

**PROJECT MANAGEMENT PLAN  
FOR  
FEASIBILITY PHASE STUDY  
OF  
SKOKOMISH RIVER BASIN, MASON COUNTY, WASHINGTON**

***Final Project Management Plan***

**FEASIBILITY COST SHARING AGREEMENT  
Attachment A**

**PROJECT MANAGEMENT PLAN  
Skokomish River, Washington, Ecosystem Restoration and Flood  
Damage Reduction Study**

**1.0 SCOPE.**

**1.1 General.** The Project Management Plan (PMP) is the blueprint for conducting the feasibility phase of project development. It documents the work requirements and the level of detail that will be necessary to describe the future without and future with-project conditions, formulate a range of alternative measures, assess their effects, and present a clear rationale for the selection of a restoration and flood damage reduction plan for the Skokomish River. The PMP forms the basis for estimating study costs and schedules and assigning responsibilities for conducting the feasibility phase.

The PMP does not attempt to repeat all project-related information provided in the February 2000 reconnaissance report (Section 905(b) Analysis). The reconnaissance report should be referred to for a detailed description of the reconnaissance studies and related investigations conducted prior to initiating the feasibility phase of project development.

This reconnaissance study was initiated using the Corps Puget Sound and Adjacent Water study authority, Section 209 of the Flood Control Act of 1962 (PL 87-874) which continues to provide authority for investigations in the Puget Sound region and will continue to be the authority for the feasibility phase of the project.

This project is co-sponsored by Mason County and the Skokomish Indian Tribe.

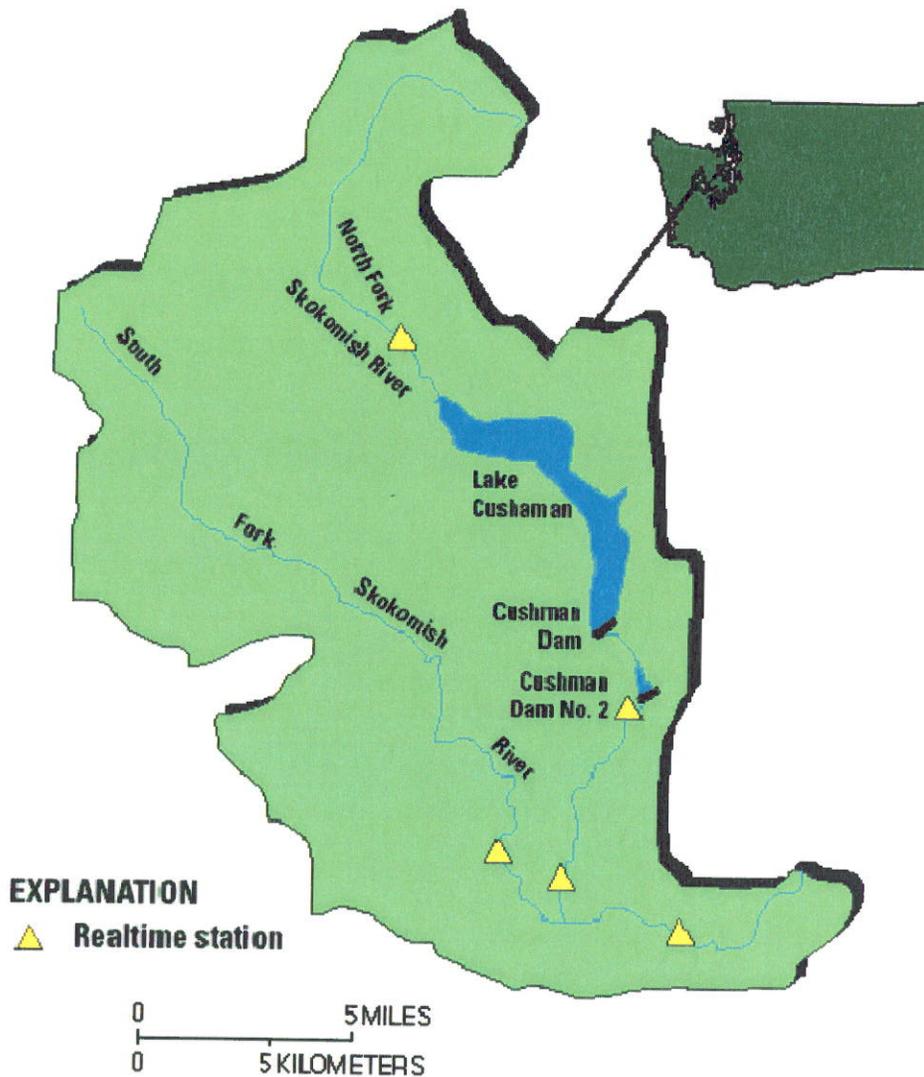


Figure 1. Watershed boundaries and USGS gaging station locations.

**1.2 Study Vision and Purpose.** The vision of the study is to improve the Skokomish River environment for fish and people. The purpose of the feasibility phase of project development is to investigate and formulate a solution to address ecosystem restoration and flood damage reduction in the Skokomish River. The sponsor's objective is to restore proper natural function to the Skokomish River basin while reducing flood damages to valley residents including the Skokomish Indian Tribe. The recommended plan that will be set forth in the feasibility report must be both technically viable and capable of being implemented to meet project objectives. The work of this phase includes formulating alternative solutions, evaluating costs and benefits, preparing initial designs, and recommending a plan to initiate solutions to the problem.

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The feasibility study will 1) investigate and identify solutions to identified water resources problems and 2) recommend either for or against Federal authorization and implementation of an ecosystem restoration and flood damage reduction project. The final feasibility report will provide a complete presentation of the study analyses and results, including those developed in the reconnaissance report. The feasibility report will also document compliance with all applicable guidance, statutes, Executive Orders and Administration policy. The feasibility report will thus be the basis for decision on Federal authorization, as well as a basis for decision-making at the State and local level.

Specific objectives of the study include:

- Maintain a sustainable river alignment (acceptable channel migration zone)
- Maintain agricultural use in the river valley
- Provide flood protection in the valley
- Maintain a sustainable ground water table
- Restore spawning, rearing, migration habitats for salmonids throughout the basin
- Restore, where possible, the natural complexity of the aquatic and riparian ecosystem
- Eliminate fish access barriers and passage barriers
- Assess, and if needed, improve water quality for parameters critical to fish survival and migration, particularly dissolved oxygen
- Reduce sedimentation and altered sediment transport processes, where critical for fish survival and flood damage reduction
- Implement post construction monitoring

Assumptions: Project assumptions include:

- Comply with ESA requirements for Puget Sound Chinook, Hood Canal Summer Run Chum, and bulltrout for construction and field testing
- Comply with NEPA
- Compatibility of recommended plan to the Skokomish Watershed Action Team and Water Resource Inventory Areas (WRIA) Salmon Recovery Plan
- Recommend projects that are biologically, politically, socially, and economically acceptable to the local sponsors and the greater WRIA.
- Any projects related to Cushman Dam, revisions to Cushman or the Diversion Dam, or construction of a new dam shall be identified and defined for scoping and cost estimating prior to development of the 10% engineering designs. Study costs associated with those actions or measures shall be re-negotiated with the sponsors.

**1.3 Skokomish River Planning Process.** Consideration of ecosystems within (or encompassing) a watershed provides a useful organizing tool to approach ecosystem-based restoration planning. Ecosystem restoration and flood damage reduction projects

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that are conceived as part of a watershed planning initiative or other regional resources management strategy are likely to more effectively meet ecosystem management goals than those projects and decisions developed independently. Independently developed ecosystem restoration projects, especially those formulated without a system context, may only partially and temporarily address symptoms of a chronic systemic problem. The planning process is a structured approach to problem solving. It typically involves six steps that include (1) identifying problems and opportunities, (2) inventorying and forecasting conditions, (3) formulating alternative plans, (4) evaluating alternative plans, (5) comparing alternative plans, and (6) selecting a plan. This process was initiated through various planning efforts by local jurisdictions and the production of the Corps' reconnaissance report. The process will continue in the feasibility phase. Major study activities will be sequenced as follows:

- Task One: Document Research and Collection of Existing Data Sets. The Skokomish River has been widely studied by a variety of local, state, Federal and Tribal agencies. These studies have examined many aspects of ecosystem restoration, river sedimentation issues, flood control and watershed management. The first task of the feasibility study will be to perform an extensive literature search and document collection. The documents will be cataloged and reviewed to determine applicability for the Corps feasibility study. cursory analysis will be performed as part of the research to better define future data collection, study, analysis, and engineering requirements. At the conclusion of this initial phase, the feasibility study will most likely be re-scoped to reflect what studies need to be done and to identify the methodology for existing condition and alternative assessment. The assessment methodology may include habitat models, or information derived from community or ecosystem assessments using other scientifically based methods that are generally accepted by state or Federal resource agencies. Public involvement for this portion of the study will include informational meetings about study plans, goals, and objectives. Also, there will be a need to meet with the community to collect anecdotal information regarding concerns and perception of the river basin problems. Whereas a list of types of alternatives to assess has been compiled, specific alternatives have yet to be defined. A series of public and agency meetings will be held to determine the comprehensive list of alternatives for analysis.
- Task Two: Physical Data Collection and Without Project Condition Report. The existing studies literature search will provide a great portion of data required for the feasibility study. It is likely, however, that there will be data that are either missing or will require updating before the existing condition or alternatives can be assessed. This information will include updating the inventory of infrastructural development for flood damage analysis, specific river cross-sections, biological, fisheries, geological and inventorying large woody debris pools, riparian habitat, and collecting juvenile out-migrant data. The result of this additional data collection when combined with the information gathered in the previous step will create the existing condition. The without project

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conditions analysis is the baseline for analysis of alternatives and defines the benefits or further problems associated with any particular course of action. A without project condition report will be created to establish the baseline condition for further studies.

- Task Three: Formulate and evaluate alternative plans and select a recommended plan. Previously identified alternative measures will be evaluated in light of the above scientific analyses. Alternative plans will be formulated and evaluated in detail using the previously selected assessment methodology. Any required detailed technical and environmental evaluations will be completed at this point including economic and real estate studies. A series of public workshops will be held during the formulation process. There will be a Feasibility Scoping Meeting (FSM), a technical review conference (TRC) and an alternative formulation briefing (AFB) prior to completing the evaluations of alternative plans and identifying a recommended plan for public review and comment.
- Task Four: Prepare draft feasibility report/EIS. A draft feasibility report/EIS be prepared and issued for a minimum 45-day public review. The draft report will include engineering, economics and real estate appendixes. A formal public meeting will be held prior to the end of the draft report public review period.
- Task Five: Prepare final feasibility report/EIS. Following public review, a final feasibility report/EIS will be prepared and submitted for review and approval at the Washington, D.C., level.
- Task Six: Washington Level Review and Approval Support. The Seattle District, Mason County, and Skokomish Indian Tribe will perform those tasks necessary to support the Washington, D.C. level review process of the feasibility report, including participation in the District Engineer's presentation to the Civil Works Board.

Task Seven: Initiate PCA and PED Agreement: The Seattle District, Mason County, and Skokomish Indian Tribe will initiate development of the project cooperation agreement (PCA) and Project Engineering and Design Agreement in order to facilitate scoping and funding for the next phase (PED) of the Skokomish River GI.

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**1.4 Reconnaissance Phase Study.** The Corps' reconnaissance report, dated February 2000 and approved by Corps headquarters on 20 March 2000, demonstrated that there is a Federal interest in pursuing a feasibility phase study to evaluate ecosystem restoration measures, including the following:

- **Dredging to Expedite Channel Conveyance Restoration:** This feature builds on assumed substantial restoration of main-stem's natural sediment transport capabilities and restoration/maintenance of channel capacity through an

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adaptive program of dredging, testing, and monitoring. It is important to determine if there is a feasible approach that could expedite achievement of channel restoration. If so, this would allow early enjoyment of related flood hazard reduction and ecosystem restoration benefits from this action. This Alternative is a consensus priority project of Mason County and the Skokomish Tribe. It merits being carried into the feasibility phase of study to analyze options for one-time selective mechanical removal of bedload that would complement or expedite achievement of Interior Department's prescription for restoration and maintenance of main-stem channel. This feature will be analyzed as a stand alone or as part of a combination alternative.

- **Dikes and Bank Protection:** Whereas dikes and bank protection are not considered to be environmentally appealing, there are appropriate instances in the Valley where the diking system (if properly improved) can provide substantial flood relief and if work can be done to improve habitat process previously constrained by dikes and levees. In addition, bank protection is also required in many areas due to the likelihood of channel avulsions. If combined with habitat features, this new bank protection can provide significant ecosystem restoration benefit. This feature will be analyzed under a combined alternative, not as a stand alone.
- **Restore Natural Drainage Patterns:** This feature will build on previous detailed studies of specific projects that enjoy broad public support and addresses very well defined projects with virtually unanimous political and resource agency support. This alternative will be further analyzed both under a stand alone context and as a combined alternative.
- **Selected Acquisition of Floodplain Easements and Floodproofing:** This feature builds on ongoing implementation of consensus County/Tribe objectives and merits being carried into the feasibility phase of study. It will build on past floodplain acquisitions and floodproofing accomplished by Mason County and the Skokomish Indian Tribe to take advantage of substantial unfulfilled opportunities to acquire from willing sellers easements to reduce flood hazard, facilitate natural streambank stabilization and improve fish and wildlife habitat, and to elevate/floodproof existing structures. This alternative will be further analyzed both under a stand alone context and as a combined alternative.
- **Combined Alternative:** A preferred alternative that will combine some of the above listed measures, but will be developed by consensus and meet all regulations.

The reconnaissance report will be used as a base from which to continue the required detailed project development and implementation studies. For a current draft project list developed during preparation of this PMP and as a basis for the baseline feasibility cost estimate, see Appendix C. The feasibility study report will thus reflect

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current problems and opportunities, the desires of the sponsors and views of the public, establish final planning criteria and planning objectives used to formulate plans, identify additional measures necessary to meet the final planning objectives, and document the formulation and evaluation of alternative plans and basis for plan selection.

**1.5 Structure of the Project Management Plan (PMP).** The PMP has been developed to plan, define, and control the development and delivery of the products to be completed during the feasibility phase study. With clearly defined work tasks, the PMP will facilitate study cost and schedule control and minimize communication and review problems. The PMP will guide the allocation of study funds among tasks, as well as ensure the appropriate level of detail and analysis. The PMP addresses the following:

- Work tasks, as well as responsibility for their accomplishment.
- The negotiated cost of individual work tasks, including the negotiated cost of work items to be accomplished by the Sponsors as in-kind services
- Corps of Engineers and other professional criteria to assess the adequacy of the completed work effort.
- The schedule of performance and associated milestones (i.e., key decision and coordination points, including review conferences, alternative formulation briefing, public workshops, public meeting).
- The coordination mechanism between the Corps, Mason County and the Skokomish Indian Tribe, and procedures for reviewing and accepting the work by both parties.
- References to regulations and other guidance that will be followed in conducting the defined study tasks.
- Coordination of work to be performed by others, including the Washington Dept of Transportaion, Mason County, Skokomish Tribe, the Bureau of Reclamation, etc., that is relevant and integrated, yet funded and managed separately from this feasibility study.

**1.6 Applicable Guidance.** The feasibility study will generally be conducted in accordance with criteria and guidance applicable to Corps of Engineers feasibility studies as identified in paragraph 4 below, including the following:

- a. ER 5-1-11, "Program and Project Management," 17 August 2001.
- b. ER 1105-2-100, "Planning Guidance Notebook, Appendix G, Amendment #1" June 30, 2004.

