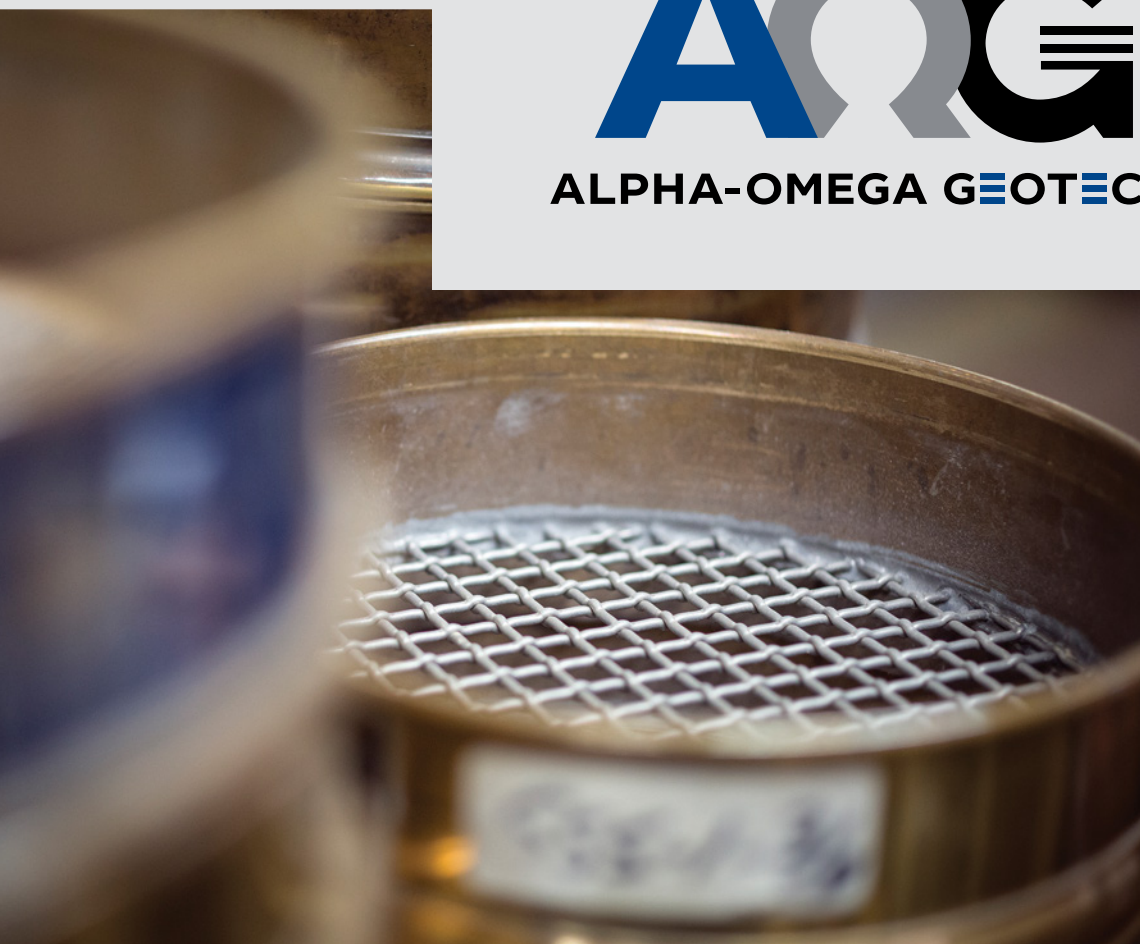




AΩG
ALPHA-OMEGA GEOTECH



35 THIRTY-FIVE
YEARS

**ALPHA-OMEGA
GEOTECH**





Alpha-Omega Geotech offers comprehensive geotechnical engineering and testing services that simplify project delivery, bringing confidence and quality assurance to the construction process.

Structure

High-Rise

Retail/Commercial

Medical

Education

Warehouse/Production

Government/Municipality

Industrial

Chemical Plants

Power Generation

Manufacturing

Transportation

Roads & Bridges

Parking

Intermodal Yards

Retaining Walls

Rail

Water Management

Water Tanks

Elevated Water Towers

Water Treatment

Sewer/Distribution

Dams

Alpha-Omega Geotech brings over 35 years of home-grown geotechnical engineering and testing experience to the Kansas City market place.

