

# FIRM PROFILE

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Founded in 2004, Engineering Solutions is a Virginia-based structural engineering firm specializing in structural design, analysis, and repair, in addition to industrial and restoration services. Our team is licensed in 14 states plus Washington, D.C. and has more than 70 years of combined experience. With a diverse client base, projects vary among commercial, residential, institutional, industrial, and more. We focus on providing practical yet creative solutions in addition to effective collaboration and open communication with owners, architects, and other consultants.

## MEET THE TEAM

Since its inception, Engineering Solutions has experienced substantial growth. Originally located in Harrisonburg, we opened a second office in Charlottesville in 2014. A third location in Richmond was established in 2016 to better serve the growing base of clientele in that area. Our highly trained team includes professionally licensed engineers who specialize in structural and industrial engineering.

### **BRIAN KOERNER** FOUNDER, DIRECTOR OF BUSINESS DEVELOPMENT

Brian Koerner is a licensed professional engineer who co-founded Engineering Solutions in 2004. He has over 21 years of engineering experience and is licensed in more than seven states. Notable projects include the City of Harrisonburg – City Hall Renovation, JMU Salt Shed, and Blue Ridge Area Food Bank. He earned his Master of Science in Structural Engineering from University of Wyoming. Brian is based in Harrisonburg.



### **TROY RUDOLPH** PARTNER, DIRECTOR OF STRUCTURAL ENGINEERING

Troy Rudolph is a licensed professional engineer who joined Engineering Solutions in 2011. He became partner in 2016. Notable projects include the Blue Ridge Area Food Bank, Mary Washington Feature Stair, Brookefield Holiday Light Display, and Pilgrim's Pride pipe bridge. Troy earned his Bachelor of Science in Civil Engineering from Tennessee Technological University with a concentration in Structural Engineering. He is based in Harrisonburg.



### **TOM A. MCLAUGHLIN** DIRECTOR OF STRUCTURAL ENGINEERING

Tom McLaughlin is a licensed professional engineer who joined Engineering Solutions in 2015. With more than 22 years of experience, he has worked on a variety of projects, including Quirk Hotel and Art Gallery – Richmond, National Gallery of Art – D.C., and Dulles National Airport. Tom earned his BSCET in Structural Design from Old Dominion University. He is based in Charlottesville and Richmond.



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# RESIDENTIAL

If you want to build it, we find a way to make it happen. Our extensive experience in residential design spans a wide variety of sizes and scopes. From single additions and renovations to multimillion-dollar full design, each of our specially trained and innovative engineers will ensure your project is a success.

## FULL DESIGN

- Roof and floor framing design
- Lateral shear wall design, braced wall plans
- Foundation designs

## SMALL PROJECTS

- Bearing wall removal
- Foundation inspections
- Retaining walls
- Additions/renovations
- Historic residences' renovations

## CASE STUDY – C&O ROW

C&O Row is a housing development of three-level homes with a basement garage and a kitchen at the rooftop level. The site where the homes are located on Water Street in Charlottesville was used as a dumping ground for the coal tower still standing there today. This leaves the soil unsuitable to build on without excessive settlement. Engineering Solutions designed a structural system where the home would be supported with below-grade helical piers. These piers act as stilts for the house, while the concrete garage slab and foundation walls span between the piers and concrete “grade” beams. We were also asked to design the segmental retaining wall behind these houses.



# COMMERCIAL

Every commercial building comes with its own distinct needs, building codes, and creative challenges. Our past project experience includes luxury hotels, office spaces, breweries, and more.

## FULL DESIGN

- New construction
- Renovations

## SMALL PROJECTS

- Openings in masonry walls
- Occupancy use change (from residential to office, etc.)
- Capacity reviews of roofs for new equipment
- Mezzanines, equipment platforms
- Bearing wall removal

## CASE STUDY – TIMBERWOOD COMMONS

This project involved a commercial building that utilizes light wood frame construction instead of the typical steel and concrete construction type. Using wood framing and trusses allowed the project to be constructed at a lower material cost but presented a design challenge to carry the lateral loads of the building through concentrated masonry shear walls. It required coordination with the architect and developer to provide a relatively inexpensive structure that will still be structurally sound. Timberwood Commons is used as professional and medical office space in Charlottesville, VA.





# INDUSTRIAL

Engineering Solutions is a one-stop shop for industrial clients. We understand that time is money, and we often provide same-day service even if clients are located in other states. We determine load capacity for existing catwalks, mezzanine, and roof structures, as well as for trolleys. We identify fall protection tie off locations. We also offer stickers that can be installed to indicate a permanent rating on existing structures.

