Capabilities Statement

Gall Zeidler Consultants (GZ) is a worldwide leader in geotechnics, tunnel design, tunnel engineering, and tunnel construction management, with special expertise in transportation and infrastructure projects. The company specializes in mastering difficult ground conditions by using cutting-edge methods including, but not limited to, dewatering, grouting, and ground freezing. GZ offers exceptional expertise in urban tunneling with shallow overburden and the related protection of neighboring structures and surface operations by innovatively combining conventional (SEM / NATM) and mechanical tunneling methods (TBM) with ground improvement and state-of-the-art waterproofing techniques. GZ employs over 50 staff worldwide, and can look at a history of over 170 miles (275 kilometers) of successfully completed international tunneling projects. The company's expertise has consistently been sought after by major contractors and project owners in the industry to assist with the mitigation of risks associated with tunneling, the streamlining the design process, and making projects run more efficiently in terms of both time and cost. In addition, GZ provides specialized staff to conduct quality assurance and control as well as geological mapping and construction management on-site for a number of complex, large-scale infrastructure projects. Selected recent and ongoing projects include the East Side Access Project in New York, Anacostia River Tunnel in Washington, D.C., Northgate Link Extension in Seattle, Washington, Crossrail Link in London, United Kingdom, and the Riyadh Metro in Saudi Arabia. GZ was also involved in the recently completed Caldecott Tunnel 4th Bore Project in Walnut Creek, CA., Dulles Metrorail Extension in Washington, DC, and Devil’s Slide Tunnel in Pacifica, CA.

Worldwide Leader

The map below shows GZ project locations around the world.

Selected Projects

The selected projects below demonstrate GZ's expertise in the areas of tunnel design, mining, construction support and construction management.
Gall Zeidler Consultants provided tunnel design and consultancy for running tunneling and station caverns, structural and geotechnical instrumentation and monitoring programs, construction inspection, and waterproofing and final lining alternatives for the New York Mass Transit Authority’s Long Island Rail Road (LIRR) East Side Access tunnels in Manhattan. Construction uses hard rock tunnel boring machines (TBM) for running tunnels and drill-and-blast methods for caverns. The East Side Access Manhattan running tunnels feature crossover caverns and two large station caverns for direct LIRR service to Manhattan’s Grand Central Terminal. The alignment starts at the bulkheads of the existing subway tunnels at 63rd Street and Second Avenue, and continues to the terminus of the tail tracks at East 38th Street and Park Avenue.

**GZ Consultants provides construction management services for the Metropolitan Transit Authority’s No. 7 Subway (Flushing) Line Extension. These services include design review and construction inspection related to the underground aspects of the work, NATM / TBM tunnel excavation and support, instrumentation and monitoring, waterproofing, and installation of electrical and mechanical systems. Once completed, the No. 7 Subway (Flushing) Line Extension will extend service beyond its current end point at Times Square west along 41st Street and south along 11th Avenue terminating in the vicinity of 25th Street and 11th Avenue. The extension will include twin running tunnels with 5 cross passages, a 34th Street Station Cavern, 3 shafts and numerous ancillary tunnels and structures.**

**Date:** 2001 - Present

**Structure:** Manhattan running tunnels, crossover caverns, GCT station caverns

**Length:** Approximately 25,000 feet (7,620 meters)

**Cross-Section:** Approximately 350 - 4,200 square feet (33 - 390 square meters)

**Geology:** Schist, schistose gneiss, gneiss, granofels, amphibolite and pegmatite

**Client:** Parsons Brinckerhoff / Parsons / STV JV

**Date:** 2007 - Present

**Structure:** Hard Rock Running Tunnels excavated by TBM and drill-and-blast, Cross Passages, Station Cavern, Shafts, Ancillary Tunnels and Structures

**Length:** Approximately 1.5 miles (2.4 kilometers)

**Cross-Section:** Station: 3,700 square feet (305 square meters)

**Geology:** Fill, alluvial and glacial sediments, weathered and hard rock (Manhattan Schist); groundwater table is approximately 20 feet (6 meters) below the surface

