



Packet A

Statement of Qualifications

Geotechnical Engineering & Project Delivery (Area 1)

Washington State Department of Transportation

May 8th, 2024

SHANNON & WILSON
3990 Collins Way, Suite 100, Lake Oswego, OR 97035

Travis Nguyen and the Shannon & Wilson Team are Uniquely Qualified to Help the State Geotechnical Office Efficiently and Effectively Deliver WSDOT Projects

The Washington State Department of Transportation (WSDOT) continues to be challenged with an ever-increasing demand to deliver projects related to fish passage, seismic retrofits, and ongoing Megaprograms. Because of this sizeable workload, WSDOT is looking once again to supplement their staff in the State Geotechnical Office (SGO) with a subconsultant team, led by a Senior Level Geotechnical Engineer (SLGE), to provide specialized geotechnical expertise, report development, project delivery, construction support, and related activities on large complex transportation projects statewide.

Shannon & Wilson, Inc. (S&W) has a long history of successful partnership with WSDOT. Travis Nguyen is S&W's choice to lead the Geotechnical Engineering & Project Delivery (Area 1) contract, supported by S&W's extensive resources.

We look forward to continuing a successful relationship with the Washington State Department of Transportation.

Throughout S&W's statement of qualifications (SOQ), you'll see several matrices presenting firm and staff experience with Criteria 1 and 2 project elements. In addition, we have included icons (below) indicating five highlighted skill sets to quickly note our ability to support the SGO in successfully delivering these projects.



S&W has geotechnically evaluated more than 200 **fish barrier/fish passage** sites.



S&W is renowned for our **seismic** expertise and is trusted by WSDOT and other agencies.



S&W has performed geotechnical services for hundreds of **rail freight** projects.



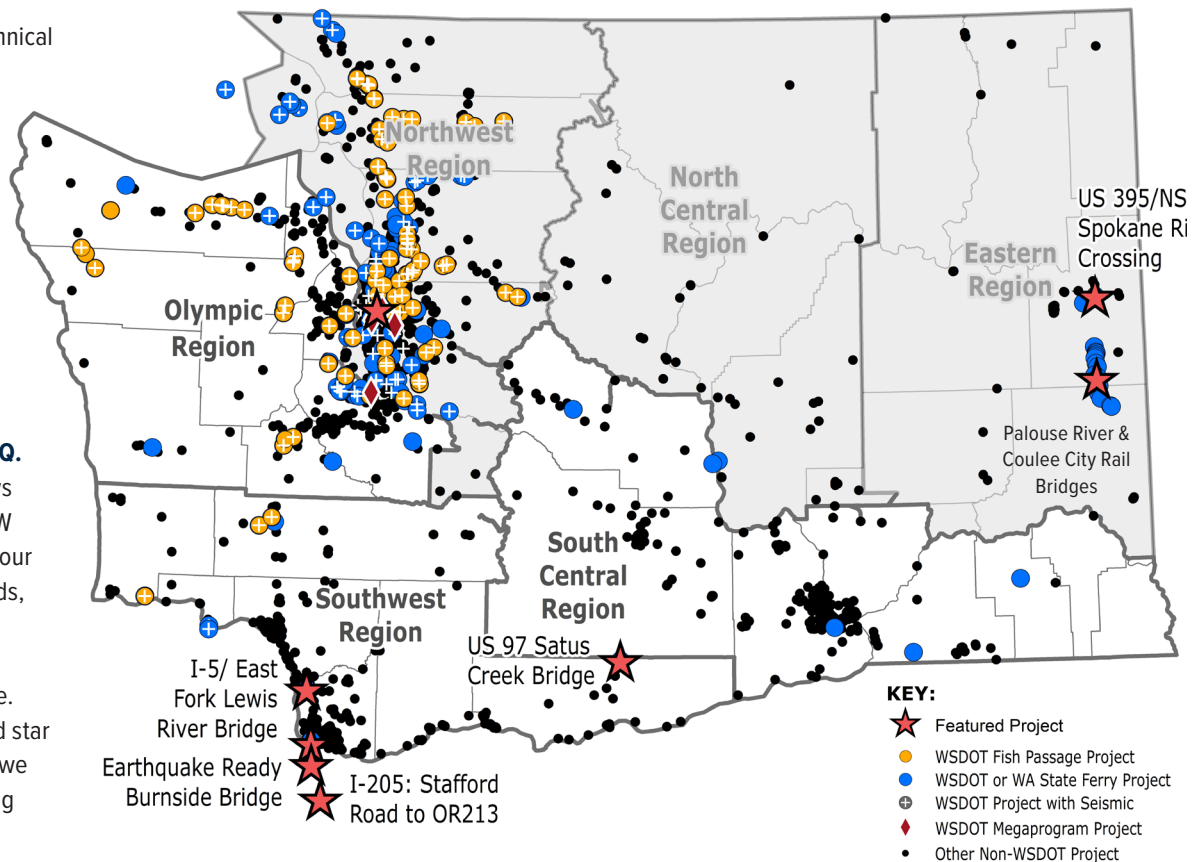
S&W has been the subject matter expert on more than 30 **design-build** highway projects.



S&W was the geotechnical engineer of record on more than 1,000 **design-bid-build** highway projects.

Figure 1: Map of S&W Relevant Projects

S&W is a premiere geotechnical firm that was founded in Washington State. **We have provided geotechnical services for more than 800 projects in Washington State which cover all of the requested geotechnical analysis and design experience elements listed in the RFQ.** This map to the right shows projects performed by S&W for WSDOT and highlights our work on highways, railroads, ferries, fish passages, Megaprograms, and other general project experience. Projects marked with a red star are featured projects that we discuss further on following pages in this SOQ.



S&W is Committed to Working with DBE Team Members in Roles of Varying Sizes

Before this Geotechnical Engineering & Project Delivery (Area 1) RFQ was released, S&W identified several disciplines for this opportunity where supplementing our in-house skills and staff with strong subconsultant firms would provide WSDOT with a robust team to address project needs. The following DBE certified firms will be participating on this project, helping us to provide at least 15% DBE involvement in the contract over its lifetime.

- **HWA GeoSciences, Inc. (HWA) — WBE**
Geotechnical Project Management & Support
- **CADCAB LLC (CADCAB) — WBE**
Subsurface Profiles & Drafting
- **Bolima Drafting & Design, Inc. (Bolima) — MBE**
MicroStation Design & Drafting
- **Stell Environmental Enterprises, Inc. (Stell) — WBE**
Geographic Information Systems (GIS)
- **Scarlet Plume LLC — WBE**
Technical Editing

Each firm listed above will have tasks important to the ultimate success of the years-long contract. They'll have the opportunity to work with us virtually and in-person, giving them direct access to our SLGE, Travis Nguyen, and to the project team, as well as use of our support infrastructure (e.g. templates, Teams). We will provide guidance on project tasks and management and submit useful feedback on their project scopes, schedules, and submittals.

HWA Will Hold a Significant Role

S&W has determined that the most efficient way to maintain significant DBE involvement throughout this contract is to trust HWA with the management and support of entire task orders, wherever possible and commensurate with their skills. Sandy Brodahl, president of HWA, has demonstrated superior talent in managing geotechnical projects. She has nearly 15 years of experience working with various state agencies and local municipalities on roadway corridor, fish passage/fish barrier removal, bridge replacement, bridge retrofit, multi-use pathway, and slope stabilization projects. Sandy has participated in the procurement and/or delivery of many DB projects for WSDOT, giving them an in-depth understanding of WSDOT geotechnical procurement documents and the Geotechnical Design Manual (GDM). HWA understands the importance of defensible design, clear documentation, and detailed QA/QC procedures, and will be an unmatched asset to the team.

Our Strategies for Maintaining Inclusion Throughout the Life of the Contract

At the start of the on-call contract, Travis Nguyen will meet with the WSDOT Office of Equity and Civil Rights to understand how best to work with our DBEs and show our good faith effort to promote their success and participation. As the project progresses and task orders are released, Travis will be responsible for reviewing DBE participation on a monthly basis and mentoring and providing support to the DBE firms. If necessary, he'll identify broader opportunities for these firms that arise through new assignments, changes in scope, and additional project work, helping S&W meet or exceed our 15% inclusion goal.

How S&W Supports DBE Team Members

S&W measures success by meeting or exceeding our DBE goals, by providing and receiving feedback on our performance together during the project, and by strengthening relationships with our team members. Enduring relationships benefit us, our team members, and the clients we serve. S&W frequently:

- Extends invitations (at no cost) to our regular online technical seminars and in-house training workshops.
- Works with DBE firms to provide invoices that meet WSDOT criteria, reducing the number of days until they are paid, knowing that delayed payment of services can strongly impact smaller businesses.

Other Potential Team Members

S&W is prepared to retain other subcontractors/subconsultants to meet SGO needs for this contract. For example, if a project needs cone penetration testing or geophysical testing, we can retain experienced firms to provide these services. Where available, we will retain DBE firms to perform these services.

S&W Diversity Equity and Inclusion Statement

At S&W, it's our desire to create a work environment that is diverse, equitable, and inclusive. We encourage and promote opportunities for everyone regardless of age, gender identity, sexual orientation, physical and mental ability, ethnicity, personality styles, backgrounds, beliefs, and perspectives. When we listen and learn from each other, we will better serve our clients and community. We believe having a diverse, equitable, and inclusive workplace ensures a wide range of experiences, perspectives, and skills that will provide better solutions, drive innovation and creativity, and enhance decision making.

Criteria 1: Qualifications/Expertise of Firms on Team

A. Highway Projects in the State of Washington Where S&W Provided Stamped Recommendations for Each of the Listed Types of Geotechnical Analysis and Design

The following projects present S&W’s expertise with geotechnical analysis and design, one of which was managed by Travis Nguyen, our proposed SLGE for this contract. Project descriptions, as well as involvement of our key support staff, are provided on the following pages.

