



Engineering ● Surveying ● Consulting

Trusted
Expertise

Statement of Qualifications



Levee Accreditation Engineering Services

BFA, Inc.
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Washington, MO 63090

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www.bfaeng.com

Prepared for

City of New Haven

101 Front Street
New Haven, MO 63068

March 6, 2014

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Business Information



BFA, Inc. is a consulting engineering firm located in Washington, MO. The firm specializes in municipal planning, engineering, and surveying. Formerly known as Buescher Frankenberg Associates, BFA is an S-Corp business registered in the state of Missouri and has been in business since 1968. We are licensed professional engineers in the State of Missouri and 29 other states; and are licensed professional land surveyors in the State of Missouri along with 8 other states. Currently, BFA's staff consists of 25 associates which include Professional Engineers (PE), Professional Land Surveyors (PLS), Certified Professionals in Erosion and Sediment Control (CPESC), Certified Erosion Sediment and Storm Water Inspectors (CESSWI), Certified Floodplain Managers (CFM), Engineers In Training (EIT), and Land Surveyors In Training (LSIT).

BFA has over 40 years of experience designing and providing engineering and surveying services for streets, water, sewer, stormwater and flood management projects.

BFA, Inc.	103 Elm Street Washington, MO 63090
800.455.4751	www.bfaeng.com

We feel that the strength of our organization is built on service to the client and consistent monitoring. BFA's focus is on client response, realistic design, and value engineering. We are confident in our services and look forward to the opportunity to earn your respect and trust in Planning, Engineering, Surveying, and all services BFA has to offer.

President – Raymond H Frankenberg, II (PE, PLS, CFM, CPESC, CESSWI)

Surveying	Engineering
Principal – Mark Frankenberg (PLS)	Manager – Rick Rohlfing (PE, PLS, CPESC, CESSWI)
Manager – Jason Pellin (PLS)	Designer – John Nilges (PE, CPESC, CFM)
Surveyor – Mike Meyer (PLS)	Designer – Kent Vedder
Field Technician – Raymond H Frankenberg, III	Designer - Shane Michel
Coordinator – Wes Theissen (EIT, CFM, CPESC)	

AutoCAD/Drafting	
Manager – James Quilacio (LSIT)	Sr. Drafting Technician – Ward Hanneken
Engineer In Training – Robert Hausman (EIT)	Engineer In Training – Tiffaney Meyer (EIT)
Drafting Technician - Kristi Meyer	Drafting Technician – John Mades
Drafting Technician – George Schmidt	



BFA is registered in the following states: **Arizona**, **Arkansas**, Colorado, Connecticut, Georgia, **Illinois**, Indiana, Iowa, **Kansas**, **Kentucky**, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, **Missouri**, Nebraska, **New Mexico**,

ico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, **South Dakota**, Tennessee, Texas, Virginia, **West Virginia**, Wisconsin and Wyoming.

Legal Authorization:

Raymond H. Frankenberg II,
President
rfrankenberg@bfaeng.com
PE, PLS, CPESC, CESSWI, CFM
Mobile: 636.346.4752

Point of Contact:

Wes Theissen,
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CPESC, CFM, EIT
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**** States in Blue reflect licensing in both Engineering and Surveying ****

Experience & Technical Competence

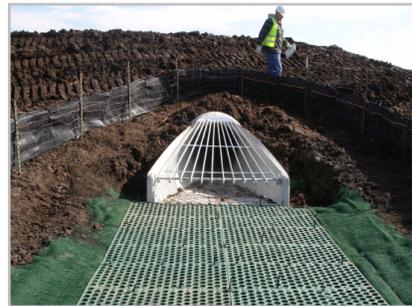


SITE SPECIFIC STORMWATER DESIGN

Stormwater issues continue to grow in complexity and urgency as stormwater pollution and Phase II requirements become more important. **BFA has been involved in the planning and preparing of hydrologic/hydraulic studies for stormwater projects and systems for decades.** We use a computerized modeling approach to take the guess work out of system design and give our clients the most value for their stormwater dollar. The BFA stormwater team listens first, investigates, creates a vision of the successful system with our client, and then takes action on the stormwater challenge.

Experience and Services include:

- Hydrologic/Hydraulic Studies for site-specific, local, and regional stormwater projects
- Planning & Design of Stormwater and Detention systems for public and private projects (conception to completion)
- System Analysis & Plan Review
- MS4 Stormwater Management & Phase II Compliance
- Floodplain Management
- Stream relocations
- Municipal stormwater conveyance/detention systems



REGIONAL STORMWATER MANAGEMENT

The Professionals at BFA have a thorough understanding of Stormwater Management. From designing a parking lot or road without areas of ponding water, to creating stormwater runoff studies to meet local, state, and federal jurisdictional permit requirements, we can put together the plan and information to keep your project moving. Our Stormwater Technicians and Engineers are familiar with many types of software and fluid calculations to generate the reports and information needed to properly design your site.



The photo to the left is of an extended detention and trail system and is an example of thinking “outside the box” and creating a solution for all stakeholders. The large pond (lower right) collects stormwater from the development and then slowly releases it to the three downstream detention and ponding areas via a surface skimmer. This allows this drainage system to create a stream-like atmosphere for two-three months without rainfall in the area and provides habitat for wildlife and scenic views for walkers using the trails. This design also met the mitigation requirement for impacting over 2500 linear feet of unnamed tributaries, saving our client time and money.

