



**WHATCOM COUNTY CONTRACT
INFORMATION SHEET**

Whatcom County Contract No.
201803009-7

Originating Department:	Public Works
Division/Program: <i>(i.e. Dept. Division and Program)</i>	River and Flood/907525-CFHMP
Contract or Grant Administrator:	Paula Harris
Contractor's / Agency Name:	Herrera Environmental Consultants
Is this a New Contract? If not, is this an Amendment or Renewal to an Existing Contract? Yes <input checked="" type="radio"/> No <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> If Amendment or Renewal, (per WCC 3.08.100 (a)) Original Contract #: 201803009	
Does contract require Council Approval? Yes <input checked="" type="radio"/> No <input type="radio"/> If No, include WCC: _____ Already approved? Council Approved Date: _____ (Exclusions see: Whatcom County Codes 3.06.010, 3.08.090 and 3.08.100)	
Is this a grant agreement? Yes <input type="radio"/> No <input checked="" type="radio"/> If yes, grantor agency contract number(s): _____ CFDA#: _____	
Is this contract grant funded? Yes <input checked="" type="radio"/> No <input type="radio"/> If yes, Whatcom County grant contract number(s): DOE#: OTGP-2325-WHCoPW-00054	
Is this contract the result of a RFP or Bid process? Contract _____ Yes <input checked="" type="radio"/> No <input type="radio"/> If yes, RFP and Bid number(s): 17-77 Cost Center: 722007	
Is this agreement excluded from E-Verify? No <input type="radio"/> Yes <input checked="" type="radio"/> If no, include Attachment D Contractor Declaration form.	
If YES, indicate exclusion(s) below: <input checked="" type="checkbox"/> Professional services agreement for certified/licensed professional. <input type="checkbox"/> Goods and services provided due to an emergency <input type="checkbox"/> Contract work is for less than \$100,000. <input type="checkbox"/> Contract for Commercial off the shelf items (COTS). <input type="checkbox"/> Contract work is for less than 120 days. <input type="checkbox"/> Work related subcontract less than \$25,000. <input type="checkbox"/> Interlocal Agreement (between Governments). <input type="checkbox"/> Public Works - Local Agency/Federally Funded FHWA.	
Contract Amount:(sum of original contract amount and any prior amendments): \$ 1,199,700 <hr/> This Amendment Amount: \$ 1,207,840 <hr/> Total Amended Amount: \$ 2,407,540	Council approval required for; all property leases, contracts or bid awards exceeding \$40,000 , and professional service contract amendments that have an increase greater than \$10,000 or 10% of contract amount, whichever is greater, except when : 1. Exercising an option contained in a contract previously approved by the council. 2. Contract is for design, construction, r-o-w acquisition, prof. services, or other capital costs approved by council in a capital budget appropriation ordinance. 3. Bid or award is for supplies. 4. Equipment is included in Exhibit "B" of the Budget Ordinance. 5. Contract is for manufacturer's technical support and hardware maintenance of electronic systems and/or technical support and software maintenance from the developer of proprietary software currently used by Whatcom County.
Summary of Scope:	
This amendment to the Contract for Services with Herrera Environmental Consultants will provide additional support to update and broaden the scope of the 1999 Lower Nooksack River Comprehensive Flood Hazard Management Plan and continue FLIP process support along with additional specific technical tasks to further the flood mitigation planning for the Everson-Sumas overflow.	
Term of Contract: Not to exceed Expiration Date: 1/31/2025	

Contract Routing:	1. Prepared by: Paula Harris	Date: 11/3/2023
	2. Attorney signoff: Christopher Quinn	Date: 11/6/2023
	3. AS Finance reviewed: Amy Martin	Date: 11/8/2023
	4. IT reviewed (if IT related): DS	Date: _____
	5. Contractor signed: BSR	Date: 11/28/2023
	6. Executive contract review: _____	Date: _____
	7. Council approved, if necessary: AB2023-759	Date: 11/21/2023
	8. Executive signed: _____	Date: _____
	9. Original to Council: _____	Date: _____

**WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT**

**Elizabeth Kosa
DIRECTOR**



RIVER AND FLOOD
322 N. Commercial Street, Suite 120
Bellingham, WA 98225-4042
Phone: (360) 778-6230
www.whatcomcounty.us

MEMORANDUM

TO: Carol Frazey, Whatcom County Executive Pro Tempore, and The Honorable Members of the Whatcom County Council, collectively serving in their capacity as the Whatcom County Flood Control Zone District Board of Supervisors

THROUGH: Elizabeth Kosa, Public Works Director

FROM: Paula J. Harris, P.E., River and Flood Manager *PJH*
Gary Stoyka, Natural Resources Program Manager

DATE: November 3, 2023

RE: Herrera Environmental Consultants Contract for Services to support Lower Nooksack River Floodplain Integrated Planning – Amendment No. 7

Enclosed is an amendment to a Contract for Services between the Whatcom County Flood Control Zone District (FCZD) and Herrera Environmental Consultants for your review and signature.

▪ **Requested Action**

Public Works respectfully requests that the County Executive and Council, acting as the FCZD Board of Supervisors, enter into a contract amendment with Herrera Environmental Consultants to continue supporting the Floodplain Integrated Planning (FLIP) Process along with additional specific tasks to further the technical work needed to advance flood mitigation work for the Everson-Sumas overflow. Under this contract amendment, the consultants will produce deliverables as outlined in the scope of work of the Washington State Department of Ecology (WA DOE) Proviso grant which is proposed as a separate agenda item.

▪ **Background and Purpose**

Herrera was retained in March 2018 to assist Public Works staff in updating and broadening the scope of the 1999 Lower Nooksack River Comprehensive Flood Hazard Management Plan to integrate flood risk reduction with the needs of salmon and floodplain land-uses. The update will provide a basis for future Whatcom County Flood Control Zone District capital programs and support possible WRIA1 Salmon Recovery Plan updates.

The first two years of planning focused on developing a shared understanding of the river processes and impacts to flood risk, habitat and floodplain land uses. Detailed reach planned begin in 2020, with a focus on Reach 2 (Guide-Meridian to I-5). Since the 2021 floods, the focus has shifted to the Everson-Overflow flow split.

Mitigation options were developed by the Flow Split Reach Team at a design charrette help in April of 2022. Since then we have performed hydraulic analyses of the options, and started combining options into scenarios and evaluating how the scenarios address the shared values of the FLIP team.

The proposed amendment will continue this work of hydraulic modeling and evaluating mitigation scenarios and includes sediment investigations to assess how potential mitigation actions will affect the flow of sediment to downstream reaches of the river. Support for public outreach and communications is also included.

▪ **Funding Amount and Source**

The proposed amendment is for \$1,207,840 for a total amended contract amount of \$2,407,540. The WA DOE Proviso grant will provide 100% reimbursement to support this work. The 2023 and proposed 2024 FCZD budgets have adequate expenditure authority to fund the proposed amendment.

Please contact Paula Harris at extension 6285 if you have any questions or concerns regarding the terms of this agreement.

**AMENDMENT NO. 7
TO
CONTRACT FOR SERVICES BETWEEN WHATCOM COUNTY FLOOD CONTROL ZONE
DISTRICT AND HERRERA ENVIRONMENTAL CONSULTANTS**

THIS AMENDMENT is to the Contract between the Whatcom County Flood Control Zone District, hereinafter referred to as the "County", and Herrera Environmental Consultants, a consulting company hereinafter referred to as the "Contractor", dated March 19, 2018, and designated "Whatcom County Contract No. 201803009". In consideration of the mutual benefits to be derived, the parties agree to the following:

WITNESSETH

WHEREAS, the County has entered into an agreement with the Contractor dated March 19, 2018, to assist in updating and broadening the scope of the 1999 Lower Nooksack River Comprehensive Flood Hazard Management Plan (CFHMP); and,

WHEREAS, the Contractor is helping to guide the planning process in close coordination with the Floodplain Integrated Planning (FLIP) Team, the FLIP Steering Committee, and Whatcom County staff; and

WHEREAS, additional specific support needs have been identified to further the work of the FLIP Team and Steering Committee and to produce deliverables required under the Washington State Department of Ecology Proviso grant funding; and

WHEREAS, the Contractor has delivered a quality product and has been responsive thus far to the County's needs; and

WHEREAS, the County has requested the Contractor to perform additional services and desires to revise the scope of work, contract amount and contract expiration date.