From plant expansion to platform design and OSHA safety compliance, our team has in-depth knowledge of distinct industry needs and regulations. We combine our expertise with yours to ensure each structure is safe and efficient.

## FULL DESIGN

- Outdoor structures
- Seismic upgrade
- New masonry structures
- Retaining tanks
- New metal building facilities

## SMALL/MEDIUM PROJECTS

- Catwalk framing
- Masonry wall openings
- Retaining walls
- Dunnage framing
- Fall protection
- Load capacity review from roof top units (RTU)

## CASE STUDY – VPGC

The Virginia Poultry Growers Cooperative has undergone a major plant expansion over the past three years. We have assisted on several projects, including the Flow Equalization Basin (FEB) and Office Building. The FEB is a 120-foot diameter reinforced concrete retaining tank that holds non-potable water. The tank walls are 20 feet high, 14 inches thick and heavily reinforced. The office building abuts the concrete tank and has part of the building supported by the tank walls. The building utilized concrete masonry unit (CMU) walls, concrete, and bar joist construction.



# INSTITUTIONAL

Each of our structural engineers understands that no two institutions are the same. Our goal is to protect the integrity of an institution's mission while providing a creative and secure design to meet its needs. We pride ourselves on respecting and adhering to institutional building regulations and delivering satisfying results. In the past, we have worked extensively with educational facilities, such as UVA and James Madison University; healthcare facilities, such as UVA Hospital; government facilities, such as City Hall in Harrisonburg; and correctional facilities, such as the Virginia Department of Corrections.

## FULL DESIGN

- Outdoor structures
- New masonry structures
- Additions to existing bridges

## SMALL/MEDIUM PROJECTS

- Catwalk framing
- Masonry wall openings
- Dunnage framing
- Structural investigations

## CASE STUDY – CITY HALL

The existing municipal building served as the city of Harrisonburg's main offices since 1967. While it will remain a beautiful historic government building, the new services from the Community Development and Municipal Buildings have moved to the new, and more modern, City Hall. Working with a team of local professionals, Engineering Solutions provided the structural engineering services for this large three-story addition to the existing building.

The new City Hall was an exciting project to work on because it combined almost all construction materials. Design materials included limestone veneer (commonly called bluestone), concrete, masonry, precast concrete planks, structural steel, cold formed steel, and wood roof trusses. The connector between the new building and the old was created with a glass atrium to highlight the historical building and offset the new building. The project team included Mather Architects, MEI, Blackwell Engineering, and Nielsen Builders.



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# RESTORATION

We provide emergency response to projects after flooding, fire or impact damage. When you need immediate action, we drop everything to get the job done. We also work on a variety of restoration projects, from historical sites more than 200 years old to mountainside retaining walls.

## FORENSIC - COMMERCIAL & RESIDENTIAL

- **Fire Damage:** We check the extent of the fire damage throughout the structure to see if any of the structural members have maintained their structural integrity or have diminished capacity. Fire damage inspections may include shoring the structural members to provide a safe area for personnel to enter/exit the property, or analysis to determine what members can be salvaged after the fire.
- **Foundation Evaluation**
- **Impact Damage:** We can inspect to see what can be salvaged after abrupt impact occurs, such as a car driving into a building or pole. We evaluate what needs temporary shoring for safety.
- **Seismic Retrofit:** Earlier code cycles didn't necessarily design for seismic stability. In older buildings, large shear cracks may occur as a result of an earthquake. We inspect the crack to determine if it is earthquake damage or settlement of the structure.

### CASE STUDY – APARTMENT BUILDING FIRE IN D.C.

This four-story apartment building suffered a fire on the top floor that completely burned the roof system. The roof system eventually fell onto the third floor. We had to determine which sections of the masonry walls needed to be replaced. We were contracted to evaluate the building, ensure it was safe, and design a new roof structure so the building was safe from the elements. We had to determine which sections of the masonry walls in the pictures had to be replaced and which ones needed to be repaired or were good as is.



## HISTORIC RESTORATION

We maintain the footprint of the building and the historic character while updating it to the current code cycle.

## RETAINING AND FOUNDATION WALLS

Cracks due to settlement may occur. We can provide retrofit design to reinforce the wall in place through helical piers, carbon fiber reinforcement, and epoxy injection.

### CASE STUDY – MARY CARR GREER HOUSE

This historic house was built in the 1880s and is currently occupied. We did a full home structural evaluation where we provided recommendations to strengthen or fix existing members while keeping the architectural charm of the house and improving its structural integrity.



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