Experience & Technical Competence



PERMIT ACQUISITION

At BFA, we typically obtain necessary permits from federal, state and local authorities for projects including, Federal EPA, State DNR/DEQ and local City zoning and construction permits. The projects have ranged in cost from \$50,000 to \$10 million in site work costs.



Experience
Does
Matter

Typically obtained permits include:

- **Land Disturbance Permits** from state authorities and occasionally from the Federal EPA
- **US Army Corp of Engineers 404 permits** for construction within streams ranging from small creeks to parks and river accesses along the Missouri River
- **Section 401 Water Quality** Certification and Permitting
- **DOT permitting** for access and upgrades to public streets and highway facilities
- **DNR permits** for water and sewer extensions and expansions in any of the states where we are registered

GRANT WRITING

BFA has the experience and expertise to provide you with information and services necessary to complete a successful grant project.

- Environmental Review
- Grant Application Preparation
- Grant Consulting
- Project Engineering

Extensive experience working for a wide variety of grant agencies.

- CDBG (Community Development Block Grant)
- East West Gateway Council of Governments
- Meramec Regional Planning Commission
- Missouri Department of Economic Development
- Missouri Department of Natural Resources-soUSDA (United States Department of Agriculture / Rural Development)

BFA can also provide engineering services for the project, once it is funded.

THIS HAS PROVEN INVALUABLE TO OUR CLIENTS.

Because of our engineering expertise we have a better understanding of the overall scope and costs of the project. Once the grant has been awarded we can quickly move forward on the engineering design portion at a cost savings to the client since we are already familiar with the project.

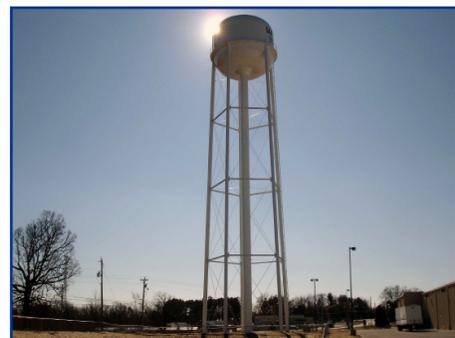
Because of our thorough and practical approach to each grant application we boast a high success rate in obtaining grant funding for our clients.

**MUNICIPAL
ENGINEERING**

Municipalities often deal with multi-faceted perspectives and viewpoints from numerous stakeholders. At BFA, we understand the working relationship the client must have with its government, businesses and citizens and we work diligently to nurture a strong relationship between BFA and all involved parties. This relationship enables us to provide proactive, responsive and cost-effective services.

Below is a sampling of the services we offer:

- Permit Approval Assistance
- Corp Of Engineers
- Department Of Natural Resources
- FEMA
- Redevelopment Planning, Zoning And Annexing
- Infrastructure and Utility Planning
- Design Of City/Riverfront Parks And Trails
- Industrial Parks
- Construction Management and Site Inspections
- GIS and Mapping
- Review of Development Plans
- Traffic Analysis and Design



Water and Wastewater

Providing abundant, safe Drinking Water is an essential element for any design project in which people live and work. It is equally essential to sustaining the livelihood of a community as it is to sustaining life. BFA understands this and offers our clients many services to assist in providing water where it is needed:

Facilities Planning & Engineering	Distribution Plans
Water Tower Projects	Hydraulic Modeling

Wastewater services are also very important to the sustainability of a community. Whether you need assistance in meeting EPA or DNR requirements or developing new systems, BFA offers many services to assist you in supplying the basic needs to your community:

Master Planning & Engineering	Gravity Lines	Combined Sewer Overflow Analysis
Grinder Pumps & Lift Stations	Lagoons	Sanitary Sewer Overflow Analysis

Capacity & Capability



CIVIL DESIGN

BFA has performed engineering design services for residential subdivisions, levee's, city parks and trails, small municipal airports, riverfront accesses (roads, boat ramps, parking and restrooms) and commercial shopping centers. We have been City Engineers and City Surveyors for several mid-Missouri communities; working with them to improve their infrastructures and plan for future needs, develop industrial parks, as well as designing parks and recreation areas.



The company has a diversified portfolio of clients and projects that we have had the opportunity to actively take part in, including:

- Retail/Commercial Centers
- Restaurants
- Residential Developments/Land Planning
- Site Investigation Analysis
- Due Diligence Coordination
- Conceptual Site Design/Land Use Planning
- Representation at Governmental Hearings (i.e. zoning, subdivision, site plan approval)
- Commercial Development Design
- Permitting and Public Approvals
- Municipal and Public Works Design
- Highway Improvements
- Utility Infrastructure Design/Improvements



STORMWATER

Sustainable Design is a growing trend in site development and municipal infrastructure design. Many grant opportunities encourage the incorporation of Sustainable Design Features. BFA's engineers have experience in many elements of sustainable design to make your project a success and protect our planet's environment. Past projects with sustainable elements BFA has designed include:



- Rain Garden Design
- Bio-Retention Design
- Parking Lot Infiltration Islands
- Rainwater Harvesting/Cisterns
- Permeable Pavements
- Infiltrating Detention
- Native Landscaping/Xeriscape
- Recycling Facilities

Floodplain Management

BFA's Engineers and Certified Floodplain Managers (CFM) can assist and guide your community and/or project through wise floodplain management decisions. Flood-prone areas can be used to add great value to communities without risking property or human life. There are also monetary advantages to good floodplain management through the National Flood Insurance Program (NFIP) and Community Rating System (CRS). Let BFA help you save your residents money on their flood insurance while you reduce their risk of being flooded.