NOW, THEREFORE, County and Contractor agree to modify the Agreement as follows:

1. SCOPE OF SERVICES

The scope of services is amended to include the additional Scope of Services described in Exhibit A-7, attached hereto and incorporated herein by reference.

2. PERFORMANCE

As consideration for the services provided by the Contractor, the County agrees to reimburse the Contractor for additional services rendered under this amendment at a sum not to exceed \$1,207,840 DOLLARS based on the cost breakdown detailed in Exhibit B-7, attached hereto and incorporated herein by reference. The revised contract amount is \$2,407,540 DOLLARS.

3. TIME SCHEDULE

The duration of this Agreement shall be extended to January 31, 2025.

This Amendment shall be made part of W.C. Contract No. 201803009 by and between Whatcom County Flood Control Zone District and Herrera Environmental Consultants. Unless specifically stated herein, all other terms and conditions of the original agreement shall remain in full force and effect.

IN WITNESS WHEREOF, Whatcom County and Herrera Environmental Services have executed this Amendment on the date and year below written.

DATED this 11/28/2023 day of _____, 2023.

Each person signing this Contract represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Contract.

CONTRACTOR:

Herrera Environmental Consultants

DocuSigned by:
Mark Ewbank 11/22/2023
E6657A7049ED438

Mark Ewbank, Vice President

CONTRACTOR INFORMATION:

Herrera Environmental Consultants
2200 Sixth Avenue, Suite 1100
Seattle, WA 98121

Contact Name: Mark Ewbank
Contact Phone: (206) 787-8266
Contact FAX: (206) 441-9108
Contact Email: mewbank@herrerainc.com

WHATCOM COUNTY FLOOD CONTROL ZONE DISTRICT:

Recommended for Approval:

DocuSigned by:
Elizabeth Kosa 11/22/2023
870F242DD76C408
Elizabeth Kosa, Public Works Director Date

Approved as to form:

DocuSigned by:
Christopher Quinn 11/27/2023
EC466EF5C8894FD...
Christopher Quinn, Senior Civil Deputy Prosecuting Attorney Date

Approved:

Accepted for Whatcom County Flood Control Zone District:

DocuSigned by:
Carol Frazey 11/28/2023
By: 8C1B2C72D4554A4...
Carol Frazey, Executive Pro Tempore, acting for the Whatcom County Flood Control Zone District Board of Supervisors

Exhibit A-7 Scope of Work

I. Background

Whatcom County is preparing a major update to its Comprehensive Flood Hazard Management Plan for the Lower Nooksack River, encompassing approximately 36 miles of the river from the confluence of the North and South forks near Deming to the river mouth in Bellingham Bay. The plan update is a collaborative effort with affected governments and stakeholders representing these interests, called Nooksack Floodplain Integrated Planning (FLIP) by the participants. Reach-scale floodplain management strategies and project concepts will be developed for actions that reduce flood risk, advance salmon habitat protection and restoration, and provide for restored habitat processes to the extent practicable, while sustaining adjacent floodplain land uses. A consultant team led by Herrera Environmental Consultants (Herrera) is assisting the County in this FLIP work, including steering committee facilitation and coordination, hydrologic, hydraulic, and geomorphic modeling and analyses, alternatives analyses, outreach and coordination with planning participants, conceptual engineering design, and plan compilation. This scope of work describes additional services that the Herrera team will provide through December 2024 to continue coordinating with the Nooksack FLIP Team and the FLIP Steering Committee, and completing technical work supporting the process.

The scope of work supplements the work described in Whatcom County contract #201803009, authorized on March 19, 2018, and in Amendment 1 to the original contract, dated August 22, 2018, Amendment 3 to the contract dated October 23, 2019, and Amendment 5 to the contract dated September 22, 2022. Amendments 2 and 4 were contract time extensions and did not include scope of work supplements. Amendment 6 adjusted a contract provision associated with consultant billing rates.

