

August 29, 2018

Ms. Stephanie L. Gale  
West Virginia Department of Administration  
Purchasing Division  
2019 Washington Street, East  
Charleston, West Virginia 25305

**Subject: CEOI 0603 ADJ1900000005  
A/E Services for Camp Dawson Barracks Building 246 Renovations**

Dear Ms. Gale:

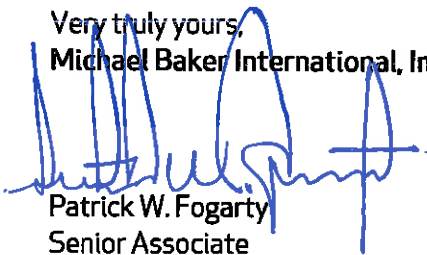
The Charleston office of Michael Baker International, Inc. (Michael Baker) is pleased to respond to the Request for Expression of Interest for Architectural & Engineering services for the renovation of Building 301 at Camp Dawson. We believe that our team of professionals is uniquely qualified to provide the required design services that will bring this facility to 100% of intended function.

Michael Baker is well positioned to provide a comprehensive design team (in-house) including: Architectural, Civil/Site, Mechanical, Electrical, Plumbing and Structural expertise. Our diverse team of professionals are well versed in the preparation of construction documents, bid specifications, and the application of required construction permits and certifications. Michael Baker can also provide assistance during the Bidding process.

We thank you for your consideration and look forward to meeting with the selection committee in person in order to share our thoughts and ideas for this exciting opportunity!

Should you have any questions or require additional information, please feel free to contact me at (304) 769-2132 or by e-mail at [pfogarty@mbakerintl.com](mailto:pfogarty@mbakerintl.com).

Very truly yours,  
Michael Baker International, Inc.



Patrick W. Fogarty  
Senior Associate

Enclosure

RECEIVED  
2018 AUG 29 AM 11:46  
WV PURCHASING  
DIVISION



**COVER LETTER**

**MANDATORY PROPOSAL SUBMISSION FORMS**

**PROPOSAL**

**Project Location**.....1

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**Michael Baker**

**INTERNATIONAL**

**MANDATORY PROPOSAL SUBMISSION FORMS**



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

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

Proc Folder: 481606

Doc Description: Addendum #3 Camp Dawson Barracks Building 246 Renovations

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2018-08-22	2018-08-29 13:30:00	CEOI 0603 ADJ1900000005	4

**BID RECEIVING LOCATION**

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

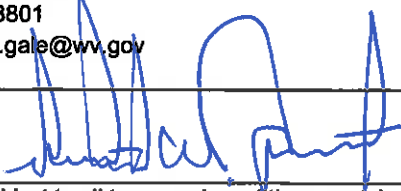
**VENDOR**

Vendor Name, Address and Telephone Number:

Michael Baker International, Inc.  
 400 Washington Street East, Suite 301  
 Charleston, West Virginia 25301  
 304-769-0821

**FOR INFORMATION CONTACT THE BUYER**

Stephanie L Gale  
 (304) 558-8801  
 stephanie.l.gale@wv.gov

Signature X 

FEIN # 25-1228638

DATE August 29, 2018

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

**ADDITIONAL INFORMATION:**

Addendum #3 issued to:

1. Provide responses to technical Questions.

d of Addendum #3.

INVOICE TO		SHIP TO	
DIVISION ENGINEERING & FACILITIES ADJUTANT GENERALS OFFICE 1707 COONSKIN DR		FACILITY MAINTENANCE MANAGER CAMP DAWSON ARMY TRAINING SITE 240 ARMY RD	
CHARLESTON	WV25311	KINGWOOD	WV 26537-1077
US		US	

Line	Comm Ln Desc	Qty	Unit Issue
1	Camp Dawson Barracks Building 246 Renovations		

Comm Code	Manufacturer	Specification	Model #
81101508			

**Extended Description :**

Professional engineering design services to develop construction documents to provide for Barracks Building 246 Renovation Design , located at Camp Dawson, near Kingwood, WV, per the attached documentation.

**SCHEDULE OF EVENTS**

<u>Line</u>	<u>Event</u>	<u>Event Date</u>
	Technical Questions Due	2018-08-21

<b>ADJ190000005</b>	<b>Document Phase</b> <b>Final</b>	<b>Document Description</b> Addendum #3 Camp Dawson Barracks Building 246 Renovations	<b>Page 3</b> <b>of 3</b>
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**ADDITIONAL TERMS AND CONDITIONS**

See attached document(s) for additional Terms and Conditions

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: CEOI ADJ1900000005**

**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.

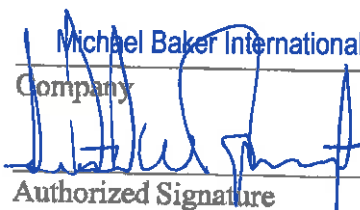
**Acknowledgment:** I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

**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 checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7  |
| <input checked="" 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.

Michael Baker International, Inc.  
\_\_\_\_\_  
Company  
  
\_\_\_\_\_  
Authorized Signature

August 29, 2018  
\_\_\_\_\_  
Date

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

**SOLICITATION NUMBER: CEOI ADJ1900000005**  
**Addendum Number: 1**

---

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

**Applicable Addendum Category:**

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

**Description of Modification to Solicitation:**

Addendum #1 issued to:

1. Move the mandatory pre-bid meeting to 8/29/2018

End of Addendum #1

**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.



**SOLICITATION NUMBER: CEOI ADJ1900000005**

**Addendum Number: 2**

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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:**

Addendum #2 issued to:

1. To correct language in Addendum 1 and clarify. Addendum #1 stated erroneously that there would be a pre bid meeting on 8/29/2018. There will be no pre bid meeting for this solicitation. The Bid opening date for this has been moved to 8/29/2018.

End of Addendum #2

**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.

**SOLICITATION NUMBER: CEOI ADJ1900000005**  
**Addendum Number: 3**

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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:**

Addendum #3 issued to:

1. Provide responses to technical Questions.

End of Addendum #3.

**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.

**Vendor Questions for CEOI 0603 ADJ1900000005  
Camp Dawson Barracks Building 246 Renovations Design**

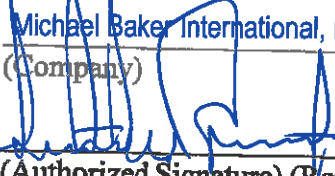

- 1. Is any site work or design (including sidewalks) included in the scope?**

**Answer) No**

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

 PROJECT ENGINEER  
\_\_\_\_\_  
(Name, Title)  
David J. Hilliard, Project Engineer  
\_\_\_\_\_  
(Printed Name and Title)  
400 Washington Street East, Suite 301, Charleston, West Virginia 25301  
\_\_\_\_\_  
(Address)  
304-769-0821 / 304-769-0822  
\_\_\_\_\_  
(Phone Number) / (Fax Number)  
dhilliard@mbakerintl.com  
\_\_\_\_\_  
(email address)

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

  
\_\_\_\_\_  
Michael Baker International, Inc.  
(Company)  
\_\_\_\_\_  
 SENIOR ASSOCIATE  
(Authorized Signature) (Representative Name, Title)

Patrick W. Fogarty, Senior Associate  
\_\_\_\_\_  
(Printed Name and Title of Authorized Representative)

August 29, 2018  
\_\_\_\_\_  
(Date)

304-769-0821 / 304-769-0822  
\_\_\_\_\_  
(Phone Number) (Fax Number)

STATE OF WEST VIRGINIA  
Purchasing Division  
**PURCHASING AFFIDAVIT**

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

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

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

**DEFINITIONS:**

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

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

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

**AFFIRMATION:** By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

**WITNESS THE FOLLOWING SIGNATURE:**

Vendor's Name: Michael Baker International, Inc.

Authorized Signature: [Signature] Date: August 29, 2018

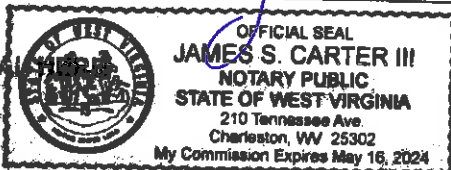
State of West Virginia

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 28<sup>th</sup> day of August, 2018.

My Commission expires May 16<sup>th</sup>, 2024

AFFIX SEAL



NOTARY PUBLIC [Signature]



**Michael Baker**  
**INTERNATIONAL**  
**PROPOSAL**



## Project Location



Camp Dawson is located near Kingwood, WV and serves as a hub for billeting, training, and outfitting citizen soldiers and is the site of the renovation project described in CEOI 0603 ADJ1900000005.

The West Virginia Army National Guard Construction Facilities and Management Office (CFMO) will oversee the project and it is located at 1707 Coonskin Drive, at the West Virginia National Guard Headquarters in Charleston, WV.

## Project Background

Through the West Virginia Department of Administration Purchasing Division, The West Virginia Army National Guard (WVArNG) is seeking a highly qualified Architectural and Engineering firm to provide comprehensive design and construction document preparation services for the renovation of an existing two-story barracks, built in the early 1960s, which houses WV National Guard Troops. **Michael Baker has designed many of these types of buildings, both new construction and renovations.** The firm will be responsible for a complete design including the preparation of construction plans and specifications and to provide bidding assistance to the WVArNG and the Purchasing Division as specified in the Expression of Interest (EOI).



The WVArNG has garnered distinction around the nation for its ability to train top notch men and women as well as serve our state and country when the need arises. These existing facilities used for the training and preparation of our soldiers deserves the full attention of the design team. Michael Baker understands this mission of readiness and we are willing to commit all our efforts into restoring the function of the existing Facility, while bringing efficiency and cost savings. We are familiar with the Department of Defense (DOD) requirements and stand ready with the experience, capability, and capacity to complete this assignment for the WVArNG.



## Qualifications and Experience

### Firm Capacity

Michael Baker is a full service Architectural/Engineering firm. Our local office in Charleston WV is a "single-stop resource" capable of providing comprehensive professional services, from Architecture and Planning to Mechanical/Electrical, Civil and Structural Engineering to construction management through operational support. Michael Baker will provide the hands-on services needed for this project, from Client meetings to site surveys, design and bidding phase assistance.

With over 30 in house professionals locally and 800 regionally, Michael Baker prides itself on a legacy of returning clientele. Some of these local clients whose projects encompass facilities development and renovation include but are not limited to; the West Virginia Department of Transportation, General Services Division, West Virginia Air National Guard, West Virginia University, West Virginia State University, the cities of Nitro, Dunbar, Winfield, and many others. Numerous private sector clients fill out a broad resume of satisfied clientele.

Michael Baker's central geographic location in the State Capitol and depth of experience nationally will enable us to respond quickly to wide-ranging scopes of service to meet needs of the WVAirNG.

Nationally, Michael Baker is a leading global provider of engineering and consulting services which includes planning, architectural, environmental, construction, program management, and full life cycle support services as well as information technology and communications services and solutions. Michael Baker provides its comprehensive range of services and solutions in support of U.S. federal, state, and municipal governments, foreign allied governments, and a wide range of commercial clients. With more than \$1.3 billion in annual revenue, Michael Baker has more than 6,000 employees in over 90 offices located across the U.S. and internationally. Michael Baker seamlessly integrates architecture, planning, landscape architecture, engineering and management. Internationally recognized with a portfolio spanning over half a century, the team provides excellence in solutions, superior technical ability, creative design and collaborative integration.

The success of our multidisciplinary approach to *built* environments results from the expertise of our design professionals. We solve challenges from multiple vantage points providing unsurpassed holistic, sustainable and innovative solutions that benefit our diverse clients, including institutions, governmental agencies, corporations, developers and builders.

Michael Baker has extensive resources and the required qualifications to provide planning, architectural, and engineering services for the WVAirNG on this important project. We have local and nationally recognized experts with the technical experience necessary for this assignment. In addition, Michael Baker's team of experienced professionals have an established record of delivering quality work products to our clients, on schedule and within budget.

In summary, Michael Baker's staff can provide documentation of our extensive experience in the following areas for this project:

- Nationally recognized expertise in Assessing, Programming and Planning
- Innovative Architectural concepts and designs
- Facilities Engineering (Civil, Mechanical, Fire Protection, Plumbing, Electrical and Communication)
- Construction Administration and Construction Monitoring
- Coordination with State and Federal Agencies, as required

From small projects to major new or renovated building facilities, infrastructure and aviation, to oil and gas pipeline design, bridges and roadway designs, and water resource projects, Michael Baker has evolved into one of the leading engineering and energy services firms by consistently providing targeted solutions for its clients most complex challenges.







## Management and Staffing

Our team will incorporate "the Baker Way" project management practices into the project by giving the WVarNG one point of contact. This person is responsible for keeping everyone on the same page, by providing open and clear communication, even when the decisions may be tough. Mr. Patrick Fogarty will fill this role for your project, he will coordinate information and ideas between the team members and the Client. Keeping all team members on the right track and coordinating efforts for an innovative and efficient design.

Michael Baker brings fully qualified and integrated teams to address all aspects of the project delivery process. All key personnel are experts in their field with have numerous projects behind them. The Project Managers possess the capability and expertise to lead the team and establish the project programming while progressing through the various milestones of document execution. Our Design Team will establish and execute the program, our Quality Assurance/Quality Control (QA/QC) Team will provide quality checks throughout the design process; and ties the design together. This overlap is what we refer to as "The Baker Way". A cohesive design with continual communication leads to successful projects.

Our locally led, nationally experienced team will be exceptionally responsive to the needs of this project. All our key project delivery personnel are locally based. We will be where you need us, when you need us, every time. Our service goals are:

- Timely response to all documentation
- Return phone calls on the same day
- Provide flexible designs
- In-house peer review on all projects
- Quality program for a successful project

We understand that many of the programming elements may have already been determined. However, we pride ourselves in creating an environment to allow our design professionals to do what they do best- solve problems. The Michael Baker team will assist in any programming that has not already been accomplished by the client. The Project Manager will have the final say over quality control; all while keeping our most important team member, the WVarNG abreast of the progress of the project, budget, and the ramifications of any changes.

## Project Team and Organization-The Right People

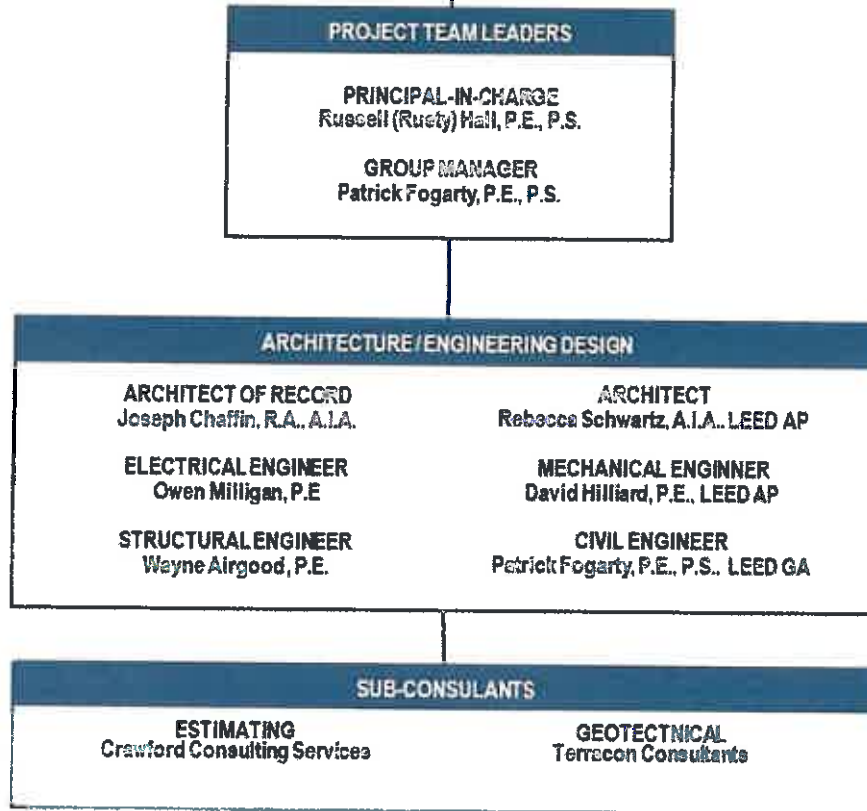
Michael Baker has assembled an integrated team of architects and engineers who all have a specific and critical role to play in the performance of these projects. We have organized our teams under a primary point of contact, Patrick Fogarty. He will organize the team in three primary groups: the programming/architectural team, the engineering team and the QA/QC team. Mr. Fogarty has successfully used his leadership skills to deliver projects all over the state.

