
# JCK UNDERGROUND INCORPORATED

# STATEMENT OF QUALIFICATIONS

## OCTOBER 2016

**JCK Underground** is an employee-owned firm specializing in program management, engineering and construction management of underground facilities. This brief statement of qualifications provides information regarding our Company Focus, Markets, Services, People, Projects and Contact Information.

## Company Focus

JCK Underground's core objective is to assist our clients' successful execution of underground projects by applying our unique blend of expertise. The JCK Underground team's exceptional proficiency results from our extensive experience in developing **focused solutions** for tunnels and underground works, while maintaining a **broad based appreciation** of those projects' wider goals. No matter what phase or size of project, JCK Underground provides an appropriate balance of capability from our multi-disciplinary team of seasoned engineers and construction managers. Through knowledgeable planning, engineering, and construction management, we help our clients achieve their goals by effectively identifying and managing the risks that are inherent to underground work.

## Markets

For both public and private clients, JCK Underground extends specialist skills to a diverse range of market sectors. Working for owners, consultants, and construction contractors, we support and manage underground infrastructure projects within:

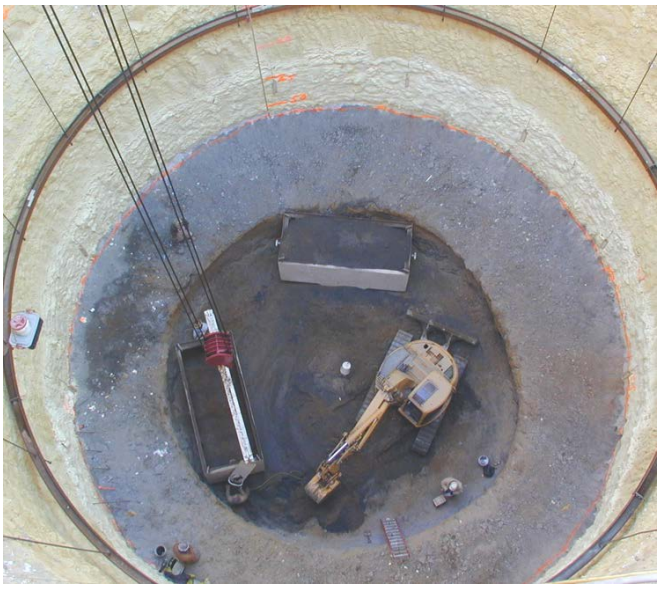
- Water and Wastewater
- Light and Heavy Rail Transit
- Roads and Highways
- Hydropower
- Utilities

JCK Underground staff provide program management services for DC Clean Rivers Project.

## Services

From planning and conceptual design, through construction and commissioning, JCK Underground offers a comprehensive range of services. Through our experience, we understand that each client is confronted with a unique set of challenges and circumstances. We are nimble and able to readily customize our services to match our clients' needs and project challenges.

**JCK Underground staff provided program, construction and design management for the NBC CSO Program.**



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|---|
| **PLANNING AND PRELIMINARY DESIGN** |
| Conceptual Studies |
| Environmental Impact Studies |
| Alternative Analyses / Construction Impacts and Staging Requirements / Permitting Support |
| Facility Planning |
| Siting / Conceptual Design |
| General Program Management |
| Geotechnical Investigations |
| Geotechnical Data Reports and Interpretations |
| Preliminary Engineering |
| Alignment Selection / Establishing Design and Performance Criteria |
| Procurement Strategies |
| Risk Management |
| **CONSTRUCTION MANAGEMENT** |
| Change Order / Claims Support |
| Quality Assurance / Quality Control Support |
| Resident Engineering and Inspections |
| Risk Management |
| **FINAL DESIGN** |
| Constructability Reviews |
| Front End Documents (Divisions 0 and 1) |
| Technical Specifications |
| Geotechnical Engineering |
| Investigations / Baseline Reports / Technical Analyses / Protection of Structures / Ground Improvement |
| Risk Management |
| Structural Engineering |
| Underground Asset Inspections / Underground Structure Rehabilitation Design / Temporary Works Design / Shafts and Underground Structures |
| **CONSTRUCTION SUPPORT – DESIGN-BUILD** |
| Design Coordination and Quality Control |
| Final Design Services (noted above) |
| Independent Design Peer Reviews |
| Quality Management |
| Risk Management |
| TBM and Equipment Peer Review |