This legacy brings knowledge and creativity to an often [perceived to be] commoditized field led by process and prescribed technical standards. Drawing from our early years as a forensic specialty firm, we bring a commitment to discovery—a ‘seek-to-understand’ approach that now applies across a range of full-service capabilities. Our tenured staff brings know-how that simplifies project delivery and conveys real-world confidence.



■ Allan Bush, P.E., President
Blake Bennett, General Manager

SIMPLIFIED | Specialty should bring simple to the construction process if you blend the right mix of local expertise and capitalize on the collective strength of full-cycle engagement. With potential subsurface debris and other elusive soil stressors, co-teaming allows AOG a breadth of skills to deliver common sense solutions at the point of need—nothing artificial or excessive to compensate for lack of experience and/or confidence.

CONFIDENCE | While AOG is comprehensive and capable of delivering full-service, we align our services with client needs. Investigative procedures may seem indiscriminate, but the interpretation and follow-on solutions take creative wisdom and experience. AOG's services are a strategic investment. We think beyond today, tailoring solutions and adapting processes across the design and construction project cycle. We take pride in what we deliver—confidence.





MARK TWAIN ELEMENTARY, Kansas City, Kansas | Kansas City Kansas Public Schools underwent an ambitious expansion effort to transform the existing elementary school by three times. Construction was fast-tracked to ensure completion by the start of fall semester. AOG inspected all soils, concrete, steel and asphalt for the project, helping to fulfill District renovations on time for school opening.

Geotechnical Engineering

Geotechnical engineering is critical for construction design—validating foundation systems by maximizing soil functionality and extending earth resources. Enabling this functionality while recognizing soil diversity, hinges AOG's commitment to the greater Kansas City metropolitan area.

KANSAS CITY | Soil and terrains are geographically diverse. Native to Kansas City are complex clay, silt and variable shale and limestone that pose shrink-swell issues among other distinguishing complexities. AOG is not a newcomer experimenting with boilerplate solutions. Rather, we consider project demographics (i.e., structural use, land position, client directive) and pair our recommendations with foundational systems conducive to Kansas City's soil infrastructure. Systems including drilled piers, auger cast and driven piles, in addition to trench footings, spread footings and grade beams, are all representative of AOG's experience across construction processes.

Drilling

AOG's extensive drilling capabilities bring advantage to our geotechnical engineering services. Our CME 55 high-torque standard and all-terrain platform rigs offer the versatility to maneuver Kansas City soil complexities and are also particularly valuable for undeveloped land areas.

Laboratory

AOG's advanced testing capabilities, along with a tenured staff of over 35 years, offers hands-on knowledge of Kansas City soil behavior. We enable progressive geotechnical design that optimizes construction investment—reducing material costs, risks and obtrusive delays wherever possible. By aligning industry best practice with Kansas City soil insights and construction perspective, AOG's in-house laboratory also keeps material testing local and enables a much more robust and responsive construction community.

Collaborative Services

AOG operates one of the most acclaimed soil and concrete testing practices in the region. Kansas City's soils along with an affinity for concrete construction, makes AOG a go-to resident affiliate for a number of local and national engineering, architectural and construction firms.

CONCRETE | AOG facilitates mix design trial batches, along with Alkali Silica Reactivity tests and other full range expansion and shrinkage concrete testing.

SOIL | Inclusive of Hydraulic Conductivity and Triaxial UU-Bar Testing for permeability and strength concerns, AOG is equipped to deliver a comprehensive suite of laboratory services.



Our consultative 'all-hands' response facilitates value.

AOG recognizes the link between structural design and building technology and also subsurface integrity and material compatibility—an affinity that necessitates cross-functional collaboration and priority response. AOG is cross-disciplinary and maintains open communication in support of full-scale delivery. We are collaborators that drive cohesion within and across all phases of construction.

Field Testing & Special Inspection



With insights derived throughout the design process, AOG becomes even more valuable during the transition to field construction. As a full-service specialty engineering firm, AOG field technicians are not only familiar with native soil mechanics, but bring on-site troubleshooting that allows responsive field mitigation throughout the construction continuum. Equipped with “T” Probes, Nuclear Densometers, GeoGauges, Dynamic Cone Penetrometers (DCP) and various other mobile devices, AOG has the experience and know-how to adapt across multi-phase construction. Inclusive of early-construction inspections like soil compaction, along with mid-construction floor flatness and steel/concrete testing or code verifications, on to late-construction asphalt performance testing for parking installation and fireproofing, AOG has scalability to meet customer needs.