Our design team is under the supervision of Mr. Joe Chaffin, (the Architect of Record) who has over two decades of "getting things done". His hands-on management style means he will be involved in the production and assembly of a well thought out and coordinated set of construction documents.

Michael Baker's programming/architecture team is spearheaded by Ms. Rebecca Schwartz, the project lead Architect, with experience designing and programming military and related projects. Her intimate knowledge of the Department of Defense (DOD) Unified Facilities Criteria (UFC), other governing regulations, and award-winning design concepts will bring unequalled depth of knowledge to this critical role.

Our engineering team, led by Mr. David Hilliard, will ensure the engineering portion of the project meets the UFC for design requirements in a well-coordinated project. Mr. Hilliard has worked as a key member of Mr. Chaffin's team for the last 9 years. He has served as a full project manager on many projects as well as the engineering manager providing a unique ability to facilitate inter-discipline coordination.

**Please see APPENDIX 1 for RELATED RESUMES.**



Our team thrives in a collaborative environment, whether it be with our in-house professionals, our subs or our most important member: Our Client. We coordinate with all team's members to make sure that the architectural, structural, mechanical, electrical, and civil components of the design are assured to produce a complete and fully coordinated set of construction drawings. We are partnered with an independent estimating firm to provide unbiased analysis for project construction costs and a nationally recognized firm for Geotechnical services located near the project site.



Michael Baker achieves success in uniting the Client with the team by continually synchronizing with- in this case, the WVARNG Construction and Facilities Management Office ensuring the end user group will save time, money, and a lot of headaches simply because we are exclusively one company. **This is our key strength; the ability to integrate seamlessly among multiple offices and with subject matter experts throughout the company, along with specialized subconsultants as needed for the project.**



**Our resident soldiers are a permanent part of our community and we want them to be proud of any facility in which they serve. We proudly support the National Guard locally and nationally.**

**Demonstrated Experience**

What separates the qualified from the other teams? Michael Baker believes it is the individual team members and the specific project experience and process knowledge they possess. Our team stands apart as one that excels on all levels. Our blend of Department of Defense and National Guard expertise, incorporating sustainable design leadership and local experience places us at the forefront of firms vying for this unique opportunity.

Michael Baker has strong knowledge of the local WVArNG project requirements and practices with numerous project experiences, both in West Virginia and throughout the United States, we are ready for any challenge. Michael Baker prides itself on providing innovative solutions to complex problems. Cookie cutter solutions rarely benefit owners. Owners reap real value when design teams are willing to be creative and incorporate custom solutions into their analysis and design



As the National Guard continues its historic dual mission, providing units citizen-soldiers from our local community, trained and equipped to protect life and property, to the states while providing units, trained, equipped, and ready to defend the United States and its interests, to the nation and around the globe, Michael Baker continues to support the National Guard Bureau and has previously worked at over 70 National Guard installations nationwide, including Camp Geiger and the 426th Regional Training Institute at Fort McCoy as well as numerous other DOD facilities. The Michael Baker team provides the National Guard with this highly skilled and experienced team that is prepared to support the project with excellent planning, architectural, engineering, environmental, and construction phase services. Michael Baker, serves our clients from concept designs through operations. **Now, we stand ready to be part your successful team!**



Forth Worth Warriors in Transition Barricks



AFRC Oklahoma

**Please see APPENDIX 2 for RELATED PROJECTS.**

**Please see APPENDIX 3 for SUBCONSULTANTS.**



## Project Goals and Objectives

### General:



Some of the first steps of the project would be to prioritize tasks and develop submission schedules and budget requirements for the project. Any available information for the existing facility would be gathered and reviewed prior to a visit to the property. Once all of the existing data has been reviewed, a site visit would be conducted to assess the current field conditions. Next, a survey of existing site conditions would be conducted, and, if warranted, a subsurface investigation to analyze the existing geology as required for corrective measure to the existing building. All of this information will be used to develop conceptual plan options (35%) that will be presented to and reviewed by the WV CFMO. The project will be studied in a systematic way to analyze the existing conditions, client needs and budget considerations. Through this process we will arrive at a final-agreed-upon concept plan for Design Development.

It is Michael Baker's understanding is that the West Virginia Army National Guard, Construction and Facilities Management Office (WVARNG) would like to develop functional, yet sustainable, designs for a proposed facility renovation.

The renovated two-story barracks building is to house WV National Guard Troops to help facilitate their mission. Built in the early 1960s, the building has numerous opportunities for improved efficiencies and energy savings. Below is a listing of the current design requirement as indicated in the EOI.

- Complete Restroom Renovation with instantaneous hot water systems
- New HVAC systems
- New Efficient windows
- New exterior and interior doors
- New exterior and interior LED lights
- Structural repairs – first floor ceiling and second floor flooring
- Design a solution for freezing domestic water lines in attic

#### Optional requirements:

- Geotechnical drilling
- Associated site utilizes infrastructure
- Associated Road infrastructure



Our firm provides sustainable design leadership on all our projects starting with the programming phase, the time when our efforts yield the greatest results. Michael Baker understands that the Nation Guard wishes to be a good steward of its resources and we welcome the opportunity to facilitate discussions and guide projects towards a sustainable path. We believe that we understand the project requirements and can provide the needed design in an inovated and cost effective way.

### GOAL/OBJECTIVE 1:

Michael Baker will employ a planning philosophy to work with the building constraints and to develop a complementary design concept that respects other surroundings facilities. The Owner's guidelines for the facilities will dictate the type of and common amenities to be provided, the degree of infrastructure needed and the overall aesthetic of the renovated building.

Once a schematic plan is approved, it will be developed into the first stage of design development with the direction and approval of the WVARNG. The concept will be tested against the Client's Project Requirements and would receive a preliminary cost estimate to ensure that the concept works within the framework of the budget. Once these plans and costs have been verified, the plan can move forward through design development (65%). This approach provides a more informed and comprehensive concept and ultimately a more complete plan.



## GOAL/OBJECTIVE 2:

Based on discussions and approvals from the WVArNG CFM& O, the design approved at the 65% completion submission, the plans and specifications for the facilities will be developed to the Construction Document Phase (95%) for completion. A final design Construction Cost Estimates will accompany the 95% CD submission. Upon approval from WV ArNG CFMO, Michael Baker will bring the documents to 100% for bidding purposes.

*Building Design Package:* Once the exact programming and cost of the proposed facility has been determined and upon approval from WV ArNG CFMO, Michael Baker will finalize the A/E design and Construction Documents for the building facility. We will coordinate with the WVArNG and provide all necessary design documents in accordance with UFC directives and all applicable codes for all aspects of the building design. Specifications for the installation of all required products or components will be provided as part of the 100% Design submittals.



As required, the plan set could include, but not limited to the following sheets:

*Site and Site Utility Plans.*

*Building Plans, Elevations and Details as required.*

*Plumbing, Fire Protection and Mechanical Plans, Schedules and Details as required.*

*Electrical Power, Lighting, Fire Alarms and Data/Communication Plans, Schedules and Details as required.*

*Specifications:* Technical specifications for the building and all related site improvements will be provided.

## GOAL/OBJECTIVE 3:

At this phase, the construction plans, and specifications have been completed, These Plans will be submitted or reviewed with state agencies and utility providers. These plans can be provided as independent or a combined Bid Documents for permitting and construction. Complete A/E services can be provided to the WV ArNG CFMO during this phase including: bid package assembly and distribution to plan rooms, bid assistance, analyzing and the evaluation of bids or proposals. Michael Baker can also provide Construction Administration, throughout the entire construction process as needed.

The same team members that began the project will follow through to the end. All products intended to be installed on the project shall be submitted to and approved by the A/E of record. Shop drawings provided by the awarded contractor will be reviewed by the A/E of record to ensure they meet all code requirements, specifications approved based on meeting the prepared specifications, current code requirements and contract requirements.

After the system installations are complete, Baker will perform a final inspection and develop a corrective measure punch list. Michael Baker will also provide the WVArNG ongoing support through the manufacturer's warranty period after the construction is completed. It is Michael Baker's desire to provide a successful design, but also a practical, functional building suited to the needs of its patrons.

Complete **on-site** Construction Administration services can be provided to the client for each phase of the process, if desired.

**Michael Baker can provide all necessary planning, design and bidding documents for construction in accordance with West Virginia Purchasing Division for all aspects of the project. Specifications for the installation of all required products or components will be provided as part of the bid package.**



**Michael Baker**

**INTERNATIONAL**

**APPENDIX 1 –Team Resumes**

# Patrick W. Fogarty, P.E., P.S., LEED®GA

## *Civil Engineer , Facilities Practice Manager*

### **General Qualifications**

Mr. Fogarty has over 29 years of civil engineering project design and management experience. He is responsible for the technical and management aspects of civil design and surveying projects within Baker's Charleston, West Virginia office. Mr. Fogarty has designed and managed projects in numerous disciplines including civil, structural, and transportation engineering; site development planning; and surveying. These projects have included retail/commercial site preparation, airports, streets/highways, bridges, parking lots, buildings, retaining walls/foundations, sanitary systems and structures, as well as boundary and topographic and photogrammetric surveys. Duties included field surveying, drawings and specification preparation, design, design drafting, construction inspection, quality control testing, shop drawing review, project management, contract administration and report preparation.

### **Experience**

**Renovations to Classroom Building, Beckley, West Virginia. WVU Tech/ West Virginia University. Practice Lead.** Responsibilities included overseeing and managing the required resources for the design team and quality control. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with a compressed time frame in mind. Coordination of new and old HVAC designs were a large component of this project. University branding elements were incorporated into the interior design to bring new life to a defunct campus. Special consideration was given to coordination with the University's existing door hardware products as well as the design and product specifications for a nationally accredited psychological laboratory within the Project. This project is currently under construction.

**Renovations to the Benedum Center, Beckley, West Virginia. WVU Tech/ West Virginia University. Practice Lead.**

A sister project to the above referenced Classroom Building, this 21,000 S.F. project ran concurrent and also stemmed from a Feasibility Study requested by the Owner. Primarily responsibilities included overseeing and managing the required resources for the design team and quality control. This project is currently under construction.

*Years with Michael Baker: 10*

*Years with Other Firms: 20*

### **Degrees**

B.S., 1985, Civil Engineering, West Virginia University Institute of Technology

Diploma, 1993, Surveying and Mapping, International Correspondence Schools

Coursework, Business Administration, Heriot-Watt University, Edinburgh College of Art

### **Licenses/Certifications**

Professional Engineer - Civil/Structural, West Virginia, 1990

Professional Surveyor, West Virginia, 1993

Construction Documents Technologist, 1996

**West Virginia State Capitol Restroom Renovations.** *State of WV General Services Division.* Project Manager. Responsible for the overall management of the project including the coordination of the subconsultant. Baker is leading a planning study for the renovation of 31 restrooms in the historic West Virginia Capitol Building. The planning study will assess the facilities and their conformance to current code requirements and code-required capacities, compliance with Americans with Disabilities Act (ADA) requirements, quantification of the building occupancy during normal and peak periods, and an evaluation of gender distribution of restrooms within the capitol. Baker will provide design, construction sequence, and scheduling recommendations. Upon approval of the design, Baker will prepare construction documents and provide construction administration services for the renovation of three restrooms on the basement level.

**Nitro Bank Street Streetscape Improvements, Nitro, West Virginia.** *City of Nitro.* Project Manager. Responsible for concept planning, detailed design, construction document generation, and construction administration. Baker provided design, bid-phase support, and construction services for streetscape improvements to Bank Street, located in the city's business district. Baker's services include base mapping, background data collection, design plans, construction document preparation, bid-phase support, construction management, and construction inspection.

**A/E Services for the Office of the Adjutant General, West Virginia Army National Guard, Division of Engineering and Facilities, Charleston, West Virginia.** *State Army National Guard Headquarters.* Project Manager. Responsible for the management and coordination of all activities. The Facilities Management Officer (FMO) for the State of West Virginia, Division of Engineering and Facilities (DEF), West Virginia Army National Guard (WVARNG) selected Baker for a lump sum/fixed fee contract for architectural and engineering services. Baker was selected by the Division of Engineering and Facilities to provide complete design and construction administration services for the renovation of the first floor of the entire wing of the Office of the Adjutant General (TAG). The Owner requested the need for modernization of approximately 12,000 square feet of existing outdated office space - project elements included new acoustical ceilings, flooring, energy-saving light fixtures, duplex outlets, communications jacks, alterations to the existing floor plan, exterior door replacements, new interior doors and hardware, new wall finishes and asbestos removal.

**Lost Creek Train Depot Rehabilitation, Lost Creek, West Virginia.** *Town of Lost Creek.* Project Manager. Responsible for the management and coordination of all activities as well as all engineering design. The Town of Lost Creek retained Baker for the planning and design of the rehabilitation of a historic train depot adjacent to the Harrison County Rail Trail. Baker prepared a plan to raise the structure, make repairs to the deteriorated timber, excavate and place the concrete foundation system, then lower the structure to rest on the new foundation. Baker provided construction administration and inspection services as well as periodic site review during construction.

**Little Kanawha Bus Facility, Calhoun County, West Virginia.** *WV Division Of Public Transit.* Project Manager. Responsible for the civil, site and structural engineering components of the project. Baker is providing architectural and engineering services, landscape architecture, and construction-phase support for a new, 9,900-square foot, pre-engineered, metal and brick bus maintenance and transit operations facility. The 5,100-square-foot administrative area will include offices, a conference room, a money-counting room, and a driver-training room, and the 4,800-square-foot bus maintenance area will include storage for seven buses. The facility will be ADA-compliant and is being designed to achieve LEED® certification. Services include site survey and design, geotechnical testing, environmental compliance, utility coordination, bid documents, bid-phase support, and as-built drawings.



## **R. Joseph Chaffin, R.A., A.I.A.**

### ***Architectural Manager and Architect of Record***

#### **General Qualifications**

In balancing creative, organizational, and technical strengths, Joseph Chaffin's professional experience demonstrates a broad practice of architecture from residential through complex institutional projects. He challenges current capabilities, cultivates leadership, and develops new strengths through his position at Baker. As Director of Architecture, Mr. Chaffin is responsible for the daily operations, design quality, and project execution of the architectural and interior design staff. He performs interdisciplinary technical reviews for all designs and oversees coordination of related engineering disciplines. Ensuring the highest quality design services within budget and schedule parameters, he also emphasizes a "world view," or comprehensive perspective, within which professional services are delivered prioritizing and maintaining client expectations.

#### **Experience**

##### **Renovations to Classroom Building, Beckley, West Virginia. WVU Tech/ West Virginia University. Architect of Record.**

Responsibilities included facilitating complete design package and collaboration with WVU Tech staff for the 31,000 S.F. facility. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with a compressed time frame in mind. Coordination of new and old HVAC designs were a large component of this project. University branding elements were incorporated into the interior design to bring new life to a defunct campus. Special consideration was given to coordination with the University's existing door hardware products as well as the design and product specifications for a nationally accredited psychological laboratory within the Project. This project is currently under construction.