SURVEYING

BFA has provided professional surveying services for over 40 years. We have five Professional Land Surveyors and one Land Surveyor-in-Training on staff. We are registered in nine states, including Missouri. We have the capacity and capability to provide Professional Surveying Services as well as the credentials to justify the use of our firm for these professional services.

Municipal Infrastructure Utility Surveying and Mapping

It is advantageous for most municipalities to keep records of the underground utilities that are within their jurisdictional limits for various reasons including:

- ongoing maintenance
- quick response time when repairs are necessary
- isolating possible contamination areas by shutting off valves
- reduce the risk of damage due to new developments as well as redevelopments

BFA assists communities by locating their existing utilities and mapping them for future use. This surveying service includes utility infrastructure records research, investigation, field marking and documentation, surveys, mapping and reporting of the location of all subsurface utility systems the client requests.



ALTA/ACSM Survey
(American Land Title Association/American Congress on Surveying & Mapping) This type of survey is most commonly performed on commercial property and is the most comprehensive type of survey. Combined with a Title Policy, this survey informs the client of easements, restrictions, and/or encumbrances that affect their property and how they affect it. An ALTA/ACSM Survey also indicates property corners, either found or set, existing fences bordering the property and visible improvements or other information, as requested by the client (ie: buildings, houses, roadways, tree lines, drainage ways, creeks or rivers, etc.).

development and is typical for most projects that require construction improvements including grade changes and underground utilities. The information gathered from these types of surveys is also necessary for earthwork calculations and to adequately design storm water drainage and sanitary sewer infrastructure improvements.

Boundary Survey

This is a survey that is normally described by Metes & Bounds and requires research of owners' deeds, adjoining deeds, original government surveys, highway plans, etc. The owner requesting this survey receives a drawing depicting the Boundary of the property they own.

Subdivision Survey

This survey is necessary when an owner of an existing parcel or lot wishes to divide their property into smaller parcels or lots. These types of surveys require recording within the county that the property is located. Subdivision surveys are often more extensive surveys in that they require the owner's signature. As per many cities' requirements, subdivisions would go through the necessary approvals at the City or through the county, if the survey is outside of the city limits. Typically the city and county have their own set of subdivision regulations and requirements that must be met on this type of survey.



Topographic Surveys
This type of survey is prepared to depict the elevations or "lay of the land" by using an elevated reference point (either published or assumed). This type of survey is normally used for design purposes in land

Construction Stake-out Marking

This surveying service is provided to construction contractors to stake the location and/or the elevations of buildings, structures, or other improvements that are required to complete the proposed design improvements. BFA has experience working for municipalities, MODOT, and Contractors to perform construction stakeout services.



Capacity & Capability



GPS Integrated Surveying uses a GPS (Global Positioning System) receiver and a standard total station or robotic total station to collect field data. This allows our field crew to set up a total station on an assumed or unknown point and still have the field data tied into a known coordinate system, such as state plane coordinates. Another advantage to this type of surveying is that we can use the system in GPS mode while in open areas with good satellite reception. Once the operator moves to an area that has overhead obstructions, such as trees or buildings, they can simply switch over to taking shots with the standard or robotic total station. GPS Integrated Surveying gives BFA field crews greater flexibility to adapt to various field conditions and allows us to simultaneously use both types of surveying systems in one setup.

Other BFA surveying services include:

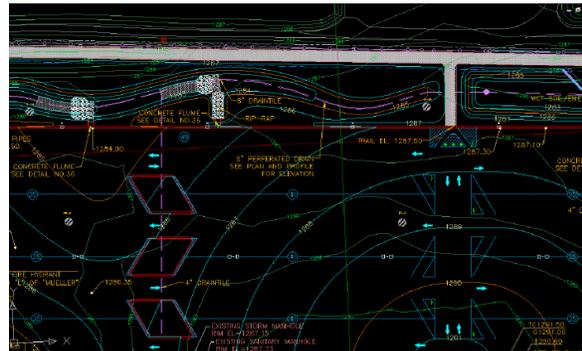
Plat Maps	Farm Surveys	GIS Mapping
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DRAFTING

BFA stays on the cutting edge of technology with our drafting software and computer system updates. Therefore BFA not only obtains the new versions of AutoCAD and Civil 3D – we actually use their design features to reduce drafting hours and save money for our clients! Our CAD Manager is AutoDesk Certified and also beta-tests new versions of their software, prior to release. Our drafting technicians receive regular training so they continue to learn how to implement the newest time saving features of the product updates these powerful programs offer. Due to BFA's commitment to technology and training our clients benefit with cost savings and higher accuracy in their engineered plans.

A brief list of our design technology includes:

- AutoCAD Civil 3D
- Autodesk Impression
- Autodesk Design Review
- Autodesk Raster Design
- Autodesk Map 3D
- Pictometry Online Aerial Imagery
- Transoft AutoTurn



COMMUNICATION AND TECHNOLOGY

BFA invests heavily in communication and collaborative technology. Our clients can remotely communicate easily and effectively with us. We provide the following services to our clients to make their lives easier:



Clients can easily join a meeting by clicking a link from our website and entering a meeting number – they can then view our computer desktop with us, so discussion of engineering plans/surveying details happens without confusion or unnecessary travel costs.



Clients have access to a secure website on our servers to view, upload, or download documents, drawings, and photos – this allows all project stakeholders to have access to the same information at the same time.



