William Chang, P.E.

Principal/Senior Engineer

Mr. Chang has 38 years of experience in the practice of geotechnical engineering in the western United States. He is the founder and principal of GEO Group Northwest, Inc. (GGNW). He has been the principal-in-charge for GGNW projects since 1990. He is responsible for GGNW's QA/QC program and is involved in project management, coordination and engineering analysis. His experience and expertise include studies for building structures, landslide stabilization, shoring wall design, foundation design, seismic analysis, water main replacement, tunneling technology, earthwork quality control, liquefaction, environmental site assessments, and hazardous waste containment and remediation.

Representative Experience

Buildings

National Hotel Chain – Oregon, Idaho, California and Washington. Mr. Chang has provided management and coordination for 60 geotechnical investigations for this hotel chain throughout Washington, Oregon, Idaho and California. These projects have presented issues including time constraints, adverse weather conditions and poor subsurface conditions. Unique geotechnical issues have included:

- Design of a methane collection system for a site that is located next to a landfill.
- Cement treatment to improve subsurface conditions for sites in Washington and Oregon.
- Augercast pile foundations for hotels that are located on soft soils.

West Seattle High School – Seattle, WA. Managed the geotechnical engineering study for the West Seattle High School renovation and construction project for Seattle Public School District No. 1. The West Seattle H.S. project included the renovation of historic buildings, demolition of temporary buildings, and the addition of 100,000 sq. ft. of new building space. The scope of work included a subsurface investigation, characterization of soils, engineering analysis for foundation support, play field drainage, seismic monitoring, subgrade stabilization, pavement section design, utility backfills, compaction monitoring, and quality control.

Cooper Elementary School – Seattle, WA. Managed the geotechnical engineering study for Cooper Elementary School as part of the Seattle Public School District No. 1 – Building Excellence Program. Developed recommendations for foundation support, play field drainage, subgrade stabilization, pavement section design, and building setback from steep slopes.

Office Park Developments – Puget Sound Area. Mr. Chang has managed geotechnical studies for several large-scale office park developments, including the North Creek and Canyon Park office park sites in Bothell, the 500-acre Van Doren Office Park in Kent, and the Redmond Business Park in Redmond.

High-Rise Buildings – Seattle Area. Managed geotechnical engineering studies for several high-rise buildings in Seattle and Bellevue, Washington, including the 17-story Market Place Tower and the 9-story Quadrant Plaza.

Western Wireless Cellular Communication Towers – King County, WA. Managed geotechnical engineering studies for a 100-foot tall cellular telephone communications tower for Western Wireless. The scope of work involved site reconnaissance, subsurface exploration, geotechnical engineering analysis, and report preparation that included a foundation design involving use of a 66-inch drilled pier.

Family Housing Site – Hopelink Place, Bellevue, WA. Mr. Chang managed the geotechnical engineering study for the Hopelink project in Bellevue on what had been a sewage-treatment site. The completed complex includes multi-family residential buildings, a day care center, parking lots, a driveway, and utilities. In a cost-saving decision, the extensive foundation debris on the former City of Bellevue site was left on site and used to support the parking area.

King County Fire District #37 – Kent, WA. Managed the geotechnical engineering study for Fire Station #77 in Kent. The new fire station is a two-story building with truck bays, driveways and 41 parking spaces. The project scope included the placing of a storm water infiltration/detention pond to capture rainwater from the building in a confined area, performing compaction testing on backfills, and specifying criteria for cut slopes and a rockery for accommodating grade elevation changes.

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Landslide Stabilization

Landslide Investigations – Seattle Public Utilities – Seattle, WA. Managed the geotechnical investigations for the slope and roadway stabilization for the roadways at 13th Avenue East and East Lynn Street, and 34th Avenue NW and NW 77th Street. Participated in community meeting where stabilization alternatives were discussed.

Slope Stability Investigation – Seattle Public Utilities – Seattle, WA. Directed the slope stability investigation for the roadway at West Raye Street. The study used slope inclinometers to measure the movement of the slope to determine stabilization alternative requirements.

Landslide Investigation – Private Residences. Managed the landslide repairs that involved the installation of toe buttresses and drainage measures for slope protection.

Slope Stabilization – Liberty View Apartments – Poulsbo, WA. Managed the geotechnical investigation for the apartment complex, which entailed the design of a cantilever soldier pile wall and underpinning recommendations.

Slope Stabilization Investigation – Vashon Island, WA. Directed the slope stabilization investigation at a private residence that included the use of a rock buttress blanket and horizontal rock filled trenches to stabilize the slope and increase drainage.

Sewer Interceptors, Pump Stations and Treatment Facilities

Kenmore Pump Station – Kenmore, WA. Managed the geotechnical engineering study, performed an earthquake engineering evaluation, and monitored construction of this pump station which used the sunken caisson method of construction.