##### **Renovations to the Benedum Center, Beckley, West Virginia. WVU Tech/ West Virginia University. Architect of Record.**

A sister project to the above referenced Classroom Building, this 21,000 S.F. project ran concurrent and also stemmed from a Feasibility Study requested by the Owner. Primarily an interior design heavy project, this building required new retrofitted ADA toilet facilities as well as door hardware and HVAC systems coordination. This project is currently under construction.

##### **Aviation Science Center Renovation, Community College of Beaver County, Monaca, Pennsylvania. Architect of Record.**

Responsible for design/technical quality and project execution provided by the architectural and interior design staff. The Project consisted of architecture, engineering, construction administration and cost estimates to design the auditorium renovations and replacement the HVAC system. Preliminary design services included research of applicable building codes; on site project assessment and verification, measurements, and documentation of the project areas, including a comprehensive field survey of the existing conditions, and the development and prioritization of preliminary scopes of work, schedule development, and oversight of estimates of probable cost. He directed the completion of pre-final 90 percent construction documents and the final construction and bid documents, including architectural, mechanical, electrical, and communications engineering drawings, and specifications. Mr. Chaffin also coordinated with the vendor of the air traffic control simulator throughout the design phase.

**Years with Baker: 9**

**Years with Other Firms: 17**

#### **Education**

B.Arch, 1990, Architecture, University of Cincinnati

Certificate, 1988, Architecture, Ecole d'Art Americaines - Ecole des Beaux Arts

#### **Licenses/Certifications**

Registered Architect -

West Virginia, 2011

Pennsylvania, 2001

NCARB, 1999

**Nursing Simulation Renovation and Laboratory Design, Clarion University, Clarion, Pennsylvania.** Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff.

This state-of-the-art nursing education facility, included a simulation laboratory with four high-technology mannequins and a control room, related classrooms and skills lab spaces, offices, conference rooms, social lounge, and study lounge. His role also included interdisciplinary technical reviews for all design/construction documents. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

**Building 12 Defense Logistics Agency Headquarters Renovation Design, Tobyhanna, Pennsylvania.** *Tobyhanna Army Depot.* Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. Baker prepared design documents for the partial renovation of Building 12 to serve as the new Defense Logistics Agency headquarters building. Work was performed under a three-year indefinite delivery-indefinite quantity contract. Baker's tasks included architectural design, building systems engineering, construction cost estimate development, and as-built plans development.

**Restroom Renovation Design, TISCOM, Alexandria, Virginia.** *U.S. Coast Guard, CEU Cleveland.* Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. Baker is developing specifications, construction drawings, a detailed cost estimate, and a projected construction schedule to renovate two male and two female restroom areas in the Telecommunication and Information Systems Command Navigation Center. The renovated restrooms will be compliant with the Americans with Disabilities Act and will include new plumbing fixtures, toilet partitions, floor coverings, wall coverings, electrical fixtures, and exhaust fans.

**U.S. Armed Forces Reserve Center, Rutland, Vermont.** *U.S. Army Corps of Engineers, Louisville District.* Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff.

Responsibilities also included detailed interdisciplinary reviews of the RFP design criteria documents with an emphasis on architecture. Baker developed design-build RFP documents for a new 600-member Armed Forces Reserve Center meeting Silver LEED® standards. A 97,634-square-foot training building (AFRC), a 14,600-square-foot multi-use classroom, a 7,302-square-foot Organized Maintenance Shop (OMS), and a 3,113-square-foot unheated storage (UHS) building were included in the RFP package. The center accommodates training and mobilization, and provides for the storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Vermont Army National Guard and Army Reserve units. RFP development consisted of conducting a design charrette; providing a topographical survey and geotechnical investigation; performing a utility survey; developing conceptual site plans, floor plans, and building elevations; developing RFP specifications; preparing DD Form 1354 – Transfer of Real Property; and providing a PACES construction cost estimate.

**Design of U.S. Army Reserve Center Renovation and Expansion, Homewood, Illinois.** *U.S. Army Corps of Engineers, Louisville District.* Director.

Responsible for design/technical quality and project execution provided by the architectural and interior design staff. Role also included interdisciplinary technical reviews for all design/construction documents. As designer of record, Baker provided architectural and engineering services for the renovation and expansion of a 400-member U.S. Army Reserve Center to provide a 60,374-square-foot Training Building, including an approximately 3,500-square-foot Unheated Storage Building. The project also includes construction of a 22,300-square-foot parking area for military equipment, and 130 parking spaces for privately owned vehicles. Tasks were performed under an indefinite quantity-indefinite delivery engineering agreement. Baker designed the training facility to meet LEED® Silver certification. Baker's services included architectural design, surveys, environmental and geotechnical investigation, all site and building engineering, cost estimating, value engineering, and LEED® certification administration.

## Rebecca Marie Schwartz, AIA, LEED AP BD+C

### Technical Architecture Manager

#### General Qualifications

Ms. Schwartz is an architect with experience in commercial, higher education, and military facilities. She manages and develops projects from Pre-design through Contract Administration phases, including all aspects of a project: drafts proposals and contracts, documents existing conditions, performs code analysis, prepares architectural programming documentation pertinent to clientele, proposes and develops design schemes, creates and revises construction documents, compiles specifications, reviews shop drawings and submittals, reviews request for payments, and prepares field reports and records. She maintains direct working relationships with clients, consultants, contractors, and governing authorities throughout the design process.

#### Experience

**French Creek Bachelor Enlisted Quarters, Marine Corps Base Camp LeJeune, North Carolina.** *Naval Facilities Engineering Command, Mid-Atlantic.* Project Architect. Responsibilities included coordination with design-build contractor and engineering disciplines. Generated construction documentation not limited to but including the following: specifications, design analysis, floor plans, elevations, building sections, and details. Provided Building Information Modeling (BIM) for the project. Michael Baker was the designer of record on a design-build project to construct a 103,334-square-foot combined multistory facility to serve as bachelor enlisted quarters, a 167,450-square-foot three-story 700-vehicle parking garage, a recreation shelter, and a personal equipment cleaning station. The barracks achieved LEED@-NC gold certification. The team's strategic design approach integrated two barracks into a single structure via enclosed connecting corridors on each floor, optimizing common space. Michael Baker's tasks included planning, structural design, and architectural and building systems design.

**P-478 Navy Gateway Inn & Suites (NGIS), Naval Station Newport, Rhode Island.** *NAVFAC MIDLANT NEIPT.* Sustainability Manager. Responsible for overseeing and ensuring sustainable design strategies and features to minimize the energy consumption of the facilities; conserve resources; minimize adverse effects to the environment; and improve occupant productivity, health, and comfort to reduce the total cost of ownership of the project using a whole building, life-cycle approach. Led effort with lead architect and design engineers in creating the USGBC LEED-NC project checklist and the LEED documentation to achieve LEED Silver rating. Michael Baker is the designer of record for the new 200 key, 104,000-square-foot Navy Gateway Inns & Suites hotel. Michael Baker's services included architecture, interior design, civil engineering, landscape architecture, mechanical engineering, plumbing design, fire protection design, and sustainable design.

*Years with Michael Baker: 10*

*Years with Other Firms: 8*

#### Degrees

B.Arch., 2000, Architecture, The Pennsylvania State University, College of Architecture

#### Licenses/Certifications

Registered Professional Architect, Pennsylvania, 2005 [REDACTED]

NCARB, Pennsylvania, 2011, [REDACTED]

LEED Accredited Professional, 2002, [REDACTED]

LEED Accredited Professional BD+C, 2011 [REDACTED]

Registered Professional Architect, New York, 2013, [REDACTED]

Registered Professional Architect, Kentucky, 2017 [REDACTED]

**Design of 1,000-Room Lodge, Fort Lee, Virginia.** *U.S. Army Family, Morale, Welfare and Recreation Command (FMWRC).* Project Architect. Responsibilities included coordination with the design-build contractor and engineering disciplines. Generated construction documentation not limited to but including: specifications, design analysis, floor plans, elevations, building sections and details. Michael Baker provided design services for a 500,000-square-foot, 1,000-room lodge, comparable to a commercially branded hotel, with associated grounds building and site development. The architecture approach for the seven-story structure was influenced by several important factors, including proximity to the Petersburg Battlefield National Park and the adjacent four-story Army Logistics University, for which the Lodge was constructed. Design features include integrated stormwater management with landscape design, wireless communications, Onity system lodging controls, multistory fire protection and alarm systems, and High-Risk Target antiterrorism and force protection measures. The "green building" is designed and constructed to obtain LEED® Silver certification, achieving LEED® points in the categories of Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation In Design. Energy conservation is integral with the building envelope design and includes a continuous, spray-applied, soy-based polyurethane foam insulating air barrier system.

**14LRL13 Independence FFRDB RFP.** *U.S. Army Corps of Engineers, Louisville District.* Senior Architect. Responsibilities included coordination with users and engineering disciplines. Participated in design charrettes with end users, conducted field investigation, and generated programming data and analysis utilized to generate RFP (Request for Proposal) documentation not limited to but including the following: specifications, design analysis, and floor plans.

**Historic Marine Barracks Washington Building 8 Renovation Design-Build RFP, Marine Barracks Washington, Washington, D.C.** *U.S. Navy NAVFAC Washington.* Technical Manager. Responsibilities as Architecture Technical Manager included managing the work effort of the professional and technical staff in the architecture group within the overall architecture engineering practice. Essential duties are comprised of providing technical guidance, preparing scope of work and cost estimates for the project, managing staff utilization by scheduling, monitoring and revising assignments related to the project, and satisfying project requirements by ensuring that quality standards and deadlines are met through internal design reviews. Michael Baker provided design, engineering, and historic preservation services for the renovation of Building 8, a 47,000-square-foot historic structure constructed between 1903 and 1906 that is part of the U.S. Marine Corps Barracks and Commandant's House National Historic Landmark Site. The project included a sensitive phased renovation with integration of existing communications and networks running through the building from other sections of the campus to the Commandant's House at the north end of the site. The scope of the renovation work addressed structural modifications to reflect space requirements; mechanical, electrical, and plumbing systems upgrade; communication system upgrade; fire protection system and life safety review and upgrade; Americans with Disabilities Act (ADA) analysis and compliance; and anti-terrorism/force protection (AT/FP) compliance to the maximum extent practicable. The procurement documents required integration of sustainability design into the renovation work, and the building is expected to meet a LEED® Silver certification.

**Rehabilitation of the Ernie Pyle U.S. Army Reserve Center, Fort Totten, Queens, New York.** *U.S. Army Corps of Engineers, Louisville District.* Architect. Provided architectural support to the project architect such as space planning and other tasks. Michael Baker was tasked to provide Design-Bid-Build documents for the renovation of a 41,312-square-foot U.S. Army Reserve Center, the addition of a 4,994-square-foot Unheated Storage Building, and the addition of MEP and POV parking. The renovation included storage and office areas on two floors, electrical, mechanical, plumbing, and fire protection on all three floors, as well as vault and elevator construction and asbestos removal. Renovation included compliance with Anti-terrorism and Force Protection Requirements, as well as Handicapped Accessibility.

## **David J. Hilliard, P.E., LEED® AP**

### ***Mechanical/Electrical/Plumbing Engineer***

#### **General Qualifications**

Mr. Hilliard has a wide range of "hands on" design, engineering, and construction experience. From his beginnings as a carpenter he has expanded his professional abilities to a senior engineer for Baker. His recent design experience has included the design of new campus water lines and other service utilities at West Virginia State University, the complex mechanical design of such projects as a large Charleston, West Virginia hospital, a Bus Maintenance Garage and office building for the West Virginia Department of Transportation, an Army National Guard Armory HVAC/Electrical renovation, Master Planning and engineering at the West Virginia Capitol Complex including plumbing renovation design on the historic State Capitol Building. His resume covers over 30 years of real world work in engineering, design, fabrication and construction in the mechanical, electrical and general trades.

Over the years, while practicing his profession, Mr. Hilliard continued his education by studying mathematics, civil and mechanical engineering, finally taking degrees in both mathematics and mechanical engineering. He has continued his professional development through his involvement with ASME, ASHRAE, ASPE, USGBC, and other pertinent organizations

#### **Experience**

**Design of Three T-Hangars, Morgantown, West Virginia.** *Morgantown Municipal Airport.* Mechanical/Electrical Engineer. Responsibilities included the Mechanical, Electrical and Plumbing Design of three T-hangars on the east side of the airfield and included, HVAC, plumbing ADA restrooms and drainage systems, fire protection, and electrical utilities design. He also, performed Construction Administration for advised during construction and help coordinate with the Military IRT staff through an onsite project manager.

**Renovations to Classroom Building, Beckley, West Virginia.** *WVUTech/ West Virginia University, Morgantown, WV.* MEP Designer and Engineer of Record. Responsibilities included facilitating complete design package and collaboration with WVU Tech staff for the 31,000 S.F. facility. This fast track design and construction project stemmed from a feasibility study produced by request of the Client. The deficiencies found during the Study were remedied during the design phase with a compressed time frame in mind. Renovation old HVAC systems, electrical upgrades, fire alarm upgrades, and a new building wide sprinkles system were undertaken, as well as the design of new ADA restrooms. Special consideration was given to the design and product specifications for a nationally accredited psychological rat laboratory within the Project. This project is currently under construction.

*Years with Michael Baker: 9*

*Years with Other Firms: 20*

#### **Degrees**

B.S.M.E., 2005, Mechanical Engineering, West Virginia University Institute of Technology

B.S., 2002, Mathematics and Science, West Virginia State College

#### **Licenses/Certifications**

Professional Engineer, West Virginia 2011

Mississippi, 2016

Louisiana, 2016

Kentucky, 2017

LEED AP, bd+c, 2010

#### **Professional Affiliations**

American Society of Plumbing Engineers

American Society of Heating, Refrigerating, and Air-Conditioning Engineers

**Renovations to the Benedum Center, Beckley, West Virginia.** *WVUTech/ West Virginia University, Morgantown, WV.* MEP Designer and Engineer of Record. A sister project to the above referenced Classroom Building, this 21,000 S.F. project ran concurrent and also stemmed from a Feasibility Study requested by the Owner. Primarily an interior design heavy project, this building required new ADA toilet facilities, Fire Alarm and sprinkler system upgrades and retrofitted HVAC equipment. This project is currently under construction.

**Open-End Architectural/Engineering Services (10-year IDIQ), West Virginia State University, Institute, WV.** Mechanical/Electrical and Plumbing Designer and Engineer of Record for on demand projects at West Virginia State University. Mr. Hilliard has been involved with and coordinated all aspects of the various tasks which have included; programming, planning, design development, construction documentation, systems evaluations, and feasibility studies, as well as cost estimating. Also included were mapping, evaluation and design services for storm and sewer line systems, a campus wide domestic water loop system design, football field upgrades and overall facility maintenance support as requested by the University. He has also been involved with the development and acquisition of WVDEP permits for both MS4 and Air Perming.

**Little Kanawha Bus, Calhoun County, West Virginia.** *WV Division of Public Transit, Charleston, WV.* Mechanical Engineer. Responsible for the Mechanical, Electrical and Plumbing Design, MEP Document Preparation, and Construction Administration for a new bus maintenance and office facility for Gilmer County. Duties include the design of the vehicle storage, cleaning and maintenance mechanical systems, as well as oil pumping and collection systems. The design of an energy efficient HVAC system for the entire building is also part of his responsibilities. The facility was designed as a LEED® project.

