

## GENERAL SCOPE OF WORK

### Description

The Engineering Geology & Rock/Rockfall Geotechnical Project Delivery Consultant will provide services to assist Washington State Department of Transportation (STATE) and the State Geotechnical Office (SGO) during various stages of project delivery of Transportation & Infrastructure projects. The primary focus for the AGREEMENT is to support projects that require the specialty and knowledge of Rock/Rockfall related mitigation, design and or construction throughout the State of Washington.

### A. CONSULTANT Agreement Manager (SLG)

The CONSULTANT shall provide a senior level engineering geologist (SLG) as the appointed Agreement Manager to support the STATE and the SGO by performing and managing geology, engineering geology and geotechnical engineering (GEOTECHNICAL) work in accordance with their Washington State license which constitutes the practice of engineering geology as defined by RCW 18.220. As requested by the STATE and approved by the SGO, the CONSULTANT's SLG shall:

- The SLG shall have a minimum of ten (10) years of professional licensed experience in the Pacific Northwest (preferably Washington State) at the Senior Project Manager, Senior Associate, or higher level.
- Work as an extension of SGO staff.
- Function as a GEOTECHNICAL liaison between the SGO and other STATE offices and CONSULTANT staff to deliver transportation projects under design-bid-build, design-build, progressive design-build, emergency, or alternative contract mechanisms.
- Available on an on-call basis, for emergency response work. This availability must be maintained continually, with limited pre-approved exceptions, for all days of the week on a 24-hour basis such that the CONSULTANT can respond onsite to an emergency project location within 12 hours of notice by the STATE.
- Have authority to plan, prioritize, and handle all duties within an assigned area of responsibility. Make team or CONSULTANT staff project assignments to accomplish the GEOTECHNICAL work.
- Interact with the STATE, SGO and CONSULTANT to negotiate GEOTECHNICAL schedule, deliverables, scopes of work, and budgets for statewide projects.
- Develop, negotiate, and manage Task Order documents for project delivery of statewide projects.

- Confirm that GEOTECHNICAL aspects of project design and construction are consistent with standards of practice, national codes, and departmental policies.
- Review and prepare GEOTECHNICAL memorandums/reports for statewide transportation projects.
- Assist the State Geotechnical Engineer in the development, execution, and implementation of statewide GEOTECHNICAL policy.
- Mentor and train SGO staff and STATE team members on specialized GEOTECHNICAL expertise.
- Submit monthly invoice for progress payments to the SGO for all work completed per Task Order, on a regular monthly basis or as approved by the SGO Geotechnical Design & Project Development Manager in writing.

## **B. CONSULTANT SLG and Staff**

The SLG provided by the CONSULTANT shall be available to work at the State Geotechnical Office located at 1655 S. 2nd Ave. SW, Tumwater WA 98512, as requested by the SGO up to two (2) days per week. The SLG may work the remaining time per week in various STATE offices related to the assigned project work, official station or remotely.

The CONSULTANT shall provide additional CONSULTANT staff to support the STATE with specialized GEOTECHNICAL expertise by performing and managing geology, engineering geology, and geotechnical engineering work in accordance with their Washington State license(s) which constitutes the practice of engineering geology as defined by RCW 18.220, and engineering as defined by RCW 18.43 to supplement the work of the SLG depending on project needs, as requested, and authorized by the SGO. The CONSULTANT will submit the request for additional personnel to the SGO Geotechnical Design & Project Development Manager for approval. In such cases, the SLG shall be responsible for overseeing the work of the additional CONSULTANT staff.

The CONSULTANT staff shall work out of the CONSULTANT official station, project sites, remotely, or from STATE facilities as required by the STATE to complete the work.

The CONSULTANT will be available on a regular basis for project work and coordination with the STATE and SGO staff between the hours of 6:00 am and 6:00 pm for the duration of a regular shift, additional availability maybe requested on an as needed basis. Availability must be maintained for emergency response work, as described in Section A.

### **C. General Project Management**

As the GEOTECHNICAL subject matter expert, the CONSULTANT shall:

- Manage GEOTECHNICAL projects performed in-house and with consultants.
- Independently manage their assigned project workload and prioritize work assigned to them.
- Track project(s) scope, schedule & budget, and report status to the SGO via the SLG, and directly to the STATE project engineering office(s) (PEO).
- Develop comprehensive scopes of work and cost estimates for the GEOTECHNICAL projects assigned to them.
- Coordinate with the PEO(s) as the SGO representative to determine project GEOTECHNICAL needs.
- Interact with Geotechnical Engineers, Engineering Geologists, Bridge Engineers, Civil Engineers, and other technical specialists on multidisciplinary projects to complete the projects on time and within budget while following standards of practice, national codes, and departmental policies.
- Lead design and construction milestone meetings with the STATE PEO(s), State Geotechnical Engineer, State Foundations Engineer, State Engineering Geologist, SGO staff or other consultants at appropriate times during the project(s).