Citrix ShareFile enables us and our clients to send, receive and track files and photos that are normally too large to send as email attachments. ShareFile utilizes solid security, allowing BFA to achieve compliance and prevent costly data breaches.

BFA Applicable Experience – FEMA Experience – CFM Experience

- **New Haven**
 - Lagoon Levee – Repair and Certification
 - Boat Ramp – Levee Crossing, No Rise Certificate and Corps Permits
 - Main Levee – No Rise Certificate – Side Walk – As-Built Survey and TOPO
 - Elevation Certificate for Rest Rooms

- **Hermann**
 - Missouri River Park Fill Permit and No Rise Certificate
 - Flood Buyout – Elevation Certificates – Demo Plans – Grant Certificates
 - Frene Creek – Corps Permits – FEMA Certificate
 - CRM – meetings with SEMA, FEMA and Public

- **Washington**
 - Concrete Plant – No Rise Certificate and Fill Permits for Concrete Plant
 - Busch Creek – FEMA – Corps – DNR Permits

- **Levee Engineering**
 - Certification, Consulting, Design
 - Missouri River Levee Districts of Rhineland, Berger, Peers, Pinckney, Darst, Hancock, Charrette, Labadie
 - Mississippi River in Caruthersville, MO
 - Hide-Away-Harbor – Columbia Bottoms
 - St. Charles County Klondike Park Boat Ramp
 - New boat ramp design
 - Construction Management
 - HEC-RAS modeling
 - No-Rise Certifications
 - Corp Permit
 - DNR Permit
 - Cape Girardeau Riverwalk Trail
 - Trail & Pedestrian Bridge Design in Floodway
 - No-Rise Certification
 - Corp Permit

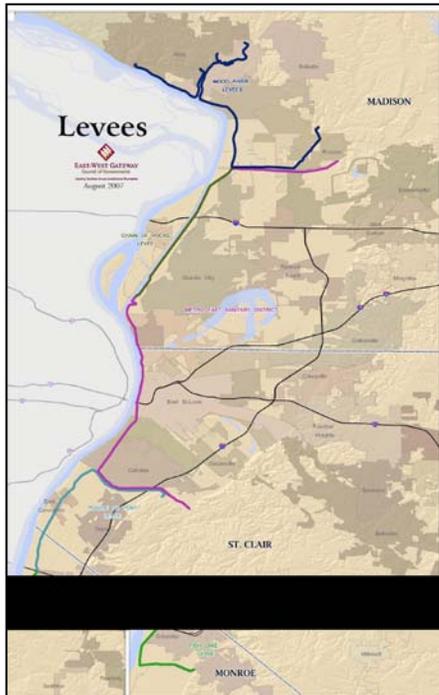
- **Complex Projects**
 - Hermann, MO Riverfront Park
 - 30,000 cubic yards of fill inside of Missouri River floodway.
 - No Rise justification to Corps and FEMA
 - DOT approval to remove bluff and close highway
 - Decorah, IA – Upper Iowa River
 - DNR and Corps permits with FEMA oversight

- Shopping center in floodway and floodplain
- Sensitive stream relocation with endangered habitat
- Lawsuit by local opposition – FEMA and Corps experts
- Ames, IA – Skunk River and Squaw Creek
 - Floodplain and Floodway construction permits
 - Accommodation of flow through commercial parking
 - 100 year flood during construction after grand opening
- Many other projects requiring specialized technical expertise to obtain Federal, State and local permits on sensitive, complex, expensive projects specializing in establishing long term relationships and controlling economics

Sub-Consultant Section – SCI Engineering

■ **Prairie DuPont Levee Improvements**

St. Clair and Monroe Counties, Illinois



SCI is providing geotechnical and laboratory testing services for improvements to the Prairie DuPont Levee. The project includes 158 borings in 10.4 miles of levees protecting over 15 square miles in St. Clair and Monroe counties. Improvements to the levee have been proposed and could include installation of relief wells or seepage berms to mitigate the potential for underseepage. The project area consists of an approximate 540-acre corridor and approximately 100 acres of potential borrow area.

Geotechnical services include the advancement of geotechnical borings and the performance of laboratory tests in order to characterize the subsurface conditions of the levee system. Results will be presented to USACE personnel for underseepage analysis. Laboratory testing included conducting over 3,000 tests in a six-week period and providing QA samples to the USACE. Services also included agency coordination, QA on laboratory staff and procedures, and reviewing test results.

SCI also prepared an Environmental Assessment (EA). A significant portion of the EA was the preparation of a Phase One submitted to the USACE. This Phase One was performed

in general conformance with ASTM 1527-05 standards and included over 350 individual parcels with varying owners. Natural and Cultural Resource services were also provided by SCI for this project.

■ **Wood River and Metro East Levees**

St. Clair and Madison Counties, Illinois

SCI is providing geotechnical services for improvements to the Wood River and Metro East Sanitary District Levees. The project includes approximately 21 miles of levee within the Wood River Drainage and Levee District and 37.5 miles of levee within the Metro East Sanitary District, which together protects over 124 square miles in Madison and St. Clair counties. Improvements to the levees have been proposed and could include installation of relief wells or seepage berms to mitigate the potential for underseepage. SCI's geotechnical services include the advancement of geotechnical borings and the performance of laboratory tests in order to characterize the subsurface conditions of the levee system. Results will be presented to USACE personnel for underseepage analysis.

