



# **Exhibit A-3**

## **Supplemental Scope of Work**

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Project No.ER-WA-20-03

### **OBJECTIVE**

The objective of this Agreement is to provide professional services for the preparation of the plans, specifications, and estimate (PSE) for the replacement of the culvert which carries Goodman Creek under Mountain Loop Highway, including the engineered channel design below the bridge. This is a continuation of the work performed as a part of the Type, Size, and Location Study that was previously completed. The following scope of work and estimate are given under the assumption that the Long Bridge Option is the preferred alternative. The new bridge is envisioned to be a single span bridge along the same alignment as the existing road over an open channel (no retaining walls). Traffic will be maintained by way of a construction bypass road to the south of the crossing. Construction for this project is currently programmed for the 2024 construction season.

### **SERVICES**

In order to complete the Final PSE documents, the CONSULTANT and its SUBCONSULTANT will perform the following tasks:

#### **Bridge Design**

The CONSULTANT will perform the bridge design starting with the preferred bridge alternative from the TS&L report, progressing through 60% and 90% design submittals, to final PS&E documents for the bridge. In order to accomplish this, the CONSULTANT will rely on the AGENCY to provide land survey, the environmental permits, the necessary agreements with adjoining landowners, the geotechnical investigation, the roadway and storm drainage design, and construction management. We would request that prior to the AGENCY sending the project out to bid, we be provided the opportunity to perform a final review of the bid documents.

#### **1. Project Management**

The CONSULTANT will maintain an open line of communication with the AGENCY throughout the project to ensure that project needs are being met and to discuss key decisions as the project develops.

The CONSULTANT will arrange and manage the subconsultant contracts and will coordinate subconsultant activities to ensure the project team remains on schedule and provides a quality product. The CONSULTANT will provide monthly invoicing of all consultant and subconsultant project work, along with brief progress descriptions.

The CONSULTANT shall hold up to four video conference meetings to discuss, review, and share information. One meeting of the four meetings will occur at the start of the project to exchange data and discuss the project requirements and goals. One additional meeting will be held on site and in person at the AGENCY's discretion.

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**Assumptions:**

- Four meetings will be virtual.
- One meeting will be on site and in person (at the discretion of the AGENCY).
- CONSULTANT principal and/or staff engineer will participate in meetings.

**Deliverables:**

- Key information exchanged during meetings will be included in the various stages of the project (60%, 90%, and Final PSE).
- Monthly invoices and progress reports.

**2. 60% Design**

The 60% design will complete the design of the bridge based on the work already performed by the Consultant, its subconsultant, and the AGENCY during the Type, Size, and Location study. The design will follow current FHWA, WSDOT, and AGENCY Requirements.

The 60% structure plans shall include:

- 1) Bridge Layout Sheet (1 sheet)
- 2) Channel Layout Sheet (1 sheet)
- 3) Channel Features and Details Sheets (2 sheets)
- 4) Bridge Foundation Plan (1 sheet)
- 5) Construction Sequencing Sheet (1 sheet)
- 6) Temporary Roadway Bypass Sheet (1 sheet)
- 7) Abutment Details Sheets, Including Wingwall and Shaft Details (3 sheets)
- 8) Framing Plan and Bridge Section Sheet (1 sheet)
- 9) Intermediate Diaphragm Details Sheet (1 sheet)
- 10) Deck Reinforcing Plan Sheet (1 sheet)
- 11) Girder Sheets (3 to 5 sheets)
- 12) Barrier Sheets (2 sheets)
- 13) Approach Slabs Plan and Details Sheets (2 sheets)
- 14) Bar List Sheet (1 sheet)

Structure specifications, in WSDOT format, will be prepared at this time along with a cost estimate for the bridge and stream channel.

We have also included time to assist the AGENCY by preparing JARPA drawings for the project.

**Assumptions:**

- The Long Bridge Option (Option 3) was selected from the TS&L Study, which includes an approximately 150-foot-long bridge founded on drilled shafts of diameter recommended by the AGENCY's Geotechnical Group.

- AGENCY will perform roadway and storm drainage design and prepare the associated documents/plans, including, but not limited to, Traffic Control and Temporary Erosion and Sediment Control Plans.

**Deliverables:**

- 60% design package including preliminary drawings, specifications, and estimate for AGENCY review.

