

Snohomish County Standard Consultant Agreement Supplement		Consultant/Address/Telephone BergerABAM Inc. 3301 Ninth Avenue South, Suite 300 Federal Way, WA 98003	
Supplement Number Supplement No.7	Contact Name / E-Mail Address Robert L. Fernandes / bob.fernandes@abam.com		
Agreement Number CCF07-13	Telephone 206-357-5616	Fax 206-357-5601	Completion Date <i>December 31, 2018</i>
Execution Date <i>August 8, 2013</i>	New Maximum Amount Payable \$2,613,745.00		
Project Title Structural Engineering, Geotechnical Design, Survey and Mapping Services for the Index Galena Road (MP 6.4 – 6.9) Flood Repair Project	Description of Work <i>Provide Structural Engineering, Geotechnical Design, Survey and Mapping Services for the Index Galena Road (MP 6.4 – 6.9) Flood Repair Project. The Index-Galena Road is located along the Skykomish River in the Mount Baker – Snoqualmie National Forest in southeast Snohomish County. During Fall 2006 it was severely damaged by flooding and was washed out between mile posts 6.4 and 6.9.</i>		

WHEREAS, Snohomish County desires to supplement the Agreement entered into with **BergerABAM Inc.** and executed on the 8th day of August, 2013, as amended by Supplement No.1 on the 13th day of May, 2014, Supplement No.2 on the 24th day of February, 2015, Supplement No.3 on the 21st day of October, 2015, Supplement No.4 on the 17th day of December, 2015, Supplement No.5 on the 28th day of April, 2016, and Supplement No.6 on the 27th day of July, 2016, and identified as Agreement No. **CCF07-13**. All provision of the basic agreement remain in effect except as expressly modified by this supplement.

The changes to this Agreement are described as follows:

1. The "Completion Date" on the Agreement title page is amended as follows:

Completion Date ~~((December 31, 2016))~~ December 31, 2018

2. The "Total Amount Authorized" amount on the Agreement title page is amended as follows:

Total Amount Authorized ~~((\$1,209,019.00))~~ \$2,585,124.00

3. The "Maximum Amount Payable" amount on the Agreement title page is amended as follows:

Maximum Amount Payable ~~((\$1,237,640.00))~~ \$2,613,745.00

4. Section **II Scope of Work**, is hereby amended to read:

The Scope of Work and projected level of effort required for this PROJECT is detailed in Exhibit "A" comprised of Exhibit A-1, Exhibit A-1a, Exhibit A-1b, Exhibit A-1c, Exhibit A-1d, Exhibit A-1e, and Exhibit A-1f attached hereto and by this reference made a part of the AGREEMENT.

5. The first and second paragraphs of section **IV Sub-Contracting**, are hereby amended to read:

The COUNTY permits sub-contracts for those items of work as shown in Exhibit "G" comprised of Exhibit G, Exhibit Ga, Exhibit Gb, Exhibit Gc, and Exhibit Gd, attached hereto, and by reference made a part of the AGREEMENT.

Compensation for this sub-consultant work shall be based on the cost factors shown on Exhibit "G-1", Exhibit "G-1a", Exhibit "G-1b", Exhibit "G-1c", Exhibit "G-1d" and Exhibit "G-2".

6. **EXHIBIT A-1f Supplemental Scope of Work**, attached hereto is added to and incorporated into the Agreement.
7. **EXHIBIT E-1f Supplemental Consultant Fee Determination – Budget**, attached hereto is added to and incorporated into the Agreement.
8. **EXHIBIT Gd Supplemental Subcontracted Work**, attached hereto is added to and incorporated into the Agreement.
9. **EXHIBIT G-1d Supplemental Subconsultant Fee Determination – Budget**, attached hereto is added to and incorporated into the Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Supplement No.7 on this 2nd day of November, 2016.

SNOHOMISH COUNTY

Marcia Isenberg
 Signature
 Marcia Isenberg
 Deputy Executive

 Title

BERGERABAM INC.

Paul F. Zucchi
 Signature
 VICE PRESIDENT

 Title

**CONTRACT TEMPLATE ONLY
 REVIEWED AND APPROVED:**
 Rebecca J. Guadamud
 Deputy Prosecuting Attorney
 Date: 11/26/14

**CONTRACT TEMPLATE ONLY
 REVIEWED AND APPROVED:**
 Keith Mitchell
 County Risk Manager
 Date: 12/5/14

COUNCIL USE ONLY
 Approved: 10.31.16
 Docfile: D-9

EXHIBIT A-1f Supplemental Scope of Work

PROJECT DESCRIPTION

The COUNTY desires to restore the roadway connection of the Index-Galena Road between project design Mileposts 6.088 and 7.032 by constructing a new roadway realigned to the south and east of the original roadway which was damaged during flooding of the North Fork of the Skykomish River in November of 2006.

The current design phase of the project for a 35 MPH roadway alignment includes studies of selected project elements and design development with working plans and a construction cost estimate.

CONTRACT HISTORY

- Initial Scope Provide survey, geotechnical, and structural engineering services.
- Supplement 1 CONSULTANT provided soil boring and foundation analysis.
- Supplement 2 CONSULTANT facilitated Agency meeting to re-evaluate the project Purpose and Need. (added Task 11 Workshop Facilitation)
- Supplement 3 Scope was restructured without adding budget. Several project features were re-evaluated. Engineering with drainage design was added to consultant scope. (Tasks 1 -10 were closed, and Tasks 12-21 were opened)
- Supplement 4 Adjustment to audited overhead rates.
- Supplement 5 Added Task 22 Construction Schedule.
- Supplement 6 Added Tasks 23 and 24 to perform site surveying during the summer of 2016 for staking the 35 MPH alignment, associated topographic mapping and locating ordinary high water (OHW) as flagged by COUNTY.
- Supplement 7 CONSULTANT will complete drainage, geotechnical, structural, surveying and provide plans, specifications, and estimate for construction. (Tasks 25-36)

SUPPLEMENTAL SERVICES

The purpose of these supplemental services is to complete the Plans, Specifications, and Estimates (PS&E) for design of the project through the construction bidding phase, including Easement Plans. This includes completing the design of the roadway including drainage and culverts, walls and slopes, box culvert vented ford, debris diversion berm, and bridge structure; development of easement plans; and performance of additional surveying and basemapping to support the completion of this scope of work.

This supplemental scope of work includes the following new tasks:

- Task 25 - Project Management
- Task 26 - Survey and Basemapping
- Task 27 - Geotechnical Engineering
- Task 28 - Hydraulic Engineering
- Task 29 - Permitting Support
- Task 30 - Drainage Engineering
- Task 31 - Roadway Engineering
- Task 32 - Structural Engineering
- Task 33 - PS&E Submittals
- Task 34 - Easement Plans
- Task 35 - Quality Assurance / Quality Control
- Task 36 - Support During Bidding

ESTIMATED LEVEL OF EFFORT

The estimated level of effort to provide these services is shown in Exhibit E-1f and G1d, and is based upon the following scope of work, assumptions, and task descriptions.

SCHEDULE

Our understanding is that the current target for advertisement for bidding is now late 2017 to allow for construction to begin in early spring of 2018. The project schedule is dependent on the environmental process and milestones for deliverables of this scope will be developed in consultation with the COUNTY.

The following is a preliminary milestone schedule for this supplemental scope of work that will be coordinated with the timeline for environmental process and final project approval.

Notice to Proceed (NTP)	01 October 2016
35 MPH Alignment Plans Review w/ New Topo	30 October 2016
Finalize Roadway Alignment Geometry	30 October 2016
Finalize Drainage Approach	30 October 2016
60 Percent PS&E	30 November 2016
COUNTY Comments	15 December 2016
90 Percent PS&E	15 February 2017
COUNTY Comments	15 March 2017
Shoreline Permit Application Plans	15 March 2017
Hydraulic Project Approval (HPA) Plans	15 March 2017
JARPA Submittal Drawings	15 March 2017
100 Percent PS&E + Easement Plans & Draft Summary of Geotech Cond.	15 May 2017
COUNTY Comments	15 June 2017
Site Survey for Easement & Timber Appraisal Task 26.1	15 June 2017
Final Bid Ad-Ready Documents	30 August 2017
Site Survey for RFP/Bidding Task 26.2	15 September 2017
Support During Bidding	15 January 2018

DESIGN CODES AND STANDARDS

The following design codes will be used to conduct the design and analyses.

1. Washington State Department of Transportation (WSDOT) Bridge Design Manual Load and Resistance Factor Design (LRFD), M 23-50.15, or most current version including Design Memorandums
2. American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications, 7th Edition
3. AASHTO Guide Specifications for LRFD Seismic Bridge Design 2nd Edition (2011)
4. AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT \leq 400), 2001
5. Snohomish County CADD Standards
[http://snohomishcountywa.gov/205/Engineering-ServicesSnohomish County](http://snohomishcountywa.gov/205/Engineering-ServicesSnohomish%20County)
6. Engineering Design and Development Standards (EDDS)
<http://snohomishcountywa.gov/492/Design-Standards-EDDS>
7. Snohomish County Drainage Manual or WSDOT Highway Runoff Manual (HRM)
8. WSDOT Design Manual
9. WSDOT Standard Specifications for Road, Bridge, and Municipal Construction 2016.
10. WSDOT Standard Plans
11. WSDOT Geotechnical Design Manual

ASSUMPTIONS

The scope of work defined within this document includes the assumptions noted below.

1. The COUNTY will perform environmental documentation and permit applications. Documentation prepared to date will be provided to the COUNSULTANT as the permitting process advances.
2. Compensatory mitigation and/or mitigation plan required by regulatory agencies will be performed by the COUNTY.
3. It is assumed that utilities are not present within the project limits and therefore will not be field located by subsurface methods. However, two 6-inch-diameter openings will be provided in the bridge diaphragms for future accommodation.
4. Cross-sections of the active river channel will not be surveyed, but the dry portions of the potential side channel at the bridge will be surveyed as required for hydraulic modeling and analysis.

5. It is assumed that contaminated soils do not exist within the anticipated project limits.
6. Soil conditions may vary from those conditions where the actual site investigations will be conducted. Because of the inherent uncertainties in subsurface conditions, underground conditions may occur that could affect the total project cost and/or execution.
7. It is anticipated that the bridge analysis work will be completed using the most recent version of SAP 2000 and PG Super, supplemented with Excel spreadsheets where required.
8. The plans will be prepared in accordance with current COUNTY drafting standards, and all electronic drawings submitted by the CONSULTANT as part of any deliverable shall be in AutoCAD 2015 format, or later version(s) as adopted by the COUNTY during the project duration.
9. No rights-of-entry are required.
10. The design schedule is premised on a notice-to-proceed (NTP) date of 1 October 2016. The schedule will be revised in a mutually agreeable fashion based upon the actual date that the written NTP is received.
11. The overall duration of the project and the anticipated sequence of the CONSULTANT's work are shown in the preliminary project schedule attached.

TASK 25 PROJECT MANAGEMENT

Task 25.1 Project Coordination

The CONSULTANT will provide project management and communications between the CONSULTANT team and the COUNTY. Coordinating with the COUNTY, the CONSULTANT shall follow a project communication plan that establishes protocol for contact, distribution of information, written documentation, and other communication procedures previously developed.

The CONSULTANT will perform project administration and management tasks as follows.

- Prepare and submit monthly invoices.
- Prepare monthly progress reports summarizing the status of the budget, highlights, details, issues, approved changes, plans for next period.
- Prepare and update the project schedule as circumstances require. The project schedule will be developed using Microsoft Project.
- Prepare subconsultant agreements and perform ongoing subconsultant coordination.
- Maintain all contract-required documentation.

Task 25.2 Progress Meetings

The CONSULTANT will attend meetings with the COUNTY to coordinate the engineering study and design efforts; eight face-to-face meetings are assumed, as well as a monthly conference call when not meeting in person through the PS&E completion phase of the project (up to 18 months).

Task 25.3 Management of Subconsultants

The CONSULTANT will manage the subconsultant firms of Shannon & Wilson, Louis Berger Group, Sitts & Hill (SUBCONSULTANT), and any other subconsultants, that may be added during the duration of the project.

Task 25.4 Project Demobilizations and Restarts

It is anticipated that the project will undergo two periods on inactivity during Phase 2 of the design to accommodate the expected permitting, right-of-way, and easement process timelines. These periods are shown on the attached preliminary design schedule for the project following the 90 percent and 100 percent submittals of plans, specifications, and estimates (PS&E). The CONSULTANT will perform services needed to accomplish two demobilizations and two restarts of project activities, including possible transitions of project staff assigned and record keeping during the demobilization process to facilitate efficient restart of project activities.

Task 25.5 Project Closeout

The CONSULTANT will perform services necessary to document and closeout the project file. Survey data shall be provided to the COUNTY in an electronic format with no loss of coordinate accuracy, point and string identifiers, feature codes, and point and string types.

All CADD data will be provided to the COUNTY in a format that can be used directly by AutoCAD® Civil 3D® and LandXML format with no translation and/or loss of COUNTY standard levels, symbologies, colors, weights, and base map/sheet file organization.

TASK 26 SURVEY AND BASE MAPPING (SUBCONSULTANT)

Sitts & Hill (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide the following supplemental survey and basemapping services.

All SUBCONSULTANT survey data will be incorporated into the existing base file. Site survey data will be compiled in AutoCAD® Civil 3D® 2015 for the basis of design. This file will show the site's existing condition and surface capable of displaying 2-foot contours. Dynamic notes, control, and other observations (prepared for 1"=20' plans) will be included in this file to aid in the design progression.

Task 26.1 Field Staking for 90% Design Review and Timber Appraisal

A one-time field staking of the design will be performed during the design phase (at approximately the 90% design completion) to support design review, to confirm project cut/ fill quantities and to aid the US Forest Service timber cruise/appraisal effort.

As part of this effort, the SUBCONSULTANT will perform the required field survey within the 90% plan easement lines. The cut/fill slope stakes (coincident with the clearing limits) will be set on both sides of the proposed centerline alignment (also to be set), to show the full extents of the proposed roadway's cut/fill as visual evidence of the quantities in and around the respective improvements. The easement line stakes will be established at a 50 foot +/- station interval including all major jogs to show the project's easement lines in the field for visual evidence of the tree appraisal required. The stakes will be flagged and intervisible flagging will be established at a 50 foot +/- station intervals for the project's footprint and easement area as required for the US Forest Service timber for cruise/appraisal.

Task 26.2 Field Staking for RFP/Bidding

A one-time field staking will be performed during the RFP to provide final project cut and fills limits to support the bidding process. As part of this effort, the SUBCONSULTANT will perform the required field layout based upon the 100% plan set. The cut/fill slope stakes (coincident with the 100% clearing limits) will be verified and refreshed or reset on both sides of the proposed centerline alignment (also to be verified and refreshed or reset), to show the full extents of the proposed roadway's cut/fill per the 100% plans allowing a visual evidence of the tree removal required for this project in addition to the final cut/fills evidenced by the respective slope stakes.

DELIVERABLES

A file, developed in AutoCAD® Civil 3D® 2015 including the information listed above, will be the deliverable for Tasks 26.1 and 26.2 as performed. This file will serve as the basis of this project's design. An existing ground surface model in AutoCAD® Civil 3D® 2015 and LandXML v1.2 format will be provided as part of this effort. Photos, field notes, videos and sketches captured during this projects survey effort will also be included as part of the existing conditions documentation.

TASK 27 GEOTECHNICAL ENGINEERING (SUBCONSULTANT)

Shannon & Wilson, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide the following supplemental geotechnical engineering services.

Task 27.1 Project Management

The SUBCONSULTANT will perform project management services for geotechnical engineering tasks including invoicing, scheduling of work, communications with the CONSULTANT and the COUNTY, QA/QC, and attend progress meetings.

The SUBCONSULTANT will attend meetings with the CONSULTANT and the COUNTY to coordinate the engineering study and design efforts; eight face-to-face meetings are assumed, as well as a monthly conference call when not meeting in person through the completion of the preliminary design (up to 18 months). The SUBCONSULTANT will also attend up to two meetings at the project site with the CONSULTANT and the COUNTY to review project design features and the staked alignment.

Task 27.2 Preliminary Design

The new 35 MPH alternative alignment changes the layout of structures and graded slopes along the project from the previous alignment. The SUBCONSULTANT will provide additional geotechnical consultation to complete preliminary design and produce a geotechnical data report and a geotechnical design and interpretive report for the new 35 MPH alignment. The reports will document the data collection and engineering efforts that form the basis of the project design.