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- c. ER 1110-2-1150, "Engineering and Design for Civil Works Projects," August 31, 1999.
- d. ER 1165-2-502, "Civil Works Ecosystem Restoration Policy," September 30, 1999.
- e. ER 1165-2-130, "Ecosystem Restoration - Supporting Policy Information.," September 30, 1999.
- f. ER 405-1-12, "Real Estate Handbook," November 20, 1985.
- g. Policy Guidance Letter (PGL) No. 52, Flood Plain Management Plans, December 8, 1997.
- h. "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," U.S. Water Resources Council, March 10, 1983.
- i. ER 200-2-2, "Procedures for Implementing NEPA," U.S. Army Corps of Engineers, March 4, 1988.
- j. EC 1105-2-405, Division Engineers Submittal of Final Decision Document for Projects Requiring Specific Authorization, Corps of Engineers, March 31, 2005
- k. EC 1105-2-406, Planning District Engineers Presentation of Final Decision Document for Projects Requiring Specific Authorization, March 31, 2005.
- l. EC-1105-2-407, Planning Models Improvement Program: Model Certification, May 31, 2005.
- m. EC-1105-2-408, Peer Review of Decision Documents, May 31, 2005.
- n. EC-1105-2-409, Planning in a Collaborative Environment, May 31, 2005.
- o. All applicable federal, state and local policies and regulations pertinent to fish and wildlife restoration and flood damage reduction.

**1.7 Study Sponsorship.** Mason County and the Skokomish Indian Tribe are the non-Federal sponsors of the feasibility study. The Tribe and Mason County have been involved in the development of this PMP and will provide the level of cash and in-kind services for the feasibility study as prescribed in the Agreement and this PMP.

## **2.0 FEASIBILITY PHASE STUDY REQUIREMENTS.**

**2.1 Basic Requirements.** The work to be performed shall consist of the formulation and evaluation of alternative plans to address the ecosystem restoration and flood damage reduction opportunities for the Skokomish River basin and selection of a recommended plan. This will include: (1) developing a detailed plan and design; (2) preparing construction and operation and maintenance cost estimates for the recommended plan; (3) computing environmental benefits and costs; (4) calculating flood control benefits and costs; (5) evaluating technical and economic feasibility of the plan; (6) assessing environmental and social impacts, including impacts on biological resources, socio-economic resources, cultural resources, and recreation; (7) addressing the views of the public through workshops and a public meeting; (8) formulating plan mitigation measures; (9) preparing the draft and final feasibility report and EIS with required documentation to present the investigations and evaluations which support the selected plan; (10) coordinating with the Cushman Project licensee efforts to implement mitigation conditions that relate to ecosystem restoration and flooding..

The end product will be a feasibility report/environmental impact statement (EIS), which will describe problems and opportunities identified, plans formulated, engineering and economic feasibility and public acceptability of each alternative, the social and environmental constraints and impacts for each alternative, and the selected plan recommended for implementation.

**2.2 Specific Requirements.** The specific requirement of the feasibility phase is to identify a plan for flood damage reduction that is both technically viable and able to be implemented, has Federal and non-Federal support, and will provide economic benefits at a reasonable and affordable cost. Specifically, a plan recommended for implementation must be:

- Technically feasible from an engineering standpoint (i.e., sound engineering design).
- Economically justified (with construction and maintenance costs such that national environmental restoration and flood damage reduction benefits are incrementally justified).
- Environmentally acceptable (able to meet permitting and regulatory requirements).
- Supported by the project sponsor.

The PMP thus defines and limits the work to that necessary to meet these requirements for a complete feasibility report. There will be close coordination between the Corps of Engineers, Mason County, and the Skokomish Indian Tribe throughout the study.

The preparation of the feasibility report/EIS will consist of writing the main body and associated appendixes. There will be a technical review conference (TRC), a

feasibility scoping meeting (FSM), and an alternative formulation briefing (AFB), and a presentation to the Civil Works Board by the District Engineer. Senior staff from Seattle District, Northwestern Division, HQUSACE, Mason county, and Skokomish Indian Tribe will participate in these briefings and conferences. The draft feasibility report will be released for public review, and a public meeting will be held. The report will then be revised and a final feasibility report/EIS will be submitted to the Northwestern Division Engineer for further processing.

The report will then be forwarded to USACE HQ for the Washington level review process. This process consists of filing the final EIS in the Federal Register following State and Federal agency review, submittal of the Chief of Engineer's report to the Assistant Secretary of the Army for Civil Works [ASA(CW)], and submittal of the ASA(CW) letter to the Office of Management and Budget (OMB) for review for consistency with the policies and programs of the President.

**2.3 Levels of Project Development and Work Breakdown Structure.** The relationship between the feasibility phase and related phases of project development is illustrated in Figure 1. Level 1 is the project itself, with successive levels representing discrete phases or aspects of project development. Level 5 represents the tasks and subtasks necessary to produce the feasibility report, associated appendixes, and EIS. A work breakdown structure (WBS) is applied to these study tasks and subtasks, creating a hierarchy of activities. The WBS provides a means for organizing the feasibility phase activities in a logical sequence and identifying products or deliverables through the various stages of the feasibility phase. The study tasks identified in the PMP are organized in Table 1 (Feasibility Phase Cost Estimate Summary) according to their associated WBS.

**FIGURE 1**

**Levels and Phases of Project Development**

**LEVEL 1 (Project):**

- Skokomish River Ecosystem Restoration and Flood Damage Reduction Project

**LEVEL 2 (Major phases of project development):**

- Reconnaissance phase
- Feasibility phase
- Pre-construction engineering and design (PED) phase
- Construction phase
- Operation and maintenance phase

**LEVEL 3 (Product of the feasibility phase):**

- Decision Document

**LEVEL 4 (Features of the decision document):**

- Feasibility Report/EIS
- Engineering Appendix
- Economics Appendix
- Real Estate Appendix

**LEVEL 5 (Specific tasks and subtasks to achieve Level 4 features):**

- Refer to Section 4 below for feasibility study task descriptions and associated work breakdown structure (WBS)

**3.0 FISCAL YEAR FUNDING BREAKDOWN.** The feasibility study cost estimate is summarized by Government fiscal year (FY) in Table 1. The funding breakdown is tied to a schedule which calls for submittal of the final feasibility report to the Northwestern Division Commander in Portland, Oregon 40 months after signing the FCSA and initiating the study. For estimating purposes, team members have assumed 36 months of effort to complete the feasibility report and submit to NWD. Note that the “study period,” as defined in the Agreement (Article I D), commences with the release to the U.S. Army Corps of Engineers, Seattle District, of initial Federal feasibility funds following execution of the Agreement. The study period, and thus the feasibility phase itself, ends when the Chief of Engineers signs the Chief’s report.

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Table 1 summarizes the estimate of Government cost share and Sponsor cost share (cash contribution and in-kind services) for each Government fiscal year (FY) of the study. Office of Management and Budget (OMB) inflation factors have been applied to FY 2006 through 2010 estimates. The fully funded total study cost estimate is shown at the bottom of Table 1, followed by the Government and Sponsor cost share for each year of the study period. Detailed study cost estimates for individual study tasks have been assembled in an Attachment to the PMP. The detailed estimates will be used by the Project Manager in budgeting in P2 and in issuing Work Requests during the course of the feasibility phase.

The contingency used is 10 percent. Supervision and Administration used is 3%. Inflation rate used to accommodate labor rate increases by fiscal year are 5%. These rates are to be verified.

GI Phase Discipline	Feas Initiation FY06	w/o Project Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DA/PED FY10	HQ Approval FY11	Authorization FY12	Total
<b>Project and Program</b>								
Management	\$ 20,000	\$ 195,250	\$ 96,326	\$ 76,210	\$ 10,897	\$ 20,000	\$ 10,000	\$ 428,683
Plan Formulation	\$ 1,000	\$ 5,000	\$ 15,000	\$ 8,050	\$ 2,000	\$ 5,000		\$ 28,000
Public Involvement		\$ 7,100	\$ 16,100	\$ 8,100	\$ 8,050			\$ 32,200
Report Writing and GIS		\$ 112,500	\$ 30,800	\$ 11,800	\$ 4,500			\$ 19,700
Economics	\$ 13,622	\$ 1,175,697	\$ 498,897	\$ 97,622	\$ 45,622	\$ 26,348	\$ 10,000	\$ 1,867,808
ERS	\$ 1,725	\$ 48,085	\$ 9,488	\$ 17,682	\$ 3,738			\$ 80,718
HTRW		\$ 8,211	\$ 23,184	\$ 17,390	\$ 4,830			\$ 53,615
Cost Engineering	\$ 27,489	\$ 182,716	\$ 85,812	\$ 18,475				\$ 314,492
HH		\$ 54,855	\$ 27,531	\$ 14,881	\$ 506			\$ 71,300
Geotech		\$ 91,811	\$ 54,788	\$ 19,994	\$ 5,297			\$ 171,890
Civil	\$ 5,918	\$ 266,495	\$ 201,656	\$ 549,285	\$ 35,232	\$ 6,285		\$ 1,064,871
Real Estate		\$ 5,750	\$ 32,775	\$ 32,775				\$ 71,300
ITR (DR CHECK setup/PCX)	\$ 69,754	\$ 2,153,470	\$ 1,092,357	\$ 872,264	\$ 120,672	\$ 57,633	\$ 20,000	\$ 4,386,150
<b>Total</b>								
Local Cost Share Required:	\$ 35,000	\$ 1,076,735	\$ 546,179	\$ 436,132	\$ 60,336	\$ 28,817	\$ 10,000	\$ 2,193,198
Local In-Kind Labor:	\$ 2,000	\$ 55,000	\$ 5,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 5,000	\$ 87,000
Contracted In-Kind Labor	\$ 33,000	\$ 844,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 844,000
Local Funds Required:	\$ 10,000	\$ 177,735	\$ 541,179	\$ 431,132	\$ 50,336	\$ 23,817	\$ 5,000	\$ 1,262,198
Local Funds by Source:								
Flood Control Zone District	\$ 10,000	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,000
SRFB River Reach Grant	\$ 23,000	\$ 167,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 190,000
SRFB Fishery Survey Grant		\$ 444,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 444,000
Washington FCAAP		\$ 400,000	\$ 100,000	\$ 430,544	\$ 60,336	\$ 28,817	\$ 10,000	\$ 990,880
Other Grant Sources	\$ -	\$ 735	\$ 441,179	\$ 589	\$ -	\$ -	\$ -	\$ 441,914

#### **4.0 STUDY TASK AND SUBTASK DESCRIPTIONS AND**

**WBS CODES.** Below is a brief narrative description of the individual feasibility phase tasks, organized in accordance with the prescribed work breakdown structure (WBS). The WBS for each task and subtask corresponds to the work category element in the Corps of Engineers Financial Management System or CEFMS (P2 WBS is in parenthesis). For example, "J0000" is the WBS for feasibility report; "JAA00" is the WBS for surveys and mapping. Use of the WBS will enable the estimated funding and actual cost of individual tasks and subtasks, and consequently the estimated and actual costs of the feasibility phase, to be allocated and accounted for, respectively. The study cost estimate is summarized on Table 1. Detailed information and cost estimates for individual study tasks shown in Table 1 are assembled as an Appendix to the PMP. The study milestones and schedule is shown on Figure 2 at the end of the PMP.

#### **J0000 (22S00) – FEASIBILITY REPORT.**

a. **Draft Report Preparation.** This task includes all activities specifically pertaining to producing the draft feasibility report and EIS for public review. Activities include writing the draft report, editing and revision following independent technical review, and distributing the draft feasibility report for public review.

Reference: ER 1105-2-100.

b. **Draft Feasibility Report Independent Technical Review.** This task includes costs for technical review of the draft feasibility report by the Independent Technical Review Team. Qualified staff members who are independent of the technical production of the feasibility report will conduct technical review of the draft report. The review will verify that the recommended plan (1) satisfies engineering and functional criteria; (2) meets the customers needs consistent with law and existing public policy, (3) has correct design assumptions and calculations; and (4) has a sufficient level of engineering to substantiate both the screening level comparative cost estimates and the baseline cost estimate with contingencies to support selection of the recommended plan. The ITR will be coordinated with the Planning Center of Expertise, and also may include members of the District, NWD representatives, and sponsor representatives. The study will also have extensive review during the plan formulation process, and the draft feasibility report/EIS will undergo a rigorous public review following the independent technical review. See also Paragraph 6 below for additional discussion pertaining to quality control.

Reference: EC-1165-2-203, Technical and Policy Compliance Review.

c. **Final Report Preparation.** This task includes all activities specifically pertaining to producing the final feasibility report/EIS is under JD000. Specific activities include responding to review comments, preparing the final documents, transmitting them for processing by the Northwestern Division Engineer.

Reference: ER 1105-2-100.

d. **Washington Level Review and Approval Support.** This task includes those activities typically necessary for the Seattle District and the Sponsor to support the Washington level review process of the feasibility report/EIS. This includes the period from the signing of the final report by the Seattle District Engineer, and the signing of the Chief's report. These items could include answering comments, attending Washington level meetings and other necessary travel, and making minor report revisions as a result of Washington level review. This item is required to be estimated at five (5) percent of the total study cost or \$50,000, whichever is less, and will be shared equally. Because the amount of work that will be required during this review period cannot be predetermined, this work item is considered a contingency, to be used only as necessary. Any costs relating to the feasibility report that are incurred following completion of the feasibility phase and subsequent termination of the FCSA are PED costs, and will be funded upfront with 100 percent Federal funds. However, PED will ultimately be cost shared with the Sponsors. The feasibility ends with the signing of the Chief's Report.  
Reference: ER 1105-2-100. ER 1110-2-1150.

**JAA00 (FEA1800) – SURVEYS AND MAPPING.** This task includes all surveying, aerial photography, mapping and related tasks necessary to support real estate, engineering, and design studies. Through previous work of Mason County, Skokomish Indian Tribe, and the Corps, much of this data are thought to exist, with only sporadic gaps in information. The first phase of the feasibility study will analyze the existing information to ensure appropriate coverage, and list in detail what still needs to be collected.

Reference: ER 1105-2-100. ER 1110-2-1150.

**JAE00 (22P00) – ENGINEERING AND DESIGN.**

a. **(FEA1860) Collect and Review Existing Literature and/or Surveys in Project Area.** Review will focus on Federal, Tribal, State, and Local agency technical studies previously performed analyzing the Skokomish River basin. Of particular interest will be those studies related to flood damage reduction, sediment transport, and environmental restoration proposals. The field studies listed below may be modified after a thorough review of existing literature and surveys of the project area has been completed. Without the knowledge of this review, the following list of studies is recommended in order to fulfill the purpose of this project. See Reference list of existing studies and reports, Appendix B.

b. **(FEA1820) Geotechnical Surveys.** This task includes collecting the necessary information required for the sediment transport models. Various suspended sediment sample will be taken at selected locations on the Skokomish mainstem, Vance Creek, South Fork Skokomish, North Fork Skokomish, Swift Creek, Weaver Creek, Hunter Creek using a standard depth-integrating suspended load sampler. Bedload samples will be collected using a Helley Smith pressure difference sampler. Each suspended sediment sample will undergo standard laboratory testing and the results will be provided to H&H as input to their sediment transport analysis. In addition to the

sediment sampling, geotechnical sampling will be done for the other types of alternatives as required for alternative screening and analysis, including borings, test trenches and the like. The details of these studies can be found in Appendix D.

Reference: ER 1110-2-1150, ER 1105-2-1407.