**Client:** Hill International / Lemley / Liro / Frankfurt Daniel JV
## DULLES TRANSIT PARTNERS JV, Dulles Corridor Metrorail Project, Vienna, Virginia

**Scope:** GZ Provides tunnel and station design services from the conceptual to preliminary and final design engineering stages of the project, as well as construction management services. This expertise includes design drawings, specifications, structural calculations, design reports and construction cost estimates. Design activities include TBM selection for both soft ground (Earth Pressure Balance Tunnel Boring Machine), one-pass and two-pass tunnel lining designs for TBM tunnels, NATM / SEM designs for soft ground and rock tunneling for running tunnels, the mined station at Dulles International Airport, and associated emergency egress shafts and cross passages.

**Date:** 2004 - 2014  
**Structure:** Light Rail Station Tunnels, Running Tunnels, Mined Underground Station  
**Length:** 1,700 feet (518 meters) at Tysons Corner and 18,500 feet (5.6 kilometers) at Dulles International Airport  
**Cross-Sections:** Running Tunnels: About 20 feet (7 meters)  
Station Tunnels: 40 feet (12 meters)  
**Geology:** Fill, residual soils, saprolite; claystones, mudstones and siltstones of the Balls Bluff Formation  
**Client:** Dulles Transit Partners, LLC, a JV of Bechtel Inc. and URS

## Automated People Mover System (APM), Dulles International Airport, Dulles, Virginia

**Scope:** Gall Zeidler Consultants provided construction management services for the Washington Dulles International Airport Automated People Mover System. These services included design review and construction inspection related to the underground aspects of the work, SEM / NATM and TBM tunnel excavation and support, instrumentation and monitoring, waterproofing, support of excavation for cut-and-cover construction for station and line tunnels, and the installation of electrical and mechanical systems for the facility. The Automated People Mover System is part of the Dulles Development “D2” Program. When completed, the APM will connect to existing and future terminals. The D2 scheme included a total of approximately 4 miles (6.4 kilometers) of APM tunnels and four new stations at terminal nodes, along with tug and utility tunnels, a pedestrian tunnel that will be built using a combination of cut-and-cover, TBM and SEM / NATM construction techniques, and an at-grade vehicle maintenance facility.

**Date:** 2003 - 2010  
**Structure:** Automated People Mover System (APM)  
**Length:** Approximately 4 miles (6.4 kilometers)  
**Cross-Section:** 300 - 400 square feet (28 - 37 square meters)  
**Geology:** Fill, residual soil and sedimentary rocks of the Balls Bluff Formation (siltstones, mudstones and sandstones)  
**Client:** Parsons Management Consultants
Alexandria Station Pedestrian Tunnel, Alexandria, Virginia

Scope: Virginia Railway Express (VRE) intends to eliminate an at-grade railway crossing currently in use at the Alexandria Union Station. Currently, passengers must cross the tracks to access a central island platform, which poses safety and accessibility concerns to VRE. A new pedestrian tunnel will be constructed to allow access from Alexandria Union Station to the island platform, as well as a direct connection with the King Street Metro station.

GZ, as part of the Gannett Fleming design team, is responsible for the design of a mined pedestrian tunnel beneath the three live rail lines with less than 6 feet of ground cover.

Date: 2014 - Present
Structure: Underground Pedestrian Tunnel
Length: Two mined tunnels totaling 50 feet
Cross-Sections: 245 square feet
Geology: Fill (fat and lean clays), Terrace deposit sandy gravels, Potomac Group
Client: Gannett Fleming

Anacostia River Tunnel Project, Washington D.C.

Scope: The Anacostia River Tunnel project is designed to capture and provide storage for combined sewer overflows (CSOs) being discharged to the Anacostia River. The project consists of a system of deep large diameter underground storage tunnels and associated diversion and pumping facilities. When completed, the tunnel system will be used for the conveyance and storage of combined sewage overflow.