Table 1: Criteria 1A Projects

	Project #1	Project #2	Project #3	Project #4
Geotechnical Analysis and Design Project Elements	<i>WSDOT, US 97 Satus Bridge Replacement</i>	<i>WSDOT, I-5 Columbia River Crossing</i>	<i>WSDOT, Palouse River & Coulee City Rail Bridge Replacement</i>	<i>WSDOT, US 395/ NSC Spokane River Crossing Project</i>
1. Retaining Walls	☒	☒	☒	☒
2. Highway Bridges	☒	☒		☒
3. Spread Footing Foundations			☒	☒
4. Driven Pile Foundations		☒	☒	
5. Drilled Shaft Foundations	☒	☒		☒
6. Ground Improvement		☒		
7. Slope Stability	☒	☒	☒	☒
8. Landslide Analysis & Remediation				
9. Excavation & Shoring	☒	☒	☒	☒
10. Fill Placement & Compaction	☒		☒	☒
11. Settlement Analysis	☒	☒		☒
12. Analysis of Geotechnical Lab Test Data	B, C, E	A, C, E, F	B, F	C, F
13. Analysis of Geotechnical Field Data	G, I	G, H, I	G, I	G, I

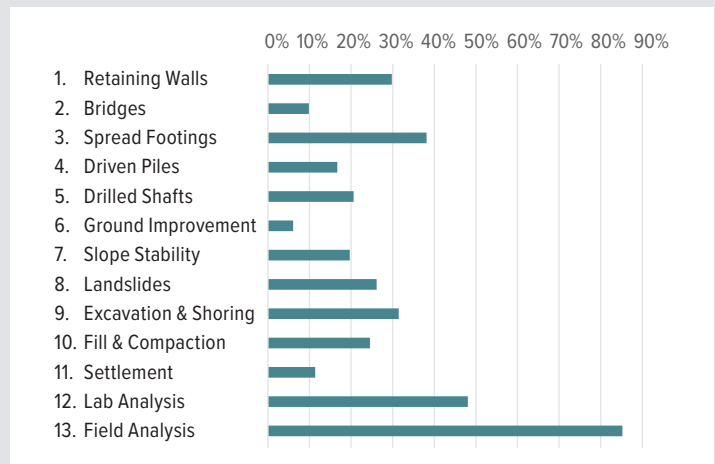
KEY: **A**–Soil shear strength, **B**–Rock shear strength, **C**–Soil consolidation, **D**–Soil compaction, **E**–Soil permeability, **F**–Other lab data
G–Geotechnical field data, **H**–Geophysical data, **I**–Geotechnical instrumentation data

Figure 2: S&W Experience with Geotechnical Analysis & Design Categories

Our geotechnical engineers have experience with all types of geotechnical engineering analyses and data evaluation that can be expected for WSDOT projects.

Figure 2 represents geotechnical projects performed by S&W in Washington State. This graph illustrates our broad range of expertise. For example, 30% of our geotechnical projects include design of retaining walls.

The following pages provide our example projects for Scoring Criteria 1, which focuses on projects that we have performed for WSDOT highway facilities.





WSDOT, US 97 Satus Creek Bridge Replacement | Klickitat County, WA

Engineer of Record: Travis Nguyen, PE // **Senior Advisor:** Monique Anderson, PE

The project, under our WSDOT Geotechnical Engineering Personnel Augmentation Agreement (Y-12254) with the WSDOT Headquarters Geotechnical Office, involved replacing an existing three-span bridge over Satus Creek.

The proposed replacement bridge is a single-span bridge, approximately 105 feet long, with approach fills retained by concrete cantilever walls. S&W evaluated subsurface data collected by WSDOT and performed geotechnical analyses for bridge foundations and retaining walls. The site's subsurface conditions included sand, gravel, and cobbles over basalt bedrock. Artesian groundwater conditions were encountered at the site, which required specialized design and construction considerations.

The seismic hazard analyses performed for the project included evaluation of the design ground motions, liquefaction triggering and liquefaction-induced ground deformation, and co-seismic slope stability. The geotechnical evaluations considered multiple foundation alternatives including driven H-piles and drilled shafts. Drilled shafts were ultimately selected by WSDOT as the preferred option.

The project was designed to meet the requirements of the WSDOT Geotechnical Design Manual and Bridge Design Manual. In accordance with WSDOT Headquarters Geotechnical Office procedures, S&W prepared calculation packages, a draft and final Geotechnical Report, and a Summary of Geotechnical Conditions document.

Throughout the project, S&W coordinated with WSDOT Southwest Region staff and WSDOT Bridge and Structures Office to deliver the geotechnical documents and support development of the Plans, Specification and Estimate package. During construction, S&W provided support to the construction office, including responses to contractor's questions, review of contractor submittals, and RFIs.

As the SGO's geotechnical lead for this project, S&W was responsible for managing the geotechnical effort during design and construction, including:

- Evaluating subsurface data (soil, rock, and groundwater) collected by WSDOT.
- Performing geotechnical analyses for the new bridge, approach abutments, and retaining walls for static and seismic conditions.
- Preparing all geotechnical documents for execution of the project, including a geotechnical report, geotechnical summary of conditions, plans and specifications.
- Providing support during construction to address contractor questions and review of contractor's submittals and RFIs.

Throughout the process, S&W worked closely with the WSDOT Project Engineer's Office (PEO), the BSO, and the WSDOT Construction office (CO) to successfully see the Project through to completion.



WSDOT, I-5 Columbia River Crossing | Vancouver, WA

Engineer of Record: Park Piao, PE // **Senior Advisor:** Gerard Buechel, PE

The Columbia River Crossing was a planned transportation solution to improve congestion and safety on a 5-mile segment of Interstate-5 (I-5) between Vancouver, WA and Portland, OR. The project was led by the WSDOT Project Office. S&W provided geotechnical engineering services for the preliminary design phase. The project consisted of over 100 bridge structures, including the Columbia River Interstate Bridge, as well as miles of retaining structures including both fill walls and cut walls.

S&W performed the subsurface explorations, which consisted of multiple state-of-the-practice boring and in situ characterization techniques including over-water and on-land mud rotary, sonic, seismic cone penetrometer explorations, down-hole shear wave velocity measurements, and pressuremeter testing. The laboratory testing program included cyclic direct simple shear, unconfined compressive strength, consolidation, and soil index testing.

A site-specific seismic study was performed to evaluate the seismic hazards for the project and to develop input ground motions and soil-structure-interaction springs for the Columbia River Bridge structural nonlinear time-history analysis. The seismic study consisted of evaluating the design ground motions considering three design earthquakes, 2D dynamic numerical modeling performed in FLAC to evaluate site response and the dynamic loading on the proposed structures, liquefaction, seismic settlement, lateral spreading, and ground improvement mitigation alternatives.

The foundation design for the Main River Crossing Bridge included 10-foot-diameter, 250-foot-long drilled shafts. The proposed foundation solutions for ancillary structures along the alignment included conventional drilled shaft and driven pile foundations. To provide increased reliability in design and construction, a load testing program including sacrificial load tests on both large diameter driven pile and drilled shaft was successfully conducted.

The information from the load testing program was used to reduce preliminary construction cost estimates, due to the ability to use higher resistance factors in design.

The program featured four sacrificial load tests including a 130-foot long closed-end 24-inch diameter steel pipe pile, a 130-foot long 6-foot diameter drilled shaft, a 150-foot long 8-foot-diameter drilled shaft, and a 250-foot long 10-foot diameter drilled shaft. The load test results significantly exceeded the bearing resistances estimated using conventional evaluation methods. In addition to engineering benefits, the load test program demonstrated that permanent casing was not required, which alleviated prior constructibility assumptions and significantly alleviated constructibility concerns.

As the WSDOT geotechnical lead for this project, S&W was responsible for managing the geotechnical effort during design and load test construction, including:

- Evaluating subsurface data collected by S&W and WSDOT. The site included complex soil, intermediate geomaterial (Troutdale Formation), and groundwater conditions.
- Performing geotechnical analyses for the new bridge, approach abutments, and retaining walls for static and seismic conditions.
- Preparing all geotechnical documents for execution of the project, including a geotechnical data report, geotechnical engineering report, and geotechnical-related design/build procurement documents including both the RFP and GBRs.
- Developing geotechnical related plans and specifications for the driven pile and drilled shaft load testing program.
- Providing support during the driven pile and drilled shaft load test construction to address contractor questions and review of contractor's submittals and RFIs, and provided geotechnical support for construction claims.



WSDOT, Palouse River & Coulee City Rail Bridge Replacement | Whitman County, WA

Engineer of Record: Tyler Stephens, PE // **Senior Advisor:** Neal McCulloch, PE, LEG

The Washington State Department of Transportation plans to replace twelve bridges along the PCC Railroad as part of a capital improvement project. S&W was retained to perform the subsurface exploration and geotechnical foundation analysis for the project.

S&W performed the field exploration program which consisted of 21 soil/rock borings drilled from a modified rail car and the installation of vibrating wire piezometers and data loggers. A laboratory testing program featuring both index and strength testing was completed to evaluate the soil and rock properties.

S&W evaluated the subsurface conditions for each bridge site based on the results of the field explorations, discussed the preferred bridge foundation alternatives with the design team, and provided geotechnical recommendations for design. Through a collaborative design process, driven pile foundations were selected as the preferred foundation solution due to potential scour concerns.

S&W performed seismic ground motion and seismic hazard evaluations for each bridge site in accordance with AREMA guidelines. The evaluations included developing seismic design ground motions, liquefaction triggering evaluations, seismic slope stability, and lateral earth pressures.

For each bridge site, S&W developed 14- and 16-inch diameter pipe pile axial bearing resistance and provided soil parameters for pile lateral load analysis.

The construction considerations developed by S&W considered both the bridge requirements as well as the potential impacts on the underlying railroad corridor.

A geotechnical report was developed in accordance with the WSDOT GDM. S&W provided the geotechnical support for the bridge replacement design plans and specifications. During construction, S&W provided construction support including review of contractor's submittals and periodic site visits and inspections.