■ **Chain of Rocks Levee Improvements**

Granite City, Illinois

The Chain of Rocks North Berms Phase 3 project consisted of the placement of approximately 260,000 cubic yards of fine to medium coarse sand river dredge material as fill on the downstream side of the canal (Area 1, Task 1) to add additional pressure/support to the existing levee. SCI's role was to perform field and laboratory testing to determine material classifications and relative density on all fill dredge material placed.



■ **Selma Farm Levee**

Jefferson County, Missouri

This project featured construction of an earthen fill levee to protect the facilities at the Selma Farm resort that were damaged in the 1993 and 1995 floods, and nearly damaged again in the spring of 2002. SCI performed the geotechnical exploration, material testing, slope stability calculations, settlement and pore pressure analysis, and other related geotechnical engineering work during the summer of 2003.

SCI also facilitated the permitting of the project with the Corps of Engineers and other agencies through our Natural Resource Services Group and provided construction observation and testing services for the construction of the levee. Due to material availability, shale overburden from a nearby quarry was used to construct the one-half-mile-long, 25-foot-tall levee.

Cultural Resource services involved a survey of approximately 15 acres for the construction of the levee to protect a set of buildings from the flooding of Selma Hollow Creek, which flows into the Mississippi River. A section of the creek will be rerouted to accommodate building of the levee. Phase Two testing was also completed at a portion of the site by hand excavation to help define the density of artifacts and location of subsurface features.

■ **Consolidated North County Levee District**

St. Charles County, Missouri

The Consolidated North County Levee District is located in the eastern portion of St. Charles County, Missouri approximately 25 miles west of the City of St. Louis, Missouri. The western boundary of the District runs from the eastern boundary of the City of St. Charles to Portage Des Sioux and the northern, western, and southern boundaries of the District are formed by the Mississippi and Missouri Rivers. The District encompasses approximately 30,000 acres and was organized in 1986. SCI provided continuous services on this project for eight consecutive years.

SCI provided the following services associated with the levee improvements from 1986 to 1992. These included:

- Preparation of the maps of the Levee District depicting all property boundaries, based on St Charles County Tax records. The maps were then overlain on topographic maps prepared by U.S. Army Corp of Engineers (COE) and SCI determined three flood categories based on the elevation of the ground and the impact of a flood. Each parcel was then examined and assigned the appropriate percentage of each flood category.
- Preparation of a map of the District with the appropriate classification of each property for taxing purposes
- Survey of the levees to determine the amount of fill required to meet Corp Standards of height and cross section
- Assistance with acquisition of Easements from land owners within the Levee Right-of-Way
- Determination of the borrow areas for the fill required
- Design of wetland mitigation borrow sites
- Re-alignment of Saale Road
- Meeting and coordination with the Federal Emergency Management Agency (FEMA) for approvals

Representative Experience

Levees and Dams



- Assistance with the preparation of permits from the Corp. of Engineers, Burlington Northern Railroad and Missouri Department of Transportation.
- Development of plans and specifications for bidding
- Provision of engineering and testing services during the levee construction

SCI continued to provide services associated with the levee improvements from 1993 to 1995. These included:

- Assistance with condition assessment of the levees after the 1993 flood
- Provision of surveys of levee breaks and alignment and cross-sections of damaged areas
- Design of the improvements to damaged levees and new alignment where appropriate
- Preparation of a reclamation plan for the levee improvements
- Obtaining permits from the COE
- Addressing FEMA concerns
- Provision of specifications for the project repairs
- Review Grading improvement proposals
- Observation and testing services during the levee construction

■ Lakeside 370 Levee

St. Peters, Missouri

Lakeside 370 is a \$350 million, mixed use development that will combine public parkland with commercial, entertainment, and light industrial uses. SCI provided construction testing/observation services for the four-mile levee, which was built to protect the development. The project, which features a 300-acre public park and 140-acre recreation lake, will take an estimated 15 to 20 years to completely build out and will bring about 6,000 - 10,000 permanent jobs, millions of man hours of construction trades jobs and millions of dollars in annual tax revenue to the area.

■ Howard Bend Levee

St. Louis County, Missouri

SCI managed the exploration and design of the Howard Bend Levee replacement following the flood of 1993, including review of plans and specifications and construction inspection of the first phase of approximately eight miles of levee in the Missouri River Valley. Studies included stability, various alternatives for underseepage protection, and several pipe crossings.

■ Innsbrook – Alpine Dam

Innsbrook, Missouri

Alpine dam is located on the southern end of Alpine Lake within the Innsbrook Estates development. The dam, constructed in 1999, is approximately 118 feet in height, and impounds the 236-acre lake. In 2008, the 36-inch diameter outflow pipe broke off in the upper portion of the downstream embankment, creating an approximate 40-foot-wide hole in the embankment. Another 150-foot-long scoured area was created in the lower portion of the downstream embankment.

Representative Experience

Levees and Dams



SCI's services included recommendations for reconstruction of the failed area, review of plans and specifications and compaction testing during the reconstruction of the dam. A stability analysis along the downstream face was performed in order to provide the recommendations for reconstruction.

During excavation of the spillway for the dam, a sinkhole, 6 feet by 10 feet in plan dimension and 28 feet in depth, was encountered along the east side of the spillway. SCI observed the site and recommended that the feature be filled with on-site shot rock and capped with a minimum 2-foot-thick reinforced concrete cap. This option allowed groundwater migration, which was previously occurring, to continue along its current path.