**c. (FEA1810) Hydraulic and Hydrology Studies.** The Hydraulic and Hydrologic studies address identification of the without project conditions and several alternatives to restore the river ecosystem and reduce flood hazards on the Valley floodplain of the Skokomish River Basin, which includes the Skokomish Indian Reservation. This effort is intended to assist the evaluation of alternatives to restore the riverine ecosystem and reduce flood hazards through the execution of applied engineering geomorphology, and hydraulic and sediment engineering studies of the Skokomish River. The various technical studies assessing existing and with project geomorphic, sediment transport, and flood conditions will extend from the mouth of the Skokomish River, upstream to the upper watersheds of South Fork Skokomish and Vance Creek and to Cushman Dam on the North Fork Skokomish River.

The basic sequence of these Hydraulic and Hydrologic studies will be to define the existing hydraulic and geomorphic conditions, and to then develop alternative measures. The initial phase will utilize previous reports, new field work, and work to be conducted by the Bureau of Reclamation to define existing geomorphic conditions. An existing HEC-RAS hydraulic model will be improved to define current flood hazards and identify potential flood damage reductions measures. An HEC-6 sediment transport model will be developed to reflect current topographic, sediment transport and sediment deposition conditions. The fluvial geomorphology and sediment transport findings and the study findings regarding fisheries habitat and spawning locations will be correlated to describe existing river ecosystem conditions. Those findings will also be used to develop and assess alternative measures which may reduce flood damages, improve the fisheries habitats, and/or improve the channel and sediment transport conditions. The non Federal sponsors will be responsible for the physical data collection as outlined in Appendix E. These data collection activities will be coordinated with the Seattle District hydrologic engineers to ensure that the materials collected meet the data quality objectives of the Hydrologic Engineering Management Plan. More detail of these studies can be found in the Hydrologic Engineering Management Plan, attached as Appendix E.

Reference: ER 1110-2-1460, "Hydrologic Engineering Management" and EP 1110-2-9, "Hydrologic Engineering Studies Design."

**c. (FEA1840) Screen and Develop Alternatives, and Prepare Engineering and Design Appendix.** This task will involve using the results of the above engineering analyses and related information as a basis for design studies to screen and develop alternative plans. Civil and Geotechnical disciplines will develop project features and elements to form an adequate basis for establishing a project construction schedule and a baseline cost estimate. Activities will include evaluation of alternative measures and plans, development of data for the environmental impact statement, establishment of the

design of project alternatives, development of construction procedures, identification of construction materials, identification of facilities and utilities proposed for relocation, and identification of operation and maintenance requirements. Engineering and design studies will be performed at the minimum level needed to establish conceptual designs for project features and elements and for development of construction cost estimates, while at the same time forming an appropriate basis for subsequent preconstruction engineering and design (PED). The engineering appendix will document the engineering and design effort during project formulation, and will include the design data analyses, a detailed description of the design features of the recommended plan, summary of alternative measures and plans evaluated, drawings, and construction cost estimates.

Sufficient engineering and design will be performed in the feasibility phase to enable refinement of the project features, prepare the baseline cost estimate, develop a design and construction schedule, and allow detailed design on the selected plan to begin immediately following receipt of PED funds. The objective is to allow the project to proceed through the PED phase without need for reformulation or post-authorization changes. The details of these studies can be found in Part 1 and 2 of Appendix D.

Reference: ER 1110-2-1150, ER 1105-2-1407.

**JB000 (22C00) – SOCIO-ECONOMIC STUDIES.** This includes studies pertinent to an economic analysis of alternative ecosystem restoration and flood damage reduction (FDR) plans under future without and with-project conditions. The economic analysis will quantify the future without-project condition and quantify ecosystem restoration benefits for each alternative plan. A financial analysis in support of the construction recommendation will also be prepared and will include a statement of Sponsor financial capability, a financial capability assessment, and a financing plan. The financing plan will provide detail as to the anticipated project implementation funding sources available to the Sponsor. An economic appendix to the feasibility report will be prepared. The appendix will include the results of all social and economic studies, plus benefit-to-cost analysis, maximization analysis, Federal versus non-Federal cost sharing computations, and determination of the National Economic Restoration (NER) and National Economic Development (NED) plans. More detail of these studies can be found in the Skokomish Economics Cost Estimate, attached as Appendix G.

Reference: ER 1105-2-100

**JC000 (22H00) – REAL ESTATE STUDIES/APPENDIX.** This task includes all required real estate studies and analysis to support plan formulation and selection. Products will include: a gross appraisal of land and property under both future without and with-project conditions; real estate mapping information; a Public Law 91-646 relocation survey; preparation of a real estate baseline cost estimate; identification of real estate requirements; and preparation of a real estate requirements plan for the feasibility report. The nonfederal Sponsors shall be responsible for procuring the title reports and preparing the rights of entry for the project. All activities will be coordinated with the Seattle District Real Estate Division to ensure that all federal real estate procedures are

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satisfied. More detail of these studies can be found in the Real Estate Feasibility Study Cost Estimate, attached as Appendix H.

Reference: ER 405-1-12, Real Estate Handbook; Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970; Uniform Relocation Act Amendments of 1987.

**JD000 (22E00) – ENVIRONMENTAL STUDIES AND COORDINATION.** This effort is intended to assist the evaluation of alternatives to restore riverine ecosystem. It includes environmental data collection and the determination of environmental impacts of alternative plans. A number of discrete tasks have been identified, which will include terrestrial surveys, woody debris analysis, and out-migration survey. This task also includes the extensive coordination effort required for scoping, developing, and reviewing the various alternatives. Work will lead to preparation of a feasibility report/EIS. The work will be performed by the Government, its contracting agents, and the Sponsor. The nonfederal Sponsors shall be responsible for the riparian/wetland surveys, instream woody debris and pool volume surveys, fisheries surveys (including the outmigration study and screw trap survey), spawner surveys, water quality analyses, and cultural resources overviews. All activities will be coordinated with the Seattle District Environmental Resources Section to ensure that all data collection requirements are satisfied. More details of these studies can be found in Appendix F.

Reference: ER 1105-2-100, ER 200-2-2.

**JH000 (FEA1870)– COST ESTIMATES.** This task includes development of cost estimates necessary to evaluate alternative plans, and preparation of a detailed baseline cost estimate for the recommended plan to be used for project authorization, development and completion. Cost estimates for the recommended plan and NER and NED plans, if different, will be prepared for the final feasibility report using the Corps' MCACES software. The estimates will include all Federal and non-Federal costs for lands and damages, all construction features, relocation of facilities and utilities, mitigation, HTRW concerns, planning, engineering and design, monitoring, and supervision and administration, along with the appropriate contingencies and escalation associated with each of these activities through project completion. The final product will be a reliable, accurate cost estimate that defines the non-Federal sponsor's obligations and supports project authorization within established statutory limits. More detail of these studies can be found in the Cost Engineering Study Cost Estimate, attached as Part 3 of Appendix D.  
Reference: ER 1110-2-1150 and ER 1110-2-1302.

**JJ000 (22R00)- PLAN FORMULATION AND EVALUATION.**

a. **Formulation Methodology.** This task will identify a plan formulation and evaluation methodology, including a process for identifying, preliminarily screening, analyzing and selection of alternatives. Based upon the results of the literature search/compilation, alternatives will be identified and scope of feasibility studies will be modified.

**b. Alternative Analysis.** This task includes the iterative process of evaluation of alternative plans and selection of the recommended plan, and includes activities that are not directly associated with other study tasks. Plan formulation is the process whereby project alternatives, including the existing and future without and with-project condition, are evaluated. Alternative plans will be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. As formulation progresses, alternatives will be considered in increasing level of detail and the number of alternative plans will decrease in number, until a recommended plan is selected and a detailed evaluation is completed. The formulation process will analyze all available information and data assembled from many different components of the study.

Reference: ER 1105-2-100.

**Z0000 (22T00) – PROGRAM AND PROJECT MANAGEMENT.** This task will include all activities related to the overall management of the feasibility phase.

**a. Program management.** Program management consists of feasibility phase budget development, justification, management, defense and execution, as well as funds allocation and monitoring of both Federal and non-Federal expenditures. It includes preparation of budgetary documents and upward reporting; programming of funding, managing and tracking study obligations and expenditures, and accounting for Sponsor cash contributions and in-kind services.

**b. Project management.** Project management includes a wide variety of tasks and activities, including study management. These include overall coordination with local, state, tribal and Federal governmental agencies, interest groups, and the general public; oversight management of Corps of Engineer, Sponsor, and contracted study tasks and related activities; coordination between the Corps and the Sponsor; attending and conducting meetings and briefings throughout the course of the study; responding to congressional and other inquiries; and oversight management of the review of the draft and final feasibility report/EIS. Both the Government and the Sponsor will perform project management activities. This task does not include plan formulation, report preparation, or Washington level review support, which are separately accounted for.

Reference: ER 5-1-11, ER 1105-2-100.

**c. (22A00) Public Involvement.** Education and increased awareness and exchange of viewpoints with the public are vital to the formulation of a technically viable and implementable ecosystem restoration plan. The public involvement strategy will consist of: (1) a series of public workshops and meetings; (2) newsletters and news releases; (3) public outreach to bring expertise and knowledge external to the Seattle District and the Sponsor into the plan formulation and evaluation process; and (4) a formal public meeting on the feasibility report/EIS. Coordination with local citizenry, state and Federal resource agencies, and interest groups and parties, is an important component of the public involvement program. The Non Federal Sponsor will provide the meeting facilities and assist in developing public notices/news releases for workshops and the public hearing. The Government will maintain a mailing list and distribute

workshop and public hearing notices. The Government and Sponsor will jointly conduct workshops and the EIS public meeting.

Reference: ER 1105-2-100.

**d. Executive Committee.** This task includes costs incurred by the study Executive Committee members who will generally oversee study progress in accordance with the PMP, as prescribed in Article IV of the FCSA. The Executive Committee will meet periodically throughout the feasibility phase. The Executive Committee for this study will consist of the District Engineer and the Chief of Planning Branch from the Corps, Mason County Council Chair, Skokomish Indian Tribe Council Chair, and possibly other resource agency or stakeholder representatives, as deemed necessary.

**e. (30DG0) Preconstruction Engineering and Design Cost Sharing Agreement.** A preconstruction engineering and design (PED) cost sharing agreement is prepared during the feasibility phase, following completion and submittal of the final feasibility report. The PED phase of project development encompasses all planning and engineering necessary for project construction. It also outlines the division of design responsibilities between the Government and the Sponsor.

**f. (30AP0) Negotiate Draft Project Cooperation Agreement.** This task includes reviewing the model project cooperation agreement (PCA) with the Sponsor to ensure that all parties have a complete understanding of the ultimate requirements for implementation of the plan, as well as writing the portion of the feasibility report that addresses the PCA. This task will also include coordination of any special conditions that the sponsors request that differ from the model PCA, and development of the recommendation of the reporting officer.

## **5.0 STUDY MANAGEMENT AND COORDINATION.**

**5.1 Coordination Mechanism.** Study management and coordination is generally described in Article IV of the Agreement. The specific coordination mechanism between the Seattle District, Mason County, and the Skokomish Tribe is described below.

a. The Corps Project Manager will be responsible for day-to-day management of the study. He/she will maintain close coordination with the entire Project Delivery Team, to ensure timely prosecution of the study and compliance with this Agreement. The Corps Project Manager will meet and confer with the Sponsor's designated representative on a regular basis throughout the study to discuss study prosecution and progress. The Corps Project Manager will maintain a written record of such meetings, with a copy provided to the Sponsor's representative.

b. The Corps Project Manager will prepare quarterly study progress reports, with appropriate input from the Sponsor's representative and the Project Delivery Team. Quarterly study progress reports will be submitted to the Executive Committee. The

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reports will identify progress of all study tasks during the period, as well as document unresolved conflicts or policy issues requiring action by the Executive Committee. In addition, modifications to the PMP requiring amendment of the Agreement will be reported to the Executive Committee as necessary (reference Article IV of the Agreement).

**5.2 Review and Acceptance of Work.** The Project Delivery Team, under the direction of the Corps Project Manager, will monitor and review all work. Review and acceptance of work products will be documented in the quarterly study progress reports submitted to the Executive Committee. The Project Manager will bring any disagreements about the acceptability of completed work to the attention of the Executive Committee.

**6.0 QUALITY CONTROL PLAN.**

**6.1 Purpose.** This Quality Control (QC) Plan presents the process that assures quality products. This QC Plan defines the responsibilities and roles of each member on the Project Delivery Team and Independent Technical Review Team. The products to be reviewed by the Independent Technical Review Team are the feasibility report/EIS and associated technical appendixes.

**6.2 Methodology.**

a. The Project Delivery Team is comprised of qualified staff principally from within the Seattle District, contractors, Mason County, and The Skokomish Indian Tribe. Team members are identified in Table 2.

**TABLE 2  
FEASIBILITY PHASE PROJECT DELIVERY TEAM**

<u>Discipline</u>	<u>Name</u>	<u>Office/Agency</u>
Project Manager	Mamie Brouwer	CENWS-PM-CP
Program Manager (GI)	Linda Smith	CENWS-PM-PL
Program Analyst	Pat Bauccio	CENWS-PM-CU
Plan Formulator	Noel Gilbrough	CENWS-PM-PL
Report Formatting/Editing	Jim Kluge	CENWS-EC-DB-SP
Environmental Coordinator	Mike Scuderi	CENWS-PM-PL-ER
Cultural Resources	David Grant	CENWS-PM-PL-ER
Historic Properties	Lauren McCroskey	CENWS-EC-DB-AS
Environmental Eng/HTRW	TBD	CENWS-EC-TB-ET
Fish & Wildlife	Charles Ebel	CENWS-PM-PL-ER
Civil Design	Jennifer West	CENWS-EC-DB-CS
Survey/ CADD Mapping/GIS	Kurt Noble	CENWS-EC-TB-SY
GIS	Dave Fox/Stephen Jesse	CENWS-IM-PI

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Geotechnical	Monte Kaiser	HDR Inc
Hydraulics	Karl Eriksen	CENWS-EC-TB-W
Hydrology	Marian Valentine	CENWS-EC-TB-HE
Economic Evaluation	Mike Green	CENWS-PM-PL
Cost Engineering	Stephen Pierce	CENWS-EC-CO-C
Real Estate	Karen Brooks/Wanda Gentry	CENWS-RE-RS
Public Affairs Office	Ashley (Jessica) Richie	CENWS-PA
Office of Counsel	Ann Gerner	CENWS-OC
Co-Sponsor PM	Keith Dublanica/Jack Turner	Skokomish Indian Tribe
Co-Sponsor PM	Rich Geiger	Mason County

**TABLE 3  
 PROPOSED INDEPENDENT TECHNICAL REVIEW TEAM**

<u>Discipline</u>	<u>Reviewer</u>	<u>Office/Agency</u>
Review Team Leader	Patty Robinson	
Plan Formulation	TBD –Coordinated with Planning CX	
Environmental Coordinator	TBD –Coordinated with Planning CX	
Cultural Resources	TBD	
Civil Design	TBD	
Geotechnical	TBD	
Economic Evaluation	TBD – Coordinated with Planning CX	
Cost Engineering	TBD	
Real Estate	TBD	
Sponsor (Skokomish Tribe)	TBD	
Sponsor (Mason County)	TBD	
Cooperating Agency	TBD	
Hydraulics and Hydrology	TBD	

b. The Independent Technical Review Team will be selected on the basis of having the proper knowledge, skills, and experience necessary to perform the task and their lack of affiliation with the development of the feasibility report/EIS and associated appendixes. The review team is primarily drawn from NWD personnel, to ensure that the technical work and products from engineering, cost estimating, real estate, and H&H achieve a quality product. Other ITR members from disciplines such as Economics, Environmental, and Plan Formulation will be coordinated through the Planning CX, and funding their participation may include travel to Seattle District for the review conference. Review team members are identified in Table 3. An independent review will be completed on all major engineering deliverables, including the without project conditions report, the hydrologic engineering management plan, draft feasibility report/EIS, and the final feasibility report/EIS, if necessary. All ITRs will be completed through DRCHECKS where comments and comment resolution are captured.

