiple years of experience providing quality engineering design services on AML projects for the WVDEP.

Upon your review of the enclosed, please do not hesitate to contact me at 304-755-8291 with any questions or concerns. I look forward to hearing from you soon.

Sincerely,



Ryan Wheeler  
Director of Business Development  
TERRADON Corporation



**SUBMITTED BY**  
TERRADON Corporation  
409 Jacobson Drive  
Poca, WV 25159  
304-755-8291

**PROJECT MANAGER &  
POINT OF CONTACT**  
Joe Saunders, PE  
VP Transportation & AML  
Joe.saunders@terradon.com  
304-729-9157

## **STATEMENT OF QUALIFICATIONS**

CEOI 0313 DEP2200000015

EOI - AML Contract 7 Project North

- Weston (Curtis) Landslide, Lewis County, WV
- Upland Run (Harrison) AMD and Drainage, Lewis County, WV

Attn: Joseph E. Hager III  
Department of Administration  
Purchasing Division  
2019 Washington Street, East  
Charleston, WV 25305  
Joseph.e.hageriii@wv.gov

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Appendix C: AML Related Project Experience Matrix (RPEM - RFP Attachment B)	
Appendix D: Certificates of Authorization & Applicable Certifications	

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# 1

## TERRADON Qualifications

TERRADON Services Overview





**FOUNDED:** 1989

**EMPLOYEES:** 95

**LOCATIONS:**

- Poca, WV
- Lewisburg, WV
- Fayetteville, WV
- Washington, PA

**SERVICES:**

- Survey & Mapping
- Civil Engineering
- Geotechnical Engineering
- Transportation Engineering
- Structural Engineering
- Construction Services
- Environmental Consulting
- Land Planning & Design

TERRADON Corporation offers a multi-faceted approach to design engineering and consulting services. For more than 30 years TERRADON staff has provided a wealth of engineering solutions on successful projects. The company built its reputation on expert personnel and quality, time-sensitive service. Those same founding principles hold true today.

The firm has been recognized through numerous awards from professional organizations and agencies including the American Society of Civil Engineers, State Highway Departments, the Department of Environmental Protection and the American Institute of Architects.

TERRADON's diverse team of professionals work together on projects to offer a wide range of services in house to keep projects centrally focused. By providing this range of services, TERRADON is able to work completely as a team to offer clients the most rewarding design.

TERRADON's corporate culture promotes innovation and progressive thinking. Project leaders strive to sustain customers through a wide-range of engineering offerings. TERRADON employees understand the purpose behind their services and work to cultivate lasting relationships with clients through honest, hard work.

TERRADON is a sWaM certified woman-owned business in West Virginia and Virginia (awarded by VA-SBSD).



*TERRADON is the largest, woman-owned engineering firm in West Virginia and is a certified Women's Business Enterprise in both WV and VA.*



TERRADON's engineers, geologists, environmental specialists and planners are well-versed in designing Abandoned Mine Land (AML) reclamation and Acid Mine Drainage (AMD) treatment solutions. TERRADON understands the complex impacts mine drainage and abandoned mines have left on our environment. TERRADON is particularly suited to design engineering within the mountainous areas of West Virginia and the Appalachian Region.

Our geotechnical engineers are qualified to evaluate and remediate landslides, impoundment stability, mine subsidence, highwall hazards and other AML problems. Our AML and environmental professionals have the expertise required to assess watersheds, design active and passive treatment facilities and restore streams impacted by AMD.

Our AML specialists and geologists study and make recommendations for soil amendments to restore vegetative growth in former mining areas. TERRADON has the expertise to remediate water supply and quality issues, and design new or replacement water supply lines waterlines impacted by mining activities.

TERRADON has extensive experience in both wet and dry mine seals, with or without bat gates. TERRADON has experience with all facets of drainage associated with the majority of projects we have completed over the years, from acid mine drainage to basic conveyance of water from problem areas via channels, ditches and pipes. Our years of experience with AML problem areas, coupled with our quick response time to WVDEP/AML needs, makes TERRADON an excellent fit for any project.

TERRADON's solutions are unique for site-specification characteristics, and are tailored for our clients depending on each projects needs. TERRADON offers a full-service approach from review and concept phases through construction, implementation and operational phases.

### Services

- Mine Portal Reclamation
- Drainage Controls
- Erosion & Sediment Control
- Coal Refuse Reclamation
- Slope Stabilization
- Landslide Repairs
- Structure Demolition Plans
- Geotechnical Evaluation
- Environmental Assessments
- Hydrologic & Hydraulic Analyses





The transportation engineering team at TERRADON provides design services for the infrastructure projects that we rely on every day. From large-scale, multi-lane highways with complex interchanges, to narrow city streets, to winding single-lane county roads our roadway and bridge experts offer experience to benefit client needs.

Our teams uses a data-driven approach for every transportation engineering project, developing bridges, roadways and interchanges that link the traveling public safely from one place to the next. Taking into consideration the transportation demands and understanding the environmental impacts and land-use needs of these projects, our team designs smart, efficient transportation projects for the future.

Using the latest technology, we study traffic patterns and needs, and advise on options for improving flow and access. By monitoring the terrain around the projects, and considering the needs of the surrounding communities, our team will make recommendations for the placement and structure of the roadway, and on surrounding features including landscaping, noise abatement and retaining walls.

This all-around approach has earned TERRADON's team of transportation engineers numerous Engineering Excellence Awards and recognition from numerous industry organizations. Our transportation engineering services make TERRADON a highly sought-after partner in transportation and infrastructure projects.

### Services

- Highway Design
- Corridor Design
- Geotechnical Design
- Right-of-Way Plans
- Road Widening
- Noise Walls
- Retaining Walls
- Roadway Design
- Structural Engineering/Bridge Design
- Bridge Rehabilitation Design
- Bridge Replacement Study and Design
- Maintenance of Traffic
- Infrastructure Rehabilitation
- Traffic Analysis
- Grading Studies
- Transportation Surveying & Mapping
- AML Design
- Design-Build
- Signing Design
- Pavement Marking Design
- Preliminary Investigation and Engineering Studies
- Corridor Studies
- Utility Relocations
- Interchange Improvements
- Maintenance of Traffic
- Permitting
- Value Engineering



At TERRADON, we tailor our approach to the specific project, and collect the necessary data for decision making. It's not just about supplying the data though – we provide an understanding and a plan for our client to move forward. It's not just collection and analyzation, it's about educating our clients on the risks and benefits of our data and recommendations.

With the difficult soil and groundwater conditions found across the Ohio Valley and the Appalachian regions, having an experienced staff that knows the territory is incredibly important. The team at TERRADON aren't just experts in geotechnical engineering, they are geographical experts – many of them are Appalachian Region born-and-raised, and understand the land where our clients build.

This has allowed TERRADON to tackle a vast variety of projects and industries, providing geotechnical investigation and advisement for everything from mining, to cell and high mast towers, to flexible or rigid pavement design. Even tasks such as landfill permitting and environmental remediation are well within our realm of experience.

### Services

- Subsurface Exploration
- Test Borings
- Test Pit Excavations
- Monitoring Well & Piezometer Installation
- Slope Inclinometers
- Soil and Rock Logging, Sampling & Testing
- Geotechnical Investigations & Site Characterizations
- Site Feasibility Assessments
- Soil and Rock Stability Analysis
- Shallow & Deep Foundation Design and Analysis
- Pile Drivability Analysis
- Groundwater Seepage Analysis
- Dewatering Analysis
- Landslide Analysis & Remedial Design
- Structural Corrections
- Temporary Shoring Design
- Earthen Dams Evaluations & Design
- Municipal & Industrial Landfill Design and Permitting
- Laboratory Testing
- Flexible & Rigid Pavement Design
- Earth Retention Systems
- MSE Walls, Gravity Walls, Anchors (Rock or Soil Nailing), Sheet Pile Walls, and Solider Pile & Lagging Walls
- Geosynthetic Engineering & Design
- Ground Improvement Design



Our team has a commitment to the Ohio Valley and Appalachian regions that goes far beyond our jobs. It is where we work, where we live, and where we play. It is where our family and friends are, it's home. That's why our team at TERRADON sees our environmental services as critical to both preservation and responsible development. Every project has the potential to impact ecological resources and our surrounding environment. Our accomplished team at TERRADON provides unparalleled environmental services and understands the risks, procedures, and regulatory standards involved in managing environmental resources. A team that knows the urgency of conducting the proper studies to protect natural resources, wetlands, and ecology around your project while keeping it on schedule, and within budget.

The experience of our team provides us the ability to address environmental issues. Our environmental team draws on credentials in chemical engineering, chemistry, civil engineering, environmental sciences, landscape architecture, geology, and geotechnical engineering to help manage complex issues. From permitting to site assessment and reporting, our team is well-versed in federal and state requirements. Our team provides education and assistance, not just for the permitting process, but for the overall concept to construction of a project. Client communication and transparency ensure that project stakeholders are constantly in-the-know, while our years of building relationships with federal and local agencies help ensure smooth, timely and sound timelines. In the end, this makes TERRADON a regional leader in environmentally responsible projects.

### SERVICES

- Environmental Site Assessments (ESA)
- Phase I ESA
- Phase II ESA
- NEPA EA
- Environmental Audits
- NEPA Compliance
- Hazardous Waste
- Wastewater
- Stormwater
- Groundwater
- Air Permitting
- Wetland Delineation
- Aquatic Resource Mitigation Design
- Tier II Reporting
- Asbestos and Lead Inspection
- Underground Storage Tanks
- Impoundment Stabilization and Closure
- 401 and 404 Permitting
- Turbidity Monitoring
- Risk Management Plans
- Emergency Response Plans
- SPCC Planning
- BMP Planning
- Real Estate Due Diligence
- Environmental Assessments and Remediation
- Land Restoration and Brownfields
- Environmental Sciences
- Biology
- Cultural Resources



TERRADON has been a leader in West Virginia and the surrounding region for the land surveying industry since 1989. The team has developed an extensive resume of successful surveying and mapping projects performed for a diverse group of repeat private and public sector clients. TERRADON's experienced staff of licensed professional surveyors and mappers bring expertise and proficiency to every project task.

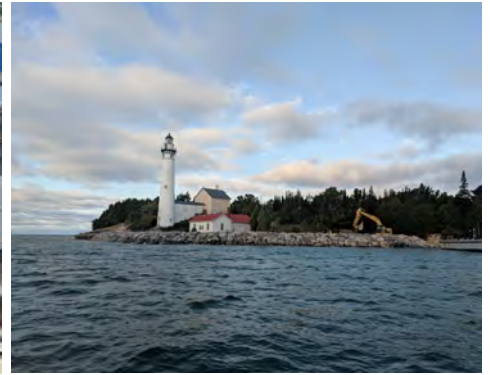
The company is committed to staying ahead of the industry's pace by investing in state-of-the-art equipment and technology. That commitment enables TERRADON to overcome unique and challenging project conditions or obstacles, and efficiently provide the most accurate and complete information available to clients.

TERRADON has a long history of providing design and construction survey services for numerous transportation projects. Efficient and accurate results are ensured by prioritizing the use of modern technology, including state of the art GPS and robotic total stations, with the latest design software.

TERRADON maintains full-time Professional Surveyors on staff. The firm services projects through the use of in-house field survey crews who are backed by corporate staff members, including an experienced team of CAD designers. TERRADON's transportation survey group is experienced in preparing highway right-of-way plans, including courthouse research and right of way questionnaires, and writing legal descriptions for right of way take parcels, temporary construction easements and permanent drainage easements.

### Services

- Mapping
- Construction Layout
- ALTA survey
- Topographic Survey
- GPS Network Control Surveys
- Aerial Mapping
- LiDAR Mapping
- Ground Penetrating Radar (GPR)
- 3D Mapping



TERRADON offers materials testing and construction monitoring services to document compliance with project design specifications and regulatory requirements. The firm provides construction monitoring for utility, highway, and commercial construction projects. TERRADON also provides laboratory and field testing of construction materials. Engineers and technicians at TERRADON are West Virginia Department of Highways certified in Portland Cement Concrete, Hot-mixed Asphalt, Compaction and Aggregates.

Additionally, TERRADON provides Construction Management services including construction oversight, documentation, and safety procedure implementation. TERRADON has more than 35 qualified and certified construction inspectors and more than 5 qualified construction management representatives. TERRADON's team also includes environmental field inspectors, geotechnical inspectors, and geological field inspectors.

TERRADON Corporation Construction Testing and Inspection Department maintains a full service laboratory testing facility on site at the Poca, WV office. The laboratory is staffed by qualified and certified construction inspection technicians.

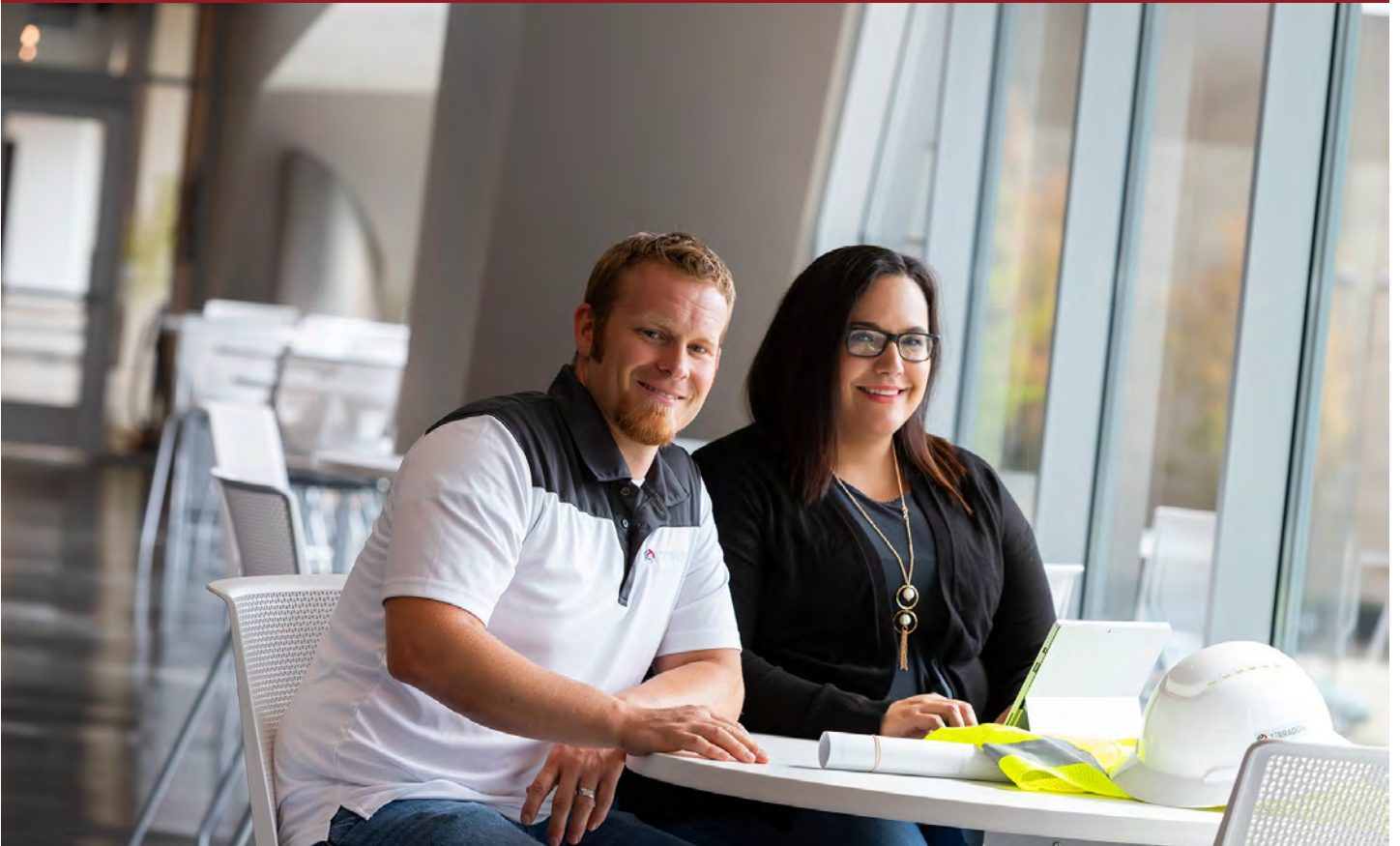
### Services

- Slump of Portland Cement Concrete (AASHTO-T119)
- Air Content of Freshly Mixed Concrete (AASHTO-T196 and T152)
- Unit Weight and Yield (AASHTO-T121)
- Making and Curing of Concrete Test Specimens (AASHTO-T23)
- Compressive Strength of Concrete Specimens (AASHTO-T22)
- Fine and Course Aggregate Gradations (AASHTO-T11 and T27)
- Specific Gravity of Aggregates (AASHTO-T84 and T85)
- Atterberg Limits (AASHTO-T89 and T90)
- Moisture Content of Soil (ASTM-D2216)
- Nuclear Compaction Testing of Soil, Stone, and Hot Mixed Asphalt
- Preparation of Certification Forms and Construction Reports
- Welder Certification
- Agency Compliance
- Floor Flatness Testing
- Fireproofing
- Masonry Testing
- Structural Steel Inspection Certified
- Welding Inspection
- Dye Penetrant Testing
- Bolt Testing
- Project Safety Monitoring
- FAA Eastern Regional Laboratories
- Steel Institute AST Inspections