II. Statement of Work

Herrera and its subconsultants, which include Northwest Hydraulic Consultants, Applied Geomorphology Inc., Kramer Consulting, Cramer Fish Sciences, Watershed Science and Engineering, and Wheeler Consulting Group, will perform the services described in the following tasks. Adjustments to the focus and level of effort may be needed as task work proceeds in coordination with County staff and the FLIP Steering Committee to provide the most value. The task numbering used in this amendment follows in sequence with tasks already established on the contract.

Task 11 – Support for Flow Split Technical Analyses

During large flood events the Nooksack River overtops its northeast bank near the city of Everson and overflows to the north, eventually reaching Johnson Creek and the Sumas River in the City of Sumas and the Fraser River in Abbotsford, British Columbia, Canada. This “flow split” is central to developing solutions that balance future flood risk reduction, aquatic habitat protection and enhancement, and maintain viable agricultural lands in the floodplains. Record flooding in November 2021 highlighted the importance of the flow split, resulting in the FLIP Steering Committee focusing attention on additional technical analysis and communications with stakeholders and the public related to improving the accuracy of a two-dimensional hydraulic model of the river and its overflow corridor and developing conceptual solutions to optimize

flow split impacts.

Herrera and its subconsultants will assist Whatcom County and the FLIP Steering Committee with the following types of work in this task:

- Scheduling, developing agendas, facilitating, and preparing notes for frequent Steering Committee meetings and other FLIP Team meetings
- Preparing and implementing a community outreach plan to ensure engagement of interested parties and to inform the community regarding proposed actions to address flood risks in combination with other community values
- Assisting with communications to the public, stakeholder groups, and elected officials, including preparation and updates to an online storymap
- Technical support for the Nooksack River International Task Force
 - Herrera's project manager and NHC's lead modeler will attend Transboundary Flood Initiative Technical Table and Hydrology Subgroup meetings
- Hydraulic modeling –
 - Complete hydraulic model runs for various capital project design concepts, combinations of concepts ("scenarios"), and incorporate predicted flow and sediment changes associated with climate change
 - Process 2024 LiDAR data set, to be collected and provided by Whatcom County, into a new 2024 topobathy mosaic data set (assuming breakline additions as with 2022 data). Update a technical memo prepared by NHC in 2023 as appropriate. Provide GIS technical support to the County for this effort as requested.
 - Update/refine calibration of a Sumas River HSPF hydrologic model if/as available information may warrant doing. Update a technical memo produced by NHC in 2023 if applicable.
 - Refine calibration of a HEC-RAS 2D hydraulic model of the Nooksack River and floodplain areas as available information may warrant doing. Update a technical memo produced by NHC in 2023 as applicable.
 - Work may also include conducting sensitivity analyses and detailed analysis of Everson Bridge hydraulics as discussed in the draft hydraulic modeling technical report produced in 2023.
 - NHC's lead modeler will attend biweekly check-in meetings with County staff and Herrera for progress status updates and hydraulic analysis needs and priorities
 - Extend the 2D model mesh sufficiently far into Canada such that results at the Water Survey Canada Huntingdon gage are not affected by the downstream boundary condition, and calibrate selected events to WSC gage data. Coordinate with KWL, City of Abbotsford, and B.C. agency staff to provide needed input hydrographs for their hydraulic modeling on the Canadian side of the border. Test sensitivity to extracting HEC-RAS 2D model results at the output location identified by the Canadian modeling team (e.g., anticipating a request for output hydrographs along 100m sections across the floodplain). Evaluate relative contributions of flood volumes flowing to Canada.
 - Provide technical support to the National Weather Service (NWS) in providing an Everson Overflow estimate based on gaged Nooksack River flows.