WSDOT, US 395/NSC Spokane River Crossing Project | Spokane, WA

Engineer of Record: Hisham Sarieedine, PE // **Senior Advisor:** Monique Anderson, PE

The US395/NSC Spokane River Crossing Project under our WSDOT Geotechnical Engineering Personnel Augmentation Agreement (Y-12254) with the WSDOT Headquarters Geotechnical Office, involved the construction of two parallel US 395 bridges overcrossing the Spokane River.

Each proposed bridge will have eight spans with a 210-foot-long span crossing the Spokane River with the seven remaining spans between 110 and 155 feet in length. The approach embankments that connect to the north ends of the new bridges consist of back-to-back retaining walls.

The approach embankment walls are about 570 feet long with maximum heights just short of 30 feet. The north end of the project also includes an 115 feet wide, single monotube, sign bridge that will span the north- and southbound lanes.

S&W evaluated subsurface data collected by WSDOT and developed geotechnical recommendations for the project, which included spread footing and 9- and 9.8-ft-diameter drilled shafts to support the new bridges. The design of the drilled shafts supporting the long-span crossing the Spokane River accounted for the anticipated scour around the foundations.

S&W also provided recommendations for the design of mechanically stabilized earth walls, embankment fills, seismic hazard evaluations, and foundation design for the sign bridge.

All design recommendations were developed following WSDOT's Geotechnical Design Manual (GDM), WSDOT's Bridge Design Manual, and American Association of State Highway and Transportation Officials (AASHTO's) Load and Resistance Factor Design (LRFD).

S&W provided geotechnical support for the preparation of the design plans and specifications. During construction, S&W provided support to WSDOT's Construction Office, including responses to contractor's questions, and review of contractor submittals and RFIs.

S&W participated in design and construction meetings and closely coordinated with the WSDOT's Eastern Region Spokane Project Engineer's Office and their Bridge and Structures Office.

B. Highway Projects in the State of Washington and Oregon Where S&W Provided Stamped Recommendations for Seismic Design

S&W is known for providing routine and advanced seismic design services for all types of projects. Through the technical expertise of our engineers and geologists, S&W delivers solutions for a full range of seismic hazard evaluation, design, and mitigation services, including site response studies, soil liquefaction evaluations, and seismic hazard analyses for major bridges and other transportation facilities. We have developed project-specific seismic design criteria to correspond to WSDOT, AASHTO, and other state, federal, and international codes. To complete our seismic analyses, we combine results from the subsurface exploration program, laboratory testing, and in situ testing, including downhole suspension logging to measure shear wave velocity. We use the results of our analyses to develop foundation solutions, such as use of ground improvement or use of alternate materials (e.g., lightweight fill for embankment stability).

The following projects illustrate S&W’s expertise with seismic design for state highway projects, as well as involvement of our key support staff, if applicable:

Table 2: Criteria 1B Projects

	Project #1	Project #2	Project #3	Project #4	Project #5
	<i>WSDOT, I-5 East Fork Lewis River Bridge Replacement</i>	<i>WSDOT, SR 520 West Approach Bridge North</i>	<i>WSDOT, I-5 Columbia River Crossing</i>	<i>ODOT, I-205: Abernethy Bridge</i>	<i>Multnomah County, I-205: Burnside Bridge</i>
Seismic Design Project Elements					
1. Seismic Deaggregation	☒	☒	☒	☒	☒
2. Seismic Effects on Slope Stability	☒	☒	☒	☒	☒
3. Seismic Effects Upon Foundations	☒	☒	☒	☒	☒
4. Liquefaction Evaluation	☒	☒	☒	☒	☒
5. Liquefaction Effects on Slope Stability	☒	☒	☒	☒	☒
6. Liquefaction Effects on Upon Foundations	☒	☒	☒	☒	☒
7. Advanced Seismic Studies	☒	☒	☒	☒	☒

In addition to the seismic design project elements included above, S&W has performed the following advanced seismic studies on previous WSDOT projects:

- Probabilistic Seismic Hazard Analysis (PSHA)
- Earthquake Time History Analysis
- Ground Motion Models
- Ground Motion Intensity Analyses (Response Spectra, Arias Intensity, Cumulative Velocity, and Duration)
- Dynamic Soil-Foundation Springs/Stiffness Matrix
- Dynamic Soil-Structure Interaction (DSSI) Analysis
- Uniform Hazard Spectra
- Conditional Mean Spectra
- Spectrum-Compatible Time History Development
- Basin Amplification Effects
- Wave Passage and Directivity Effects
- Fault, Tectonics, and Seismicity Evaluations
- Fault Rupture Hazard Analyses

Because of S&W's team of seismic professionals, we also have the expertise in-house to perform several other types of advanced seismic studies, such as:

- Deterministic Seismic Hazard Analysis
- Risk-Targeted Spectra
- Ground Improvement Modeling, Design, Plans, and Specifications





WSDOT, I-5/East Fork Lewis River Bridge Replacement | Clark County, WA

Subject Matter Expert: Travis Nguyen, PE // **Senior Advisor:** Monique Anderson, PE

The I-5/East Fork Lewis River Bridge Replacement Project includes replacing the existing 84-year-old 852-foot-long steel truss bridge along northbound I-5 located in Woodland, Washington. The project was performed under our WSDOT Geotechnical Engineering Personnel Augmentation Agreement (Y-12254) with the WSDOT Headquarters Geotechnical Office. S&W stamped seismic design recommendations for the project.

S&W evaluated the subsurface data collected by WSDOT along the bridge alignment. The subsurface conditions mainly consisted of loose to medium-dense sand and silt overlain by gravel and bedrock. The bedrock surface was variable along the bridge alignment between 30 feet and 220 feet below the existing ground surface.

S&W performed a site-specific seismic study to develop project-specific seismic design criteria for the design/builder. Our seismic study included the selection of input time histories based on seismic hazard deaggregation data, 1D site response analysis for the SEE and FEE seismic design events specified in the WSDOT GDM and BDM, and development of project-specific seismic design response spectra for SEE and FEE earthquakes.

In addition, S&W performed site-specific seismic hazard evaluations including liquefaction, residual shear strength, seismic settlement, lateral spreading, and seismic slope stability.

The results of the seismic hazard evaluations indicated that the sand and low plasticity silt are liquefiable under both SEE and FEE design earthquakes. The design seismic events, lateral spreading would occur along both the north and south riverbanks. S&W evaluated the seismic effects on the proposed new bridge drilled shaft foundations including downdrag and lateral spreading loads on the drilled shaft foundations.

Our evaluations indicated that ground improvement may be required to mitigate the lateral spreading loads on the proposed drilled shaft foundations. S&W performed a seismic ground improvement study for permitting purposes, including the evaluation of feasible ground improvement methods.

Based on the subsurface soil conditions and the project site constraints, S&W concluded that the preferred type of ground improvement would consist of deep soil mixing with supplemental jet grouting in areas with low overhead clearance. S&W also developed the preliminary ground improvement locations and configurations for the permitting purpose.

Throughout the process, S&W worked closely with the WSDOT Project Engineer's Office (PEO), the Bridge and Structures Office (BSO) to successfully develop DB contract procurement documents.



Photo courtesy of WSDOT



WSDOT, SR 520 West Approach Bridge North | Seattle, WA

Engineer of Record: Jeremy Butikovich, PE

The SR520 West Approach Bridge North project included the construction of a new 6,000-foot-long bridge that connects the SR 520 Evergreen Point Floating Bridge to the Montlake neighborhood of Seattle. WSDOT determined that the old approach bridge was vulnerable to collapse during an earthquake. S&W was the geotechnical EOR for this DBB project.

Subsurface conditions along the bridge alignment consist of 5 to 80 feet of very soft peat and clay, over very dense/hard sand and clay. The new bridge is supported by 8- to 10-foot-diameter drilled shafts that extend about 50 feet into the underlying very dense/hard soil. To reduce seismic demands on the bridge superstructure, the bridge design includes a seismic base-isolation system.

Design of the base-isolation system required a dynamic soil structure interaction analysis. To support this effort, S&W performed 1D, 2D, and 3D DSSI analyses and coordinated with the structural designer and structural peer reviewer.

S&W performed a PSHA to characterize the seismic hazard at the site. The PSHA included Seattle Basin effects.

The time histories for the DSSI analyses were spectrally matched to conditional mean spectra consistent with the seismic source of each time history. This method—new to WSDOT projects—led to more realistic demands on the bridge structure.

Other analyses included liquefaction triggering, liquefaction-induced settlement, slope stability, deep foundation axial and lateral resistance, and retaining wall lateral earth pressures.

S&W supported WSDOT during construction and helped address challenging drilled shaft construction conditions. The project was successfully completed in 2017.



WSDOT, I-5 Columbia River Crossing Project | Vancouver, WA

Engineer of Record: Park Piao, PE, and Robert Mitchell, PE // **Senior Advisor:** Gerard Buechel, PE

The Interstate 5 (I-5) Columbia River Crossing (CRC) Project is a joint project between WSDOT and ODOT. S&W performed a site-specific seismic hazard evaluation including a site response study to develop design ground motions for the Columbia River Bridge and to develop soil-structure-interaction springs and displacement time histories for input into the 3D structural nonlinear time history analysis model.