# 2

## References

Similar Experience Project References



### WVDEP AML Project References

#### Roger Earle

*WVDEP AML, Waterlines*

601 57th Street SE, Charleston, WV 25304  
304-926-0499x41183  
Roger.a.earle@wv.gov

#### Larry Board

*Environmental Resources Program Manager 2, WVDEP Division of Water & Waste Management*

601 57th Street SE, Charleston, WV 25304  
304-926-0499x43883  
Larry.d.board@wv.gov

#### Travis Parsons

*WVDEP AML, Program Manager*

601 57th Street SE, Charleston, WV 25304  
304-926-0499x41185  
Travis.g.parsons@wv.gov

### Additional Project References

#### Mr. Jim Insko, Director of Public Works

*City of Huntington, WV*

800 Fifth Avenue, Huntington, WV 25701  
304-696-5540  
inscoj@huntingtonwv.gov

Project: Landslide Repairs & Various City Engineer Repair Projects

#### C. Elwood Penn IV, PE, Director

*WV Division of Highways, Planning Division*

304-558-9629  
Elwood.c.penn@wv.gov

Project: Various slip repair, sidewalk, streetscape, and recreational trail projects

#### Raymond J. "R.J." Scites, PE

*Director, WV Division of Highways - Engineering Division*

1334 Smith Street, Charleston, WV 25301  
Raymond.j.scites@wv.gov

Project: Various slip repair, highway, roadway, bridge, truss, sidewalk, streetscape, and recreational trail projects

# 3

## Staffing Plan

Proposed Key Staff Management Plan





**WVDEP**

*Project Owner / Management*



**W. Joe Saunders, PE**  
*Project Manager*

**AML Engineering**

W. Joe Saunders, PE  
Ben Prior, PE  
Andrew Wagner, EIT  
Jamal Shanaa, PE  
Rana Mutashar, PE, PhD  
Matt Brenner  
Steve Chapman

**Civil Engineering**

Will Thornton, PE, PS  
Dakota Smith, PE  
Steve Young, PE  
Kevin Huffman  
Scott Browning  
Dan Thompson

**Geotechnical Engineering**

Joe Carte, PE  
John James, PE  
Chris Hancock  
Brittany Beckwith

**Surveying & Mapping**

Robert Thaw, PS  
Dave Brown, PS  
Brian Bakanas, PS  
Robert Fuller, PS  
Mark Shamblin, PS

**Environmental Consulting & Engineering**

Matt Glaspey, CCM, Env. Sp.  
Mike Pickens  
Morgan Jackson  
Barry Dickerson  
Ally Reeves

# 4

## Project Approach

Proposed Approach - Goals & Objectives



TERRADON Corporation is a full-service licensed West Virginia engineering firm, with a qualified team with multiple years experience providing engineering design services for various similar projects. The TERRADON Team will approach this project with civil engineering, geotechnical engineering, and hydrological engineering design methods as the priority.

TERRADON will be responsible for full contract services, which may include:

- *NEPA Tasks and IJJA Compliance:*

All project design and construction will be performed to comply with the National Environmental Policy Act and in conformation with the newly passed Infrastructure Investments and Jobs Act. All necessary permits, including but not limited to USACE 404 permits, WVDEP 401 permits, and NPDES permits will be obtained as part of the project, as warranted by the various anticipated construction activities. Whenever possible, USACE Nationwide permits will be used, but depending on the scope of the project, individual permits will be obtained if necessary. TERRADON has the background and experience to handle any and all permits that the project may require.

- *Determine legal ownership of properties and provide legal documentation to substantiate legal ownership findings (if required):*

As part of the project, our team will determine the legal ownership of the properties and we will provide legal documentation to substantiate legal ownership findings. TERRADON performs these services on a regular basis for projects all over the state, as necessary for Right of Way work for WVDOT-DOH projects, as well as for various project for the City of Huntington and other clients. We have a group of engineers and surveyors who routinely determine property ownership for a host of projects.

- *Develop construction plans and technical specifications for all aspects to reclaim mine portals, demolition of structures (silo, buildings, etc.), drainage controls and systems, slope stabilization, coal refuse reclamation, stream restoration, subsidence repair, limits of disturbance, storm water and erosion and sediment control, regrade and revegetation, and all other conditions encountered on the project sites:*

As demonstrated in our project descriptions, TERRADON has developed construction plans and specifications for all aspects of various reclamation projects including mine portal closures (wet and dry), demolition of buildings, such as silos, old mine workings, houses, and miscellaneous buildings on numerous projects in the past, for the Abandoned Mine Lands Program. We have vast experience with slope stabilization, coal refuse reclamation, stream restoration, and subsidence repairs. Routine plan features include showing limits of disturbance, storm water and erosion & sediment control, regrading and revegetation, as well as any other condition that may be encountered on project sites. As one of the premier engineering firms in the state previously working on AML projects over the past 30+ years, we have seen and designed reclamation projects that include virtually any aspect an AML site may encounter.

- *Obtain/maintain/release all required permits:*

As part of the permitting process, we have the experience and ability to not only obtain all permits a project may require, but we have the knowledge and experience to ensure the permits are maintained during the life of the project. The TERRADON environmental team knows the process for releasing/closing permits at the conclusion of a project. These tasks are often handled by the contractor, but if these tasks are included as scope items, we have the in-house expertise for these items.

- *Provide resident project representative, QA/QC certification, and prepare daily field activity logs summarizing construction activities:*

As a full service engineering firm, one of our core offerings is construction inspection and quality assurance/quality control. We have more than 25 field services team members to handle these

tasks, and our staff are routinely engaged on active construction sites for various contractors and clients (including WVDOT, West Virginia American Water, and Toyota Motor Manufacturing West Virginia). As part of these services, our experienced staff prepare daily field activity logs summarizing construction activities. TERRADON maintains a QA/QC technician who routinely works in office preparing designs, so we have the ability to offer staff who can perform the design and then see its execution in the field working as our QA/QC field representative.

- *Mine portal reclamation:*

Often a part of an abandoned mine reclamation, there are several considerations that must be taken into account for mine portal closures. Whether wet or dry, mine portal closures typically require bat gates. However, when the portal is wet, it is often being used as a potable water source for nearby residents. If a wet portal is being used for potable water, accommodations must be made to preserve a water source for the residence. Ideally, a new connection to a public water source can be made, but oftentimes, a cistern must be created as part of the project plans to ensure a water source remains for those who need it. Mine portal reclamation is typically comprised of filling the portal with stone to prevent egress into the mine portal. A bat gate along with underdrains is provided to ensure bat habitat remains, and that ground water is not prevented from escape which can lead to surcharge issues that result in future blowout or upstream flooding.

- *Drainage control items:*

This may vary from new channel design, lining existing channels, and cistern design for potable water when necessary. Often, a cistern may be installed with a weir to allow for a controlled depth of ponding water before being discharged into a nearby receiving stream. Drainage control items sometimes includes check dams or ponds.

- *Erosion and sediment control:*

These items are typically engineered to meet the requirements of obtaining an NPDES permit. Erosion and sediment controls consist of ponds, dams, matting, drainage channels, swales, and proper vegetative cover. Other Erosion and Sediment control features are added as necessary in accordance with the WVDEP E&S BMP Manual.

- *Coal refuse reclamation:*

This work typically consists of regrading a refuse pile such that stable slopes are provided, followed by installation of topsoil and a vegetative cover. The intent may also be to prevent further weathering of shales that may create future stability problems that result from undermining or more competent material. Slope stabilization and erosion control are major items of coal refuse reclamation, although at times a reclamation operation may involve re-mining the refuse pile to extract usable coal that can now be obtained as a result of better technology that exists today compared to the era when the mine was active and the refuse pile was created.

- *Slope stabilization:*

While often employed on a refuse pile, this may also be applied to step slopes that were created from mining operations, or also from fixing old highwalls where back-stacking is employed as a safety remediation technique. Slope stabilization may also be necessary to stop or mitigate surface erosion.

- *Structure demolition:*

Many times there are structures such as railroads, houses, piping systems, and miscellaneous buildings that were abandoned when a mine was closed. When encountered on an AML site, these structures must be identified and catalogued to be sure they are demolished and disposed of in an approved manner. Sometimes the structures can be hauled to an approved landfill, while at other times, asbestos may be encountered. If asbestos is suspected, testing is completed for

confirmation, and if present, a plan is created for proper removal and disposal.

- *Geotechnical evaluation:*

At times, a visit by an experienced geotechnical engineer may be all that is necessary to evaluate a site, but often, a boring and testing program may be necessary to determine stable slope angles and proper bearing capacities for culverts or other structures.

- *Hydrologic and hydraulic analyses:*

The site hydrology is studied in order to perform proper hydraulic analysis of channels, swales, pipes, and stream relocations.

All of the above items may be included in the scope of services for this contract projects. TERRADON has a long history of providing all these services for WVDEP-AML. Our project history dates from recent years ago to decades ago for AML projects, and we have continued many of these design philosophies as recently as the past couple of weeks.

TERRADON's approach to Abandoned Mine Land projects is to visit the site, followed by creation of a detailed scope of work for the items that are identified in the project solicitation. After our site visit and scope are prepared, TERRADON would negotiate scope and fee with the WVDEP-AML.

As demonstrated in this statement of qualifications, the TERRADON team has all the experience and service offerings needed on these projects in-house, and is prepared to offer design and develop plans and specifications for all aspects of this contract.

# 5

## Similar Experience

Similar Project Experience



The Shabbyroom Hollow project was an approximately 10 acre complex located along Shabbyroom Branch in McDowell County, West Virginia, near the community of Roderfield. The site consisted of two coal refuse piles and several mine portals in various conditions, including collapsed portals, open portals and draining mine portals. Both refuse piles had areas of steep, unstable and barren slopes and were the primary source of high sediment loads to Shabbyroom Branch.

The subsequent sediment deposits in Shabbyroom Branch resulted in a significant reduction of the flow carrying capacity of Shabbyroom Branch, and if the refuse piles collapsed into the adjacent stream, significant flooding would have occurred. The open mine portals were easily accessible and represented a significant life safety hazard from roof falls, potentially deadly gases and other hazards. The draining mine portals were in danger of collapsing and stopping the dewatering of the mine openings, potentially leading to catastrophic blowouts and subsequent downstream flooding. Several residents were also using the draining portals as their primary water source.

The purpose of this reclamation program was to regrade the refuse piles to stable slopes, provide proper stabilization with vegetative cover and permanent drainage channel improvements, and safely seal the open and draining mine portals. Generally, refuse piles were regraded to stable slopes and permanent drainage patterns were established. A 60" pipe was necessary to carry the creek at one of the refuse piles to regrade the refuse pile in-place, as opposed to hauling material to a waste area off site. Where refuse piles toe into the creek, stream bank protection was provided.

All mine portals were closed with an appropriate mine seal. Bat gates were also installed in all of the open mine portals. Underdrains and mine drain systems were installed to alleviate wet areas in several residents' yards. Several cisterns were installed to enable residents to continue to utilize the mine water as their primary source of water where necessary. All disturbed areas were revegetated or otherwise stabilized with structural methods.

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**Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Gains Highwall**

*Harrison County, West Virginia*



The Gains Highwall project consisted of three sites located in Harrison County, West Virginia, near the city of Clarksburg. The site occupied approximately 17 acres of conglomerate land area. The purpose of this reclamation program was to regrade the refuse pile and highwall to stable slopes, provide proper stabilization, with vegetative cover and permanent drainage channel improvements and safely seal the open draining and surcharging mine portals. Generally, the refuse pile was regraded to stable slopes and permanent drainage patterns were established.

The highwall was regraded to a stable slope by breaking down the top of the highwall and encapsulating the weathered shale strata to prevent further weathering and collapse of the sandstone strata above. Permanent drainage patterns were established. The slip area was regraded to stable slopes and permanent drainage patterns were established.

The mine portal contributing the saturation of the slip area was allowed to dewater by installing a horizontal bore. All mine portals were closed with an appropriate mine seal and several horizontal bores were installed to provide permanent and controlled dewatering and permanent drainage patterns were established. Bat gates were also installed in all of the open mine portals.

Underdrains, drop inlets and Mine drain systems were installed to alleviate wet areas in several residents' yards. The subsidence area was repaired and a stable drainage channel was provided to alleviate surcharging of the mine workings. Several areas of scattered refuse were soil covered and seeded. All disturbed areas were revegetated or otherwise stabilized with structural methods.

### **Project Owner**

WVDEP Office of AML&R



The Lilbern-Pritt Highwall Project is located in Barbour County, West Virginia, near the town of Junior, WV. The site consists of a total of six highwalls, and in the initial design phase, areas of wetlands had to be delineated in order to avoid disturbance of any wetland area. Several wetland areas were defined in the project, and as a result, a significant portion of highwall 1 was left un-reclaimed, along with all of highwall 2, highwall 4, and highwall 5.

Additional work included a gabion basket retaining wall, along with ditch design to carry mine conveyance to eliminate a foundation problem at a nearby residence at highwall 1, and soil cover over mine refuse leading to a large wetland at highwall 5.

For the gabion basket retaining wall, a design study was performed to investigate several alternatives to reclaim a very difficult site immediately behind a residence. Alternatives included soil nails, rock anchors, wire net draping, reinforced concrete retaining walls, and gabion basket retaining walls. Considerations for the study were cost, constructability, and future maintenance. The gabion basket retaining wall proved to be the best overall solution for the site.

After work was begun in the area of highwall 3, an existing county route was discovered which runs along the bench in front of highwall 3. The county route location was not clearly defined, but according to deeds for the properties adjacent to the county route, the county route served as a property boundary. Reclaiming the refuse and correcting steep slopes on the refuse in the vicinity of the wall was going to require disturbing the county route, and possibly relocation, and as a result the correct location of the county route had to be determined in order to re-establish property lines at the conclusion of the project.

### Project Owner

WVDEP Office of AML&R

The Mallory (Gibson) Portals project was located in Logan County, near the town of Mallory. This project consisted of 57 portals that needed to be sealed, two of which were draining and required ditch design to carry the mine drainage to a stream below the mine portals. Many of the mine portals appeared to be shallow openings which may have originally been used for house coal, but more than half of the portals were deep. Nearly all the mine portals received mine seals with bat gates, but a few of the very shallow portals received mine seals without bat gates.

In addition to the mine seals, two gas lines had to be relocated to allow access to the project site. Below the portals, in the town of Mallory, underdrain was installed to correct wet areas on residences properties. Also in the town of Mallory two major culverts were designed to replace existing pipes that were collapsed or filled with sediment. In order for the culverts to be replaced, existing waterline had to be relocated and guardrail had to be installed on either end of the two major culverts.

At the beginning of the design, a drainage study was performed to compare culverts against open channel reconstruction for a portion of the watercourse through the town. In the existing condition, two culverts were used to carry the stream under two roads. Our scope of services included replacing the two pipes, but there was an area between the two pipes that was an open channel. The drainage study compared alternatives and costs of the for the area between the two culverts.

### Project Owner

WVDEP Office of AML&R

Phase 1 and 2 projects were located in Fayette County, West Virginia, near the Community of Glen Jean. The projects contained several sites occupying approximately 433 acres of conglomerate land area consisting of approximately 12 miles of dangerous highwall. The highwalls ranged in height from 20 to 70 feet. The slopes were steep and property owners were concerned about the possibility of falling debris. The sites also consisted of several coal refuse piles and in excess of 100 mine portals in various conditions, including collapsed portals, open portals and draining mine portals. The refuse piles had areas of steep, unstable and barren slopes that were a primary source of high sediment load to the surrounding streams.

The open mine portals were easily accessible and represented a significant life safety hazard from roof falls, potentially deadly gases and other hazards. The draining mine portals were in danger of collapsing and stopping the dewatering of the mine openings potentially leading to catastrophic blowouts and subsequent downstream flooding. Dangerous mine structures also existed on several of the sites. Several dangerous impoundments also existed on the sites. These dangerous impoundments could potentially collapse leading to catastrophic downstream flooding. The purpose of the reclamation program was to regrade the highwalls to a stable slope by using the available mine spoil that existed on the adjacent strip benches or by breaking down the highwall where available mine spoil quantities were insufficient. Very few highwalls had to be broken down as the available mine spoil was of sufficient quantity in most cases.

