KELLER

Curriculum Vitae

David K. Mueller

Vice President

Mr. Mueller has extensive experience in the design and installation of frozen earth support and groundwater cut-offs, landfill remediation systems, soil-bentonite slurry walls, construction dewatering and groundwater treatment systems, cement-bentonite and chemical grouting applications, and mechanical installations. He has been instrumental in the successful execution of a variety of geotechnical construction and environmental remediation projects ranging in value up to $25M.

Mr. Mueller was appointed a Vice President of Moretrench in 2009. After serving as Chief Estimator since 2002, he was appointed Vice President of Estimating in 2015, with overall responsibility for the estimating of all projects undertaken by the company through its Rockaway headquarters.

EDUCATION: BS in Civil Engineering, Rutgers - State University of New Jersey, New Brunswick, NJ,

YEARS OF EXPERIENCE: Since 1991

PROFESSIONAL HISTORY:

2015 to date: Vice President of Estimating, Moretrench

2009 to 2015: Vice President/Chief Estimator, Moretrench

2002 to 2009: Chief Estimator/Project Manager, Moretrench

1991 to 2002: Superintendent/Project Engineer, Moretrench

HEALTH AND SAFETY:

OSHA 40-Hour HAZWOPER training
OSHA 8-Hour HAZWOPER refresher
OSHA 30-hour Occupational Health and Safety training
OSHA 10-hour Construction
OSHA 8-Hour Supervisory Training
Confined Space Entry Training
Corporate Drug and Alcohol Testing Program
Annual Medical Monitoring Program

PROFESSIONAL AFFILIATIONS:

Member, American Society of Civil Engineers
Member, American Society of Professional Estimators

SELECTED PROJECT EXPERIENCE:

GROUND FREEZING

Boeing Future 4-86 Dinol Booth, Renton WA: Ground freezing system for ground water cut-off and support of excavation for a future ventilation air plenum of a paint booth.

Seattle Sound Transit Northgate Link Extension, Contract N125, Seattle, WA: Six ground freezing systems to support cross passage installation between two light rail tunnels. The system at each cross passage included over 1000 feet of horizontal drilling, a freeze plant in each tunnel, pumps and piping for chilled brine distribution, and a data acquisition system to ensure satisfactory system performance.

Shaft DST-1, Dugway Storage Tunnel, Cleveland, OH: Ground freezing to provide groundwater control and excavation support to allow completion of a 48-foot diameter water tunnel access shaft. During excavation of the shaft, repeated soil and groundwater ingress under the liner plate excavation support had occurred that other remediation methods attempted over time had failed to rectify. The scope of the ground freezing contract included design and furnishing of the 63-pipe freeze system; provision of field engineering and on-site supervision during freeze pipe installation; and monitoring of ground freezing operations through excavation.

First Street Tunnel, Washington, D.C.: Three frozen shafts, three frozen tunnel connections, and one frozen SOE for the First Street Tunnel, which will serve as a CSO for District of Columbia Water. The project involved drilling of over 300 freeze pipes and installation of two 12-inch Supply/Return headers and three freeze plants. The overall scope of Moretrench's work also included installation of a dewatering well system for the client's main TBM launch shaft; installation of a well and battered wellpoint system to dewater a deep open cut excavation from the main shaft to existing infrastructure on First Street; and several weeks of polyurethane grouting, requested by the JV team, in different areas of the cast-in-place adit tunnel linings.

Access Shaft #3, Buenos Aires, Argentina: Ground freezing to provide groundwater control and excavation support to allow completion of a 35.4-foot diameter water tunnel access shaft. During excavation of the shaft repeated soil and groundwater ingress between the slurry panel excavation support had occurred that other remediation methods attempted over time had failed to rectify. The scope of the ground freezing contract included design and furnishing of the freeze system; provision of field engineering and on-site supervision during freeze pipe installation by the owner's drilling subcontractor; and monitoring of ground freezing operations through final concrete liner installation. The project was successfully completed without further issues.