■ **Innsbrook – Konstanz Dam**

Innsbrook, Missouri

SCI observed a shallow slide, roughly 60 feet long by 40 feet wide up and down the face of the slope of the dam. The exact cause of the slide was unknown, however SCI speculated that during the past dry summer, shrinkage cracks formed within the surficial soils along the face of the dam in this area, and that when recent snows slowly melted, the water percolated down to the bottom of the cracks, saturating the surficial soils and providing a slickened surface for these soils to slide over. SCI recommend that the slide be repaired by removing and recompacting the disturbed soils and was on site to observe the repair and test the compaction of the backfill.



Professional Summary

Dr. Dirnberger joined SCI Engineering in 2008 as Chief Engineer. In this capacity, Dr. Dirnberger is primarily responsible for technical issues associated with SCI's geotechnical and transportation departments.

Dr. Dirnberger has more than 34 years of experience in all phases of a wide variety of geotechnical engineering. His most recent experience includes a 29 year tenure working for the U.S. Army Corps of Engineers, St. Louis District. In this capacity, Dr. Dirnberger was responsible for all aspects of soils and foundation engineering for projects of long-term duration and of broad technical scope and major complexity.

Project Experience

- **Lock and Dam 26 and 3** [Alton, IL and Red River, LA] – Construction dewatering analysis for both Lock and Dam locations. Project involved design of deep well systems to estimate total flows and drawdowns for construction estimates and plans and specifications.
- **Pumping Station** [Wood River, IL] – Underseepage analysis and relief well design.
- **Lock and Dams 24, 25, 26, 27** [Lake Carlyle, Lake Shelbyville, and Rend Lake, IL] – Foundation liquefaction evaluation of dam sites, St. Louis District, by obtaining and/or reviewing existing geotechnical site or regional information to determine effects of geology on existing dams, including geomorphology, structure, drainage, soil stratigraphy, and earthquake history.
- **Embankment Dam and Dry Detention Reservoir** [Cape Girardeau and Jackson, MO] – Responsible for the evaluation of through seepage and uplift pressure, settlement analysis, slope stability, pile design, and locating borrow sources. Authored the geotechnical report, plans and specifications, and performed engineering during construction (EDC).
- **Channel Widening** [Cape Girardeau and Jackson, MO] – Performed EDC for channel widening phases of project, including solving foundation construction problems on sensitive soil.
- **DERA Sites** [Various] – Developed Scopes of Work (SOW) for contracted jobs relating to individual Defense Environmental Restoration Account

Education

Ph.D., Civil Engineering, University of Missouri
– Rolla, 1995

M.S., Geological Engineering, University of
Missouri – Rolla, 1979

B.S., Geology, St. Louis University, 1975

Registrations and Certifications

Professional Engineer (Geological), Arizona

Professional Engineer (Civil), Arizona

Professional Engineer, Missouri

Registered Geologist, Missouri

Affiliations

American Society of Civil Engineers

Association of Engineering Geologists

(DERA) sites. Engineer responsible for making initial evaluation of hazardous waste sites and writing scopes of work for investigation stage.

- **Lock 25** [Winfield, MO] – Developed Scope of Work for contracted job relating to engineering during construction for Lock 25 Dewatering.
- **Wappapello Dam** [Wappapello, MO] – Developed Scope of Work for contracted job relating to evaluation of underseepage for Wappapello Dam. Also reviewed contractor submittals for these and various other Scopes of Work and monitored job performance.
- **Wappapello Lake Project** [Wappapello, MO] – Performed detailed earthquake analysis of Wappapello Lake project. Used dynamic shear testing to estimate pore water pressures in the foundation attributed to a given earthquake, for use in a stability analysis. This was combined with earthquake recurrence intervals and stage hydrographs to evaluate the probabilistically the chance of earthquake induced pool release.



- **Fruitvale Ave Railroad Bridge** [San Francisco, CA]
 - Performed detailed earthquake analysis of Fruitvale Ave Railroad Bridge. Obtained and reviewed existing geotechnical and earthquake information at the site of the bridge. Developed site specific earthquake ground motions. Evaluated the site as to the effects of occurrence of earthquakes from different sources, using the Seed/Idriss method.
- **Nutwood Levee Raise and Pump Station** [Nutwood, IL] – Performed pseudo-probabilistic failure analysis for levee and pump station. Designed pile foundation for new pump station, wrote the geotechnical report and plans and specifications.
- **St. Peters Levee** [St. Peters, MO] – Developed new levee design, performed underseepage, settlement, and stability analyses for St. Peters, MO levee. Wrote geotechnical report and plans and specifications.
- **St. Peters Levee Pump Station** [St. Peters, MO] – Developed pile foundation design and analysis for St. Peters levee pump station, wrote plans and specifications.
- **Festus-Crystal City Levee** [Festus-Crystal City, MO]
 - Developed new levee design, performed underseepage, settlement, and stability analyses for the levee. Wrote plans and specifications.
- **Festus-Crystal City Pump Station** [Festus-Crystal City, MO] – Developed pile foundation design and analysis for pump station and closure structure. Wrote plans and specifications.
- **Illinois and Mississippi Rivers** – Participated in emergency flood duty on the Illinois and Mississippi Rivers as a geotechnical consultant, arising from underseepage and through seepage during the following years: 1982, 1986, 1993, 1995.
- **Fifteen Levee Repairs** [Illinois and Mississippi Rivers] – Geotechnical engineer responsible for levee repairs caused by the 1993 flood, for 15 separate levee districts on the Illinois and Mississippi Rivers. Duties included finding and approving borrow sources, repair design, write specifications, monitor construction, perform EDC, and participate in final inspection.