**Good News Mountaineer Garage, Charleston, West Virginia.** Mechanical Engineer. Responsible for the Mechanical, Electrical and Plumbing Design, MEP Document Preparation, and Construction Administration for newly renovated Auto Repair garage and administrative office facility for this non-profit organization. The Good News Mountaineer Garage accepts donations of vehicles that are repairable for a reasonable amount of money. These donated cars are then distributed to families with low incomes for transportation to work.

**West Virginia State Capitol Restroom Renovations.** *State of WV General Services Division, Charleston, WV.* Mechanical Electrical and Plumbing Engineer. Mr. Hilliard provided the State of West Virginia General Services Division a comprehensive MEP plan for the renovation and renovation of the 33 restrooms of the West Virginia State Capitol Building. He helped provide design, construction sequence, and scheduling recommendations. And will provide Construction Administration during construction

**Headquarters Facility Renovations for the Coonskin Complex.** *West Virginia Army National Guard, Charleston, WV.* Mechanical Engineer. Responsible for all mechanical design oversight and construction management. Baker performed complete planning, design, and construction management services for renovations to the Office of the Adjutant General at the State Army National Guard Headquarters in Charleston, West Virginia. Project elements included a complete renovation and replacement of the HVAC system with a Loop Heat Pumps, new acoustical ceilings, flooring, energy-saving light fixtures, several new wall partitions, new interior doors and hardware, new wall finishes and asbestos removal. Baker provided Construction Administration and inspection services as well as periodic site review during construction.

## Kevin Spangler, P.E.

### Fire Protection Engineering Manager

#### General Qualifications

Mr. Spangler is a registered fire protection engineer with an M.S. degree in Fire Protection Engineering and 9 years of experience in the fire and life safety consulting industry. He has been with Michael Baker International since 2009 and has been the fire protection engineering manager since 2014. He provides leadership to the fire protection group and performs project technical reviews of system designs. He also serves as the Designer of Record for his specific project designs. In his wide-ranging fire protection experience and education, he has an extensive technical background and knowledge in the design of fire protection engineering systems, code and life safety analysis, and the commissioning and testing of fire systems. The variety of projects have exposed Mr. Spangler to various types of facilities for military, government, commercial, public, and private clients.

#### Experience

**Renovations to Classroom Building, Beckley, West Virginia. WVUTech/ West Virginia University, Morgantown, WV.** Mr. Spangler was the fire protection engineer of record responsible for the design of the fire protection systems at the WVU Tech Beckley Classroom Building. The project consisted of a renovation of an existing building. A new wet-pipe sprinkler system was added to the building, and the existing fire alarm system was adjusted to account for the building renovation. Mr. Spangler provide drawings and specifications for the installing contractor, and reviewed the delegated design submittals for compliance with the project scope and construction codes. This project is currently under construction.

**Renovations to the Benedum Center, Beckley, West Virginia. WVUTech/ West Virginia University, Morgantown, WV. Designer.** A sister project to the above referenced Classroom Building, this 21,000 S.F. The existing sprinkler and fire alarm systems were adjusted to account for the building renovation. This project is currently under construction.

#### **Army Reserve Center, Full Facility Revitalization (FFR), Independence, MO.**

Mr. Spangler was the fire protection engineer for the renovation of the existing army reserve center located in Independence, Missouri. He was responsible for performing a field investigation of existing conditions, performing a fire hydrant flow test and preparing RFP specifications and design criteria documents. The building scope included a new wet pipe sprinkler system in the Reserve Center Building and also the Maintenance Facility. The existing fire alarm system was documented and determined to be removed and replaced with a new fire alarm and mass notification system. The new fire alarm system is designed to serve both buildings and an outdoor speaker system for parking lot notification.

#### **Shaw Headquarters Building Renovation, Shaw AFB, South Carolina**

Mr. Spangler was the Fire Protection Engineer of record for the renovation of the three story Headquarters Building at

**Years with Michael Baker: 8**

**Years with Other Firms: 1**

#### Degrees

M.S., 2008, Fire Protection Engineering, University of Maryland, College Park Campus

B.S., 2006, Agricultural and Biological Engineering, The Pennsylvania State University

#### Licenses/Certifications

Professional Engineer -

California, 2011, [REDACTED]

Virginia, 2012, [REDACTED]

Pennsylvania, 2012, [REDACTED]

Illinois, 2013, 062 [REDACTED]

Idaho, 2014, [REDACTED]

New York, 2014, [REDACTED]

Connecticut, 2015, [REDACTED]

South Carolina, 2016, [REDACTED]

Minnesota, 2016, [REDACTED]

Mississippi, 2017, [REDACTED]

Shaw AFB in South Carolina. The building contained an existing fire alarm and existing sprinkler system. The fire alarm system was removed and installed with a new fire alarm and mass notification system. The existing sprinkler system was modified to account for the new building design. The existing sprinkler system was identified by field investigation and as much of the existing sprinkler system was re-used as possible to keep costs minimal for the client. A life safety analysis was performed according to NFPA 101 Life Safety Code and the IBC to ensure the new system design met all building and egress requirements. Mr. Spangler was responsible for the delegated design review and approval of shop drawings prepared by the installing contractor.

**Fire Pump Replacement. Allegheny County Airport Authority – Pittsburgh International Airport.**

Mr. Spangler was the fire protection engineer designer of record for the project. He completed detailed field measurements of the existing systems and finalized the design for the newly installed fire pumps. The project included the installation of 4 new, electric motor driven fire pumps in two (2) separate fire pump houses (2 pumps per fire pump house). The fire water tanks and existing water supply were analyzed to meet code requirements and the existing piping rerouted as necessary to provide appropriate pump recirculation. The challenges that were faced and solved during in the project included the installation of previously purchased fire pumps into an existing system. The project was successful due to the attention to detail in field measurements of the existing systems and the detailed design of the new system.

**Private Corporate Client. Hangar located at Allegheny County Airport.** Michael Baker was responsible for the building design for a renovation of a historic hangar located at the Allegheny County Airport. Mr. Spangler was the Fire Protection Engineer responsible for the design of fire protection systems throughout the building including sprinkler system, foam system, and fire alarm system. Two fire pumps were designed and retrofitted into the building to provide the adequate flow and pressure for the suppression systems. Detailed hydraulic calculations were performed and discussed with the local Authority Having Jurisdiction in order to remove the existing fire water storage tanks from the project. As part of the project, a site survey of existing building and final inspections of the final systems installations were performed.

**Camp Geiger East Infantry Training Complex, Marine Corps Base Camp Lejeune, North Carolina. Naval Facilities Engineering Command, Mid-Atlantic.** Mr. Spangler was the fire protection engineer of record for Academic Building, Cif and Warehouse buildings. He was responsible for fire protection design of protection systems including sprinklers, fire alarm and mass notification systems to meet the requirements of the RFP, UFC and NFPA codes. He performed life safety analysis for complete compliance with NFPA 101, IBC and the UFC criteria. This includes classifying occupancies, occupant load calculations, egress analysis and rated separations. He also performed an on-site fire hydrant flow test according to NFPA 291 to determine the available water supply. This information was used to perform detailed hydraulic calculations for the building sprinkler systems. He worked directly with the NAVFAC fire protection engineer to analyze the water system and remove the need for a fire pump for each of the buildings. Michael Baker served as the lead designer for the design-build delivery of a 137,850-square-foot infantry training complex on five acres at Camp Geiger. The project included the construction of a two-story headquarters and academic building, a warehouse, a consolidated issue facility, an armory building, and an emergency weather center, the demolition of five buildings and various electrical distribution upgrades. The project was designed to meet the requirements for LEED Silver certification.



## **Raymond C. Paff, C.P.D.**

### **Senior Plumbing Designer**

#### **General Qualifications**

Mr. Paff is a senior designer responsible for the design and specification of a variety of projects involving all building plumbing systems, vehicle fluid systems, vehicle fuel systems; gasoline and diesel, medical gas, generator fuel oil systems, site drainage, deionized water systems, fire protection (sprinkler and halon FM 200), life safety systems, water supply systems, and natural gas systems with leak detection. He has worked on military, transit, aviation, commercial, industrial, health care, and institutional projects.

#### **Experience**

**U.S. Army Reserve Complex, Wheeling, West Virginia. U.S. Army Corps of Engineers, Baltimore District.** Designer. Provided fire protection design for a LP gas-driven fire pump, pump house, and 100,000-gallon above ground water tank. The project was designed to meet military design standards. Michael Baker provided a complete design-build package for a new U.S. Army Reserve Center located on a 25-acre site in Wheeling, West Virginia. The \$15.5 million project involved design of an 18,000-square-foot OMS/AMSA building and a 24,000-square-foot training center. Both buildings were constructed of steel frames on spread-footing foundations. Facades feature a combination of split-faced block with brick. The roofs are constructed of standing-seam metal, with certain roofs vaulted. Associated site infrastructure work included the removal of a hilltop and construction of parking facilities and a one-half mile access road, as well as landscaping. Due to water pressure issues for fire protection, an on-site 60,000-gallon water storage tank was constructed. This project shared property with a regional general airport authority.

**Design-Build Transient Quarters & Dining Facility Manama Bahrain, Manama, Bahrain. VERTEX (ECC).** Designer. Responsible for providing design review of the plumbing systems. This project was a restart of an earlier Design-Build effort by ECC/Michael Baker. ECC was removed from the project as the constructor of the facilities. Michael Baker was asked by the Middle East District of USACE to remain on the project and to finish the A/E support through the end of construction.

**P-478 Navy Gateway Inn & Suites (NGIS), Naval Station Newport, Rhode Island. NAVFAC MIDLANT NEIPT.** Designer. Responsible for QA/QC of the plumbing design drawings. Michael Baker is the designer of record for the new 200 key, 104,000-square-foot Navy Gateway Inns & Suites hotel. Michael Baker's services included architecture, interior design, civil engineering, landscape architecture, mechanical engineering, plumbing design, fire protection design, and sustainable design.

**Renovation of Building 3147, Aberdeen Proving Ground, Maryland. U.S. Army Corps of Engineers, Baltimore District.** Designer. Responsible for the design of plumbing and fire protection systems to meet UFC military design standards. Architectural and engineering design services were provided for the renovation of Building 3147, the U.S. Army Ordnance Center and School. Simplified design construction drawings and specifications, and construction cost estimates were included.

**Years with Michael Baker: 27**

**Years with Other Firms: 13**

#### **Degrees**

Certificate, 1987, Visual Arts, Art Institute of Pittsburgh

A.S., 1977, Architectural Engineering Technology, The Pennsylvania State University

#### **Licenses/Certifications**

Certified Plumbing Designer, 1981,  
[REDACTED]

**Junior NCO and Enlisted Quarters, Fort Irwin, California.** *Stronghold Engineering, Inc.* Designer. Responsible for design of the plumbing systems, required to meet UFC military design standards, including domestic water and sanitary systems for military housing. Under a Design-Build MATOC contract with the U.S. Army Corps of Engineers, Los Angeles District, Michael Baker worked with contractor Stronghold Engineering as designer of record for the design-build delivery of 24 JNCO/Enlisted Quarters at the Fort Irwin National Training Center in California. The housing units are comprised of 24 two-bedroom apartments in 12 one-story duplex buildings and were designed to strict USACE guidelines for materials, energy efficiency, and response to regional architectural precedents.

**Systems Integration Maintenance Office, Fort Campbell, Kentucky.** *U.S. Army Corps of Engineers, Louisville District.* Designer. Responsible for plumbing design for an office building which included the design of a domestic water heating that used waste heat from the HVAC system. Michael Baker was the designer of record for a 48,400-square-foot Systems Integration Maintenance Office (SIMO) facility. The facility includes administrative space (private offices and open office space); classrooms; conference rooms; laboratory spaces; storage spaces; metal fabrication shop; computer labs; flight lockers; showers and restrooms; mechanical, electrical and communication rooms; intrusion detection; surveillance; and electronic access control. Spaces support SIMO flight operations, mission planning, and pilot flight planning. This project complied with UFC 4-010-01 DoD Anti-Terrorism Force Protection requirements and per unified facilities criteria and Mission Planning spaces complied with ICS 705-1, 705-2, and TER room were designed to comply with AR 380-5 requirements. Site design included parking, stormwater management/bio-retention, landscaping and site utilities. The project is designed to achieve a LEED Silver Certification.

**Renovations to Building 4305, Aberdeen Proving Ground, Maryland.** *U.S. Army Corps of Engineers, Baltimore District.* Designer. Responsible for the design of the plumbing and fire protection systems to meet UFC military design standards. Building 4305 at Aberdeen Proving Ground (APG) was an existing three-story concrete framed structure with concrete slab floors. Michael Baker designed the interior office renovations to the 25,000-square-foot second floor, including new offices, conference rooms, and training facilities. An addition to the building provided space for a new elevator and stairs, providing for emergency and ADA egress to the upper two floors. The new roof-mounted HVAC system and second floor build-out, which included extending the new exterior wall treatment to match what had previously been finished, were completed while the building remained partially occupied. The first floor had been renovated prior to Michael Baker's contract, including the exterior.

**Military Instructional Facility Barracks, Fort Indiantown Gap, Annville, Pennsylvania.** *Pennsylvania Department of General Services.* Designer. Provided design of the plumbing and fire protection systems to meet International Plumbing Code design standards, including a diesel-driven fire pump to serve the sprinkler systems in three buildings. Michael Baker provided architecture and engineering services for the design of a new 100,000 square-foot barracks complex, which provides housing and dining for almost 600 students and structured parking for 264 cars. Michael Baker's services included planning; architecture; interior design; civil, geotechnical, structural, mechanical, and electrical engineering; and cost estimating.

**Air Force Master Housing Contract, Various Air Force Bases, Nationwide.** *Air Force Center for Engineering and the Environment (AFCEE).* Designer. Responsible for the plumbing design of domestic water and sanitary systems to support military housing at MacDill AFB and Bolling AFB. The projects were required to meet UFC military design standards. Michael Baker performed comprehensive AE services at Bolling Air Force Base and Edwards Air Force Base. The work included housing design and construction management services, as well as design of neighborhood parks and General Officer's Quarters.

## Owen Milligan, P.E.

### Electrical Engineering Manager

#### General Qualifications

Mr. Milligan is an electrical engineer who is experienced working with consulting engineering firms in the study and design of electric distribution and control systems, emergency power for process plants and facilities, water/wastewater treatment plants, government and commercial projects, ASHRAE energy-efficient building design, coordination with vendor and contractors, and approval of vendor drawings. He has a strong knowledge of distribution equipment and designs, motor control center layouts and design, and start-up and services during construction. He is capable of handling multiple projects from conception to final design, working as a team member toward meeting project goals. His work includes management of Baker's electrical engineering department, supervising and providing technical advice to designers and coordinating design and construction work with engineers, contractors, vendors, and clients.

#### Experience

**Design/Build SATOC for Military Facilities in the Southwest Region, Various Locations in Southwestern U.S., AR,AZ, CA, LA, NM, NV, OK, TX.** *U.S. Army Corps of Engineers, Tulsa District.* Electrical Engineer. Provided design assistance to the electrical engineering subconsultant, and performed a technical quality review of the construction documents for the TEMFs located at Fort Bliss. Electrical systems included lighting, lightning protection and grounding, power distribution, telecommunications, fire alarm, and unique voltage and frequency requirements. Designs were required to meet UFC and military design standards. Projects constructed under this contract include Brigade Combat Team (BCT) Tactical Equipment Maintenance Facilities (TEMF). TEMFs provide facilities for the purpose of maintaining and repairing vehicles, complete with equipment and parts storage, and administrative offices. Task orders awarded to date include the following: Two TEMFs at Fort Bliss in El Paso, Texas to be shared by five Battalions and one Company; and a Unit Operations Facilities consisting of a TEMF and an Organizational (Deployment) Storage facility, at Fort Bliss in El Paso, Texas. Facility designs are required to meet or exceed a Silver LEED® certification.