For the purposes of establishing an estimate of expected effort, S&W will provide additional geotechnical consultation for:

- Bridge Foundations
- Walls and Slopes
- Box Culvert Vented Ford

Task 27.2.1 Bridge Foundations

The creek and low-lying area near Sta. 55+00 will be spanned with a 180-foot steel plate girder bridge supported on 6-foot-diameter drilled shaft foundations. During the previous project phase, the SUBCONSULTANT completed two additional borings, one at each proposed foundation location. The bridge foundation design recommendations will be revised to incorporate the new subsurface information. Tasks will include:

- Revise charts of estimated axial resistance with depth for 6-foot-diameter drilled shafts
- Revise estimated lateral resistance recommendations (LPILE parameters) for 6-foot-diameter drilled shafts
- Revise seismic design recommendations for 6-foot-diameter drilled shafts to comply with AASHTO 2016
- Revise estimated settlement for 6-foot-diameter drilled shafts
- Revise liquefaction susceptibility estimates using new subsurface data
- Provide estimated drag loads for 6-foot-diameter drilled shafts

Task 27.2.2 Walls and Slopes

The revised 35 MPH alignment changes the layout of walls and slopes along the length of the project from the 60 Percent Submittal plans provided to the COUNTY in March 2014. Changes to the wall and slope geometry will require reevaluation of the preliminary designs of most or all of the proposed structures. The SUBCONSULTANT will provide the CONSULTANT with preliminary details and configurations for mechanically-stability earth (MSE) walls, reinforced soil slopes (RSS), and rock fill slopes. Aesthetic treatment of the wall and slope faces will be considered, including review and selection of preferred facing options by the COUNTY and US Forest Service. Geotechnical recommendations for finalization of the design for all anticipated walls and slopes (i.e., 1 MSE and 4 RSS) are included. Tasks will include:

- Mechanically Stabilized Earth (MSE) Walls - The two MSE wall locations assumed are STA 51+25 to 54+10 (SB) and STA 53+50 to 54+10 (NB).
 - Review the proposed MSE walls along the new 35 MPH alignment and confirm that previous design recommendations are suitable
 - Revise MSE wall design calculations and recommendations at 1 location to conform with new 35 MPH roadway alignment
 - Provide check on global stability of MSE wall after scour scenario
 - Provide a sliding, bearing and overturning stability check at 1 location to confirm constructability of the MSE walls.
- Reinforced Soil Slopes (RSSs)
 - Review the proposed RSSs along the new 35 MPH alignment and confirm that previous design recommendations are adequate
 - Revise RSS design calculations and recommendations at 3 locations to conform with new 35 MPH roadway alignment
 - Provide a compound stability check at 1 location to confirm constructability of the RSSs.
- Rock Fill Slopes (1 location)
 - Provide check on global stability of rock fill slope and roadway after scour scenario

Task 27.2.3 Box Culvert Vented Ford

Preliminary design elements of the box culvert vented ford crossing has changed based on the newly adopted 35 MPH alignment. The stream and debris flow crossing near STA 29+00 will consist of a box culvert vented

ford structure with a 12 foot box culvert span and 150 LF of roadway prism concrete armoring. A debris flow diversion berm will be constructed upslope of the vented ford to direct debris to the structure and away from unprotected roadway. The SUBCONSULTANT will consult with the CONSULTANT regarding preliminary design elements of the box culvert vented ford crossing and diversion berm design. Specific tasks will include:

- Review, develop and finalize the design calculations and recommendation for the box culvert vented ford to conform with the new 35 MPH alignment. Tasks will include confirming the orientation and location of the box culvert structure, confirming the hydraulic conditions, confirming the erosion and scour protection, revising the global stability analyses of the crossing during a debris flow event, and providing earth and bearing pressures for the box culvert structure.
- Provide the CONSULTANT with design parameters for the diversion berm upslope of the vented ford.

Task 27.2.4 Geotechnical Data Report

The SUBCONSULTANT will produce a draft and final Geotechnical Data Report (GDR) that will include a summary of the field exploration program, results of the laboratory testing, results of the geophysical exploration program, and the boring logs.

Task 27.2.5 Geotechnical Design and Interpretive Report

The SUBCONSULTANT will produce a draft and final Geotechnical Design and Interpretive Report (GDIR) which will include our design recommendations and construction considerations for the various project features. The GDIR will address the following topics:

- Bridge Foundations
- Mechanically Stabilized Earth Walls
- Reinforced Soil Slopes
- Boulder and Rock Excavation
- Box Culvert Vented Ford
- Geology
- Diversion Berm
- Soil and Rock Excavations
- Embankment Construction
- Reuse of On-site Soil and Rock
- Pavement Design

Task 27.2 Assumptions

1. The proposed bridge will be founded on 6-foot-diameter drilled shafts.
2. The proposed bridge will be a single-span, approximately 180 feet long.
3. Bridge foundation axial resistance will be analyzed for a 6-foot-diameter shaft only.
4. New topographical surveys will result in significant geometry changes to walls and slopes from those assumed for the S&W Final Geotechnical Study (2012). Reanalysis of 1 MSE wall and 3 reinforced soil slopes will be required. This reanalysis will be a recheck of global stability following the review of currently shown wall and slopes.
5. Global stability analyses and sliding, bearing and overturning analyses for MSE walls will consider the static condition only.
6. Boulders larger than 4 feet in diameter are difficult to move with standard equipment and will be blasted and/or fractured.
7. The distribution of boulders at the ground surface is representative of boulders in colluvial deposits.
8. Rockfall sources include cut slopes in soil, bedrock, and broken slopes.
9. The Geotechnical Design and Interpretive Report and the Geotechnical Data Report will include a draft copy in electronic format only, and 1 final paper and electronic copy.
10. Analyses, recommendations and data from the previous geotechnical studies, still applicable to the current project design, will be incorporated in to the subtasks Geotechnical Data Report (Task 27.2.4) and the Geotechnical Design and Interpretive Report (Task 27.2.5).

Task 27.2 Deliverables

- Geotechnical Data Report (Draft and Final)
- Geotechnical Design and Interpretive Report (Draft and Final)

Task 27.3 Final Design

The SUBCONSULTANT will provide redline review and comments on the revised 60% design plans based on new survey information provided during preliminary design. The SUBCONSULTANT will provide the CONSULTANT with design calculations, drawings and layouts, details, quantities, unit costs, and other information needed to prepare the 90% and Final design plans, Summary of Geotechnical Conditions, project-specific special provisions, and engineer's opinion of probable construction cost for the following identified project elements:

1. Walls and Slopes
2. Large Boulders and Rock Outcrops
3. Debris Diversion Berm
4. Box Culvert Vented Ford

The SUBCONSULTANT will provide drawings and details in ACAD format as needed for the CONSULTANT to produce the 90% and Final Plans.

The SUBCONSULTANT will prepare a Summary of Geotechnical Conditions as an appendix to the Special Provisions, which along with the boring logs shall be considered part of the contract documents. The Summary of Geotechnical Conditions will contain geotechnical information provided in the geotechnical reports following the reporting and documentation requirements of the WSDOT Geotechnical Design Manual.

Task 27.3.1 60% Design Plan Review

The SUBCONSULTANT will provide redline review and comments on the revised 60% design plans, which include the additional topographic survey data in the project basemap and revised designs of the roadway, walls, slopes, and design of other elements, including the proposed bridge.

Task 27.3.2 Walls and Slopes

The SUBCONSULTANT will provide design input for walls and slopes, including calculations, drawings and layouts necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will prepare special provisions for contractor-designed MSE walls, RSSs, and rock fill slopes.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the walls and slopes. Unit prices will be estimated from recent bid experience with similar projects, WSDOT unit bid analysis, contractor inquiries, and Means construction estimating manuals.

Task 27.3.3 Large Boulders and Rock Outcrops

The SUBCONSULTANT will provide drawing details and layouts available for the CONSULTANT to prepare the final contract drawings showing the locations of known large boulder and rock outcrops. The SUBCONSULTANT will prepare the project specific special provisions required for the removal or excavation of large boulders and rock outcrops, including blasting, rock excavation, rock bolts, and other recommended methods from preliminary design. Quantities and unit prices will be estimated for bid items required for the large boulders and rock outcrops. Boulder quantities will be based on the distribution estimated from the sizes of boulders visible on the ground surface.

Task 27.3.4 Debris Diversion Berm

The SUBCONSULTANT will provide design input for the debris diversion berm, including calculations and drawings necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the debris diversion berm.

Task 27.3.5 Box Culvert Vented Ford

The SUBCONSULTANT will provide design input for the box culvert vented ford and associated diversion berm, including calculations, drawings and layouts necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the box culvert vented ford.

Task 27.3 Deliverables

- Design calculations, drawings and layouts, details, special provisions, quantities, and unit costs for the subtask items above to prepare the 90% PS&E.
- Summary of Geotechnical Conditions, 90% Draft and Final per WSDOT

Task 27.4 Geotechnical Support During Bidding (Phase 3)

The SUBCONSULTANT will provide the following services during this phase.

- Respond to bidders' inquiries during the bid period (3 assumed)
- Preparation of addendum during the bid period (1 assumed)
- Attend the pre-bid meeting

TASK 28 HYDRAULIC ENGINEERING (SUBCONSULTANT)

Shannon & Wilson, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide hydraulic river engineering support for the design of the proposed bridge structure centered at approximate STA 55+00 and the protection of the new roadway toe of slope in areas where the toe is located adjacent to the river or within the identified channel migration zone (CMZ).

This scope of services covers data collection, hydrologic analysis, hydraulic modeling and estimating scour depths, and hydraulics design report to support design of the new bridge, and revetment/riverbank and scour protection at the bridge and along the toe of slope for the new roadway.

Task 28.1 Project Management

The SUBCONSULTANT will perform project management services for hydraulic engineering tasks including invoicing, scheduling of work, communications with the CONSULTANT and the COUNTY, QA/QC, and attendance at three progress meetings held in coordination with the design review meetings at the COUNTY offices.

Task 28.2 Documentation

The results of the hydraulic and scour analyses will be documented in a hydraulic report. The report will include a description of the physical characteristics of the site, including photographs taken during the site reconnaissance, text, tables, and figures that describe the results of the hydraulic analysis, and revetment/riverbank protection recommendations. The CONSULTANT's report will include key hydraulic related data needed for permit application. A draft version of the report (1 digital copy) will be provided to the COUNTY for review and comment.

Based on COUNTY comments, The CONSULTANT will revise and finalize the report and provide 1 digital and 5 hard copies.

Task 28.2 Deliverables

- Draft and Final Hydraulics Report. Digital copies shall be provided in Microsoft Word format and in PDF format.
- Conceptual Plans in PDF format and 5 (five) sets of hard copies.
- Complete copies of all updated hydraulic models with data files.

Task 28.3 Bridge Scour and Riverbank Protection Design

The SUBCONSULTANT will provide bridge scour protection and riverbank erosion and scour protection design plans, details and special provisions specifications as outlined in the following sections.

Task 28.3.1 60% Design Plan Review

The SUBCONSULTANT will provide redline review and comments on the 35 MPH 60% design plans which include the additional topographic survey data in the project basemap and revised designs of the roadway, walls, slopes, and design of other elements, including the proposed bridge.

Task 28.3.2 Bridge Erosion and Scour Protection Design Plans & Details

The SUBCONSULTANT will provide 60% plans and details, and 90% and Final plans, details and specification special provisions for bridge erosion and scour protection designs using the preferred alternatives from previous conceptual designs. Bridge erosion and scour protection features include rock (riprap) materials underneath the bridge. Large woody debris and plantings will not be evaluated beneath the bridge due to flood and debris conveyance considerations. Both rock and vegetated soil slopes with rock, wood and bioengineering will be

provided for roadway approach sections that may have MSE walls and Reinforced Soil Slopes (RSS), and will use similar details as the roadway design sections.

Task 28.3.3 Riverbank Erosion and Scour Protection Design Plans & Details

The SUBCONSULTANT will provide 60% plans and details, and 90% and Final plans, details and specification special provisions for riverbank erosion and scour protection designs. Riverbank erosion and scour protection features may include rock (riprap), piles, large woody debris, anchorage and planting plans that will be incorporated with the geotechnical MSE and RSS wall designs.

Task 28.3.4 60%, 90% 100% Plan Review Meetings and Calls

The SUBCONSULTANT will attend three, two hour combined progress/design review meetings, one each for the revised 60%, 90% and 100% submittals at COUNTY offices. The SUBCONSULTANT will attend up to four, one hour conference calls for plan development and review.

Task 28.3 Deliverables

- Design calculations, drawings and layouts, details, quantities, unit costs, memoranda and other information needed for the subtask items above to prepare the 90% and Final design plans, special provisions and construction costs.

Task 28.4 Permitting Assistance

The SUBCONSULTANT will provide up to 48 hours of support to the CONSULTANT during review and input to environmental documents and permit applications. Besides verbal and other communication, The SUBCONSULTANT's deliverables will include:

- Technical documentation of hydraulic analyses: Relevant data will describe anticipated project impacts to flood characteristics, channel response, habitat benefits, etc.
- Quantity estimates and construction elements: Estimates of excavation and fill, riverbank protection measures, dewatering, site access, sequencing, costs, etc.
- Snohomish County "No-Rise Certification": The project area is located within the FEMA Special Flood Hazard Area (SFHA) Zone A – No Base Flood Elevations Determined. Section 30.65.230 of the Snohomish County Code requires that a registered professional engineer must verify that all encroachments to the floodway, including fill, new construction, and other development does not "result in any increase in flood levels during the occurrence of the base flood discharge." A "No-Rise" analysis will be completed for the new bridge, scour/erosion protection features and roadway embankment using the existing HEC-RAS hydraulic model. The model will be run for pre-project and post-project conditions, comparing pre-flood damage road conditions to post-project new road and bridge alignment conditions. The results will be summarized in a letter report, stamped by a registered professional engineer. The letter report will also provide our opinion of whether or not the "No-Rise" conditions of the Snohomish County Code have been met.

ASSUMPTIONS

1. The SUBCONSULTANT will attend up to three combined progress and design review meetings at COUNTY offices.
2. The CONSULTANT, will provide requested ACAD drawings and modeling surfaces, in electronic formats for the revised 35 MPH design.
3. The existing HEC-RAS model is developed based on LIDAR with some local survey information. The HEC-RAS model will be updated to incorporate limited amounts of recent survey data from the CONSULTANT and as part of this scope of services, near the proposed bridge and roadway embankment to reflect existing conditions.
4. The CONSULTANT will provide all bridge and roadway embankment plans and section details (elevation detail), including updates and superseded designs, in AutoCAD for the SUBCONSULTANT to modify for bridge and riverbank erosion and scour design plan and details. The SUBCONSULTANT will revise current design plans and details based on the revised plans and details provided at the outset of the design phase using the 35 MPH roadway design alignment and design decisions provided in an email to the SUBCONSULTANT on March 17th, 2016. Additional changes in roadway alignments, wall, embankment and bridge configurations which result in reanalysis of river hydraulics will be done so through future amendment.

5. Bridge hydraulics design uses the 180 foot bridge span selected by the County, and assumes that the WSDOT and FHWA design manuals will be followed and that the WDFW Water Crossing Design Guidelines methods will be checked and met for the velocity ratio criteria. A full reach analysis, as described in the WDFW guidelines, will not be performed. A summary of existing studies will be provided and compared with the WSDOT, FHWA design manuals and WDFW guidelines.
6. FEMA floodplain map revisions, CLOMR/LOMR applications and remapping are not included in this scope of services and can be provided upon request from the COUNTY
7. Preliminary designs and the resulting final designs are limited to those types of designs identified above. Use or selection of different design methods and features require changes in scope and budget.
8. The SUBCONSULTANT will provide design plans and details in AutoCAD format, to which the CONSULTANT will incorporate the design plans and details into the final plans and specifications. The SUBCONSULTANT will provide professional stamps on reports and letters submitted to the CONSULTANT. The CONSULTANT will stamp and sign the final plans which include the SUBCONSULTANT designs, and by reference professional stamps included in the supporting reports and design memoranda.

TASK 29 PERMITTING SUPPORT

The project is subject to review under a number of environmental policies and permitting requirements which have been identified by the COUNTY.

Task 29.1 Permit Coordination

To assist the COUNTY, the CONSULTANT will review the environmental commitments, permitting strategy, and discipline reports that support the Environmental Assessment (EA).

The CONSULTANT attendance at six (6) agency coordination meetings is estimated for the proposed project design for this supplemental phase with representatives of the COUNTY, US Forest Service (USFS), Federal Highway Administration (FHWA), and Washington State Department of Transportation (WSDOT) Local Programs.

Task 29.1 Permit Submittal Drawings

The CONSULTANT will continue to support the project by providing technical design data (quantities, measured impact areas, etc.) for proposed project elements designed by the CONSULTANT. The evaluation will include the project footprint and other areas that could be used during construction, including temporary structures that may be required for access during construction. This information is required in various formats for permit application submittals and will be shown on drawings/plans prepared to accompany the permit applications prepared by the COUNTY. Three primary permit submittal drawing sets will be produced by the CONSULTANT to support the following permits and be prepared in accordance with the permitting agency's application requirements:

1. Shoreline Permit for Snohomish County Planning and Development Services (PDS)
2. Hydraulic Project Approval (HPA) for Washington Department of Fish and Wildlife (WDFW)
3. Joint Aquatic Resources Permit Application (JARPA) for United States Army Corps of Engineers (USACE)

ASSUMPTIONS

1. The COUNTY will continue to provide a complete record of communications with regulatory agencies concerning the proposed project design, cost and schedule.
2. The agency coordination meetings will be held at COUNTY offices in Everett, or at other stakeholder office locations as determined by the stakeholders.

DELIVERABLES

- Meeting materials for attended agency coordination meetings.
- Design input and review during 60 percent design for JARPA, Shoreline, and HPA.
- Final design input and review during 90 and 100 percent design for JARPA, Shoreline, and HPA.

- Draft and Final permit submittal drawings to support the County Shoreline permit application to Snohomish County PDS.
- Draft and Final permit submittal drawings to support the Hydraulic Project Approval (HPA) permit application to WDFW.
- Draft and Final permit submittal drawings to support the Joint Aquatic Resources Permit Application (JARPA) to the USACE.

TASK 30 DRAINAGE ENGINEERING (SUBCONSULTANT)

The Louis Berger Group, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide civil engineering services for drainage design to complete previous work performed for the 35 MPH Alignment roadway.