- **HTW Site** [March AFB, CA] – Provided field on-site quality assurance for installation of vadose-zone air extraction wells, groundwater monitoring wells, piezometers, chemical and geological sampling, and radius-of-influence test.
- **Levee Pump Station** [Ste. Genevieve, MO] – Developed pile foundation design and analysis for levee pump station and wrote geotechnical portion of Feature Design Memorandum.

Expert Testimony

- Provided key testimony in an Alternate Dispute Resolution (ADR) involving a Differing Site Condition claim, saving the Government over \$500,000.

Additional Experience

- **Member St. Louis District FUSRAP** [St. Louis, MO]
 - Geotechnical member of the St. Louis District FUSRAP (Formerly Used Sites Remedial Action Plan) team. Responsible for review and evaluation of contractor designs for removal of radioactive wastes at two St. Louis Area sites.
- **Independent Technical Reviewer** [Illinois and California] – Independent Technical Reviewer, Chain of Rocks, IL Levee and Whittier Narrows Dam, CA. Responsible for review of assumptions, methods, and analyses made for design deficiencies, including review of reliability analyses for slope stability and underseepage.
- **FSM Volunteer** [Federated States of Micronesia] – Volunteered for emergency recovery efforts, Federated States of Micronesia (FSM), for recovery of Typhoon Chataan. This involved giving briefings to the Governor of FSM and his cabinet, and the U.S. Ambassador to FSM on landslides. Also gave technical advice to FEMA on landslides. Determined typhoon related damages to affected structures and wrote reports on such for FEMA.
- **Technical Assistance** [New Orleans District] – Provided technical assistance to New Orleans District (MVN) as part of Task Force Guardian, subsequent to Hurricane Katrina.



Professional Summary

As President of SCI Engineering, Inc. Mr. Harms is responsible for marketing strategy, proposal preparation, project management, technical guidance, report review, and administrative functions. He has overall responsibility for the supervision and administration of the engineering, laboratory, field and office staff.

He has been with the firm since 1985 and was previously a senior project manager. In 1989, Mr. Harms opened the Illinois office.

His engineering and project management experience includes multi-story office buildings, roadway construction, industrial construction, medium- to large-scale residential developments, schools and churches. These projects have required slope stability analyses and remediation, site stabilization with surcharge fill, wick drains, liquefaction studies and shallow and deep foundation analyses. Transportation projects have included roadway soil surveys and structure Geotechnical reports for county highway departments and for IDOT projects in Districts 4, 7, 8, and 9.

Project Experience

Project Management

- Chain of Rocks Levee Improvements – Granite City, Illinois
- Lewis & Clark Confluence Tower [Village of Hartford, Illinois]

Transportation

- MidAmerica Airport – Scott Air Force Base, Illinois
- Frank Scott Parkway – St. Clair County, Illinois
- St. Clair County Bridges – Illinois
- IL Route 159 Widening, FAP 600 – St. Clair County, Illinois
- Robinson School Road Bridge – St. Clair County, Illinois
- Illinois Route 96 – Calhoun County, Illinois

Educational Facilities

- Edwardsville Schools – Edwardsville, Illinois
- Shiloh Middle School – Shiloh, Illinois
- Collinsville High School – Collinsville, Illinois
- Wolf Branch School – Swansea, Illinois

Education

M.S., Civil Engineering (Geotechnical),
University of Missouri – Rolla, 1985

B.S., Civil Engineering, University of
Missouri – Rolla, 1983

Registrations and Certifications

Professional Engineer
Missouri 023668 (1989)
Illinois 062-045542 (1990)
Texas 93327 (2004)

Affiliations

Inducted into University of Missouri – Rolla
Academy of Civil Engineers

Leadership Council Southwestern Illinois

Illinois and National Societies of
Professional Engineers

Southern Illinois Builders Association

American Society of Civil Engineers

American Council of Engineering Companies of
Illinois

- East St. Louis Higher Education Center – East St. Louis, Illinois

Site Development

- Alton Memorial Hospital Expansion – Alton, Illinois
- Dierbergs Developments – Shiloh and Edwardsville, Illinois
- Spencer Creek Wastewater Treatment Plant Improvements – St. Peters, Missouri
- Remington Oaks – St. Louis County, Missouri
- Former Corvette Building, Union Seventy Business Center – St. Louis, Missouri

**Sub-Consultant Section – Central Missouri Engineering
Services (CMES)**

L. SCOTT SAMUELS, P.E., C.F.M.
Central Missouri Engineering Services, LLC

POSITION: Owner and Principal Engineer

EDUCATION: B.S. in Civil Engineering, Colorado State University, Ft. Collins, CO, 1988

PROFESSIONAL SUMMARY:

Mr. Samuels has sixteen (16) years of experience as a registered professional engineer. He has held positions in both the public and private sectors during this time with emphasis on the land development aspects of civil engineering. This includes new and reconstructed road designs, subdivision layout and utility plans, gravity stormwater and sanitary sewer design, and stormwater detention/retention facilities. Beginning in 1998, Mr. Samuels gained expertise in floodplain management as an employee for the State Emergency Management Agency (SEMA) of Missouri as the State Floodplain Management Engineer. Here he provided technical assistance to communities, consulting firms, and private individuals on floodplain management issues including proper administration of the Nation Flood Insurance Program (NFIP), assistance with the Federal Emergency Management Agency (FEMA) letter of map change process, and resolution of community compliance issues. Mr. Samuels has computer program experience in TR-55, HEC-RAS, HEC-HMS, ArcVIEW 3.2, and AutoCAD. Mr. Samuels has also performed construction inspection duties and has passed the Land Surveyor in Training exam for the State of Maine.