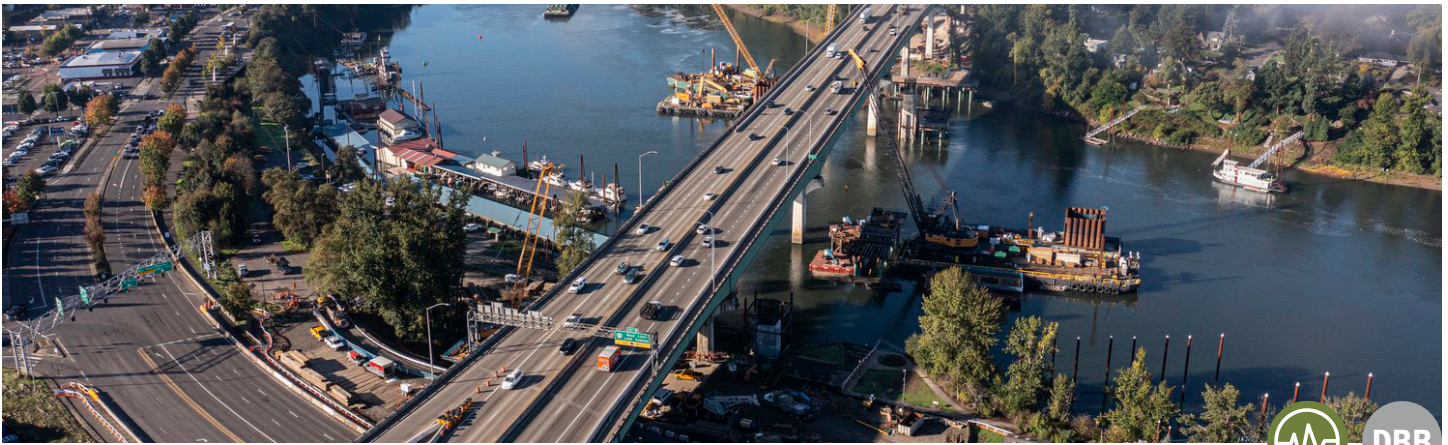
The project-specific design criteria included three seismic design events corresponding to return periods of 500-, 1,000-, and 2,500-years. S&W performed a probabilistic seismic hazard analysis and de-aggregation study to develop bedrock source-specific spectra. A suit of ground motion time histories was selected and scaled for each of the three design events. S&W performed 1D and 2D numerical continuum modeling to evaluate both equivalent linear and nonlinear effective stress site response for each design event.

S&W performed seismic hazard evaluations including liquefaction and seismic induced settlement using both simplified methods defined in the WSDOT GDM and supplemented with the nonlinear effective stress site response analysis. The results of evaluations indicated that the alluvial sand within the upper 110 feet below the ground surface would be liquefiable. The depth of the liquefiable soils was especially pronounced at the Oregon shoreline.

S&W also performed slope stability and lateral spreading analysis to evaluate the seismic performance of the riverbanks. The results of the analysis showed that the riverbank slope would be unstable and lateral spreading would occur under all three design events. S&W evaluated the impact of the seismic slope instability on the large-diameter drilled shaft bridge foundations and provided design recommendations including seismic downdrag and lateral spreading loads on drilled shafts.

To evaluate seismic mitigation options, S&W performed preliminary ground improvement evaluations along the Oregon side riverbank to protect the drilled shaft foundations located in the riverbank area and the bridge approach embankment retaining walls.

Based on the subsurface soil conditions, deep soil mixing was selected as the preferred ground improvement alternative. S&W developed a preliminary deep soil mixing configuration including alignment, width, and depth to provide a basis for engineering cost estimating and permitting purposes. S&W provided the Design Ground Motion Report and the Preliminary Geotechnical Engineering Report for the project.



ODOT, I-205: Stafford Road to OR213 Widening Project, Abernethy Bridge | Clackamas County, OR

Engineer of Record: Park Piao, PE // **Senior Advisor:** Bill Perkins, PE

The I-205: Stafford Road to OR213 Widening Project is a 7-mile-long highway corridor improvement project in Clackamas County, OR that includes nine bridge replacements/retrofits and rockfall hazard mitigation. The project included the widening and seismic retrofit of the Abernethy Bridge, an approximately 2,700-foot-long structure, including 14 piers and two bridge abutments, across the Willamette River between the cities of West Linn and Oregon City. S&W is the geotechnical EOR for the project.

The evaluation of the bridge utilized performance-based design using non-linear time history analysis (NLTH) of the full bridge structure to satisfy project-specific design criteria. The challenging subsurface conditions along the bridge alignment included a dipping basalt bedrock contact, liquefiable sand alluvium, and deposits of loose low-plasticity silts that were up to 130 feet thick along the east side of the alignment. Laboratory testing including cyclic and post-cyclic testing indicated the low-plasticity silts encountered at the site were subject to pore pressure generation and strength loss during seismic loading.

S&W performed PSHA to evaluate the seismic demand at the site. To refine the estimate of seismic demand at the site, S&W utilized the seismic deaggregation data and performed conditional mean spectra analysis to evaluate source-specific design ground motions. The design motions were used as input for 1D, 2D, and 3D numerical modeling to evaluate the seismic performance of the site soils and ground improvement mitigation alternatives and to provide soil-structure-interaction springs and displacement time histories for the NLTH bridge model.

The geotechnical modeling included project-specific calibration to capture the behavior of the low-plasticity silts as observed in the laboratory and evaluation of liquefaction

triggering and the effects of liquefaction and cyclic softening on site response and seismic slope stability.

The design of the bridge substructure and foundations was iteratively performed in collaboration with the structural design team to develop pier-specific solutions. S&W provided design loading considering the effects of liquefaction and cyclic softening including downdrag and lateral soil deformation. The design solutions included combinations of a triple-pendulum seismic isolation system, drilled shafts up to 12 feet in diameter, and ground improvement at select locations.

The ground improvement mitigation was optimized using the 2-dimensional numerical modeling. The ground improvement configuration and strength properties were adjusted, and seismic deformations were estimated and provided to the structural engineer for evaluation. The recursive design process was repeated to simultaneously minimize the ground improvement footprint while reducing the estimated seismic deformations and foundation demands to meet the performance criteria.

The 12-foot-diameter shafts are the largest shafts ever constructed in the State of Oregon and S&W led a bi-directional load testing program to successfully confirm the shaft capacity. S&W supported ODOT during construction and helped address the challenging drilled shaft construction conditions. The drilled shafts were successfully completed in 2023, the anticipated date of construction completion is end of 2025.

***NOTE - Although not affiliated with WSDOT nor situated in the State of Washington, this project adhered closely to AASHTO standards in its design. Despite its geographical variance, the project mirrored the features outlined in this WSDOT RFQ.**



Multnomah County, Earthquake Ready Burnside Bridge | Portland, OR

Engineer of Record: Sam Sideras, PhD, PE // **Senior Advisor:** Park Piao, PE

Multnomah County is conducting the Earthquake Ready Burnside Bridge (EQRB) to improve the bridge and meet the region's needs for seismic resiliency. The EQRB project involves the replacement of the 100-year-old existing bridge structure with a new, approximately 2,200-foot-long, bridge structure crossing the Willamette River to connect the east and west sides of Portland.

The new bridge will include a movable bascule structure spanning the primary navigable river channel. The EQRB project is currently in final design and utilizes the CM/GC delivery method. S&W is the geotechnical EOR for the project.

The project-specific design criteria for the project established a two-level performance criterion that exceeds typical AASHTO requirements. Performance-based design was evaluated using dynamic soil-structure-interaction analysis including a nonlinear time history analysis of a 3D bridge model and 1D, 2D, and 3D continuum modeling performed by S&W to characterize the seismic performance of the site.

Subsurface conditions along the bridge alignment include 20 feet of historical, undocumented fill on both riverbanks underlain by alluvial soils consisting of loose to medium dense sands and low plasticity silts up to 120-feet-thick. The river channel includes up to 60 feet of loose to medium-dense sand. The site is underlain by dense gravel alluvium and Troutdale Formation. The primary geotechnical seismic hazards at the site were liquefaction, cyclic softening, and seismic slope displacement.

The geotechnical design and analysis included numerous site-specific refinements to estimate the seismic performance of the bridge including:

- Probabilistic and deterministic seismic hazard analysis.
- Conditional mean spectra evaluations considering the seismic hazard deaggregation data to determine representative source-specific design spectrum.
- Numerical modeling with soil models calibrated to site-specific cyclic and post-cyclic laboratory test data.
- 1D and 2D site response modeling to evaluate site response and seismic slope stability.
- 3-dimensional continuum modeling to evaluate soil-structure-interaction for shafts embedded within an improved soil grid.

The seismic effects on foundations including liquefaction and cyclic softening induced downdrag and lateral soil deformation loading were explicitly accounted for in the soil-structural-interaction springs and displacement time histories S&W provided to the structural design team.

In addition to the seismic requirements, the design and construction of the bridge needs to consider the dense urban environment, adjacent historical infrastructure, and interaction with existing railroads and ODOT highway structures. S&W is collaborating with the design, agency, peer review, and construction teams to facilitate project delivery.

***NOTE - Although not affiliated with WSDOT nor situated in the State of Washington, this project adhered closely to AASHTO standards in its design. Despite its geographical variance, the project mirrored the features outlined in this WSDOT RFQ.**

Criteria 2. Qualifications of the Proposed Senior Level Geotechnical Engineer

A. Qualifications and Expertise of the CONSULTANT’s Senior Level Geotechnical Engineer (SLGE)



TRAVIS NGUYEN, PE // SLGE & Project Administrator

Firm: Shannon & Wilson

Registration: Professional Engineer-Civil, WA, #19263, 1997

Education:

BS, Civil Engineering, Oregon State University

21 Years of Geotechnical Project Management



Travis Nguyen boasts 33 years of geotechnical engineering experience, with over two decades dedicated to project management. His expertise spans various geotechnical projects including bridges, rail freight, port and waterfront structures, embankments, buildings, retaining walls, landslides, dams, levees, shoring systems, and excavations for a variety of clients. For the past six years, Travis has efficiently managed projects for WSDOT through SGO. He possesses deep knowledge of SGO's administrative and technical processes, collaborating effectively with different WSDOT sections. Travis recently served as WSDOT’s geotechnical Subject Matter Expert (SME) for the I-5/East Fork Lewis Bridge NB Bridge Replacement – see Table 3 below. Travis also provides training and mentorship to S&W staff, guiding them through WSDOT procedures, adhering to AASHTO and GDM design standards, and crafting geotechnical memoranda and reports.