■ Tom Burdick, Laboratory Manager



ROCK CHALK PARK, Lawrence, Kansas | Regarded as the largest sports venue in the Midwest, this project required many different types of foundations and structural methods. AOG provided Geotechnical drilling and engineering for the design phase and material inspections and testing during construction.

Geotechnical Engineering

Structure and Building Foundations:

Low-rise, Mid-rise, High-rise, and Industrial

- Shallow foundation systems:
Spread footings, mat foundations,
post-tensioned slabs
- Intermediate foundation systems:
Rammed Aggregate Piers
- Deep foundation systems:
Drilled piers, auger cast piles,
driven piling, micropiles
- Anchored structures

Earth Structures:

- Slope Stability including design
and repair of failed slopes
- Embankment dams
- Earthen embankments
- Underground limestone
mine development

Retaining Walls:

- Cantilevered
- Mechanically Stabilized Earth (MSE) /
Modular block systems
- Soil nails / Tieback and anchored
- Stacked Stone

Pavement Design:

- Rigid—Portland cement concrete
- Flexible—Asphaltic concrete
- Soil stabilization using fly ash or lime
- Subgrade reinforcement using
geotextiles and geogrids

Drilling

- Solid and hollow auger drilling
- Mud-rotary wash bore drilling
- Rock coring—Wire line methods,
NX-size (ASTM D2113)
- Rock drilling—Tricone roller bit
- Sampling: Shelby tube (ASTM
D1587) and Standard Penetra-
tion Testing (ASTM D1586)
- Pressuremeter (downhole)
insitu testing (ASTM D4719)
- Vane Shear testing (ASTM
D2573)
- Slope Inclinator installation,
monitoring and reporting

Drill Rigs:

(owned and operated by AOG)

- ATV: CME-55 (high-torque)—
Low Clearance Capable
- Truck-mounted: CME-55
(high-torque), Simco 2800

Laboratory

Soil Laboratory:

- Routine and index testing of physical properties of soil, aggregate and rock
- Grain-size distribution & Atterberg limits
- Determination of shear strength: Unconfined and Triaxial compression, and Direct shear
- Falling Head and Constant Head permeability testing
- Compressibility and Consolidation characteristics of soil
- California Bearing Ratio (CBR)
- Swelling characteristics of clay soils
- Electrical resistivity (lab and field)

Asphalt Lab:

- Marshall mix design verification (ASTM D1559)
- Stability and flow
- Marshall density (ASTM D2726)
- Asphalt content—Ignition oven
- Asphalt content—Solvent method (ASTM D2172)
- Maximum theoretical specific gravity (ASTM D2041)
- Gradation of aggregates

Concrete Lab:

- Compressive strength of concrete test cylinders (ASTM C39)
- Concrete coring and cutting (ASTM C42)
- Flexural strength of concrete beams (ASTM C78)
- Compressive strength of mortar, grout and masonry materials—including full height prism strength testing
- Freeze-thaw resistance of concrete
- Length change of hardened mortar and concrete (ASTM C157)
- Chloride content—concrete or aggregates (AASHTO T260)
- Alkali reactivity mortar bar (ASTM C227/1260)
- Modified alkali reactivity (Pyrex glass) (ASTM C595/227/1260)
- Time of set—concrete, penetration resistance (ASTM C403) and cement (ASTM C191)
- Concrete Mix Designs and Trial Batches
- Concrete Maturity development and testing (field and laboratory)

Aggregate Testing:

- Soundness of aggregate, Na or Mg sulfate (ASTM C88)
- Specific gravity and absorption of aggregates
- LA Abrasion of aggregates
- Freeze-thaw resistance of aggregates
- Lightweight particles and chert (ASTM C123)
- Sand equivalent test (AASHTO T176)
- Shale and shale-like particles (KDOT KT-8)
- Clay lumps and friable particles in aggregate (ASTM C142 / KT-7)
- Slake durability of shale (ASTM D4644)

Field

- Sampling and Testing of fresh or hardened concrete
- Compaction of Structural fill, lift-by-lift (nuclear density gauge, GeoGauge)
- Placement of Reinforcing Steel
- Verification of Bearing Conditions for Foundations

- Structural Masonry Inspections
- Structural Steel & Welding Inspections
- High-strength Bolting
- Spray-applied Fireproofing
- Concrete coring and cutting
- Electrical resistivity surveys

- Floor flatness testing (FF and FL)
- Swiss hammer rebound testing (ASTM C805)
- Vapor emission through hardened concrete
- Presence of reinforcing steel in hardened concrete: size, embedment depth, location



AOG brings depth that breeds point-of-need solutions and persuades innovation.