### **3. 90% Design**

The 90% design refines the 60% design based on comments from the AGENCY's review of the 60% documents. The plans, specifications, and cost estimate will be checked and modified based on the quality assurance engineer's comments. All sheets will be reviewed and corrected as required. The bid items and specifications will be coordinated.

**Assumptions:**

- Same assumptions as for 60% design.

**Deliverables:**

- 90% design package including preliminary drawings, specifications, and estimate for AGENCY review.

### **4. Final Plans, Specifications, and Estimate (100% Design)**

This item of work completes the coordination of the documents, addresses all comments and produces the final plans, specification, and estimate for bidding.

**Assumptions:**

- Same assumptions as 60% and 90% design.
- AGENCY will assemble the final project bid documents.

**Deliverables:**

- Final PSE package including final stamped drawings, design calculations, specifications, and estimate for the AGENCY to prepare bid documents.

### **5. Bidding and Construction Assistance**

This item includes time to assist the AGENCY by answering questions during bidding and reviewing submittals during construction.

**Assumptions:**

- We have included 10 hours of time for answering questions during bidding.
- We have included time to review up to 30 construction submittals at an average time of 2 hours to review each submittal.

**Deliverables:**

- Depending on results of the CONSULTANT's submittal review, approved submittals or redmarked submittals for correction/modification.

### **6. Post Construction Tasks**

This item includes completing a stamped load rating for the completed bridge.

**Assumptions:**

- Bridge will be single span prestressed girder bridge.
- Substructure rating will not be required.

**Deliverables:**

- Stamped load rating calculation.
- Uploaded stamped summary sheet to WSBS reporting database.

**Hydraulic and Geomorphic Design Support**

Watershed Science & Engineering (SUBCONSULTANT) has been assisting the CONSULTANT with the evaluation of alternatives for a replacement crossing to carry Goodman Creek under the Mountain Loop Highway seven miles southeast of Darrington, Washington. The current proposal is to replace the existing 12-foot diameter CMP culvert with a bridge. The AGENCY is planning to amend the contract with the CONSULTANT to include detailed design of the preferred alternative. This scope of work describes the tasks that SUBCONSULTANT will complete to support the design effort.

Note – The scope below assumes that at the conclusion of the existing TSL effort a preferred alternative has been selected to advance to design.

**1. Site Inspection**

SUBCONSULTANT staff shall travel to the project site to conduct a detailed examination of the characteristics of the natural stream channel (reference reach) near the project site, paying particular attention of the size, arrangement, and number of large boulders and wood that provide stability to the stream bed. Site inspection may include development of a site map to document stream structure, limited stream channel survey, up to three (3) Wollman pebble counts, photographs, aerial (drone) photos, and survey of available sediment and wood upstream from the structure. Information collected during the site visit will be used to support design of the reconstructed stream channel to replicate the existing natural channel within the reference reach. (Note – SUBCONSULTANT traveled to and completed a general site reconnaissance during the TSL phase of the project. The site inspection proposed above will allow SUBCONSULTANT to collect detailed channel bed feature characteristic data which will be used to inform channel bed design within the bridge waterway.)

Note: the scope of work for Site Inspection was included and performed as a part of Supplement 3 and is only included here to provide clarity to the remaining tasks in this document.

**Assumptions:**

- SUBCONSULTANT will be free to access lands both upstream and downstream from the crossing.
- Property access will be coordinated by the AGENCY

**Deliverables:**

- Key site observations and channel morphology shall be described in the hydraulic design memorandum (Task 5).

**2. Hydraulic Modeling and Scour Analysis**

The HEC-RAS model of Goodman Creek created during the TSL will be applied to generate the hydraulic data needed to evaluate potential scour within the bridge waterway, and to support design of the reconstructed channel bed (Task 3) and any scour countermeasures (if necessary). SUBCONSULTANT will provide/certify a Not Scour Critical NBIS scour code for the proposed crossing. This will be documented in the hydraulic design technical memorandum.

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**Assumptions:**

- None

**Deliverables:**

- Key model results will be described in the hydraulic design memorandum (Task 5)
- NBIS Scour Code – to be included in the hydraulic design technical memorandum.

**3. Stream Channel and Scour Protection Countermeasure Design**

SUBCONSULTANT shall develop a design concept to:

- a. Reconstruct the Goodman Creek channel. Design will include a recommended channel bed material mix, channel structure and layout, and placement of key boulders and wood.
- b. Protect embankment slopes and bridge foundations from scour and erosion within the bridge waterway.
- c. Transition into the channel upstream from the crossing to allow it to naturally adjust in a manner that minimizes risks to the proposed crossing.