Proper stabilization, with vegetative cover and permanent drainage channel improvements were provided. Generally, the refuse piles were regraded to stable slopes, soil was covered and seeded and permanent drainage patterns were established. All of the dangerous impoundments were drained in a controlled manner and the soft bottom material was mucked out and allowed to dry. A rock blanket was then provided in the bottom of the impoundments and the dried material was then utilized in the backfilling of the impoundments and highwalls. All mine portals were closed with an appropriate mine seal. Bat gates were also installed in all of the open mine portals. Underdrains and Mine drain systems were installed to alleviate wet areas, impoundments and further saturation of highwall backfill areas.

The dangerous mine structures were removed and disposed of at an approved landfill. Several barren areas of scattered refused were also soil covered and seeded. All of the required erosion and sediment control measures were installed prior to construction. Additional erosion and sediment control measure were installed and maintained during construction. All erosion and sediment control structures were removed after construction, once vegetation was reestablished. All disturbed areas were revegetated or otherwise stabilized with structural methods.

### Project Owner

WVDEP Office of AML&R

The Morgan Run PA #2 project consisted of 2 sites that are located in Preston County, West Virginia, near the community of Albright. The two sites were separated by Morgan's Run. The project occupied approximately 8 acres of conglomerate land. Two refuse piles had areas of steep, unstable and barren slopes and sediment from the piles was being washed into adjacent road side ditches. The project also has 19 mine portals in various conditions, including collapsed portals, open portals and draining mine portals. The open mine portals were easily accessible and represented a significant life safety hazard from roof falls, potentially deadly gases and other hazards. The draining mine portals were in danger of collapsing and stopping the dewatering of the mine openings potentially leading to catastrophic blowouts and subsequent downstream flooding. Several drainage culverts on the project were severely eroded by the AMD discharging from the draining portals and would need to be replaced. An artesian well, discharging low pH AMD also exists on the project. Several areas of scattered refuse exist on the project. Old abandoned building ruins are present on site and present a hazard to the local population also. Areas of scattered trash and debris exist on the project as well.

The purpose of the reclamation program was to regrade the two coal refuse piles to stable slopes, provide proper stabilization with vegetative cover and permanent drainage channel improvements, and safely seal the open and draining mine portals. Generally, the refuse piles were regraded to stable slopes and permanent drainage patterns were established. On site soil borrow areas were utilized to obtain the necessary soil cover material required. Access to the site isolated by Morgan's run was achieved by installation of a temporary stream crossing. The stream crossing was removed after construction activities were completed. All mine portals were closed with an appropriate mine seal and several wet seals were installed to provide permanent and controlled dewatering and permanent drainage patterns were established. Bat gates were also installed in all of the open mine portals. A sloping bat gate was installed in one of the mine portals in a 10 to 15 foot deep depression.

The artesian well was stabilized and the low PH AMD was treated with a limestone blanket surrounding the well. All trash and debris were disposed of at an approved landfill. Several areas of scattered refuse were soil covered and seeded. Abandoned building ruins were demolished and disposed of at an approved landfill. Some of the Stone building material was able to be disposed of on site in a rubble disposal area. All of the required erosion and sediment control measures were installed prior to construction. Additional erosion and sediment control measure were installed and maintained during construction. All erosion and sediment control measures were removed after construction, once vegetation was reestablished. All disturbed areas were revegetated or otherwise stabilized with structural methods.

### Project Owner

WVDEP Office of AML&R

The Harris Branch site was located in McDowell County, West Virginia, near the community of Havaco. The project contained a coal refuse pile and is approximately 2 acres in size. The refuse pile had areas of steep, unstable and barren slopes that were a source of sediment load to the adjacent Tug Fork River. The main concern of the project was to eliminate the refuse encroachment on the fence and property of an adjacent land owner. Various items of trash and debris existed on the site as well.

The refuse pile was regraded to stable slopes, soil was covered and seeded and permanent drainage patterns were established. The refuse pile was removed from the adjacent property owner and the existing collapsed fence was removed and replaced. An off-site soil borrow area was utilized to obtain the necessary soil required for the soil cover and seeding. Riprap bank protection was utilized to prevent future washout and undercutting of the refuse pile as well as further erosion and sedimentation into the Tug Fork River. All trash and debris were disposed of at an approved landfill. All of the required erosion and sediment control measures were installed prior to construction. Additional erosion and sediment control measure were installed and maintained during construction. All erosion and sediment control measures were removed after construction, once vegetation was reestablished. All disturbed areas were revegetated or otherwise stabilized with structural methods.

**Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Venus (Hamilton) Drainage**

*McDowell County, West Virginia*



In the community of Venus, McDowell County, on a steep mountain side, mine drainage was discharging from a collapsed portal. The amount of water flowing from this portal changes from time to time throughout the year. This mine water discharges down the mountain side, on the surface of the ground and also through underground voids, causing damage to the homes and property of the approximate seven (7) homeowners living down slope of this discharge.

A wet seal was designed at the open portal and the drainage from this mine was conveyed into a pipe across the gas well road. A grouted rip rap drainage channel was designed to carry all flow away from the property owners, down the hillside to a point of discharge near the railroad.

### **Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Conley Branch (Whitt) Landslide**

*Logan County, West Virginia*



The Conley Branch (Whitt) Landslide project is located in Logan County, West Virginia, near the community of Sarah Ann. This complicated project included nearly 600 linear feet of stream bank restoration, one large draining mine portal with approximately 200 linear feet of associated channel construction, as well as nearly 1700 LF of additional surface water conveyance channel, one cistern for local residential water supply, and two dry mine seals.

The complicated portion of the project was the stream bank restoration, and difficulty resulted from the requirement to maintain an existing bench at the top of the stream bank area. The stream bank restoration project was necessary because of an existing steep slope comprised of mine spoil and refuse that was reeling into the creek below. In order to stabilize the mine spoil and refuse, the stream bank had to be lined with large riprap up to 25' in elevation, in conjunction with regrading the steep slope above the riprap up to the bench elevation.

The stream bank/slope stabilization portion of the project required in excess of 2500 cubic yards of riprap. All erosion and sediment control structures were removed after construction, once vegetation was reestablished.

### **Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Pierpont Refuse Pile**

*Wyoming County, West Virginia*



The Pierpont Refuse Pile is located in Wyoming County, West Virginia near the town of Pierpont. This project involved reclaiming an existing steep slope piled high with mine spoil/refuse, which was reeling into the creek below. The project consisted of regrading the steep slope approximately 1 to 1) to a flatter, more stable slope, and back stacking the old abandoned high wall in the vicinity with the material gathered from regrading the slope. Additionally, there were several wet and dry mine seals in the area that required bat gate mine seals.

The draining portals and existing bench drainage were collected into channels that were constructed on the bench, and the channels were designed to flow to an existing drain running down the mountain to the stream below. Because the dry mine seals on the project had the potential to impound water in the future, drains for the dry mine seals were installed, and the drains were designed to run to the bottom of the refuse pile, where an accumulated drainage could run to the creek below without washing over the refuse pile.

It was necessary to take the drains to the toe of the slope because the elevation of the mine seals was below that of the channels constructed on the bench in front of the existing high wall. All erosion and sediment control structures were removed after construction, once vegetation was reestablished.

### **Project Owner**

WVDEP Office of AML&R



The North View Mine Drainage project is located in the North View area of Clarksburg, WV. The proposed mine drainage project consisted of interceptor and piping systems, wet mine seals, and a special basement treatment for mine water. Mine water was intercepted just below the coal seam elevation along Richards Avenue on both sides of its intersection with North 18th Street. The intercepted mine water was conveyed through 12 PVC pipes to the existing catch basins at the corners of the intersection. Similarly, water from sealed mine portals about a half mile away from the above mentioned site was conveyed to the existing storm sewer system.

The wet mine seals were installed after excavating and dewatering the mine portal. During dewatering of the existing mine, the discharge was monitored and treated, as necessary, to meet state and federal discharge limits. The wet seal consists of drainage stone, 12 inch PVC perforated pipe and a compacted soil cover. A special basement treatment is required to intercept seepage at the perimeter and beneath the floor of a garage.

The treatment included removing the existing floor and installing both a perimeter drain, and a drainage blanket in the floor area. A new concrete floor was installed over the area drain. These drains collect AMD into a pipe which discharges into the sewer at the end of the driveway. This project solved wet conditions in basements, on roads, and in yards.

### Project Owner

WVDEP Office of AML&R

The Highland Avenue Drainage Project consisted of the replacement of existing mine seals, the addition of an underdrain system, and the replacement of corroded underground sanitary sewer systems. The drainage system installed intercepts and drains subsurface waters from abandoned mine shafts which lie above Nuttall, Clifton, and Highland Avenues in the City of Wheeling in Ohio County, WV.

The problem created nuisances and property damage from the mineral-laden subsurface seepage onto the residential properties and public streets. This problem was caused by roof falls and clogged mine drains. Existing mine seals were removed and replaced with new seals and drainage systems. A special underdrain system was installed continuously on three parcels to intercept subsurface seepage and prevent further damage to foundation walls and basements. The existing corroded sanitary sewer systems downstream of the problem were replaced to properly transport the intercepted drainage and sewer flows.

### Project Owner

WVDEP Office of AML&R

The Toppers Creek (Layne) Landslide project is located two miles southeast of the Toppers Creek exit off of interstate 77 near Charleston, WV. The project area had numerous houses built on and below the Pittsburgh coal seam. Numerous collapsed portals discharged acid mine drainage, killing vegetation and causing landslides. One section of the working area was known to be completely flooded with other sections suspected to be partially flooded. The proximity of residences downstream of the flooded mine workings required that any pooled water be eliminated.

The remedial measures for this project included:

- Establishing positive drainage around the landslide at the Layne residence.
- Removal of the landslide material to a waste area.
- Installing wet mine seals and dewatering the mine workings.
- Providing positive drainage from the wet mine seals to natural drainage features.
- Revegetating all disturbed areas.
- Resurfacing the existing roads in the project area after construction is completed.

### Project Owner

WVDEP Office of AML&R

The Grass Run Refuse project is located approximately one mile north of the intersection of Routes 33/3 and 119/19 (Grass Run Road) in Lewis County, WV. The project site was approximately five miles east of Weston, WV. The Grass Run Refuse project included a series of water treatment ponds, coarse coal refuse disposal areas, fine coal refuse slurry ponds, foundations associated with a preparation plant, un-reclaimed highwalls, and backfilled mine entries. Acid mine drainage (AMD), high suspended solids, and excessive runoff contributed to poor water quality and flooding along Grass Run, a tributary of Stonecoal Creek.

Coarse coal refuse was disposed at numerous locations over the site. The main disposal area was a valley fill constructed in the north fork of the site. The fill covered approximately 11 acres and contained coal refuse to a depth of over 60 feet. Other coarse coal refuse disposal areas existed in the east fork of the site.

Fine coal refuse was disposed in several slurry ponds. Based on visual observations, disposal of fine coal refuse is evident along the west side of the north fork and in two ponds near the confluence of the north and east forks. The surface area of these ponds was approximately 5 acres.

Several water treatment ponds existed at the site for sediment control and AMD treatment. Some of these ponds contained water and sediments while others were breached.

The reclamation of the site included regrading areas of coal refuse to provide positive drainage. Areas of coarse coal refuse located in the east fork were regraded. Two breached ponds were covered and developed into wetland areas. Two ponds were rehabilitated to provide stormwater detention to lessen downstream flooding. One pond was covered and vegetated. Dangerous highwalls were eliminated. Surface water channels were constructed to convey runoff through the site. Finally, exposed coal refuse were covered with a one foot layer of soil and revegetated.

The approximate area contained within the limits of construction was 120 acres.

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**Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Black Wolfe Refuse**

*McDowell County, West Virginia*



The Black Wolfe Refuse project is located approximately one mile northwest of the intersection of State Routes 103 and 161 in McDowell County, West Virginia. The project site was approximately three miles southeast of Gary. The site consisted of a 12 acre refuse pile and one smaller pile, five (5) portals, an abandoned tipple and mining equipment. The refuse pile was unstable, as evidenced by slips and erosion, and had already begun to block the stream at the toe of the pile. Three (3) of the portals had large openings with hazardous roof conditions.

Near the center of the project site, there were the remains of a preparation plant and load out facility. This area had debris that was potentially hazardous, including old scrap metal. There were also deteriorating retaining walls, small refuse piles and abandoned rail lines. Additionally, old building remains were scattered around the old preparation area.

Coal refuse had been primarily disposed in two piles. They were approximately 1500 feet upstream of the confluence of the Tug Fork and Doc Branch. The large pile was as much as 50 feet deep and both had several eroded areas which were impacting Doc Branch. There was a small illegal dump next to the large pile.

The purpose of this reclamation program was to regrade and cover the exposed coal refuse at the site, properly seal the mine portals, and remove the building remains. Drainage channels were constructed to minimize uncontrolled runoff and erosion. Garbage at the site was disposed of properly. All areas with sparse or no vegetation were vegetated.

The approximate area contained within the limits of construction was 28 acres.

### **Project Owner**

WVDEP Office of AML&R

## **WVDEP AML Camp Mohonegan Surface Mine**

*Randolph & Barbour Counties, West Virginia*



The Camp Mahonegan Surface Mine project is located along the border of Randolph and Barbour Counties, West Virginia. The problem area included acid mine drainage (AMD) seeping from numerous locations over an area of approximately 100 acres. AMD is believed to be a result of surface mining the Kittanning coal seam by mountaintop mining methods during the 1960s and early 1970s. During mining, the Homewood sandstone overburden was brought to the surface as spoil. This acidic overburden was responsible for sparse vegetation over portions of the site.

TERRADON identified more than 20 locations where AMD seeps impacted surface water. The reclamation plan included constructing both anoxic limestone drains (ALD) and open limestone channels (OLC) to generate alkalinity to buffer the AMD. Two existing ponds had the existing pipe outlets removed, the embankments lowered and new spillways installed. Areas that had standing water were regraded to provide positive drainage. Areas that lacked soil cover and vegetation were covered with soil from borrow areas. All disturbed areas were limed, fertilized, seeded and mulched.

### **Project Owner**

WVDEP Office of AML&R

The Lower Burning Creek Refuse project is located at the intersection of U.S. Routes 52 and 52/12 in Mingo County, West Virginia. The project site was approximately one-half mile southeast of the town of Kermit. The site consisted of two ponds, coarse coal refuse disposal areas, foundations of preparation plant and loadout facility, open mine entries, and an un-reclaimed highwall.

Two ponds were identified at the site. The ponds were adjacent to each other and next to Lower Burning Creek at the entrance to the site. The ponds appeared to have been sediment control structures and/or water treatment structures. Both ponds had failing outlet pipes and the potential to cause downstream flooding. The embankments of both ponds appeared to be constructed of refuse material. One pond had a seep at its toe that was orange from iron precipitate. Uncontaminated surface water was infiltrating through the refuse material causing acid mine drainage (AMD).

Just upstream from the ponds were the remains of a preparation plant and loadout facility. This area had debris that was potentially hazardous, including old capacitors and scrap metal. There were also deteriorating retaining walls, small refuse piles and abandoned rail lines. Additionally, several old building remains were scattered across the project area.

Coarse coal refuse was primarily disposed in two piles next to Lower Burning Creek. The first was approximately 500 feet upstream of the loadout facility. It was 1.5 acres and as much as 25 feet deep. The pile was restricting the creek as it eroded and slid into the channel.

The second refuse pile was approximately 500 feet upstream from the first. It was 3.5 acres in area and had very little vegetation. The pile was as much as 50 feet deep and had several eroded areas. There was a small illegal dump next to this pile.

The purpose of this reclamation program was to regrade and cover the exposed coal refuse at the site, and seal the open mine portals. Areas of standing water in contact with acidic coal refuse were eliminated. Drainage channels were constructed to minimize contact between runoff and the refuse. The settling ponds (presently inoperative) were removed. Garbage at the site was disposed of properly. All areas with sparse or no vegetation were vegetated.

The approximate area contained within the limits of construction was 50 acres.

### Project Owner

WVDEP Office of AML&R

The Spring Branch Burning Refuse Pile project is located around the former town of Milburn, in Fayette County, West Virginia. The project had three separate sites, each with coal refuse piles. Site one was just below Milburn on Paint Creek, it was a small refuse pile between County Road 15 and Paint Creek. Site two was across Paint Creek from Milburn and about a half-mile up Spring Branch. It had a large refuse disposal area covering about 4 acres and two other refuse areas about two acres each. Site three was about one half-mile above Milburn on Paint Creek, it was a small refuse pile between Interstate 64/77 and the CSX railroad right-of-way.