**On-Call Multi-Discipline Services, Pittsburgh International, and Allegheny County Airports (PIT/AGC), Pittsburgh, Pennsylvania.** *Allegheny County Airport Authority.* Technical Advisor. Provided technical direction to electrical design staff and performed a technical quality review of the construction documents. Designs were required to meet NEC standards. Since 1989, Baker has provided multidiscipline, on-call services to the Allegheny County Airport Authority (ACAA). The ACAA owns and operates Pittsburgh International Airport (PIT) and Allegheny County Airport (AGC). Baker acted as an extension to the ACAA's staff, providing the depth of resources and experience of the entire company when called upon by the ACAA. Baker provided a full range of services to ACAA on an "On-Call/As-Needed" basis, including architecture, civil, structural, mechanical, electrical and environmental engineering, general engineering administration, construction support, and other areas.

**Years with Michael Baker:** 9

**Years with Other Firms:** 21

#### Degrees

B.S., 1988, Electrical Engineering,  
Gannon University

Computer Aided Drafting, Putnam  
County Technical Center, 1995

#### Licenses/Certifications

Professional Engineer -

West Virginia, 2013

California, 2003

Pennsylvania, 1999

Montana, 2001

Kentucky, 2005

Oklahoma, 2008

**Rescue Swimmer Training Facility, U.S. Coast Guard Support Center, Elizabeth City, North Carolina.** *U.S. Coast Guard, Facilities Design & Construction Center Atlantic.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles. Baker prepared Design/Build RFP Documents for a new Rescue Swimmer Training Facility (RSTF) for the Aviation Technical Training Center (ATTC), a tenant of and located on the SC Elizabeth City, NC. The \$13.3 million RSTF is a dedicated aquatic trainer for the purpose of supporting the Aviation Survival Technician (AST) School and recurrent water survival training requirements. Sized appropriately for the curriculum and student loading, the RSTF contained elevated platforms, pool temperature controls, adequate wet and dry storage, male and female locker/shower facilities, classrooms, and office space.

**Gymnasium Locker Room Rehabilitation, USCG Training Center Cape May, New Jersey.** *U.S. Coast Guard.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles. Baker prepared the design, construction documents, and cost estimate for the interior rehabilitation of an existing facility to combine two women's locker rooms into one large room.

**Relocation and Improvements to the Front Gate, USCG Training Center Cape May, New Jersey.** *U.S. Coast Guard.* QA/QC. Performed a technical quality review of the electrical design for this building renovation project, including lighting and electrical receptacles.

**Route 52, Contract - "B", Somers Point & Ocean City, New Jersey.** *New Jersey Department of Transportation.* Electrical Engineer. Responsible for the electrical systems design to meet NEC standards for a new Visitor's Center, bridge and site lighting, power distribution, and a supplemental photovoltaic solar system.

### **Non-Baker Project Experience**

**Siemens Government Services, Inc (formerly SD Engineers), Pittsburgh, Pennsylvania.** Senior Electrical Project Engineer. Responsibilities included Senior Electrical Engineer in charge of all electrical work at the Department of Energy's Naval Reactor Facility in West Mifflin, Pennsylvania. Duties included complete electrical design including multiple new office building designs and construction, light industrial type facilities for confidential DOE projects, retrofitting and relocation of existing laboratories, power studies, arc flash calculations, and site power distribution.

**Chester Engineers / US Filter Corporation, Pittsburgh, Pennsylvania.** Electrical Project Engineer. Responsibilities included the following:

- Lead electrical engineer for multiple site water and wastewater treatment projects for a large automobile manufacturer.
- Lead electrical engineer for design of water treatment plants for several large steel manufacturers.
- Lead electrical engineer on design of numerous remote cellular telephone communication sites for a large, wireless Telecommunications Company.
- Assisted a Senior Electrical Engineer on a Short Circuit and Coordination Study using CAPTOR/DAPPER analysis program.
- Responsible for several large detailed constructions cost estimates.
- Lead Electrical Engineer to many local municipalities for wastewater and water pumping/filtration upgrades.

## Wayne Airgood, P.E.

### Structural Engineer

#### General Qualifications

Mr. Airgood is a practicing structural engineer with experience in the design of commercial, institutional, light industrial building structure, and foundation systems.

#### Experience

**Design of Central Issue Facility, Fort McCoy, Wisconsin.** *U.S. Army Corps of Engineers, Louisville District.* Mr. Airgood was the senior structural engineer of record responsible for design of the building structure and foundation systems from concept through construction of an approximate 62,553-square-foot large-sized Central Issue Facility (CIF) to expedite the shipping and receiving, distribution, processing, and exchange of soldier equipment. The structural system consisted of steel joist and girder framing supported by interior steel columns and exterior precast, insulated concrete load-bearing walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

**Container-Loading Facility Design, Fort McCoy, Wisconsin.** *U.S. Army Corps of Engineers, Louisville District.* Mr. Airgood was the senior structural engineer of record responsible for the design of a clear span steel roof framing system to achieve column-free interior warehouse space of a 30,862-square-foot Container-Loading Facility. Roof framing system is supported by interior steel columns and exterior precast, insulated concrete load-bearing walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

**Montgomery County Public Schools Foodservices Facility.** *Montgomery County, Department of General Services.* Mr. Airgood was the senior structural engineer of record responsible for the development and design of structural framing and foundation systems for 70,000-square-foot food production, warehouse and distribution facility. His responsibilities included coordination with owner/user and other engineering disciplines throughout design, performing and overseeing of production structural design calculations and documents and construction administration services such as review of structural product submittals and periodic site visits.

**West Haven Commuter Rail Station Engineering Design, West Haven, Connecticut.** *Connecticut Department of Transportation.* Mr. Airgood was the senior structural engineer responsible for the structural framing and foundation design of a two story passenger train station building. The station building featured a two story, glass curtain wall enclosed passenger waiting area with exposed to view curved roof structure. The design also included a 75 foot span, glass curtain wall enclosed pedestrian bridge spanning over the four rail line track bed to connect the station building with a new two story stair and elevator tower. His responsibilities included coordination with engineering and architectural disciplines during design, performing and overseeing of production structural design calculations and documents, and review of fabrication shop drawings and other construction administration services as related to the building structural systems.

**Years with Michael Baker: 8**

**Years with Other Firms: 23**

#### Degrees

B.S.C.E., 1984, Structural Engineering, Geneva College

#### Licenses/Certifications

Professional Engineer –

Pennsylvania, 1999, [REDACTED]

Maryland, 2013, [REDACTED]

North Carolina, 2014, [REDACTED]

**Penn Hills Operations Center Addition, Penn Hills, Pennsylvania.** *Duquesne Light Company.* Mr. Airgood was the senior structural engineer of record responsible for the development, design, and detailing of a load bearing masonry wall and steel framing addition to an existing facility.

**Design-Build Tactical Equipment Maintenance Facilities, 31st ADA Brigade, Fort Sill, Oklahoma.** *U.S. Army Corps of Engineers, Tulsa District.* Mr. Airgood was the senior structural engineer responsible for the design of the foundation systems to support an 18,000-square-foot, 35,200-square-foot, and 57,031-square-foot pre-engineered steel Tactical Equipment Maintenance Facilities (TEMF), and a 20,000-square-foot Supply Support Activity facility supply support activity warehouse (SSA). Because of existing expansive soil conditions, the ground floors of each building were designed as reinforced concrete floor systems with a void space between the expansive soil and floors. The concrete floor system and PEMB structural columns were supported by a deep foundation system of drilled concrete piers extending to rock. His responsibilities included review of structural fabrication drawings, attending design coordination meetings and periodic site visits during construction.

**Buildings 200 & 250 of Imperial Business Park, Imperial, Pennsylvania.** Mr. Airgood was the lead structural engineer responsible for the development and design of the structure and foundation systems for two, 250,000-square-foot warehouse facilities. Responsibilities also included construction administration services such as review of structural product submittals and periodic site visits. Each building consisted of steel joist and joist girder roof framing supported by interior steel columns and exterior precast concrete bearing and shear walls. Foundations were soil supported, isolated and continuous, reinforced spread footings.

**ABB Manufacturing and Office Facility, Mt. Pleasant, Pennsylvania.** Mr. Airgood was the lead structural engineer of a high-bay manufacturing, testing and warehouse facility for electric transformer equipment, including an attached two-story office area. The structural systems consisted of precast concrete wall panels enclosing a steel framed interior column and roof structure, including the support of numerous under-hung crane systems throughout the facility ranging from 5- to 20-ton capacities. The lateral framing system was a combination of steel braced and moment frames, and foundations were soil supported isolated and continuous, reinforced spread footings.

**Fuel Cell Facility, Pittsburgh, Pennsylvania.** *Siemens Westinghouse.* Mr. Airgood was the lead structural engineer of a high-bay manufacturing facility, warehouse and two-story attached office area. The structural systems consisted of precast concrete wall panels enclosing a steel framed interior column and roof structure. The lateral framing system was a combination of steel braced and moment frames, and the structural design included support of various top running bridge crane systems ranging from 10- to 40-ton capacities. The foundations were soil supported isolated and continuous, reinforced spread footings.



**Michael Baker**

**INTERNATIONAL**

**APPENDIX 2 – Project Profiles**

## **Joint Base McGuire-Dix- Lakehurst (MDL) - Dormitory Building Renovation**

*Philadelphia, Pennsylvania*

Michael Baker is providing architectural and engineering for this project, which involves renovating existing floor plans on all floors to provide private sleeping rooms with private baths and closet. Michael Baker is providing all ATRP requirements for progressive collapse and blast resistant windows.

### ***Client***

U.S. Army Corps of Engineers,  
Philadelphia District  
Wanamaker Building, 100 Penn  
Square East  
Philadelphia, Pennsylvania 19107

### ***Completion Date***

Estimated Late 2018

### ***Project Costs***

\$574,511 (Fee)



## **Building 355 Renovation Design**

### **Joint Base McGuire-Dix-Lakehurst, Lakehurst, New Jersey**

Michael Baker provided construction documents for all work necessary to selectively demolish and renovate the first floor, perform exterior renovations, and construct a new elevator core/tower of the south side lean-to of Building 355 in the NAVAIR Test Area along Taxiway Four.

The building was built as a hangar in 1957 and was converted to Test Department operation and labs. The three floors of the lean-to were carved up in to a warren of small dysfunctional spaces. This project included exterior renovations, first floor renovations, and a new elevator/stair/egress tower to comply with Americans with Disabilities Act (ADA) Standards for Accessible Design and Department of Defense regulations. It also included new restroom facilities and replacement of finishes, floors, walls, electrical, plumbing, fire protection, windows, and telephone and computer networking systems. The first floor included a coffee bar area/kitchenette sized for the occupants of all three floors.

Michael Baker developed construction documents for the demolition of all first floor interior spaces and all vertical exiting elements to accommodate a new "collaborative" type open office space on the first floor, and pre-planned elements to facilitate renovations on the upper floors in an upcoming project. Michael Baker provided designs for all systems to be removed and replaced and for construction of a new hydraulic and pit-less elevator core with emergency egress.

Michael Baker designed interior office spaces; structural systems, including live loads and wind loads; heating, ventilation, and air conditioning (HVAC) systems; and electrical systems. Michael Baker's designs also included energy efficient LED lighting throughout all spaces, exit and emergency lighting, fire alarm systems, telephone systems, and local area network (LAN) systems.

Michael Baker developed construction documents in compliance with all applicable state and federal regulations and Air Force instructions regarding environmental and occupational safety and health to address areas of known asbestos-containing floor tile on the first floor in accordance with all regulations. Michael Baker also coordinated required permits regarding air quality, land use, waters and water supply, and fuel storage.

#### **Value-Added**

Based upon the client's budget limitations, Michael Baker designed a three-story addition with alterations to the full exterior plus a complete renovation of the existing first floor office space. With budgeting for the 2nd and 3rd floors available in the near future, Michael Baker designed utility runs and finalized exit pathways for the future renovations of the upper floors. This was accomplished within the project budget and will save both construction time and dollars during the next and final phase of the project.

#### **Client**

U.S. Army Corps of Engineers,  
Philadelphia District  
Wanamaker Building, 100 Penn  
Square East  
Philadelphia, Pennsylvania 19107

#### **Completion Date**

2015

#### **Project Costs**

\$170,152 (Fee)

#### **Michael Baker's Role**

- Construction documents
- Structural engineering
- Demolition design
- Office space design
- HVAC design
- Electrical design
- Lighting design
- Fire alarm system design
- Telephone and computer systems design
- Environmental health and safety compliance permitting

**Michael Baker**

**INTERNATIONAL**

*We Make a Difference*



# Sector Delaware Bay Replacement of Windows and Doors

*Philadelphia, Pennsylvania*

Michael Baker provided architectural and engineering services for replacement of windows and exterior doors in multiple buildings at Sector Delaware Bay.

The project included demolition of the skylight in the Administration Building (formerly the Marine Safety Office Building); construction of structural roof components and internal components, including insulation, finishes, electrical, and lighting in the area of skylight removal; replacement of the windows in the west wing of the Administration Building; and replacement of the doors and windows at the Maintenance Building.

The purpose is to eliminate the problematic skylight, which experiences routine water intrusion due to rain/snow fall, especially under storm conditions, and to increase the resilience of the building envelope by removing the skylight and replacing the windows in the west wing. The windows and doors at the Maintenance Building are also in need of replacement to protect the interior from the external elements.

Michael Baker generated design plans, specifications, cost estimates, and other documentation necessary for the client to solicit and advertise for the contract to complete the work items. Michael Baker performed a thorough site investigation for the project to identify and document existing construction, conditions, and deficiencies and prepared a Site Survey Report.

Michael Baker used a collaborative, integrated, LEED®-based planning and design approach that established performance goals associated with high performance, sustainable buildings. Performance goals aimed to optimize building energy efficiency, enhance indoor environmental quality, and minimize environmental impact by using appropriate materials. Each design was analyzed to demonstrate it would be cost effective throughout its anticipated life-cycle.

Michael Baker prepared calculations, developed cost and construction estimates, prepared project specifications and drawings, performed a site survey, and developed a site survey report. Michael Baker developed design submittals that included site plans; demolition plans; building and structural plans; elevations, cross sections, and design estimates; and descriptions of construction materials.

Additionally, Michael Baker provided solicitation phase and construction phase support by answering design-related questions and reviewing construction submittals.

## **Client**

U.S. Coast Guard  
427 Commercial Street  
Boston, Massachusetts 02109

**Additional References**  
U.S. Coast Guard, CEU Cleveland  
1240 East Ninth Street  
Room 2179  
Cleveland, Ohio 44199-2060

## **Completion Date**

2015

## **Project Costs**

\$82,468 (Fee)

## **Michael Baker's Role**

- Construction documents
- Designs, specifications, and estimates
- Site investigation and survey
- LEED®-based design approach
- Pre- and post-award assistance

# Design-Build Renovation of Dormitory Building 2424

## *Edwards Air Force Base, California*

Michael Baker was the designer of record for the design-build renovation of the 25,933-gross-square-foot, three-story Dormitory Building 2424. Michael Baker's services included project and design management; architecture; civil, structural, mechanical, electrical, and plumbing engineering; structural interior design; life safety, fire alarm and suppression, and telecommunications design; landscape architecture; and construction administration and observation.

### **Project Overview**

Dormitory Building 2424, constructed in the 1950s, consists of cast-in-place concrete columns bearing the concrete slabs of three levels: the second and third floors and a roof slab. The purpose of the project was to renovate the dormitory to comply with the U.S. Air Force Unaccompanied Housing Design Guide. The dormitory was reconfigured to change the building from a 58-room to a 61-room facility and provide seismic, sprinkler, and life-safety system upgrades, and was modified to meet current antiterrorism and force protections standards.