- Attend interagency meetings such as continuing discussions with the USGS and NWS, as requested by Whatcom County. Prepare presentations as needed for these meetings.
- Prepare other technical documentation and presentation material for sharing of model results and interpretation of the results
- Geomorphic analysis –
 - Continue providing reach-scale process geomorphology support. This may include developing a Nooksack River sediment budget involving site reconnaissance, subsurface sediment sampling, and pebble counts.
 - Prepare technical presentations, coordinate with the County, and attend interagency meetings related to the geomorphic analysis task work.
 - Develop a MAST 1D model to represent key Nooksack River processes including literature review, desktop geomorphic analysis, and data extraction from the HEC-RAS 2D hydraulic model. Calibrate the MAST 1D model to existing conditions and develop proposed conditions model inputs. Conduct model sensitivity testing.
 - Prepare a draft geomorphic analysis report documenting the work described above and respond to one set of review comments.
 - Develop a HEC-RAS 1D Nooksack River mainstem existing conditions fixed bed model and calibrate it. Conduct mobile bed calibration of the model. Test sensitivity of results to varying model parameters. Simulate long-term existing and proposed conditions (including up to three alternatives). Prepare a draft report documenting this modeling and respond to one set of review comments.
- Concepts, scenarios, and alternatives development, analyses, and design –
 - Preliminary layout and concept design of alternatives
 - Hydraulic modeling of alternatives and evaluation of modeling results to refine alternative configurations for desired effects
 - Evaluating effects on flooding of occupied structures, key infrastructure elements, and land uses
 - Preparing documentation to communicate alternatives to the public, stakeholders, and elected officials
- Developing multi-objective evaluation criteria to use in comparing expected outcomes of concepts, scenarios, and alternatives
- Evaluating aquatic, riparian, and terrestrial habitat conditions and potential habitat restoration project configurations
- Drafting portions of the updated Comprehensive Flood Hazard Management Plan as completion of FLIP work enables
- Other technical analysis as may be requested

This task also includes project management activities including monthly invoicing and progress reporting, coordination with subconsultants, coordination with County staff regarding schedule and priorities, and maintenance of project files.

Task 11 Deliverables:

- Monthly invoices and progress reports
- Notes from project management check-in meetings as applicable
- Steering Committee meeting agendas and notes
- Iterative hydraulic model outputs
- Online storymap content using ESRI software, and periodic updates to the storymap as may be desired
- Iterative GIS-based modeling of flood impacts to occupied structures, roads, other infrastructure, and potentially selected land uses tied to evaluating hydraulic modeling predictions of various options, scenarios, and alternatives
- Technical documentation of hydrologic and hydraulic analyses, including:
 - Updated technical memos for river channel and floodplain topobathymetric mosaic creation, Sumas River hydrologic modeling, and/or Nooksack River hydraulic modeling.
- Technical documentation of geomorphic analyses, including:
 - Draft and final report documenting MAST 1D modeling
 - Draft and final report documenting HEC-RAS 1D fixed bed and mobile bed hydraulic and sediment transport modeling
- Conceptual design plans and cost estimates
- Iterative definition of multi-objective evaluation criteria (in tabular/matrix or narrative list format) for flood risk reduction benefits and habitat benefits
- Documentation of estimated habitat impacts and benefits if needed during the course of developing alternatives, in the form of a technical memo or comparable
- Presentation content for meetings with FLIP audiences
- Detailed design plans for any alternative(s) carried forward as an early action
- Written content and other products as may be requested by Whatcom County for a draft and final community outreach plan

Task 12 – Other FLIP Assistance

This task provides a basis for other work that may be needed beyond what is done in Task 11, which may include but not be limited to public and stakeholder communications, technical analyses in mainstem river reaches downstream of Everson, and coordination of complementary work being done by the University of Washington Climate Impacts Group, WRIA 1 working groups, and the Whatcom Conservation District. Specific work to be done under this task, and corresponding deliverables and budget allocation, will be further defined in an email describing the scope of work, budget and schedule as needs arise. This work must be approved in writing (email) by the County Project Manager before work can proceed.