This scope includes final design of the roadway drainage associated with the reconstruction of the roadway alignment in coordination with the roadway and other design elements performed by the CONSULTANT under Tasks 31 and 32. The scope includes the design of 15 roadway culverts (this excludes the Box Culvert Vented Ford) that convey offsite runoff across the roadway. In addition, this scope includes hydrologic and hydraulic support for the design of the roadside ditch that will collect the offsite runoff and route it to the culverts. The scope also includes preparation of a Full Drainage Report, the Stormwater Pollution Prevention Plan (SWPPP), and plans, specifications, and cost estimates (PS&E) for the site preparation and temporary erosion and sediment control (TESC) design.

ASSUMPTIONS

It is assumed that natural dispersion will be used as the flow control and water quality treatment for this project. This also will satisfy the low impact development (LID) requirement. Therefore, no flow control or water quality treatment facilities will be included in the design. The project site contains steep slopes and several areas of weak, landslide prone soils. Thus, mimicking the natural system through dispersion of non-concentrated flows in the best method of flow control and water quality treatment, minimizing the threat of erosion of landslide(s). However, onsite slopes are very steep and exceed the maximum dispersion slope requirement.

A deviation from typical slope criteria is proposed to allow the use of natural dispersion to achieve full project drainage compliance. The project has obtained a waiver to use the WSDOT Highway Runoff Manual (HRM) instead of the Snohomish County Drainage Manual. The HRM acknowledges that the prescriptive design approach for drainage mitigation may not work for every project and provides a procedure to evaluate challenged projects called an Engineering and Economic Feasibility Study (EEF). The COUNTY has prepared an EEF to allow a deviation from the natural diversion criteria to be used on this project and will submit it to WSDOT for review and approval.

The scope of work for this task includes the overall surface water assumptions noted below.

- Natural dispersion will be used such that no flow control or water quality treatment facilities will be required.
- Because it is assumed natural dispersion will be used for stormwater mitigation, no other low impact development bmp will be required other than Post Construction Soil Quality and Depth where applicable.
- Energy dissipaters will not be required at the outlet to the culverts. In previous engineering analysis, it was decided to route flow away from the roadway embankment without a structural energy dissipater.
- The COUNTY will submit the EEF to WSDOT, prepare any additional back up information, negotiate with WSDOT if necessary and will gain approval to use Natural Dispersion to mitigate for stormwater.

Task 30.1 Project Management

The SUBCONSULTANT will perform project management services which include the following activities:

- Project Administration (monitoring project budget, schedule and progress)
- Monthly Progress Reports: Provide Progress Reports with invoices to include the following:
 - Progress Report (Exhibit N3)
 - Anticipated upcoming tasks.

- Budget summary status for the project.
- Anticipated schedule delays or other problems. If schedule is delayed, provide an updated schedule
- Other issues and concerns
- Invoice for tasks accomplished
- Communication and Meetings
 - Miscellaneous communications between the SUBCONSULTANT and the CONSULTANT and/or COUNTY
 - Up to three (3) Team meetings (not associated with specific technical tasks)
- Quality Assurance/Quality Control.
 - The SUBCONSULTANT will perform quality control reviews of client deliverables Quality control reviews will be done by senior staff personnel

Task 30.1 Deliverables

- Monthly invoices and project status reports.
- Up to three (3) team meetings attended by up to two Louis Berger staff.

Task 30.2 Supplemental Hydrologic and Hydraulic Analysis

This task is to provide supplemental hydrologic modeling and hydraulic modeling to assess system hydraulic response as refinements are made during the design process. Refinements may be made as the result of new survey data, adjustment in roadway alignment and/or design criteria. Work may include updating the HEC-RAS models to re-evaluate the 7 stream crossings and the HY-8 analyses for the remaining 8 drainage crossings. In addition, it is anticipated that the scour analysis to select channel lining material for the channels upstream and downstream of the culverts may need to be re-visited. Finally, this task may include re-evaluating the roadside ditch capacity as the roadway alignment is re-adjusted.

Task 30.2 Assumptions

- No significant changes in modeling approach from the preliminary design are assumed.

Task 30.3 Full Drainage Report / SWPPP

For projects that include 5,000 or more square feet of new impervious surface, a Full Drainage Report is required. The drainage report shall include:

- An executive summary of the drainage plan and drainage summary form.
- Stormwater Site Plan Narrative that provides a general description of the project, pre-developed and developed conditions of the site, site area and size of the improvements, and the pre- and post-developed stormwater runoff conditions.
- A vicinity map that locates property, identifies all roads bordering the site, shows the route of stormwater offsite to the natural receiving waters and significant geographic features and critical areas.
- Stormwater site planning sheets which display:
 - Acreage and boundaries of all drainage basins (with table of area tabulations)
 - Existing stormwater drainage to and from the site to the stream or one quarter mile offsite, whichever is nearer to the site.
 - Routes of existing drainage courses, construction pipes, ditches and future flows at all discharge points;
 - Length of travel from the farthest upstream end of a proposed storm drainage system to any of proposed flow control and treatment facility;
 - Significant geographical features;
 - Critical areas; and
 - Soils within the project site;
- Existing conditions summary
- Any areas of site limitation
- Off-site analysis (upstream and downstream) and mitigation report
- Drainage design, including the basis on which feasibility or infeasibility of on-site stormwater management BMP's was determined

- SWPPP prepared pursuant to Volume II Chapter 3 of the *Snohomish County Drainage Manual* and/or the *WSDOT Highway Runoff Manual*
- Permanent stormwater control plan
- Special reports, studies and maps conducted to prepare the stormwater site plan (e.g., soil testing, critical areas reports and delineations)
- A list of other necessary permits and approvals as required by other regulatory agencies if those permits or approvals include conditions that affect the stormwater site plan or contain more restrictive drainage-related requirements
- An operation and maintenance manual for each flow control and treatment facility. The manual should contain a description of the facility. The manual must identify and describe the maintenance tasks and the frequency of each task meeting the standards established in Volume V, Chapter 4. A maintenance activity log shall be provided that indicates what maintenance actions will be taken, by whom and when, pursuant to Chapter 7.54 SCC

Task 30.3 Assumptions

1. No mitigation report will be required.
2. Drainage report information regarding the "Box Culvert Vented Ford" crossing and the bridge shall be provided by the CONSULTANT and included in the drainage report. Drainage report information includes but is not limited to basin delineation (CADD), hydrology estimate with model output back up, hydrology parameters (soils, impervious area, etc.), drainage routes (CADD), length of travel from farthest upstream point in the basin (CADD), hydraulic results with model output back up (scour, water level), narrative inserts following County drainage report outline format, including downstream analysis (narratives, photographs, analyses).
3. Special reports will be provided by others
4. Permits and approvals will be provided by others
5. Critical areas such as wetlands, streams/stream buffers and areas with high potential for erosion and sediment deposition will be provided by others (CADD and pdf).
6. Due to the density of vegetation at the site, specific trees and other vegetation will not be called out on the base map. As a result, no vegetation map will be provided.
7. Landscaping plans will be provided by others.
8. Because it is assumed natural dispersion will be used for stormwater mitigation, no other low impact development bmp will be required other than Post Construction Soil Quality and Depth where applicable. No evaluation of infiltration/LID feasibility will be required.
9. Natural dispersion will be used such that no flow control or water quality treatment facilities will be required.

Task 30.3 Deliverables

- Draft and Final Full Drainage Report (Electronic Submittal and one paper copy)
- Draft and Final SWPPP (Electronic Submittal and one paper copy)

Task 30.4 60% Drainage Design PS&E

The SUBCONSULTANT will prepare 60% plans, specifications, and construction cost estimates of the drainage design. The budget is based upon the following drawings:

- Site Preparation & TESC Plans (13 sheets)
- Site Preparation & TESC Details and Notes (2 sheets)

The SUBCONSULTANT shall prepare 60% Project Drainage Specifications using the WSDOT Standard Specifications for Road Bridge, and Municipal Construction (2016). In addition, the SUBCONSULTANT shall prepare the 60% Drainage Cost Estimate for the site preparation and TESC design and provide input to the CONSULTANT for the culvert crossings.

Task 30.4 Assumptions

1. The level of effort is largely based upon the assumed number of drawings and extent of work. Should the actual number of drawings be increased, it may be the basis to negotiate additional work.

2. The PS&E documents will be consistent with WSDOT and/or COUNTY design standards.
3. The design of the roadside ditch will be included in the roadway cross sections provided by the CONSULTANT. Confirmation regarding ditch sizing will be provided by the SUBCONSULTANT.
4. Plans, specifications and estimate associated with the "Box Culvert Vented Ford" will be prepared by the CONSULTANT.
5. The SUBCONSULTANT will be responsible for the design recommendations for the culvert crossings and provide input to the CONSULTANT. Plans, specifications and estimate associated with the stream/culvert crossings will be prepared by the CONSULTANT as part of Task 31.
6. Typical culvert headwalls or wing walls required will be covered by a standard plan. Should a special design of headwalls or wing walls be required, this effort will be performed by the CONSULTANT as part of Task 31.
7. Material for culverts shall be CMP.
8. No chemical treatment will be required for the Temporary Erosion and Sediment Control.

Task 30.4 Deliverables

- 60% Site Preparation & TESC Plans (electronic in .pdf form and ACAD form)
- 60% Site Preparation & TESC Specifications (in Word format)
- 60% Site Preparation & TESC Cost Estimate

Task 30.5 90% Drainage Design PS&E

The SUBCONSULTANT will address COUNTY comments on the 60% plans, specifications, and estimate and resubmit at a 90% level of completion. The SUBCONSULTANT shall include 1 meeting with the CONSULTANT and the COUNTY to review and discuss comments.

Task 30.5 Assumptions

- See Task 30.4 assumptions.

Task 30.5 Deliverables

- Same as 60% deliverables, except at 90% level of completion.

Task 30.6 100% and Ad-Ready Drainage PS&E

The SUBCONSULTANT will address COUNTY comments on the 90% plans, specifications, and estimates and resubmit a 100% submittal for COUNTY review. The SUBCONSULTANT shall include 1 meeting with the CONSULTANT and the COUNTY to review and discuss comments. Upon COUNTY review, the SUBCONSULTANT shall incorporate comments on the "100%" submittal and submit Ad-Ready stamped plans and specifications, and estimate.

Task 30.6 Assumptions

- See Task 30.4 assumptions.
- It is assumed that others will be responsible for final printing and production.
- It is assumed that the design of improvements advances in level of detail and that there is no major or fundamental change in extent for approach to the improvements between 100% and Ad-Ready submittals.

Task 30.6 Deliverables

- Same as 60% deliverables, except at 100% and Ad-Ready levels of completion.

Task 30.7 Support During Bidding (Phase 3)

This task is an allowance task for the SUBCONSULTANT to support the CONSULTANT and the COUNTY during the bid and award phase. It is an allowance task because it is difficult to estimate the level of effort. It could include the following activities:

- Assist the CONSULTANT and the COUNTY in responding to Bidder's questions and requests for information
- Preparation of any addenda, if required
- Attending a pre-bid conference, if desired
- Review of bids and assist on recommendation of award, if required

TASK 31 ROADWAY ENGINEERING

The CONSULTANT will complete roadway and other engineering design and plans, specifications, and estimates (PS&E) for the 35 MPH Alignment. This work includes safety elements, roadway grading, subgrade, surfacing, channelization and signage.

Roadway engineering and design work will be performed to advance the design of the Index Galena roadway and two access roadways to a final construction bid document level of design completion. Final plans, specifications, and estimates (PS&E) will be prepared, including PS&E for the 15 culvert crossings as designed by the SUBCONSULTANT under Task 30. Any special designs required for headwalls or wingwalls associated with the culvert crossings will be provided by the CONSULTANT.

Calculations – Calculations will be completed and designs will be prepared for the roadway alignment including grading, subgrade, surfacing, guardrail, channelization, and signage.

Drawings – The CONSULTANT will complete the final contract drawings indicated in the list of Roadway drawings provided in the attached fee estimate, Exhibit E-1f. The CONSULTANT shall prepare PS&E documents for the construction of the proposed project consistent with COUNTY and/or state design standards, and of such standards as to provide competitive bidding by contractors. Plans shall be formatted to provide sufficient detail for convenient field layout of all proposed facilities. COUNTY standard plans and WSDOT standard plans will be supplemented with project-specific details as required. Final bid documents will be signed by a licensed professional engineer in the state of Washington.

Specifications - Current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction (2016) will be the standard specifications for the work. The CONSULTANT shall prepare the general special provisions and project-specific special provisions required for construction of the roadway. The CONSULTANT shall be responsible for running the pick list and the COUNTY shall merge all special provisions, and shall consolidate and finalize the bid specification documents.

Quantities and Construction Cost Estimate - A list of bid items will be prepared, conforming as much as possible to the WSDOT standard item table. Every bid item will have a description, measurement unit, and payment description in the specifications. Quantities and unit prices will be estimated for every bid item. Unit prices will be estimated from recent bid experience with similar projects, WSDOT unit bid analysis, contractor inquiries, and Means construction estimating manuals.

Roadway Cross Sections - A set of roadway cross-sections will be prepared at a scale and incremental distance along the project roadway alignment as desired by the COUNTY at the 90% PS&E Submittal and Final Construction Document stages.

ASSUMPTIONS

1. The CONSULTANT shall attend one site visit during Roadway plan completion and review with up to four CONSULTANT participants.
2. The CONSULTANT shall participate in four phone conferences during Roadway plan completion and review with up to three CONSULTANT participants.
3. Utilities are not present and utility coordination is not required.
4. The CONSULTANT is responsible for the following Roadway & Culvert plan sheets listed in Exhibit E-1f.
5. The COUNTY is responsible for the following drawings for incorporation into the plan set:
 - a. Environmental Compliance Plans
 - b. Planting Plans, Schedule and Notes
 - c. Traffic Control Plans
6. The COUNTY is responsible for drainage design requirements related to regulatory compliance, such as the Engineering and Economic Feasibility Study (EEF) process.

TASK 32 STRUCTURAL ENGINEERING

The CONSULTANT will prepare the PS&E and project-specific special provisions for the project's proposed bridge and other project elements of reinforced soil slopes, structural earth walls, box culvert vented ford structure, and debris diversion berm. Any temporary bridge or other structures required for construction of the proposed bridge or other project elements will be developed conceptually with required width, length, alignment

and flood clearance (as required) shown on the plans. Two site visits by up to three CONSULTANT staff each visit are assumed to support the final design and bid document preparation of the bridge and other project elements.

Task 32.1 Bridge Design and Drawings

This task involves engineering and design work required to advance the design of the proposed bridge to a final construction bid document level of design completion. The SUBCONSULTANT shall support the design completion of the bridge per their Task 27 and Task 28 efforts.

- **Substructure Design Calculations** – Calculations will be completed and designs will be prepared for the abutments, columns, crossbeams, and foundations based on the controlling forces from the static and seismic analyses.
- **Superstructure Design Calculations** - Calculations will be completed and designs will be prepared for the superstructure components of the preferred bridge alternative determined at the conclusion of the study
- **Bridge Drawings** - The CONSULTANT will complete the final contract drawings indicated in the list of bridge drawings provided in the attached fee estimate, Exhibit E-1f.
- **Bridge Specifications** - Current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction will be the standard specifications for the work. The CONSULTANT will prepare the project specific special provisions required for construction of the bridge.
- **Bridge Quantities and Construction Cost Estimate** - A list of bid items will be prepared, conforming as much as possible to the WSDOT standard item table. Every bid item will have a description, measurement unit, and payment description in the specifications. Quantities and unit prices will be estimated for every bid item. Unit prices will be estimated from recent bid experience with similar projects, WSDOT unit bid analysis, contractor inquiries, and Means construction estimating manuals.

Task 32.2 Project Elements Design and Drawings

This task involves engineering and design work required to advance the design of the proposed project elements of reinforced soil slopes, structural earth walls, box culvert vented ford structure, and debris diversion berm to a final construction bid document level of design completion. The SUBCONSULTANT shall support the design completion of the project elements per their Task 27 and Task 28 efforts.

- **Walls & Slopes Design Calculations** – Calculations and designs (layouts) will be completed for the reinforced soil slopes and structural earth walls.
- **Box Culvert Vented Ford Design Calculations** - Calculations and designs will be completed for the box culvert vented ford structure and associated diversion berm.
- **Debris Diversion Berm Design Calculations** - Calculations and designs will be completed for the debris diversion berm design element.
- **Bridge Scour & Riverbank Protection** – Drawings will be prepared from sketches and design information provided by the SUBCONSULTANT for erosion and scour protection at the bridge piers and riverbank erosion and scour protection measures along the toes of walls and slopes.
- **Drawings** - The CONSULTANT will complete the final contract drawings indicated in the list of Project Element drawings provided in the attached fee estimate, Exhibit E-1f.
- **Specifications** - Current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction will be the standard specifications for the work. The CONSULTANT will prepare the project specific special provisions required for construction of the project elements.
- **Quantities and Construction Cost Estimate** - A list of bid items will be prepared, conforming as much as possible to the WSDOT standard item table. Every bid item will have a description, measurement unit, and payment description in the specifications. Quantities and unit prices will be estimated for every

bid item. Unit prices will be estimated from recent bid experience with similar projects, WSDOT unit bid analysis, contractor inquiries, and Means construction estimating manuals.

TASK 33 PS&E SUBMITTALS

The CONSULTANT shall prepare the PS&E submittals for the proposed roadway design, bridge structure and other project elements of reinforced soil slopes, structural earth walls, box culvert vented ford structure, and debris diversion berm design. PS&E prepared by the SUBCONSULTANT under Task 30 shall be incorporated into the submittals by the CONSULTANT. PS&E submittal documents will be transmitted to the COUNTY for review using electronic file transfer.