Technical review will use appropriate analytical methods for each technical area. Technical review will rely on periodic technical review team meetings to discuss critical plan formulation or other project decisions, and on the review of the written feasibility report documentation and files. Independent technical review will ensure that:

- the feasibility report/EIS is consistent with current criteria, procedures and policy;

- clearly justified and valid assumptions that are in accordance with established guidance and policy have been utilized, with any deviations clearly identified and properly approved;
- concepts, features, analytical methods, analyses, and details are appropriate, fully coordinated, and correct;
- problems/issues are properly defined and scoped; and
- conclusions and recommendations are reasonable.

### 6.3 Quality Control Responsibilities.

a. **General.** Technical review team continuity will be maintained through the life of the project, to the maximum extent possible. The size and composition of the review team shall be based on the complexity of the project; this composition may change as the project progresses and specific project features are better defined. The review team leader will normally be a Corps of Engineers project manager.

b. **Project Manager.** The feasibility study project manager shall be responsible for coordinating the review effort with the review team leader and shall:

- ensure that the schedule contains sufficient time to perform reviews of completed products;
- ensure that the team leader is notified of significant study team meetings and review conferences so that he/she can assemble the review team for in-progress reviews; and
- manage responses to review memorandums and resolve technical issues with the review team leader, consult with North Western Division as appropriate, and forward all unresolved technical issues to the appropriate Functional Chief for resolution.

c. **Resource Managers.** Each Corps of Engineers Resource Manager is responsible for insuring that all work prepared by or for his/her Section or Branch has received any necessary internal quality control checks prior to the deliverable being furnished to the review team for review.

d. **Technical Review Team Leader.** The review team leader is responsible for coordinating all activities associated with the independent technical review of the without project conditions report, the hydrologic engineering management plan, draft feasibility report/EIS, and the final feasibility report/EIS, if necessary, and will:

- Attend all major plan formulation meetings.
- Coordinate the technical review and assemble all technical review comments and other review related correspondence for the use by the review team and Project Delivery Team.

e. **Technical Review Team Members.** Each review team member is responsible for performing an independent technical review of the draft feasibility report/EIS or portion thereof.

#### 6.4 **Quality Control Process.**

a. **Technical Coordination.** Generally, product development shall be performed in accordance with established criteria and guidance and with established policy. Meetings with the appropriate review team members during the planning process will be held at key decision points. Meetings will also be held to discuss and resolve technical and/or policy issues that may arise during the course of product development. Technical issues and concerns raised during the technical review process will be documented, as will the resolution of these issues and concerns.

b. **Product Quality Control.** Product Quality Control is the independent technical review of a completed product. The Corps Project Manager will provide completed documents to the review team leader who will distribute them to the review team members for review. During the review, review team meetings will be scheduled as required to ensure that all components have been coordinated, there is consistency throughout the document, and there is a consensus on proposed revisions. Any issues on which a review team position can not be reached will be referred through the project manager to the District Functional Chief for resolution. The review team leader will record the significant team comments in a written review memorandum that will be provided to the project manager for appropriate action. Comments that can not be resolved between reviewers and study team will be taken by the review team leader and project manager to the appropriate Functional Chief for final disposition; the assistance of NWD and HQUSACE will be requested as needed.

c. **Consultant Products.** Consultants are an extension of the Corps or Sponsor staff. Accordingly, any designs, reports, etc. prepared by consultants will have an independent review as part of their approved quality control plan.

d. **Policy Review.** Questions or problems regarding policy concerns will be elevated through the Planning Branch Chief and NWD for resolution, as the issues develop. Legal and real estate policy issues will be elevated to the Chief Counsel and Director of Real Estate, respectively.

#### 6.5 **Technical Review Documentation.**

a. All significant review comments will be provided to the Project Delivery Team in written format. The Project Manager will assure that all significant comments are resolved and their final disposition is identified in writing.

b. The feasibility report submitted to higher authority shall be accompanied by technical review documentation. This documentation shall be a separate item not to be included as part of the feasibility report. A page indicating the names of the Project Delivery Team members and technical review team members shall be included.

**6.6 Schedule.** Technical review milestones are scheduled as indicated on Figure 2 of the PMP.

**Figure 2**  
**FEASIBILITY PHASE MILESTONES AND SCHEDULE**

Number	Milestone Name	Date
9	Execute FCSA	June 30, 2006
11	Initiate Feasibility	July 3, 2006
32	Without Project Report Complete	August 2007
43	Feasibility Scoping Meeting	December 2007
60	Tentative Plan Selection	August 2008
67	Feasibility Design Complete	January 2009
75	Alternative Formulation Briefing	April 2009
91	Draft FR/EIS Public Review Complete	December 2009
95	Draft FR/EIS Complete	May 2010
108	Final FR/EIS Complete	October 2010
112	Chief's Report Signed	November 2010
119	PED Agreement Executed	March 2011
123	Sign PCA	October 2012

## 7.0 COMMUNICATION PLAN.

### 7.1 Goals.

1. Inform stakeholders of public comment opportunities and study milestones
2. Inform the public of agency plans, milestones, and opportunities to provide meaningful comments
3. Answer questions from local elected officials as representatives of their community
4. Keep internal Corps' team informed

### 7.2 Key messages:

- The Corps works closely with Mason County and the Skokomish Tribe on developing an ecosystem restoration/flood damage reduction plan for the people of Mason County.

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- The feasibility study report will give us information to select the best possible alternative for the most cost-effective amount of money and least environmental impact.
- Our highest priority is the safety of the people in the local communities.
- We must follow all of the steps in the process in order to complete a thorough study so we come up with the best solution for the taxpayers' money.
- A Corps flood damage reduction project must be feasible from engineering and environmental criteria.

**7.3 Target Audiences:**

Adjacent property owners  
Other interested community members  
Local media  
Elected state and local officials  
NGOs  
Mason County  
Skokomish Tribe  
Tacoma Public Utilities

**7.4 Potential Tools:**

Website  
FAQs  
Public Notice  
Advertisement  
News releases  
Site tours  
Hearing/meeting  
Open house

**7.5 Timeline.** Once FCSA is signed, news release to the local media  
Public meeting at the scoping phase of the feasibility study  
Other required meetings under NEPA

**7.6 Objectives.**

**Objective for Goal 1:** Keep stakeholders consistently and directly informed.

- **Strategy:** Direct mail for study milestones
- **Tactics/tools:** Use Real Estate's mailing list to direct-mail affected parties
- **Implementation (lead party, timeline, costs):** Kathy/Real Estate—Provide list to PAO to direct mail all updates, releases and notices.
- **Evaluation:** Letters and phone calls of concern from stakeholders received by Corps. Level of knowledge expressed in letters and phone calls of concern

**Objective for Goal 2:** Inform the public of milestones and opportunities to comment.

**Strategy 1:** News releases two weeks prior to milestone events.

- **Tactics/tools:** Send a timed and targeted news release to the Shelton-Mason County Journal once the FCSA is signed
- **Implementation:** Joint news releases coordinated with sponsors
- **Evaluation:** Balanced coverage

**Strategy 2:** Meet on site with editor or reporter from the Shelton-Mason County Journal to share milestones and status as well as answering any questions regarding the current preferred alternative.

- **Tactics/tools:** Call local paper editors and determine a date and time to meet on site with project staff. This should take place later in the study process.
- **Implementation (responsible party, timeline, costs):** PAO team will lead this effort.
- **Evaluation:** Newspaper promotion of upcoming milestones and opportunities to comment

**Strategy 4:** Inform interested parties of current proposal and compliance activities via Internet site, frequently updated.

- **Tactics/tools:** Establish a web page, where we can post current documents and upcoming event notification. Ensure site website address in any correspondence.
- **Implementation (responsible party, timeline, costs):** Project Manager, PAO rep, Chris Pollock.
- **Evaluation:** Webpage hits

**Objective for Goal 3:** Address questions and concerns face-to-face with state and county elected officials. Include site visit if necessary.

- **Strategy:** Invite local and state elected officials to meet in person with project managers and agency officials, if appropriate.
- **Tactics/tools:** Letter of invitation to elected officials. Draft FAQs as reference document for team members.
- **Implementation (responsible party, timeline, costs):**
  - Identify agency participants
  - Establish date and time, including opportunity for site visit
  - Reserve location
  - Letter of invitation—list of names and addresses, letter writing and approval, signature?
  - Draft FAQs as reference for team members
- **Evaluation:** Level of awareness and level of understanding in private encounters. Stated unanswered concerns or questions.

**Objective for Goal 4:** Keep internal Corps Team consistently and directly informed.

**Strategy 1:** Have a face-to-face meeting quarterly and when necessary

- **Tactics/tools:** Email from Microsoft Outlook calendar to all team members

- **Implementation:** Pam will be responsible for reserving a room and inviting team members
- **Evaluation:** Level of awareness among team members

**Strategy 2:** Email any updates and pertinent information to team members

- **Implementation:** Pam will be responsible for updating team members through email when necessary
- **Evaluation:** Level of awareness among team members

**7.7 Other Considerations.** Consider paid advertisement in Shelton-Mason County Journal to announce public meetings.

# APPENDIX

## A

## **DRAFT LIST OF RECOVERY/FLOOD DAMAGE REDUCTION ACTIONS FOR SKOKOMISH GI FEASIBILITY STUDY**

The following list is a summary of potential actions that will be analyzed in Skokomish River GI Feasibility Study. Not all the actions listed will be studied in detail. After prioritization and ranking, the remaining actions will be evaluated at the 10% design level. A colored map was created by the team depicting approx. locations and areas of these draft projects between 15 Dec 05 and 10 Jan 06. Assumptions are noted below for scoping and cost estimating purposes.

Assumption for purposes of scoping and costing out the Project Management Plan (PMP), is that 50% of the actions will be taken to 10% design level and 25% of the action will be taken to 35% design level. It is assumed for estimating purposes that the 35% level design of the recommended alternative will include the following:

- a) 5 miles of dredging in the South Fork and Main Stem
- b) 10 miles of levee removal and setback along the South Fork and Main Stem
- c) 10 new Large Woody Debris (LWD) or Engineered Log Jams (ELJ) habitat structures in the Main Stem
- d) 3 new in stream sediment stabilization structures in the South Fork
- e) 2 miles of road removal within the Skokomish Indian Reservation
- f) One spreader levee located on the south side of the Main Stem
- g) Riparian planting to be associated with the above actions

### **Possible Actions to be evaluated in the feasibility study**

#### **I. MAINSTEM REALIGNMENT**

##### **A. Dike removal, New Dikes and/or setbacks/breaches**

Reconnect the historic floodplain, allowing the river to migrate laterally, creating a more sinuous and complex channel. Actions should be targeted on the estuary, mainstem Skokomish River, lower SF Skokomish River, lower NF Skokomish River and lower Vance Creek.

The lower half of Bourgalt Road will be removed. The upper half of the road will either be removed or a levee will be built around existing structures. Assume levee at this time.

**B. Reconnection of freshwater wetlands and side channels** Improve floodplain connectivity, increase available rearing habitat for salmonids and to reduce flood impacts. Provide return pathways for water (see item F below).

Up to 500 acres with two side channels (800 feet each) being constructed on the lower two sites (look at Hunter (check name?) also, which is listed under estuary restoration)

Vance Creek Realignment -Remove old channel to South Fork (by creating blockage and re-grading) and move to Swift Creek by building about 500 feet of new channel. Add plantings and gravels.

Wetland Agricultural rotation (work out in conjunction with NRCS) NRCS PROJECT. We will not estimate as part of GI at this time.

**C. Riparian corridor restoration/enhancement** Restore riparian forests in the Skokomish Valley floodplain supporting future wood recruitment and maintenance of channel complexity and channel sinuosity. (entire river is eligible). Tied to other areas where change will occur. Look mainly at 4 miles upstream of 101 Bridge (though again look at Hunter). Plant riparian vegetation on both sides of river. Assume 50' wide buffer zone. Within this zone, assume that 500 Acres will be planted.

**E. Construct engineered log jams and other habitat features** Main stem (10 (5 upstream of 101 and 5 downstream), SF Skokomish (2), NF Skokomish (2) and Vance Creek (2) to aid in creating and maintaining channel sinuosity and channel complexity and to restore important fish habitat features such as pools, side channels and stable spawning habitat. (16 projects total). Exact jam locations need to be tied into analysis of river system. Typically construction cost is approx. \$100,000 each.

#### **F. Floodplain stabilization and enhancement**

2 to 3 Level spreader dikes and drop structures: used to prevent channel formation by head-cutting through open areas

Surface Roughening: used to slow the velocity of flood flows over open areas

Precision Land Forming: used to reshape existing low spots and overflow channels across the floodplain to manage hydraulic energy while maintaining floodplain capacity

Subsurface Drainage: used to lower the water table to permit planting while routing additional ground water to fish-bearing streams during summer low-flow periods

Diversion Channel – Evaluate two alignments for routing river around avulsion points so that a controlled change in the river channel occurs. Create new channel, 100 feet wide with 50 foot buffer on each side. Two alignments will be carried to 10% design, one alignment to 35% design. Assume the longest (2 mile) alignment to be carried to 35% design for estimating purposes.

Note that in the levee spreader areas, there will be three alternatives: Either the levee spreader will be built, a diversion channel will be built, or the levee will be removed.

## **II. SEDIMENT CONTROL**

**A. Sediment Stabilization** - In place stabilization of material in upper watershed (see also road decommissioning). Road decommissioning in NF Skokomish, SF Skokomish, Vance Creek sub-basins. Past and planned road treatments on USFS property include:

- Road decommissioning totaling roughly 106 miles accomplished and 43 mile planned
- Road stabilization totaling 87 miles, five miles planned
- Road drainage upgrade totaling 11 miles, up to 171 miles planned.

Per the Simpson Timber Company Habitat Conservation Plan (HCP), dated July 2000, the plan for road remediation on the Green Diamond timberland (formerly named Simpson Timer Company) is first to inventory all existing logging roads in the Skokomish watershed. Those roads necessary for future operations will be rebuilt and improved to eliminate unstable side slopes and to disperse storm runoff rather than rapidly deliver it to surface streams. Those roads deemed unnecessary will be decommissioned. No figures regarding total road mile were published in the HCP.

**B. South Fork Main stem Stabilization** – On the South Fork above the confluence, stabilize 2 miles of in stream sediment using a fish passable weir. The design could be assumed to be similar to Goldsborough Creek at this time, but a much larger scale. Assume 5 weirs to be added.

### **C. Dredging** –

1. Examine initial dredging of channel over five river miles upstream of Hwy 101 to facilitate movement of accumulated sediment. This would be a one shot operation to “kick start” the movement of material through the system combined with increased flows from the South Fork.

2. "Selective gravel removal" - The idea is to remove only the largest sediment sizes at specific locations (typically downstream end of a gravel bar) in order to reduce the stream power required to mobilize the remaining sediment. This would allow the river to naturally move more sediment, especially the sands and small gravels that need to move to the estuary to restore shellfish beds. (Subset of item 1)

3. Main stem stream restoration - Compatible with sediment volume, gradient, valley type. Physically create the stream pattern/channels, sinuosity, gradient, etc based on the physical components of the system. Look at the stream plus 50 feet on each side. The real estate requirements will mirror the needs for initial dredging PLUS riparian restoration zone (50' ea side).

### **III. ROAD REMOVAL/ALTERATION**

#### **A. Assessment and Modification of the Hwy 101 and Hwy 106 bridge/road prisms**

Assume DOT actions which they will come up with design and estimates for. Replace 101 Bridge to address floodplain connectivity that is now disconnected because of the fill. An alternative would be to make the approaches more "porous", through addition of culverts bored through. There could be more opportunities to make 106 more porous as well, though may be addressed with Skabob Creek bridge.