GZ provides the design of the excavation and support system, the final lining, and the waterproofing system. The excavation and support design of the tunnel was based on Sequential Excavation Method (SEM) principles. GZ also provided expert design consulting services and is currently providing full site support during construction.

Date: 2012 - present
Structure: Mined Tunnel (TBM, SEM)
Length: 102 feet
Cross-Section: 102 feet
Geology: Clay of the Patapsco/Arundel Formation
Client: Impregilo, Hailey, and Parsons (IPH)
**SOUND TRANSIT University Link Light Rail, U230 Project - TBM Tunnels, Seattle, Washington**

**Scope:**
GZ Provides expert consulting to the contractor and in that capacity, developed construction drawings for the cross passage excavation. The geological conditions on site called for GZ to develop a systematic depressurization scheme to lower the groundwater pressure in the immediate area of the excavation. The prevailing geology comprised of mostly soft cohesive soils, with intermittent lenses of granular soils that are prone to running when pressurized. Systematic pre-support with self-drilling grouted pipe spiling as required by the ground conditions were utilized. GZ worked with another company to coordinate the installation sequence for the temporary support frames within the TBM tunnels and also coordinated with the equipment manufacturer (Brokk) to select suitable robotic excavation machinery. GZ will provide NATM / SEM experts on site to assist with construction when cross passage construction begins.

**Date:** 2011 - Present
**Structure:** Light Rail TBM Tunnels
**Length:** Approximately 40 feet (12 meters)
**Cross-Section:** Approximately 130 square feet (12 square meters)
**Geology:** Soft cohesive soils with intermittent lenses of granular soils; high ground water table
**Client:** JCM U-Link JV

**SOUND TRANSIT Beacon Hill Station, Seattle, Washington**

**Scope:**
The Beacon Hill Station is a new underground scheme for Sound Transit and was constructed by Obayashi Corporation. The project consists of two 4,300 foot-long (1,310 meter-long) running tunnels and a mined station. All underground structures are located in partially water-saturated soft ground. The 21 foot (6.4 meter) diameter EPB commenced its drive at the West Portal and continued through the station platform tunnel toward the East Portal. The second running tunnel drive was executed from the East Portal. During the construction phase, GZ provided construction design for specific parts of the project, such as the EPB launch at the West Portal, TBM (Earth Pressure Balance Shield EPBS) pass-through the station platform tunnels and re-launch from the platform tunnels, as well as independent design review and advice on the EPB drives to the Contractor. GZ evaluated the TBM performance, geotechnical monitoring data and made recommendations as to the ground conditions and related support measures.

**Date:** 2005 - 2007
**Structure:** Light Rail Station and Tunnels
**Length:** EPB TBM Tunnels: 4,300 feet (1,310 meters) each
**Station Platforms:** Station NATM / SEM Tunnels: 550 feet (170 meters)
**Geology:** Soft to very stiff clays and silts, and cohesionless soils with high groundwater level
**Client:** Obayashi Corporation
### CALTRANS Devil’s Slide Tunnels, U.S. Highway 1, Pacifica, California

**Scope:**
GZ was part of the integrated on-site team (IOST) with several senior engineers providing expert consulting as well as support services for NATM / SEM engineering and construction. This expertise included preparation of shop drawings, ground-structure interaction analyses, evaluation of ground conditions in the field and selection of ground support categories, as well as the evaluation of NATM / SEM instrumentation and monitoring results.