A consolidated list of review comments will be provided to the CONSULTANT following the 60 and 90 percent PS&E design submittals for the CONSULTANT's responses, and a meeting will be conducted with the COUNTY to discuss and resolve the comments from the previous review with up to four CONSULTANT participants. The CONSULTANT shall prepare final/100% PS&E documents that will be submitted to the COUNTY for approval before advancing to the Ad-Ready submittal.

The planned PS&E submittal deliverables are as follows.

- **Intermediate / 60 Percent Submittal** - All remaining design work will be based upon the project decisions represented in this 60 percent submittal and future changes to these decisions can impact design costs and project delivery schedule. The 60 percent submittal will include one half-size set of plans, an outline of the special provisions, and an updated construction cost estimate.
- **Intermediate / 90 Percent Submittal** - This submittal will have all important details needed to construct the project, identify all anticipated pay items, and provide outline specifications. The 90 percent submittal will conform to the WSDOT Deliverables Expectation Matrix for bridge projects at Intermediate PS&E Submittal Review and include one half-size set of plans, construction cost estimate, and project special provisions.
- **100 Percent Submittal** - This submittal will represent a complete draft of the construction contract. The 100 percent submittal will conform to the WSDOT Deliverables Expectation Matrix for bridge projects at PS&E Pre-submittal Review and include one half-size set of plans, construction cost estimate, and project special provisions.
- **Ad-Ready Submittal** - This submittal will incorporate COUNTY comments on the 100 percent submittal and is intended for the Bid Advertisement (Ad). The Ad-Ready submittal will conform to the WSDOT Deliverables Expectation Matrix for bridge projects at Final PS&E Review Process and include one half-size and one full-size set of plans and one ACAD CD, construction cost estimate, and project special provisions.

DELIVERABLES

The CONSULTANT shall provide the following as latest file formats available for each of the identified project submittals:

1. Plans – ACAD and .pdf files
2. Civil 3D Etransmit file – Electronic file
3. Engineer's Cost Estimate – Excel and .pdf files
4. General and Project Specific Special Provisions – MS Word document file
5. Summary of Quantities – Excel and PDF files
6. Response to previous submittal's comments – Excel file
7. Roadway Cross-Section sheets
8. Quantity Calculation Notebook

TASK 34 EASEMENT PLANS

The proposed roadway will require a memorandum of understanding (MOU) and an easement from the United States Department of Agriculture's Forestry Service (USDA-FS). The CONSULTANT shall prepare a preliminary set of Easement plans and legal description based on an example (US 2 milepost 89.36 to 90.36) provided by the COUNTY.

The CONSULTANT will incorporate one consolidated set of comments from the COUNTY and USDA-FS into a set of Final Easement Plans and Legal Description, and will provide a response to the preliminary Easement Plan comments. An estimate of the expected drawings sheets is reflected in Exhibit E-1F.

ASSUMPTIONS

- One set of revisions to the easement plans
- Two meetings/phone conferences

DELIVERABLES

- Preliminary Easement Plans
- Response to Preliminary Easement Plan Comments
- Legal Description
- Final Easement Plans

TASK 35 QUALITY ASSURANCE / QUALITY CONTROL

The CONSULTANT will provide quality assurance/quality control (QA/QC) for all CONSULTANT design work in accordance with the CONSULTANT's QA/QC standards.

TASK 36 SUPPORT DURING BIDDING (PHASE 3)

Under this phase, the CONSULTANT will provide the following services.

- Responding to bidders questions during the bid period (8 assumed)
- Preparation of addendum during the bid period (2 assumed)
- Attendance at the Pre-Bid meeting
- Field staking for bidding support – included under Task 26.2
- Site visit to confirm staking by design team

CONSTRUCTION PERIOD SERVICES (PHASE 4)

Services to be performed during the project construction are not included in this scope of services and will be provided as supplemental services when the project enters the construction phase as agreed upon with the COUNTY.

**EXHIBIT E-1f
Supplemental Consultant Fee Determination – Budget**

**EXHIBIT E-1f, PROJECT FEE DETERMINATION
BergerABAM
SUPPLEMENT NO. 7**

**Total Cost Summary
8/8/2016**

**Index-Galena Road MP 6.4 to 6.9 Realignment
Snohomish County - RC 1532 / UPI #06-0150**

BergerABAM PERSONNEL

<u>Project Function</u>	<u>Hours</u>		<u>Billing Rate</u>		<u>Cost</u>
1 Engineer VIII/IX - Principal / Officer	599.0	X	\$ 224.40	= \$	134,416
2 Senior Construction Specialist	136.0	X	\$ 168.42	= \$	22,905
3 Engineer VI - Structural Project	626.0	X	\$ 158.10	= \$	98,971
4 Engineer IV - Structural / Civil	1,410.0	X	\$ 131.58	= \$	185,528
5 Engineer VI - Civil Project	724.0	X	\$ 158.10	= \$	114,464
6 Applications Programmer II	77.0	X	\$ 151.26	= \$	11,647
7 CAD Operator / Designer	1,538.0	X	\$ 115.70	= \$	177,947
8 Survey Director	83.0	X	\$ 148.31	= \$	12,310
9 Coordinator / Administration	102.0	X	\$ 116.96	= \$	11,930
BergerABAM Hours, TOTAL	5,295		Subtotal Personnel Costs = \$		770,117
			Salary Escalation for FY 2017 & 2018 at = 7.00%	\$	53,908
			TOTAL PERSONNEL COSTS = \$		824,025

EXPENSES / DIRECT NONSALARY COSTS (DNSC)

Mileage	3,450	miles @	0.54	\$	1,863
Federal Express / Courier	0	each @	\$ 15.00	\$	-
		TOTAL REIMBURSABLE EXPENSES (DNSC) = \$			1,863

SUBTOTAL BergerABAM FEE = \$ 825,888

SUBCONSULTANTS

Sitts & Hill - Survey & Base Mapping	\$	83,769
Shannon & Wilson - Geotechnical Engineering	\$	164,868
Shannon & Wilson - Hydraulic Engineering	\$	94,101
Louis Berger Group - Drainage Engineering	\$	207,479
	SUBTOTAL SUBCONSULTANT FEES = \$	550,217

TOTAL AUTHORIZED SUPPLEMENT AMOUNT = \$1,376,105

Prepared by: SKJ

Date: 08 August 2016

**EXHIBIT E-1f: PROJECT FEE DETERMINATION
BergerABAM
SUPPLEMENT NO. 7**

8/8/2016

**Index-Galena Road MP 6.4 to 6.9 Realignment
Snohomish County - RC 1532 / UPI #06-0150**

BergerABAM COST TOTALS by TASK

		<u>Total Hours</u>	<u>Expenses</u>	<u>Personnel Task Totals</u>
Task 25	Project Management	436.0	\$ 648.00	\$ 76,661
Task 26	Survey & Base Mapping	48.0	\$ -	\$ 7,119
Task 29	Permitting Support	494.0	\$ 486.00	\$ 72,784
Task 31	Civil /Roadway Engineering	1,497.0	\$ 108.00	\$ 203,224
Task 32	Structural Engineering	1,556.0	\$ 108.00	\$ 209,868
Task 33	PS&E Submittals	346.0	\$ 162.00	\$ 52,582
Task 34	Easement Plans	242.0	\$ 162.00	\$ 35,131
Task 35	Quality Assurance / Quality Control	488.0	\$ -	\$ 83,370
Task 36	Support During Bidding	188.0	\$ 189.00	\$ 29,376
				\$ 770,117

Total BergerABAM Hours	5,295.0
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Total BergerABAM Expenses	\$ 1,863.00
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Subtotal Personnel Costs =	\$ 770,117
Salary Escalation for FY 2017 & 2018 at = 7.00%	\$ 53,908
TOTAL PERSONNEL COSTS =	\$ 824,025

DIRECT NONSALARY COSTS (DNSC)

TOTAL REIMBURSABLE EXPENSES (DNSC) = \$ 1,863

SUBTOTAL BergerABAM FEE = \$ 825,888

SUBCONSULTANT COST TOTALS by TASK

Task 26	Survey & Base Mapping - Sitts & Hill	\$ 83,769
Task 27	Geotechnical Engineering - Shannon & Wilson	\$ 164,868
Task 28	Hydraulic Engineering - Shannon & Wilson	\$ 94,101
Task 30	Civil /Drainage Engineering - Louis Berger Group	\$ 207,479
		SUBTOTAL SUBCONSULTANT FEES = \$ 550,217

TOTAL AMOUNT = \$ 1,376,105

SUPPLEMENT NO. 7	Task Number	Engineer/Architect/Principal/Officer	Senior Construction Specialist	Engineer/Architect/Structural Project	Engineer/Architect/Structural/Civil	Engineer/Architect/Civil Project	Applications Programmer/IT	CAD Operator/Designer	Survey Director	Coordinator/Administrator	Totals	
BILLING RATE (hour)		\$ 234.45	\$ 168.42	\$ 168.45	\$ 131.60	\$ 168.10	\$ 131.25	\$ 118.70	\$ 142.51	\$ 118.85		
TASK 25 - PROJECT MANAGEMENT	25	168		108	8	88	8	12		84	488	
Project Coordination	25.1	80		45		40				40	206	
Progress Meetings (M) & Conference Calls (M)	25.2	24		15	8	15	8				70	
Management of Subcontractors	25.3	32		15						4	61	
Project Demobilization and Restarts	25.4	15		15		12				16	60	
Project Close-Out	25.5	15		12				12		4	44	
TASK	25	\$37,699		\$17,976	\$1,053	\$10,781	\$1,218	\$1,384		\$7,445	\$ 78,881	
TASK 26 - SURVEY & BASE MAPPING	26			See Page 9 for SIBs & HRE Survey Hours						82		82
TASK	26							\$7,116			\$ 7,116	
TASK 27 - GEOTECHNICAL ENGINEERING				See Page 11 for Sherman & Wagon Geotech Hours								
TASK 28 - HYDRAULIC ENGINEERING				See Page 13 for Sherman & Wagon Hydraulic Hours								
TASK 29 - PERMITTING SUPPORT	29	22		24	28	24		121		2	281	
Permit Coordination	29.1	41		52		36				2	131	
Environmental Document Review		4		5		5				2	20	
Agency Coordination Meetings (M)		35		35		24					94	
Additional Coordination & Consultation		5		5		4					20	
Permit Submittal Drawings	29.2	24		12	56	48		108			248	
Stonewine (Permit) County		4		2	15	8		24			54	
Hydraulic Project Approval (HPA) (VWD/PA)		4		2	15	8		24			54	
Joint Aquatic Resource Permit Application (JAAR) (VWD/PA)		15		5	24	32		128			248	
TASK	29	\$16,187		\$18,116	\$12,632	\$13,280		\$26,263		\$234	\$ 72,784	
TASK 30 - DRAINAGE ENGINEERING	30			See Pages 15-17 for Louis Berger Drainage Hours								
TASK 31 - ROADWAY ENGINEERING	31	88		18	498	288	18	814		11	1,687	
Site/Utility Civil Project Hours		5		5	5	5		5		5	30	
Roadway & Culvert Drawings (see below)		82		8	490	234	18	582		3	1,335	
Culverts - Special Roadway (Wing/Wall) Design		2		5	15	4		5			26	
Site Preparation and BASIC Drawings (Coordinate w/ LBSC)		4		5	15	8		12			40	
Roadway Cross Sections @ 50% and Final		2		5	4	2		12			25	
Plan Advancement and Review/Conference Calls (M)		5		5	5						24	
TASK	31	\$18,244		\$2,850	\$81,945	\$42,965	\$2,723	\$71,040		\$1,631	\$ 208,224	

SUPPLEMENT NO. 7		Task Number	Engineer/MLTX Principal / Officer	Senior Construction Specialist	Engineer M - Structural / Project	Engineer IV - Structural / Civil	Engineer M - Civil Project	Applications Programming II	CAD Operator / Designer	Survey Director	Coordinator / Administration	Totals
TASK DESCRIPTION		BILLING RATE ==>	\$ 224.40	\$ 118.43	\$ 158.10	\$ 131.60	\$ 150.10	\$ 151.26	\$ 118.70	\$ 143.31	\$ 110.95	
No.	TASK 31 - ROADWAY & CULVERT DRAWINGS											Totals
1	COVER SHEET WITH VICINITY MAP				2				8			10
2	INDEX SHEET		1		4		4		12			21
3	SECTION - SUBDIVISION				4		2	1	8	1		18
4	SURVEY CONTROL, ROW AND ALIGNMENT		1		0		4	1	12	2		20
5	LEGEND AND ABBREVIATIONS - SHEET 1		1		4		4		8			17
6	LEGEND AND ABBREVIATIONS - SHEET 2		1		4		4		8			17
7	GENERAL NOTES - SHEET 1		1		4		2		16			23
8	GENERAL NOTES - SHEET 2		1		4		2		16			23
9	OUTREINCH PLAN & DETOUR MAP		1		4		2		8			15
10	ROADWAY AND GRADING SECTIONS - SHEET 1		1		0		4		8			21
11	ROADWAY AND GRADING SECTIONS - SHEET 2		1		0		4		8			21
12	ROADWAY AND GRADING SECTIONS - SHEET 3		1		0		4		8			21
13	ROADWAY AND GRADING SECTIONS - SHEET 4		1		0		4		8			21
14	ROADWAY AND GRADING SECTIONS - SHEET 5		1		0		4		8			21
15	ROADWAY AND GRADING TRANSITIONS - SHEET 1		1		2		4		8			23
16	ROADWAY AND GRADING TRANSITIONS - SHEET 2		1		2		4		8			23
17	ROADWAY AND GRADING TRANSITIONS - SHEET 3		1		2		4		8			23
18	ROADWAY AND GRADING TRANSITIONS - SHEET 4		1		2		4		8			23
19	ROADWAY PLAN & PROFILE - KEY SHEET		1		4		2		8			15
20	ROADWAY PLAN & PROFILE - SHEET 1		1		0		4	1	8			20
21	ROADWAY PLAN & PROFILE - SHEET 2		1		0		4	1	8			20
22	ROADWAY PLAN & PROFILE - SHEET 3		1		0		4	1	8			20
23	ROADWAY PLAN & PROFILE - SHEET 4		1		0		4	1	8			20
24	ROADWAY PLAN & PROFILE - SHEET 5		1		0		4	1	8			20
25	ROADWAY PLAN & PROFILE - SHEET 6		1		0		4	1	8			20
26	ROADWAY PLAN & PROFILE - SHEET 7		1		0		4	1	8			20
27	ROADWAY PLAN & PROFILE - SHEET 8		1		0		4	1	8			20
28	ROADWAY PLAN & PROFILE - SHEET 9		1		0		4	1	8			20
29	ROADWAY PLAN & PROFILE - SHEET 10		1		0		4	1	8			20
30	ROADWAY PLAN & PROFILE - SHEET 11		1		0		4	1	8			20
31	ROADWAY PLAN & PROFILE - SHEET 12		1		0		4	1	8			20
32	ROADWAY PLAN & PROFILE - SHEET 13		1		0		4	1	8			20
33	ROADWAY PLAN & PROFILE - ACCESS ROADS		1		0		4	1	8			20
34	CULVERT 1 - PLAN & PROFILE		1		0		4		8			21
35	CULVERT 2 - PLAN & PROFILE		1		0		4		8			21
36	CULVERT 3 - PLAN & PROFILE		1		0		4		8			21
37	CULVERT 4 - PLAN & PROFILE		1		0		4		8			21
38	CULVERT 5 - PLAN & PROFILE		1		0		4		8			21
39	CULVERT 6 - PLAN & PROFILE		1		0		4		8			21
40	CULVERT 7 - PLAN & PROFILE		1		0		4		8			21
41	CULVERT 8 - PLAN & PROFILE		1		0		4		8			21
42	CULVERT 9 - PLAN & PROFILE		1		0		4		8			21
43	CULVERT 10 - PLAN & PROFILE		1		0		4		8			21
44	CULVERT 11 - PLAN & PROFILE		1		0		4		8			21
45	CULVERT 12 - PLAN & PROFILE		1		0		4		8			21
46	CULVERT 13 - PLAN & PROFILE		1		0		4		8			21
47	CULVERT 14 - PLAN & PROFILE		1		0		4		8			21
48	CULVERT 15 - PLAN & PROFILE		1		0		4		8			21
49	CULVERT 16 - PLAN & PROFILE		1		0		4		8			21
50	CULVERT DETAILS - SHEET 1		2		12		0		12			22
51	CULVERT DETAILS - SHEET 2		2		12		0		12			22
52	CULVERT DETAILS - SHEET 3		2		12		0		12			22
53	CULVERT DETAILS - SHEET 4		2		12		0		12			22
54	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 1		1		0		4		16			20
55	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 2		1		0		4		16			20
56	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 3		1		0		4		16			20
57	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 4		1		0		4		16			20
58	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 5		1		0		4		16			20
59	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 6		1		0		4		16			20
60	PAVING, SIGNING & CHANNELIZATION PLAN - SHEET 7		1		0		4		16			20
61	CHANNELIZATION AND SIGNING DETAILS - SHEET 1		1		0		4		16			20
	PLANTING PLANS, SCHEDULE, AND NOTES - BY COUNTY		-		-		-		-			-
	CLASS 'A' SIGNS & TRAFFIC CONTROL PLANS - BY COUNTY		-		-		-		-			-
TASK 31 - ROADWAY DRAWINGS			62		8	438	234	15	812	3		1,538

SUPPLEMENT NO. 7 TASK DESCRIPTION	Task Number	Engineer VI/III/II	Senior	Engineer V -	Engineer IV -	Engineer M - Civil	Applications	CAD Operator /	Survey Director	Coordinator /	Totals
		Principal / Consultant	Construction Specialist	Structural Project	Structural / Civil	Project	Programming	Designer	Administration		
BIDDING RATE =		\$ 234.45	\$ 168.43	\$ 168.16	\$ 131.60	\$ 166.10	\$ 191.26	\$ 116.70	\$ 163.31	\$ 116.88	