North Creek Interceptor – Bothell, WA. Managed the geotechnical engineering study for the 42-inch diameter METRO sewer interceptor crossing an area underlain by compressible clay, silt, and peat.

12-Inch Water Main Replacement – Seattle, WA. Directed the geotechnical engineering study for a 12-inch water main replacement at the 500 to 1000 block of Occidental Avenue South. Performed settlement analysis, an earthquake engineering evaluation, and timber pile design for the water main.

Water Main Extensions and Replacements – Seattle Public Utilities – Seattle, WA. Managed geotechnical engineering studies for water main replacements, including soil stability and roadway stability analyses for the water mains.

Transportation

Oaksdale Avenue Southwest – Renton, WA. Directed field exploration, testing, and analysis of this roadway extension, which included a pile supported bridge and deep utility trenches.

195th Street Northeast and Northcreek Parkway – Bothell, WA. Directed and managed geotechnical engineering studies for the roadways, which were underlain with soft peat. Utilized geogrids and geotextiles for subgrade reinforcement and timber piles to support roadway bridges.

Shoring Design

Oregon Health and Science University – Science Building – Portland, OR. Designed a permanent soil nail shoring wall below the Science Building. The design of the nail wall was developed using the computer program NAILM5 developed by the University of California at Davis.

Broadway Market – Seattle, WA. Managed the geotechnical engineering study for the excavation retention system using soil nails. This was the first use of soil nails in the Seattle area.

Shoring Review – Seattle Engineering Department – Seattle, WA. Reviewed the shoring designs of several high-rise buildings in Seattle for the City of Seattle Engineering Department. The buildings reviewed included the Pacific Northwest Bell Building, the 40-story Century Square Building, the Washington Federal Building, and Elliot Park South.

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Settlement Analysis

Mr. Chang has performed extensive analysis of building and roadway performance over soft peat and clay deposits and evaluated the effectiveness of surcharge loads to reduce post construction settlements of these structures. The computer program CONSOL has been used to evaluate the time rate of settlement of the surcharge load and the structures.

Earthquake Engineering

Mr. Chang is experienced in earthquake engineering analysis, including soil liquefaction studies and site modification technologies to improve liquefaction resistance. He is familiar with computations for site response analysis using the computer program SHAKE and the Uniform Building Code determination of site period.

- Mr. Chang completed a soil liquefaction study for METRO's Atlantic Base and Central Base Facility, which encompasses 20 acres for METRO's transit operations.

The following projects were completed while Mr. Chang was employed elsewhere:

Bridge 32 on Interstate I-90 – Seattle, WA. Directed a geotechnical engineering study and analyzed the use of drilled pier foundations to support the elevated bridge which links the floating bridge to the tunnel.

I-90 Tunnel – Seattle, WA. Performed value engineering for the design and construction of the 63-foot-diameter soft ground tunnel. Recommendations included relocating the ventilation stacks to reduce energy requirements.

Bay Area Rapid Transit (BART) – San Francisco, CA. Managed and performed geotechnical engineering studies on the BART Tail Track south of Daly City, which included the utilization of large diameter drilled piers to support the elevated section of the track along Highway 280.

District of Columbia, Washington. Performed detailed foundation and superstructure inspections for over 200 bridges within the District of Columbia.

Bayside Facilities Planning Project – San Francisco, CA. Managed the geotechnical studies for the two billion dollar project which included a 9-mile sea-level tunnel across the San Francisco Peninsula with seven storage and transport facilities feeding into the tunnel.

Central Marin Sanitation Agency – Marin County, CA. Performed geotechnical engineering studies for the secondary treatment facilities which included a new treatment plant, three pump stations, four interceptors, a rock tunnel across the San Quentin firing range and a seven-foot diameter offshore outfall.

Novato Sanitary District – Novato, CA. Performed settlement analysis, earthquake engineering evaluations, and pile foundation design for this wastewater reclamation project.

Education:	MS Civil Engineering – University of California, Berkeley BS Civil Engineering – Drexel University
Registration:	Professional Engineer in Civil Engineering, Washington and Oregon Geotechnical Engineer in California
Affiliations:	Member, American Society of Civil Engineers Member, Society of Military Engineers Member, Chi Epsilon; Member, Tau Beta Pi
Publications:	Drexel University: Thixotropy and Sensitivity of Clays. University of California, Berkeley: Calibration of Capacitance Probes for Moisture Measurements.
Training:	40-Hour Health and Safety Training for Hazardous Waste Operations Nuclear Densometer Gauge Safety Training University of Washington Underground Storage Tank Short Course University of California, Berkeley Rock Mechanics Short Course Concrete Pipe Association Pipeline Engineering Short Course