Refuse Pile No. 1 was regraded to stabilize the slope, covered with soil and revegetated, and had drainage structures installed to prevent erosion.

Refuse Pile No. 2A was excavated, burning refuse extinguished and regraded to a stable configuration. The regrade required a valley fill with underdrains and surface water control structures. The upper area of the pile was removed to original ground due to the steep slopes, thereby requiring the relocation of the gas company access road that crossed the pile. Exposed refuse received soil cover. All disturbed areas were revegetated.

Refuse Pile No. 2B was removed to original ground. The refuse was hauled to Pile No. 2A and incorporated in the valley fill. Surface water diversion was installed and all disturbed areas were revegetated.

Refuse Pile No. 2C was handled in the same manner as Refuse Pile No. 2B.

Refuse Pile No. 3 was regraded to stabilize the steep slopes, covered with soil and revegetated, and had drainage structures installed to prevent erosion.

Areas on any of the three sites that have trees or shrubs established were direct seeded or soil covered in such a way that did not harm the existing vegetation.

### Project Owner

WVDEP Office of AML&R



The Cedar Creek Refuse Pile project is located near the former town of Mahan, in Fayette County, West Virginia. The project area was deep mined in three coal seams, No. 2 Gas, Powellton (Eagle "A"), and Eagle, each with open or draining portals. A large refuse pile was located near a portal in the Eagle seam. The site was mined by the Christian Colliery Company and the Carbon Fuel Company. The last mining was by the Carbon Fuel Company in the No. 2 Gas seam in the 1970s. The site is about one half mile south of the Mahan exit of the West Virginia Turnpike on County Route 15. A frequently used gas well access road leads to the refuse pile.

The refuse pile had steep, unstable side slopes which toe out in the creek below. The refuse covers the creek in several locations, creating the potential for impounding water and causing significant amounts of refuse to wash downstream. Additionally, during heavy precipitation, refuse erodes from the side slopes.

The site had multiple portals in all three coal seams, many were draining. The mine drainage from these portals was a contributor to poor water quality on the lower Paint Creek watershed. The roof of the portals, which remained open were severely weathered and the rock strata was cracked. The partial remains of a brick structure exist at one of the portals.

The refuse pile was excavated and regraded to a stable configuration. The regrade required a valley fill with underdrains and surface water control structures. Exposed refuse received soil cover. The structures were dismantled and removed. The draining portals had wet seals installed after the mine workings were dewatered. The discharge was treated and diverted to the stream. Debris and scrap metal was disposed of properly. All disturbed areas were revegetated.

### Project Owner

WVDEP Office of AML&R

The Micajah Refuse Pile project is located in Wyoming County, near Covel, West Virginia. The area was deep mined resulting in two refuse dumps and an open portal. An access road crosses both refuse piles. One access road embankment had a 12-foot diameter culvert. The site was mined by United Pocahontas Coal Company and was last mined in the 1960's. The site is south of Herndon on WV Route 16/2, off of WV Route 10. A frequently used gas well access road crossed the refuse piles.

The refuse piles have steep, unstable side slopes that span the valley and toe out in the creek. During heavy precipitation, refuse eroded from the side slopes and entered the stream. The refuse piles could impound water. Failure of the impoundments could endanger a railroad and public road. One of the piles was burning, creating noxious fumes and possible voids that presented a cave-in hazard. Also an open portal existed that was draining.

The refuse piles were regraded to a stable configuration and stream drainage was channelized across the refuse. Scattered gob was incorporated into the regraded areas. The access road across the refuse piles was rerouted to a better condition than it was found. Existing gas lines were also relocated. The burning refuse was extinguished. The existing 12-foot steel plate pipe was removed and disposed of. The refuse on the valley floor of this site was "mucked" and backfilled with select rock fill over geotextile to provide a stable foundation for the regraded refuse. The existing portal was closed with a wet seal consisting of a double-block wall and two drainage pipes.

### Project Owner

WVDEP Office of AML&R

The Jenkin Jones project is located near Anawalt, in southern McDowell County. The site consisted of four large coal refuse piles which occupied approximately 75 acres of land area. All the refuse piles had areas of steep, unstable slopes that could slide creating a substantial hazard. In addition, two large buildings were demolished.

The purpose of this reclamation program was to regrade the refuse piles to stable slopes, and provide proper vegetative cover to minimize erosion. Permanent drainage channels were provided to conduct the surface water off of, and around, the refuse piles. Generally, the refuse piles were regraded by excavating back the top portion to original ground while filling the bottom portion to form stable slopes. This required keying the toe into the steep hillside.

The structures consisted of a mine office building and company store with a small warehouse. The structures were built in 1917 by the Pocahontas Fuel Company. The buildings are substantial being constructed of brick, steel, and concrete. It is likely that some asbestos was used in the construction and asbestos sampling was conducted.

**Project Owner**

WVDEP Office of AML&R

## WVDEP AML Stonecoal Creek Complex #1

Raleigh County, West Virginia



The Stonecoal Creek Complex project is located along Stonecoal Creek, near the community of Lillybrook, in southern Raleigh County. The site consisted of numerous coal refuse piles and open mine portals which occupied approximately 66 acres of conglomerate land area. All the refuse piles had areas of steep, unstable slopes; the primary source of a very high sediment load to Stonecoal Creek.

The subsequent sediment deposits in Stonecoal Creek resulted in a significant reduction of the flow-carrying capacity of Stonecoal Creek, resulting in more frequent flooding of adjacent areas. The open mine portals were easily accessible and represented a significant life safety hazard from roof falls, potential deadly gases, and other hazards.

The purpose of this reclamation program was to regrade the refuse piles to stable slopes, provide proper stabilization with vegetative cover and permanent drainage channel improvements, and seal open mine portals. Generally, the refuse piles were regraded to stable slopes and permanent drainage patterns were established, relocating portions of Stonecoal Creek where necessary. Where refuse piles toe into the creek, stream bank protection was provided. The open mine portals were closed with an appropriate mine seal. All disturbed areas were revegetated or otherwise stabilized with structural methods.

### Project Owner

WVDEP Office of AML&R

The Stonecoal Creek Complex project is located along Stonecoal Creek, near the community of Lillybrook, in southern Raleigh County. The site consisted of eight coal refuse piles and twelve open mine portals. All the refuse piles had areas of steep, unstable slopes; they are the primary source of a very high sediment load to Stonecoal Creek. The subsequent sediment deposits in Stonecoal Creek had resulted in a significant reduction of the flow-carrying capacity of Stonecoal Creek, resulting in more frequent flooding of adjacent areas. The open mine portals were easily accessible and represent a significant life safety hazard from roof falls, potential deadly gases, and other hazards.

The purpose of this reclamation program was to regrade the refuse piles to stable slopes, provide proper stabilization with vegetative cover and permanent drainage channel improvements, and seal open mine portals. Generally, the refuse piles were regraded to stable slopes and permanent drainage patterns were established, relocating portions of Stonecoal Creek where necessary. Where refuse piles toe into the creek, stream bank protection was provided. The open mine portals were closed, wet seals were placed in the 12 portals consisting of two drainage pipes. Two of the wet seals received cisterns since local residents are using the mine water.

In addition, one of the portals receiving the cistern had a bat gate installed. Two of the remaining 10 wet mine seals received bat gates. Bat gates consisted of either 24 or 36-inch diameter plastic pipe with an angle iron grill. The wet mine seals were stowed with stone and covered with soil.

All disturbed areas were revegetated or otherwise stabilized with structural methods. The access roads to gas wells were maintained and returned to as good or better condition as they were found. Existing utilities were relocated, where necessary.

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**Project Owner**

WVDEP Office of AML&R

## WVDEP AML Stonecoal Creek Complex #3

Raleigh County, West Virginia



The Stonecoal Creek Complex project is located along Stonecoal Creek, near the community of Lillybrook, in southern Raleigh County. The site consisted of five coal refuse piles, scattered gob, and six open mine portals. The open mine portals were easily accessible and represent a significant life safety hazard from roof falls, potential deadly gases, and other hazards.

The purpose of this reclamation program was to regrade the refuse piles to stable slopes, provide proper stabilization with vegetative cover and permanent drainage channel improvements, and seal open mine portals. Wet seals were needed in 5 of the portals consisting of two drainage pipes. Discharge from the mine drained into the existing drainage in front of the portal or channeled to the stream. Four of the wet mine seals received bat gates. Bat gates consisted of either 24 or 36-inch diameter plastic pipe with an angle iron grill. There was only one dry mine seal needed on this project. The wet and dry mine seals were stowed with stone and covered with soil.

All disturbed areas were revegetated or otherwise stabilized with structural methods. The access roads to gas wells were maintained and returned to as good or better condition as they were found. Existing utilities were relocated, where necessary. Two piles were to receive permanent access roads. A resident lives at the end of one of the permanent access roads, which remained open. Several foundations and piers, and railroad trestle abutments were removed.

### Project Owner

WVDEP Office of AML&R

Drews Creek "A" Highwall consists of a large landslide and three (3) existing mine portals. The slide starts below a pre-law surface mine bench and consists mostly of "shoot and shove" material. A local resident stated that he saw a large stream of water flowing out of the toe for several days during the initial stages. The toe of the slide is located next to the stream bank. Large boulders and very large trees have fallen over and are obstructing the stream flow. This slide is approximately six (6) acres in size. Most of the six acres is exposed soil, eroding very fast during rain events. Approximately 0.25 miles below this slide is a community of approximately 50 people living in close proximity to the creek. The slide has the potential of impounding water (during heavy rain events), in the waterway, and therefore, the potential to flood these 50 people and homes exists.

Two of the mine portals are partially collapsed. One portal is 4 feet wide and 3 feet high; the second is 6 feet wide and 3 feet high. Both of these portals have mine drainage seeping from the partially collapsed openings.

These portals are located on the above mentioned highwall bench, and are easily accessible by humans. The third portal is located inside an existing block building on the same bench. The project approach consists of wet and dry seals on all open portals, conveyance of all drainage to new channels leading to all drainage dispensing into Drews Creek. The landslide will be regraded and all drainage from the grading will be conveyed to Drews Creek.

### Project Owner

WVDEP Office of AML&R



TERRADON assisted the Wyoming County Economic Development Authority (WCEDA) with submitting and ensuring the completion of the Barkers Creek Industrial Park (Site) in the West Virginia Voluntary Remediation Program (VRP) to assess and remediate unresolved environmental contamination. Previous site environmental assessments indicated that the property displayed environmental concerns pertaining to RCRA 8 Metals differentiating between Chromium III and VI, Volatile Organic Compounds (VOCs), and Poly Aromatic Hydrocarbons.

Therefore, TERRADON completed a Site Work Plan and Health and Safety Plan in coordination and compliance with WVDEP to perform a site characterization warranting appropriate soil and groundwater water profiles of the subject property while safeguarding appropriate Quality Assurance and Quality Control (QA/QC) procedures. Upon approval of the Site Work Plan from WVDEP, TERRADON performed a Site Characterization of the site by performing Soil Borings utilizing a GeoProbe system, Photoionization Detector (PID), and Installation of Monitoring Wells. The site characterization determined Arsenic, Naphthalene, Chromium VI, and Benzo(b) fluroanthene as Contaminants of Concern for the subject property.

Accordingly, TERRADON conducted Data Validation from the Site Characterization from a third party to ensure unbiased results. A Baseline Human Health and Ecological Risk Assessment was conducted to evaluate potential human and ecological receptors at the site in accordance with the requirements outlined in the VRP. The Risk assessment recommended a Land Use Covenant (LUC), Deed Restrictions prohibiting the development of the site for residential purposes, a soil or concrete cap, and venting systems. As such, a Remediation Action Plan was developed and implemented for site ensuring appropriate environmental capping, LUC, and Deed restrictions.

## **PROJECT OWNER**

Wyoming County Economic  
Development Authority





TERRADON was contracted by the West Virginia National Guard to provide the state with environmental services to address slum and blight properties and to assist in the removal of vacant, deteriorated and/or abandoned buildings that were located throughout the twelve counties which were declared disaster areas following the historic flooding of 2016.

Working with the WV State Finance Adjutant Generals Office, TERRADON organized and oversaw the completion of reviews of 95 separate properties to determine their eligibility and eventual disposition under the RISE WV Program. TERRADON became involved with this program after delays in assessing properties and securing funding for affected property owners had caused the program to be modified and put under new leadership.

Each property was assessed within the guidelines of the State Finance Adjutant Generals Office for the presence of:

- Hazardous wastes/materials as defined by CERCLA;
- Potential Environmental Impacts as defined by the National Environmental Policy Act;
- Aquatic Resources as defined by the US Army Corps of Engineers;
- Rare, Threatened and Endangered Species as defined by the US Fish and Wildlife Service; and
- Archaeological and Historical Resources Section 106 Concurrence as defined by the West Virginia Historic Preservation office.

Upon completion of these scope items, the findings for each property were compiled into individual TIER II Environmental Assessment Reports. Each report was submitted to the WV State Finance Adjutant General's Office for prioritization within the Rise and Blight Program.

## PROJECT OWNER

WV National Guard

# A

## Key Staff Resumes

Appendix A: Key Staff Resumes

Joe Saunders is a Professional Engineer, licensed in West Virginia, Ohio, Virginia, North Carolina, Kentucky, Maryland, Alabama, Nevada, Maryland, Colorado, Texas, and Oklahoma. Saunders offers a wealth of experience through projects performed for the West Virginia Department of Transportation and Ohio Department of Transportation and related to engineering design and plan development for structures and roadways.

As Lead Designer for Transportation and AML design projects, Saunders is responsible for the development of construction plans for transportation, including bridge replacements and rehabilitations, roadway and highway design, right-of-way plans, and ancillary design. Additional responsibilities include preliminary design and reports, construction plans and specifications, construction estimates, contracts and bidding review, and construction engineering.

Saunders directs the highway design team for hydrology and hydraulic calculations. Saunders also works with the highway design team to schedule manpower and capacity for design projects and provides daily coordination of project tasks with clients/owners. With 28 years of experience as a designer and almost a decade of additional experience in highway and bridge construction, Saunders is experienced with all critical elements required of this contract.

Saunders has provided Project Management and design experience on numerous highway and bridge projects in Ohio, West Virginia, Indiana, Pennsylvania, and North Carolina.

### **Project Experience**

#### **Conley Branch (Whitt) Landslide (WVDEP)**

Served as Project Manager and Lead Design Engineer for this WVDEP-AML project located in Logan County, WV. Responsible for all project tasks and coordination with the client.

#### **Pierpont Refuse Pile (WVDEP)**

Served as Project Manager and Lead Design Engineer for this WVDEP-AML project. Responsible for all project tasks and coordination with the client.

#### **Mallory (Gibson) Portals (WVDEP)**

Served as Project Manager and Lead Design Engineer for this WVDEP-AML project located in Logan County, WV. Responsible for all project tasks and coordination with the client.

#### **Lilbern-Pritt Highwall Project (WVDEP)**

Served as Project Manager and Lead Design Engineer for this WVDEP-AML project located in Fayette County, WV. Responsible for all project tasks and coordination with the client.

#### **Shabbyroom Hollow Complex (WVDEP)**

Served as Project Manager and Lead Design Engineer for this WVDEP-AML project located in McDowell County, WV. Responsible for all project tasks and coordination with the client.

#### **Robinette Refuse Pile (WVDEP)**

Served as Project Manager for this WVDEP-AML Project. While not initially involved as design engineer, Saunders oversaw any remaining work on the project, including engineering support for the client and contractor, and inspection services.

### **Education**

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

### **Certifications**

Registered Professional Engineer: WV, OH, VA, NC, KY, NV, MD, AL, CO, TX, OK

### **Total Years Experience**

32

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**U.S. 35 Design and Construction Plans, Mason County, WV**

Structural Engineer: Overall QA/QC. Involved in checking and reviewing roadway geometry, drainage and quantities. Responsible for the design of box culverts.

**AEP Building Expansion, Ashland, KY**

TERRADON was contracted by AEP to design a new exterior ramp enclosure. The building extension projected from an existing maintenance facility, and the building extension was used to enclose an existing ramp to protect the ramp and traffic on the ramp from the weather. Saunders was the engineer of record for this project.

**Toyota Office Expansion , Buffalo, WV**

TERRADON was contracted by TMMNA to design and oversee construction of a 6000sf expansion at the manufacturing facility in Buffalo, WV. Saunders was the engineer of record for this project.