#### **B. Reroute both the high voltage and PUD power lines**

Reroute both high voltage and PUD power lines to follow existing road alignments, and remove all utility lines and supporting service roadways in the Skokomish River estuary and Annas Bay marine wetland areas. Consider removal of power substation facilities in the Skokomish floodplain.

#### **C. Remove access roads on the estuary (Bourgalt and Old Skokomish River Road).**

Remove road to grade, scarify and hydro seed (map indicates which roads are paved or dirt). On Reservation Road assume installation of 4 prefab 50 foot bridges to improve water interchange. The lower half of Bourgalt Road will be removed. The upper half of the road will either be removed or a levee will be built around existing structures.

### **IV. CUSHMAN DAM FERC ACTIONS**

#### **A. Cushman Dam Options**

1. Immediate removal of dams 1 and 2.
2. Tiered removal, first Cushman 2 followed by Cushman 1
3. Gradational recovery of flows to North Fork over 10 yr. period with fish passage structures to allow access to upper North Fork.

4. Third dam constructed below Cushman 2 and dismantle diversion with fish passage structures to allow access to upper North Fork.
5. Cushman Dam Flow Modification – Moderate flows. Assume has already been evaluated as part of the license process. Flows from Cushman will be assumed as part of the GI study. Moderate flows

Cushman Dam Assumptions:

Without Project – flows in N. Fork are as currently being operated.

With Project -

- Increased minimum flows in the N Fork to between 140 – 240 CFS.
- Within 10 yrs license may be lifted.
- Flushing flows of 2500 acre feet twice per yr.

## **V. OTHER ACTIONS (not necessarily part of the GI)**

### **Estuarine Enhancement**

Examine three restoration areas totaling approximately 330 acres in lower estuary for restoration with Washington Department of Fish and Wildlife grant funding and with support from the USACE Puget Sound and Adjacent Waters Program. The levee protecting the Hunter Property located east of the Skokomish River in the vicinity of SR 106 would be incorporated under the GI. Actions would include levee removal, regarding, and notch construction to enhance dendritic channel formation. Disposal of excavated materials would be onsite in the borrow ditches created for the original dike construction to restore natural riparian and estuarine topography.

### **Acquisitions of Key habitats and Refugia**

Riparian and floodplain easements along NF Skokomish and main stem Skokomish Rivers. (Sponsor actions)

### **Fish Barrier Removal and Stream Habitat Improvement**

USFS plans to upgrade culverts currently blocking fish passage and improve stream habitat for resident cutthroat and rainbow trout in the upper watershed. Streams identified for improvements include Rock, Vincent, Fir, LeBar, Cabin, Nickelson, and Vance Creeks.

# APPENDIX

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PROJECT MANAGEMENT PLAN  
FOR FEASIBILITY PHASE STUDY  
OF SKOKOMISH RIVER

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# APPENDIX

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GI Phase Discipline	Feas Initiation FY06	w/o Project Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DA/PED FY10	HQ Approval FY11	Authorization FY12	Total
Project and Program								
Management	\$ 20,000	\$ 195,250	\$ 96,326	\$ 76,210	\$ 10,897	\$ 20,000	\$ 10,000	\$ 428,683
Plan Formulation	\$ 1,000	\$ 5,000	\$ 15,000	\$ 8,050	\$ 2,000	\$ 5,000		\$ 28,000
Public Involvement		\$ 7,100	\$ 16,100	\$ 8,100	\$ 4,500			\$ 32,200
Report Writing and GIS		\$ 112,500	\$ 30,800	\$ 11,800				\$ 19,700
Economics	\$ 13,622	\$ 1,175,697	\$ 498,897	\$ 97,622	\$ 45,622	\$ 26,348	\$ 10,000	\$ 155,100
ERS	\$ 1,725	\$ 48,085	\$ 9,488	\$ 17,682	\$ 3,738			\$ 1,867,808
HTRW		\$ 8,211	\$ 23,184	\$ 17,390	\$ 4,830			\$ 80,718
Cost Engineering	\$ 27,489	\$ 182,716	\$ 85,812	\$ 18,475				\$ 53,615
HH		\$ 54,855	\$ 27,531	\$ 14,881	\$ 506			\$ 314,492
Geotech		\$ 91,811	\$ 54,788	\$ 19,994	\$ 5,297			\$ 97,773
Civil	\$ 5,918	\$ 266,495	\$ 201,656	\$ 549,285	\$ 35,232	\$ 6,285		\$ 171,890
Real Estate		\$ 5,750	\$ 32,775	\$ 32,775				\$ 1,064,871
ITR (DR CHECK setup/PCX)	\$ 69,754	\$ 2,153,470	\$ 1,092,357	\$ 872,264	\$ 120,672	\$ 57,633	\$ 20,000	\$ 71,300
Total	\$ 35,000	\$ 1,076,735	\$ 546,179	\$ 436,132	\$ 60,336	\$ 28,817	\$ 10,000	\$ 2,193,198
Local Cost Share Required:								
Local In-Kind Labor:	\$ 2,000	\$ 55,000	\$ 5,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 5,000	\$ 87,000
Contracted In-Kind Labor	\$ 33,000	\$ 844,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 844,000
Local Funds Required:	\$ 10,000	\$ 177,735	\$ 541,179	\$ 431,132	\$ 50,336	\$ 23,817	\$ 5,000	\$ 1,262,198
Local Funds by Source:								
Flood Control Zone District	\$ 23,000	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,000
SRFB River Reach Grant		\$ 167,000						\$ 190,000
SRFB Fishery Survey Grant		\$ 444,000						\$ 444,000
Washington FCAAP		\$ 400,000	\$ 100,000	\$ 430,544	\$ 60,336	\$ 28,817	\$ 10,000	\$ 990,880
Other Grant Sources	\$ -	\$ 735	\$ 441,179	\$ 589	\$ -	\$ -	\$ -	\$ 441,914

## PMP - Time and Cost Estimate

- see Appendix \_\_\_ for Backup

### PUBLIC INVOLVEMENT

#### Skokomish River Flood Damage Reduction & Ecosystem Restoration Project Feasibility Study

Task No.	Task	Labor Days	Daily Rate	Direct Labor
<b>1</b>	<b>Document Research and Collection of Existing Data Sets</b>			
	Ch., Planning Branch		\$1,025	0
	Program Mgr		\$900	0
	Project Mgr		\$850	0
	Travel			0
	Program Analyst		\$850	0
	Budget Analyst		\$500	0
	<i>Task Subtotal</i>		<i>0</i>	
<b>2</b>	<b>Physical Data Collection and Existing Condition Report</b>			
	Subtask 1 - Environmental Scoping Meeting			
	Project Manager	3	\$850	2550
	ERS - see Environmental tab	0	\$850	0
	PM Assistant	5	\$700	3500
	Reproduction			
	IMO	2	\$500	1000
	<i>Task Subtotal</i>		<i>10</i>	
<b>3</b>	<b>Formulate and Evaluate Alternative Plans and Select a Recommended Plan</b>			
	Subtask 1 - Workshop (NEPA)			
	Project Manager	3	\$850	2550
	ERS - see Environmental tab	0	\$850	0
	PM Assistant	5	\$700	3500
	Reproduction			
	IMO	2	\$500	1000
	<i>Task Subtotal</i>		<i>10</i>	
<b>4</b>	<b>Prepare Draft Feasibility Report/EIS</b>			
	Subtask 1 - Workshop (NEPA)			
	Project Manager	3	\$850	2550
	ERS - see Environmental tab	0	\$850	0
	PM Assistant	5	\$700	3500
	Reproduction			
	IMO	2	\$500	1000
	<i>Task Subtotal</i>		<i>10</i>	
<b>5</b>	<b>Prepare Final Feasibility Report/EIS</b>			
	Subtask 1 - Formal Public Meeting			
	Project Manager	3	\$850	2550

PROJECT MANAGEMENT PLAN  
 FOR FEASIBILITY PHASE STUDY  
 OF SKOKOMISH RIVER

	ERS - see Environmental tab	0	\$850	0
	PM Assistant	5	\$700	3500
	Reproduction			
	IMO	2	\$500	1000
	<i>Task Subtotal</i>	<i>10</i>		<i>\$7,050</i>
<b>6</b>	<b>Washington Level Review and Approval Support</b>			
	Ch., Planning Branch		\$1,025	0
	Program Mgr		\$900	0
	Project Mgr		\$850	0
	Travel			
	Program Analyst		\$850	0
	Budget Analyst		\$500	0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>7</b>	<b>Initiate PCA and PED Agreement</b>			
	Ch., Planning Branch		\$1,025	0
	Program Mgr		\$900	0
	Project Mgr		\$850	0
	Travel			
	Program Analyst		\$850	0
	Budget Analyst		\$500	0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>Discipline Subtotal</b>		<b>40</b>		<b>\$28,200</b>
	Contingencies	0		\$0
	Supervision and Administration	0		\$0
<b>Discipline Total</b>		<b>40</b>		<b>\$28,200</b>

## PMP - Time and Cost Estimate

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### REPORT WRITING AND GIS

- see Appendix \_\_ for Backup

#### Skokomish River Flood Damage Reduction & Ecosystem Restoration Project Feasibility Study

Task No.	Task	Labor Days	Daily Rate	Direct Labor
<b>1</b>	<b>Document Research and Collection of Existing Data Sets</b>			
	Subtask 1 -			\$0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>2</b>	<b>Physical Data Collection and Existing Condition Report</b>			
	Lead Editor	3	\$700	\$2,100
	GIS Support	10	\$500	\$5,000
	<i>Task Subtotal</i>	<i>13</i>		<i>\$7,100</i>
<b>3</b>	<b>Formulate and Evaluate Alternative Plans and Select a Recommended Plan</b>			
	Subtask 1 -			\$0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>4</b>	<b>Prepare Draft Feasibility Report/EIS</b>			
	Lead Editor	8	\$700	\$5,600
	GIS Support	5	\$500	\$2,500
	<i>Task Subtotal</i>	<i>13</i>		<i>\$8,100</i>
<b>5</b>	<b>Prepare Final Feasibility Report/EIS</b>			
	Lead Editor	5	\$700	\$3,500
	GIS Support	2	\$500	\$1,000
	<i>Task Subtotal</i>	<i>7</i>		<i>\$4,500</i>
<b>6</b>	<b>Washington Level Review and Approval Support</b>			
	Subtask 1 -			\$0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>7</b>	<b>Initiate PCA and PED Agreement</b>			
	Subtask 1 -			\$0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>Discipline Subtotal</b>		<b>33</b>		<b>\$19,700</b>
	Contingencies	0		\$0
	Supervision and Administration	0		\$0
<b>Discipline Total</b>		<b>33</b>		<b>\$19,700</b>

## PMP - Time and Cost Estimate

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### PLAN FORMULATION

- see Appendix \_\_ for Backup

#### Skokomish River Flood Damage Reduction & Ecosystem Restoration Project Feasibility Study

Task No.	Task	Labor Days	Daily Rate	Direct Labor
1	<b>Document Research and Collection of Existing Data Sets</b>			
	Plan Formulator	1	\$1,000	\$1,000
	<i>Task Subtotal</i>	<i>1</i>		<i>\$1,000</i>
2	<b>Physical Data Collection and Existing Condition Report</b>			
	Plan Formulator	5	\$1,000	\$5,000
	<i>Task Subtotal</i>	<i>5</i>		<i>\$5,000</i>
3	<b>Formulate and Evaluate Alternative Plans and Select a Recommended Plan</b>			
	Plan Formulator	10	\$1,000	\$10,000
	<i>Task Subtotal</i>	<i>10</i>		<i>\$10,000</i>
4	<b>Prepare Draft Feasibility Report/EIS</b>			
	Plan Formulator	5	\$1,000	\$5,000
	<i>Task Subtotal</i>	<i>5</i>		<i>\$5,000</i>
5	<b>Prepare Final Feasibility Report/EIS</b>			
	Plan Formulator	2	\$1,000	\$2,000
	<i>Task Subtotal</i>	<i>2</i>		<i>\$2,000</i>
6	<b>Washington Level Review and Approval Support</b>			
	Plan Formulator	5	\$1,000	\$5,000
	<i>Task Subtotal</i>	<i>5</i>		<i>\$5,000</i>
7	<b>Initiate PCA and PED Agreement</b>			
	Subtask 1 -			\$0
	<i>Task Subtotal</i>	<i>0</i>		<i>\$0</i>
<b>Discipline Subtotal</b>		<b>28</b>		<b>\$28,000</b>
	Contingencies	0		\$0
	Supervision and Administration	0		\$0
<b>Discipline Total</b>		<b>28</b>		<b>\$28,000</b>

Scope of Work: ERS	Feas Initiation FY06	w/o Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DA/PED FY10	HQ Approval FY11	Authorization FY12	Total
GI Phase Discipline								
Coordination	\$ 10,472	\$ 10,472	\$ 10,472	\$ 10,472	\$ 10,472	\$ 20,000	\$ 10,000	\$ 82,360
Public Involvement	\$ 3,150	\$ 8,400	\$ 3,150	\$ 3,150	\$ 3,150	\$ 2,000		\$ 23,000
Data Collection		\$ 1,148,825	\$ -	\$ -	\$ -			\$ 1,148,825
Environmental Plan Development		\$ -	\$ 121,275	\$ -	\$ -			\$ 121,275
DFR/DEIS		\$ -	\$ 132,000	\$ -	\$ -	\$ 4,348		\$ 136,348
Technical Coordination		\$ -	\$ 118,000	\$ -	\$ -			\$ 118,000
FFR/FDEIS	\$ -	\$ -	\$ -	\$ 76,000	\$ -			\$ 76,000
Final Comments	\$ -	\$ -	\$ -	\$ -	\$ 24,000			\$ 24,000
FWS Coordination		\$ -	\$ 106,000	\$ -	\$ -			\$ 106,000
Subtotal	\$ 13,622	\$ 1,167,697	\$ 490,897	\$ 89,622	\$ 37,622	\$ 26,348	\$ 10,000	\$ 1,835,808
ITR/AARS		\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000			\$ 32,000
Total	\$ 13,622	\$ 1,175,697	\$ 498,897	\$ 97,622	\$ 45,622	\$ 26,348	\$ 10,000	\$ 1,867,808

Scope of Work: HH	Feas Initiation FY06	w/o Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DAMPED FY10	HQ Approval FY11	Authorization FY12	Total
GI Phase Discipline	\$ 22,800	\$ 19,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,800
Existing Data Collection	\$ -	\$ 38,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,000
Physical Data Collection		\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 38,000
Hydraulic Engineering Analysis		\$ 15,200	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 70,000
Sediment Engineering		\$ -	\$ 20,900	\$ -	\$ -	\$ -	\$ -	\$ 15,200
Existing Conditions Report		\$ -	\$ 15,200	\$ -	\$ -	\$ -	\$ -	\$ 20,900
HH Evaluation	\$ -	\$ 7,000	\$ 14,000	\$ 7,000	\$ -	\$ -	\$ -	\$ 15,200
Preliminary Design Report	\$ -	\$ -	\$ 15,200	\$ -	\$ -	\$ -	\$ -	\$ 28,000
Technical Review	\$ -	\$ -	\$ 4,667	\$ -	\$ -	\$ -	\$ -	\$ 15,200
DFR/DEIS	\$ 1,000	\$ 4,667	\$ 4,667	\$ 4,667	\$ -	\$ -	\$ -	\$ 15,001
Meetings	\$ 23,800	\$ 153,867	\$ 69,967	\$ 11,667	\$ -	\$ -	\$ -	\$ 259,301
Subtotal	\$ 2,380	\$ 15,387	\$ 6,997	\$ 1,167	\$ -	\$ -	\$ -	\$ 25,930
Plus 10 percent (Contingency)	\$ 26,180	\$ 169,254	\$ 76,964	\$ 12,834	\$ -	\$ -	\$ -	\$ 285,231
Subtotal	\$ 1,309	\$ 8,463	\$ 3,848	\$ 642	\$ -	\$ -	\$ -	\$ 14,262
Plus 5 percent (S&A)	\$ 27,489	\$ 177,716	\$ 80,812	\$ 13,475	\$ -	\$ -	\$ -	\$ 299,493
ITR/AARS	\$ -	\$ 5,000	\$ 5,000	\$ 5,000	\$ -	\$ -	\$ -	\$ 15,000
Total	\$ 27,489	\$ 182,716	\$ 85,812	\$ 18,475	\$ -	\$ -	\$ -	\$ 314,493