The project involved renovation of the housing wings with some modifications to the central core. The design converted the 58 individual-style units to three- and four-person modules with individual full baths and closets.

The core areas of the renovated facility include a first-floor hall and mail room, storage areas, offices, electrical and mechanical rooms, a communications room, lockers, and a vending area. The second-floor core area includes a hall, TV room, dining area, communications room, mechanical room, lockers, and a storage area. The third-floor core includes a lounge, game room, communications room, lockers, and a storage area.

The project also involved replacement of all building systems, including the fire suppression system; plumbing; heating, ventilation, and air conditioning systems; electrical systems; and communication systems. The exterior design is compatible with the installation's design standards, providing a contemporary aesthetic and thermally efficient envelope.

### **Project and Design Management**

Michael Baker's project and design management services included facilitation of two-day kick-off meeting and design charrette at the base, participation in biweekly progress meetings with the contractor, and participation in design review meetings.

### **Client**

U.S. Army Corps of Engineers, Los Angeles District  
CESLCT-P  
P.O. Box 2711  
Los Angeles, California 90053-2325

### **Completion Date**

2017

### **Project Costs**

\$600,956 (Fee)

### **Michael Baker's Role**

- Project management
- Design management
- Preliminary and final design
- Architecture
- Civil engineering
- Structural engineering
- Mechanical, electrical, and plumbing design
- Structural interior design
- Life safety and fire protection design
- Telecommunications design
- Landscape architecture
- Construction administration
- Construction observation

Michael Baker developed and maintained a SharePoint website for document control, and developed and implemented a design quality control plan for the project.

### **Preliminary and Final Design**

Following the design charrette, Michael Baker performed a pre-design visit to the project site and researched available building construction records and compared them with visible building systems to develop baseline record drawings for the design. Michael Baker prepared design documents at the 65 percent interim, 100 percent pre-final, and corrected 100 percent design phases. Michael Baker prepared Unified Facilities Guide design specifications in SpecsIntact format, and participated in three design review meetings.

The structural design maintained the standing-seam metal roofing that was installed during a renovation in 1992. The new exterior wall finish consists of a 3-inch-thick exterior insulation and finish system over 8-inch concrete masonry block that provides a minimum of R-15 thermal insulation. The project team installed a weather barrier to prevent air and moisture infiltration. Thermally broken, fixed, blast-resistant aluminum windows using glazing filled with argon gas also provide insulation and a measure of antiterrorism and force protection. Other antiterrorism and force protection measures include exterior metal blast-resistant doors.

Interior finishes are low-maintenance and easily cleaned. Colors are comfortable and provide an aesthetically pleasing environment. Interior colors and finishes are coordinated to create a cohesive design and give a residential feel to the facility.

Within the apartments, the bathrooms have ceramic tile flooring with coordinating ceramic tile base. Kitchens and living rooms feature sheet vinyl tile flooring and rubber baseboard. The sleeping rooms and closet floors also have carpet tile with coordinating base. Cabinets and built-in casework in kitchens are medium density fiberboard with a plastic-laminate finish with solid surface counters and backsplashes.

Other flooring includes resilient tile floor and loose entry mat in the vestibule and interior common area corridors. Ceramic tile with coordinating ceramic tile base is in the public restrooms. The lounges and game room have carpet tile floor with coordinating rubber base. The mechanical rooms, electrical rooms, communication rooms have the existing floor finishes from a renovation in the 1990s, and lockers have resilient tile flooring with coordinating rubber baseboards.

The purpose of the electrical design was to support the mechanical system requirements of chillers, exhaust fans, air compressors, roll-up doors, and hot water heaters. The electrical design package included all the electrical construction requirements needed to complete the exterior site work and the interior design for the facility. This consisted of the primary medium voltage connection details and the associated underground duct bank; primary pad-mounted transformer for the facility, parking lot lighting, and primary duct banks; the manhole connection details for the communication systems lighting fixture layout and lighting fixture schedule creation; receptacle layout, panel, and switchboard installation details with panel schedule loading; electrical circuiting to mechanical equipment, primary, and secondary grounding design, power, and communication system one-line diagrams; and communication rack placement and equipment layout.

The renovations included all new light fixtures and lighting controls; replacement of emergency egress lighting; and removal of all abandoned electrical equipment, devices, conduit, and wiring.

Michael Baker designed an upgraded telecommunications system with all new telephone and data outlets throughout the facility, and new 19-inch racks, patch panels, and termination blocks in the telecommunications

rooms on each floor. New 19-inch voice and data racks with separate telephone and data patch panels are installed in each telecommunications room. All new Category 6 UTP horizontal cabling was installed from each telecommunications outlet to the rack-mounted patch panels. New backbone copper and fiber-optic cabling was installed between racks on each floor.

Michael Baker provided mechanical design to upgrade the heating, ventilation, and air conditioning (HVAC) and plumbing systems to meet current standards. The mechanical and plumbing design included replacement of the exterior boiler; the air-cooled chiller; hot and chilled water piping, pumps, and accessories; all fan-coil units and thermostats; and the two exhaust fans.

Plumbing design consisted of upgrades to the building domestic water supply system, including replacement of the domestic hot water heater, main domestic water line, and domestic hot water storage tank, and modification of distribution systems for the new restroom and kitchen layouts. Michael Baker also designed upgrades to the building sanitary system, including the replacement of the sanitary sewer main outside the building and rework of the sanitary sewer lines and vent lines to accommodate the new restroom layouts. The plumbing design also included the replacement of the natural gas main piping and distribution within the facility.

Michael Baker designed a new automatic fire protection sprinkler system with an aboveground double-check backflow preventer, a fire department connection, and control valves. The fire protection upgrade also included the replacement of the entire fire alarm system and mass notification system, including single-station and photoelectric duct smoke detectors that initiate the shutdown of the associated HVAC units, strobe and speaker devices, and fire extinguishers.

The intent of Michael Baker's landscape design concept was to provide moderate solar exposure and wind protection, control noise, screen objectionable or frame good views, provide antiterrorism and force protection measures, and define the area. Michael Baker designed an automated underground irrigation system using the most recent water efficiency technology, and designed site furnishings that complement adjacent facilities.

### **Construction-Phase Services**

During construction, Michael Baker reviewed all contractor submittals and responded to contractor requests for information, and provided on-site construction observation services. Michael Baker prepared as-built drawings based on the contractor's red-line construction documents.

# WVU Institute of Technology, Classroom Building

*Beckley, West Virginia*

Baker provided general Architectural and Engineering services to the West Virginia University Institute of Technology, Beckley Campus. The client requested a feasibility study, which laid the groundwork for the ambitious renovation of two buildings concurrently. The first was the Classroom building, the facility will house engineering labs, computer classrooms, psychological observation and Rat laboratories as well as some administrative services.

The Classroom Building required extensive coordination between generations of building engineering systems as well as selective demolition of architectural interior systems to allow for update use. The 31,000 SF facility was designed originally as a junior high school on the 1940's and was renovated to house technically advanced mechanical, hydraulic and computer engineering laboratories. To bring the facility to the 21<sup>st</sup> century, a student lounge, student rest and study spaces- where electronics can be utilized and charged- were devised from a former kitchen and corridor locker areas, respectively. A modern mechanical distribution system was designed to support air conditioning while a new, **building-wide fire suppression system**, complete with a larger water supply line, was engineered. The Classroom Building also included the design of a psychological observation laboratory that requires national accreditation and necessitated special design considerations.

The facility also received a completely new EPDM roof to shore up existing water problems. A large energy recovery unit was installed on the roof to provide fresh air to the classrooms throughout the building. The Classroom Building also required technical coordination of the existing door hardware to interface with existing products as appropriate and necessary. These hardware considerations also had to align with campus wide standards. Lastly, both facilities received interior upgrades to emphasize University branding elements and bring renewed life to a defunct campus.

Additionally, all portions- feasibility study to design and cost proposals- of this traditional design, bid, and build project were performed under a compressed and confined time constraint, allowing the client to successfully move one campus to another in one short year.

## **Client**

West Virginia University  
Beckley Campus  
400 Kanawha Street  
Beckley, WV 25801

## **Completion Date**

July 2017  
Currently under Construction

## **Michael Baker's Role**

- Feasibility studies
- Architecture
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Plumbing engineering
- Cost estimates
- Construction Administration



# WVU Institute of Technology, Benedum Building

*Beckley, West Virginia*

Baker provided general Architectural and Engineering services to the West Virginia University Institute of Technology, Beckley Campus. The client requested a feasibility study, which laid the groundwork for the fast pace renovation of the building prior to the start of the new school year in August 2017. The facility will house administrative services, student services, student government, a recreational area and upward bound.

The work completed at the 21,000 SF Benedum Center included interior finishes selection to support large numbers of student use. Other notable portions of the work included upgrades to the mechanical and fire alarm and fire suppression systems as well as retrofitted ADA toilet facilities. A conglomerate of three separate buildings, special attention was spent on exiting requirements and coordination of door hardware systems.

The facility also received a completely new EPDM roof and specialized basement wall treatments to shore up existing water penetration problems. The Benedum Center also required technical upgrades including new data lines and server. The project also requires lots of coordination of the existing door hardware to interface with existing products as appropriate and necessary. These hardware considerations also had to align with campus wide standards. Lastly, both facilities received interior upgrades to emphasize University branding elements and bring renewed life to a defunct campus.

Additionally, all portions- feasibility study to design and cost proposals- of this traditional design, bid, and build project were performed under a compressed and confined time constraint, allowing the client to successfully move one campus to another in one short year.

## **Client**

West Virginia University  
Beckley Campus  
400 Kanawha Street  
Beckley, WV 25801

## **Completion Date**

July, 2017  
Currently under Construction

## **Michael Baker's Role**

- Feasibility studies
- Architecture
- Mechanical engineering
- Fire Protection Engineering
- Electrical engineering
- Plumbing engineering
- Cost estimates
- Construction Administration





# Design & Construction Oversight of Three PEMB T-Hangars

*Morgantown Municipal Airport (MGW),  
Morgantown, West Virginia*

Michael Baker provided design and engineering services for three pre-engineered metal building (PEMB) t-hangars west of the West Virginia Army National Guard Readiness Center known as the East Side Development and east of Runway 18-36. The construction was completed using the Civil/Military Partnership - Innovative Readiness Training Program (IRT).

Phase 1 of the project encompassed development of infrastructure, including site grading, drainage, bituminous taxilanes, pavement markings, vehicle parking, and fencing for the three t-hangars. Phase 2 encompassed the t-hangars on the east side of the airfield and included site civil, structural, architectural, interior, mechanical, plumbing, fire protection, and electrical utilities design. Michael Baker also provided material bidding/procurement services, and construction administration/management services.

## Phase 1

Michael Baker surveyed the project site to locate existing drainage structures, determine structure inverts, pipe sizes, orientation, and pertinent utility structures; performed a geotechnical investigation to determine subgrade soil properties for pavement design and building foundations; and developed an engineer's report to serve as the basis of design. Michael Baker also prepared and submitted FAA Form 7460-1 to address the permanent and temporary impacts to the airspace as a result of the project.

Additionally, Michael Baker developed a grading plan with best management practices (BMP), provided a bituminous pavement design with a 20-year structural design-life, developed preliminary airfield lighting and wiring layouts for the existing Taxiway D, and designed electrical and communication utility infrastructure necessary for future hangars. Michael Baker then prepared construction plans and specifications for all required materials for completion of the development.

## Phase 2

Michael Baker produced drawings and specifications for the construction of the three PEMB t-hangars and the associated site work. Site/civil design included sewer, sanitary holding tank, trench drains, medium voltage duct bank, concrete access aprons, sidewalks, grading, and drainage. Structural design included spread footing foundation for each t-hangar. Architectural design included floor plans and elevations, restroom, and fire barrier

## Client

Morgantown Municipal Airport  
100 Hart Field Road  
Morgantown, West Virginia 26505

## Completion Date

2017

## Project Costs

\$145,352 (Fee)

## Michael Baker's Role

- Survey and mapping
- Stormwater management
- Geotech investigation
- Permitting
- Engineer's report
- Pavement design
- Site grading design
- Drainage design
- Environmental assessment
- Architecture
- Structural Engineering
- Mechanical Engineering
- Electrical Engineering
- Construction Documents, Estimating and Bidding phase services
- Construction management

walls. Mechanical and plumbing design included heating, ventilation, plumbing, water heating, and drain-waste-vent piping for restrooms. Fire protection design included a two-hour rated fire barrier, life safety report and drawings, and a code review. Electrical design included power feed, power distribution, lighting system, controls, and grounding; site lighting photometric calculations, layout, and controls; and exit emergency egress lighting.

**Bidding and Construction Management Services**

During the bidding phase, Michael Baker distributed bid documents to material suppliers, prepared material lists, evaluated bids for completeness and accuracy, provided a recommendation for award, assisted with preparation of grant application documents, and prepared and coordinated contract documents.

Construction phase services consisted of construction administration, construction management, and construction observation. Michael Baker provided an on-site inspector to observe construction progress and activities were completed in accordance with the plans and specifications. Administrative services consisted of project coordination, meeting attendance, submittal and shop drawing review, and project closeout.

# Architectural and Engineering Indefinite Delivery, Indefinite Quantity Contract for Design of Army Reserve and Military Projects

## *Nationwide*

Michael Baker is providing planning, design, and construction-phase services for U.S. Army Reserve facilities and other military projects throughout the United States. Michael Baker provides third-party verification that the buildings are designed and built using strategies aimed at reducing the environmental impact of the project. The projects are designed to achieve LEED® Silver certification, with an emphasis on energy and water efficiency. In addition, many of the projects feature preferred parking for fuel-efficient vehicles and bicycle storage and changing rooms. To preserve green space, many of the buildings maximize open space and are built on environmentally preferable sites.

Brief descriptions of representative task orders follow.

**Combined Regional Maintenance Facility, Phases I and II, Fort Dix, New Jersey.** Michael Baker provided design services for a combined regional maintenance facility. The 50,400-square-foot facility is an integrated, consolidated, regional combined vehicle maintenance shop and mobilization and training equipment site that provides for the storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Army National Guard, Army, Marine, and Navy Reserve units. Phase II consisted of final design using building information modeling software, and completes the project through the construction phase.

**New Warehouse and Special Purpose Brigade Operations Buildings, Fort Jackson, Columbia, South Carolina.** Michael Baker prepared design-build request for proposal documents for an operations building for the Army Recruiting Command. The 9,840-square-foot facility provided office and storage space and a professional, comfortable work atmosphere to allow the recruiting command to meet its mission of attracting new soldiers. The project consisted of the renovation of a three-story building for office space and the construction of a new 3,250-square-foot warehouse. Antiterrorism and force protection measures included progressive collapse analysis, setback

### *Client*

U.S. Army Corps of Engineers,  
Louisville District  
Room 972  
600 Dr. Martin Luther King, Jr.  
Place  
P.O. Box 59  
Louisville, Kentucky 40202

### *Completion Date*

2014

### *Project Costs*

\$17,979,605 (Fee)

### *Michael Baker's Role*

- Design charrettes
- Design-Build RFP documents
- Demolition design
- Asbestos and lead paint investigations
- Environmental engineering
- Site-civil engineering
- Geotechnical engineering
- Landscape architecture
- Antiterrorism and force protection
- Planning
- Architecture
- Interior space planning
- Structural engineering
- Mechanical engineering
- Plumbing design
- Fire protection engineering
- Electrical engineering
- Sustainable design
- MCACES cost estimating

requirements, and blast-proof window installation.