**Toyota Waste Water Tank Farm , Buffalo, WV**

TERRADON was contracted by TMMWV to design a new tank farm for the existing manufacturing facility in Buffalo, WV. As part of the project, TERRADON also designed a secondary containment system for the tank farm. Saunders was the engineer of record for this project.

**Toyota Stair Tower, Buffalo, WV**

TERRADON was contracted by TMMWV to design a new exterior stair tower to provide roof access to the existing motor manufacturing plant in Buffalo, WV. Saunders was the engineer of record for this project.

**Toyota Various Plan Review, Buffalo, WV**

TERRADON was contracted by TMMWV to act as an independent plan reviewer providing oversight and plan review comments on plans prepared by other consultants. TERRADON reviewed plans and provided comments to the owner. Saunders was the engineer of record for this project.

**Bluestone Dam Structural Design & Inspection, Summers County, WV**

Saunders has served as the Lead Project Structural Engineer of Record for the Bluestone Dam Phase IV Construction team working for Heeter Construction under the direction of the USACE. Designs included structural cantilevered steel framing anchored to the sloped downstream face of the dam that supports drilling operations for anchor installation and a 150 ton crane. The cantilevered platform extends 32' from the face of the dam, with supports spaced up to as much as 15'. This spacing provides main support members to accommodate the full weight of the 150 ton crane and support vehicles, and requires a detailed examination of fatigue prone members for the design service life of the project. All members below ordinary high water level were designed to support full loadings and force effects from water and debris collisions. Project Engineer responsibilities include providing professional and technical leadership and expertise on structural design and inspection to professional staff.

**AEP Gavin Power Plant, Mercury Reduction Basin Design, Kanawha County, WV**

Served as Project Manager and Lead Designer to design a Mercury Reduction Basin. The project was created as a Mercury (Hg) Reduction effort to comply with EPA requirements. The Mercury Reduction Facility was created to reduce the mercury effluent level at the storm water discharge at the Gavin Power Plant. The facility was created by designing a concrete sump where chemicals could be added to the storm water that would cause the mercury to precipitate where it could be mechanically removed. The sump was constructed of reinforced concrete walls that

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acted as both load bearing structures as well as earth retaining structures. The sump had a vertical divider to create two separate chambers, which allowed one chamber to be in service for the treatment of the effluent while the other chamber was being serviced or cleaned. A complicated valve mechanism was designed to control effluent flow to the desired chamber.

#### **Noise Wall Design, Montgomery County, OH**

Structural Design Engineer for the design of drilled shaft foundations, FAA aeronautical clearance requirements, and plan review of the free standing noise wall located adjacent to I-75 near Dayton, OH.

#### **American Electric Power John E. Amos Plant Haul Road Project, Putnam County, WV**

Engineer of Record for the haul road and bridge for the John E. Amos Power Plant. The project consisted of approximately 0.75 miles of new roadway alignment along with a 3-span continuous steel bridge crossing WV817. Prior to building this project, trucks hauling ash from the coal fired power plant travelled along WV817 to reach the land fill. AEP desired to remove this truck traffic from WV817 as part of a community outreach program. Saunders was responsible for all aspects of the project, including roadway geometry, design of the bridge, design of an MSE wall, and permitting. The roadway geometry had to be worked to avoid interference with transmission towers, a helipad, and various other geometric constraints along the corridor. The bridge design was performed using custom loads provided by AEP. The power plant desired to build a bridge that could handle loads that were nearly double the design legal limit, which would allow the plant to use overloaded trucks to reduce the number of cycles to the landfill. The bridge was located in a tight radius curve with three radial supports and one severely skewed abutment. The curvature of the bridge along with the skew created very complicated geometry and load paths. In addition to the complicated geometry, Saunders devised an erection scheme for the project that would allow the bridge superstructure to be erected without the need for shoring towers. Under normal erection procedures for curved girder bridges, intermediate towers are erected to prevent the curved girders from rolling over during erection, and the towers can also be used to jack the girders into place. The erection scheme devised by Saunders eliminated the potential for roll over while at the same time eliminating the need for the girders to be jacked into place. This scheme offered significant cost and time savings to the owner over conventional erection procedures.

#### **MacArthur Bridge, Raleigh County, WV**

The project was scoped to rehabilitate the MacArthur Bridge (WV Route 16) over I-77 ramps near Beckley, WV. Wagner performed drafting and digitization of field inspection notes for bridge repair.

#### **Harper Road Bridge Rehab, Beckley WV**

The project was scoped to rehabilitate the Harper Road Bridge (WV Route 3) over I-77 in Beckley, WV. Wagner performed drafting and digitization of field inspection notes for bridge repair.

#### **Mossy Bridge, Mossy WV**

The project consisted of the design and preparation of contract plans and related documents for the replacement of the existing Mossy Interchange Bridge, which carries WV 612 over Paint Creek in Fayette County. Wagner served as a Project Designer and performed a site visit and assisted with collecting field data for hydraulics analysis, assisted with hydraulics analysis and drafting of a bridge hydraulics report, delineated drainage area for Paint Creek for drainage calculations, consulted on roadway and super elevation design for the proposed alignment to satisfy DOH requirements, and developed construction phasing and maintenance of traffic schemes.

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Thornton is an experienced project manager and design engineer for civil engineering design projects. Thornton has more than 33 years of experience with consulting engineering in West Virginia, and three years with a construction firm performing major concrete paving projects in West Virginia, Pennsylvania and Ohio. Thornton also provided consultant review for the WVDOT, Division of Highways.

The major design projects with which he has been involved included roadway design, drainage design, site design, mine land reclamation, permitting, property surveys, airport design, Right-of-Way Services, maintenance of traffic and construction administration and oversight. He provides analysis and design on the construction and rehabilitation of a variety of infrastructure utilities (water, wastewater and storm water), including streets, drainage, sidewalks, buildings, and traffic and other safety improvements.

### **Project Experience**

#### **Schoenbaum Tennis Courts Asphalt and Drainage Rehabilitation, City of Charleston Parks and Recreation, Charleston, WV**

Management of design and renovation of an 8 court tennis complex located in the Kanawha City area of Charleston, WV. Subsurface drainage problems were solved by the installation of an open graded drainage layer under the courts. The entire court are was repaved with a construction cost of \$500,000.

#### **Verizon Clemtown Slide Remediation, Taylor County, WV**

Management of the remediation of a slide blocking access and threatening nearby property of a Verizon cell tower site in Taylor County, WV.

#### **WVA Manufacturing Raw Material Retaining Wall**

Management during the design of a new retaining wall at the Raw Material Railroad loadout at the WVA Manufacturing Alloy, WV site. The proposed wall will be approximately 450 linear feet and range from 3 to 10 feet tall.

#### **Grayson Lake Boundary Survey, US Army Corps of Engineers, Grayson Lake, KY**

Management of the inspection of 151 miles of fee boundary line along the Grayson Lake project.

#### **Ravenswood Downtown Revitalization 2010, Ravenswood Development Authority, Ravenswood, WV**

Management of the bidding, construction administration, inspection and material testing for the sidewalk rebuilding, lighting and ADA improvement project. Took over project after design was completed by another consultant. When the project bids came in over original estimate, we helped secure additional funding from WVDOH.

#### **Golden Corral Pipe Collapse Repair, Cross Lanes, WV**

Management of the professional services related to surveying, design, and analysis for the existing pipe collapse issue at the Golden Corral restaurant on Goff Mountain Road in Cross Lanes, WV.

#### **Hammer Strait Bridge, Pendleton County, WV**

Management of bridge replacement over Trout Run in Pendleton County, WV.

### **Education**

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

### **Certifications**

WDOH Portland Cement Concrete Technician

WVDOT Asphalt Pavement Technician

### **Registration**

Professional Engineer: WV, OH, VA

Professional Surveyor: WV

### **Total Years Experience**

33

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**District 2 Slides, Statewide, WV**

Project Manager for the development of construction plans for 10 separate slide projects caused by April 2015 flooding events.

**Waterloo Bridge, Mason County, WV**

Management of bridge replacement and related design tasks for replacement of a bridge over Thirteen Mile Creek in Mason County, WV.

**I-77 North Camden Interchange to Staunton Avenue Interchange, Wood County, WV**

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

**Corridor H Section 7—Forman to Moorefield, Grant County, WV**

Design and management included five miles of new mainline four-lane highway, several side road connectors, truck brake check area, truck escape ramp, and a wetland overlook area including more than 8 Million cubic yards of earthwork.

**I-79 Bridgeport to Meadowbrook, Harrison County, WV**

Included the widening of I-79 from two lanes North Bound and South Bound to four lanes North Bound and South Bound from Bridgeport to Meadowbrook Road including two sets of bridges.

**Corridor H Davis to Bismark, Section 01, Tucker County, WV**

Included design and management for upgrade of approximately two miles of WV 93 between Davis and Bismarck to a four-lane highway.

**ODOT-Ashtabula Grade Separation, OH**

Design and management of a grade separation over two sets of railroad tracks with related approaches and utility relocation.

**U.S. 52 Kermit Bypass, Mingo County, WV**

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

**U.S. 19 Corridor L Upgrade near Muddelty, Nicholas County, WV**

Design and management of approximately four miles of the expansion of U.S. 19 from 2 lanes to 4 lanes in Nicholas County. This fast track project was completed in nine months.

**Meadowbrook Road (U.S. 19 End), Harrison County, WV**

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

**Mon-Fayette Expressway, Monongalia County, WV**

New four lane section of the Mon-Fayette expressway in Monongalia County.

**WVDOH Master (On-Call) Engineering Services, WV**

Managed various highway, bridge, and related engineering services at locations throughout the state including: Lavalette to Huntington Road Widening, Spencer Center Turn Lane, Church Street in Ripley Center Turn Lane, WV 14, WV 15 Intersection Upgrade.

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Bridge and Roadway projects for which Thornton provided Project Management and QA/QC while at WV DOH Engineering Division, Consultant Review Section, are listed below. Typical services included project scheduling and tracking, plan review for adherence to AASHTO and DOH standards and ensuring the project stays within scope.

**Ohio River Bridge, Weirton, WV**

Design study for a new Ohio River crossing near Weirton WV. Project included alignment studies, preparation of an Environmental Assessment document and coordination with stakeholders including local governments, public, US Corps of Engineers, FHWA offices in Ohio and WV, Ohio DOT

**I-79 Morgantown Interchange, Morgantown, WV**

Design study for a new Interchange on I-79 in Morgantown. This fast track project included the preparation of an Environmental Assessment as well as developing alignments for a new interchange on I-79.

**Mineral Wells to Pettyville, Pettyville, WV**

Design Study and Environmental Assessment for the extension of four lane roadway from Mineral Wells to Pettyville. Typical services included project scheduling and tracking, attending public meetings, plan review for adherence to AASHTO and DOH standards and ensuring the project stays within scope.

**Nutter Farm Bridge Road**

Construction plans for new roadway and intersection with US 50 to allow the removal of the existing Nutter Farm bridge.

**Blandville Bridge**

Construction plans for the replacement of existing bridge and approach roadway.

**Camp Creek Bridge, Clay County, WV**

Design Study to replace the existing bridge in Clay County.

**Burlington Mill Creek Bridge**

Design study to select preferred option to replace the existing bridge.

**US 220 Passing Lane**

Construction plans for the addition of a passing lane on US 220. Typical services included project scheduling and tracking, plan review for adherence to AASHTO and DOH standards and ensuring the project stays within scope.

**Bartley Branch Bridge**

Construction plans for the extension of new roadway alignment to allow the removal of a structure.

**Hartland Bridge**

Construction plans for the replacement of existing bridge over the Elk River and approach roadway.

**Fourth Street Bridge, Fairmont, WV**

Design Study and Construction plans to replace the existing Fourth Street bridge with a new structure and roadway at Third Street in Fairmont. This project included coordination with City of Fairmont officials as well as the local public.

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Joe Carte's role at TERRADON Corporation is to provide senior-level review, training, and assists with the day-to-day tasks and geotechnical decisions. Carte brings 36 years of diverse geotechnical experience and is a registered Civil Engineer. Carte has provided heavy foundation design for bridges, towers, and tanks throughout his career. Carte's experience as the Geotechnical Group Leader with the WVDOH Materials Division gives him insights into the state's guidelines, the LRFD Code, and the statewide geology.

Some of Carte's accomplishments while at the WVDOH include standardizing the estimation of bearing resistance for bridges, developing the PSSLOPE software, training staff, revising the piling specification, and championing the GRS-IBS abutments for the FHWA Every Day Counts initiative. Carte has routinely volunteered for the West Point Bridge Contest and enjoys training children in the use of the software in schools. Carte co-invented a soil bolting system (patented) for correcting landslides.

### **Project Experience**

#### **WVDEP – AML**

As a Geotechnical Engineer, Carte developed designs, cost estimates, and bid packages for various reclamation projects. Relevant projects include the Red Jacket Mine Fire, and the Coal City and Jenkin Jones reclamation projects.

#### **WVDOH -Engineering Division Assistance**

As Geotechnical Group Leader, reviewed and help prepare bridge and roadway investigation reports for hundreds of transportation projects. Some significant project involvement includes: the Ohio River Crossing design-build project, Wellsburg, WV; the Hughes Creek Landslide reverse-batter driven piling wall design near Hugheston, WV; and Corridor H Design-Build Criteria, Karnes to Parson, WV,

#### **WVDOH - Legal Division Assistance**

As the Geotechnical Expert Witness for the WVDOH, Mr. Carte has investigated and developed expert reports and testimony for numerous cases, both for the defense and the plaintiff.

#### **WVDOH – Traffic Division Assistance**

As the Geotechnical Group Leader, developed standard designs for high-mast Lighting towers. Managed large drilling project of 100+ miles of medium for cable guardrail.

#### **WVDOH – Maintenance Division Assistance**

While the WVDOH, assisted in the development of specification/contract documents for open-ended maintenance contracts for both landslide (soil nailing) and rockfall clean-up and repairs. Provided geotechnical reports for various headquarters, maintenance, salt-sheds, and rest area facilities.

#### **WVDOH – District Assistance**

The Geotechnical Group provided assistance with innumerable landslide repairs and with various rock fall projects, some of which were on an emergency basis.

#### **WVDEP LCAP – Landfill Closures**

### **Education**

B.S. Mining Engineering,  
WV Institute of Technology

### **Certifications**

Registered Professional Engineer: WV, OH, KY

### **Total Years Experience**

+36

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As a design engineer Carte developed two innovative gravity-powered wetland systems for leachate treatment at the ERO landfill. Prepared closure plans for the Buckhannon, Mingo, and the ERO landfills.

#### **WVDEP - Solid Waste Landfill Design**

As a design engineer Carte prepared complete plans and permit documents for the Sycamore, Prichard, and the Morehead landfills. Provided consulting service to the Meadowfill Landfill, and the Tucker County WV, and Gallia County, Ohio landfills.

#### **WVDEP- Hazardous Waste Landfills Design**

As a design engineer Carte provided a closure plan for the Holtz Impoundment in South Charleston, WV. Developed plans and permit documents for the potential development of a "dry impoundment," Sistersville, WV. Prepared closure plans and permit documents for impoundments and landfills at Sistersville, WV and Marietta, OH. Provided HELP modeling service for the Goff Mountain Landfill, Institute, WV.

#### **WVDEP – Dam Control Projects**

As a Geotechnical Engineer, Carte assisted with the development of construction plans and permit documents for the Lake Chaweva, WV dam replacement project. Performed dam-break analysis and blasting monitoring for the Horton Dam. Bluefield, WV. Analyzed highway embankments at the Smithfield Lake near, West Union, WV.

#### **Cellular Towers**

As a Geotechnical Engineer, Carte provided numerous geotechnical reports and foundations design for much of the cell towers in central West Virginia. Provided designs for drilled shafts, mat and special steel foundations.

#### **Civil and Infrastructure**

As a design engineer, Carte designed storm and sanitary sewers, watermains and storage tanks, and streets and pavements. Project of significant relevance includes portions of South Ridge Center development and the Century Volga Watermain Extension projects.

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Jason Asbury is the Vice President of Geotechnical, Environmental and Field Services at TERRADON. Additionally, Asbury is a Geo-Environmental Project Manager and serves as an Environmental Agency Coordinator. Acting as regulatory liaison/coordinator, Asbury provides critical project support for specialized permitting and erosion and sediment control planning, as well as conducting field work for wetland assessment/ delineation projects and Section 404/401 permitting. Asbury is also responsible for scheduling and coordinating field service teams for Construction QA/QC services. Asbury also provides site grading, landscape and utility plans, site detailing and erosion sediment control plans and permitting for energy, commercial, and educational projects.