### **D. Project Delivery**

The CONSULTANT will be assigned various projects requiring GEOTECHNICAL investigation, analyses, design, and report preparation. In completing this work, the CONSULTANT shall:

- Manage and coordinate multiple tasks and projects.
- Draw on their training and experience in GEOTECHNICAL engineering to complete GEOTECHNICAL designs for projects and to support construction.
- Perform GEOTECHNICAL designs by independently selecting analysis methods that are appropriate for highly complex site conditions, collected data, and project needs.
- Complete GEOTECHNICAL design for conceptual design for design-build, and other projects.
- Complete GEOTECHNICAL design for Type, Size and Location (TS&L) and Plans, Specifications and Estimate (PS&E) design levels.
- Identify, evaluate, and design for geotechnical hazards such as; liquefaction, lateral spread, flow failure, landslides, and seismic loading.

- Calculate resistances, earth pressures, water pressures, settlement, and loads for geomaterials.
- Develop field exploration plans and specialized laboratory testing plans to support their GEOTECHNICAL engineering activities.
- Provide Instrumentation expertise, deployment and monitoring as requested by the STATE.
- Provides direction to field instrumentation engineer(s) and drill inspector(s) to ensure that valid and applicable data are collected, and borehole instrumentation is properly installed.
- Provides direction to laboratory technicians regarding material testing and provides final quality review of laboratory data and methods.
- Collect primary data for GEOTECHNICAL designs, including, but not limited to discontinuity and geomorphic mapping, and field reconnaissance work.
- Communicate clearly and effectively with the STATE, and SGO in writing and orally.
- Review their own engineering work and the engineering work of others for clarity, correctness, and conformance to STATE policy, National design codes, and contract documents.
- Coordinate with the STATE & SGO Staff for field exploration, laboratory testing, instrumentation & monitoring, Computer Aided Drafting & Design (CADD) Support, Geographic Information Systems (GIS) Support, or other support activities. When additional support is needed from Consultant Office staff, the CONSULTANT will submit the request for additional personnel per Section C for approval.
- Seal their own professional work and the work of subordinates when they are in responsible charge of the subordinate's work.
- Review their own (or others) work for accuracy and correctness.
- Prepare GEOTECHNICAL Recommendations for project delivery including but not limited to; Geotechnical reports/memorandums, and Summary of Geotechnical Conditions utilizing templates provided by the SGO.
- Advise the STATE on how to incorporate the GEOTECHNICAL recommendations into the PS&E or Request for Proposal (RFP).
- Write GEOTECHNICAL contract special provisions, amendments, and RFP sections.
- Review the GEOTECHNICAL portions of final PS&E contracts, plans, and RFP's prior to release for bid.

- Use computers and commercially available software for performing calculations, designs, and the preparation of reports and technical memorandums for engineering use. The staff provided by the CONSULTANT shall be proficient in generating designs using the following RocScience programs: Slide, RocFall, Swedge, Dips, Rocplane.
- The CONSULTANT staff shall have knowledge and proficiency in the use of ArcGIS.
- Store, share, maintain, and update all AGREEMENT, project files, calculations, specifications, reports, memos, and other related files via ProjectWise Explorer or as designated by the STATE.
- Document design recommendations and calculations for peer review and for records retention. The design documentation must be in a format that can be stored in the design file in the SGO electronic files. The design recommendations, reports, calculations and supporting documents must be submitted, as a complete project design package to the SGO in an electronic format for record retention and storage within the STATE ECM Portal upon project completion of each phase including Preliminary Engineering (PE) and Construction support (CN).
- Be available for extensive travel throughout the state of Washington due to project specific locations as needed. The CONSULTANT SLG and staff shall have a valid Driver's License as required by law.
- Be able to traverse uneven, slippery, and steep terrain while performing field reconnaissance, investigating landslides, or while on project and/or construction sites.
- Work over water, in confined spaces, and at heights or any combination thereof.

#### **E. Engineering Geology / Geologist**

The CONSULTANT shall possess knowledge, experience, and expertise specific to transportation facilities in the following:

- Geology of Washington State.
- Geologic site characterization.
- Rock mechanics.
- Subsurface exploration methods including geotechnical drilling and geophysical survey techniques.
- Rock slope and rockfall mitigation design, including compound slopes/cuts in overburden soil/rock slopes.
- Drilling, blasting and overbreak control for rock cuts.

- For STATE drilling operations, provide field exploration inspector(s) and the logging of bore holes and other field related documentation as needed.
- Rockslope mitigation design, including soil/rock overburden and compound cuts.
- Rockfall analysis and rockfall containment design using both structural and non-structural solutions.
- Rock slope reinforcement design using both passive and active reinforcement strategies.
- Selection and design of rockfall mitigation measures including rockfall fences, mesh drapes, attenuators, and pinned mesh systems.
- Rock cut design, including examination of structural control and kinematics of failure, as well as application of reinforcement in the cut design.
- Provides emergency response and design services for rockfall closures on a state-wide basis. Required demonstrated experience in this area must be specific to transportation infrastructure and include emergency mapping/characterization of geohazards, determination of need for route closure, provision of recommendations for use in emergency declaration documentation, development of design and emergency contract documents, and field support/implementation of remedial design work.
- Perform site visit(s) and complete a Geotechnical Site Visit Report (GSVR) as required by the SGO.
- The staff provided by the CONSULTANT shall have training in high-angle rope access safety and have demonstrated experience in applying this training to the access of steep slopes for both geotechnical design and emergency response work. Any individual(s) provided by the consultant overseeing geotechnical high-angle rope access work must be familiar with high-angle rope access safety and support all high-angle rope access safety protocols.