Scope of Work: Socio-Economics	Feas Initiation FY06	w/o Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DA/PED FY10	HQ Approval FY11	Authorization FY12	Total
GI Phase Discipline								
Cost Analysis	\$ -	\$26,600	\$0	\$0	\$0	\$0	\$0	\$ 26,600
Avg Annual HUs	\$ -	\$ 9,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,500
IWR Plan	\$ -	\$ 22,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,800
Review and Analyze Data			\$ 22,800	\$ -	\$ -	\$ -	\$ -	\$ 22,800
Property Inventory		\$ 5,700	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,700
Det FP Property Values		\$ 3,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,800
Structure & Content Damage Analysis	\$ -	\$ 5,700	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,700
Time and Travel Delays	\$ -	\$ 3,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,800
Alt Analysis		\$ 5,700	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,700
Benefit Cost Analysis			\$ 3,800					\$ 3,800
Property Inventory		\$ 5,700						\$ 5,700
Det Erosion Zone Prop Values	\$ -	\$ 7,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,600
Structure and Content Damage Analysis		\$ 7,600						\$ 7,600
Alt Analysis		\$ 3,800						\$ 3,800
System of Accounts				\$ 7,600				\$ 7,600
Meetings & Rpt Prep			\$ 3,200	\$ 3,200				\$ 9,600
Subtotal	\$ -	\$ 111,500	\$ 29,800	\$ 10,800	\$ -	\$ -	\$ -	\$ 152,100
ITR/AARS	\$ -	\$ 1,000	\$ 1,000	\$ 1,000	\$ -	\$ -	\$ -	\$ 3,000
Total	\$ -	\$ 112,500	\$ 30,800	\$ 11,800	\$ -	\$ -	\$ -	\$ 155,100





Scope of Work: Real Estate	Feas Initiation FY06	w/o Condition FY07	Plan Selection FY08	FFR/FEIS FY09	PCA/DA/PED FY10	HQ Approval FY11	Authorization FY12	Total
GI Phase								
Discipline								
Attend FS Meetings	\$ 141	\$7,055	\$5,362	\$14,677	\$847	\$141	\$0	\$ 28,223
Conferences	\$ -		\$ 5,058	\$ -	\$ -	\$ -		\$ 5,058
Coordination			\$ 23,414	\$ -	\$ -	\$ -		\$ 23,414
Acquire Title Information		\$130,727		\$ -	\$ -	\$ -		\$ 130,727
ROEs		\$50,545	\$ -	\$ -	\$ -	\$ -		\$ 50,545
Facility/Utility								
Relocations/Compensability			\$ 18,028	\$ -	\$ -	\$ -		\$ 18,028
Navigational Servitude	\$ -		\$ 10,379	\$ -	\$ -	\$ -		\$ 10,379
Physical Taking Analysis	\$ -		\$ 13,391	\$ -	\$ -	\$ -		\$ 13,391
RE Requirements			\$ 11,748	\$ -	\$ -	\$ -		\$ 11,748
RE Drawings			\$ 32,835	\$ -	\$ -	\$ -		\$ 32,835
PL 91-646 Relocations Survey			\$ 22,247	\$ -	\$ -	\$ -		\$ 22,247
Land Cost Estimates	\$ -		\$ -	\$336,279		\$ -		\$ 336,279
Baseline Cost Estimate				\$ 8,335				\$ 8,335
RE Plan				\$ 23,001				\$ 23,001
PCA/PED PMP				\$ -	\$ 6,828			\$ 6,828
Study Team Review				\$ 5,623				\$ 5,623
Det. NFS Legal Authorities	\$ 4,070							\$ 4,070
PCA and Deviation Report					\$ 3,812			\$ 3,812
ITR					\$ 9,228			\$ 9,228
Technical Review and								
Response to Comments					\$ 4,348	\$ 4,348		\$ 8,696
RE Project Management	\$ 204	\$10,182	\$ 7,738	\$ 21,178	\$ 1,222	\$ 204		\$ 40,728
S&A	\$ 68	\$3,381	\$ 2,570	\$ 7,032	\$ 406	\$ 68		\$ 13,525
Subtotal	\$ 4,483	\$201,890	\$ 152,770	\$416,125	\$ 26,691	\$ 4,761	\$ -	\$ 806,720
Contingencies (32%)	\$ 1,435	\$64,605	\$ 48,886	\$133,160	\$ 8,541	\$ 1,524	\$ -	\$ 258,150
Total	\$ 5,918	\$266,495	\$ 201,656	\$549,285	\$ 35,232	\$ 6,285	\$ -	\$ 1,064,870



Scope of Work: HTRW	Feas Initiation FY06	w/o Condition FY07	Plan Selection FY08	DFR/DEIS FY09	PCADA/PED FY10	HQ Approval FY11	Authorization FY12	Total
Existing Data Research/Collection Physical Data Collection/w/o Conditions Report	\$ 1,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,500
10% Design	\$ -	\$ 37,313	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 37,313
35% Design	\$ -	\$ -	\$ 3,750	\$ -	\$ -	\$ -	\$ -	\$ 3,750
DFR/DEIS	\$ -	\$ -	\$ -	\$ 10,876	\$ -	\$ -	\$ -	\$ 10,876
FFR/FEIS	\$ -	\$ -	\$ -	\$ -	\$ 1,500	\$ -	\$ -	\$ 1,500
Team Meetings/PMP Review ITRs	\$ -	\$ 1,500	\$ 1,500	\$ 1,500	\$ 750	\$ -	\$ -	\$ 5,250
	\$ 1,500	\$ 3,000	\$ 3,000	\$ 3,000	\$ 1,000	\$ -	\$ -	\$ 10,000
Subtotal	\$ 1,500	\$ 41,813	\$ 8,250	\$ 15,376	\$ 3,250	\$ -	\$ -	\$ 70,189
Contingencies (10%)	\$ 150	\$ 4,181	\$ 825	\$ 1,538	\$ 325	\$ -	\$ -	\$ 7,019
S&A (5%)	\$ 75	\$ 2,091	\$ 413	\$ 769	\$ 163	\$ -	\$ -	\$ 3,509
Total	\$ 1,725	\$ 48,085	\$ 9,488	\$ 17,682	\$ 3,738	\$ -	\$ -	\$ 80,717



Skokomish General Investigation Study  
 Feasibility Phase  
 Work Breakdown Structure

By: R.J.G

Date: 6/6/2006

		FY 2006		FY 2007	
		Mason Co		Mason Co	
		Tribe		Tribe	
		USACE		USACE	
<b>Tasks: Existing Condition Analysis</b>					
<b>Discipline:</b>					
<b>Project Management</b>					
Corps Personnel:	Days	Rate/Day	Labor	Total	
Project Manager	0	\$ 700.00	\$ -	\$ -	
Local Point of Contact	28	\$ 500.00	\$ 14,000.00	\$ 14,000.00	
Subtask Total:	28		\$ 14,000.00	\$ 14,000.00	
<b>Discipline:</b>					
<b>Public Involvement</b>					
Subtask:					
Environmental Scoping Meeting	Days	Rate/Day	Labor	Total	
Corps Personnel:	0	\$ 850.00	\$ 5,100.00	\$ 5,100.00	
Project Manager	6	\$ 850.00	\$ 5,100.00	\$ 5,100.00	
ERS	0	\$ 700.00	\$ -	\$ -	
PM Assistant	10	\$ 700.00	\$ 7,000.00	\$ 7,000.00	
Reproduction			\$ 2,000.00	\$ 2,000.00	
IMO	4	\$ 500.00	\$ 2,000.00	\$ 2,000.00	
Subtask Total:	20		\$ 14,100.00	\$ 16,100.00	
<b>Discipline:</b>					
<b>Report Writing and GIS</b>					
Corps Personnel:	Days	Rate/Day	Labor	Total	
Lead Editor	3	\$ 700.00	\$ 2,100.00	\$ 2,100.00	
GIS Support	10	\$ 500.00	\$ 5,000.00	\$ 5,000.00	
Subtask Total:	13		\$ 7,100.00	\$ 7,100.00	
<b>Discipline:</b>					
<b>Independent Technical Review</b>					
Corps Personnel:	Days	Rate/Day	Labor	Total	
Dr. Checks Setup	1	\$ 750.00	\$ 750.00	\$ 750.00	
Technical Reviews	7	\$ 850.00	\$ 5,950.00	\$ 5,950.00	
Subtask Total:	8		\$ 6,700.00	\$ 6,700.00	
<b>Discipline:</b>					
<b>Plan Formulation</b>					
Corps Personnel:	Days	Rate/Day	Labor	Total	
Plan Formulator	5	\$ 1,000.00	\$ 5,000.00	\$ 5,000.00	
Subtask Total:	5		\$ 5,000.00	\$ 5,000.00	

Skokomish General Investigation Study  
 Feasibility Phase  
 Work Breakdown Structure

By: R.J.G  
 Date: 6/6/2006

Discipline: Socio-Economic Studies	FY 2006		FY 2007	
	USACE	Mason Co	USACE	Mason Co
	Tribe		Tribe	
Subtask: Environmental Scoping Meeting				
Corps Personnel:				
Meetings	1	760.00	760.00	
Plan Formulator	0	850.00		
Subtask Total:	1	760.00	760.00	
Subtask: Economic Tasks				
Cost Estimate	35	737.00	25,795.00	
Avg Annual Habitat Units	13	737.00	9,581.00	
IWR Plan Program Input/Prep	30	737.00	22,110.00	
Subtask Total:	78	57,486.00	37,486.00	
Subtask: Flood Control Benefit/Cost Analysis				
Property Inventory	6	737.00	5,896.00	
Det. Floodplain Property Values	5	737.00	3,685.00	
Structure Damage Analysis	8	737.00	5,896.00	
Time and Travel Delays	5	737.00	3,685.00	
Alternative Analysis	8	737.00	5,896.00	
Subtask Total:	34	25,058.00	25,058.00	
Subtask: Erosion Damage Analysis				
Property Inventory	8	737.00	5,896.00	
Det. Erosion Zone Property Values	10.5	737.00	7,738.50	
Structure Damage Analysis	5	737.00	3,685.00	
Alternative Analysis	5	737.00	3,685.00	
Subtask Total:	34	25,058.00	25,058.00	
Subtask: Meetings and Report Preparation				
Corps Personnel:				
Team Coordination	2	737.00	1,474.00	
Subtask Total:	2	1,474.00	1,474.00	



Stokomish General Investigation Study  
 Feasibility Phase  
 Work Breakdown Structure

By: R.J.G Date: 6/6/2006

	FY 2006		FY 2007	
	USACE	Tribe	USACE	Tribe
Subtask: Prepare Final Feasibility Report & EIS				
Subtask 1 92	\$ 770.00	\$ 70,840.00	\$ 70,840.00	\$ 70,840.00
Public Involvement 5	\$ 770.00	\$ 3,850.00	\$ 3,850.00	\$ 3,850.00
Team Coordination 3	\$ 770.00	\$ 2,310.00	\$ 2,310.00	\$ 2,310.00
Subtask Total: 100	\$ 770,000.00	\$ 77,000.00	\$ 77,000.00	\$ 77,000.00
Subtask: Washington Level Review & Approval				
Subtask 1 30	\$ 770.00	\$ 23,100.00	\$ 23,100.00	\$ 23,100.00
Subtask: Initiate PCA and PED Agreement				
Subtask 1 5	\$ 770.00	\$ 3,850.00	\$ 3,850.00	\$ 3,850.00
<b>Discipline: Hazardous, Toxic and Radioactive Waste</b>				
Subtask: Document Research and Collect Existing Data				
Team Meetings & Agency/Public Coord: 2	\$ 900.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Subtask Total: 2	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Subtask: Data Collection/Existing Condition Report				
Corps Personnel: Days Rate/Day Labor Total				
HTRW Search, Field Trip & Report 5	\$ 900.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
ITR/AAR 4	\$ 900.00	\$ 3,600.00	\$ 3,600.00	\$ 3,600.00
Team Coordination 2	\$ 900.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Subtask Total: 11	\$ 9,900.00	\$ 9,900.00	\$ 9,900.00	\$ 9,900.00
Subtask: Meetings and Report Preparation				
Corps Personnel: Days Rate/Day Labor Total				
Team Coordination 4.5	\$ 840.00	\$ 3,780.00	\$ 3,780.00	\$ 3,780.00
Subtask Total: 4.5	\$ 3,780.00	\$ 3,780.00	\$ 3,780.00	\$ 3,780.00
Subtask: Formulate & Evaluate Alternatives, Select Recommended Plan				
Alternative Analysis 5	\$ 900.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
ITR/AAR 4	\$ 900.00	\$ 3,600.00	\$ 3,600.00	\$ 3,600.00
Team Coordination 2	\$ 900.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Subtask Total: 11	\$ 9,900.00	\$ 9,900.00	\$ 9,900.00	\$ 9,900.00
Subtask: Prepare Draft Feasibility Report and EIS				
Prelim Assessment Reports (10 @ 4 days) 40	\$ 900.00	\$ 36,000.00	\$ 36,000.00	\$ 36,000.00
Summary Workshop to FS 5	\$ 900.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
10 Site Visits 10	\$ 900.00	\$ 9,000.00	\$ 9,000.00	\$ 9,000.00
Team Coordination 2	\$ 900.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Subtask Total: 57	\$ 51,300.00	\$ 51,300.00	\$ 51,300.00	\$ 51,300.00
Subtask: Prepare Final Feasibility Report & EIS				
Subtask 1 2	\$ 900.00	\$ 1,800.00	\$ 1,800.00	\$ 1,800.00
Team Coordination 1	\$ 900.00	\$ 900.00	\$ 900.00	\$ 900.00
Subtask Total: 3	\$ 2,700.00	\$ 2,700.00	\$ 2,700.00	\$ 2,700.00