### **Project Experience**

#### **Above Ground Storage Tank Inspections (WV SB 37 Compliance)**

Served as Regulatory Coordinator and Project Manager for Approximately 1,800 Above Ground Storage Tank Inspection across the State of West Virginia. Task included inspections of AST's, certification of tanks, submitting certifications to WVDEP for compliance. Inspections of the AST's included a visual inspection to determine if the tank was structurally sound and fit for service. Inspection and certification of secondary containment was also conducted to determine if proper spill prevention, control, and countermeasures were in place.

#### **West Virginia American Water Above Ground Storage Tank Inspections**

Served as Regulatory Coordinator and Project Manager for Approximately 33 Above Ground Storage Tank Inspection across the State of West Virginia. Task included coordination and review of inspections of AST's, certification of tanks, submitting certifications to WVDEP for compliance. Inspections of the AST's included a visual inspection to determine if the tank was structurally sound and fit for service. Inspection and certification of secondary containment was also conducted to determine if proper spill prevention, control, and countermeasures were in place.

#### **Tanyard Station Commercial Development**

Served as Project Manager and Regulatory Coordinator for a 50 Acre mixed use commercial development located in Barboursville, WV acting as the primary contact with the WVDEP, US Army Corps of Engineers, US Fish and Wildlife, as well as the Village of Barboursville. The Tanyard Station project was a collaborative design effort between TERRADON and SITE Incorporated from Knoxville Tennessee. The site design included removing 956 linear feet of Tanyard Branch a Perennial Stream and re-routing the existing stream through a new 6'x8' concrete box culvert. Task included, conducting field assessments to determine quality of existing Tanyard Branch, preparation of sediment and erosion control plans and obtaining NPDES Permit Approval from West Virginia Department of Environmental Protection, coordination of habitat analysis study, coordination of FEMA Flood Study for Tanyard Branch, coordination of structural design of proposed box culvert, coordination of sanitary sewer and water design as well as health department permitting, coordination of all utility and access permits required from West Virginia Department of Highways.

### **Education**

B.S. Landscape Architecture  
West Virginia University

### **Certifications**

Certified Erosion Sediment Storm Water Inspector

38 Hour USACE Wetland Delineation Training

30 Hour OSHA Construction Safety & Health Certification

40 Hour OSHA HAZWOPER Certification

OSHA Confined Space Entry Trained

OPEC SafeLandUSA

WVDOT TRECNO Level 5

### **Total Years Experience**

15

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### **The Bechtel Summit National Scouting Reserve**

Served as Regulatory Coordinator for a 10,600+- acre recreational development in Fayette County, WV, acting as the primary contact with the WVDEP on behalf of all contractors and consultants, for more than 50 site permits. Task included NDPES design and permitting, including erosion and sediment control, for multiple contractors/consultants with the WVDEP. Also coordinated monthly site inspections with representatives from the WVDEP and numerous on-site contractor representatives. The project included 550,000 tons of aggregate, 600 acres of grading activities, 28 miles of drainage swales, 14 miles of new road construction, 4 earthen dams, and more than 60 miles of new utility installation.

### **Columbia Pipeline Group**

Served as Regulatory Coordinator and Site Designer for a compressor station site that routinely flooded. Project included hydraulic analysis on existing drainage structures. Designed approximately 500-foot of pipe replacement to alleviate runoff. Tasks included storm water calculations, grading plan, and storm water design and handled all agency contact for the submittal and approval of the project permits.

### **Chesapeake Energy - Trace Fork Slip**

Served as Regulatory Coordinator and Project Manager for erosion repair design for a 175' x 40' wide slip for a Chesapeake Energy site located in Lincoln County, West Virginia. The project included the redesigned of an existing storm water channel that constantly eroded preventing permit closure of the facility from WVDEP. Upon the completion of the design, construction, and final stabilization of the site a notice of termination was filed with WVDEP. Tasks included the redesign of an existing stormwater channel, preparation of grading, and sediment and erosion control plans. Also coordinated all agency contact for the submittal and approval of all necessary construction permits.

### **Marathon Petroleum Corporation Utica Access Road Slip**

Served as Project Manager and Regulatory Coordinator for erosion and sediment control design to repair a slip along an access road at the Catlettsburg Refinery in Ashland, Kentucky. Tasks included preparation of grading, and sediment and erosion control plans for a slip mitigation along a site access road.

### **Chesapeake Energy Aquatic Resource Assessments/Wetland Delineation**

Served as Qualified Individual and Regulatory Coordinator to assess approximately 350 well pad sites across the State of West Virginia. Task included conducting field survey for wetland indicators (soil, plants, and hydrology) in accordance with US Army Corps of Engineers methodology, flagging wetland boundaries for survey and preparation of reports with detailed field activities and findings for USACE. Also was responsible for determining and obtaining appropriate Nationwide, Office of Land and Stream and WV DOH permits when project conditions warranted permitting.

### **Culloden WV Commercial Development Aquatic Resource Assessment/Wetland Delineation**

Served as Qualified Individual and assessed a small commercial site located in Culloden, West Virginia. Task included conducting field survey for wetland indicators (soil, vegetation, and hydrology) in accordance with US Army Corps of Engineers methodology, flagging and surveying wetland boundaries and preparation of report detailing filed activities and findings for USACE.

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Christopher Hancock is a Geotechnical Project Manager at TERRADON. Hancock's skills and abilities include AutoCAD, foundation design, designs using Geosynthetic Materials, MSE wall design, and groundwater and seepage control. As an Geotechnical Engineer and Geo/Environmental team member, Hancock applies environmental and geologic skills to engineering uses; on-site geotechnical drilling representative, interprets various borehole data (e.g., bulk density, groundwater monitoring, gamma ray, etc.); and collects various field data; lab testing experience. He is proficient in various software programs related to scientific study, including Civil3D

### **Project Experience**

#### **Kinetic Park Landslide, Huntington, WV**

Project Technician-Assisted in the management of the subsurface drilling investigation. An emergency slip posing immediate danger to a stream and homeowners below the site. Part of the slip remediation included a subsurface investigation to give insight on the extent, location and probable origin of the slope failure displayed along with recommendations to control potential future slips. The subsurface investigation included 4 borings drilled with each boring logged as it progressed with visually described soil types and recorded layer depths along with the classification of rock.

#### **Monroe County Schools, Monroe County, WV**

Served as an on-site geotechnical drilling representative during subsurface investigation. On-site requirements included: visual classification on rock and soil, sample collection, percolation testing, mapping boring locations, coordinated with drill team. Also completed the Geotechnical Investigation Report that detailed the results of the drilling operation. The report also included: foundation recommendations, site development specifications, asphalt and concrete pavement recommendations, seismic design considerations, and laboratory testing results.

#### **Seneca Medical Warehouse, Kanawha County, WV**

Served as a qualified individual to ensure Quality Assurance and Quality Control (QA/QC) by performing and inspecting: foundation bearing capacity, concrete testing, welding inspection, compaction testing, 1 & 5 point proctor, reinforcing steel inspection, rammed aggregate pier inspection. Completed and submitted reports daily to the project manager.

#### **Clendenin Flood Relief**

Served as an on-site geotechnical drilling representative during subsurface investigation for two replacement bridges and eleven retaining walls after the summer flood of 2016. Performed: visual classification on rock and soil, sample collection, mapping boring locations, creating boring logs, laboratory testing, and coordinated with drill teams. Provided CAD support to design team and senior CAD technicians during the design of the structures.

### **Education**

B.S. Civil Engineering—  
Geotechnical Emphasis,  
West Virginia University Institute of Technology

### **Certifications**

APNGA Portable

USDOT Hazmat

Nuclear Gauge Safety

### **Years Experience**

+7

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## **Earl M. Vickers Memorial Bridge**

Served as a qualified individual to perform bridge inspection. This entailed: super & sub structure inspection of steel and concrete. Visual inspection of steel components included: girders, stringers, floor beams, joints, and bearings. Concrete components were sounded then spalls and delamination's were sketched. A final report was created to show all defects and rehabilitation strategies.

## **SHEETZ, Parkersburg, WV**

Served as an on-site geotechnical drilling representative during subsurface investigation. On-site requirements included: visual classification on rock and soil, sample collection, environmental testing with photoionization detector, mapping boring locations, MS4 percolation test, coordinated with drill team. Also completed the Geotechnical Investigation Report that detailed the results of the drilling operation. The report also included: foundation recommendations, site development specifications, asphalt and concrete pavement recommendations, seismic design considerations, and laboratory testing results.

## **On-Site Geotechnical Drilling Representative**

Served as an on-site drilling representative during geotechnical drilling. Tasks include: performing visual soil and rock classification and collecting samples, mapping out boring locations, creating boring logs, and performing necessary lab testing.

## **McCoy Road Slip Remediation, Huntington, WV**

Served as a geotechnical project manager. TERRADON contracted with the City of Huntington office of Public Works to provide plans for slip remediation along Foster Road. The remediation consisted of the installation of a 112' long pile and concrete lagging retaining wall. The retained height was 12', with piles socketed into rock. The wall was installed on the downhill side of the road in order to stabilize the roadway and prevent further movement if the slip below the wall persists. The asphalt roadway section in the area of the wall was then reconstructed. All work was specified in accordance with WVDOT requirements.

## **South Park Drive Slip Remediation, Huntington, WV**

Served as a geotechnical project manager. TERRADON contracted with the City of Huntington office of Public Works to provide plans for slip remediation along Foster Road. The remediation consisted of the installation of a 40' long pile and concrete lagging retaining wall. The retained height was 6', with piles socketed into rock. The wall was installed on the downhill side of the road in order to stabilize the roadway and prevent further movement if the slip below the wall persists. The asphalt roadway section in the area of the wall was then reconstructed. All work was specified in accordance with WVDOT requirements.

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Andrew Wagner is a Project Designer and Engineer in Training at TERRADON Corporation. Wagner is responsible for design on civil and highway projects. Wagner has a background in mine engineering as well as oil and gas drilling and completions operations management and has served as the drill site manager in the Gulf of Mexico while with another firm. Wagner has experience in highway design and drainage design and has provided relevant services on various projects throughout West Virginia.

### **Project Experience**

#### **Mingo Logan Coal (Blair Slip), Logan, WV**

The project was an emergency slip repair on CR 17. Approximately 1530 feet of roadway was realigned to locate the route on stable bedrock. Wagner served as Lead Designer on the project and consulted on selection of an appropriate and cost-effective long-term solution for stabilization of the length roadway in question. Wagner designed horizontal geometry, vertical geometry and typical section of the realignment, utilized geotechnical drilling reports to design a cut slope for the realigned roadway, performed drainage calculations to design the roadside ditch and drop inlets, and performed modeling and drafting work to produce a plan set for construction.

#### **Twin Branch (Twin Branch Box Culverts), Twin Branch, WV**

The project consisted of the study, design, and preparation of construction contract plans for the replacement of two bridges with two box culverts in Twin Branch near Davy, WV. Wagner served as a Project Designer and assisted with drafting and structural detailing of the box culvert designs, developed steel reinforcing schedules for the box culverts, drafted roadway plans, created a maintenance of traffic plan showing road closures, detours, and required signage, and calculated roadway and bridge quantities.

#### **MacArthur Bridge, Raleigh County, WV**

The project was scoped to rehabilitate the MacArthur Bridge (WV Route 16) over I-77 ramps near Beckley, WV. Wagner performed drafting and digitization of field inspection notes for bridge repair.

#### **Harper Road Bridge Rehab, Beckley WV**

The project was scoped to rehabilitate the Harper Road Bridge (WV Route 3) over I-77 in Beckley, WV. Wagner performed drafting and digitization of field inspection notes for bridge repair.

#### **Mossy Bridge, Mossy WV**

The project consisted of the design and preparation of contract plans and related documents for the replacement of the existing Mossy Interchange Bridge, which carries WV 612 over Paint Creek in Fayette County. Wagner served as a Project Designer and performed a site visit and assisted with collecting field data for hydraulics analysis, assisted with hydraulics analysis and drafting of a bridge hydraulics report, delineated drainage area for Paint Creek for drainage calculations, consulted on roadway and super elevation design for the proposed alignment to satisfy DOH requirements, and developed construction phasing and maintenance of traffic schemes.

### **Education**

B.S. Mining Engineering,  
Virginia Polytechnic Institute & State University  
Blacksburg, VA

### **Certifications**

Engineer In Training (EIT)

### **Total Years Experience**

7

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**311 Bridge, Greenbrier County, WV**

The project consisted of the design and preparation of contract plans and related documents for the rehabilitation of the existing 311 Bridge, which carries WV 311 over I-64 in Greenbrier County. The rehabilitation consisted of deck replacement, conversion of abutments to semi-integral abutments, repair of cracking and delaminated concrete at abutments and piers, repair of the approach railing, repair of the approach slab, clean and paint superstructure, and the construction of a pier protection system. Wagner served as a Project Designer and calculated & check calculations of roadway quantities, developed steel reinforcing schedule for pier protection system, and designed super elevation transitions and profile corrections on 311.

**Chelyan to Montgomery, Kanahwa County, WV**

The Route 60 Design Study, following WVDOH guidance, divided approximately 12 miles of highway into 3 sections, with each section containing multiple study sites. A total of twelve sites were studied. Improvements studied included a roadway realignment, adding turning lanes, and slope stabilization. For each alternate at each site, roadway geometry, right-of-way impacts, environmental impacts, earthwork volumes, construction cost, etc. were assessed in order to recommend a preferred alternate. Wagner served as Design Team Lead for the design study, coordinating and managing work for all study sites. Wagner developed two alternates for realignment at "Site 1A" near Shrewsbury, WV. This included preliminary design of roadway geometry, cut and fill slopes, construction cost estimation, major drainage requirements, and assessment of right of way impact and utility relocation requirements. Wagner was responsible for a preliminary design and cost estimate for a pile and lagging wall to fix a slip at "Site 1AA" near Shrewsbury, WV.

**I-79 US 50, Clarksburg, WV**

The project is a Phase I PIE Design study for improving the I-79/US 50 Interchange in Clarksburg, WV. The study consists of three alternates for interchange modification: Diverging Diamond, Bypass A, and Bypass B. Wagner produced design study plans for Bypass A involving two interchange bypass bridges and a ramp flyover bridge. This included the development of new roadway geometry, preliminary span arrangements for the three bridges, major drainage requirements, earthwork calculations, construction cost estimates, and an assessment of the alternate's impact and overall feasibility. Wagner also contributed to modeling and drafting of the other two alternates.

**Pipestem Zipline Design, Pipestem, WV**

The project consists of design and construction inspection of a zipline at Pipestem State Park. Wagner participated in pre-construction site meetings to inspect the site and discuss design alternatives and construction planning with the client. Wagner prepared the bid document for zipline construction vendors to bid on the job. Wagner provided LiDAR mapping in the vendor's requested CAD format for zipline layout and modeling, and reviewed the vendor's plans for construction.

**City of Huntington – Fern Street, Huntington, WV**

The project is a retaining wall in Huntington, WV. Wagner used CAD to create an alignment for stationing reference on the existing Fern Street.

**City of Huntington – Kinetic Park Landslide, Huntington, WV**

The project involves an emergency landslide at Kinetic Park in Huntington, WV. The large landslide impacted houses below and threatened to close an unnamed tributary. Wagner performed a drainage area delineation and peak discharge calculation at the site for NPDES permitting purposes.

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Dakota Smith is a project designer for TERRADON Corporation. Smith provides engineering design services on various projects ranging from land slips to deck replacements. Smith has performed various tasks from drafting in Microstation, to preparing calculations for different structural components, to using modeling software to analyze bridge superstructures.

### **Project Experience**

#### **Amherst Coal Pad, Amherst, PA**

Smith served as a staff designer for the design of a coal pad in Amherst, PA. The job included investigation of a site by the river that would require a large excavator to unload large amounts of material from barges. Smith performed the calculations and analysis to determine what (if anything) needed to be added to the foundation to be able to support the large equipment that would be unloading material for an extended period of time.

#### **Bonds Creek Bridge Replacement, Ritchie County, WV**

Smith performed calculations to verify the crane capacity for the crane the contractor was using for their erection scheme. Smith analyzed shop drawings from the manufacturer of the new girders and analyzed moment capacities.

#### **US35, Mason County, WV**

Smith served as a staff designer for the US35 Bridge Replacement. Smith performed calculations for the shore towers that would be temporarily supporting the girders during the time of erection. Smith verified what the wind load on the shore towers would be and that the cables on the towers were large enough to support the loads that would be applied to them.

#### **Mingo Logan Coal (Blair Slip), Logan County, WV**

Smith served as a staff designer for the Mingo Logan Coal (also referred to as the Blair Slip) project in Blair, WV. She performed quantity calculations for various materials on the job including pavement markings, excavation quantities, and guardrail quantities.