## People

JCK Underground staff are its biggest asset. The projects on which they participate benefit from their diverse backgrounds in the fields of construction, engineering, program management, and construction management:

**Jennifer Jordan, P.E.** has 24 years of experience, specializing in geotechnical and tunnel engineering for planning, preliminary and final design, and construction of deep underground structures. In addition to successfully managing both design and construction projects, she has extensive experience in the planning and execution of subsurface exploration programs and has performed geotechnical design and analyses on numerous types of projects including tunnels, bridges, railroads, and underground facilities. Ms. Jordan has been responsible for the compilation of various geotechnical design, data and baseline reports for deep tunnels and shafts, as well as near-surface facilities and pipelines with trenchless technology. She has an extensive background analyzing tunneling and excavation-induced ground movement and in mitigating impacts to adjacent facilities through the provision of robust geotechnical design criteria and instrumentation monitoring programs.

**Rafael Castro, P.E.** has 28 years of comprehensive experience related to planning, design and construction of tunnels for water, wastewater and transit programs. He has been responsible for feasibility, planning, preliminary design, program management, final design, condition assessment and construction management of many tunnel systems and underground facilities throughout North America. His diverse planning-to-design-to-construction background provides his clients with a practical and proven approach to managing technical and program risks throughout all phases of a project. Mr. Castro has an extensive background in geotechnical engineering, tunnel and deep excavation induced ground and structure movements, and ground improvement associated with tunneling and shaft construction in urban environments. Mr. Castro has successfully managed and assisted his clients in delivering complex underground projects using both conventional and alternative delivery methods throughout his career.

**Joel Kantola, P.E.** has 29 years of design and construction experience with over 25 years specializing in tunnels and underground structures for water, wastewater, transit and transportation projects. His practical approach to underground engineering stems from years of experience working on all phases of a project, including: project management, design, procurement, construction management, and contracting. Several of these projects have had profound logistical challenges, including tight urban settings, marine environments, subaqueous tunnels beneath the Atlantic and working in a remote desert location. These projects have required thorough planning, mitigation of risk through design, and contingency measures built into means and methods. Mr. Kantola has been applying these lessons to the DC Clean Rivers Project (DCCR), where he has been managing the procurement of approximately $1.4 billion in soft ground tunnel contracts. These contracts are being delivered using a combination of alternative and conventional procurement methods. Through his experience, Mr. Kantola has developed an expertise in underground contracting practices, often thinking outside the box to mitigate project risks and deliver projects on time.

**Thomas Hennings, P.E., P. Eng.** has 25 years of structural related design and construction experience with over 18 years specializing in tunnels, deep excavations and underground structures. Having undertaken past roles as a consulting engineer and a construction project engineer, he has the unique ability to holistically consider and reconcile both the theoretical and the practical aspects of a design. This perspective, combined with his comprehensive knowledge of designing permanent and temporary structures, has equipped him with the ability to develop solutions to engineering challenges that are not only suitably robust but also constructible. His technical skills are further complimented by his capacity to communicate, organize and supervise teams, and effectively manage projects to successful completion. Among his more recent accomplishments, Mr. Hennings instituted the mandatory design criteria which govern shaft designs for DC Water's CSO Program and supervised their implementation by several design-builders. On the same program he is also the Engineer-Of-Record for several shafts that were procured by design-bid-build.