**Date:** 2006 - 2010
**Structure:** Highway Tunnels
**Length:** Approximately 8,000 feet (2,240 meters) total (Two Bores)
**Cross-Section:** Approximately 1,290 square feet (120 square meters)
**Geology:** Highly tectonized and chemically altered granite, granodiorite, sandstone and multiple faults with gauge; groundwater table above tunnel roof

**Client:** Kiewit Construction Company

### CALTRANS / CONTRA COSTA TRANSPORTATION AUTHORITY Caldecott Tunnel Improvement, Walnut Creek, California

**Scope:** The existing Caldecott Tunnel consists of three two-lane tunnels that connect Alameda and Contra Costa counties via State Route 24 (SR-24). In order to reduce traffic congestion and delays, the project includes the construction of a fourth tunnel with seven cross passages to the existing Third Bore, using NATM / SEM. The California Department of Transportation (Caltrans) leads the construction management (CM) team on site. Gall Zeidler Consultants is responsible for the technical construction management of the NATM / SEM section and supports the team with technical expertise and inspection services.

**Date:** 2009 - Present
**Structure:** Two-Lane Highway Tunnel
**Length:** Approximately 3,389 feet (1,033 meters)
**Width:** Approximately 49 feet (15 meters)
**Geology:** Moraga Formation (volcanic rocks), Orinda Formation (sandstone, siltstone, mudstone and conglomerate), Claremont Formation (chert, shale and sandstone), Sobrante Formation (sandstone and shale)

**Client:** Parsons Brinckerhoff Construction Management Services
Riyadh Metro Project, Riyadh, Saudi Arabia

Scope: GZ is currently providing design services and on site construction report for the Riyadh Metro Project in Saudi Arabia. The Riyadh Metro project is currently one of the biggest infrastructure projects in the world. The project consists of 6 metro lines connecting various parts of the city. The project is estimated to be completed by 2018. GZ is providing design services specifically for several mined tunnels, as well as several shafts and slopes.

Date: 2013 - Present
Structure: NATM Running Tunnel
Length: 2 kilometer (1.25 miles)
Cross-Section: 10.8 meter wide, 8.6 meter tall (35.8 feet x 28.2 feet)
Geology: Stratas consisting of Surface Deposits (silty Clays and Gravels) Upper and Lower Limestone Breccias, With Bedded Limestone Unit Inbetween
Client: Bechtel, Almabani, CCC & Siemens (BACS Consortium)

Crossrail Link, London, United Kingdom

Scope: Gall Zeidler Consultants provides expertise in design preparation for this project’s five underground stations (Liverpool Street, Whitechapel, Bond Street, Tottenham Court Road and Farringdon) and ancillary subsurface structures, including ventilation and access / egress shafts and adits. The project’s goal is to connect London’s West End and Docklands to Heathrow Airport with existing railway lines that extend east, west, and southeast from the city. A total of seven new stations will be located along the tunneled section.

Date: 2006 – Present
Structure: Underground Railroad Stations
Length: Approximately 12.5 miles (20 kilometers)
Cross-Section: Approximately 538 - 2,150 square feet (50 - 200 square meters)
Geology: Fill, terrace gravels and alluvium (gravel, sand, silt and clay), London Clay and various deposits of the Lambeth Group (sand, silt, clay); groundwater table above tunnel roof elevations
Client: Mott MacDonald
### Vauxhall Station Upgrade Project, London, United Kingdom

**Scope:** GZ is responsible for the design of the SCL lift shaft and adit tunnel, both of which will be constructed using SCL techniques. By taking advantage of the existing sheet piles and the geometry of the existing structures, the design has demonstrated that the adjacent structures and utilities will be minimally influenced by the underground works. Construction is set to begin in early 2014 with anticipated completion of the project scheduled for 2015.

<table>
<thead>
<tr>
<th>Date:</th>
<th>2013 - Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure:</td>
<td>Lift Shaft, Adit Tunnel, and Cross Passage</td>
</tr>
<tr>
<td>Length:</td>
<td>50 ft deep Lift Shaft</td>
</tr>
<tr>
<td>Cross-Section:</td>
<td>5.0 to 9.6 m diameter</td>
</tr>
<tr>
<td>Geology:</td>
<td>London Clay, Terrace Gravels (gravels with substantial sand)</td>
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<tr>
<td>Client:</td>
<td>Kiewit Construction Company</td>
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</tbody>
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### Bond Street Station Capacity Upgrade, London, United Kingdom

**Scope:** Bond Street Station in one of the busiest underground stations on the network of London Underground. With the aging station and increasing ridership, a large scale upgrade program is being carried out by LUL. GZ performed the independent Category III check of the design for all new underground structures and the independent check of the assessments of the impact on the surface structures, utility main, and existing LUL assets.