**Stewart Newburgh Armed Forces Reserve Center, Newburgh, New York.** Michael Baker developed design-build request for proposal documents for an integrated, consolidated, regional 84,000-square-foot training facility, a 16,200-square-foot vehicle maintenance shop, and a 2,350-square-foot unheated storage building. The center accommodates training and mobilization and provides for the storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Army National Guard and Army Reserve units.

**Revitalization of Diamond U.S. Army Reserve Center, New Orleans, Louisiana.** Michael Baker developed design-build request for proposal documents for the revitalization of a facility that was severely damaged by Hurricane Katrina. The project included the demolition of the 37,000-square-foot Fleming Reserve Center, which was destroyed by the hurricane. The new facility, which was remodeled to suit the needs of the newly formed and consolidated Army Reserve units, is an integrated, consolidated, regional, 54,300-square-foot training building, a 6,600-square-foot vehicle maintenance shop, a 12,600-square-foot warehouse, and a 5,000-square-foot unheated storage building for training and mobilization and for storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Army Reserve units.

**Armed Forces Reserve Center, Rutland, Vermont.** Michael Baker developed design-build request for proposal documents for a new 600-member Armed Forces Reserve Center meeting Silver LEED® standards. The project included a 97,634-square-foot training building, a 14,600-square-foot multiuse classroom, a 7,302-square-foot organized maintenance shop, and a 3,113-square-foot unheated storage building. The center accommodates training and mobilization and provides for the storage, inspection, maintenance, and repair of combat and tactical vehicles and equipment associated with the regional deployment of Vermont Army National Guard and Army Reserve units. Michael Baker conducted a design charrette; performed a topographical survey and geotechnical investigation; conducted a utility survey; developed conceptual site plans, floor plans, and building elevations; developed specifications; prepared DD Form 1354 for transfer of real property; and provided a construction cost estimate using PACES software.

**Armed Forces Reserve Center, Bristol, Pennsylvania.** Michael Baker developed design-build request for proposal documents for a new 600-member Armed Forces Reserve Center with an organized maintenance shop and an unheated storage building that realigns Army Reserve and Marine Reserve units as directed by the 2005 Base Realignment and Closure (BRAC) Act. The facility will provide administrative, educational, assembly, library, learning center, vault, weapons simulator, and physical fitness areas for eight Army Reserve units and three Marine units, and will provide adequate parking for military and privately owned vehicles. The project includes a 94,500-square-foot training building, an 8,900-square-foot maintenance shop, and a 2,900-square-foot unheated storage building. The buildings will be permanent construction with reinforced concrete foundations and concrete floor slabs, and will include mechanical, electrical, and information systems, including SIPRNET rooms, as required. The project includes site preparation, paving, fencing, and extension of utilities. The facility is designed to meet Silver LEED® standards and to comply with Americans with Disabilities Act requirements.

**Armed Forces Reserve Center, Scranton, Pennsylvania.** Michael Baker developed design-build request for proposal documents for a new 650-member Armed Forces Reserve Center with an organized maintenance shop and an unheated storage building that realigns Army Reserve and National Guard units, as directed by BRAC. The facility provides administrative, educational, assembly, library, learning center, vault, weapons simulator, and physical fitness areas for eight Army Reserve units and four Pennsylvania Army National Guard units,

and adequate parking for military and privately owned vehicles. The project includes a 166,000-square-foot training building, a 7,300-square-foot multiuse classroom, a 6,400-square-foot organized maintenance shop, and a 1,700-square-foot unheated storage building. The buildings are permanent construction with reinforced concrete foundations and concrete floor slabs, and include mechanical, electrical, and information systems, including SIPRNET rooms, interior finishes, window systems, roof decks with standing seam metal roofs, and exterior finishes. The project includes site preparation, paving, fencing, and extension of utilities.

**Operational Readiness Training Complex, Fort Drum, New York.** Michael Baker provided architectural and engineering services in the preparation of designs for design-build request for proposal documents for an operational readiness training complex. The complex is intended to support recurring Reserve and Guard unit annual training and premobilization training support at active component installations for battalion sets. Optimized for use by functional brigades, with modularized subordinate elements, the complex design will also facilitate training support of battalion-sized units augmenting a larger brigade task force. The entire complex sits on 225 acres and comprises 48 buildings, totaling more than 1.2 million square feet, including brigade headquarters; battalion headquarters; officer's quarters; dining facility; barracks; privately owned vehicle parking; company operations facility; motor pool; general purpose, physical training and formation fields; and troops, organization, and equipment parking. The sustainability rating for the complex is LEED® Silver Certification.

**Child Development Center Complex Design-Build Documents, Fort Drum, New York.** Michael Baker provided architectural and engineering services to assist with the preparation of design-build request for proposal documents for a child development center complex. The 24,050-square-foot complex for 232 children aged six weeks to five years accommodates infants, pretoddlers, toddlers, and preschool-age children, and includes age-specific outdoor play areas, activity rooms for each age group, restrooms, a reception and entrance area, administrative area, staff lounge and work room, storage, kitchen, janitor closet, and laundry room. The sustainability rating for the complex is LEED® Silver.

**Child Development Center and Central Issue Facility, Fort Drum, New York.** Michael Baker provided design charrettes, programming data, and architectural and engineering services to assist in the preparation of DD Form 1391 programming documents for a central issue facility and a child development center. The general-purpose, installation-level central issue facility of approximately 100,000 square feet is planned to serve as garrison support of base operations. A child development center for children under six years of age is also planned for construction to provide the required care for 100 children.

**Master Plan Update, Detroit Arsenal, Michigan.** Michael Baker is updating select components of the real property master plan for Detroit Arsenal, in compliance with the revised AR210-20. Master plan components to be updated are limited to the long-range component and the short-range component and, as necessary, the real property master plan digest.

**BRAC Area Development Plan, Detroit Arsenal, Michigan.** Michael Baker is preparing a Base Realignment and Closure (BRAC) Area Development Plan. The purpose of this project is to identify, analyze, and conceptually layout facilities, site furnishings, and infrastructure necessary to support existing and planned facilities in an area designated to accommodate BRAC activities. The intent of this effort is to provide a realistic guide to facility development and related requirements from which construction phasing may be established and issues identified and mitigated, resulting in a plan that can be executed with minimal disruption to ongoing missions and functions.

# Michael Baker INTERNATIONAL

*We Make a Difference*



Architectural and Engineering Indefinite  
Delivery, Indefinite Quantity Contract for  
Design of Army Reserve and Military Projects

# WVARNG Charleston Armory HVAC & Architectural Renovations

*Charleston, West Virginia*

The existing building/facility started as the Coonskin Armory constructed in 1961. The Headquarters Building was constructed simultaneously with the Coonskin Armory and occupied the second floor. Also in 1961, as a separate structure, the Adjutant General's Wing (TAG Wing) was constructed nearby. Later, in 1984 the Coonskin Armory/Headquarters Building was physically connected to the TAG Wing with an area of administrative offices. This final major construction project connected all the buildings into one major facility of over 50,000 square feet, referred to as the Charleston Armory.

The West Virginia Army National Guard (WVARNG) Construction and Facilities Management Office (C&FMO) requested a study be conducted of the consolidated mechanical and electrical components of the consolidated facility known as the Charleston Armory. Such items were considered as the condition of existing HVAC/MEP systems and design improvements or upgrades to those systems and examination of the existing building envelope and recommend possible improvements to the Envelope, HVAC, Electrical and Plumbing systems.

A loop pipe water source heat pump system determined the most cost effective for this situation, with fewer pipes, smaller space requirements and a lower installation cost. Various HVAC components included a Fluid Cooler, Boilers, Pumps, Wall Consoles, above ceiling HPs, along with some Rooftop Units and Energy Recovery Units.

During the renovation process, mold was discovered growing in certain areas of the building. An investigation was undertaken, building humidity was logged and measures were implemented to install dehumidification in existing equipment in the building, building leaks were sealed and existing mold was remediated.

Baker's design also addressed the repair of the existing roofing system, addition and repairs of roof curbs for HVAC equipment, repositioning of blocking and walk pads around the roof, and installation, repair and patching of the existing EDPM roofing system and maintaining the existing warranty.

## **Client**

West Virginia Army National Guard  
Division of Engineering and  
Facilities  
1703 Coonskin Drive  
Charleston, WV 25311-1085

*Major Michael J. Beckner*  
304-561-6333

## **Contract Completion Date**

2013

## **Baker's Role**

- Architecture
- Mechanical Engineering
- Feasibility studies
- Cost estimates
- Civil engineering
- Electrical Engineering
- Structural engineering
- Environmental Permitting



# Louisville District IDIQ for Various Civil and Military Projects

***Great Lakes and Ohio River Division, Louisville, Kentucky***

Michael Baker provided a wide variety of planning and design services under a four-year indefinite delivery contract. Michael Baker's services included conducting design charrettes; master planning; capital investment strategy; programming; antiterrorism and force protection; civil, geotechnical, structural, mechanical, and electrical engineering; erosion and sedimentation control; stormwater management; hydraulics and hydrology; utilities engineering; GIS; survey and mapping; landscape architecture; architecture; interior design; life safety and Americans with Disabilities Act compliance; equipment specification; plumbing design; fire protection engineering; environmental engineering; permitting; scheduling; sustainable design; traffic engineering; and cost estimating.

Descriptions of representative projects follow.

## **High School Design; Fort Knox, Kentucky**

Built in 1958, Fort Knox High School contained undersized and inadequate classrooms. The facility also was not equipped to handle the changing educational demands of a modern school. Michael Baker provided renovation design for the school and plans for a new building and gymnasium, totaling 90,682 square feet. The new school was designed to accommodate DoDEA students in grades nine through 12. It features a foreign language center and a laboratory area. Michael Baker developed plans and specifications, quantity and cost estimates using M-CACES software, a proposed construction schedule, design analysis and calculations, and a design documentation report for the project.

## **Installation Design Guide; Fort Campbell, Kentucky**

Using Army installation design standards as a framework, Michael Baker prepared an installation design guide (IDG) for site planning; buildings; vehicular and pedestrian circulation; landscaping; site elements, such as signage and utilities; force protection; and sustainable design.

The IDG provided standards and guidelines to installation decision makers, planning and design professionals, installation maintenance personnel, and others. The IDG set interior and exterior standards and planning criteria to be integrated into all proposals, design and construction contracts, renovation, maintenance, or repair projects. It

## **Client**

U.S. Army Corps of Engineers,  
Louisville District  
Room 972  
600 Dr. Martin Luther King, Jr.  
Place  
P.O. Box 59  
Louisville, Kentucky 40202

## **Completion Date**

Estimated: 2009

## **Project Costs**

\$3,360,541 (Fee)

## **Michael Baker's Role**

- Master planning
- Capital investment strategy
- Programming
- Site/Civil Engineering
- Geotechnical Engineering
- Stormwater Management
- Hydraulics and Hydrology
- GIS
- Survey and Mapping
- Landscape Architecture
- Architecture
- Interior Design
- Structural Engineering
- Mechanical Engineering
- Plumbing Design
- Fire Protection Eng.
- Electrical Engineering
- Environmental Eng.
- Permitting
- Traffic Engineering



promoted a sense of arrival, functional compatibility, and visual order; enhanced site assets; related the natural and man-made environment; and achieved consistent architectural themes throughout the installation.

#### **Fort Campbell Vehicle Maintenance Capital Investment Strategy, Fort Campbell, Kentucky**

This project entailed the creation of a vehicle maintenance capital investment strategy (CIS) for the installation. The CIS defined future capital investment strategies for Fort Campbell vehicle maintenance shops, Facility Category Group 21410, by identifying the best way to meet the installation's real property requirements.

The CIS defined the preferred methods for satisfying facility requirements through an analysis of alternatives. The CIS described a general plan for satisfying installation real property and environmental stewardship requirements based on the tabulation of existing and required facilities, the Army stationing and installation plan, analyses of the condition and mission suitability of facilities and supporting infrastructure, and environmental aspects of mission performance.

The CIS summarized the installation's overall strategic plan for investing in real property and established an implementation schedule to sequence the installation's actions to transition from the existing situation to the alternative selected. The investment strategies were linked to the Army's programming and budgeting goals, and forces command's and the installation management agency's planning guidance.

#### **Real Property Master Plan Update; Rock Island Arsenal, Illinois**

Michael Baker updated the real property master plan and brought it into compliance with the revised AR210-20, Real Property Master Planning for Army Installations. Work included preparation of a master plan digest, a synopsis of the real property planning, and development recommendations.

located on an island in the Mississippi River between Illinois and Iowa. It is home to approximately 60 tenant organizations that provide critical products and services to all of the armed services.

The real property master plan was developed in response to Department of the Army or major command missions, operations and planning requirements. The planning process identified real property improvements and upgraded that best enhancements of the long-term capabilities of RIA.

#### **U.S. Army Reserve Center Training Center, Organizational Maintenance Shop and Area Maintenance Support Activity, and Unheated Storage; Greenville, South Carolina**

Michael Baker designed a new 88,500-square-foot multistory training center, organizational maintenance shop and area maintenance support activity, and unheated storage structure to accommodate 600 reservists. The design incorporated sustainable design principles to achieve the Army's SPiRiT Gold Level sustainable design rating. The new structures consist of structural steel frames, masonry veneer exterior walls, and standing-seam metal roofs. Supporting activities included site preparation, stormwater prevention plan, paving, fencing, security lighting, site signage, wash racks, storm drainage, and extension of utilities. Force protection measures were incorporated by using the maximum feasible standoff distances from roads, parking areas, and vehicle unloading areas. Environmental services were provided to sample, test, and mitigate hazardous materials.

#### **DSCC Special Purpose Battalion Operations Facility; Defense Supply Center, Columbus, Ohio**

To comply with the U.S. Army Recruiting Command policy and the Army initiative to reduce the private sector recruiting lease program, the Columbus Battalion relocated from its leased space with the GSA. The new special

purpose battalion operations facility provides adequate special purpose operations center space for the U.S. Army Columbus Recruiting Battalion personnel at Defense Supply Center (DSCC), Columbus. The special-purpose space supports six companies and 44 recruiting stations located in Ohio and Northern Kentucky.

The \$3,400,000, 11,400-square-foot Battalion Operations facility is equipped with fire protection and alarm systems and includes: a battalion operations center, computer training classroom, local area network room, information systems staging area, information systems storage room, mailroom, file room, conference room, legal library, graphics art room, lunch and break room, and humidity-controlled general purpose storage warehouse. Michael Baker provided comprehensive interior design services and handicapped accessibility features. A Gold SPiRiT-certified rating was required for this project.

Michael Baker designed a paved hardstand area for table of organization and equipment vehicles. Supporting amenities include electric service; sanitary sewer; storm sewer; paving, walks, curbs and gutters; information systems; and site improvements. Michael Baker performed topographic surveys, geotechnical investigations, utility investigations, and environmental investigations. Gas-fired heating and air conditioning is provided by self-contained systems. Commissioning services for the HVAC system were included. Antiterrorism and force protection measures include the use of laminated glass, security fencing, and lighting. Michael Baker performed an analysis to confirm that the structure had lateral wind and seismic stability.

Michael Baker conducted an on-site charrette with all project stakeholders to determine space requirements, working adjacencies, and building layout. The charrette resulted in quick consensus of the stakeholders, allowing the project schedule to be compressed. Michael Baker prepared 10 percent project definition documents in English units of measurement. Included in the 10 percent submittal were preliminary site design, single-line floor plans and building elevations, utilities information, and a cost estimate. Michael Baker prepared DD Form 1354, Transfer of Real Property, which itemizes the types, quantities, and costs of various equipment and systems that comprise the project for the purpose of transferring the new construction project from the USACE Construction Division to the installation's inventory of real property.