Table 3: SLGE Projects & Areas of Expertise

Travis has spent the last six years working on WSDOT projects, dedicating his career to providing excellent project management and quality service. His experience leading projects with Criteria 1A and 1B Areas of Expertise are extensive.

Project Name	Criteria 1A											Criteria 1B								
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, US 97 Satus Creek Bridge Replacement (PM)	☒	☒		☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, I-5/East Fork Lewis River NB Bridge Replacement (PM)	☒	☒		☒	☒	☒	☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, SR MP 12.57 Cemetery Creek Fish Passage (PM)	☒	☒			☒		☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, US 2 MP 5.02 & 5.18 Bunk Foss Creek Fish Passage (PM)	☒		☒		☒			☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, I-5 Columbia River Crossing (Project Engineer)	☒	☒		☒	☒	☒	☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

B. Familiarity with State Design and Construction Standards

At S&W, we agree with WSDOT on the critical importance of the SLGE for this contract to possess a thorough grasp of WSDOT and AASHTO manuals and standards. Travis possesses extensive knowledge and experience in this regard, making him the primary point of reference for our team when utilizing these manuals and standards in our geotechnical projects. For DB and DBB projects, Travis will ensure that our geotechnical tasks align with WSDOT requirements.

WSDOT Geotechnical Design Manual (GDM)

Since joining S&W in 2008, Travis' career has primarily focused on transportation projects, including projects in Washington State. With experience ranging from small to large WSDOT projects, Travis is well-versed in many WSDOT GDM requirements and has played a significant role in leading WSDOT projects under the existing staff augmentation contract, including DBB and DB projects. This involvement has led him to regularly utilize and integrate the WSDOT GDM. His ongoing work with WSDOT further enhances his understanding of the SGO's objectives in providing clear guidance to geotechnical designers both within and outside of WSDOT.

AASHTO LRFD Bridge Design Specifications (BDS)

As mentioned above, Travis specializes in transportation projects, primarily for clients like WSDOT, ODOT, and other local agencies in both the states of Oregon and Washington. For these projects, the design being in accordance with AASHTO BDS is a requirement. Travis regularly utilizes AASHTO BDS and stays informed about updates that could impact his projects. His extensive experience with AASHTO BDS and WSDOT standards greatly benefits his role as SLGE for this contract.

C. Familiarity with Project Management

The last 20 years of Travis's career has been spent managing transportation projects in Oregon and Washington with a major focus on supporting WSDOT and the SGO on projects over the last six years. The following narrative provides an example of how Travis has successfully managed geotechnical projects and teams.

Travis is extremely skilled at managing multiple projects with overlapping schedules.

Because of his WSDOT project familiarity and experience, Travis voluntarily assists Monique Anderson on our existing WSDOT Personnel Augmentation Contract and is currently supporting four S&W PMs on more than 15 fish passage project sites. He uses his WSDOT knowledge to appropriately identify S&W resources to help complete the work considering project expertise needs and schedules.

Travis' experience has a unique ability to prioritize limited resources and optimize project delivery.

Travis oversees many projects with concurrent timelines and holds a weekly project workload meeting with other project managers to forecast workload and schedules. This meetings allow for resource allocation adjustments, prioritization of tasks, and ensuring timely, high-quality project delivery. Travis collaborates closely with owners and clients to establish feasible schedules, utilizing his PM network for resource adjustments.

Travis' Eight Project Management Tips

1. *Understand scope and budget.*
2. *Learn client's project intentions.*
3. *Communicate clearly and regularly.*
4. *Be responsive to your client and staff.*
5. *Track project progress weekly and document decisions/changes.*
6. *Prioritize meetings/calls over emails.*
7. *Follow QA/QC protocols.*
8. *Recap lessons learned for the next project!*

C. Familiarity with Project Management - Continued

Through Travis' management experience and working on task orders from our SGO augmentation services, he has a thorough understanding of how WSDOT and the SGO approach delivery of projects and geotechnical design. He is familiar with the WSDOT field exploration unit, the State materials laboratory, the project offices, and project teams. This gives him the ability to quickly identify where schedule or resource availability can affect the project schedule. He keeps a close eye on each project so that he can quickly respond to WSDOT questions.

Travis is known for his clear communication on complex projects with multidisciplinary teams.

Clear communication is one of Travis's top priorities and is one of the most important skills that is needed when working with a multidisciplinary team. One example of his successful communication skills was the TriMet Orange Line Project, a 7-mile long light rail project in Portland, OR. For this project, Travis communicated on a daily basis with the agency, bridge lead, ground utility lead, environmental lead, CM/GC contractor, and S&W internal engineering staff. His promptness and clear communication made the geotechnical-related construction successful and helped avoid numerous geotechnical-related project risks.

D. Familiarity with DB Team Leadership/Mentorship

S&W has been involved with many DB projects, either as the Owner's representative or as part of the design-builder's team. In his career, Travis has served as the Owner's Representative and SME for many design/build projects. He has served in this role from the start of DB procurement and through completed DB implementation. This DB owner experience makes him an excellent representative for WSDOT. Recently he successfully delivered the DB geotechnical procurement documents for the I-5/East Fork Lewis Bridge NB Replacement Bridge Project.

Throughout the procurement process, Travis prepared the geotechnical requirements for the RFP, developed and implemented subsurface exploration programs for geotechnical data, performed conceptual design, and thoughtfully developed baselines. He prepared geotechnical data reports (GDRs), geotechnical baseline reports (GBRs), and reference memoranda. During DB implementation of these projects, Travis will coordinate technical review of the submittals through staff within S&W and then perform the final review himself to confirm that technical requirements were met.

Travis is a professional who continually seeks to improve, help, and develop clear guidance for his staff, WSDOT staff, and the geotechnical community. His extensive DB experience and deep knowledge of WSDOT requirements and goals make him an excellent representative for the SGO/WSDOT in DB projects.



E. Familiarity with Construction Support

Travis has been providing geotechnical construction support services for most of his career.

In his 33 year career, Travis has performed hundreds of construction observations and inspections of various geotechnical-related construction activities, including fill placement and compaction, small and large drilled shaft installation, pile driving, ground improvement (stone column, deep soil mixing, and jet grouting), soldier pile and tieback walls, micropiles, soil nail walls, mechanically stabilized earth (MSE) walls, lightweight fill construction, instrumentation installation and monitoring, and spread footing subgrade evaluation.

For the last decade, he has been leading construction projects including several large-scale complex transportation projects. For DB projects, his construction support has been focused on the typical construction-related needs for transportation projects, including:

- Incorporating geotechnical requirements into PS&E or RFP documents;
- Writing special provisions and editing RFP technical requirements;
- Reviewing PS&E documents prior to advertisement;
- Providing inspection training;
- Performing quality verification inspection;
- Participate in pre-construction meetings;
- Reviewing submittals and cost reduction incentive proposals (CRIPs);
- Answering RFIs;
- Assessing change of condition claims.



Travis Nguyen provided excellent geotechnical services to the City of Newberg on transportation projects that I managed in the last 15 years. He consistently delivered sound advice for roadway design and construction.

– Paul Chiu, Senior Engineer, City of Newberg

Travis' skills in these areas are best described by the following project example for a DBB project.

DBB // WSDOT, US 97 Satus Bridge Replacement

The primary geotechnical-related construction elements for this project included:

- Drilled shafts 6 feet in diameter, extending to depths of 27 feet with 10 feet minimum embedment in basalt bedrock.
- Cast-in-place concrete retaining wall up to 28 feet high.
- The required construction sequencing to allow for maintenance of traffic on US 97.
- During the preparation of the PS&E documents, Travis prepared special provisions to include the unique aspects of this project relating to drilled shafts and wall subgrade preparation. Design services during construction included reviewing Contractor submittals, providing responses to Contractor's requests for information, and consultation.



Criteria 3. Qualifications/Expertise of Selected CONSULTANT Staff

A. Qualifications and Expertise of the S&W Team's Selected Senior Staff

S&W has a strong, effective, and seasoned set of project leaders. The following pages describe in detail our Selected Senior Staff's skills, abilities, and familiarity with WSDOT's project elements and criteria. These PMs are more than qualified to take on any task the SGO requests of us. However, there may be times where it's necessary to bring in a PM with a specific skill set, a more efficient location (e.g. Olympia, Richland, Vancouver) or additional availability. To ensure that WSDOT's SGO always has a top-notch PM to lead a task order, we have provided 10 alternate managers with more than 10 years of geotechnical project management and five alternate managers with 5-10 years.

Figure 4: S&W's Team Organization Chart





PARK PIAO, PE // Project Manager

Firm: Shannon & Wilson

Registration: Professional Engineer-Civil, WA, #53578, 2016

Education:

MS, Civil Engineering, Portland State University

BS, Civil Engineering, Dalian Institute of Technology

20 Years of Geotechnical Project Management



Park has nearly 30 years of experience with a wide range of geotechnical and seismic engineering projects. He has a strong background in leading complex transportation projects that involve analyzing and designing pile and drilled shaft foundations, especially laterally loaded piles and drilled shafts. He is also experienced in seismic ground motion characterization analysis, liquefaction analyses, post-liquefaction settlement analyses, post-liquefaction soil residual strength evaluations, and seismic soil-structure design. Park’s other areas of expertise include retaining walls, shoring design, landslide remediation, soil improvement, shallow foundation design and settlement analysis, and construction consultation, particularly for pile and pier installations, soil nailing, and tiebacks. He has managed numerous WSDOT projects in the past and is currently managing five fish passage projects under the WSDOT Geotechnical Engineering Personnel Augmentation Agreement; therefore, he is very familiar with WSDOT design and construction standards. Park has a proven track record of managing complex, multidisciplinary projects, providing high-quality deliverables, and meeting project schedules and budgets. As Geotechnical Manager for the Columbia River Crossing (CRC) Project, Park demonstrated his ability to simultaneously manage multiple tasks (both preliminary engineering and DB procurement document development), design for challenging subsurface conditions, and effectively communicate with the CRC agency project manager and bridge lead. For this contract, Park will primarily serve as S&W’s PM for WSDOT highway and fish passage projects and provide his technical expertise for other projects and to staff within the SGO.