TASK 32 - STRUCTURAL ENGINEERING	32	81	48	222	572	38	18	888	1,558
Bridge Design & Drawings	32.1	12	21	81	228			234	588
Site Visit for Bridge Project Team		0	0	0	0				24
Final Bridge Design		4	0	20	50				112
Bridge Drawings (see below)		0	0	55	133			234	428
Plan Advancement and Review Conference Calls (4)		0	0	0	0				24

No.	TASK 32.1 - BRIDGE DRAWINGS								Totals
1	Bridge Plan & Elevation			2	6			10	18
2	Structural Notes			2	4			6	14
3	Construction Sequence	0		2	4			6	18
4	Foundation Plan			2	4			6	14
5	Drilled Shaft Details - Sheet 1			1	4			5	11
6	Drilled Shaft Details - Sheet 2			1	4			5	11
7	Pier 1 Plan			1	4			5	11
8	Pier 1 Elevation			1	4			5	11
9	Pier 1 Sections & Details			1	4			5	11
10	Pier 2 Plan			1	4			5	11
11	Pier 2 Elevation			1	4			5	11
12	Pier 2 Sections & Details			1	4			5	11
13	Pier 1 Curtain Walls			1	4			5	11
14	Pier 2 Curtain Walls			1	4			5	11
15	Bearing Details Pier 1			1	2			4	7
16	Bearing Details Pier 2			1	2			4	7
17	Typical Section			1	2			4	7
18	Trussing Plan			1	2			4	7
19	Girder Elevation			1	2			4	7
20	Girder Splices Details			1	2			4	7
21	Girder Details - Field Splice No. 1			1	2			4	7
22	Girder Details - Field Splice No. 2			1	2			4	7
23	Girder Mac. Details			1	2			4	7
24	Girder Camber Diagram			1	2			4	7
25	Girder Safety Cable Details			1	2			4	7
26	End Diaphragm Details			1	2			4	7
27	Intermediate Diaphragm Details			1	2			4	7
28	Bridge Deck Reinforcement Top Mat			1	2			4	7
29	Bridge Deck Reinforcement Bottom Mat			1	2			4	7
30	Bridge Deck Reinforcement Section			1	2			4	7
31	Bridge Deck Edge Beam Details			1	2			4	7
32	Pier 1 Expansion Joint Details			1	2			4	7
33	Pier 2 Expansion Joint Details			1	2			4	7
34	Traffic Barrier Details - Sheet 1			1	2			4	7
35	Traffic Barrier Details - Sheet 2			1	2			4	7
36	Traffic Barrier Details - Sheet 3			1	2			4	7
37	Traffic Barrier Details - Sheet 4			1	2			4	7
38	Approach Slab - Plan			1	2			5	8
39	Approach Slab Details - Sheet 1			1	2			5	8
40	Approach Slab Details - Sheet 2			1	2			5	8
41	Construction Access Bridge - Plan Layout & Elevation	1		4	6			10	25
42	Construction Access Bridge - Details	1		2	4			10	17
43	Moment Slab Details	1		4	6			10	25
44	Bar List & Bending Sheet			1	2			5	8

TASK 32.1 - BRIDGE DRAWINGS		5	55	132			234	428
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TASK 32 - STRUCTURAL ENGINEERING (cont.)		48	25	181	344	38	18	864	870
Project Element Design & Drawings	32.2								
Site Visit w/ Project Team					0				0
Final Diversion Berm Design		2	2	0	18				25
Final Box Culvert Vertical Ford Design		2	4	15	32				54
Final Wall Design		2	4	15	32				54
Project Element Drawings (see below)		35	15	83	240	38	18	364	802
Plan Advancement and Review Mts Conference Calls (2)		0	0	0	0				24

SUPPLEMENT NO. 7		Task Number	Engineer/MLIX Principal / Officer	Senior Construction Specialist	Engineer M - Structural Project	Engineer IV - Structural / Civil	Engineer M - Civil Project	Applications Programmer/IT	CAD Operator / Designer	Survey Director	Coordinator / Administration	Totals
TASK DESCRIPTION		BILLING RATE ==>	\$ 22,448	\$ 188,42	\$ 188,18	\$ 131,82	\$ 182,10	\$ 131,28	\$ 118,70	\$ 142,51	\$ 116,96	
TASK 32.2 - PROJECT ELEMENT DRAWINGS												
Walls and Slopes			19	3	46	112		13	188			Totals
1	Wall & Slopes - Structural Notes		1	1	2	8			5			20
2	Wall Plan & Profile - Key Sheet		1		2	4			4			11
3	Wall Plan & Profile - Sheet 1		1		2	4		1	2			10
4	Wall Plan & Profile - Sheet 2		1		2	4		1	5			14
5	Wall Plan & Profile - Sheet 3		1		2	4		1	5			14
6	Wall Plan & Profile - Sheet 4		1		2	4		1	5			14
7	Wall Plan & Profile - Sheet 5		1		2	4		1	5			14
8	Wall Plan & Profile - Sheet 6		1		2	4		1	5			14
9	Wall Plan & Profile - Sheet 7		1		2	4		1	5			14
10	Wall Plan & Profile - Sheet 8		1		2	4		1	5			14
11	Wall Plan & Profile - Sheet 9		1		2	4		1	5			14
12	Wall Plan & Profile - Sheet 10		1		2	4		1	5			14
13	Wall Plan & Profile - Sheet 11		1		2	4		1	5			14
14	Wall Plan & Profile - Sheet 12		1		2	4		1	5			14
15	Wall Plan & Profile - Sheet 13		1		2	4		1	5			14
16	Reinforced Soil Slopes - Section 1 of 2				2	4			2			14
17	Reinforced Soil Slopes - Section 2 of 2				2	4			2			14
18	Reinforced Soil Slopes - Details 1 of 2				2	8			2			18
19	Reinforced Soil Slopes - Details 2 of 2				2	8			2			18
20	Structural Earth Walls (SEW) Sections - Sheet 1		1		2	4			2			15
21	Structural Earth Walls (SEW) Sections - Sheet 2		1		2	4			2			15
22	Structural Earth Walls (SEW) Details - Sheet 1		1	1	2	8			2			20
23	Structural Earth Walls (SEW) Details - Sheet 2		1	1	2	8			2			20
Large Boulders & Rock Outcrops			3	3	8	24	10		24			
24	Boulder/Block Areas Notes, Abbreviations & Symbols		1	1	2	8	2		2			22
25	Boulder/Block Areas - Typical Sections & Details - Sheet 1		1	1	2	8	4		2			24
26	Boulder/Block Areas - Typical Sections & Details - Sheet 2		1	1	2	8	4		2			24
Box Culvert/Verted Ford			2	2	7	42	12	4	56			
27	Box Culvert/Verted Ford - Layout & Geometry		1	1	1	8	2		5			19
28	Box Culvert/Verted Ford - Grading/Diversion Berm		1	1	1	8	2	4	5			21
29	Box Culvert/Verted Ford - Plan & Elevation				1	8	2		5			17
30	Box Culvert/Verted Ford - Elevations				1	8	4		5			19
31	Box Culvert/Verted Ford - Sections				1	8	2		5			17
32	Box Culvert/Verted Ford Details - Sheet 1				1	8			5			15
33	Box Culvert/Verted Ford Details - Sheet 2				1	8			5			15
Debris Diversion Berm			2	2	8	16		2	32			
34	Debris Diversion Berm - Plan & Grading			1	2	4		2	5			17
35	Debris Diversion Berm - Elevation			1	2	4			5			15
36	Debris Diversion Berm - Sections		1	1	4	8			5			14
37	Debris Diversion Berm - Details		1	1	4	8			5			14
Bridge Scour & Riverbank Protection			9	8	18	54	16		72			
38	Bridge Scour & Riverbank Protection Notes		1	1	2	8			3			18
39	Bridge Scour Protection - Plan & Elevation		1		2	8			5			17
40	Bridge Scour Protection - Grading		1		2	8			5			17
41	Bridge Scour Protection - Sections		1	1	2	8			5			18
42	Bridge Scour Protection - Details		1	1	2	8			5			18
43	Riverbank Protection Layout - Sheet 1		1		2	8	4		5			21
44	Riverbank Protection Layout - Sheet 2		1		2	8	4		5			21
45	Riverbank Protection - Typical Sections & Details		1	1	2	8	4		5			22
46	Riverbank Protection - Road Details		1	1	2	8	4		5			22
TASK 32.3 - PROJECT ELEMENT DRAWINGS			38	18	43	242	38	18	344			622
TASK		32	\$13,634	\$7,747	\$33,998	\$75,264	\$6,208	\$2,874	\$68,189			\$ 209,888

SUPPLEMENT NO. 7 TASK DESCRIPTION	Task Number	Engineer VIII / Principal / O'Meara	Senior Construction Specialist	Engineer VI - Structural / Project	Engineer IV - Structural / Civil	Engineer III - Civil / Project	Applications / Programming	CAD Operator / Designer	Survey Director	Coordinator / Administration	Totals
		\$ 234.42	\$ 188.43	\$ 108.33	\$ 131.82	\$ 162.10	\$ 151.26	\$ 116.70	\$ 142.31	\$ 116.96	
TASK 33 - PS&E SUBMITTALS	33	42	16	60	128	60		24		16	348
85% Specifications & Special Provisions		4	4	4	16	4				4	36
85% Cost Estimate		4	4	4	16	4		2			34
Intermediate / 80% PS&E Submittal		2		2	4	2		6		2	16
Review and Respond to 85% Comments		2		4	8	4					18
85% Comment Review & Response Meeting		6		6	6	6					24
80% Specifications & Special Provisions		2	2	4	12	4				2	36
80% Cost Estimate		2	2	4	12	4		2			36
Intermediate / 60% PS&E Submittal		2		4	4	4		4		2	30
Review and Respond to 80% Comments		2		4	8	4					18
80% Comment Review & Response Meeting		6		6	6	6					24
100% Specifications & Special Provisions		2	2	4	8	4				2	32
100% Engineer's Cost Estimate		2	2	4	8	4		2			32
100% PS&E Submittal		2		2	4	2		4		2	16
Review and Respond to Final / 100% Comments		2		4	8	4					18
As-Ready Submittal		2		4	8	4		4		2	24
TASK	33	\$8,423	\$2,893	\$6,498	\$16,842	\$9,498		\$2,777		\$1,671	\$ 62,682
TASK 34 - EASEMENT PLANS	34	21		30	48			63	24		242
Preliminary Right-of-Way Exhibits / Easement Plans		6		40	24			48	4		122
Response to Preliminary Easement Plan Comments		2		8	4			2			16
Legal Description		2		8					16		26
Final Easement Plans		2		8	4			12			26
Project Easement Meetings (2)		12		12	12						36
Asst Easement/Right of Way Coordination		4		4	4				4		16
TASK	34	\$4,283			\$16,926	\$7,689		\$7,173	\$3,519		\$ 36,591
TASK 35 - QUALITY ASSURANCE / QUALITY CONTROL	35	120	48	120		120	32	32		16	488
TASK	35	\$28,918	\$8,264	\$16,872		\$16,872	\$4,848	\$3,792		\$1,671	\$ 63,978
TASK 38 - SUPPORT DURING BIDDING	38	21	21	21	42	42		20		1	158
Prebid Meeting Attendance		6	6	6		6					30
Response to Bidder Inquiries (6 assumed)		4	6	16	24	16		4			70
Preparation of Bid Abstracts (2 assumed)		2	4	4	16	8		16		4	64
Site Visit During Bid (1)		6	6	6		6					30
TASK	38	\$4,937	\$4,279	\$6,862	\$5,263	\$6,324		\$2,314		\$469	\$ 28,678

BergenABAM TOTAL HOURS =	689	198	628	1410	724	77	1638	83	162	6,286
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DIRECT NONSALARY COSTS (DNCS)

	Qty	Unit Cost	Per		
Task 25 - Mileage for Meetings (8)	1,200	\$ 0.54	/Mile	\$ 648.00	Task 25
Task 29 - Mileage for Meetings (6)	900	\$ 0.54	/Mile	\$ 486.00	Task 29
Task 31 - Mileage for Site Visit (1)	200	\$ 0.54	/Mile	\$ 108.00	Task 31
Task 32 - Mileage for Site Visit (1)	200	\$ 0.54	/Mile	\$ 108.00	Task 32
Task 33 - Mileage for Meetings (2)	300	\$ 0.54	/Mile	\$ 162.00	Task 33
Task 34 - Mileage for Meetings (2)	300	\$ 0.54	/Mile	\$ 162.00	Task 34
Task 35 - Mileage for Meetings (1) & Site Visit (1)	350	\$ 0.54	/Mile	\$ 189.00	Task 35

Notes:

1. See Site & Hill Cost Sheet for S&H Survey Expenses.
2. See Shannon & Wilson Cost Sheets for S&W Expenses.
3. See Louis Berger Group Cost Sheet for LBG Expenses.

3,450 Miles \$ 1,863.00

EXHIBIT Gd Supplemental Subcontracted Work

The County permits subcontracting for the following portions of the work of this AGREEMENT.

TASK 26 SURVEY AND BASE MAPPING (SUBCONSULTANT)

Sitts & Hill (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide the following supplemental survey and basemapping services.

All SUBCONSULTANT survey data will be incorporated into the existing base file. Site survey data will be compiled in AutoCAD® Civil 3D® 2015 for the basis of design. This file will show the site's existing condition and surface capable of displaying 2-foot contours. Dynamic notes, control, and other observations (prepared for 1"=20' plans) will be included in this file to aid in the design progression.

Task 26.1 Field Staking for 90% Design Review and Timber Appraisal

A one-time field staking of the design will be performed during the design phase (at approximately the 90% design completion) to support design review, to confirm project cut/ fill quantities and to aid the US Forest Service timber cruise/appraisal effort.

As part of this effort, the SUBCONSULTANT will perform the required field survey within the 90% plan easement lines. The cut/fill slope stakes (coincident with the clearing limits) will be set on both sides of the proposed centerline alignment (also to be set), to show the full extents of the proposed roadway's cut/fill as visual evidence of the quantities in and around the respective improvements. The easement line stakes will be established at a 50 foot +/- station interval including all major jogs to show the project's easement lines in the field for visual evidence of the tree appraisal required. The stakes will be flagged and intervisible flagging will be established at a 50 foot +/- station intervals for the project's footprint and easement area as required for the US Forest Service timber for cruise/appraisal.

Task 26.2 Field Staking for RFP/Bidding

A one-time field staking will be performed during the RFP to provide final project cut and fills limits to support the bidding process. As part of this effort, the SUBCONSULTANT will perform the required field layout based upon the 100% plan set. The cut/fill slope stakes (coincident with the 100% clearing limits) will be verified and refreshed or reset on both sides of the proposed centerline alignment (also to be verified and refreshed or reset), to show the full extents of the proposed roadway's cut/fill per the 100% plans allowing a visual evidence of the tree removal required for this project in addition to the final cut/fills evidenced by the respective slope stakes.

DELIVERABLES

A file, developed in AutoCAD® Civil 3D® 2015 including the information listed above, will be the deliverable for Tasks 26.1 and 26.2 as performed. This file will serve as the basis of this project's design. An existing ground surface model in AutoCAD® Civil 3D® 2015 and LandXML v1.2 format will be provided as part of this effort. Photos, field notes, videos and sketches captured during this projects survey effort will also be included as part of the existing conditions documentation.

TASK 27 GEOTECHNICAL ENGINEERING (SUBCONSULTANT)

Shannon & Wilson, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide the following supplemental geotechnical engineering services.

Task 27.1 Project Management

The SUBCONSULTANT will perform project management services for geotechnical engineering tasks including invoicing, scheduling of work, communications with the CONSULTANT and the COUNTY, QA/QC, and attend progress meetings.

The SUBCONSULTANT will attend meetings with the CONSULTANT and the COUNTY to coordinate the engineering study and design efforts; eight face-to-face meetings are assumed, as well as a monthly conference call when not meeting in person through the completion of the preliminary design (up to 18 months). The SUBCONSULTANT will also attend up to two meetings at the project site with the CONSULTANT and the COUNTY to review project design features and the staked alignment.

Task 27.2 Preliminary Design

The new 35 MPH alternative alignment changes the layout of structures and graded slopes along the project from the previous alignment. The SUBCONSULTANT will provide additional geotechnical consultation to complete preliminary design and produce a geotechnical data report and a geotechnical design and interpretive report for the new 35 MPH alignment. The reports will document the data collection and engineering efforts that form the basis of the project design.