Exhibit B-7 Compensation

As consideration for the services provided pursuant to Exhibit A-7, Scope of Work, the County agrees to compensate the Contractor according to the hourly rates provided in the Rate Schedule provided below. These rates, however, are subject to annual adjustment. Contractor will provide written notice to the County in advance of any rate increases. Other reasonable expenses incurred in the course of performing the duties herein shall be reimbursed. Mileage is to be reimbursed at the IRS rate; lodging and per diem will be reimbursed at a rate not to exceed the GSA rate for the location at which services are provided. Reimbursement for air travel will be at coach rates. Other expenditures such as printing, postage and telephone charges shall be reimbursed at actual cost.

The Contractor will invoice monthly. Invoices will include hours worked by employee by day together with tasks accomplished. Requests for reimbursement of expenses must be accompanied by copies of paid invoices itemizing costs incurred. Costs of alcoholic beverages are not eligible for reimbursement. Compensation shall not exceed the amended contract amount of \$2,407,540. Any work continuing after the completion date of the amended contract, unless otherwise agreed upon in writing, will be at the Contractor's expense.



Cost Estimate for Lower Nooksack River Floodplain Integrated Planning Amendment 7
 Herrera Project No. 16-06477-000
 11/2/2023

			Task No.		Total
			11	12	
			Support for Flow Split Technical Analyses	Other FLIP Assistance	
Herrera Labor based on:	Direct Labor Rates				
Schedule	Task Start Date		11/1/2023	6/1/2024	
	Task End Date		1/1/2025	1/1/2025	
Staff	Labor Category	2023 Direct Labor Rates			
Ewbank, Mark	Engineer VII / Vice President	\$96.37	320	20	340
Johansen, Sally	Project Accountant IV	\$44.68	20		20
Avolio, Christina	Engineer V	\$71.77	278	40	318
Van Orden, Emma	Engineer II	\$43.66	260	40	300
Bagniewski, Ben	GIS Analyst I	\$26.75	150		150
Lyons, Betsy	Planner IV	\$63.50	24		24
Schmidt, Jennifer	GIS Analyst VI	\$71.60	120	40	160
Marston, Charles	CAD Technician II	\$34.39	50		50
Total Hours per Task			1,222	140	1362
Subtotal Labor			\$78,884	\$9,409	\$88,292
197.78% Overhead			\$156,016	\$18,608	\$174,624
30% Fee on Direct Labor			\$23,665	\$2,823	\$26,488
Subtotal Herrera Labor			\$258,565	\$30,840	\$289,404
5%	Escalation on Herrera Labor in 2024		\$11,081	\$1,542	\$12,623
Escalated Subtotal Herrera Labor			\$269,646	\$32,381	\$302,028
Subconsultant					
Northwest Hydraulic Consultants			\$754,515	\$0	\$754,515
Cramer Fish Sciences			\$48,580	\$0	\$48,580
Applied Geomorphology			\$24,100	\$0	\$24,100
Kramer Consulting			\$54,600	\$0	\$54,600
Wheeler Consulting Group			\$23,100	\$0	\$23,100
Subtotal Subconsultant Cost			\$904,895	\$0	\$904,895
Direct Expenses					
Item	Unit	Unit Cost			
Auto Use	Mile	\$0.66	1400	\$0	1400
Subtotal Direct Expenses			\$917	\$0	\$917
Grand Subtotal			\$1,175,458	\$32,381	\$1,207,840
Grand Total					\$1,207,840

Northwest Hydraulic Consultants Inc.
 301 W Holly St U-3
 Bellingham, WA 98225
 Tel: (206) 241-6000
 Fax (206) 439-2420

Prepared for: Whatcom County River & Flood Division
 Project: Nooksack FLIP
 Date: 11/2/2023
 NHC Project No.: P200S117
 Prepared By: Todd Bennett