**Marco Giorelli, P. Eng.** has 30 years of experience in underground works, specializing in tunneling for transit, water and wastewater projects. He has played key roles as construction manager and project manager for project owners and contractors on tunneling projects throughout North America including Boston and Toronto. Mr. Giorelli is well known for his expertise in the configuration and operational performance assessment of Earth Pressure Balance TBMs. He has provided expert consultation on TBM-driven transit, wastewater, water and transportation tunneling projects throughout the world including Italy, Spain France, Turkey, Singapore, Venezuela, Canada and the United States. In his latest role, Mr. Giorelli is providing construction oversight for DC Water's DC Clean Rivers project involving 13 miles of soft ground tunnels and adits with a dozen large diameter shafts.

**Geoffrey Hughes** has 27 years of experience managing the planning, design, and installation of water and wastewater infrastructure projects involving underground construction. His areas of expertise include program management, design management, construction management, resident engineering and inspection, geotechnical investigation, permitting and dispute resolution. His prior projects involved a variety of geology from very soft soils to hard rock and work sites within urban and rural locations subject to a wide range of regulatory oversight. He has worked with owners, contractors and consulting engineers to develop and deliver projects with several types of procurement. Throughout the course of his career he has accumulated a working knowledge of construction techniques including TBM technology, excavation support and the improvement of difficult ground. His comprehensive understanding of technical and contractual challenges endows Mr. Hughes with the ability to recognize, prioritize and address project risks and effectively manage them through to project completion.

**Ryan Payne, P.E.** has 9 years of geotechnical engineering and construction management experience in deep excavations and soft ground tunneling. Mr. Payne's practical experience includes the measurement and evaluation of ground movement and the protection of existing structures. His hands-on knowledge includes quality control monitoring for permanent structural diaphragm wall construction, temporary support of excavation systems, and ground improvement for the protection of structures adjacent to deep excavations. As a construction manager, Mr. Payne has been an assistant Resident Engineer on various projects including the Blue Plains Tunnel and CSO 021 facilities in Washington, DC. In these roles he was responsible for field quality control as well as contract administration for projects in both soft ground and rock.

## Current Projects

### DC CLEAN RIVERS PROJECT

**Client:** Greeley and Hansen
**Project Owner:** DC Water
**Project Location:** Washington, DC

The DC Clean Rivers project is being constructed to reduce combined sewer overflows (CSOs) into the Anacostia and Potomac Rivers, and Rock Creek. Additionally, components of the project target the reduction of flooding in certain District of Columbia northeast boundary neighborhoods. The DC Clean Rivers project includes combined sewerage storage tunnels as well as green solutions to reduce total handling of CSO water.

In its approximately $2.8 billion cost, the project comprises approximately 18 miles of soft ground and rock tunnels between 100 to 170 feet in depth. Tunnels range from 15 to 23 feet in diameter and traverse beneath the Potomac and Anacostia Rivers as well as beneath federal, district and private residences. Drop shafts to take combined sewer and storm water flows to the tunnel level are 35 to 55 feet in diameter. At the project's tunnel terminus are two larger diameter shafts of 70 and 132 feet in diameter which house the Grit and Screening Removal Shaft and Tunnel Dewatering Pump Station respectively. Near-surface facilities designed to divert flows from the various combined sewers to the drop shafts are located in postage-stamp sized sites throughout the District of Columbia. The DC Clean Rivers project possesses some of the nation's most challenging tunneling work, with an aggressive schedule, in an unrelenting urban environment.

As part of the Program Consultants Organization, JCK Underground is assisting DC Water to implement and execute the DC Clean Rivers project. Currently, JCK Underground provides a wide range of services for the project including: design management for the Northeast Boundary Tunnel; construction

oversight, including ensuring quality of construction, and managing costs; construction management for the CSO 021 Diversion project; and program-wide tunneling, deep excavation and trenchless expertise. Previously, JCK Underground's personnel functioned to: develop novel procurement strategies; plan and manage geotechnical investigations; establish program-wide protocols for protecting third party structures and formulate bid documents for construction contracts for the Blue Plains Tunnel, Anacostia River Tunnel, First Street Tunnel and Tingey Street Microtunnel Projects.