Port of Miami Tunnel Project Cross Passages 2 & 3, Miami, FL: Installation of a horizontal ground freezing system to temporarily support the open excavation of two 50-feet long cross-passages between two concrete segment tunnels. The cross-passages were situated approximately 100 feet below ground surface and approximately 1,500 and 2,000 feet from the tunnel entrance. Project challenges included the installation of a 200-ton refrigeration system above ground, 500 feet from the tunnel entrance, a 400-gpm brine pumping system to deliver the brine to the two cross-passages through over 5,000 feet of polyethylene piping, and a custom instrumentation and SCADA system.

East Side Access Safe Havens, Sunnyside Rail Yard, Queens, NY: Mass freezing to create a frozen soil zone 100 ft deep x 40 ft long x 40 ft wide to provide 'safe havens' for the ESA tunnel boring machines where cutter head inspection and replacement can safely take place without risk to personnel.

Second Avenue Subway, New York City, NY: Ground freezing to provide ground stabilization and groundwater cut-off to remediate mixed face soil/rock conditions and inadequate rock cover above the crown of one of twin, 22-foot diameter tunnels to be mined through rock. A grid of 100 angled freeze pipes was installed over a 150-foot length of the tunnel alignment to create a frozen mass extending below the invert and approximately 10 feet either side of the tunnel.

City Water Tunnel No. 3 Shafts 21B, 22B and 19B, Brooklyn, NY: Project Engineer and site superintendent for the installation of frozen earth cofferdams to bedrock for deep shaft excavation through varying soil profiles. Shaft 21B was a 40-foot diameter frozen shaft excavated to 260 feet, shaft 22B was a 41-foot diameter frozen shaft excavated to 255 feet, and shaft 19B was a 41-foot diameter frozen shaft excavated to 275 feet. The total contract value for the three shafts was in excess of $6M.

No. 7 Line Extension, New York City, NY: Ground freezing for stabilization of a hand mined portion of subway tunnel extension. The top of rock was found to dip below the crown of the tunnel, which was originally planned to be excavated fully in rock. Over 40 angled freeze pipes, installed to depths of 80 to 110 feet were used to establish a stabilized frozen zone of overburden soil and weathered rock above the section of tunnel to be mined.

Central Artery/ Tunnel Project, Boston, MA: Design and Site Engineer, and site superintendent, for mass freezing to provide groundwater cut-off, soil stability, and encapsulation of numerous man-made obstructions to facilitate jacking of three massive, pre-cast concrete box structures, up to 350 feet long, 70 feet wide and 40 feet high, under minimal cover and through complex subsurface conditions beneath the active South Street Station. Responsibilities included system design, including two 2800 gpm pump stations, implementation, monitoring and performance analysis. This ground freezing operation represents the largest ever performed in the United States to date.

SLURRY TRENCHES

Keegan Landfill, Kearny, NJ: Project Manager for the installation of a soil-bentonite slurry perimeter cut-off wall, 9,240 feet long and 57 feet deep, at a landfill in the process of closure to prevent the migration of leachate off site.

Shepley's Hill Landfill Barrier Wall, Devens, MA: Project Manager for the installation of an 850 lineal foot soil-bentonite slurry wall to a depth of 53 feet at a closed landfill. Other work involved installation of a work platform, repair of an existing cap and restoration of the site.

Erie Landfill Site Improvements, Lyndhurst, NJ: Project Manager for the installation of approximately 250,000 SF of soil-bentonite slurry wall installed to a maximum depth of 65 ft. The wall was successfully installed with an in-place permeability of less than $1x10^{-7}$ cm/s. Also included in the scope of work was installation of a leachate collection and pumping system.

G.R.O.W.S. Landfill, **Morrisville, PA:** Project Engineer and site superintendent for the design and installation of a 50 feet by 30 feet elliptical frozen earth cofferdam to an impermeable clay layer at a depth of 60 feet to provide soil stabilization and groundwater cutoff prior to excavation for a leachate pumping station. Responsibilities also included monitoring and analysis of the ground freezing system performance. A 1,000-foot long by 25 feet deep by 3 feet wide slurry trench was also excavated under bentonite slurry to sink HDPE leachate transmission pipe into place for final connection into the pumping station.

Harbor Square, Ossining, NY: Installation of a 410 LF soil-bentonite slurry trench to a depth of 25 feet to prevent off-site groundwater migration. Laboratory testing of the backfill mix confirmed that the permeability

requirement of less than $1x10^{-7}$ had been met.