Labor Detail for Task 1.1 Hydrology and Hydraulics Work Elements

Subtask Description	Principal	Principal TA	Sr. Project Engineer/Sr. Scientist	Sr. Engineer/Sr. Scientist 1	Sr. Engineer/Sr. Scientist 2	Engineer/Sr. Scientist 1	Engineer/Sr. Scientist 2	Jr. Engineer/Sr. Scientist	GIS Analyst 1	Engineering Technician 1	Sr. Contract Administrator	Sr. Technical Editor	Direct Cost
Topobathy Process new LIDAR data set into a new 2023 topobathy file (assuming breakline additions as with 2022 data). Update technical memo as appropriate. Address one round of review comments.	8			8			16		80				\$ 17,372
RAS 2D Model Development and Application Extend model mesh sufficiently far into Canada such that results at the Water Survey Canada Huntingdon gage are not affected by the downstream boundary condition, and calibrate selected events to WSC gage data. Coordinate with KWL, City, and Ministry staff to provide needed hydrographs for their hydraulic modeling on the Canadian side of the border. Test sensitivity to extracting HEC-RAS 2D model results at the output location identified by the Canadian modeling team (e.g., anticipating a request for output hydrographs along 100m sections across the floodplain). Evaluate relative contributions of flood volumes flowing to Canada.	16						80	40					\$ 19,814
RAS 2D Model Development and Application Continue model refinement learned from continued model application and based on external review comments. Update technical report accordingly. Work may include conducting sensitivity analyses and detailed analysis of Everson Bridge hydraulics as discussed in the Nooksack Model Calibration Report. Attend weekly remote check County/Herrera progress status update, project needs and check-in meetings and	80			16			120	120					\$ 54,768
RAS 2D Model Development and Application approximate monthly Transboundary Flood Initiative full team and Hydrology Subgroup meetings and FLIP Technical Group meetings. Prepare presentations as needed. Attend FLIP Working Group and Steering Group meetings, as requested.	56						16						\$ 16,790
RAS 2D Model Development and Application NWS and USGS support (e.g., rating curves)	40			4			120						\$ 27,474
RAS 2D Model Development and Application Attend agency meetings such as continuing discussions with the USGS and NWS, as requested.	40						16						\$ 12,611
Alternatives (Options and Scenarios) Continue development of Options and Scenarios in concert with the County and Herrera, including model revisions to reflect concept designs. Review and analyze results. Post-process data and provide GIS data to County and Herrera as needed. Provide supporting documentation as needed.	80			40		40	120	120	40			40	\$ 77,983
Alternatives (Options and Scenarios) Attend meetings, and prepare and present presentations, as requested.	24												\$ 6,268
Alternatives (Options and Scenarios) Assist with evolution of Option and Scenario concepts into engineering design.	40			40		40	120	120	40				\$ 61,042
Hydrology Calibrate lower Nooksack River HSPF modeling to available data. Prepare technical memo. Respond to one round of review comments.	16			40			140		40				\$ 36,864
Hydrology Revisit Sumas River HSPF calibration applying HEC-RAS model Everson Overflow inputs, and update technical memo accordingly.	16			32			40						\$ 15,982
Total Hours	416	0	0	180	0	80	788	400	200	0	0	40	\$ 346,968
WSDDT approved ANTE Table Rates	\$261.18	\$243.52	\$243.52	\$199.82	\$174.81	\$154.12	\$135.23	\$120.41	\$144.01	\$108.23	\$190.00	\$162.35	
Total Labor:												\$ 346,968	
Direct Expense Detail													
Field Reconnaissance Mileage													\$0.655
Field Reconnaissance Hotel													\$98
Field Reconnaissance Meals													\$59
Boat for field access rental													\$600
Sediment sampling equipment													\$100
Total Direct Expenses:												\$ 0	
Cost Summary													
Total Labor													\$ 346,968
Total Direct Expenses													\$ 0
Total Project Cost:												\$ 346,968	

Northwest Hydraulic Consultants Inc.

301 W Holly St U-3
 Bellingham, WA 98225
 Tel. (206) 241-6000
 Fax (206) 439-2420

Prepared for: Whatcom County River & Flood Division
 Project: Nooksack FLIP
 Date: 11/2/2023
 NHC Project No: P2005117
 Prepared By: Andrew Nelson