*JCK Underground staff currently assigned to this project includes: Joel Kantola, Rafael Castro, Marco Giorelli and Ryan Payne.*

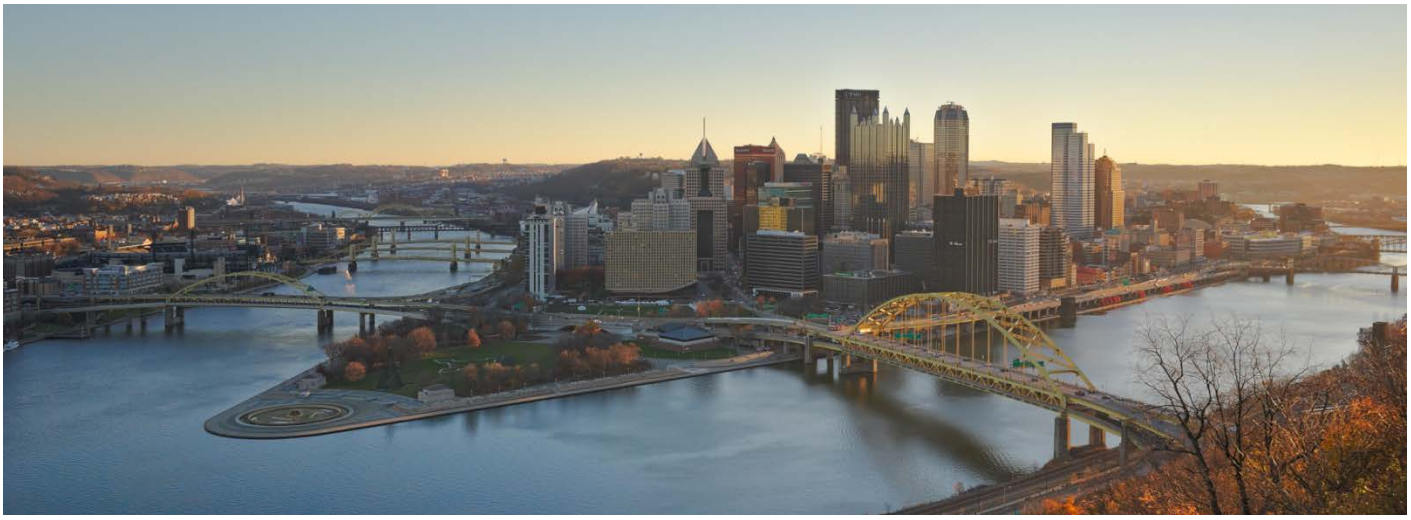
## WET WEATHER PROGRAM

**Client:** CDM Smith
**Project Owner:** Allegheny County Sanitary Authority (ALCOSAN)
**Project Location:** Pittsburgh, PA

Allegheny County Sanitary Authority's (ALCOSAN) Wet Weather Program will implement a Wet Weather Plan to eliminate sanitary sewer overflows (SSOs) and significantly reduce combined sewer overflows (CSOs) into the Allegheny, Monongahela and Ohio Rivers. This is a multi-billion dollar capital improvement program to comply with federal, state and local regulatory requirements. ALCOSAN is considering a hybrid approach, including both gray and green solutions.

CDM Smith's Program Director team is integral to the Program Management Organization that is charged with long-range planning and implementation of the Wet Weather. JCK Underground is providing geotechnical and tunneling expertise to the Program Director team.