#### **Twin Branch Culverts, McDowell County, WV**

Smith served as a staff designer for the Twin Branch Culverts design in Twin Branch, WV. The design included replacing the current culverts with improved, up to date culverts. Smith assisted in the preparation of drawings for the culverts.

#### **Harper Road Bridge, Raleigh County, WV**

Smith served as a staff designer for the Harper Road Bridge Rehabilitation in Beckley, WV. The rehabilitation included changing the abutments to semi-integral, and rehabilitating the existing pier. Smith assisted in the inspection of an abutment on the bridge, and assisted in the preparation of the plan set.

#### **MacArthur Bridge, Raleigh County, WV**

Smith served as a staff designer for the MacArthur Bridge Rehabilitation in Beckley, WV. The rehabilitation included repairs to the substructures, and changing the abutments to semi-integral.

### **Education**

B.S. Civil Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA

### **Certifications**

Engineer in Training (EIT)

Level II Erosion & Sediment Control NCDOT

WVDOT TRET Level III

### **Total Years Experience**

5

Ben Prior is a staff engineer at TERRADON Corporation. Mr. Prior is responsible for a variety of tasks for civil engineering projects. He inspects, evaluates, designs and coordinates installation of structural systems. Much of his experience is in modification, improvement, and retrofitting for coal and railroad clients.

### **Project Experience**

#### **311 Bridge Rehabilitation, WVDOH, Greenbrier County, WV**

311 Bridge Rehabilitation consisted of the following; concrete deck replacement with lightweight concrete to achieve desired load rating using "Traditional" deck design, converting the abutments to semi-integral, and an adjustment to the normal cross-slope. Prior was part of the structural design team assisting with deck design and designing connection dowels for seismic loading per AASHTO.

#### **Route 60 Roadway Design Study Chelyan to Montgomery, WVDOH, Kanawha County, WV**

The Route 60 Design Study, following WVDOH guidance, divided approximately 12 miles of highway into 3 sections, with each section containing multiple study sites. A total of twelve sites were studied. Improvements studied included a roadway realignment, adding turning lanes, and slope stabilization. For each alternate at each site, roadway geometry, right-of-way impacts, environmental impacts, earthwork volumes, construction cost, etc. were assessed in order to recommend a preferred alternate.

#### **Port Perry Bridge Rehab, West Mifflin, PA**

While at another firm, Prior Inspected 1,600' plus railroad bridge. Inspection was performed by climbing with fall protection and by utilizing a specialized pontoon boat with extendable boom. Developed plans for railroad bridge rehab. Worked with bridge owner to prioritize needed repairs.

#### **Railroad Retaining Wall, Madsville, WV**

While at another firm, Prior designed and acquired permits for (4) retaining wall for railroad company. The walls were approximately 100' to 250' long cantilevered and tie-back soldier pile wall. Coordinated with railroad and state DOT on right-of-way locations.

#### **Railroad Retaining Wall, Shamrock, PA**

While at another firm, Prior designed and acquired permits for a retaining wall for railroad company. The wall was approximately 250' long cantilevered soldier pile wall. Designed maintenance of traffic plan while coordinating with state DOT officials.

#### **General Railroad Infrastructure, Various Locations East of Mississippi**

While at another firm, Prior designed fueling platforms, jib crane foundations, stairs, sand silo foundations, underground concrete vaults, and other facility structures for a railroad company. Most of these projects were retrofitting and rehabilitation designs. These designs required creative solutions that both fulfilled the owner's need and fit into the significant constraints of limited space and cost effectiveness. Loading and analysis included wind, gravity, buoyancy, and seismic when applicable.

### **Education**

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

### **Certifications**

Registered Professional Engineer: WV

### **Total Years Experience**

8

Andrew Brenner serves as a Project Engineer at TERRADON Corporation. He offers a background in bridge inspecting, steel design, and bridge design. Brenner has provided services on various projects throughout West Virginia.

### **Project Experience**

#### **Twin Branch, McDowell County, WV**

Served as a hydraulic designer for two culverts by using bridge modeling programs: TR-55, HY-8, and HEC-RAS and developed a hydraulic design report. Brenner also checked roadway and bridge calculations and calculated vertical curve geometry.

#### **I-79/US50 Interchange, Harrison County, WV**

Brenner checked MDX bridge models and load calculations.

#### **Harper Road Bridge Rehabilitation, Raleigh County, WV**

Brenner was the lead structural inspector of fracture critical and fatigue prone details. All areas inspected were documented using photographs and notes as required.

#### **MacArthur Bridge Rehabilitation, Raleigh County, WV**

Brenner was the lead structural inspector of fracture critical and fatigue prone details. All areas inspected were documented using photographs and notes as required.

#### **Mossy Interchange Bridge, Fayette County, WV**

Brenner was the lead structural inspector of fracture critical and fatigue prone details. All areas inspected were documented using photographs and notes as required. Brenner was tasked with designing parapets, approach slabs, sleeper slabs, abutments, and the reinforcement that goes along with each of these. Brenner was also tasked with checking MDX modeling and load calculations. Brenner was also tasked with doing Bridge and Roadway quantities and creating the tables that go with them.

#### **WV 311 Bridge Rehabilitation, Greenbrier County, WV**

Brenner was the lead structural inspector of fracture critical and fatigue prone details. All areas inspected were documented using photographs and notes as required. Brenner drilled four 2" diameter concrete cores on each of the piers. Brenner was tasked with using TAEG to do an overhang design. Brenner was tasked with designing parapets, approach slabs, sleeper slabs, abutments, and the reinforcement that goes along with each of these. Brenner also checked crash wall, abutment, and wing wall reinforcing. Brenner was also tasked with checking MDX modeling and load calculations. Brenner was also tasked with calculating and checking Bridge and Roadway quantities and creating the tables that go with them. Brenner also assisted with populating beam camber and deflection tables.

#### **Earl Vickers Montgomery Bridge, Kanawha County, WV**

Brenner was the lead structural inspector of fracture critical and fatigue prone details. All areas inspected were documented using photographs and notes as required. Load ratings and distributed and concentrated loads were also calculated for the stringers and girders in order for inputs to be put into programs.

### **Education**

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

### **Certifications**

Engineer In Training: WV

OSHA 10 HR

OSHA 40 HR

WVDOH Level III TRET

Aerial Operator Certified

### **Total Years Experience**

5

Jamal Shanaa, PE serves as a Lead Project Engineer at TERRADON Corporation. He offers a background in bridge inspecting, steel design, and bridge design. Shanaa has provided services on various projects throughout West Virginia.

### **Project Experience**

**US 35 Over Upper Nine Mile Creek & Middle Nine Mile Creek, WV**  
Prepared final design plans for two culverts. Reviewed final design calculations for the foundations. One culvert has an 80 feet span over Upper Ninemile Creek founded on spread footings. The second culvert has a 42 feet span over Middle Ninemile Creek founded on footing on steel piles. Design calculations were prepared in conformance with AASHTO LRFD specifications.

**Central Avenue Bridge Rehabilitation, City of South Charleston, WV**  
Performed preliminary design for a three-span steel girder bridge, 74'-96'-74', in conformance with AASHTO LRFD specifications. Checked adequacy of steel piles for the cantilevered abutments

**Duhring Bridge Study, Mercer County, WV**  
Reviewed calculations for final design of reinforced concrete bridge deck. Also reviewed design of concrete diaphragm for future jacking forces.

**Fairmont Gateway Connector, WVDOT, WV**  
Reviewed calculations for the contractor's erection plan of an arch bridge.

**Mill Creek Bridge, WVDOT, Jackson County, WV**  
Reviewed final bridge detailed design and construction plans for a superstructure replacement of a dual 4-span steel plate girder bridge, 258 feet long, 43'-67'-82'-66'. Substructures were rehabilitated including partial removal of abutments and one of the piers. Abutments were converted into semi-integral.

**Twin Branch, WVDOT, McDowell County, WV**  
Lead Bridge Engineer responsible for the delivery of the final construction plans of two skewed box culverts 12.5' X 5.5' and 19.5' X 6'. Soldier pile retaining walls were used due to the restrictions due to the close proximity of exiting railroad abutments. Moment slabs were used to minimize the load on the soldier pile walls.

**Harper Road Bridge, WVDOT, Raleigh County, WV**  
Lead Bridge Engineer for the rehabilitation of a 2-span steel plate girder bridge, 98'- 98', over the Turnpike. Ultra-High-Performance Concrete was used for the pier cap repair, while conventional concrete repair with fiber reinforced polymer wrap was used for the pier column. Electrochemical Chloride Extraction was used for the abutments.

### **Education**

B.S. Civil  
Engineering

### **Certifications**

Registered  
Professional  
Engineer: WV,  
OH, PA, IN

### **Total Years Experience**

+35

Michael is a Senior Engineer at TERRADON Corporation and is responsible for designing storm water drainage systems for highways & bridges, bridge/culvert hydraulics and scour analysis, hydrology & hydraulic studies, erosion & sedimentation control, storm water management, maintenance of traffic & right-of-way plans, site development, utility relocations, water distribution systems, wastewater treatment, collection & pumping systems, and preparing analysis models for hydrology, hydraulics, scour, and water distribution systems.

## Project Experience

### 311 Bridge, White Sulphur Springs, WV

Design Engineer for maintenance of traffic plans for a bridge deck replacement for an existing bridge over I-64 in Greenbrier County for a WVDOH project.

### Mossy Interchange Bridge, Mossy, WV

Design Engineer and Cad Drafter for hydraulic & scour analysis and report, bridge deck drainage analysis, and right-of-way acquisition plans on a replacement bridge over Paint Creek on Fayette WV 612 for a WVDOH project.

### Twin Branch Culverts , Twin Branch, WV

QA/QC Reviewer for a hydraulic analysis and report for two (2) box culverts that replaced the existing culverts for Twin Branch and Lower Twin Branch (tributaries of the Tug Fork) on McDowell CR 7/05 for a WVDOH project.

### Mill Creek Bridge, Ripley, WV

Design Engineer and Cad Drafter for bridge deck drainage analysis and drainage pipe system design on bridge deck replacements and maintenance of traffic plans for two (2) existing bridges over Mill Creek on I-77 in Jackson County for a WVDOH project.

### Waterloo Bridge, Waterloo, WV

Design Engineer and Cad Drafter for hydraulic and scour analysis, bridge deck drainage analysis, right-of-way acquisition plans, and maintenance of traffic plans on a replacement bridge over Thirteenmile Creek on Mason CR 31 for a WVDOH project.

### 2016 Clendenin Flood Relief, Clay County, WV

Design Engineer for a hydraulic and scour analysis of the abutments on two (2) replacement bridges over Porter Creek on Clay CR 2 for a WVDOH emergency project.

### Morrow County Structures over Otter Creek, Denmark, OH

Design Engineer and Cad Drafter for hydraulic & scour analysis and report, waterline relocation, quantities, right-of-way acquisition plans, and maintenance of traffic plans for a 3-sided arch culvert that replaced an existing bridge over Otter Creek on SR-95 for an ODOT project located west of the City of Denmark, Morrow County, Ohio.

### 4th Street Drainage, Fairmont, WV

Design Engineer for the storm water system on a WVDOH project for the relocation and upgrade of 4th Street for Fox Engineering.

## Education

A.S. Mining  
Engineering  
Technology  
West Virginia  
Institute of  
Technology

B.S. Civil  
Engineering  
West Virginia  
Institute of  
Technology

M.S.  
Engineering,  
Marshall  
University

## Certifications

Registered  
Professional  
Engineer: WV

## Total Years Experience

+45

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**Hammer Strait Bridge, Franklin, WV**

Design Engineer for a scour analysis of the abutments on a replacement bridge over Trout Run on Pendleton CR 33 for a WVDOH project.

**Catfish Man of the Woods Bridge, Gwinn, WV**

Design Engineer and Cad Drafter for the design of the erosion & sediment control, storm water management, bridge deck drainage analysis, right-of-way acquisition plans, 404 permit application, and hydraulic & scour analysis on a replacement bridge over Spurlock Creek on Cabell CR 1 for a WVDOH project

**Fairmont Gateway Connector, Fairmont, WV**

Design Engineer for the storm water system on a WVDOH project for the relocation and upgrade of WV 273 to a four-lane divided highway and a new interchange with I-79.

**Corridor H – Davis to Bismarck Section 3, Tucker County, WV**

Design Engineer for the revised storm water ditch design on a WVDOH project for Corridor H – Davis to Bismarck Section 3.

**Corridor H—Davis to Bismarck Section 5, Tucker County, WV**

Design Engineer for the revised storm water ditch design on a WVDOH project for Corridor H – Davis to Bismarck Section 5.

**Huntington Mall Road, Cabell County, WV**

Design Engineer for the storm water system and culverts on a WVDOH project for the upgrade of US Rt. 60, Mall Road, and Ring Road, and the new road crossing over I-64 from US Rt. 60 to Ring Road to better accommodate Mall traffic.

**Culloden I/C, Cabell & Putnam Counties, WV**

Design Engineer of the storm water system on a WVDOH project for the I-64 interchange and modifications of Route 60/21.

**North Mineral Wells Relocated WV 14, Mineral Wells, WV**

Design Engineer for the storm water system and culverts on a WVDOH four lane divided highway project for the relocation and upgrade of approximately 1.5 miles of WV 14.

**Pleasant Valley I/C to WV Route 310 I/C, Marion County, Fairmont, WV**

Design Engineer for the storm water system on a WVDOH project for the widening of approximately 1.5 miles of I-79 from a 4-lane road to an 8-lane road.

**Harsh Sugar Camp Bridge, WV**

Design Engineer for a scour analysis of the piers and abutments on a replacement bridge for a WVDOH project.

**Fort Seybert Bridge, WV**

Design Engineer for a scour analysis of the piers and abutments on a replacement bridge for a WVDOH project.

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Rana Mutashar serves as a bridge designer at TERRADON Corporation. Mutashar provides experienced engineering services on various projects throughout West Virginia. She offers a background in bridge design, steel design, concrete design, finite element modeling, nonlinear analysis, model analysis, soil investigation, and soil structure interaction.

### **Project Experience**

#### **Bluestone Dam, Mercer County, WV**

Mutashar provided design assistance for various elements of the drill rig platform at Bluestone Dam. Mutashar designed the spacer angles to make sure they could handle the applied load. Structural steel design was performed in accordance with AASHTO LRFD 8th edition.

#### **Pine Creek Dam**

Mutashar designed the Catwalk Spacers at the Pine Creek Dam to ensure they could handle the applied load. Structural steel design was performed in accordance with AASHTO LRFD 8th edition and United State Army Corp. of Engineers EM-385, as required by project specifications.

#### **Ridgewood Road, Huntington, WV**

Mutashar helped design a retaining wall for a slip above Ridgewood Road in Huntington, WV. The designed wall is a pile and lagging structure designed to protect the roadway from damage from potential slip occurrence.

#### **Harper Road Bridge, Raleigh County, WV**

Mutashar provided design assistance for the rehabilitation of Harper Road Bridge in Beckley, WV. The project included a pier concrete rehabilitation utilizing a carbon fiber wrap and epoxy coating. Mutashar modeled the bridge using MDX software to investigate the load that transferred from superstructure to pier, and analyzed the existing pier using RC-pier software to investigate the causes. Mutashar assisted in the calculation to evaluate if carbon fiber wrap is sufficient to repair the deteriorating pier. The root of cracks was addressed by adding stirrups and using UHPC material around the pier. Mutashar assisted in preparation of drawings for the bridge.

#### **MacArthur Bridge Rehabilitation, Raleigh County, WV**

Mutashar provided design assistance for the rehabilitation of MacArthur Bridge in Beckley, WV. The project included a pier concrete rehabilitation utilizing a carbon fiber wrap and epoxy coating. Mutashar modeled the bridge using MDX software to investigate the load that transferred from superstructure to pier, and analyzed the existing pier using RC-pier software to investigate the causes. Mutashar assisted in the calculation to evaluate if carbon fiber wrap is sufficient to repair the deteriorating pier. The root of cracks was addressed by adding stirrups and using UHPC material around the pier. Mutashar assisted in preparation of drawings for the bridge.

#### **Twin Branch Bridge, Twin Branch, WV**

Mutashar was a staff designer for the Twin Branch culverts design in Twin Branch, WV. The design included replacing the current culverts with improved, up-to-date culverts. Mutashar assisted in the preparation of drawings for the culverts.