<table>
<thead>
<tr>
<th>Date:</th>
<th>2011 - Present</th>
</tr>
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<tbody>
<tr>
<td>Structure:</td>
<td>Underground Railroad Station</td>
</tr>
<tr>
<td>Length:</td>
<td>Tunnels and Shafts: Approximately 1,540 feet (470 meters)</td>
</tr>
<tr>
<td>Cross-Section:</td>
<td>16 – 26 feet feet (4 – 8 meters)</td>
</tr>
<tr>
<td>Geology:</td>
<td>London Clay Lambeth Group, Groundwater above London Clay</td>
</tr>
<tr>
<td>Client:</td>
<td>Halcrow – Atkins JV</td>
</tr>
</tbody>
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### Ruta del Sol, Villeta to Guaduas, Columbia

**Scope:** GZ was retained as an independent, objective arbitrator to review the current design of the alignment before and after the 2010-2011 La Niña event in order to determine the consequences, on the contractability and long-term performance. GZ conducted an in-depth, risk-based analysis of the alignment’s structures and how they will interact with the geologic units throughout the design life of the Project.

<table>
<thead>
<tr>
<th>Date:</th>
<th>June 2013 – September 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure:</td>
<td>Two-Lane Highway with Long Tunnels, Viaducts, Birdges, and Embankments</td>
</tr>
<tr>
<td>Length:</td>
<td>Evaluated a 13.4 mile(21.6 kilometer) section</td>
</tr>
<tr>
<td>Cross-Section:</td>
<td>5.0 to 9.6 m diameter</td>
</tr>
<tr>
<td>Geology:</td>
<td>London Clay, Terrace Gravels (gravels with substantial sand)</td>
</tr>
<tr>
<td>Client:</td>
<td>Kiewit Construction Company</td>
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</tbody>
</table>
LAND TRANSPORT AUTHORITY Sentosa Gateway Road Tunnels, Singapore, Singapore

Scope: GZ Designed two mined sections of the tunnel to pass under the existing major roadways (Telok Blangah Road and Kampong Bahru Road), including the temporary and final support, waterproofing, structural and geotechnical instrumentation, and monitoring programs. The double-lane tunnel crosses under Telok Blangah Road between existing bridge piers under a maximum overburden of 8 feet (2.5 meters), and the single-lane tunnel crosses under Kampong Bahru Road in an easterly direction, passes under a three-cell concrete culvert and continues along Keppel Road with a maximum ground cover of 26 feet (8 meters). The design allows for utilities and roadway traffic to be kept operational during tunnel construction.

Date: 2009 - Present
Structure: Two Road Tunnels
Length: One-Lane Tunnel: 384 feet (117 meters)  
Two-Lane Tunnel: 312 feet (95 meters)
Cross-Sections: One-Lane Tunnel: Approximately 46 feet (14 meters) wide by 30 feet (9 meters) high  
Two-Lane Tunnel: Approximately 35 feet (11 meters) wide by 27 feet (8.1 meters) high
Geology: Predominantly granular soils with layers of cohesive soils, peat, peaty and organic clay, organic sand, residual soil and sedimentary rocks (below tunnel invert); groundwater level is approximately 8.2 feet (2.5 meters) below the surface
Client: CPG Consultants

LAND TRANSPORT AUTHORITY Fort Canning Tunnel, Singapore, Singapore

Scope: GZ provided an alternative NATM / SEM design utilizing a two-pass lining system for the mined portion of the tunnel. A historic park area and an overburden cover of only 10 to 32 feet (3 to 9.5 meters) above the proposed Fort Canning Tunnel posed challenges for design and construction. Both owner and contractor rejected an initial design calling for construction with cut-and-cover methods. The tunnel was completed in 2007 and received BCA’s Construction Excellence Award for management, technology and construction quality.