*JCK Underground staff currently assisting CDM Smith and ALCOSAN on this project includes: Rafael Castro and Jennifer Jordan.*



## Prior Projects

Our staff possesses a wealth of knowledge developed during major projects that were completed prior to JCK Underground's founding. Their shared experience on many of these jobs led to the development of strong inter-personal relationships, mutual understanding and trust in each other's skills. JCK Underground is thus able to provide clients a team with a demonstrated synergy who fully recognize the dedication and collaboration necessary to deliver quality projects.

| PROJECT | PERSONNEL / ROLE | | | | | | |
|---|---|---|---|---|---|---|---|
| | JJ | RC | JK | TH | MG | GH | RP |
| **DC Clean Rivers Program**, Washington, DC (see description in Current Projects) | P/D | P/D/C | P/D | P/D | C | P | C |
| **Narragansett Bay Commission Combined Sewer Overflow Program,** Providence, RI | | | | | | | |
| • Phase I – 3 mile, 26-feet dia. 200-feet deep storage and conveyance tunnel (shield TBM in rock), drill & blast-driven connecting adits, access and drop shafts, diversion structures, conveyance conduits, and a 50 MGD pump station. | D | C | | | | P | |
| • Phase II – 5 miles of 48- to 72-inch dia. near-surface interceptors driven using slurry MTBM's, diversion structures, and deep connecting adits. | D | C | | | | P | |
| **Massachusetts Water Resources Authority**, Boston, MA | | | | | | | |
| • Boston Harbor Wastewater Treatment Project – 3 tunnels with 12- to 24-feet dia., 15 miles total length (double shield, main beam and single shield TBM's in rock and soft ground) | | | C | | C | C | |
| • Metrowest Water Supply Tunnel – 18 miles, 14-feet dia. (main beam and double shield rock TBM) | D | | C | | | C | |
| • Braintree Weymouth Wastewater Tunnel – 3 miles, 13-feet dia. (main beam rock TBM) | | | D/G | G | | | |
| **South Central Connecticut Regional Water Authority** * | | | | | | | |
| • Tunnel No. 1 and Tunnel No. 2 (*locations confidential) inspection and rehabilitation recommendations | | D | | D | | | |
| • Tunnel No. 3 Redundancy Tunnel Feasibility study | | D | | D | | | |
| **Catskill Aqueduct Repair and Rehabilitation**, Upstate NY Program to repair lining / remove biofilm in 75 miles of tunnel | D | | | D | | | |

**P** = Program Management; **D** = Design; **C** = Construction Management; **G** = General Contractor

**Blasting operations at NBC Pump Station Cavern.**

As highlighted by their detailed resumes, a number of other outstanding projects owe their success, in part, to our staff's individual contributions, innovations and dedication. Such examples include:

**North Shore Connector**
Pittsburgh, PA – **Tom Hennings** worked as lead structural in responsible charge of SOE designs for the project and final design of the North Side Station structural shell comprised of reinforced concrete slurry wall as part of a design-bid-build contract.

Strut-and-post bracing of cutter soil mix walls for the North Shore Connector Project

**WMATA Green Line Subway Tunnel Extension**
Washington, DC – **Joel Kantola** worked with the contractor-led geologic mapping effort during construction of twin subway tunnels to investigate issues related to excavation induced ground movement. Subsequent adoption of permeation grouting and dewatering enabled safe completion of the drives.

**Port of Miami Tunnel**
Miami, FL – **Jennifer Jordan** provided supervision and performed peer review of the geotechnical design for this 2 mile, 37-feet diameter sub-aqueous road tunnel which used an exceptionally wide variety of support and ground improvement techniques to overcome the challenge of variable karstic and mixed face geology.

**Enhanced Nitrogen Removal Facility (ENRF)**
Washington, DC – **Ryan Payne** was responsible for field quality control and geotechnical consulting services associated with the installation of a 60-foot-deep "bathtub" using 1,400 linear feet of permanent structural slurry wall through challenging and unstable soils.

**MUNI Metro Turnback Project**
San Francisco, CA – **Rafael Castro** led the tunnel CM team as the Tunnel Resident Engineer for twin 18-foot diameter, 1,800-foot long transit tunnels in the heart of San Francisco. This was the last US tunnel to be excavated using compressed air along its entire length and one of the earliest uses of jet grouting as a means to construct the cross-passages between twin-bores.