## **F. Engineering Standards**

The CONSULTANT shall perform their engineering services in accordance with:

- AASHTO Design Codes for Highway Structures
- WSDOT Bridge Design Manual (LRFD) (M 23-50)
- WSDOT Construction Manual (M 41-01)
- WSDOT Design Manual (M 22-01)
- WSDOT Design-Build Manual (M 3126)
- WSDOT Electronic Engineering Data Standards (M 3028)
- WSDOT Geotechnical Design Manual (M 46-03)
- WSDOT Highway Runoff Manual (M 31-16)
- WSDOT Hydraulics Manual (M 23-03)
- WSDOT Materials Manual (M 46-01)
- WSDOT Plans Preparation Manual (M 22-31)
- WSDOT Standard Plans (M 21-01)
- WSDOT Standard Specifications for Road, Bridge, and Municipal Construction (M 41-10)
- WSDOT Work Zone Traffic Control Guidelines for Maintenance Operations (M 54-44)

## **G. Geotechnical Subject Matter Expert (SME)**

The CONSULTANT shall be expected to function as a member of a team or multiple teams where the team is responsible to deliver specific projects via various delivery methods, including but not limited to; emergency, design-bid-build, design-build, and progressive design-build projects for the STATE. The team(s) will consist of a mixture of STATE staff and consultants from various disciplines. The SLG will serve as the leader for the GEOTECHNICAL team and the CONSULTANT staff may serve as a Subject Matter Expert (SME) team member. In these roles, the CONSULTANT shall:

- Oversee GEOTECHNICAL elements of the projects addressed by the team.
- Serve to facilitate integration of GEOTECHNICAL elements across the project.
- For design-build projects, prepare geotechnical contract documents for the RFP.
- Identify geotechnical issues that may affect project design, construction, and delivery and facilitate the development of team-oriented solutions to minimize the impacts of those issues on scope, schedule, and budget.

## H. Construction Support

During project construction phase, the CONSULTANT shall:

- Provide GEOTECHNICAL inspection training and/or inspection, as requested by the STATE.
- Assess change of condition claims and plans errors. Complete design revisions resulting from plan errors or changed conditions.
- Review and recommend approval or rejection of contractor submittals, respond to Requests for Information (RFI), and evaluate Cost Reduction Incentive Proposals (CRIP).
- Participate in pre-construction meetings.
- Provide guidance on field adjustments to geotechnical designs involving rock and overburden soil/rock slopes.

## I. Additional Services

The CONSULTANT shall provide additional services and/or sub-consultant(s) to be utilized by Task Order request as part of this AGREEMENT, as approved by the STATE shall include:

- Sub-consultants may be utilized to complete General Scope of Work tasks.
- Laboratory Testing, including but not limited to;
  - a. Index and Engineering testing on soil & rock.
- Geophysical Explorations, including but not limited to;
  - a. Surface Geophysical methods (i.e., Ground Penetrating Radar, Electrical Resistivity Tomography, Multi-Channel Analysis of Surface Waves, Gravity, Seismic Refraction).
  - b. Downhole Geophysical methods (i.e., Shear Wave Suspension logging, Crosshole Sonic Logging, Optical Televiewer, Acoustic Televiewer).
- Cone Penetration Testing
- Field Exploration Inspection/Inspector
- Traffic Control
- Technical Writing/Editor
- Computer Aided Drafting & Design Support (CADD)
- Geographic Information Systems Support (GIS)



## J. Assumptions

- The STATE will provide up to two (2) WSDOT laptops with supporting software, as determined by the STATE. Additional CONSULTANT staff will provide their own company computer(s), software, technology, and other resources as needed to complete the work as described in the GENERAL SCOPE OF WORK.
- The STATE will perform laboratory testing at the State Materials Laboratory in Tumwater Washington, unless otherwise requested of the CONSULTANT by the STATE on a specific Task Order.
- The STATE will perform field exploration drilling services, field survey and traffic control unless otherwise requested of the CONSULTANT by the STATE on a specific Task Order.
- The STATE shall provide Right of Entry and permits necessary to complete the field exploration and project field work.
- The CONSULTANT shall provide their own safety training, equipment, personal protective equipment (PPE) and other related equipment required by law to complete the General Scope of Work of the AGREEMENT.
- All travel, meals, lodging, transportation, services, and expenses shall be pre-authorized and detailed within each Task Order & Scope of Work document.
- No Out-of-State-Travel is authorized, unless requested by the STATE and prior approval in writing by the SGO Geotechnical Design & Project Development Manager.
- Pre-authorized services and expenses will be reimbursed by receipt and documentation only.