AOG has the experience [Kansas City], which coupled with our customer-minded practices, ultimately compounds the value of our delivery. Our focus is on protecting land investments through creative advisement and targeted strategy. We know that while boilerplate solutions may be functionally satisfying, they are also fiscally consuming. AOG prefers feasibility to 'kitchen sink.' We empower solutions through ground improvement and renewal techniques that moderate construction costs without sacrificing system performance.



Structures

RED Development

One Nineteen Development,
Leawood, KS

Ford Motor Company

Ford Plant Expansion & New Assembly
Line, *Claycomo, MO*

Cargill

Cargill Oilseed Plant & Biodiesel,
Kansas City, MO

Children's Mercy

Children's Research Institute Tower,
Kansas City, MO

City of North Kansas City

North KC Community Center,
North Kansas City, MO

Metropolitan Community College

Carter Performing Arts Center,
Kansas City, MO

Water Management

Board of Public Utilities KCK

4 Million Gallon Ground Storage Facility,
Nearman Power Plant, *Kansas City, KS*

City of Smithville

750,000 Gallon Elevated Water
Storage Tank, *Smithville, MO*

City of Sugar Creek

Holding Basins & Excess Flow
Pump Station, *Sugar Creek, MO*

City of Excelsior Springs

3.5 MGD New Wastewater
Treatment Plant, *Excelsior Springs, MO*

Transportation

KDOT/Geopier

US-69 & I-435 Highway Interchange
Improvements, *Overland Park, KS*

FEDEX

Freight Facility Expansion,
Bonner Springs, KS

Swift Transportation

Facility Expansion,
Bonner Springs, KS

Flying J Inc.

Travel Plaza, *Rockport, MO*;
Cameron, MO; *Bates City, MO*

CARGILL SOYBEAN PROCESSING PLANT, Kansas City, Missouri | With the associated high risk of differential settlement across the silty river bottoms, the “go-to” foundation solution was Rammed Aggregate Piers. AOG completed test borings to 80-100 foot depths as part of our geotechnical engineering investigation.





Structures

Buildings rely on the union of soil and structure to endure the test of time—enabling a safe transfer of building load to promote serviceability and avoid stress or long-term deformation and settlement.

Once construction of the foundation and structure are complete, time continues to influence performance.

We are resident experts on the shrink-swell dynamic of Kansas City soils and its effect on building foundations where subsurface stability is critical. While building structures are often ideally positioned upland away from river valleys, compressibility plagued by shallow shales, residual soils and Midwest climates are ‘general conditions’ that can quickly erode construction investments. While AOG can deliver deep foundation systems like Auger Cast Piling and Drilled Piers more commonly associated with maximum load facilities, these knee-jerk solutions are capital intensive and forfeit the discretionary advantage of cross-team collaboration. By focusing on ground improvement, AOG can maximize engineering performance through more innovative alternatives like Rammed Aggregate Pier (RAP) systems that maximize budgets AND promote adaptive collaboration between design and construction teams.



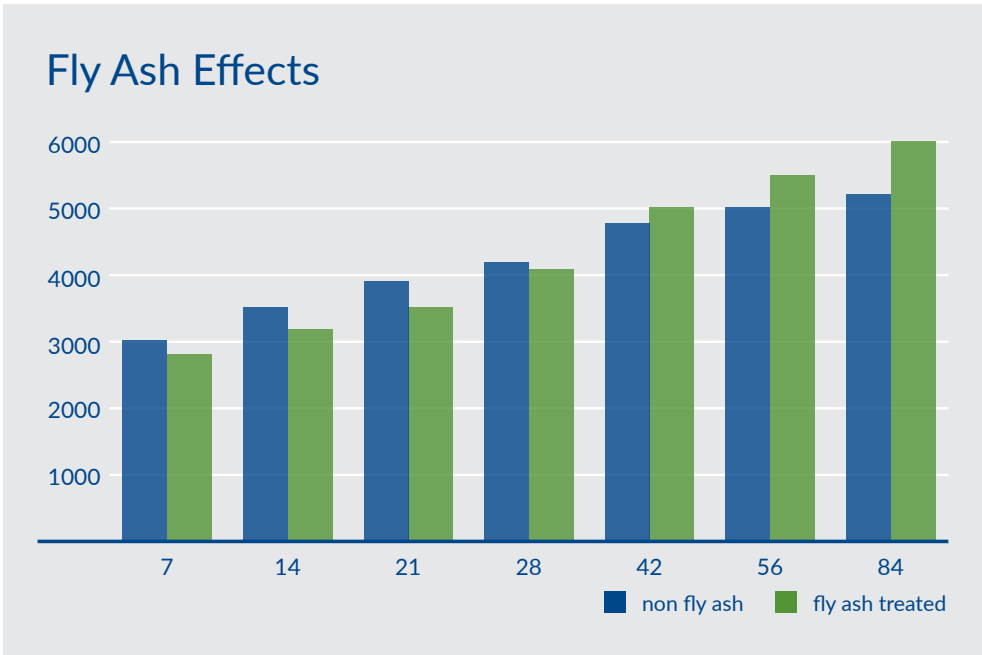
“AOG must be easy to work with and easy to work for; simply stated, but a true measure of success.”