Date: 2004 - 2007
Structure: Three-Lane Highway Tunnel
Length: 525 feet (160 meters)
Cross-Section: 1,440 square feet (134 square meters)
Geology: Fill, Fort Canning Boulder Bed (FCBB) Formation, Jorung Rock Formation; groundwater approximately 3 to 6 feet (1 to 2 feet) below existing grade
Client: T.Y. Lin International / Sato Kogyo
Bingham Canyon Drainage Tunnels, Bingham Canyon Mine, Salt Lake City, Utah

Scope: Gall Zeidler Consultants (GZ) was tasked by Rio Tinto Kennecott Copper (RTKC) to provide the structural design of the Ground Support according to industry standards for civil engineering infrastructure. This included review of the existing Ground control Management Plan, development of a Basis of Design Report (BDR) for excavation and support systems, instrumentation and monitoring as well as final designs for those systems.

Date: 2013 - Present
Structure: Horse-Shoe Shaped Tunnel
Length: Approximately 10,000 feet
Cross-Sections: 18 feet x 18 feet
Geology: Quartz Monzonite Porphyry (QMP), Latite Porphyry (LP), Quartzite (QZ), Monzonite (MZ) with Moderate to Strong Alteration
Client: Rio Tinto Kennecott Utah Copper

Bingham and Pine Canyon-Parvenue Tunnel Inspections, Bingham Canyon Mine, Salt Lake City, Utah

Scope: Gall Zeidler Consultants (GZ) was commissioned by Rio Tinto Kennecott Copper (KUC) to inspect the Bingham tunnel and Pine Canyon-Parvenu tunnel, prepare a report of findings regarding the condition of the existing ground support, and develop a ground control management plan that included a risk assessment regarding ground control hazards and the support modifications required to upgrade the tunnel to comply with the Safety Standards. The results of these efforts were utilized for the development of a feasibility study to estimate the costs for tunnel rehabilitation. Both tunnels are used for dewatering and depressurization of the pit walls and their continuous functionality is critical for the unimpeded operation of the mine.

Date: 2014 - Present
Structure: Horse Shoe Shaped Tunnel
Length: Bingham Tunnel- 7,660 feet
Pine Canyon-Parvenu Tunnel- 7,460 feet
Cross-Section: 7 feet x 7 feet to 16 feet x 22 feet
Geology: Tertiary Volcanics and Latite Porphyry, Pervasive Alteration and Deterioration to Soil-Like Conditions in Exposed Areas Lithology Showing Oxidation
Client: Rio Tinto Kennecott Utah Copper
C6 Tunnel Rehabilitation Design, Bingham Canyon Mine, Salt Lake City, Utah

Scope: Gall Zeidler Consultants (GZ) was tasked by Rio Tinto Kennecott Copper (RTKC) to provide geotechnical inspection and design services for a temporary ground support system to restore access to the tunnel. GZ provided a risk assessment and developed a Ground Control Management Plan, which included an easy to install yielding support system. In addition, a monitoring and instrumentation program as well as a Trigger Action Response Plan was developed to quantify the tunnel movements in response to future mining activities.

Date: 2014 – Present
Structure: Concrete Lined Horse Shoe Shaped Tunnel
Length: 15,000 feet
Cross-Sections: 18 fee wide x 18 feet high
Geology: Latite Porphyry (LP)
Client: Rio Tinto Kennecott Utah Copper

St. Louis Metrolink Tunnels, St. Louis, Missouri

Scope: GZ is providing leakage inspection and remediation design services for the Cross County MetroLink Extension Project. The scope of the services included approximately 1.5 miles of cut and cover tunnel, and 2 underground stations. GZ conducted an in-depth leakage assessment to determine the locations and severity of all deficiencies. This assessment included a 3-D tunnel scan. GZ is currently performing design services for the final rehabilitation design.