PROFESSIONAL HISTORY:

C.M.E.S., October 2004 to Present, Owner and Principal Engineer

State of Missouri Emergency Management Agency, 10/98 to 10/04, Floodplain Management Engineer

City of Columbia, Public Works Department, Missouri, 3/98 to 9/98, Engineer

Eriksson Engineering, LTD, Columbus, Ohio, 10/96 to 8/97, Project Engineer and Co-Survey Party Chief

Owen Haskell, Inc., Portland, Maine, 6/93 to 3/95, Project Engineer

City of Portland, Public Works Department, Maine, 4/89 to 4/93, Assistant and Project Engineer

PROFESSIONAL EXPERIENCE:

Mr. Samuels has gained extensive experience in the realm of municipal engineering. He guided these projects from field survey through to the construction inspection of the finished project. His work included the creation of the working drawings, all aspects of the design including road, sanitary and storm sewer calculations, contract preparation, and construction inspection. These projects involved continuous contact and coordination with the general public, utility companies, other city departments, and general contractors.

During his time at the City of Portland, Maine, he managed and performed the street inspection aspects of the American Public Works Association (APWA) PAVER program. Including preparation of final reports offering recommendations on how best to utilize the PAVER information submitted to the City Council. Every street in the city was inspected at least once during this time.

While working as a private consultant for Owen Haskell, Inc., Scott acquired experience in residential subdivision design. He took these projects from client concepts all the way through to final planning board approval including preparation of cost estimates and site plan/stormwater reports for planning board review. Design aspects of these projects include roadway design meeting all municipality requirements, utility location and feasibility reviews of the design by the appropriate utility company, all stormwater management aspects from pre and post development site conditions including the design of any detention or retention structures to meet city code. Mr. Samuels also designed the lot layout and building envelopes for these proposed subdivisions.

Mr. Samuels' construction inspection experience not only includes his time at the City of Portland, but also his work as a private consultant for some of the smaller municipalities in the Greater Portland area on new subdivision road construction.

Mr. Samuels' time in Ohio was evenly split between surveying activities and road reconstruction design. New experiences gained at Eriksson Engineering, LTD, included the design of county/rural two lane highway projects. He assisted other engineers on various aspects of these designs, including but not limited to horizontal and vertical sight distance calculations, cut/fill balancing, and drainage structure analysis.

Mr. Samuels' most recent experience has been in the realm of floodplain management for the State of Missouri Emergency Management Agency. It was during this time that he acquired comprehensive knowledge in regards to the NFIP. He advised communities, developers, consultants and other federal agencies with the compliance aspects of the program. His contact with these groups was continuous and on a daily basis.

Some aspects of Mr. Samuels' community contact involved providing Base Flood Elevations (BFE) for new development in areas without FEMA issued BFE's in smaller communities without engineering staff. Attendance at FEMA meetings included project scoping and final map product presentation. He also attended meetings with community governing boards to discuss NFIP participation or the benefits of adopting requirements above the minimum federal standard. He assisted with Community Program Assistance Visits (CPAV's) and Community Audit Visits (CAV's). Mr. Samuels was responsible for providing training opportunities to participating communities. He taught the technical sections of SEMA's "Tools of Floodplain Management" class held three times a year. He was responsible for keeping this training current and developed hands-on exercises for the participants. Scott also published articles about floodplain management in the agency's newsletter. These same articles were also published in the Missouri Floodplain and Stormwater Managers Association (MFSMA) newsletter and with some posted on the Nebraska Floodplain and Stormwater Association (NeFSMA) website and one was also used by The Oklahoma Water Resources Board (OWRB) in their Floodplain Management 101 guidebook. He is active in the MFSMA having served as an Area Director for three years and as the Chair of the Legislative Committee for two years. He is currently serving as the chair of the Membership Committee. He also provided technical and engineering advice to the rest of the floodplain staff.

It was at SEMA that Scott gained experience in the U.S. Army Corps of Engineers Hydrologic Engineering Centers (HEC) Hydrologic Modeling System (HMS) and River Analysis System (RAS) computer programs. He is also familiar with ESRI's GIS program ArcVIEW. Mr. Samuels also acquired experience in FEMA's MNUSS and MIC internet based databases in relationship to Cooperating Technical Partners (CTP) projects managed by SEMA.

At CMES he currently, or has provided, workshop services to the States of Missouri, Kansas, and Nebraska. These workshops cover the following aspects of the NFIP: Completing the NFIP Elevation Certificate Workshop (4-Hours), FEMA's Letter of Map Amendment Workshop (6-Hours), FEMA's Letter of Map Revision Workshop (4-Hours), using FEMA's Quick-2 Program for Determining Base Flood Elevations in Unnumbered A-Zones (4-Hours).

PROFESSIONAL AFFILIATIONS:

- Member, American Society of Civil Engineers (ASCE)
- Member, Association of State Floodplain Managers (ASFPM)
- Member, Missouri Floodplain & Stormwater Managers Assoc. (M/SMA)

PROFESSIONAL QUALIFICATIONS:

- Registered Professional Engineer in Missouri, Ohio, West Virginia and Maine
- ASFPM Certified Floodplain Manager (CFM)