To develop the design SUBCONSULTANT shall:

- Use information obtained during the site inspection (Task 1) to develop a recommended bed material mix that is consistent with Stream Simulation bed design guidance (WDFW Water Crossing Design Guidelines, 2013). Namely, the material distribution will be sized so that the median particle ( $D_{50}$ ) is within 20% of the  $D_{50}$  observed during the site inspection
- SUBCONSULTANT shall develop a reconstructed channel bed design layout detailing the recommended placement and orientation boulders and wood to create in stream structure (channel shape, pool size, and pool spacing) that is consistent with the reference reach.
- Use information from the hydraulic analysis (Task 2) to:
  - Perform stability calculations for proposed channel bed material, key boulders, and LWD features and compare those to results for the reference reach.
  - Design scour and erosion protection countermeasures to protect the embankment slopes beneath the bridge waterway.
  - Design the channel transition from the reconstructed channel to the existing channel upstream from the crossing. This will be a steepened section that will be allowed to naturally regrade following construction of the bridge project.

**Assumptions:**

- Up to four virtual and one in-person meetings (see Task 4) will be held with the CONSULTANT and AGENCY staff to discuss and refine the concepts. AGENCY environmental staff will provide input to the proposed designs to improve the likelihood that they will be acceptable to the permit agencies.

**Deliverables:**

- Channel bed design and scour countermeasure concepts, specification, etc. shall be developed in partnership with the CONSULTANT.

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- Key design recommendations and conformance with WDFW Water Crossing Design Guidelines will be documented in the hydraulic design memorandum (Task 5).

#### **4. Team & County Meetings**

A series of meetings will occur throughout the course of the project. They include:

- Up to four virtual design meetings
- One meeting project site field meeting to discuss the proposed design with regulators and USFS personnel.

##### **Assumptions:**

- SUBCONSULTANT principal and/or staff engineer will participate in meetings.

##### **Deliverables:**

- SUBCONSULTANT will prepare notes that capture key decisions agreed to during each virtual design meetings.
- SUBCONSULTANT will prepare general meeting notes for the on-site field meeting.

#### **5. Basis of Hydraulic Design Technical Memorandum**

SUBCONSULTANT will summarize the results of the hydraulic design in a draft memorandum which shall be provided to The CONSULTANT and the AGENCY for review. After receiving AGENCY comments, SUBCONSULTANT shall finalize and submit a stamped copy of the final memorandum.

##### **Assumptions:**

- AGENCY shall provide a single set of review comments for the draft memorandum.

##### **Deliverables:**

- One draft and one final version of the memorandum. Memorandum shall be delivered in electronic format, both as PDF and WORD documents

#### **6. Permit Support**

SUBCONSULTANT shall provide support to the AGENCY as they prepare permit applications and discuss the project with agency staff. Support may be in the form of text and figures, or participation in discussion.

##### **Assumptions:**

- Up to 16 hours of SUBCONSULTANT staff is available to provide support to the AGENCY

##### **Deliverables:**

- Text and figures to support the permit applications.

#### **7. Construction Guidance**

SUBCONSULTANT staff shall provide feedback / guidance to the AGENCY and contractor during construction. An allowance is provided for SUBCONSULTANT staff to make one field visit during construction and to answer questions via email or phone call.

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**Assumptions:**

- Up to 12 hours of SUBCONSULTANT staff time is allotted for the field visit
- Up to 8 hours of SUBCONSULTANT staff time is allotted for answering questions.

**Deliverables:**

- Summary of guidance recommendations if necessary.

**8. Administration**

SUBCONSULTANT will complete standard administrative duties including regular communication with AGENCY staff and preparation of monthly invoices and progress reports.

**Assumptions:**

- None

**Deliverables:**

- Monthly invoices and progress reports.