For the purposes of establishing an estimate of expected effort, S&W will provide additional geotechnical consultation for:

- Bridge Foundations
- Walls and Slopes
- Box Culvert Vented Ford

Task 27.2.1 Bridge Foundations

The creek and low-lying area near Sta. 55+00 will be spanned with a 180-foot steel plate girder bridge supported on 6-foot-diameter drilled shaft foundations. During the previous project phase, the SUBCONSULTANT completed two additional borings, one at each proposed foundation location. The bridge foundation design recommendations will be revised to incorporate the new subsurface information. Tasks will include:

- Revise charts of estimated axial resistance with depth for 6-foot-diameter drilled shafts
- Revise estimated lateral resistance recommendations (LPILE parameters) for 6-foot-diameter drilled shafts
- Revise seismic design recommendations for 6-foot-diameter drilled shafts to comply with AASHTO 2016
- Revise estimated settlement for 6-foot-diameter drilled shafts
- Revise liquefaction susceptibility estimates using new subsurface data
- Provide estimated drag loads for 6-foot-diameter drilled shafts

Task 27.2.2 Walls and Slopes

The revised 35 MPH alignment changes the layout of walls and slopes along the length of the project from the 60 Percent Submittal plans provided to the COUNTY in March 2014. Changes to the wall and slope geometry will require reevaluation of the preliminary designs of most or all of the proposed structures. The SUBCONSULTANT will provide the CONSULTANT with preliminary details and configurations for mechanically-stability earth (MSE) walls, reinforced soil slopes (RSS), and rock fill slopes. Aesthetic treatment of the wall and slope faces will be considered, including review and selection of preferred facing options by the COUNTY and US Forest Service. Geotechnical recommendations for finalization of the design for all anticipated walls and slopes (i.e., 1 MSE and 4 RSS) are included. Tasks will include:

- Mechanically Stabilized Earth (MSE) Walls - The two MSE wall locations assumed are STA 51+25 to 54+10 (SB) and STA 53+50 to 54+10 (NB).
 - Review the proposed MSE walls along the new 35 MPH alignment and confirm that previous design recommendations are suitable
 - Revise MSE wall design calculations and recommendations at 1 location to conform with new 35 MPH roadway alignment
 - Provide check on global stability of MSE wall after scour scenario
 - Provide a sliding, bearing and overturning stability check at 1 location to confirm constructability of the MSE walls.
- Reinforced Soil Slopes (RSSs)
 - Review the proposed RSSs along the new 35 MPH alignment and confirm that previous design recommendations are adequate
 - Revise RSS design calculations and recommendations at 3 locations to conform with new 35 MPH roadway alignment
 - Provide a compound stability check at 1 location to confirm constructability of the RSSs.
- Rock Fill Slopes (1 location)
 - Provide check on global stability of rock fill slope and roadway after scour scenario

Task 27.2.3 Box Culvert Vented Ford

Preliminary design elements of the box culvert vented ford crossing has changed based on the newly adopted 35 MPH alignment. The stream and debris flow crossing near STA 29+00 will consist of a box culvert vented

ford structure with a 12 foot box culvert span and 150 LF of roadway prism concrete armoring. A debris flow diversion berm will be constructed upslope of the vented ford to direct debris to the structure and away from unprotected roadway. The SUBCONSULTANT will consult with the CONSULTANT regarding preliminary design elements of the box culvert vented ford crossing and diversion berm design. Specific tasks will include:

- Review, develop and finalize the design calculations and recommendation for the box culvert vented ford to conform with the new 35 MPH alignment. Tasks will include confirming the orientation and location of the box culvert structure, confirming the hydraulic conditions, confirming the erosion and scour protection, revising the global stability analyses of the crossing during a debris flow event, and providing earth and bearing pressures for the box culvert structure.
- Provide the CONSULTANT with design parameters for the diversion berm upslope of the vented ford.

Task 27.2.4 Geotechnical Data Report

The SUBCONSULTANT will produce a draft and final Geotechnical Data Report (GDR) that will include a summary of the field exploration program, results of the laboratory testing, results of the geophysical exploration program, and the boring logs.

Task 27.2.5 Geotechnical Design and Interpretive Report

The SUBCONSULTANT will produce a draft and final Geotechnical Design and Interpretive Report (GDIR) which will include our design recommendations and construction considerations for the various project features. The GDIR will address the following topics:

- Bridge Foundations
- Mechanically Stabilized Earth Walls
- Reinforced Soil Slopes
- Boulder and Rock Excavation
- Box Culvert Vented Ford
- Geology
- Diversion Berm
- Soil and Rock Excavations
- Embankment Construction
- Reuse of On-site Soil and Rock
- Pavement Design

Task 27.2 Assumptions

11. The proposed bridge will be founded on 6-foot-diameter drilled shafts.
12. The proposed bridge will be a single-span, approximately 180 feet long.
13. Bridge foundation axial resistance will be analyzed for a 6-foot-diameter shaft only.
14. New topographical surveys will result in significant geometry changes to walls and slopes from those assumed for the S&W Final Geotechnical Study (2012). Reanalysis of 1 MSE wall and 3 reinforced soil slopes will be required. This reanalysis will be a recheck of global stability following the review of currently shown wall and slopes.
15. Global stability analyses and sliding, bearing and overturning analyses for MSE walls will consider the static condition only.
16. Boulders larger than 4 feet in diameter are difficult to move with standard equipment and will be blasted and/or fractured.
17. The distribution of boulders at the ground surface is representative of boulders in colluvial deposits.
18. Rockfall sources include cut slopes in soil, bedrock, and broken slopes.
19. The Geotechnical Design and Interpretive Report and the Geotechnical Data Report will include a draft copy in electronic format only, and 1 final paper and electronic copy.
20. Analyses, recommendations and data from the previous geotechnical studies, still applicable to the current project design, will be incorporated in to the subtasks Geotechnical Data Report (Task 27.2.4) and the Geotechnical Design and Interpretive Report (Task 27.2.5).

Task 27.2 Deliverables

- Geotechnical Data Report (Draft and Final)
- Geotechnical Design and Interpretive Report (Draft and Final)

Task 27.3 Final Design

The SUBCONSULTANT will provide redline review and comments on the revised 60% design plans based on new survey information provided during preliminary design. The SUBCONSULTANT will provide the CONSULTANT with design calculations, drawings and layouts, details, quantities, unit costs, and other information needed to prepare the 90% and Final design plans, Summary of Geotechnical Conditions, project-specific special provisions, and engineer's opinion of probable construction cost for the following identified project elements:

5. Walls and Slopes
6. Large Boulders and Rock Outcrops
7. Debris Diversion Berm
8. Box Culvert Vented Ford

The SUBCONSULTANT will provide drawings and details in ACAD format as needed for the CONSULTANT to produce the 90% and Final Plans.

The SUBCONSULTANT will prepare a Summary of Geotechnical Conditions as an appendix to the Special Provisions, which along with the boring logs shall be considered part of the contract documents. The Summary of Geotechnical Conditions will contain geotechnical information provided in the geotechnical reports following the reporting and documentation requirements of the WSDOT Geotechnical Design Manual.

Task 27.3.1 60% Design Plan Review

The SUBCONSULTANT will provide redline review and comments on the revised 60% design plans, which include the additional topographic survey data in the project basemap and revised designs of the roadway, walls, slopes, and design of other elements, including the proposed bridge.

Task 27.3.2 Walls and Slopes

The SUBCONSULTANT will provide design input for walls and slopes, including calculations, drawings and layouts necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will prepare special provisions for contractor-designed MSE walls, RSSs, and rock fill slopes.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the walls and slopes. Unit prices will be estimated from recent bid experience with similar projects, WSDOT unit bid analysis, contractor inquiries, and Means construction estimating manuals.

Task 27.3.3 Large Boulders and Rock Outcrops

The SUBCONSULTANT will provide drawing details and layouts available for the CONSULTANT to prepare the final contract drawings showing the locations of known large boulder and rock outcrops. The SUBCONSULTANT will prepare the project specific special provisions required for the removal or excavation of large boulders and rock outcrops, including blasting, rock excavation, rock bolts, and other recommended methods from preliminary design. Quantities and unit prices will be estimated for bid items required for the large boulders and rock outcrops. Boulder quantities will be based on the distribution estimated from the sizes of boulders visible on the ground surface.

Task 27.3.4 Debris Diversion Berm

The SUBCONSULTANT will provide design input for the debris diversion berm, including calculations and drawings necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the debris diversion berm.

Task 27.3.5 Box Culvert Vented Ford

The SUBCONSULTANT will provide design input for the box culvert vented ford and associated diversion berm, including calculations, drawings and layouts necessary for the CONSULTANT to produce the 90% and Final design plans.

The SUBCONSULTANT will assist the CONSULTANT with estimating unit prices for bid items required for the box culvert vented ford.

Task 27.3 Deliverables

- Design calculations, drawings and layouts, details, special provisions, quantities, and unit costs for the subtask items above to prepare the 90% PS&E.
- Summary of Geotechnical Conditions, 90% Draft and Final per WSDOT

Task 27.4 Geotechnical Support During Bidding (Phase 3)

The SUBCONSULTANT will provide the following services during this phase.

- Respond to bidders' inquiries during the bid period (3 assumed)
- Preparation of addendum during the bid period (1 assumed)
- Attend the pre-bid meeting

TASK 28 HYDRAULIC ENGINEERING (SUBCONSULTANT)

Shannon & Wilson, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide hydraulic river engineering support for the design of the proposed bridge structure centered at approximate STA 55+00 and the protection of the new roadway toe of slope in areas where the toe is located adjacent to the river or within the identified channel migration zone (CMZ).

This scope of services covers data collection, hydrologic analysis, hydraulic modeling and estimating scour depths, and hydraulics design report to support design of the new bridge, and revetment/riverbank and scour protection at the bridge and along the toe of slope for the new roadway.

Task 28.1 Project Management

The SUBCONSULTANT will perform project management services for hydraulic engineering tasks including invoicing, scheduling of work, communications with the CONSULTANT and the COUNTY, QA/QC, and attendance at three progress meetings held in coordination with the design review meetings at the COUNTY offices.

Task 28.2 Documentation

The results of the hydraulic and scour analyses will be documented in a hydraulic report. The report will include a description of the physical characteristics of the site, including photographs taken during the site reconnaissance, text, tables, and figures that describe the results of the hydraulic analysis, and revetment/riverbank protection recommendations. The CONSULTANT's report will include key hydraulic related data needed for permit application. A draft version of the report (1 digital copy) will be provided to the COUNTY for review and comment.

Based on COUNTY comments, The CONSULTANT will revise and finalize the report and provide 1 digital and 5 hard copies.

Task 28.2 Deliverables

- Draft and Final Hydraulics Report. Digital copies shall be provided in Microsoft Word format and in PDF format.
- Conceptual Plans in PDF format and 5 (five) sets of hard copies.
- Complete copies of all updated hydraulic models with data files.

Task 28.3 Bridge Scour and Riverbank Protection Design

The SUBCONSULTANT will provide bridge scour protection and riverbank erosion and scour protection design plans, details and special provisions specifications as outlined in the following sections.

Task 28.3.1 60% Design Plan Review

The SUBCONSULTANT will provide redline review and comments on the 35 MPH 60% design plans which include the additional topographic survey data in the project basemap and revised designs of the roadway, walls, slopes, and design of other elements, including the proposed bridge.

Task 28.3.2 Bridge Erosion and Scour Protection Design Plans & Details

The SUBCONSULTANT will provide 60% plans and details, and 90% and Final plans, details and specification special provisions for bridge erosion and scour protection designs using the preferred alternatives from previous conceptual designs. Bridge erosion and scour protection features include rock (riprap) materials underneath the bridge. Large woody debris and plantings will not be evaluated beneath the bridge due to flood and debris conveyance considerations. Both rock and vegetated soil slopes with rock, wood and bioengineering will be

provided for roadway approach sections that may have MSE walls and Reinforced Soil Slopes (RSS), and will use similar details as the roadway design sections.

Task 28.3.3 Riverbank Erosion and Scour Protection Design Plans & Details

The SUBCONSULTANT will provide 60% plans and details, and 90% and Final plans, details and specification special provisions for riverbank erosion and scour protection designs. Riverbank erosion and scour protection features may include rock (riprap), piles, large woody debris, anchorage and planting plans that will be incorporated with the geotechnical MSE and RSS wall designs.

Task 28.3.4 60%, 90% 100% Plan Review Meetings and Calls

The SUBCONSULTANT will attend three, two hour combined progress/design review meetings, one each for the revised 60%, 90% and 100% submittals at COUNTY offices. The SUBCONSULTANT will attend up to four, one hour conference calls for plan development and review.

Task 28.3 Deliverables

- Design calculations, drawings and layouts, details, quantities, unit costs, memoranda and other information needed for the subtask items above to prepare the 90% and Final design plans, special provisions and construction costs.

Task 28.4 Permitting Assistance

The SUBCONSULTANT will provide up to 48 hours of support to the CONSULTANT during review and input to environmental documents and permit applications. Besides verbal and other communication, The SUBCONSULTANT's deliverables will include:

- Technical documentation of hydraulic analyses: Relevant data will describe anticipated project impacts to flood characteristics, channel response, habitat benefits, etc.
- Quantity estimates and construction elements: Estimates of excavation and fill, riverbank protection measures, dewatering, site access, sequencing, costs, etc.
- Snohomish County "No-Rise Certification": The project area is located within the FEMA Special Flood Hazard Area (SFHA) Zone A – No Base Flood Elevations Determined. Section 30.65.230 of the Snohomish County Code requires that a registered professional engineer must verify that all encroachments to the floodway, including fill, new construction, and other development does not "result in any increase in flood levels during the occurrence of the base flood discharge." A "No-Rise" analysis will be completed for the new bridge, scour/erosion protection features and roadway embankment using the existing HEC-RAS hydraulic model. The model will be run for pre-project and post-project conditions, comparing pre-flood damage road conditions to post-project new road and bridge alignment conditions. The results will be summarized in a letter report, stamped by a registered professional engineer. The letter report will also provide our opinion of whether or not the "No-Rise" conditions of the Snohomish County Code have been met.

ASSUMPTIONS

9. The SUBCONSULTANT will attend up to three combined progress and design review meetings at COUNTY offices.
10. The CONSULTANT, will provide requested ACAD drawings and modeling surfaces, in electronic formats for the revised 35 MPH design.
11. The existing HEC-RAS model is developed based on LIDAR with some local survey information. The HEC-RAS model will be updated to incorporate limited amounts of recent survey data from the CONSULTANT and as part of this scope of services, near the proposed bridge and roadway embankment to reflect existing conditions.
12. The CONSULTANT will provide all bridge and roadway embankment plans and section details (elevation detail), including updates and superseded designs, in AutoCAD for the SUBCONSULTANT to modify for bridge and riverbank erosion and scour design plan and details. The SUBCONSULTANT will revise current design plans and details based on the revised plans and details provided at the outset of the design phase using the 35 MPH roadway design alignment and design decisions provided in an email to the SUBCONSULTANT on March 17th, 2016. Additional changes in roadway alignments, wall, embankment and bridge configurations which result in reanalysis of river hydraulics will be done so through future amendment.

13. Bridge hydraulics design uses the 180 foot bridge span selected by the County, and assumes that the WSDOT and FHWA design manuals will be followed and that the WDFW Water Crossing Design Guidelines methods will be checked and met for the velocity ratio criteria. A full reach analysis, as described in the WDFW guidelines, will not be performed. A summary of existing studies will be provided and compared with the WSDOT, FHWA design manuals and WDFW guidelines.
14. FEMA floodplain map revisions, CLOMR/LOMR applications and remapping are not included in this scope of services and can be provided upon request from the COUNTY
15. Preliminary designs and the resulting final designs are limited to those types of designs identified above. Use or selection of different design methods and features require changes in scope and budget.
16. The SUBCONSULTANT will provide design plans and details in AutoCAD format, to which the CONSULTANT will incorporate the design plans and details into the final plans and specifications. The SUBCONSULTANT will provide professional stamps on reports and letters submitted to the CONSULTANT. The CONSULTANT will stamp and sign the final plans which include the SUBCONSULTANT designs, and by reference professional stamps included in the supporting reports and design memoranda.

TASK 30 DRAINAGE ENGINEERING (SUBCONSULTANT)

The Louis Berger Group, Inc. (SUBCONSULTANT), under a subconsultant agreement with the CONSULTANT, will provide civil engineering services for drainage design to complete previous work performed for the 35 MPH Alignment roadway.

This scope includes final design of the roadway drainage associated with the reconstruction of the roadway alignment in coordination with the roadway and other design elements performed by the CONSULTANT under Tasks 31 and 32. The scope includes the design of 15 roadway culverts (this excludes the Box Culvert Vented Ford) that convey offsite runoff across the roadway. In addition, this scope includes hydrologic and hydraulic support for the design of the roadside ditch that will collect the offsite runoff and route it to the culverts. The scope also includes preparation of a Full Drainage Report, the Stormwater Pollution Prevention Plan (SWPPP), and plans, specifications, and cost estimates (PS&E) for the site preparation and temporary erosion and sediment control (TESC) design.

ASSUMPTIONS

It is assumed that natural dispersion will be used as the flow control and water quality treatment for this project. This also will satisfy the low impact development (LID) requirement. Therefore, no flow control or water quality treatment facilities will be included in the design. The project site contains steep slopes and several areas of weak, landslide prone soils. Thus, mimicking the natural system through dispersion of non-concentrated flows in the best method of flow control and water quality treatment, minimizing the threat of erosion of landslide(s). However, onsite slopes are very steep and exceed the maximum dispersion slope requirement.

A deviation from typical slope criteria is proposed to allow the use of natural dispersion to achieve full project drainage compliance. The project has obtained a waiver to use the WSDOT Highway Runoff Manual (HRM) instead of the Snohomish County Drainage Manual. The HRM acknowledges that the prescriptive design approach for drainage mitigation may not work for every project and provides a procedure to evaluate challenged projects called an Engineering and Economic Feasibility Study (EEF). The COUNTY has prepared an EEF to allow a deviation from the natural diversion criteria to be used on this project and will submit it to WSDOT for review and approval.

The scope of work for this task includes the overall surface water assumptions noted below.

- Natural dispersion will be used such that no flow control or water quality treatment facilities will be required.
- Because it is assumed natural dispersion will be used for stormwater mitigation, no other low impact development bmp will be required other than Post Construction Soil Quality and Depth where applicable.
- Energy dissipaters will not be required at the outlet to the culverts. In previous engineering analysis, it was decided to route flow away from the roadway embankment without a structural energy dissipater.
- The COUNTY will submit the EEF to WSDOT, prepare any additional back up information, negotiate with WSDOT if necessary and will gain approval to use Natural Dispersion to mitigate for stormwater.