Date: 2010 - Present
Structure: Cut-and-Cover Light Rail Transit Tunnel and Stations
Length: 1.5 miles (2.41 kilometers)
Cross-Section: Tunnel: 754 square feet (70 square meters)
Geology: Fill, loess and glacial deposits, Cheltenham Syncline
Client: St. Louis MetroLink
Gall Zeidler Consultants provided an alternative design for the rehabilitation of the ventilation arch walls in the Liberty Tunnel. The Liberty Tunnel, originally opened in 1924, provides a direct route to downtown Pittsburgh for the South Hills suburbs. The alternative design utilizing shotcrete and lattice girders to create a self-bearing arch, was completed by contractor within a tight schedule, and provided considerable cost savings. This project won the 2014 International Tunnelling & Underground Space Award in the category of “Rehabilitation Project of the Year”.

Date: 2012 - 2014
Structure: Two twin tunnels
Length: Approximately 5,888 feet (1795 meters each)
Cross-Section: XX
Geology: Conemaugh Group
Client: Swank Construction Company

Tuscarora Tunnel Rehabilitation, Fannettsburg, Pennsylvania

Gall Zeidler Consultants (GZ), as part of the design team, provided the PTC with multiple options for the removal of the existing deteriorating ceiling, the installation of a new ceiling, upgrading the lighting and fire safety systems, waterproofing and wall repairs, roadway drainage and tunnel entrance improvements. One option for the rehabilitation included the complete removal of the existing ceiling and the installation of a new waterproofing, drainage system and shotcrete final lining with lattice girders providing a template for the shotcrete application.

Date: 2013 - Present
Structure: Two Twin Tunnels
Length: 815 square feet (76 square meters) and 1,118 square feet (104 square meters)
Cross-Section: Oswego & Juniata Formations (Red Fine to Medium Grained Sandstone); Tuscarora Formation (White Quartzitic Sandstone and Quartzite)
Geology: Oswego & Juniata Formations (Red Fine to Medium Grained Sandstone); Tuscarora Formation (White Quartzitic Sandstone and Quartzite)
Client: Gannett Fleming
Approach to Meeting Project Challenges

GZ provides tunneling expertise as integral part of a project team and ensures compliance with the client’s goals as well as organizational and procedural systems to accomplish the highest possible degree of quality in all phases of the work. The key in doing so is to develop all engineering approaches within the establish parameters while simultaneously coordinating with all disciplines involved. This includes cost analyses, geotechnical investigations, soil and rock property testing, development of the geometrical configuration of underground structures to account for their architectural, mechanical and electrical needs, fire life safety issues and the interfaces between structure types, such as between TBM- and NATM / SEM-type tunnels. In particular, GZ excels in addressing tunneling challenges involving difficult ground conditions such as faults, high groundwater, shallow overburden in urban settings and tunnel sections prone to damage by earthquake differential movements.

All solutions are proposed for concurrence and coordination with the client. In the process of developing solutions to specific project challenges, GZ applies state-of-the-art technologies, while implementing the extensive experience gained in national and international tunneling projects, as well as utilizing more traditional tunneling methods in order to develop a highly customized, most suitable and economical fit.

Key Personnel

Vojtech Gall, Ph.D., P.E. has over 25 years of extensive experience in the design, supervision and construction management of underground projects. Having held key positions in fields ranging from structural engineering to project management and project oversight, he has been directly involved in all aspects of tunnel engineering, evaluation of geological conditions, compilation of geotechnical data for structural analyses carried out by numerical methods, feasibility studies, design and design coordination, and preparation of contract documents. On numerous tunneling projects, he has managed construction phase services.