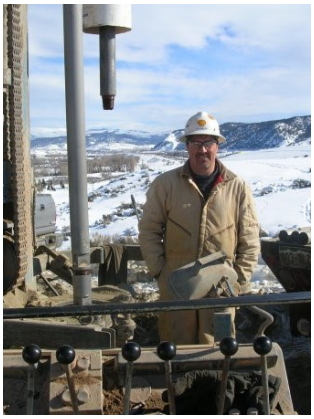
**Eglington Crosstown LRT – Eastern Tunnels**
Toronto, CN – **Marco Giorelli** managed the contractor team that constructed twin 21-foot diameter tunnels for a total length of 4 miles, using two EPB TBM's and a pre-cast concrete segmental liner which were purchased and supplied by the Owner.

**LACSD Outfall Tunnel**
Los Angeles, CA – **Geoff Hughes** led the design team for this 7 mile, 18-feet diameter wastewater tunnel to be driven by a pressurized-face TBM through soil, squeezing rock, active seismic faults, gassy ground and lined with a post-tensioned precast segmental system that was new to the US.


Testing a post-tensioned lining prototype for the L.A. Outfall Tunnel.

## Office Locations and Contact Information

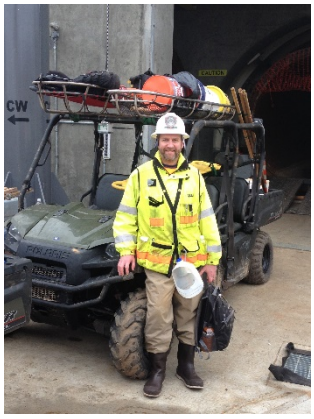
| BRANCH OFFICES | | |
|---|---|---|
| **Boston** 25 Dorchester Avenue, #51549, Boston, MA 02205 | | |
| **Jennifer Jordan, P.E.** | (781) 454-9858 | jordan@jckunderground.com |
| **Rafael Castro, P.E.** | (617) 785-9839 | castro@jckunderground.com |
| **Thomas Hennings, P.E., P.Eng.** | (781) 439-3055 | hennings@jckunderground.com |
| **Los Angeles** 615 S. Baldwin Avenue, #187, Sierra Madre, CA 91025 | | |
| **Joel Kantola, P.E.** | (857) 294-1317 | kantola@jckunderground.com |
| **PROJECT OFFICES** | | |
| **Washington DC – DC Water – DC Clean Rivers** | | |
| **Marco Giorelli, P.Eng.** | (202) 460-8440 | giorelli@jckunderground.com |
| **Ryan Payne, P.E.** | (202) 997-1185 | payne@jckunderground.com |
| **Pittsburgh – ALCOSAN – Wet Weather Program** 395 Federal Street, #6898, Pittsburgh, PA 15212 | | |
| **Geoff Hughes** | (202) 288-5838 | hughes@jckunderground.com |



**Joel managing geotechnical drilling operations.**

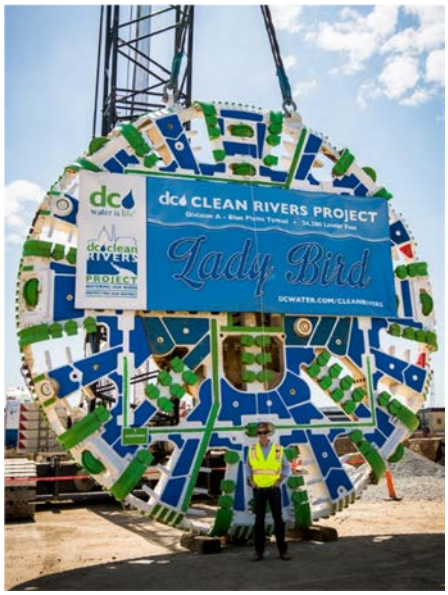
**Geoff accepting UCA of SME Award for NBC CSO Program.**

**Rafael inspecting face of jacking operation at NBC CSO Program.**



**Tom preparing to inspect Coast Range Tunnel**

## Resumes


dc CLEAN RIVERS PROJECT
Lady Bird
DCWATER.COM/CLEANRIVERS


TRAYLOR