Acid Tar Pits, Buffalo, NY: Installation of a 1,500 LF slurry cut-off wall to a depth of 45 feet to prevent the migration of contaminated groundwater off site.

Honeywell Study Area 7 Pilot Test, Jersey City, NJ: Installation of approximately 1700 SF of soil bentonite cutoff wall to depths of 17-21 feet. The wall was excavated through chrome contaminated soils, under a bio-polymer slurry. This project also included the installation of 18 vacuum operated well points.

US Army Corps of Engineers Bog Creek Farm Site OU2, **Howell Township, NJ:** Site Engineer and site superintendent for construction of an 875-foot long, 27-foot deep soil-bentonite slurry trench with an in-place permeability of less than 1 x 10^{-7} cm/sec. Scope of work also included the installation of a shallow groundwater recovery system, utilizing wellpoints, along the length of the slurry trench. Site activities for this Superfund project were conducted in Level C protective equipment.

PSE&G, Bethlehem Power Plant, Albany, NY: Installation of a slurry containment wall approximately 1000 feet long and up to 25 feet in depth.

DEWATERING & GROUNDWATER TREATMENT

Orangetown Sewage Treatment Plant, Orangeburgh, NY: Installation of a permanent, deep well dewatering system to lower the groundwater table below the invert of three existing clarifiers to allow them to be drained for inspection and repair without the risk of ground heave due to hydrostatic uplift.

NYCDEP Emergency Groundwater System Reconstruction, Queens, NY: Project Manager for the installation of granular activated carbon units and chemical treatment systems at various existing water supply well locations within the Borough of Queens, NY for the public drinking water supply. The scope of work for this $8.9M contract also includes new well pumps, electrical upgrades and general site improvements.

Former South Jersey Gas Site, Egg Harbor, NJ: Design team member and Project Manager for installation operation, and maintenance of a groundwater control system and groundwater treatment system. The groundwater control system involved installation of extraction wells, pumps, piping and a well header system. The water treatment system involved the installation of pumps, piping, valves, electrical controls and instrumentation, together with sand filters, oil/water separators, tanks and carbon filters to handle, manage, store and treat the groundwater.

Permuthane Coatings, Peabody, MA: Project Engineer for the construction of a 30 GPM groundwater/soil vapor extraction and treatment system at a large chemical manufacturing. The project included the construction of a 45-foot by 50-foot pre-engineered building with a two-foot secondary containment wall as part of the foundation. The treatment system consisted of a 25,000-gallon multi-compartment steel holding tank, an air stripping system, sand filters, liquid phase carbon, a 12,000-gallon steel discharge tank, a chemical precipitation system for the treatment of heavy metals and hardness, a catalytic oxidation unit for treatment of collected vapors and off-gas of the air stripper, and a PLC based control system. The process piping for the collection system consisted of dual containment polypropylene piping buried four feet below ground surface. Dewatering of contaminants was also performed for the installation of the process piping for the collection system. A temporary treatment system was mobilized to the site for processing of up to 50 GPM of contaminated groundwater. The entire project was performed during the worst winter on record in New England, under budget, and with minimal delays in the construction schedule. The total contract amount was in excess of $1.2M.

Curtiss Wright Corporation Ground Water Treatment Plant, **Wood Ridge, NJ:** Project Engineer and site manager for the design, installation and operation of a groundwater recovery, treatment and re-injection system to handle an overall plant inflow of 300 GPM. Influent contaminants included hydrocarbons, volatile organic compounds, heavy metals and solvents. Treatment methodology included free product separation, aeration, pH adjustment, polymer addition, and filtration through sand media and carbon. Sludge was concentrated and collected via a filter press. The total contract value for this project was in excess of $2.1M.

Route 59 Reconstruction, New York DOT Project No. D256270, Rockland County, New York: Project Engineer for installation of a remediation system including both soil vapor extraction and groundwater recovery. The treatment plant was built in an explosion-proof environment. The remediation system included carbon adsorption units for both recovered groundwater and vapor. A chemical injection system (sodium hydroxide) was installed to neutralize low groundwater pH encountered during the operation.