Task 30.1 Project Management

The SUBCONSULTANT will perform project management services which include the following activities:

- Project Administration (monitoring project budget, schedule and progress)
- Monthly Progress Reports: Provide Progress Reports with invoices to include the following:
 - Progress Report (Exhibit N3)
 - Anticipated upcoming tasks.
 - Budget summary status for the project.
 - Anticipated schedule delays or other problems. If schedule is delayed, provide an updated schedule
 - Other issues and concerns
 - Invoice for tasks accomplished
- Communication and Meetings
 - Miscellaneous communications between the SUBCONSULTANT and the CONSULTANT and/or COUNTY
 - Up to three (3) Team meetings (not associated with specific technical tasks)
- Quality Assurance/Quality Control.
 - The SUBCONSULTANT will perform quality control reviews of client deliverables. Quality control reviews will be done by senior staff personnel

Task 30.1 Deliverables

- Monthly invoices and project status reports.
- Up to three (3) team meetings attended by up to two Louis Berger staff.

Task 30.2 Supplemental Hydrologic and Hydraulic Analysis

This task is to provide supplemental hydrologic modeling and hydraulic modeling to assess system hydraulic response as refinements are made during the design process. Refinements may be made as the result of new survey data, adjustment in roadway alignment and/or design criteria. Work may include updating the HEC-RAS models to re-evaluate the 7 stream crossings and the HY-8 analyses for the remaining 8 drainage crossings. In addition, it is anticipated that the scour analysis to select channel lining material for the channels upstream and downstream of the culverts may need to be re-visited. Finally, this task may include re-evaluating the roadside ditch capacity as the roadway alignment is re-adjusted.

Task 30.2 Assumptions

- No significant changes in modeling approach from the preliminary design are assumed.

Task 30.3 Full Drainage Report / SWPPP

For projects that include 5,000 or more square feet of new impervious surface, a Full Drainage Report is required. The drainage report shall include:

- An executive summary of the drainage plan and drainage summary form.
- Stormwater Site Plan Narrative that provides a general description of the project, pre-developed and developed conditions of the site, site area and size of the improvements, and the pre- and post-developed stormwater runoff conditions.
- A vicinity map that locates property, identifies all roads bordering the site, shows the route of stormwater offsite to the natural receiving waters and significant geographic features and critical areas.
- Stormwater site planning sheets which display:
 - Acreage and boundaries of all drainage basins (with table of area tabulations)
 - Existing stormwater drainage to and from the site to the stream or one quarter mile offsite, whichever is nearer to the site.
 - Routes of existing drainage courses, construction pipes, ditches and future flows at all discharge points;
 - Length of travel from the farthest upstream end of a proposed storm drainage system to any of proposed flow control and treatment facility;
 - Significant geographical features;

- Critical areas; and
- Soils within the project site;
- Existing conditions summary
- Any areas of site limitation
- Off-site analysis (upstream and downstream) and mitigation report
- Drainage design, including the basis on which feasibility or infeasibility of on-site stormwater management BMP's was determined
- SWPPP prepared pursuant to Volume II Chapter 3 of the *Snohomish County Drainage Manual* and/or the *WSDOT Highway Runoff Manual*
- Permanent stormwater control plan
- Special reports, studies and maps conducted to prepare the stormwater site plan (e.g., soil testing, critical areas reports and delineations)
- A list of other necessary permits and approvals as required by other regulatory agencies if those permits or approvals include conditions that affect the stormwater site plan or contain more restrictive drainage-related requirements
- An operation and maintenance manual for each flow control and treatment facility. The manual should contain a description of the facility. The manual must identify and describe the maintenance tasks and the frequency of each task meeting the standards established in Volume V, Chapter 4. A maintenance activity log shall be provided that indicates what maintenance actions will be taken, by whom and when, pursuant to Chapter 7.54 SCC

Task 30.3 Assumptions

10. No mitigation report will be required.
11. Drainage report information regarding the "Box Culvert Vented Ford" crossing and the bridge shall be provided by the CONSULTANT and included in the drainage report. Drainage report information includes but is not limited to basin delineation (CADD), hydrology estimate with model output back up, hydrology parameters (soils, impervious area, etc.), drainage routes (CADD), length of travel from farthest upstream point in the basin (CADD), hydraulic results with model output back up (scour, water level), narrative inserts following County drainage report outline format, including downstream analysis (narratives, photographs, analyses).
12. Special reports will be provided by others
13. Permits and approvals will be provided by others
14. Critical areas such as wetlands, streams/stream buffers and areas with high potential for erosion and sediment deposition will be provided by others (CADD and pdf).
15. Due to the density of vegetation at the site, specific trees and other vegetation will not be called out on the base map. As a result, no vegetation map will be provided.
16. Landscaping plans will be provided by others.
17. Because it is assumed natural dispersion will be used for stormwater mitigation, no other low impact development bmp will be required other than Post Construction Soil Quality and Depth where applicable. No evaluation of infiltration/LID feasibility will be required.
18. Natural dispersion will be used such that no flow control or water quality treatment facilities will be required.

Task 30.3 Deliverables

- Draft and Final Full Drainage Report (Electronic Submittal and one paper copy)
- Draft and Final SWPPP (Electronic Submittal and one paper copy)

Task 30.4 60% Drainage Design PS&E

The SUBCONSULTANT will prepare 60% plans, specifications, and construction cost estimates of the drainage design. The budget is based upon the following drawings:

- Site Preparation & TESC Plans (13 sheets)
- Site Preparation & TESC Details and Notes (2 sheets)

The SUBCONSULTANT shall prepare 60% Project Drainage Specifications using the WSDOT Standard Specifications for Road Bridge, and Municipal Construction (2016). In addition, the SUBCONSULTANT shall

prepare the 60% Drainage Cost Estimate for the site preparation and TESC design and provide input to the CONSULTANT for the culvert crossings.

Task 30.4 Assumptions

9. The level of effort is largely based upon the assumed number of drawings and extent of work. Should the actual number of drawings be increased, it may be the basis to negotiate additional work.
10. The PS&E documents will be consistent with WSDOT and/or COUNTY design standards.
11. The design of the roadside ditch will be included in the roadway cross sections provided by the CONSULTANT. Confirmation regarding ditch sizing will be provided by the SUBCONSULTANT.
12. Plans, specifications and estimate associated with the "Box Culvert Vented Ford" will be prepared by the CONSULTANT.
13. The SUBCONSULTANT will be responsible for the design recommendations for the culvert crossings and provide input to the CONSULTANT. Plans, specifications and estimate associated with the stream/culvert crossings will be prepared by the CONSULTANT as part of Task 31.
14. Typical culvert headwalls or wing walls required will be covered by a standard plan. Should a special design of headwalls or wing walls be required, this effort will be performed by the CONSULTANT as part of Task 31.
15. Material for culverts shall be CMP.
16. No chemical treatment will be required for the Temporary Erosion and Sediment Control.

Task 30.4 Deliverables

- 60% Site Preparation & TESC Plans (electronic in .pdf form and ACAD form)
- 60% Site Preparation & TESC Specifications (in Word format)
- 60% Site Preparation & TESC Cost Estimate

Task 30.5 90% Drainage Design PS&E

The SUBCONSULTANT will address COUNTY comments on the 60% plans, specifications, and estimate and resubmit at a 90% level of completion. The SUBCONSULTANT shall include 1 meeting with the CONSULTANT and the COUNTY to review and discuss comments.

Task 30.5 Assumptions

- See Task 30.4 assumptions.

Task 30.5 Deliverables

- Same as 60% deliverables, except at 90% level of completion.

Task 30.6 100% and Ad-Ready Drainage PS&E

The SUBCONSULTANT will address COUNTY comments on the 90% plans, specifications, and estimates and resubmit a 100% submittal for COUNTY review. The SUBCONSULTANT shall include 1 meeting with the CONSULTANT and the COUNTY to review and discuss comments. Upon COUNTY review, the SUBCONSULTANT shall incorporate comments on the "100%" submittal and submit Ad-Ready stamped plans and specifications, and estimate.

Task 30.6 Assumptions

- See Task 30.4 assumptions.
- It is assumed that others will be responsible for final printing and production.
- It is assumed that the design of improvements advances in level of detail and that there is no major or fundamental change in extent for approach to the improvements between 100% and Ad-Ready submittals.

Task 30.6 Deliverables

- Same as 60% deliverables, except at 100% and Ad-Ready levels of completion.

Task 30.7 Support During Bidding (Phase 3)

This task is an allowance task for the SUBCONSULTANT to support the CONSULTANT and the COUNTY during the bid and award phase. It is an allowance task because it is difficult to estimate the level of effort. It could include the following activities:

- Assist the CONSULTANT and the COUNTY in responding to Bidder's questions and requests for information
- Preparation of any addenda, if required
- Attending a pre-bid conference, if desired
- Review of bids and assist on recommendation of award, if required

EXHIBIT G-1d
Supplemental Subconsultant Fee Determination – Budget

EXHIBIT G-1d: SUBCONSULTANT FEE DETERMINATION
SITTS and HILL
SUPPLEMENT NO. 7

8/8/2016

Index-Galena Road MP 6.4 to 6.9 Realignment
Snohomish County - RC 1532 / UPI #06-0150

SURVEY AND BASE MAPPING

SITTS & HILL PERSONNEL

<u>Position Classification</u>	<u>Hours</u>	<u>Billing Rate</u>		<u>Cost</u>
Survey Principal	20	\$ 119.42	\$	2,388
Project Surveyor	90	\$ 92.71	\$	8,344
Survey Crew Chief	380	\$ 80.26	\$	30,499
Survey Crew Member	380	\$ 60.33	\$	22,925
Survey Technician	104	\$ 65.04	\$	6,764
Survey Admin	0	\$ 60.00	\$	-
Sitts & Hill Survey Hours, TOTAL	974	Subtotal Personnel Costs =	\$	70,921

TOTAL PERSONNEL COSTS = \$ 70,921

<u>DIRECT NONSALARY COSTS (DNSC)</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Per</u>		
Field Supplies (Lath)	200	\$ 0.55	/ lath	\$	110
Field Supplies (Hubs)	200	\$ 0.37	/ hub	\$	74
Field Supplies (Flagging)	8	\$ 1.33	/ roll	\$	11
Field Supplies (Paint)	8	\$ 3.33	/ can	\$	27
Field Supplies (Rebar)		\$ 1.79	/ rebar	\$	-
Lodging (WSDOT per Diem)	60	\$ 113.00	/ night	\$	6,780
Meals - B (WSDOT per Diem)	64	\$ 16.00	/ day	\$	1,024
Meals - L (WSDOT per Diem)	92	\$ 19.00	/ day	\$	1,748
Meals - D (WSDOT per Diem)	64	\$ 29.00	/ day	\$	1,856
Mileage (WSDOT)	2,258	\$ 0.54	/ mile	\$	1,219
TOTAL REIMBURSABLE EXPENSES (DNSC) =				\$	12,849

TOTAL SITTS & HILL FEE = \$ 83,769

SURVEY AND BASE MAPPING

	SUPPLEMENT NO. 7	Survey Principal	Project Surveyor	Survey Crew Chief	Survey Crew Member	Survey Technician	Survey Admin	Total Hours per Task	Total
	Fully Burdened Billing Rate ==>	\$119.42	\$92.71	\$80.28	\$80.33	\$65.04	\$60.00		
TASK 26 - SURVEY & BASE MAPPING	Task 26.2 - Additional Topographic Survey Allowance	24	24	40	40	24		152	\$ 12,278
	Task 26.1 - Field Staking for 90% Design Review & Timber Appraisal							742	\$ 63,817
	Alignment Centerline and Cut/Fill Staking		40	180	180	40		440	\$ 31,616
	Road Easement Staking for Timber Appraisal	10	20	120	120	32		302	\$ 22,000
	Task 26.2 - Field Staking for RFP / Bidding	10	30	80	80	32		232	\$ 17,904
Hour Totals		20	90	380	380	104		974	\$ 70,821
Percentage		2%	9%	39%	39%	11%			\$ 78/hr

**EXHIBIT G-1d, SUBCONSULTANT FEE
SHANNON and WILSON
SUPPLEMENT NO. 7**

**S&W Geotech Cost
8/8/2016**

**Index-Galena Road MP 6.4 to 6.9 Realignment
Snohomish County - RC 1532 / UPI #06-0150**

GEOTECHNICAL ENGINEERING

SHANNON & WILSON PERSONNEL

<u>Position Classification</u>	<u>Hours</u>		<u>Billing Rate</u>		<u>Cost</u>
1 Officer	115.0	X	\$ 221.49	= \$	25,471
2 Associate	205.0	X	\$ 175.98	= \$	36,076
3 Senior Tech Staff	330.0	X	\$ 130.00	= \$	42,900
4 Professional Staff	400.0	X	\$ 107.66	= \$	43,064
5 Senior Drafter / Tech	25.0	X	\$ 100.52	= \$	2,513
6 Drafter / Tech	95.0	X	\$ 96.30	= \$	9,149
7 Administrative (Senior)	15.0	X	\$ 84.75	= \$	1,271
8 Administrative	45.0	X	\$ 59.64	= \$	2,684

Total Hours **1,230.0**

TOTAL PERSONNEL COSTS = \$ 163,128

DIRECT NONSALARY COSTS (DNSC)

Mileage	1000	miles @	\$ 0.540	\$	540
B&W 8.5x11 Copies	1000	copies @	\$ 0.10	\$	100
B&W 11x17 Copies	500	copies @	\$ 0.20	\$	100
Color 8.5x11 Copies	500	copies @	\$ 1.00	\$	500
Color 11x17 Copies	250	copies @	\$ 2.00	\$	500

TOTAL REIMBURSABLE EXPENSES (DNSC) = \$ 1,740

TOTAL SHANNON & WILSON GEOTECH ENGR FEE = \$ 164,868

**EXHIBIT G-1d, SUBCONSULTANT FEE
SHANNON and WILSON
SUPPLEMENT NO. 7**

**S&W Geotech Hours
8/8/2016**

TASK 27 GEOTECHNICAL ENGINEERING	Shannon & Wilson Personnel							
	Officer	Associate	Senior Staff	Professional Staff	Sr. Drafter / Tech	Drafter / Tech	Senior Admin.	Admin.
27.1 Project Management	23	52	50	8	0	0	8	8
Invoicing & Progress Reports			0					
Scheduling, coordination, work assignments			10					
Quality control / quality assurance	5		0					
6 Progress Meetings at County Offices (4 hrs each)	6	30	30					
10 Conference Calls (2 hrs each)	4	30	20					
27.2 Preliminary Design	41	67	65	168	0	51	6	33
27.2.1 Bridge Foundations								
Review estimated axial resistance - Drilled Shafts	1	1	2					
Review estimated lateral resistance - Drilled Shafts	1	1	2					
Review seismic design recommendations - Drilled Shafts	1	3	0					
Review foundation settlement estimates - Drilled Shafts	1	1	2					
Review liquefaction susceptibility estimates - Drilled Shafts	1	1	2					
Provide estimated drag loads - Drilled Shafts	1	1	2					
27.2.2 Walls and Slopes								
MSE Walls - Review locations	1	1	2					
MSE Walls - Review design recommendations (1 location)	1	3	4					
MSE Walls - Global stability per seismo	1	3	0					
MSE Walls - Sliding, bearing and overturning check	2	4	0					
RSCs - Review locations	2	3	4					
RSCs - Review design recommendations (3 locations)	2	4	10					
RSCs - Compound stability check	1	2	0					
Rock Fill Slopes - Global stability per seismo	1	2	0					
27.2.3 Box Culvert/Went Ford								
Review and revise design elements	1	3	0	10				
Provide design parameters for diversion berm	2	0	0	10		1		
27.2.4 Geotechnical Data Report (Final and Final)								
Repackage Data from Final Geotech Study (Dec 2012)	3		0	24		4	0	3
Incorporate Data Collected for Bedrock and Doubler Study	1		4	12		2	1	2
Incorporate Additional Borings for Bridge	1		2	8		2		1
27.2.5 Geotechnical Section and Alternative Report (Final and Final)								
Bridge Foundations	2	4	4	10			0	4
MSE Walls	2	4	4	8		2	0	4
RSCs	2	4	4	8		2	0	4
Soil, Boulder, and Rock Excavations	2	4	10	8		2	0	4
Box Culvert/Went Ford	2	4	0	8		2		2
Geology	1	3	0	4	1	4		2
Review Geologic Profile	1	1	4	8	2	10		
Review Geologic Cross Sections	2	4	4	10	2	18		
Diversion Berm	2	4	4	10		2		2
Embankment Construction	1	1	1	4				2
Review of On-Site Soil and Rock	1	2	2	4				2
Pavement Design	1	2		4				2
27.3 Final Design	48	78	83	299	32	44	5	52
27.3.1 60% Plan Review								
Reviewed 60% Redline Plan Review	2	4	0	8				
27.3.2 Walls and Slopes								
Design Preparation	2	3	2	8	2	4		
Drawings	2	4	4	12	4	10		
Special Provisions	2	0	0	40			3	0
Quantities and Construction Cost Estimate	1	2	2	8				
Review Contract Drawings	2	10	10					
27.3.3 Large Boulders and Rock Control								
Design Preparation	1	2	2	10				
Drawings	1	4	4	12	2	0		
Special Provisions	4	4	4	16			0	2
Quantities and Construction Cost Estimate	1	1	1	2				
Review Contract Drawings	1	4	4					
27.3.4 Diversion Berm								
Design Preparation	1	2	2	10				
Drawings	2	4	4	12	2	0		
Special Provisions	1	4	4	8			0	2
Quantities and Construction Cost Estimate	1	1	1	2				
Review Contract Drawings	1	4	4					
27.3.5 Armored Crossing / Went Ford								
Design Preparation	2	2	2	12				
Drawings	4	4	4	12	2	0		
Special Provisions	2	2	2	8			0	2
Quantities and Construction Cost Estimate	1	1	1	4				
Review Contract Drawings	2	4	4					
27.3.6 Summary of Geotechnical Conditions								
Draft Summary of Geotechnical Conditions	2	4	4	12				
Final Summary of Geotechnical Conditions	2	1	2	4				
27.4 Geotechnical Support During Bidding	14	8	14	32	0	0	4	0
Prebid Meeting Attendance	0		0					
Response to Bidder Inquiries (3 assumed)	4	4	4	16	4		2	
Preparation of Bid Addendum (1 assumed)	4	4	4	16	4		2	
SUBTOTAL S&W GEOTECH HOURS	118	226	330	400	26	95	10	45