Table 4: Selected Senior Staff Projects & Areas of Expertise

Park has been involved with thousands of projects that involve the areas of expertise listed in Criteria 1A and 1B. The matrix below provides example projects that illustrate his knowledge and management of different geotechnical areas of expertise.

Project Name	Criteria 1A												Criteria 1B							
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, I-5 Columbia River Crossing (PM)	☒	☒		☒	☒	☒	☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, I-5/East Fork Lewis River Bridge Replacement (Senior Reviewer)	☒	☒		☒	☒	☒	☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, US 97 Satus Creek Bridge Replacement (Senior Reviewer)	☒	☒			☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, I-5 Unnamed Tributaries to Penny Creek & Silver Lake (PM)	☒	☒	☒		☒		☒		☒	☒		☒	☒		☒	☒	☒	☒	☒	
WSDOT, SR 524 Martha Creek to Swamp Creek (PM)	☒	☒			☒		☒		☒	☒		☒	☒		☒	☒	☒	☒	☒	

PARK PIAO, PE – Continued**2B: Familiarity with STATE Design and Construction Standards**

Over Park's 28-year career, he has used the WSDOT GDM, the WSDOT BDM, and AASHTO LRFD BDS extensively in his work for WSDOT. Several of Park's notable projects are listed in the matrix on the previous page. Park is currently managing geotechnical activities for five WSDOT fish passage projects.

2C: Familiarity with Project Management

Park's day-to-day work involves managing many projects that often have competing schedules. Every week, Park and other PMs hold a weekly workload meeting. All PMs predict the project workload and schedule for each project. This weekly workload meeting can move resources from less time-sensitive projects and add momentum to projects with tighter schedules - this makes sure all the projects are delivered at the highest quality and on schedule. Park works closely with Owners and Client Representatives to prioritize tasks and set achievable schedules, tapping into his network of PMs to adjust resources as needed.

Park's technical expertise and complex project management experience is an invaluable resource that allows him to predict potential risks/challenges by coordinating with agencies and clients to avoid potential project schedule delays and risks. Recently, for the WSDOT I-5 Penny Creek fish passage project, the proposed creek alignment was close to the existing I-5 retaining wall and the existing bridge abutment – Park brought up the geotechnical risks to the PEO and the project team. The PEO and the project team discussed the proposed creek alignment risks with the WSDOT environmental team which led to the changing of the proposed structure type and modified the proposed creek alignment.

2D: Familiarity with DB Project Team Leadership/Membership

Park has prepared multiple geotechnical documents for DB contracts. For example, he developed the project GDR, GBR, and geotechnical sections of the RFP documents for the Columbia River Crossing project. He worked closely with WSDOT and the project team to address unique geotechnical challenges brought on by the challenging subsurface conditions at the site. As mentioned previously, Park is working on five WSDOT fish passage project sites and is currently developing the GDRs and GBRs for each project site by working closely with the PEO and the project team.

2E: Familiarity with Construction Support

Park has managed many construction projects in which he provided geotechnical support including review of contractor's submittals and RFIs, design modifications, and claim support. He also has managed construction observations for geotechnical-related features including drilled shafts, soldier piles and tiebacks, micropiles, driven piles, and landslide mitigation construction. He managed the Columbia River Crossing load test program construction which included three drilled shafts and driven pile installation. His work included reviewing contract submittals, RFIs, and managing the daily construction inspection. Park also provided claim support to WSDOT for the contractor's drilled shaft construction claim.

Park has wide-ranging experience evaluating change claims as both the Geotechnical EOR and as an expert witness in project litigation. His experience working with attorneys/agencies and seeing how claims can develop has profoundly influenced how he approaches his role as a Geotechnical EOR or technical witness. For example, in a soil nail wall contractor's claim against an agency, as geotechnical EOR, he closely worked with the agency attorney to provide geotechnical data collected during the design phase, construction inspections, daily reports, and construction photos to demonstrate that the subsurface conditions presented in the contractual documents for construction are consistent with the observed surface conditions during construction which successfully supported the agency in the claim.



SANDY BRODAHL // Project Manager

Firm: HWA GeoSciences, Inc.

Registration: Professional Engineer-Civil, WA, #52917, 2015

Education:

MS, Civil Engineering, University of Puerto Rico-Mayaguez

BS, Civil Engineering, University of Puerto Rico-Mayaguez



13 Years of Geotechnical Project Management

Sandy has 13 years of geotechnical engineering experience, performing geotechnical site investigations, laboratory testing, and providing construction monitoring services for a broad range of projects including numerous large-scale transportation and infrastructure developments. Her experience includes developing field exploration programs, performing detailed geotechnical engineering analyses, and providing geotechnical design recommendations as they relate to the challenges of each project. Her technical skills include seismic design, liquefaction analysis, slope stability analysis, retaining wall design, and analysis and design of shallow & deep foundations. Over the last 5 years, Sandy has been dedicated mostly to work on WSDOT projects, serving as lead geotechnical engineer as well as supporting WSDOT's Geotechnical team through procurement and bidding phases of various design-build projects, making her an expert in WSDOT's GDM and Standard Specifications, WSDOT Environmental Procedures Manual, WSDOT Bridge Design Manual, as well as the Local Agency Guidelines (LAG) Manual and Department of Ecology's Stormwater Management Manual for Western Washington.

Table 5: Selected Senior Staff Projects & Areas of Expertise

Sandy has been involved with hundreds of projects that involve the areas of expertise listed in Criteria 1A and 1B. The matrix below provides example projects that illustrate her knowledge and management of different geotechnical areas of expertise.

Project Name	Criteria 1A												Criteria 1B							
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, Olympic Region 23 Fish Passages (Geotechnical Engineer)	☒	☒	☒		☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, SR 3/SR 16/SR 166 Gorst Vicinity - Remove Fish Barriers (Geotechnical Engineer)	☒	☒	☒		☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, SR 302 Victor Area Corridor Study (Geotechnical Engineer)	☒				☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
SDOT, Fairview Avenue Bridge (Geotechnical Engineer)	☒	☒	☒	☒	☒		☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
City of Seattle, Northgate Pedestrian Bridge (Geotechnical Engineer)	☒	☒	☒		☒	☒	☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
City of Everett, Grand Ave Park Utility Bridge (Geotechnical Engineer)	☒				☒		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

SANDY BRODAHL, PE – Continued**2B: Familiarity with STATE Design and Construction Standards**

Sandy has extensive experience working public infrastructure projects in the Pacific Northwest, with over 13 years of experience working on various transportation projects, Sandy has worked on over 30 bridge projects within the past 10 years making her very familiar with WSDOT policies and procedures and she is knowledgeable in and complies with the standards set by regulating agencies. She uses WSDOT's GDM and Standard Specifications on a regular basis. In addition, she is knowledgeable of the AASHTO LRFD Bridge Design Manual, WSDOT Environmental Procedures Manual, WSDOT Bridge Design Manual, as well as the Local Agency Guidelines (LAG) Manual and Department of Ecology's Stormwater Management Manual for Western Washington.

2C: Familiarity with Project Management

Sandy has extensive experience managing multiple projects with overlapping schedules and HWA's multidisciplinary team is committed to meeting WSDOT's deadlines and schedules while maintaining quality standards. For example, on WSDOT's Olympic Region 23 Fish Passages project in Clallam, Jefferson, and Kitsap Counties, which was divided into four bundles, Sandy assisted in the procurement process to prepare the RFQ and RFP for one of the design build bundles and provide design recommendations through final design for one of the bundles that were delivered as design-bid-build projects. Both bundles were in progress at the same time and with different consultants managing the bundles, Sandy navigated this as well as each consultants resource constraints to optimize project delivery. The Kitsap project (design-bid-build) included the removal of four fish passage barrier removals and the Clallam/ Jefferson project (design build) included seven fish passage barrier removals.

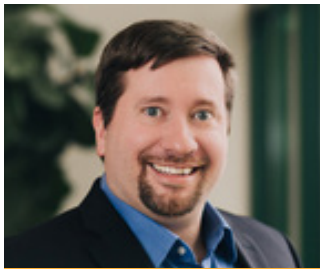
Sandy is a SME in the field of geotechnical engineering, and brings this expertise to all projects she is involved in. For example, on the Olympic Region Fish Barrier Removal, Sandy directly assisted WSDOT through the procurement process in preparing the RFP and RFQ. In addition, she assisted WSDOT's Geotechnical team during the bidding process responding Geotechnical related questions and after the selection of the DB team with support reviewing on RFI, submittals, transmittals, and other related geotechnical documents ((Geotechnical Reports, Memos, Design Calculation Reports, etc) that were related to the successful delivery of this complex project.

2D: Familiarity with DB Project Team Leadership/Membership

As a senior geotechnical engineer, Sandy understands the importance of early planning, communication, and identification of the unique geotechnical challenges of each project site. She schedules field discovery meetings with the design team to discuss geotechnical findings and present different approaches to these challenges. Sandy's active involvement in the design process ensures that geotechnical strategies seamlessly integrate with the evolving project design. As a SME in the field of geotechnical engineering, Sandy has collaborated as a team member of a multidisciplinary group to prepare geotechnical documents for various design-build contracts and provides critical information from her discipline that aids in the success of each project. For example, Sandy was the Project Manager for the Olympic Region 23 Fish Passages and SR 3/SR 16/SR 166, Gorst Vicinity – Remove Fish Barriers projects. These projects required thorough coordination with WSDOT, the completion of a geotechnical site investigation and the development of the DB procurement documents (Concept Plans, RFQ, and RFP) and assist WSDOT in support of the DB procurement process.