Allan Bush, P.E., President

Transportation

Given the transient loads commonly associated with transportation structures, serviceability limits are more directly tied to economy and quality of ride. Coupled with Kansas City’s moist soil disposition from surrounding waterways, embankment durability and premature pavement distress make subgrade stabilization a priority concern. With Kansas City’s ready access

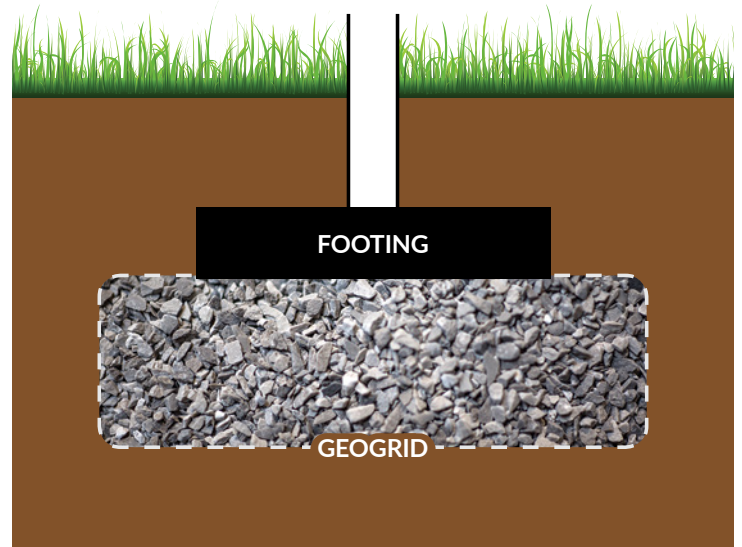
to fly ash (a sustainable material) and the region’s compatibility with Geogrids and granular subbase materials like recycled pavement, AOG uses green alternatives to maximize soil workability. By aligning subgrade stabilization strategies and applying restorative improvement techniques, AOG brings reliability and design economy across construction processes.



FEDEX TERMINAL EXPANSION, Bonner Springs, Kansas | FedEx sought to expand terminal services in western Kansas City, Kansas. Given the subprime land positioning with soft marshy soil conditions, pre-construction remediation was required. AOG provided full-cycle geotechnical drilling, engineering and field support.

Water Management

Water reservoirs and alternative water management systems are complex structures to initiate and maintain in the Kansas City metro area. Our soil compositions resulting from upstream waterways and other water flow impediments caused from low permeable soils and aquifers, along with traditional subprime land positioning, often impede on structural strength and durability. While convenience may predicate deep foundation systems (i.e., Augercast and Micro Piling) to contend with such differential settling and compromised bearing capacity, the feasibility is often prohibitive. AOG's focus on ground improvement and the refinement of more traditional shallow foundation techniques, such as our adaptive Geogrid solution, not only delivers function, but offers feasibility and showcases our commitment to construction ingenuity.



- Kansas City houses the Missouri River alluvial aquifer responsible for the drinking water for more than 900,000 people in 90 municipalities and public-water-supply districts.



NEARMAN WATER TREATMENT PLANT, Kansas City, Kansas | KCK Board of Public Utilities installed a new 4 million gallon in-ground storage tank to improve storage capacity by 33%—34 million gallons daily to 54 million gallons—in compliance with plant design standards. AOG provided inspections of soil, aggregates and concrete throughout the project.



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Specialty Simplified. Real World Confidence.