**EXHIBIT G-1d, SUBCONSULTANT FEE
SHANNON and WILSON
SUPPLEMENT NO. 7**

**S&W Hydraulic Costs
8/8/2016**

**Index-Galena Road MP 6.4 to 6.9 Realignment
Snohomish County - RC 1532 / UPI #06-0150**

HYDRAULIC ENGINEERING

SHANNON & WILSON PERSONNEL

<u>Position Classification</u>	<u>Hours</u>		<u>Billing Rate</u>		<u>Cost</u>
1 Officer	156	X	\$ 221.49	= \$	34,552
2 Associate	0	X	\$ 175.98	= \$	-
3 Senior Tech Staff	320	X	\$ 130.00	= \$	41,600
4 Professional Staff	0	X	\$ 107.66	= \$	-
5 Senior Drafter / Tech	144	X	\$ 100.52	= \$	14,475
6 Drafter / Tech	0	X	\$ 98.30	= \$	-
7 Administrative (Senior)	32	X	\$ 84.75	= \$	2,712
8 Administrative	8	X	\$ 59.64	= \$	477
Total Hours	660		TOTAL PERSONNEL COSTS =	\$	93,816

DIRECT NONSALARY COSTS (DNCS)

Mileage	360	miles @	\$ 0.540	\$	194
B&W 8.5x11 Copies	500	copies @	\$ 0.10	\$	50
B&W 11x17 Copies	200	copies @	\$ 0.20	\$	40
TOTAL REIMBURSABLE EXPENSES (DNCS) =				\$	284

TOTAL SHANNON & WILSON HYDRAULIC ENGR FEE = \$ 94,101
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**EXHIBIT G-1d, SUBCONSULTANT FEE
SHANNON and WILSON
SUPPLEMENT NO. 7**

**S&W Hydraulic Hours
8/8/2016**

TASK 28 HYDRAULIC ENGINEERING	Shannon & Wilson Personnel							
	Officer	Associate	Senior Staff	Professional Staff	Sr. Drafter / Tech	Drafter / Tech	Senior Admin.	Admin
28.1 Project Management	44	0	8	0	0	0	0	8
Invoicing & Progress Reports	8							
Scheduling, coordination, work assignments	4							
Three progress meetings	12							
Project Stop and Restarts	12		8					8
Quality control / quality assurance	8							
28.2 Documentation	40	0	168	0	80	0	24	0
28.2.1 Riverbank Flood Hydraulics, Channel Migration, Scour and Concept Design								
Update / Revise Hydraulic Models	4		16					
Finalize - Road Embankment Erosion & Scour	4		16		16			
Finalize - Bridge Erosion & Scour Recommendations	8		16		16			
Finalize - Bridge Hydraulics and Debris Loading Conditions w/ BA	8		16		16			
28.2.2 Documentation								
Draft Hydraulics Report	8		40		16		8	
Final Hydraulics Report	4		16		16		8	
Hydraulic Models and Data Files	4		16				8	
28.3 Bridge Scour & Riverbank Protection Design	62	0	120	0	48	0	8	0
28.3.1 60% Plan Review								
Revised 60% Design Plans Redline Review	8		8					
28.3.2 Bridge Scour Design Plans								
90% Design Plans & Details	4		16		8			
50% Design Plan Special Provisions	4		16					
Quantities and Construction Cost Estimate	2		8		4			
Final Design Plans & Details	2		8		8			
Final Design Plan Special Provisions	2		8				4	
28.3.3 River Embankment Erosion and Scour Design Plans								
90% Design Plans & Details	4		16		16			
50% Design Plan Special Provisions	4		16					
Quantities and Construction Cost Estimate	2		8		4			
Final Design Plans & Details	2		8		8			
Final Design Plan Special Provisions	2		8				4	
28.3.4 60%, 90% Final Plan Review Misc	16							
28.4 Permitting Assistance	20	0	68	0	16	0	0	0
Permitting Assistance	16		16		16			
No-Rise Certification	4		40					
SUBTOTAL S&W HYDRAULIC HOURS	156	0	320	0	144	0	32	8

EXHIBIT G-1d, SUBCONSULTANT FEE
 LOUIS BERGER GROUP
 SUPPLEMENT NO. 7

LBG Cost
 8/8/2016

Index-Galena Road MP 6.4 to 6.9 Realignment
 Snohomish County - RC 1532 / UPI #06-0150

CIVIL /DRAINAGE ENGINEERING

LOUIS BERGER GROUP PERSONNEL

<u>Position Classification</u>	<u>Hours</u>		<u>Billing Rate</u>		<u>Cost</u>
1 Principal	50.0	X	\$ 199.42	= \$	9,971
2 Senior Project Manager	472.0	X	\$ 160.14	= \$	75,586
3 Senior Consultant/ Senior Engineer	250.0	X	\$ 149.52	= \$	37,380
4 Junior Consultant/ Junior Engineer	584.0	X	\$ 103.09	= \$	60,205
5 Landscape Architect/CAD	166.0	X	\$ 114.51	= \$	19,009
6 Administrative Assistant	64.0	X	\$ 78.26	= \$	5,009
	Total Hours 1,586.0			TOTAL PERSONNEL COSTS = \$	207,159

DIRECT NONSALARY COSTS (DNCS)

Mileage	0	miles @	\$ 0.54	\$	-
Rental Car per Day	4	each @	\$ 80.00	\$	320

TOTAL REIMBURSABLE EXPENSES (DNCS) = \$ 320

TOTAL LOUIS BERGER GROUP ENGR FEE = \$ 207,479

SUPPLEMENT NO. 7 TASK 30 - DRAINAGE ENGINEERING		Task Number	Principal	Senior Project Manager	Senior Consultant/ Senior Engineer	Junior Consultant/ Junior Engineer	Landscaps Architect/CAD	Administrative Assistant	Total
TASK DESCRIPTION	BILLING RATE ==>		\$199.42	\$160.14	\$148.82	\$103.19	\$114.51	\$78.28	
Project Management	30.1	50	64		24			40	178
	Project Administration			40				40	80
Communication & Meetings			24		24				48
QA/QC		50							50
			\$9,971	\$10,249		\$2,474		\$3,180	\$ 25,825
Supplemental Hydrologic & Hydraulic Analysis	30.2			98	48	96			242
	HEC-RAS			14	32	24			70
	HY8			15		48			64
	Scour Analysis			50	16				76
	Ditch Analysis			8		24			32
			\$16,884	\$7,177	\$9,887			\$ 32,767	
Full Drainage Report / SWPPP	30.3			118		126	18	24	286
	Full Drainage Report-Draft			64		88	10	12	174
	Full Drainage Report-Final			16		16	4	2	38
	Full Drainage Report/SWPPP - Review Meeting			8		8			16
	SWPPP-Draft			24		10	4	8	46
	SWPPP-Final			6		4		2	12
			\$18,897		\$12,888	\$2,081	\$1,878	\$ 35,825	
60% Drainage Design PS&E	30.4			100	106	140	81		427
	60% Drainage Site Prep & TESC Drawings (see below) Design			56	95	116	73		331
	Input to Culvert Drawings (Coordinate w/ Berger&BAM) 60%			32		12	8		52
	Drainage Specifications			8	20				28
	60% Drainage Cost Estimate			4		12			16
			\$18,014	\$16,848	\$14,438	\$8,276		\$ 55,571	
90% Drainage Design PS&E	30.5			55	67	159	42		323
	90% Drainage Site Prep & TESC Drawings (see below) Design			17	47	129	34		227
	Input to Culvert Drawings (Coordinate w/ Berger&BAM) 90%			18		10	8		36
	Drainage Specifications			8	20				28
	90% Drainage Cost Estimate			4		12			16
	90% Meeting (Review 60% comments)			8		8			16
			\$8,808	\$10,018	\$16,381	\$4,808		\$ 40,026	

SUPPLEMENT NO. 7		Task Number	Principal	Senior Project Manager	Senior Consultant/ Senior Engineer	Junior Consultant/ Junior Engineer	Landscapes Architect/CAD	Administrative Assistant	Totals
TASK DESCRIPTION	BILLING RATE ==>		\$190.42	\$160.14	\$140.52	\$103.09	\$114.51	\$75.26	
100% & Ad-Ready Drainage Design P&E 100% & Ad-Ready Drainage Site Prep & TESC Dwg (see below) Design Input to Culvert Drawings (Coordinate w/ Berger/ABAM) 100% & Ad-Ready Drainage Specifications 100% & Ad-Ready Drainage Cost Estimate 100% & Ad-Ready Meeting (Review 90%)	30.6			<u>35</u>	<u>25</u>	<u>35</u>	<u>25</u>		<u>122</u>
				15	21	13	23		72
				6		6	2		14
				2	8				10
				2		8			10
				8		8			16
			\$5,285	\$4,338	\$3,608	\$2,885		\$ 16,092	
Support During Bidding Bid Assistance	30.7			<u>4</u>		<u>4</u>			<u>8</u>
				4		4			8
			\$641		\$412			\$ 1,053	
Louis Berger Group TOTAL HOURS =			50	472	250	584	166	64	1,586

No.	TASK 30.4 - DRAINAGE SITE PREP & TESC DWGS	60%					Totals
			<u>58</u>	<u>88</u>	<u>116</u>	<u>73</u>	<u>331</u>
1	SITE PREPARATION & TESC PLAN - SHEET 1		4	8	8	5	23
2	SITE PREPARATION & TESC PLAN - SHEET 2		4	8	8	5	23
3	SITE PREPARATION & TESC PLAN - SHEET 3		4	8	8	5	23
4	SITE PREPARATION & TESC PLAN - SHEET 4		4	8	8	5	23
5	SITE PREPARATION & TESC PLAN - SHEET 5		4	8	8	5	23
6	SITE PREPARATION & TESC PLAN - SHEET 6		4	8	8	5	23
7	SITE PREPARATION & TESC PLAN - SHEET 7		4	8	8	5	23
8	SITE PREPARATION & TESC PLAN - SHEET 8		4	8	8	5	23
9	SITE PREPARATION & TESC PLAN - SHEET 9		4	8	8	5	23
10	SITE PREPARATION & TESC PLAN - SHEET 10		4	8	8	5	23
11	SITE PREPARATION & TESC PLAN - SHEET 11		4	8	8	5	23
12	SITE PREPARATION & TESC PLAN - SHEET 12		4	8	8	5	23
13	SITE PREPARATION & TESC PLAN - SHEET 13		4	8	8	5	23
14	SITE PREPARATION & TESC DETAILS - SHEET 1		2	4	6	4	16
15	SITE PREPARATION & TESC DETAILS - SHEET 2		2	4	6	4	16
DRAINAGE ENGINEERING DRAWINGS		60%	58	88	116	73	331

SUPPLEMENT NO. 7		Task Number	Principal	Senior Project Manager	Senior Consultant/ Senior Engineer	Junior Consultant/ Junior Engineer	Landscape Architect/CAD	Administrative Assistant	Totals
TASK 30 - DRAINAGE ENGINEERING									
TASK DESCRIPTION	BILLING RATE ==>		\$199.42	\$180.14	\$149.52	\$103.09	\$114.51	\$78.36	

No.	TASK 30.6 - DRAINAGE SITE PREP & TESC D'WG'S	90%					Totals
			<u>17</u>	<u>47</u>	<u>128</u>	<u>34</u>	<u>227</u>
1	SITE PREPARATION & TESC PLAN - SHEET 1		1	3	0	2	15
2	SITE PREPARATION & TESC PLAN - SHEET 2		1	3	0	2	15
3	SITE PREPARATION & TESC PLAN - SHEET 3		1	3	0	2	15
4	SITE PREPARATION & TESC PLAN - SHEET 4		1	3	0	2	15
5	SITE PREPARATION & TESC PLAN - SHEET 5		1	3	0	2	15
6	SITE PREPARATION & TESC PLAN - SHEET 6		1	3	0	2	15
7	SITE PREPARATION & TESC PLAN - SHEET 7		1	3	0	2	15
8	SITE PREPARATION & TESC PLAN - SHEET 8		1	3	0	2	15
9	SITE PREPARATION & TESC PLAN - SHEET 9		1	3	0	2	15
10	SITE PREPARATION & TESC PLAN - SHEET 10		1	3	0	2	15
11	SITE PREPARATION & TESC PLAN - SHEET 11		1	3	0	2	15
12	SITE PREPARATION & TESC PLAN - SHEET 12		1	3	0	2	15
13	SITE PREPARATION & TESC PLAN - SHEET 13		1	3	0	2	15
14	SITE PREPARATION & TESC DETAILS - SHEET 1		2	4	8	4	16
15	SITE PREPARATION & TESC DETAILS - SHEET 2		2	4	8	4	16
DRAINAGE ENGINEERING DRAWINGS		90%	17	47	128	34	227

No.	TASK 30.6 - DRAINAGE SITE PREP & TESC D'WG'S	100%					Totals
			<u>15</u>	<u>21</u>	<u>18</u>	<u>28</u>	<u>72</u>
1	SITE PREPARATION & TESC PLAN - SHEET 1		1	1	1	1	4
2	SITE PREPARATION & TESC PLAN - SHEET 2		1	1	1	1	4
3	SITE PREPARATION & TESC PLAN - SHEET 3		1	1	1	1	4
4	SITE PREPARATION & TESC PLAN - SHEET 4		1	1	1	1	4
5	SITE PREPARATION & TESC PLAN - SHEET 5		1	1	1	1	4
6	SITE PREPARATION & TESC PLAN - SHEET 6		1	1	1	1	4
7	SITE PREPARATION & TESC PLAN - SHEET 7		1	1	1	1	4
8	SITE PREPARATION & TESC PLAN - SHEET 8		1	1	1	1	4
9	SITE PREPARATION & TESC PLAN - SHEET 9		1	1	1	1	4
10	SITE PREPARATION & TESC PLAN - SHEET 10		1	1	1	1	4
11	SITE PREPARATION & TESC PLAN - SHEET 11		1	1	1	1	4
12	SITE PREPARATION & TESC PLAN - SHEET 12		1	1	1	1	4
13	SITE PREPARATION & TESC PLAN - SHEET 13		1	1	1	1	4
14	SITE PREPARATION & TESC DETAILS - SHEET 1		1	4		5	10
15	SITE PREPARATION & TESC DETAILS - SHEET 2		1	4		5	10
DRAINAGE ENGINEERING DRAWINGS		100%	15	21	18	28	72



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
6/30/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Servco Pacific Insurance 1100 Dexter Ave. N. Ste 220 Seattle WA 98109	CONTACT NAME: Certificate Department	
	PHONE (A/C, No, Ext): 206-216-4830	FAX (A/C, No): 206-260-2903
E-MAIL ADDRESS: certdept@servcopacific.com		
INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A: Alaska National Insurance Company		38733
INSURER B: Travelers Indemnity Company of Amer		25666
INSURER C: Travelers Property Casualty Company		25674
INSURER D: The Phoenix Insurance Company		25623
INSURER E: Starr Surplus Lines Insurance Co		13604
INSURER F:		

INSURED 694
Berger ABAM, Inc.
33301 Ninth Avenue South
Suite 300
Federal Way WA 98003

COVERAGES CERTIFICATE NUMBER: 97314048 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
B C	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR	Y		6808264P255 6807B921034	7/1/2016 7/1/2016	7/1/2017 7/1/2017	EACH OCCURRENCE \$1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$1,000,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$1,000,000 GENERAL AGGREGATE \$2,000,000 PRODUCTS - COMP/OP AGG \$2,000,000 \$
	GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC						
D	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS			BA8269P109	7/1/2016	7/1/2017	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
C A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	UB3903T78 16G WU 08982	7/1/2016 7/1/2016	7/1/2017 7/1/2017	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input checked="" type="checkbox"/> OTHER USL&H/WA StopGap E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
E	Professional liability and Pollution Liability			1000199129181	7/1/2016	7/1/2017	Per Claim \$1,000,000 Aggregate \$1,000,000 Deductible \$200,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

IF CERTIFICATE IS NO LONGER REQUIRED, PLEASE NOTIFY SERVCO PACIFIC INSURANCE

Re: Project: Index Galena Flood Repair.

Snohomish County Public Works is included as an Additional Insured on General Liability and Automobile Liability policies. 30 days notice of cancellation applies.

APPROVED BY
RISK MANAGEMENT
9/20/14

Date/Sig: [Signature]

CERTIFICATE HOLDER

Snohomish County Public Works
Attn: Bill Thornton, Contract Specialist
3000 Rockefeller Avenue, M/S 607
Everett, WA 98201

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

J. SE

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