2E: Familiarity with Construction Support

Sandy has extensive experience reviewing submittals, requests for information, cost incentive proposals and experiencing evaluations. Sandy reviews contracts on a regular basis and reviews requests for information regularly, providing feedback to internal and external teams. Her attention to detail and experience on various projects gives her the ability to provide clear, quick, and concise reviews aiding in the completion of submissions and projects as well as navigating change of condition claims and plan errors with ease. For example, on the Olympic Region Fish Barrier Removal, Sandy directly assisted WSDOT through the procurement process in preparing the RFP and RFQ. In addition, she assisted WSDOT's Geotechnical team during the bidding process responding Geotechnical related questions and after the selection of the DB team with support reviewing on RFI, submittals, transmittals, and other related geotechnical documents ((Geotechnical Reports, Memos, Design Calculation Reports, etc).



15 Years of Geotechnical Project Management

BRIAN REZNICK, PE // Project Manager

Firm: Shannon & Wilson

Registration: Professional Engineer-Civil, WA, #42820, 2006

Education:

MS, Civil Engineering, Oregon State University

BS, Civil Engineering, Oregon State University



Brian has 22 years of experience in geotechnical engineering on transportation projects in Washington State. He has extensive experience in roadway infrastructure, bridge, culvert, and stormwater facility projects for WSDOT and local cities and counties; these projects regularly use WSDOT, AASHTO, and FHWA standards and methodologies. His technical expertise encompasses design for shallow and deep foundations including driven piles and drilled shafts, embankments, slope stability, cut and fill walls, pavement, stormwater infiltration, and ground improvement. His experience includes developing subsurface exploration, in-situ, and laboratory testing programs; completing feasibility, design, and risk analyses; and preparing reports, plans, specifications, and construction cost estimates. In his career, Brian has also managed many public facilities projects and several port and waterfront structures. For this contract, Brian will primarily serve as S&W’s PM for fish passage, highway, and port division projects, and provide his retaining wall expertise for other projects and to staff within the SGO.

Table 6: Selected Senior Staff Projects & Areas of Expertise

Brian has been involved with thousands of projects that involve the areas of expertise listed in Criteria 1A and 1B. The matrix below provides example projects that illustrate his knowledge and management of different geotechnical areas of expertise.

Project Name	Criteria 1A										Criteria 1B									
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, SR520 Bridge Replacement & HOV Project, I-5/Mercer Street to SR520/Portage Bay (WSDOT Design-Build Representative)	☒	☒					☒		☒		☒	☒	☒		☒					
WSDOT, I-5/SR11 Chuckanut Interchange Modification & Josh Wilson Road Realignment (PM/Project Engineer)	☒		☒		☒					☒	☒	☒	☒	☒		☒	☒	☒		☒
WSDOT, US Highway 2/Bickford Avenue Intersection Safety Improvements (Project Engineer)	☒						☒		☒			☒	☒		☒					
WSDOT, I-5 Joint Base Lewis McChord Interchange Justification Report (Project Engineer)	☒	☒	☒						☒			☒	☒							
Snohomish County, Granite Falls Bridge 102, Mountain Loop Highway (Project Engineer)	☒	☒	☒				☒		☒	☒	☒	☒	☒	☒	☒					

BRIAN REZNICK, PE – Continued

2B: Familiarity with STATE Design and Construction Standards

Brian has used the WSDOT GDM, WSDOT BDM, and AASHTO LRFD BDM as key guidance documents on his transportation projects for WSDOT and local Washington State agencies. Brian uses these documents for geotechnical exploration planning, geotechnical analyses, preparation of reports, plans, and specifications for DB and DBB projects. Brian is a leader at S&W for soil nail design, incorporating the latest FHWA and WSDOT methods.

2C: Familiarity with Project Management

Brian has extensive experience managing multidisciplinary, large-scale projects that have concurrent schedules. For example, Brian managed S&W's on-call contracts with King County and NOAA. These contracts have multiple work orders occurring with overlapping deliverables and schedules. The work orders include emergency repairs, feasibility studies, improvement design, and includes civil, structural, hydraulic, survey, cultural resources, and environmental subconsultants. For each project, Brian tracks the schedule, project deliverables, budget, and subconsultants, and uses tracking tools to balance the project workload. Whenever possible, Brian utilizes experienced staff to promote efficiency. Brian communicates regularly with the owner and project team to maintain progress.

2D: Familiarity with DB Project Team Leadership/Membership

In his career, Brian has managed geotechnical efforts as the Owner's Representative in numerous transportation projects. He is very familiar with WSDOT procurement documents including the geotechnical sections of the RFP, GDR, and GBR. Brian also worked with S&W's Design/Build team for the Honolulu Authority for Rapid Transit Skyline Project, analyzing and developing construction documents for permanent walls to be constructed around the monorail piers. Brian has experience both as the owner and the design/build team. His unique skill-set helps him develop high-quality procurement documents for this proposed contract.

2E: Familiarity with Construction Support

Brian's familiarity with WSDOT Standard Specifications is exemplified by his extensive involvement in WSDOT and local agency project construction. Brian began his career in the field, performing subsurface explorations and construction support services. His experience includes construction observation with soil nails, soldier piles, ground anchors, and mechanically stabilized earth walls, embankment fill placement and compaction for roadways and bridge approaches, and bridge and structure foundations such as drilled shafts, driven piles, and spread footings. This experience has given Brian invaluable insight into design constructibility, plan development, and specification preparation. Brian uses the WSDOT Standard Specifications almost exclusively when developing construction considerations for reports and preparing construction bid documents.

In his 15 years of project management experience, Brian routinely manages construction activities including review of contractor submittals, contractor requests for information, cost reduction, incentive proposals, and providing agency for geotechnical-related claim support.



15 Years of Geotechnical Project Management

TYLER STEPHENS, PE // Project Manager

Firm: Shannon & Wilson

Registration: Professional Engineer-Civil, WA, #42481, 2006

Education:

MSE, Geotechnical Engineering, University of Washington
BS, Geological Engineering, University of Idaho



Tyler has more than 25 years of experience with a wide range of geotechnical projects. He has extensive experience in leading complex transportation, railroad, and public facility projects that involve analyzing and designing bridges and building foundations supported by spread footings and deep foundations. Tyler’s other areas of expertise include seismic hazard evaluations, retaining walls and shoring design, soil improvements, shallow foundation design and settlement analysis, and construction consultation, particularly for earthwork grading and landslide mitigation construction. He has managed numerous WSDOT projects in the past. Recently, he just completed managing a fish passage project under the WSDOT Geotechnical Engineering Personnel Augmentation Agreement; therefore, he is very familiar with WSDOT design and construction standards. Tyler has a proven track record of managing complex, multidisciplinary transportation and railroad projects, providing high-quality deliverables, and meeting project schedules and budgets. As a Geotechnical Manager for WSDOT’s, Palouse River & Coulee City Rail Bridge Replacement Project, Tyler demonstrated his ability to simultaneously manage multiple tasks for 12 bridge geotechnical investigations and design for challenging subsurface conditions, and effectively communicate with the client. Tyler has managed numerous building facilities for many agencies including Sound Transit, the University of Washington, the US Department of Energy, and Whitman College. For this contract, Tyler will primarily serve as S&W’s PM for capital facilities and freight rail projects, and provide his technical expertise for other projects and staff within the SGO.

Table 7: Selected Senior Staff Projects & Areas of Expertise

Tyler has been involved with hundreds of projects that involve the areas of expertise listed in Criteria 1A and 1B. The matrix below provides example projects that illustrate his knowledge and management of different geotechnical areas of expertise.

Project Name	Criteria 1A												Criteria 1B							
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, I-5 and SR 11/Padden Creek (PM)	☒	☒	☒				☒		☒	☒	☒	☒		☒	☒					
WSDOT, Rail PCC Railroad P&L Branch Bridge Replacement (PM)	☒		☒	☒			☒		☒	☒	☒	☒		☒	☒					
WSDOT, BNSF Railway Landslide Mitigation (PM)	☒		☒				☒	☒	☒	☒		☒	☒							
WSDOT, ARRA Task 17 Corridor Reliability Project (PM)	☒		☒				☒	☒	☒	☒		☒	☒							
Sound Transit Facility, I-405 Bus Base North (PM)	☒		☒				☒		☒	☒		☒	☒							

TYLER STEPHENS, PE – Continued

2B: Familiarity with STATE Design and Construction Standards

Over Tyler's 25-year career, Tyler has used the WSDOT GDM, the WSDOT BDM, and AASHTO LRFD BDS extensively in his work for WSDOT and freight projects. Notable projects are listed in the matrix on the previous page. Tyler recently completed managing geotechnical activities for a WSDOT fish passage project.

2C: Familiarity with Project Management

As one of the senior project managers at S&W, Tyler manages multiple projects, handles staffing needs, and various project schedules. Tyler holds weekly workload meetings to justify resources for his individual project needs and successfully delivers his projects on schedule and at the highest quality.

One of Tyler's strongest project management skills is timely communication with clients and project partners. He works closely with clients to coordinate project needs, and potential geotechnical impact on other disciplines, such as environmental impacts and right-of-way constraints on the field explorations and constructions. Recently, for the WSDOT Rail PCC Railroad Bridge Replacement Project, he worked with the WSDOT drilling crew and A/E client to complete 21 borings along the roadway with a special drilling platform setup, and delivered the geotechnical report on schedule.

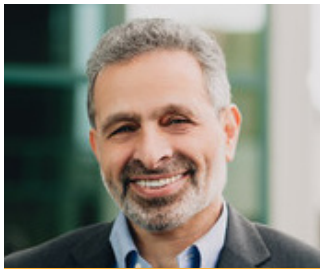
2D: Familiarity with DB Project Team Leadership/Membership

Tyler has worked on numerous DB projects. Recently, Tyler finished working on the DB WSDOT, I-5, and SR 11/Padden Creek Project where he closely worked with WSDOT and project team to address project geotechnical challenges brought on by the challenging subsurface conditions at the site, and developed the project GDR, GBR, and geotechnical section of RFP documents. After the design-builder was selected for the project, he reviewed the contractor's submittals and RFIs, and provided the claim support to WSDOT.