Kurt Zeidler, Ph.D., CEng, has more than 30 years of experience on projects in the United States, Europe, North Africa, Australia and Asia. Dr. Zeidler has held senior technical and management positions in consulting engineering companies. During his career, he has gained particular experience in geotechnical engineering, engineering geology, project management, design checks, construction supervision and advice, and fire, life and safety considerations. His broad experience includes tunnel design using a wide range of methodologies, including NATM / SEM, TBM, Cut-and-Cover and Drill-and-Blast, as well as tunnel construction and rock and soil slope support.

John Rudolph’s experience with the design and construction management of underground and above ground structures spans a career lasting over 50 years. Mr. Rudolph has been directly involved with the design and construction of the 106 miles of the Washington Metrorail system on multiple major infrastructure projects for over 30 years, including 15 miles of aerial structures and over 40 miles of subsurface structures for the system. Mr. Rudolph’s experience involves design and construction of various types of bridges and viaducts, including post-tensioned CIP and post-tensioned pre-cast Concrete Segmental Guideways. John’s tunneling experience includes the design and construction of various tunnels using NATM, cut-and-cover, and TBMs, both in soft ground and rock with CIP as well as pre-cast concrete linings.

Robert Wallner, MSc. has more than 18 years of experience in the design and construction supervision, geotechnical tunneling and civil engineering consulting of underground structures, mined in soil and rock with Cut-and-Cover methods, as well as foundations and rock mechanics. He has extensive experience in quality assurance and quality control, control of compliance with various standards and specifications, material testing and the verification and validation of systems. He has proven management experience, including the ability to motivate, lead, train, set objectives and manage the performance of multidisciplinary teams. He utilizes problem solving and a management tool and communicates effectively. In addition, he has strong skills in organizing, planning and scheduling functions, with a detailed understanding of contract administration and project control.

Walter Klary, MSc. Walter Klary has more than fifteen years of extensive experience in geotechnical engineering and tunnel construction using various construction methods, including NATM / SEM and Tunnel boring Machine (TBM). He has worked on high profile international projects in Europe, Asia and USA in all ground conditions ranging from soft to hard rock. He is well experienced in difficult ground conditions and all aspects of tunneling, such as caverns, shafts and pressure tunnels.

Julius Hirscher, MSc. has over 20 years of experience in wide-ranging aspects of tunneling, including tunnel design, tunnel management, and tunnel construction. During his career he gained particular experience in the Sequential Excavation Method (SEM). He has applied SEM in ground conditions ranging from soft ground to hard rock. Mr. Hirscher has held key positions such as SEM Sr. Construction Engineer, Project & Construction Manager, Claim Manager, as well as SEM Project and Shift Engineer on tunneling projects in Europe and Canada.
**Key Personnel (continued)**

**Ermin Stehlik** has over 39 years of extensive experience in the design and construction supervision of major international tunneling schemes. During his career, Mr. Stehlik has gained specific knowledge and expertise in the design of underground structures, construction methods, and management of tunnel construction.

**Thomas Schultheis, MSc.** has worked in geotechnical engineering, tunnel construction and consulting on both national and international projects. After graduation, he spent 10 years working in geotechnical and materials engineering at construction sites and his responsibilities have ranged from the assessment of ground conditions and support measures to the development, coordination and implementation of contract documents, as well as the recording of construction progress, geotechnical data and compensation events.

**Steffen Matthei, MSc.** has over 20 years of experience in tunnel construction, design, and management. He has been involved in numerous tunneling projects ranging from design to independent checks and expert witness services. He is knowledgeable in performing analysis and design for underground structures and various international design codes.

**Nikolaos Syrtariotis** is a highly-experienced tunnel engineer with expertise in NATM tunneling methods, including SEM and SCL, with a strong background in face mapping and rock mass classification (RMR, Q, GSI), geotechnical monitoring, ground investigations, implementation of tunnel support measures and tunnel construction in conditions ranging from drill-and-blast to squeezing ground.

**Further Information and References**

For a comprehensive list of scope of services and project experience, please refer to our website www.gzconsultants.com.
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