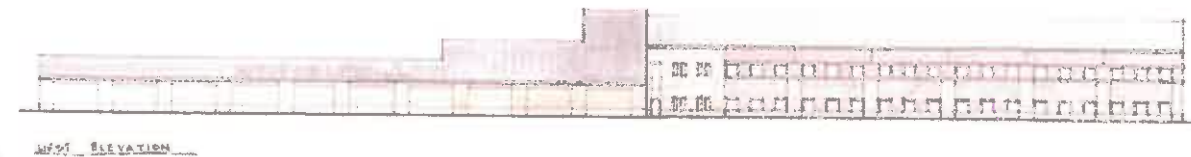
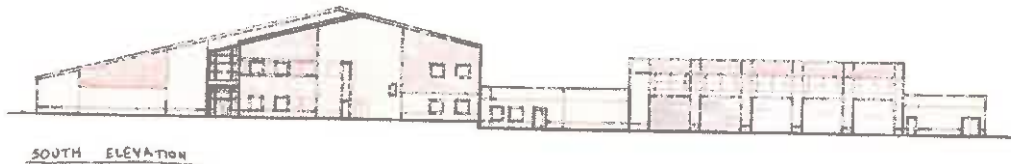
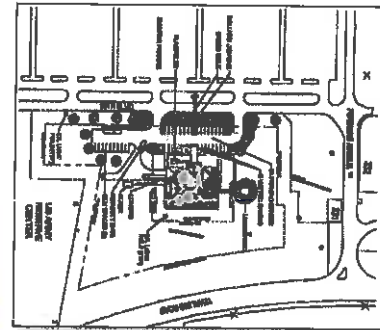
### **Project Features**

Building designs comply with Department of Defense Uniform Facilities Criteria and the Design Guide for U.S. Army Reserve Facilities, UFC 4-171-05, dated November 2003

- o UFC 1-200-1 Design: General Building Requirements (provides guidance for the use of model building codes for design and construction of DoD facilities)
- o Public Law 104-113, National Technology Transfer and Advancement Act of 1995 requires Federal use of private sector consensus standards wherever practicable. The goal of the law is to reduce reliance on Federal standards by using industry standards when there is potential to simplify contracting, increase timeliness and cost effectiveness, and promote the safety and welfare of users.
- o The Louisville District Design Guide (LDDG) - An important guidance document for doing business with the Louisville District and contains technical information, detailed requirements, and quality expectations supplemental
- o Federal, state, and industry standards

Software that was used on project:

- o SPECSINTACT
- o PACES (parametric cost estimate) using M-CACES Cost Estimating Software
- o CADD Software: MicroStation
- Gold SPiRiT Certification
- Design Charrettes
- Preparation of DD Form 1354, Transfer of Real Property
- Part of the name brand program "Army of One" within the USAREC
- DrChecks Review Process
- Anti-terrorism and Force Protection Design in accordance with UFC 4-010-01





**Michael Baker**

**I N T E R N A T I O N A L**

**APENDIX 3 - Subconsultants**



CRAWFORD has been providing high quality full service construction cost estimating services to the National Guard Bureau for the last 20 years, ranging from pre-construction through occupancy. We maintain a highly-skilled team of construction professionals with certifications including Project Management Professionals, Planning and Scheduling Professionals, Construction Quality Managers, Certified Construction Managers, Certified Professional Estimators, Certified Cost Professionals, Certified Value Specialists, Associate Value Specialists, and LEED Accredited Professionals with expertise on projects of all types and magnitude. CRAWFORD has completed projects that range in size from under \$10,000 to over \$8.5 billion. Our project capabilities range from new construction, renovation, retrofit, infrastructure, to civil works projects and our experience stretches from local, regional, national, to international. We help simplify the procurement process for contracting officers and project managers because we specialize in construction management, cost estimating / cost engineering, value engineering, quality assurance / quality control, inspection, staff support and scheduling. CRAWFORD, as a **woman-owned small business**, assists agencies in meeting small business utilization goals. Our mission is to provide unparalleled construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness. Our award-winning firm has received the following accolades:

- Society of American Military Engineers (SAME) 2016 Robert B. Flowers Small Business Award
- 2015 Business Women's First Award
- BTAP Program - Selected by Naval Facilities Engineering Command HQ as one of six Women-Owned Businesses in the United States to participate in the DoD Business Technical Assistance Pilot Program
- 2008 Mayor's Annual Good Neighbor Award
- 2006 Historic Preservation Award from the Pittsburgh Historic Review Commission (Phipps Conservatory)
- 2005 Small Business Woman of the Year Award
- 2004 Minority Business Opportunity Council Woman Business of the Year
- Fifty Best Women in Business Award in 1999 for the Commonwealth of Pennsylvania – Department of Commercial and Economic Development

**CRAWFORD has provided Cost Estimating Services for the National Guard Bureau (including Army & Air National Guard) and various state Guard agencies since 1997 on more than 140 projects totaling more than \$400 million in construction value.**

For 20 years, CRAWFORD has provided cost engineering/cost estimating and scheduling services under the IDIQ contracting environment, which includes but is not limited to detailed cost estimates/schedule analyses, quantity takeoff, reviewing change orders, obtaining vendor quotes, conducting market surveys to determine costs for labor, equipment, and materials. We have in-depth knowledge of MCACES-MII, PACES, Windows Estimator (WinEst), USACE's PC Cost Computer Estimating, USACE's Historical Analysis Generating Software, USACE Parametric Cost Estimating Software (PACES), and ROCKTEK (cost estimating for earthwork). We have completed more than 700 MCACES-MII projects and 70+ PACES projects for over 30 USACE Districts since 1998.

**Mission Statement:** To provide unparalleled full construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness.

#### Why CRAWFORD...

- ✓ 33 Full-Time discipline specific in-house cost professionals
- ✓ 20 years' experience providing IGEs for the USACE
- ✓ Experience on Federal Government, Public, Private, and Commercial construction projects



All cost estimates are built using the most current version of **MCACES Second Generation (MII)** software for all USACE projects and all CRAWFORD personnel are experts in this software. All CRAWFORD estimates are consistent with the best estimating practices of the construction industry, FAR 36.203, and are current, accurate, and complete. **They reflect the expected cost to the Government to perform the work by contract and include all reasonable costs which a prudent, experienced, and well-equipped contractor might anticipate and include in their bid.**

CRAWFORD currently has the capacity in all key cost estimating disciplines with **nine cost engineering key personnel who are certified through AACE and ASPE** who lead our architectural, structural, civil, mechanical, and electrical estimating groups respectively along with an additional **24 full-time cost engineering specialists** who support these lead estimators. Our estimating group is divided into five (5) subgroups as indicated above and **all personnel work in the same building** out of our headquarters office in Pittsburgh, PA. **The personnel named in this proposal are committed and will be the leaders of our team.**

Being in tune with different construction climates as well as being able to forecast the future is important to accuracy in budgeting projects, escalation factors, and determining availability of labor and materials in a given area. CRAWFORD has performed Market Analyses in order to ensure that a project's procurement methods are feasible in terms of scope, budget, as well as contracting strategy.

Our in-house research team is experienced at interviewing construction industry decision makers: project managers, estimators, large & small contractors, sub-contractors, distributors, wholesalers and equipment suppliers. Our methods do not rely solely on published indices and forecasts, however, we perform detailed market surveys for the specific geographic area that the project is planned to be built. This is a good resource for owners to refer to as a gauge for their project. The analysis can help determine factors that affect the overall budget, schedule, and contracting strategies for an owner. Due to the instability in the global, national, and local construction economy CRAWFORD provides analysis, discussions, material indices, and cost tables to provide real-time information on labor shortages, material costs, fuel, etc. Please see below for a few examples of our construction cost estimates against awarded projects for the US Army Corps of Engineers and other Federal Agencies in the AOR and surrounding areas:

Please see below for a few examples of our construction cost estimates against awarded projects for the National Guard Bureau:

Agency	Project	Our Estimate	Bid / Award	Delta	Year
National Guard Bureau	KC-46A Consolidated Building Renovations - Seymour Johnson AFB, NC	\$8,823,396	\$9,635,420	-8.43%	2016
National Guard Bureau	Field Maintenance Shop Design, Rochester, NH	\$7,540,000	\$7,195,000	4.79%	2015
Air National Guard	Repair Flight Simulator, Building 304, Coroapolis, PA	\$3,316,527	\$3,329,527	-0.39%	2015
Army National Guard	Multi-Use Training Facility, NASJRB, Fort Worth, TX	\$1,674,435	\$1,696,500	-1.30%	2012
Army National Guard	Civil Engineering Addition, NASJRB, Fort Worth, TX	\$1,481,304	\$1,479,000	0.16%	2012
Air National Guard	Repair / Replacement of Bridges at Michie Stadium, United States Army Garrison, West Point, NY	\$1,662,380	\$1,582,000	5.08%	2012

**Mission Statement:** To provide unparalleled full construction consulting services for our clients, ensuring a high standard of quality, timeliness, and responsiveness.

# Company Profile

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## **TERRACON CONSULTANTS, INC.**

The Terracon is a 100 percent employee-owned consulting engineering firm providing quality services to clients. Since 1965, Terracon has evolved into a successful multidiscipline firm specializing in:

- Environmental
- Facilities
- Geotechnical
- Materials

Over its history, Terracon has achieved significant expansion through both internal growth and acquisitions. Terracon currently has more than 4,000 employees in more than 140 offices and 50 states nationwide. Additionally, we partner with our U.S. clients to serve their international needs.

The firm's success is further evidenced by a current ranking of 24 in *Engineering News-Record's* 2018 listing of the Top 500 Design Firms, as compared to a ranking of 51 a decade ago. Terracon's growth is due to dedicated employees who are responsive to clients, provide quality services, and take advantage of opportunities in the marketplace.

**ENR Rankings | 2018**



Terracon provides services on thousands of projects each year. Our culture, systems, and structure enable us to excel at both small and large projects. By combining our national resources with specific local area expertise, we consistently overcome obstacles and deliver the results our clients expect.

Terracon serves a diverse portfolio of private and public clients. By being responsive, resourceful, and reliable, we strive to exceed our clients' expectations for service, solutions, quality, and speed of delivery. Based on a deep understanding of our clients' needs, Terracon's commitment is centered around these key objectives.

## **Geotechnical**

Design and construction reliable foundations and infrastructure require a thorough understanding of soil, rock, and groundwater conditions. Through Terracon's nationwide network of geotechnical professionals, access to historical subsurface exploration data from thousands of locations across the country, and GIS-enabled geology mapping, we can accurately anticipate ground conditions and develop the right work plan to explore a site. Our innovative technologies and collaborative approach allow us to provide practical design recommendations. Terracon's Geotechnical services include:

- Report of Expected Geotechnical Conditions (REGC)
- Subsurface Exploration (Soil Borings, In-Situ Testing, Geophysical)
- Laboratory Testing
- Geotechnical Design
- Collaborative Reporting / Decision Making
- Geotechnical Instrumentation
- Construction Monitoring and Support

## **Materials**

Proper selection, quality, workmanship, and performance of construction materials plays a vital role in ensuring that today's buildings and infrastructure perform adequately over long time periods. We work with clients to minimize material replacements, reduce the likelihood of deterioration, avoid potential failures, and investigate and evaluate construction materials related problems and failures when they do occur.

- Construction Quality Assurance / Quality Control
- Construction / Special Inspection
- Materials Engineering
- Field and Laboratory Testing and Analysis
- Construction Observation and Monitoring
- Pavement Consulting and Engineering
- Structural Steel and Nondestructive Testing

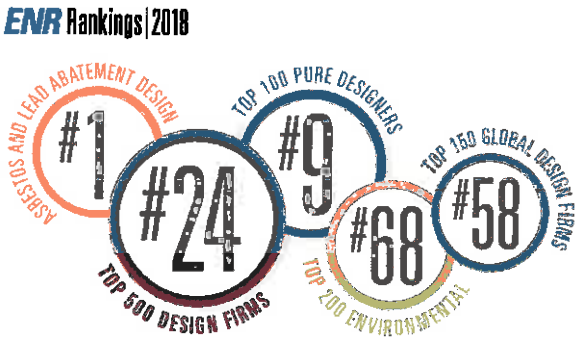
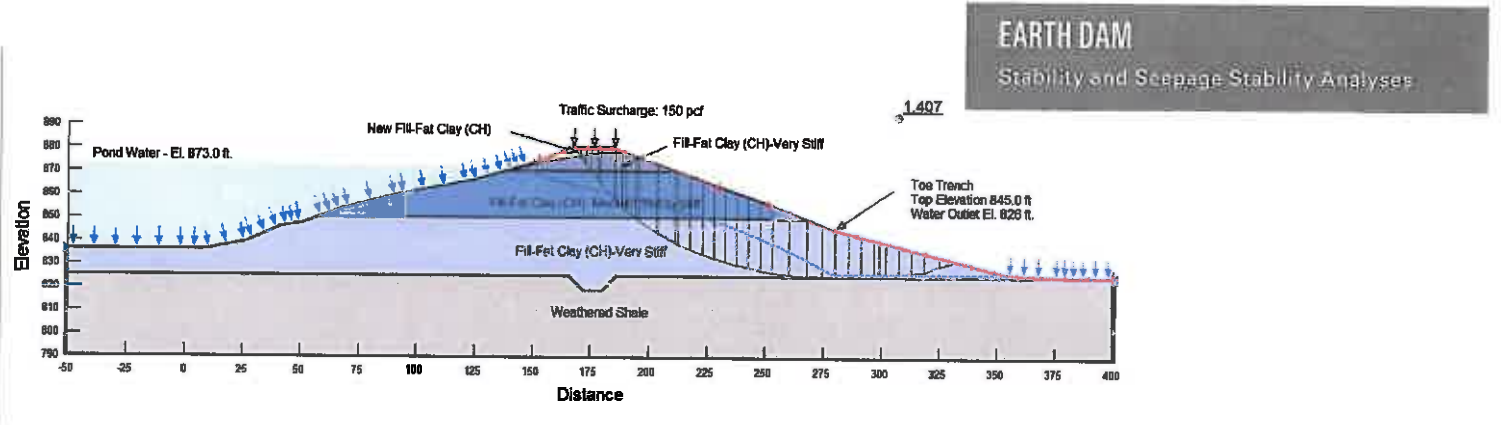
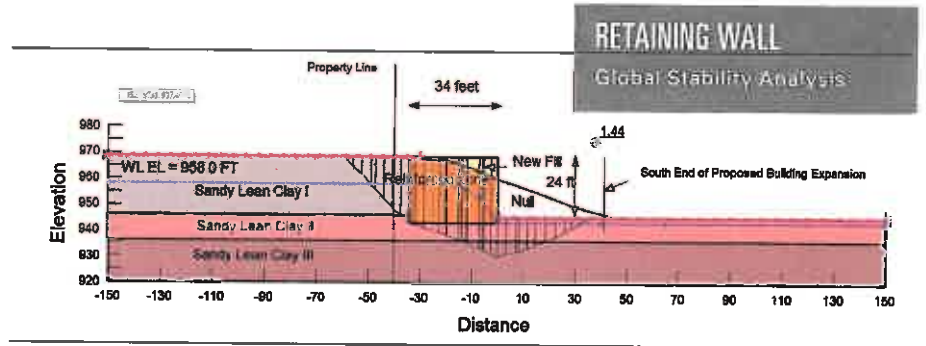


# WHY TERRACON?

**Resourceful.** We strive to find efficient solutions to project-related issues. Geodesign saves clients time and money by providing an extensive network of capabilities.

**Responsive.** With more than 140 offices nationwide, we can meet your needs no matter where the project is located and connect you with the most experienced geodesign engineers.

**Reliable.** Our extensive geodesign abilities reflect more than 50 successful years of professional experience.



# CONTACTS

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