### **Education**

B.S. Civil  
Engineering,  
Basrah  
University, Iraq

M.Sc. Civil  
Engineering  
Basrah  
University, Iraq

Ph.D Civil  
Engineering,  
Ohio University,  
Athens, OH

**Total Years  
Experience**  
+18

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**I-79 & US-50 Interchange Design Study, Harrison County, WV**

Rana Mutashar served as a project designer for the I-79 US 50 interchange Design Study in Harrison County, WV. For the design study, eight options were originally proposed by the West Virginia Department of Highways (WVDOH) and three options were selected out of the eight. Mutashar work in one option. Her work includes analysis of the proposed bridge using MDX model. She setup MDX models for bridge and modified the existing geometry to meet the current criteria required for the bridge design.

**Mill Creek Bridge, Jackson County, WV**

Mutashar provided engineering design for the construction of the Mill Creek Bridge . Design included removal of the existing pier and designing a new pier. The first stages included the removal of half of the existing bridge pier, and closing one lane above the demolition pier of the bridge. The plans for this construction process required adding temporary support to the remainder of the existing pier. Mutashar did nonlinear 2-dimension and 3-dimensions finite element analysis to investigate the axial force on the temporary support. She accounted for the construction stages in modeling. She models about 20 modeling to consider the effect of the of different support conditions and the cross-section of the support.

**WV 311 Deck Replacement, Greenbrier County, WV**

Mutashar provided engineering design for the WV311 Deck Replacement. The existing WV 311 bridge passes over I-64 and turns into an entrance ramp for I-64 westbound. It is a four-span bridge consisting of two abutments and three piers. Mutashar assisted in modeling the bridge using MDX-software and performed multiple calculations including the deck reinforcement design.

**Mossy Bridge, Fayette County, WV**

Mutashar provided engineering design for Mossy Bridge project in Fayette County, WV. The project consisted of building a new bridge in upstream of the existing bridge. Mutashar designed a new bridge using MDX software. She set up MDX models for different girder alternatives to find a design that had a good rating. Mutashar designed deck and cross frame, and oversaw the development of the plan set.

**Kenneth Shadrick Bridge, Wyoming County, WV**

Mutashar provided engineering design for the Kenneth Shadrick Bridge including plans to remove the existing pier, pier 6, and replace with a proposed new pier. Mutashar, designed the pier wall using the RC-pier model. Mutashar carried out calculations to check the stability of the proposed pier including sliding, overturning, and uplift, and assisted in the preparation of drawings for the bridge.

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# B

## AML Consultant Qualification Questionnaire

Appendix B: (RFP Attachment A - AML CQQ)

**WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**AML CONSULTANT QUALIFICATION QUESTIONNAIRE**

**Attachment "A"**

PROJECT NAME WVDEP - EOI 2022 AML Contract 7 Project North	DATE (DAY, MONTH, YEAR) 06/22/2022	FEIN 55-0687626
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1. FIRM NAME TERRADON Corporation	2. HOME OFFICE BUSINESS ADDRESS 409 Jacobson Drive, Poca, WV 25159	3. FORMER FIRM NAME N/A
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4. HOME OFFICE TELEPHONE 304-755-8291	5. ESTABLISHED (YEAR) 1989	6. TYPE OWNERSHIP Individual X - Corporation Partnership Joint-Venture	6a. WV REGISTERED DBE (Disadvantaged Business Enterprise) YES X - NO
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7. PRIMARY AML DESIGN OFFICE: ADDRESS/ TELEPHONE/ PERSON IN CHARGE/ NO. AML DESIGN PERSONNEL EACH OFFICE  
409 Jacobson Drive, Poca, WV 25159 / 304-755-8291 / Bill Hunt, President / 100 Personnel (40 AML/Project Specific Design)

8. NAMES OF PRINCIPAL OFFICERS OR MEMBERS OF FIRM Virginia King: Shareholder, Director, CEO & Secretary Ashley Lioi, PE: Shareholder, Director, PE of Record & Treasurer Amelia Randolph: Shareholder, Director, & Asst. Secretary Tom Kittredge: Shareholder, Director, & Vice President Bill Hunt, PG: President	8a. NAME, TITLE, & TELEPHONE NUMBER - OTHER PRINCIPALS Will Thornton, PE, PS - VP Civil Engineering Joe Saunders, PE - VP Transportation & AML Jason Asbury, ASLA, CESSWI - VP Geotechnical & Field Services Matt Glaspey, CCM, Env. Sp. - VP Environmental Robert Thaw, PS - VP Survey Greg Fox, RLA - VP Land Development
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9. PERSONNEL BY DISCIPLINE

<u>10</u> ADMINISTRATIVE — ARCHITECTS <u>2</u> BIOLOGIST <u>5</u> CADD OPERATORS — CHEMICAL ENGINEERS <u>12</u> CIVIL ENGINEERS <u>25</u> CONSTRUCTION INSPECTORS <u>15</u> DESIGNERS <u>5</u> DRAFTSMEN	— ECOLOGISTS — ECONOMISTS — ELECTRICAL ENGINEERS <u>4</u> ENVIRONMENTALISTS — ESTIMATORS <u>6</u> GEOLOGISTS — HISTORIANS — HYDROLOGISTS	<u>4</u> LANDSCAPE ARCHITECTS — MECHANICAL ENGINEERS <u>1</u> MINING ENGINEERS — PHOTOGRAMMETRISTS — PLANNERS: URBAN/REGIONAL — SANITARY ENGINEERS <u>2</u> SOILS ENGINEERS — SPECIFICATION WRITERS	<u>3</u> STRUCTURAL ENGINEERS <u>10</u> SURVEYORS — TRAFFIC ENGINEERS — OTHER  <u>100</u> TOTAL PERSONNEL
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**TOTAL NUMBER OF WV REGISTERED PROFESSIONAL ENGINEERS IN PRIMARY OFFICE: 12**  
**\*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".

NAME AND ADDRESS: DL Martin P.O. Box 494 Scott Depot, WV 25560	SPECIALTY: Drilling Operations	WORKED WITH BEFORE  <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS: Tuck Mapping Solutions 4632 Aerial Way Big Stone Gap, VA 24219	SPECIALTY: Aerial Photography	WORKED WITH BEFORE  <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No
NAME AND ADDRESS:	SPECIALTY:	WORKED WITH BEFORE  <input type="checkbox"/> Yes <input type="checkbox"/> No

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

YES Description and Number of Projects: 35 Projects for WVDEP/AML&R

NO

B. Is your firm experienced in Soil Analysis?

YES Description and Number of Projects:

25 WVDEP/AML&R projects included some soil analysis. TERRADON provides geotechnical engineering on a wide variety of projects including slip repairs, roadway and highway projects, bridges and structural projects, etc.

NO

C. Is your firm experienced in hydrology and hydraulics?

YES Description and Number of Projects:

25 WVDEP/AML&R projects included hydrology and hydraulics. Additionally, TERRADON has completed various roadway and highway projects with hydrology and hydraulic studies completed.

NO

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

YES Description and Number of Projects:

NO

TERRADON routinely provides photo control surveys and field edits the mapping provided. TERRADON does utilize subcontractor services for aerial photography when needed (Tuck Mapping).

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:

10 WVDEP/AML&R projects included the evaluation of aquifer degradation as a result of mining. TERRADON has also designed hundreds of miles of waterline for various projects, including projects for WV American Water, throughout West Virginia.

NO

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

YES Description and Number of Projects:

5 WVDEP/AML&R projects included acid mine drainage evaluation and abatement. Additionally, TERRADON was one of only two firms evaluating and designing AMD abatement of special reclamation projects in the 1990's.

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:
Will Thornton, PE, PS	10	10	2

Brief Explanation of Responsibilities

Will Thornton is the Vice President of Civil Engineering services at TERRADON. With more than 33 years' experience on various civil engineering projects including waterline design, utility design, slip repair design, AML design, stormwater design, and more.

EDUCATION (Degree, Year, Specialization)

B.S. Civil Engineering, 1989

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

REGISTRATION (Type, Year, State)

WV Professional Engineer, 1994  
WV Professional Surveyor, 1996

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:
William Joe Saunders, PE	10	10	0

Brief Explanation of Responsibilities

Joe Saunders is the Vice President of Transportation and AML services at TERRADON Corporation. With more than 32 years' experience in construction and design engineering, Saunders has provided civil design engineering services for a number of projects including AMLR projects, slip repair designs, highway and roadway designs, bridge and structural designs, and more.

EDUCATION (Degree, Year, Specialization)

B.S. Civil Engineering, 1998

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

REGISTRATION (Type, Year, State)

WV Professional Engineer, 2003

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:
Joe Carte, PE	37	37	20

Brief Explanation of Responsibilities

Joe Carte is a Senior Geotechnical Project Manager for TERRADON. Carte is responsible for the project management, design review, construction drawings and specifications, constructability review, etc. on various geotechnical design projects including AML design, slip repair design, and more.

EDUCATION (Degree, Year, Specialization)

B.S. Mining Engineering, 1982

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

REGISTRATION (Type, Year, State)

Registered Professional Engineer:  
WV, OH, KY

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

NAME & TITLE (Last, First, Middle Int.)	YEARS OF EXPERIENCE		
	YEARS OF AML DESIGN EXPERIENCE:	YEARS OF AML RELATED DESIGN EXPERIENCE:	YEARS OF DOMESTIC WATERLINE DESIGN EXPERIENCE:
Andrew Wagner, EIT	0	0	0

Brief Explanation of Responsibilities

Andrew Wagner is an Engineer Designer (EIT) at TERRADON with more than 6 years' experience in construction and design engineering. Wagner's background in Mining Engineering has lending design expertise for various slip repair, AML, and transportation projects throughout West Virginia.

EDUCATION (Degree, Year, Specialization)

B.S. Mining Engineering, Virginia Polytechnic Institute & State University, 2013

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

REGISTRATION (Type, Year, State)

Engineer in Training (EIT), 2013

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

Software

Autodesk Civil 3D 2020

SedCad 4 - Erosion Control and Hydrology Software

Haested Method Flowmaster Software for Channel Design

Haested Methods - Water CADD (Pipe Network Analysis)

Slope Stability -

PC Stable

REAME

SBSLOPE

WinStable and WinStable 2003

Piling Walls, Anchors and Reinforced Earth Walls -

Lpile

HeliCAP

Anchor 400

KeyWall 2004

TR 55, TR 20, TR 66 (Sites) - Hydrology

Hec-1, Hec HMS 2.22, Hec R As 3.1.2 - Hydrology

LC 58 + RP 61 - Structural (wall)

Microstation V8

Surveying Equipment

Trimble 4700 modular, RTK Global Positioning Total Station

Trimble Geomatics Office Software

Topcon Total Stations (3)

SMI Data Collectors (3)

Printing/Plotting/Reproduction

HP DesignJet +1600 Plotter

HP DesignJet 759C Plotter

HP LaserJet 8000 Printer (2)

HP Color LaserJet 3700

Sharp AR-550 Copier/Printer (2)

Sharp AR-C150 Full Color Copier/Printer

Océ 7056 Engineering Size Copier

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
WV Route 2 Relocation Marshall/Wetzel Counties, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	Engineering Design	\$95 Million	90%

TOTAL NUMBER OF PROJECTS: 1

TOTAL ESTIMATED CONSTRUCTION COSTS: \$95,000,000





17. COMPLETED WORK WITHIN LAST 5 YEARS ON WHICH YOUR FIRM WAS THE DESIGNATED ENGINEER OF RECORD				
PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST	YEAR	CONSTRUCTED (YES OR NO)
I79-US 50 Interchange PIE Study Harrison County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$95,000,000	2020	No
US 60 - Chelyan to Montgomery PIE Study Kanawha County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$40,000,000	2020	No
311 Bridge Greenbrier County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$3,500,000	2019	Yes
Harper Road Bridge Rehabilitation Raleigh County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$2,000,000	2020	Yes
Macarthur Bridge Rehabilitation Raleigh County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$2,000,000	2020	Yes
Twin Branch Box Culverts McDowell County, WV	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$1,500,000	2019	Yes
WV Statewide Engineering Design Planning	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston WV 25305	\$5,000,000	2019	Yes
Earl M. Vickers Memorial Bridge	WVDOT Building 5, Room A-110 1900 Kanawha Blvd. East Charleston, WV 25305	\$5,000,000	2018	Yes
Montgomery 6th Ave. Pump Station Montgomery, WV	Sanitary Board Of Montgomery 706 Third Avenue Montgomery, WV 25136	\$500,000	2018	Yes

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

PROJECT NAME, TYPE AND LOCATION	NAME AND ADDRESS OF OWNER	ESTIMATED CONSTRUCTION COST OF YOUR FIRM'S PORTION	YEAR	CONSTRUCTED (YES OR NO)	FIRM ASSOCIATED WITH

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

TERRADON has extensive experience in both wet and dry mine seals, with or without bat gates. Our experience with Stonecoal creek had over two dozen mine-seals. In addition, we have done regrading on numerous other refuse piles and highwalls including Jenkin Jones, Micajah, Linger, Camp Mahonegan, Cedar Creek, and Tuppers Creek and Gerath Landslides. Additionally, the TERRADON team has provided design services for landslide repairs on more than 600 combined projects throughout West Virginia.

20. The foregoing is a statement of facts.

Signature: Will Thornton Title: VP Civil Engineering  
 Printed Name: Will Thornton, PE, PS

Date: 06/22/2022

# C

## AML Related Project Experience Matrix

Appendix C: (RFP Attachment B - AML RPEM)

**AML and RELATED PROJECT EXPERIENCE MATRIX**

PROJECT	Exp. Basis C=Corp. P=Personnel *	Additional Info Provided in Section (s) **	PROJECT EXPERIENCE REQUIREMENTS														PRIMARY STAFF PARTICIPATION/CAPACITY *** M=Management P=Professional						
			Abandoned Surface Mine Reclamation	Abandoned Deep Mine Reclamation	Portal/Shaft Closure	Hydrologic/Hydraulic Design/Eval.	Remining Evaluation	Mine/Refuse Fire Abatement	Subsidence Investigation Mitigation	Hazardous Waste Disposal	Project Specifications	Water Quality Evaluation/Mitigation/ Replacement	Construction Inspection/Managem ent	Water Treatment	Eq;ipment/Structure Removal	Stream Restoration	Geotechnical/Stability						
Mallory Gibson Portals	both			X	X						X	X			X			M=100	P=100				
Lilburn Pritt	both		X								X							M=100	P=100				
Robinette	both		X			X					X							M=100	P=100				

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

# D

## Certificates of Authorization

Appendix D: Certificates of Authorization & Applicable Certifications

**WEST VIRGINIA  
STATE TAX DEPARTMENT  
BUSINESS REGISTRATION  
CERTIFICATE**

ISSUED TO:  
**TERRADON CORPORATION  
401 JACOBSON DR  
POCA, WV 25159-9691**

BUSINESS REGISTRATION ACCOUNT NUMBER: **1040-5251**

This certificate is issued on: **06/11/2010**

*This certificate is issued by  
the West Virginia State Tax Commissioner  
in accordance with W.Va. Code § 11-12.*

*The person or organization identified on this certificate is registered  
to conduct business in the State of West Virginia at the location above.*

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

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.  
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

# 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*

*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:*

*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.

*Scott E. Thomas Jr.*

BOARD PRESIDENT



# WEST VIRGINIA BOARD OF PROFESSIONAL SURVEYORS



## Certificate of Authorization

**Terradon Corpora on**

Poca, WV



### CERTIFICATE OF AUTHORIZATION # 22-5430

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 01, 2022 through December 31, 2022**

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 01 day of January 22

**2022**

Handwritten signature of Sefton R. Stewart.

Sefton R. Stewart, P.S., Chairman  
Lantz G. Rankin, P.S., Member

Douglas C. McElwee, Esq.



Handwritten signature of James T. Rayburn.

James T. Rayburn, P.S., Secretary  
Gary Facemyer, P.E., P.S., Member

Public Member

# CONTRACTOR LICENSE

Authorized by the

**West Virginia Contractor Licensing Board**

**Number:** WV005801

**Classification:**

GENERAL BUILDING  
GENERAL ENGINEERING


TERRADON CORPORATION  
DBA TERRADON CORPORATION  
PO BOX 519  
NITRO, WV 25143-0519

**Date Issued**

SEPTEMBER 20, 2021

**Expiration Date**

SEPTEMBER 20, 2022



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Authorized Company Signature



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Chair, West Virginia Contractor  
Licensing Board



**WEST VIRGINIA  
CONTRACTOR  
LICENSING  
BOARD**

A copy of this license must be readily available for inspection by the Board on every job site where contracting work is being performed. This license number must appear in all advertisements, on all bid submissions, and on all fully executed and binding contracts. This license is non-transferrable. This license is being issued under the provisions of West Virginia Code, Chapter 30, Article 42.