Labor Detail for Task 11 Geomorphology Work Elements

Task Description	Principal	Principal T3	Sr. Project Engineer/ Scientist	Sr. Engineer/ Scientist 1	Sr. Engineer/ Scientist 2	Engineer/ Scientist 1	Engineer/ Scientist 2	Jr. Engineer/ Scientist	GIS Analyst 1	Engineering Technician 1	Sr. Contract Administrator	Sr. Technical Editor		Direct Cost	
1 Project management and coordination	20	20		20			50				8			\$ 22,151	
2.1 Field input data gathering: Subsurface Sediment Sampling and Repeat Pebble Counts		8					16	16		16				\$ 7,770	
2.2 Development (alternatively it may make sense for Scott Anderson to lead this work)		4						24						\$ 4,946	
2.3 Continuing reach-scale process geomorphology support		40					20	20						\$ 14,854	
3.1 MAST 1D model development to better represent key Nooksack River Processes and Concerns		8	40				20							\$ 14,394	
3.2 MAST 1D model input data specification (literature review, desktop geomorphic analysis, and extraction from 2D HEC-RAS model)		8					40		20					\$ 11,836	
3.3 MAST 1D existing conditions model calibration runs		4	32				32							\$ 14,693	
3.4 MAST 1D proposed conditions model development		8	16				16							\$ 8,008	
3.5 MAST 1D sensitivity testing		4	40				60							\$ 20,427	
3.6 MAST 1D reporting		8	40				40					4		\$ 21,375	
4.1 HEC-RAS 1D model input data specification		4	4	20	40		20	40						\$ 22,403	
4.2 HEC-RAS 1D existing conditions fixed bed calibration			16	24			16							\$ 12,945	
4.3 HEC-RAS 1D existing conditions mobile bed calibration		4	12	20	60		20	40						\$ 28,348	
4.5 HEC-RAS 1D spin up testing			16	24										\$ 9,774	
4.5 HEC-RAS 1D sensitivity testing		4	8	16	60		20	40						\$ 26,399	
4.4 HEC-RAS 1D existing conditions long-term simulation		4	4	8	24			12						\$ 10,385	
4.4 HEC-RAS 1D proposed conditions model development (3 alternatives)		4	4	8	48		20	24	20					\$ 22,033	
4.6 HEC-RAS 1D reporting		8	8	8	60		40		8			4		\$ 25,125	
5 Presentation of results at 2 meetings		16	16		16		16							\$ 13,436	
6 Management Reserve/Additional Technical Tasks		16	16	32	200		80	120	80	20				\$ 94,785	
Total Hours	96	184	312	608	0	0	554	324	128	36	8	8		\$ 406,087	
WSDOT approved ANTE Table Rates	\$ 261.18	\$ 243.52	\$ 243.52	\$ 199.82	\$ 174.81	\$ 154.12	\$ 135.23	\$ 120.41	\$ 144.01	\$ 108.23	\$ 162.35	\$ 147.13			
Total Labor:														\$ 406,087	
Direct Expense Detail															
													Units	Rate	Cost
Field Reconnaissance Mileage													250	0.655	\$ 160
Boat for field access rental													2	600	\$ 1,200
Sediment sampling equipment													1	100	\$ 100
Total Direct Expenses:														\$ 1,460	
Cost Summary															
Total Labor														\$ 406,087	
Total Direct Expenses														\$ 1,460	
Total Project Cost:														\$ 407,547	

Amendment 7 Budget for Subconsultants:

Kramer Consulting
Applied Geomorphology Inc.
Wheeler Consulting Group
Cramer Fish Sciences

Kramer Consulting				
Staff	Hourly Rate	Hours	Cost	
Jim Kramer	\$ 195.00	280	\$	54,600

Applied Geomorphology Inc.				
Staff	Hourly Rate	Hours	Cost	
Karin Boyd	\$ 170.00	140	\$	23,800
		Expenses	\$	300
		Total	\$	24,100

Wheeler Consulting Group				
Staff	Hourly Rate	Hours	Cost	
Letitia Wheeler	\$ 165.00	140	\$	23,100

Cramer Fish Sciences				
Staff	Hourly Rate	Hours	Cost	
Senior Scientist	\$ 204.00	104	\$	21,216
GIS Analyst	\$ 130.00	48	\$	6,240
Biologist	\$ 115.00	60	\$	6,900
Bio Technician	\$ 71.00	144	\$	10,224
		Expenses	\$	4,000
		Total	\$	48,580