	FY 2006			FY 2007		
	USACE	Mason Co	Tribe	USACE	Mason Co	Tribe
<b>Discipline:</b> <b>Cost Engineering</b>						
Subtask: Data Collection/Existing Condition Report						
Corps Personnel: Days Rate/Day Labor Total						
Team Coordination 4.5 \$ 966.00 \$ 4,347.00 \$ 4,347.00						
ITR/AAR 4 \$ 966.00 \$ 3,864.00 \$ 3,864.00				\$ 4,347.00		
Subtask Total: 8.5 \$ 8,211.00 \$ 8,211.00				\$ 8,211.00		
Subtask: Formulate & Evaluate Alternatives, Select Recommended Plan						
Subtask 1 14 \$ 966.00 \$ 13,524.00 \$ 13,524.00						
ITR/AAR 4 \$ 966.00 \$ 3,864.00 \$ 3,864.00						
Team Coordination 6 \$ 966.00 \$ 5,796.00 \$ 5,796.00						
Subtask Total: 24 \$ 23,184.00 \$ 23,184.00						
Subtask: Prepare Draft Feasibility Report & EIS						
Subtask 1 12 \$ 966.00 \$ 11,592.00 \$ 11,592.00						
ITR/AAR 4 \$ 966.00 \$ 3,864.00 \$ 3,864.00						
Team Coordination 2 \$ 966.00 \$ 1,932.00 \$ 1,932.00						
Subtask Total: 18 \$ 17,388.00 \$ 17,388.00						
Subtask: Prepare Final Feasibility Report & EIS						
Subtask 1 4 \$ 966.00 \$ 3,864.00 \$ 3,864.00						
Team Coordination 1 \$ 966.00 \$ 966.00 \$ 966.00						
Subtask Total: 5 \$ 4,830.00 \$ 4,830.00						
<b>Discipline:</b> <b>Hydraulics and Hydrology</b>						
Subtask: Document Research/Collect Existing Data						
Corps Personnel: Days Rate/Day Labor Total						
Document Research 25 \$ 760.00 \$ 19,000.00 \$ 19,000.00						
Team Coordination 1 \$ 760.00 \$ 760.00 \$ 760.00						
Subtask Total: 26 \$ 19,760.00 \$ 19,760.00						
Subtask: Data Collection/Existing Condition Report						
Corps Personnel: Days Rate/Day Labor Total						
Physical Data Collection 30 \$ 760.00 \$ 22,800.00 \$ 22,800.00						
Hydraulic Engineering Analysis 50 \$ 760.00 \$ 38,000.00 \$ 38,000.00				\$ 38,000.00		
Sediment Engineering 90 \$ 760.00 \$ 68,400.00 \$ 68,400.00				\$ 68,400.00		
Hydraulic & Sediment Engineering Design 20 \$ 760.00 \$ 15,200.00 \$ 15,200.00				\$ 15,200.00		
Subtask Total: 190 \$ 144,400.00 \$ 144,400.00				\$ 121,600.00	\$ 22,800.00	
Subtask: Formulate & Evaluate Alternatives, Select Recommended Plan						
Subtask 1 60 \$ 1,006.00 \$ 60,360.00 \$ 60,360.00						
Team Coordination 7 \$ 1,006.00 \$ 7,042.00 \$ 7,042.00						
Subtask Total: 67 \$ 67,402.00 \$ 67,402.00						
Subtask: Prepare Draft Feasibility Report & EIS						
Subtask 1 20 \$ 760.00 \$ 15,200.00 \$ 15,200.00						
ITR/AAR 35 \$ 760.00 \$ 26,600.00 \$ 26,600.00						
Team Coordination 5 \$ 760.00 \$ 3,800.00 \$ 3,800.00						
Subtask Total: 60 \$ 45,600.00 \$ 45,600.00						
Subtask: Prepare Draft Feasibility Report & EIS						
Subtask 1 6 \$ 760.00 \$ 4,560.00 \$ 4,560.00						
Team Coordination 4 \$ 760.00 \$ 3,040.00 \$ 3,040.00						
Subtask Total: 10 \$ 7,600.00 \$ 7,600.00						

Discipline:	FY 2006		FY 2007	
	USACE	Mason Co	USACE	Mason Co
Tribe				
Tribe				
Subtask:				
Document Research/Collect Existing Data				
Corps Personnel:	Days	Rate/Day	Labor	Total
Document Research	3	\$ 840.00	\$ 2,520.00	\$ 2,520.00
Field Recon	2	\$ 840.00	\$ 1,680.00	\$ 1,680.00
Subtask Total:	5	\$ 4,200.00	\$ 4,200.00	\$ 4,200.00
Subtask:				
Data Collection/Existing Condition Report				
Corps Personnel:	Days	Rate/Day	Labor	Total
Write Geotech Report	3	\$ 840.00	\$ 2,520.00	\$ 2,520.00
Supervisor OC	0.5	\$ 960.00	\$ 480.00	\$ 480.00
Subtask Total:	0.5	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00
Subtask:				
Formulate & Evaluate Alternatives, Select Recommended Plan				
Subtask 1	58	\$ 840.00	\$ 48,720.00	\$ 48,720.00
Team Coordination	8	\$ 840.00	\$ 6,720.00	\$ 6,720.00
Subtask Total:	66	\$ 55,440.00	\$ 55,440.00	\$ 55,440.00
Subtask:				
Prepare Draft Feasibility Report & EIS				
Subtask 1	7	\$ 840.00	\$ 5,880.00	\$ 5,880.00
ITR/AAR	0	\$ 840.00	\$ -	\$ -
Team Coordination	2	\$ 840.00	\$ 1,680.00	\$ 1,680.00
Subtask Total:	9	\$ 7,560.00	\$ 7,560.00	\$ 7,560.00
Subtask:				
Prepare Final Feasibility Report & EIS				
Subtask 1	3	\$ 840.00	\$ 2,520.00	\$ 2,520.00
Team Coordination	1	\$ 840.00	\$ 840.00	\$ 840.00
Subtask Total:	4	\$ 3,360.00	\$ 3,360.00	\$ 3,360.00
Subtask:				
Washington Level Review & Approval				
Subtask 1	0.5	\$ 840.00	\$ 420.00	\$ 420.00
Subtask Total:	0.5	\$ 420.00	\$ 420.00	\$ 420.00
Subtask:				
Document Research/Collect Existing Data				
Corps Personnel:	Days	Rate/Day	Labor	Total
Document Research	10	\$ 750.00	\$ 7,500.00	\$ 7,500.00
Team Coordination	0.5	\$ 375.00	\$ 375.00	\$ 375.00
Subtask Total:	10.5	\$ 7,875.00	\$ 7,875.00	\$ 7,875.00
Subtask:				
Data Collection/Existing Condition Report				
Corps Personnel:	Days	Rate/Day	Labor	Total
Data Collection	3	\$ 750.00	\$ 2,250.00	\$ 2,250.00
Team Coordination	6	\$ 750.00	\$ 4,500.00	\$ 4,500.00
Subtask Total:	6	\$ 6,750.00	\$ 6,750.00	\$ 6,750.00
Subtask:				
Formulate & Evaluate Alternatives, Select Recommended Plan				
Subtask 1	140	\$ 750.00	\$ 105,000.00	\$ 105,000.00
Team Coordination	10	\$ 750.00	\$ 7,500.00	\$ 7,500.00
Subtask Total:	150	\$ 112,500.00	\$ 112,500.00	\$ 112,500.00
Subtask:				
Prepare Draft Feasibility Report & EIS				
Subtask 1	12	\$ 750.00	\$ 9,000.00	\$ 9,000.00
ITR/AAR	0	\$ 750.00	\$ -	\$ -
Team Coordination	3.5	\$ 750.00	\$ 2,625.00	\$ 2,625.00
Subtask Total:	15.5	\$ 11,625.00	\$ 11,625.00	\$ 11,625.00
Subtask:				
Prepare Final Feasibility Report & EIS				
Subtask 1	6.25	\$ 750.00	\$ 4,687.50	\$ 4,687.50
Team Coordination	0.75	\$ 750.00	\$ 562.50	\$ 562.50
Subtask Total:	7.25	\$ 5,437.50	\$ 5,437.50	\$ 5,437.50
Subtask:				
Washington Level Review & Approval				
Subtask 1	0.5	\$ 750.00	\$ 375.00	\$ 375.00
Subtask Total:	0.5	\$ 375.00	\$ 375.00	\$ 375.00

Discipline:  
 Civil Engineering

Skokomish General Investigation Study  
 Feasibility Phase  
 Work Breakdown Structure

By: R.J.G Date: 6/6/2006

Discipline: Real Estate	FY 2006				FY 2007			
	Mason Co		Tribe		USACE		Tribe	
	USACE	Mason Co	USACE	Tribe	USACE	Mason Co	Tribe	
<b>Subtask:</b>								
Attend Feasibility Study Meetings								
Corps Personnel:	Days	Rate/Day	Labor	Total				
Realty Specialist	18	\$ 612.00	\$ 11,016.00	\$ 11,016.00	\$ 5,508.00			
RE Cost Share PM	4	\$ 800.00	\$ 3,200.00	\$ 3,200.00	\$ 1,600.00			
RS Realty Tech	1	\$ 451.00	\$ 451.00	\$ 451.00	\$ 225.50			
Contract RS Realty Tech	1	\$ 240.00	\$ 240.00	\$ 240.00	\$ 120.00			
Property Attorney	5	\$ 602.00	\$ 3,010.00	\$ 3,010.00	\$ 1,505.00			
Review Appraiser	4	\$ 988.00	\$ 3,952.00	\$ 3,952.00	\$ 1,796.00			
Contract Appraiser	2	\$ 756.00	\$ 1,512.00	\$ 1,512.00	\$ 756.00			
Lead Cartographer	2	\$ 1,800.00	\$ 3,600.00	\$ 3,600.00	\$ 1,800.00			
CADD Costs	2	\$ 96.00	\$ 1,410.00	\$ 1,410.00	\$ 705.00			
Subtask Total:	41		\$ 28,031.00	\$ 28,223.00	\$ 14,111.50			
<b>Subtask:</b>								
Conferences								
Corps Personnel:	Days	Rate/Day	Labor	Total				
Realty Specialist	3	\$ 612.00	\$ 1,836.00	\$ 1,836.00	\$ 918.00			
RE Cost Share PM	2	\$ 800.00	\$ 1,600.00	\$ 1,600.00	\$ 800.00			
RS Realty Tech	0	\$ 451.00	\$ -	\$ -	\$ -			
Contract RS Realty Tech	1	\$ 240.00	\$ 240.00	\$ 240.00	\$ 120.00			
Chief, RE Division	0.5	\$ 1,218.00	\$ 609.00	\$ 609.00	\$ 304.50			
Chief, Realty Services Branch	0.75	\$ 1,030.00	\$ 772.50	\$ 772.50	\$ 386.25			
Subtask Total:	7.25		\$ 5,067.50	\$ 5,057.50	\$ 2,528.75			
<b>Subtask:</b>								
Coordination								
Corps Personnel:	Days	Rate/Day	Labor	Total				
Realty Specialist	12	\$ 612.00	\$ 7,344.00	\$ 7,344.00	\$ 3,672.00			
RE Cost Share PM	4	\$ 800.00	\$ 3,200.00	\$ 3,200.00	\$ 1,600.00			
RS Realty Tech	0	\$ 451.00	\$ -	\$ -	\$ -			
Contract RS Realty Tech	2	\$ 240.00	\$ 480.00	\$ 480.00	\$ 240.00			
Property Attorney	8	\$ 602.00	\$ 4,816.00	\$ 4,816.00	\$ 2,408.00			
Review Appraiser	0	\$ 988.00	\$ -	\$ -	\$ -			
Appraiser	0	\$ 756.00	\$ -	\$ -	\$ -			
Contract Appraiser	2	\$ 1,800.00	\$ 3,600.00	\$ 3,600.00	\$ 1,800.00			
Lead Cartographer	2	\$ 705.00	\$ 1,410.00	\$ 1,410.00	\$ 705.00			
Chief, RE Division	1	\$ 1,218.00	\$ 1,218.00	\$ 1,218.00	\$ 609.00			
Chief, Realty Services Branch	2	\$ 1,030.00	\$ 2,060.00	\$ 2,060.00	\$ 1,030.00			
CADD Costs	2	\$ 96.00	\$ 1,410.00	\$ 1,410.00	\$ 705.00			
Subtask Total:	35		\$ 24,128.00	\$ 24,320.00	\$ 12,160.00			
<b>Subtask:</b>								
Procure Title Information								
Corps Personnel:	Days	Rate/Day	Labor	Total				
Realty Specialist	10	\$ 612.00	\$ 6,120.00	\$ 6,120.00	\$ 3,060.00			
RE Cost Share PM	4	\$ 800.00	\$ 3,200.00	\$ 3,200.00	\$ 1,600.00			
RS Realty Tech	7	\$ 451.00	\$ 3,157.00	\$ 3,157.00	\$ 1,578.50			
Contract RS Realty Tech	5	\$ 240.00	\$ 1,200.00	\$ 1,200.00	\$ 600.00			
Property Attorney	10	\$ 602.00	\$ 6,020.00	\$ 6,020.00	\$ 3,010.00			
Chief, Realty Services Branch	1	\$ 1,030.00	\$ 1,030.00	\$ 1,030.00	\$ 515.00			
Purchase Title Reports	200	\$ 425.00	\$ 85,000.00	\$ 85,000.00	\$ 42,500.00			
Contract Division Costs	1	\$ 25,000.00	\$ 25,000.00	\$ 25,000.00	\$ 12,500.00			
Subtask Total:	238		\$ 20,727.00	\$ 130,727.00	\$ 65,367.50			
<b>Subtask:</b>								
Right of Entry								
Corps Personnel:	Days	Rate/Day	Labor	Total				
Realty Specialist	10	\$ 612.00	\$ 6,120.00	\$ 6,120.00	\$ 3,060.00			
RE Cost Share PM	4	\$ 800.00	\$ 3,200.00	\$ 3,200.00	\$ 1,600.00			
RS Realty Tech	65	\$ 451.00	\$ 24,805.00	\$ 24,805.00	\$ 12,402.50			
Contract RS Realty Tech	15	\$ 240.00	\$ 3,600.00	\$ 3,600.00	\$ 1,800.00			
Property Attorney	6	\$ 602.00	\$ 3,612.00	\$ 3,612.00	\$ 1,806.00			
Chief, Realty Services Branch	2	\$ 1,030.00	\$ 2,060.00	\$ 2,060.00	\$ 1,030.00			
Chief, RE Division	1	\$ 1,218.00	\$ 1,218.00	\$ 1,218.00	\$ 609.00			
Purchase Title Reports	0.5	\$ 359.00	\$ 179.50	\$ 179.50	\$ 89.75			
Contract Division Costs	1	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00	\$ 750.00			
Subtask Total:	104.5		\$ 44,794.50	\$ 50,544.50	\$ 25,277.25			



# APPENDIX

D

**CIVIL ENGINEERING DESIGN SCOPE OF WORK  
FOR**

**SKOKOMISH RIVER, WASHINGTON, ECOSYSTEM RESTORATION  
AND FLOOD DAMAGE REDUCTION FEASIBILITY STUDY**

**20 January 2006**

**1. INTRODUCTION**

**a. General**

*This engineering scope of work contains civil engineering task descriptions developed for the Skokomish River, Washington, Ecosystem Restoration and Flood Damage Reduction Feasibility Study. The purpose of this feasibility study is to evaluate alternatives to restore the ecosystem and decrease flood hazards in the Skokomish River valley, including the Skokomish Indian Reservation. This document identifies the civil engineering tasks that are anticipated for accomplishment of the feasibility phase of this study. The study sponsors are Mason County and the Skokomish Indian Tribe.*

*The feasibility study is broken down by six major tasks. These tasks are described in more detail in the project management plan. The level of civil engineering effort needed during each of these tasks will vary.*

- 1. Task One – Document Research and Collection of Existing Data Sets*
- 2. Task Two – Physical Data Collection and Existing Condition Report*
- 3. Task Three – Formulate and Evaluate Alternative Plans and Select a Recommended Plan*
- 4. Task Four – Prepare Draft Feasibility Report/EIS*
- 5. Task Five – Prepare Final Feasibility Report/EIS*
- 6. Task Six – Washington Level Review and Approval Support*

During Task One, an extensive literature review of existing reports and studies will be conducted to determine applicability to the current study. This review will help to define future data, study, and engineering needs. During Task Two, any new physical data that are needed to define the without project condition of the study area will be collected. This new data as well as existing data will define the baseline conditions. The resulting product of this task will be a without project conditions baseline report for further studies. During Task Three, previously identified alternatives will be evaluated. Alternative plans will be formulated and evaluated in detail during this phase and any detailed technical studies will be performed at this time. Alternatives will undergo technical review and a

PROJECT MANAGEMENT PLAN  
FOR FEASIBILITY PHASE STUDY  
OF SKOKOMISH RIVER

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recommended plan will be determined. During Task Four, the draft feasibility report will be completed. This report will include an engineering appendix. After review and comment on the draft report is completed, the final feasibility report will be completed during Task Five. The Corps and sponsors will support the tasks necessary during Task Six to support the final national review process of the feasibility report.