2E: Familiarity with Construction Support

Before Tyler became a project manager, he performed construction observations and inspections for many years. He is very familiar with the construction submittals, RFIs, design modifications, and claim support. Therefore, he has successfully managed hundreds of construction projects before becoming a PM. Tyler has managed most of his projects starting from geotechnical investigation, design recommendations, plans and specifications, and construction support for the last 15 years.

As described in Sections 2B, 2C, and 2D, Tyler fully understands the WSDOT Standard Specifications as well as related Special Provisions, and has used WSDOT specifications in many of his construction projects.



20 Years of Geotechnical Project Management

HISHAM SARIEDDINE, PE // Project Manager

Firm: Shannon & Wilson

Registration: Professional Engineer-Civil, WA, #NUMBER, YEAR

Education:

MS, Civil Engineering, Louisiana State University

BS, Civil Engineering, Louisiana State University



Hisham is one of S&W’s lead foundation engineers. He has 35 years of experience with a wide range of geotechnical engineering projects, including transportation and port facilities. His areas of expertise include driven piles and drilled shaft axial, and lateral bearing resistance under both static and seismic conditions. His expertise also includes cut and fill retaining walls, slope stability, settlement, liquefaction evaluation and mitigation, ground improvement, and landslide mitigation. In his career, Hisham has worked on many design-build and design-bid-build projects for WSDOT and WSDOT local agency projects; therefore, he is very familiar with WSDOT design and construction standards. He has a proven track record of managing complex, multidisciplinary transportation projects, providing high-quality deliverables, and meeting project schedules and budgets. As Geotechnical Manager for the US 395/NSC Spokane River Crossing Project, Hisham demonstrated his ability to simultaneously manage multiple tasks, design for challenging subsurface conditions, and effectively communicate with WSDOT project managers and other discipline leaders. Hisham also has experience in the design and construction of ports, waterfront structures, and landslide mitigation. For this contract, Hisham will primarily serve as S&W’s PM for WSDOT highways, Port Division projects, and provide his technical expertise for other projects and to staff within the SGO.

Table 8: Selected Senior Staff Projects & Areas of Expertise

Project Name	Criteria 1A										Criteria 1B									
	Retaining Walls	Highway Bridges	Spread Footing Foundations	Driven Pile Foundations	Drilled Shaft Foundations	Ground Improvement	Slope Stability	Landslide Analysis & Remediation	Excavation & Shoring	Fill Placement & Compaction	Settlement Analysis	Analysis of Geotechnical Lab Test Data	Analysis of Geotechnical Field Data, Test Data, & Instrumentation Data	Seismic Deaggregation	Seismic Effects on Slope Stability	Seismic Effects Upon Foundations	Liquefaction Evaluation	Liquefaction Effects on Slope Stability	Liquefaction Effects on Upon Foundations	Advanced Seismic Analysis
WSDOT, US 395/NSC Spokane River Crossing Project (PM)	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, SR20/UNT to Coal Creek Fish Passage Project (PM)	☒		☒				☒			☒	☒	☒		☒	☒	☒	☒	☒	☒	☒
WSDOT, SR20/Childs Creek to Skagit River Fish Passage Project (PM)	☒			☒			☒			☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Sound Transit, Federal Way Link Extension Design-Build (Deputy PM)	☒		☒		☒		☒			☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
WSDOT, I-5/SR526 to SR 2 HOV project, Everett, WA (Deputy PM)	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

Hisham has been involved with thousands of projects that involve the areas of expertise listed in Criteria 1A and 1B. The matrix below provides example projects that illustrate his knowledge and management of different geotechnical areas of expertise.

HISHAM SARIEDDINE, PE – Continued**2B: Familiarity with STATE Design and Construction Standards**

Hisham has extensive experience in large federal highway, transportation, and transit projects, including WSDOT's US 395/NSC Spokane River Crossing and SR20/UNT to Coal Creek Fish Passage Project, and Sound Transit's Federal Way Link Extension Design-Build Project. From his experience with WSDOT and other highway projects, Hisham is intimately familiar with WSDOT's design and construction documents, such as the Geotechnical Design Manual, Bridge Design Manual, AASHTO LRFD Bridge Design Specifications, and Standard Specifications.

2C: Familiarity with Project Management

In his career, Hisham has always managed large and complex projects that often have competing schedules. Every week, by communicating with clients, he understands the individual project schedules, and utilizes S&W's weekly workload meeting to move resources from less time-sensitive projects to projects with tighter schedules, and make sure all the projects are delivered with high quality and on schedule. Hisham works closely with clients to prioritize tasks and set achievable schedules, tapping into his network of PMs to adjust resources as needed.

Hisham's technical expertise and complex project management experience as a part of design-build teams contributes to the overall success of projects and keep his clients happy by delivering projects on time and under budget. These projects include managing more than 20 staff members as well as several subcontractors and coordinating with different disciplines involved with the projects.

2D: Familiarity with DB Project Team Leadership/Membership

In his career, Hisham has managed geotechnical efforts as the Owner's Representative and design-build team for numerous transportation-related projects. In the last 15 years, Hisham also has been involved with several large design-build projects. Working on design-build contractors' teams, he was the deputy project manager on the WOFH, Kamehameha, and Airport segments of the Honolulu Rail Project which consists of 20 miles of elevated light rail. Currently, also working with the design-build contractor, he is deputy project manager on Sound Transit's Federal Way Link Extension Design-Build Project. Hisham is also the SME for the Owner's Representative team on the Sound Transit, Operations, and Maintenance Facility South project, developing the procurement documents including the geotechnical section of RFP, GDR, and GBR for the project. This unique experience helps him to develop high-quality procurement documents for this proposed contract.

2E: Familiarity with Construction Support

Hisham has provided construction support for design-bid-build as well as design-build projects. He supervised staff performing field observations for a variety of geotechnical-related activities, including subgrade preparations, fill placement and compaction, pile driving, augercast pile, drilled shaft installation, and tie-back and soil nail installation. He reviewed contractor submittals and addressed requests for information and field design changes. He also helped in evaluating change claims.

B. Current Availability of Key Staff and Resources for the S&W Team in Hours per Month

Table 9 below shows the availability of our proposed SLGE and Selected Senior Staff. With Travis committed full-time to WSDOT, we are confident we can meet all SGO task requests with our team and our deep bench of experts.

Table 9: Availability of SLGE & Selected Senior Staff in Hours Per Month

Month	2024							2025							2026-2028						
	TN	PP	HS	BR	SB	TS	OR	TN	PP	HS	BR	SB	TS	OR	TN	PP	HS	BR	SB	TS	OR
January	<i>Hours below do not include ongoing support of the current SGO staff augmentation contract.</i>							150	120	90	80	64	90	>500	150	120	90	80	64	90	>500
February								150	120	90	80	60	90	>500	150	120	90	80	60	90	>500
March								150	120	90	80	67	90	>500	150	120	90	80	67	90	>500
April								150	120	90	80	70	90	>500	150	120	90	80	70	90	>500
May								150	120	90	80	74	90	>500	150	120	90	80	74	90	>500
June								150	120	90	80	64	90	>500	150	120	90	80	64	90	>500
July	90	90	80	60	74	65	>500	150	120	90	80	74	90	>500	150	120	90	80	74	90	>500
August	120	90	80	60	70	75	>500	150	120	90	80	70	90	>500	150	120	90	80	70	90	>500
September	125	90	100	80	64	85	>500	150	120	90	80	64	90	>500	150	120	90	80	64	90	>500
October	130	120	100	80	70	100	>500	150	120	90	80	70	90	>500	150	120	90	80	70	90	>500
November	140	120	120	100	67	100	>500	150	120	90	80	67	90	>500	150	120	90	80	67	90	>500
December	140	120	120	100	70	120	>500	150	120	90	80	70	90	>500	150	120	90	80	70	90	>500

KEY: TN Travis Nguyen PP Park Piao HS Hisham Sarieddine BR Brian Reznick SB Sandy Brodahl TS Tyler Stephens OR Other Resources

Shannon & Wilson's Statement of Qualifications has Demonstrated

Our Team's Ability to Provide WSDOT's SGO with the Following Benefits:

- **A broad base of engineering management and support from engineers in multiple S&W offices that have performed hundreds of geotechnical projects** throughout the state of Washington and particularly in the Olympic, South Central, and Southwest Regions.
- **A team you can trust to understand the contract's specialized needs** by utilizing staff with vast experience, participation in several segments of the Gateway Program, and five years of direct support of the SGO through two staff augmentation contracts.
- **Immediate understanding and manual compliance** from engineers with frequent day-to-day usage of the WSDOT GDM and the AASHTO LRFD BDS, and team members whose contributions to the industry are so valued they've been invited to update eight chapters of the GDM.
- **Leadership that needs no ramp-up time** from a current SLGE, who already knows how to successfully work as an integrated member of WSDOT's SGO staff, and who is supported by Selected Senior Staff and 10 Alternate PMs, each with more than a decade of geotechnical management experience.
- **Adaptable processes that knowingly correspond to traditional or alternate delivery methods** as needed, by professionals who have participated in the design and construction support of both DB and DBB projects.
- **An integrated team of historically underutilized DBE firms with significant roles** from support to management, thanks to an SLGE that recognizes the importance of growing smaller businesses within WSDOT's consultant pool and providing them with guidance and mentoring along the way.

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*Travis and the Shannon & Wilson team provided strong support for our E. Fork Lewis River bridge replacement project, expert analysis of this complex site, and a great deal of confidence in the approach to addressing the project needs. **We have greatly appreciated working with them.***

– **Laura Peterson**, Assistant Area Engineer
WSDOT, Project Engineer's Southwest Office
5/6/2024