## Exhibit D Prime Consultant Cost Computations

Project: Goodman Creek Culvert Replacement - Design Phase

Salary Cost					
Task	Principal	Senior Project Engineer	Project Engineer	Design Engineer	Task Cost
Rate:	\$198.00	\$155.00	\$142.00	\$110.00	
Project Management	40				\$7,920
Project Meetings	40				\$7,920
<b>60% Design</b>					
Bridge Layout			8		\$1,136
Channel Layout			8		\$1,136
Coordinate with WSE on Channel Design	16		32		\$7,712
Design Deck			8		\$1,136
Design Superstructure			24		\$3,408
Design Substructure			32		\$4,544
Bridge Layout Sheet		2	16		\$2,582
Channel Layout Sheet		2	16		\$2,582
Channel Details Sheet		4	32		\$5,164
Bridge Foundation Plan Sheet		1	8		\$1,291
Construction Sequencing Sheet		2	16		\$2,582
Temporary Roadway Bypass Sheet		1	12		\$1,859
Abutment Details (3 sheets) Sheets		3	24		\$3,873
Framing Plan Sheet		1	8		\$1,291
Intermediate Diaphragm Details Sheet		1	8		\$1,291
Deck Reinforcing Plan Sheet		1	8		\$1,291
Girder Sheets (3-5 sheets)		4	32		\$5,164
Barrier Sheets (2 sheets)		2	16		\$2,582
Approach Slabs Sheet		1	12		\$1,859
Bar List Sheet			12		\$1,704
Quantities		4	8		\$1,756
Specifications			16		\$2,272
Cost Estimate		4			\$620
Prepare JARPA drawings		8	32		\$5,784
<b>90% Design</b>					
Revisions to 60% Design			24		\$3,408
Check Bridge Design		84			\$13,020
Check Contract Documents		58			\$8,990
Revise Contract Documents	8	8	110		\$18,444
<b>Final PSE (100% Design)</b>					
Revisions to 90% Design	6	20	40		\$9,968
<b>Construction Assistance</b>					
Answer Questions and Review Submittals	10		60		\$10,500
<b>Post Construction Tasks</b>					
Load Rate Bridge	1	4	8		\$1,954
Total Hours	121	215	630	0	
Total Salary Costs					\$146,743
<b>Reimbursables</b>					
Mileage	300 miles @		\$0.56		\$168
<b>Subconsultant Costs</b>					
Hydraulic Services					\$59,204
<b>Grand Total</b>					\$206,115
Prepared By: Scott Olson				Date: Dec. 22, 2021	

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# Exhibit E

## Sub-Consultant Cost Computations



### Estimate of Professional Services

Prepared for: Snohomish County  
 Project: Goodman Creek Bridge  
 Hydraulic & Geomorphic Design Support  
 Date: December 22, 2021  
 Prepared By: Jeff Johnson/Chris Frei

Use Snohomish County Approved Rates Specifically for Goodman Creek Project

TASK DESCRIPTION	Hours							Totals
	Principal	Sr. Proj. Eng. I	Sr. Eng. II	Senior Geom	Staff Eng.	GIS Specialist	Contract Admin	
<b>Hydraulic and Geomorphic Design Support</b>								
1. Site Inspection (Included in Supplement 3 so removed from this estimate)								\$0
2. Hydraulic Modeling to Support Design	2		8		24			\$4,337
3. Channel and Scour Protection Countermeasure Design	20		72	24	97			\$29,554
4. Team & County Meetings	18		20	4	12			\$8,641
5. Hydraulic & Geomorphic Technical Memorandum	8		20		24			\$7,406
6. Permit Support	8		12		8			\$4,367
7. Construction Guidance	2		16		2			\$3,114
8. Administration	2		6		1		2	\$1,618
<b>Total Hours and Direct Labor Cost (DL)</b>	<b>60.0</b>	<b>0.0</b>	<b>154.0</b>	<b>28.0</b>	<b>168.0</b>	<b>0.0</b>	<b>2.0</b>	
Fully Burdened Labor Rate (Escalated to 2022)	\$200.31	\$180.00	\$155.55	\$144.44	\$112.18	\$102.08	\$95.11	
<b>TOTAL LABOR COST</b>	<b>\$12,019</b>	<b>\$0</b>	<b>\$23,955</b>	<b>\$4,044</b>	<b>\$18,846</b>	<b>\$0</b>	<b>\$172</b>	<b>\$59,036</b>

#### Direct Expense Detail

	Units	Rate	Cost
Mileage	300	\$0.560	\$168.00
		<b>Total</b>	<b>\$168.00</b>

#### Cost Summary

Total Labor	\$59,036
Total Direct Expenses	\$168
<b>Total</b>	<b>\$59,204</b>

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