The civil engineering discipline will be working in conjunction with geotechnical (GE), hydrology and hydraulic (H&H), environmental resources (ER), cost engineering (CE), and project management and planning (PMP) disciplines to complete feasibility study tasks. Specific inputs from these and other disciplines will be required to complete the civil engineering tasks that are outlined in this scope. Conversely, several civil engineering study products will be used as inputs to for tasks conducted by other disciplines during the feasibility study.

The civil engineering task descriptions presented herein are based on assumptions regarding project scope, desired products, and available inputs. These assumptions, task descriptions, and task products are defined in the following sections of this document. Estimates of task cost and duration are also presented.

**b. Authorization**

Feasibility Study and Report preparation is authorized under Section 209 of the Water Resource Development Act of 1999, Flood Mitigation and Riverine Restoration Program.

**c. Study Assumptions**

These civil engineering task descriptions are based on the following assumptions noted below. Additional task specific assumptions are noted in Section 2 Civil Engineering Task Descriptions.

- Task descriptions only describe civil engineering design specific tasks.
- Current topographic survey data, including bathymetry, will be provided in hard copy and electronically in Microstation format and be representative of current conditions for all of the project alternative locations. Assuming survey data will be of sufficient detail to perform 10% and subsequent 35% designs and quantities, including any necessary utility information. Assuming Corps of Engineers Survey Section will need to convert survey data to AEC Cadd Standard. It is most likely that some additional survey will be required prior to completing the 35% design, but none is assumed at this time.
- Skokomish River avulsion study prepared for Mason County will be available from HDR/Geoengineers.
- Assuming Washington State DOT study regarding Highway 101 bridge replacement and study data will be available for review by the Corps, including design and quantities. Assuming civil will not be designing the DOT bridge

replacement and that all design information will be provided by WADOT. Civil will coordinate design activities upstream and downstream of the bridge.

- Assuming Hydraulic Design, Geotechnical engineering, Cost engineering, and environmental resources input will be provided for all design alternatives as well as real estate, economic, project management/sponsor, and public input.
- [The Department of Interior's 4E requirements for the Cushman Hydroelectric Project will be or have been implemented.](#)
- Independent technical review is not a part of this cost estimate.
- All drawings to be prepared are assumed to be 11" x 17" English units Microstation unless listed otherwise. No effort for data conversion is included.
- Civil Engineer team member will provide a review and update requirements of the PMP annually or as requested/funded by the project manager. Assuming 3 updates required at 8 hours total for each year.

#### **d. Feasibility Study Alternatives**

The specific alternatives to be examined during Task Three of the feasibility study are not yet explicitly defined. They will be selected by the project study team during the plan formulation phase of the feasibility study. For purposes of anticipating study tasks, it is assumed that approximately 50% of initial alternatives will be taken to 10% design level and approximately 25% of the alternatives will be taken to 35% design level. It is assumed that civil engineering analysis of each of these components will be needed to facilitate alternative definition. Each alternative will present a unique a combination of the following components:

- Mainstream Realignment – Dike removal and new dikes and/or setbacks/breaches, Reconnection of freshwater wetlands and side channels, Riparian corridor restoration/enhancement, Construction of engineered log jams and other habitat features, Floodplain stabilization and enhancement
- Sediment Control – Includes sediment stabilization, South fork mainstem stabilization, Dredging
- Road Removal/Alteration – Includes assessment and modification of the Highway 101 and Highway 106 bridge/road prisms, Reroute of high voltage and PUD power lines, Obliterate access roads in the estuary (includes Bourgalt, Old Skokomish, and Reservation Road).
- Cushman Dam FERC Actions – Cushman Dam Options

For more detailed information on these feasibility study alternatives, see Draft List of Recovery/Flood Damage Reduction Actions for Skokomish GI Feasibility Study last revised 13 January 2006 attached to PMP.

## 2. CIVIL ENGINEERING TASK DESCRIPTIONS

### *Feasibility Study Tasks*

#### **Task 1: Document Research and Collection of Existing Data Sets**

Existing studies and other information requiring civil engineering critique will be reviewed. It is assumed that this task does not include data collection and that approximately 15 studies will be reviewed. cursory analysis will be performed as part of the research to better define existing data gaps and recommended future civil data collection, study, analysis, and engineering requirements. Task one product to include recommendations for further study.

**Site Visits & Project Meetings – Two one-day site visits to field-truth material presented in the literature. Three half-day project meetings with other study team members to discuss approach, assumptions, findings, and recommendations.**

#### **Task 2: Physical Data Collection and Existing Condition Report**

*It is assumed that no additional civil engineering investigations will be required to define the without project conditions. The literature review and site visits conducted during Task 1 are assumed adequate to characterize the without project conditions from a civil engineering perspective. Task two product to include a memo of approximately 5 pages, identifying and summarizing the existing baseline conditions based on literature and data reviewed during Task one.*

#### **Task 3: Formulate and Evaluate Alternative Plans and Select a Recommended Plan**

During Task three, various alternatives for the Skokomish River study area will be formulated and evaluated with the end result being a recommended alternatives plan. There will be scoping meetings, formulation briefing, and technical review during this task phase. Some of the alternatives considered will be taken to 10% design level and then a portion of those will be taken to the 35% design level and ultimately part of recommended plan. Input from other disciplines will be necessary to complete

evaluations of the various alternatives. A listing of some of the necessary information is listed below along with expected/possible discipline input.

- Existing channel cross sections (Sponsor, Survey),
- Recommended cross sections for pool riffle development, bar scalping and conveyance dredging scenarios (H&H, ER, Sponsor),
- Sedimentation rates (H&H, GE, Bureau of Reclamation (BOR)),
- Sediment quantities, characteristics and spatial distribution (H&H, GE BOR),
- Assessment of post-dredging channel stability (H&H, GE). Assume that disposal area topography will be defined using a USGS map.
- Boundaries of the 10 river reaches within the mainstem (H&H, ER)
- Dikes to be removed, refurbished and/or relocated (H&H, ER, GE)
- Height, typical cross sections, and length of relocated/refurbished dikes and overtopping potential (H&H, GE)
- Cross-sections and material specifications for dike refurbishment and reconstruction (GE, H&H)
- Source of materials for dike construction or refurbishment (GE, Sponsor)
- Potential avulsion points and other areas requiring bank protection (H&H, GE, and ER)
- Design criteria for bank protection (GE, H&H)
- Survey information (Survey, Sponsor)
- Floodplain water surface elevations at the 0.5, 1, 2, 5, 10, 25, 50 and 100-year recurrence intervals. Mapping of inundation at each recurrence interval (H&H).
- Flooding history of existing roadways and structures (Sponsor, previous studies).
- Hydraulic design criteria and required hydraulic openings for creek culverts (H&H)
- Fish passage assessment of existing culverts (ER)
- Identification of reconnection side channel locations (ER, H&H)
- Existing WSDOT bridge designs and studies (WSDOT, PMP)
- Approximate WSEL, channel velocities and scour depths for bridge and culvert locations under proposed designs (H&H)
- Identification of desired ecosystem restoration and hydraulic recommendations for Vance Creek (ER, H&H)

### **3.1 - Investigate Mainstream Realignment Scenarios**

**Four conceptual design scenarios and quantity estimates will be developed for each of the ten types of mainstream realignment scenarios (Dike removal, New Dikes, Setback Dikes, Dike Breaches, Two Side Channels, Vance Creek Realignment, Riparian Restoration, Engineering Log Jam**

**(ELJ) in Mainstem, ELJ in South Fork, ELJ in North Fork). Each scenario will outline different combinations of dike refurbishment, relocation and/or removal, ELJ construction, and bank protection. Bank protection measure could include vegetation, riprap, barbs, and LWD. Collectively, it is assumed that 40,000 lineal feet of dike removal, relocation, refurbishment, ELJ and bank protection will be required as indicated in the 905b analysis. Scenario performance based on study criteria and objectives will be assessed and ease of construction will be evaluated.**

Side Channel Creation: Develop a four-drawing conceptual design of two new side channels approximately 800 feet each located in the lower portion of the Skokomish River system. Identify the area footprint of the excavation, and the estimated quantity of excavation and other materials and any culverts or bridge crossings that may be required as a result of side channel development.

Vance Creek realignment: Formulate conceptual design and quantity estimate for the tributary ecosystem restoration realignment recommended for Vance Creek. Realignment will be accomplished by removing the old channel connection to the South Fork by blocking, regrading, and moving the alignment to Swift Creek. Assuming building approximately 500 feet of new channel by excavation, grading, riparian plantings, addition of stream gravels, and 2 new log jams. It is assumed that ER will provide design recommendations and H&H will provide hydraulic design criteria. Eight (11" x 17") design drawings are anticipated.

Wetland Agricultural Rotation: Assuming wetland agricultural rotation will not be estimated in this feasibility study. Assuming this will be a Natural Resource Conservation Service (NRCS) project.

Riparian Corridor Restoration/Enhancement: Assuming approximately 4 miles of riparian plantings upstream of Highway 101 planted on both sides of the river in 50 foot buffers. Riparian plantings will most likely be tied to other areas where change will occur, but the entire river is eligible for potential riparian enhancement.

Engineered Log Jams: Assuming 10 log jams will be constructed in the Skokomish main stem, 2 in the South Fork of the Skokomish River, and 2 in the North Fork of the Skokomish River.

Coordinate with and review H&H, Geotech, and ER information. Create ten conceptual (5-10%) design drawings (11' x 17') for dike removal, dike

refurbishment, dike relocation, proposed types of ELJ construction and proposed bank protection measures on a representative reach. Consider material quantities and costs, critical assumptions, and potential impacts. Cost data to be provided by the cost engineering discipline with quantity input from the civil engineer.

### 3.2 – Investigate Sediment Control Scenarios

**Formulation of 10 scenarios and quantity estimates for main stem dredging that address a combination of gravel removal and stabilization alternatives. The main stem will be broken into ten reaches and reach-specific dredging and stabilization activities will be described for each scenario (one per reach). Dredging/stabilization quantities, features and impacts relative to project criteria and objectives will be assessed and ease of construction will be evaluated.**

Investigate one time dredging of five miles of river upstream of Highway 101, selective gravel removal, and main stem stream restoration (altering stream features such as gradient, alignment, etc).

Investigate sediment stabilization in upper watershed through erosion control of slide areas and road decommissioning in North Fork, South Fork, and Vance Creek sub-basins. Forest Service road decommissioning is not part of this GI study.

**Five potential sites for sediment trap construction along the South Fork will be identified and two possible sediment traps designs per site will be proposed based on the estimate of annual sediment inflow provided by H&H. Material quantities and impacts relative to project criteria and objectives will be assessed. Ease of construction will be evaluated.**

Coordinate with and review H&H, Geotech, and ER information. Create three conceptual (5-10%) design drawings (pencil sketches) depicting the three recommended types of dredging activities on a representative reach. Consider material quantities and costs, critical assumptions, and potential impacts. Cost data to be provided by the cost engineering discipline with quantity input from the civil engineer.

### **3.3 – Investigate Road Removal/Alteration Scenarios**

Review existing WSDOT plans for proposed bridge replacements at the SR-106/Skabob Creek and SR-101/Purdy Creek crossings and summarize the quantities indicated in design drawings. This task assumes that no additional geotechnical investigations or input will be needed and that civil will not be designing the WSDOT bridge replacements.

Develop conceptual designs and quantity estimates for reroute of Tacoma Public Utilities (TPU) high voltage and PUD power lines to reduce required access to estuary/restoration locations. Assuming there will be pertinent/specific design input from utility owners to ensure proper design drawings, quantities, and assumptions. Assuming that civil will not be designing TPU or PUD towers and power lines and civil's input will not go beyond providing basic quantity takeoff and putting together Cadd drawing layout for power line reroute. Assuming 3 (11" x 17") conceptual drawings. Assuming reroute suggestions will come from the team and sponsor with approval from the utility owner.

Develop conceptual designs and quantity estimates for removal of Old Skokomish River Road and Bourgalt Road. Removal of roads constitutes taking the road bed out to grade, scarifying to reduce compaction, and then hydroseeding. Road removal includes both dirt and paved roads and will be further identified during planning. Develop conceptual design and quantity estimates for improving water interchange along Reservation Road. Assuming installation of 4 prefabricated 50 foot bridges to accomplish water interchange. This task assumes that bridge and road removal locations will be identified by the ER and H&H disciplines in conjunction with the sponsors. Seven (11" x 17") design drawings are anticipated.

Coordinate with and review H&H, Geotech, and ER information.

### **3.4 – Investigate Cushman Dam FERC Actions**

Various options for Cushman Dam will be considered during the conceptual phase including immediate and tiered removal of dams 1 and 2, recovery of flows in North Fork over 10 year period with fish passage structures added, construction of a new third dam below dam 2 with fish passage structures added and dismantle diversion, and flow modification of Cushman dam. Assuming flow modification has already been evaluated as part of FERC license process. For estimating purposes, assuming large scope Cushman Dam alternatives will be screened out prior to the 10% design phase. Coordinate with and review H&H, Geotech, and ER information. If they are part of the 10% design phase, civil engineering effort will be revised accordingly.

10% Design

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Conceptual 10% design drawings (11" x 17") and quantity estimates will be developed for each of 5 combination alternatives selected by the project study team. It is assumed that each alternative will reflect a unique combination of those measures previously investigated during Tasks 1-3 including selective gravel removal, dike removal, relocation, and/or refurbishment, sediment traps, bank protection measures, bridge improvements, natural drainage and culvert improvements. It is estimated that 4 plan view drawings and 2 cross sectional drawings, will be provided for each 10% design alternative. Detail sheets will also be provided as needed and obtained from previous task outputs. Coordinate with and review H&H, Geotech, and ER information.

35% Design

It is likely that the recommended plan will contribute to both flood damage reduction and improvements to instream habitat and incorporate multiple types of flood reduction and restoration alternatives. The alternative recommended by the project study team will be taken to the 35% design level. It is assumed for estimating purposes that there will be 5 miles of dredging in the South Fork and Main Stem, 10 miles of levee removal and setback along the South Fork and Main Stem, 10 new LWD habitat structures in the Main Stem, and 3 instream sediment stabilization structures in the South Fork. Coordinate with and review H&H, Geotech, and ER information. Some of the necessary information to develop the 35% design is listed below.

- Hydraulic assessment of the recommended alternative configuration to develop hydraulic design criteria
- Assessment of floodplain inundation areas under the 0.5, 1, 2, 10, 25, 50, and 100-year recurrence intervals
- Geotechnical investigation and recommendations regarding the proposed alternative
- Detailed current survey and bathymetry data to support project design and quantity estimation
- Orthophotos or aerial photos of the study area
- Existing plans of Impacted Access Roads and Structures
- Real estate ownership maps in order to prepare a project footprint map.

It is estimated that 15 plan view drawings (11" x 17"), 25 cross sectional drawings, and 5 typical design detail sheets will be provided. Design drawing layout will be planned to meet future requirements of 100% design. Quantity estimates for the selected alternative will be updated to the 35% design level and provided as input to cost engineering for MCACEs cost analysis. For projects at the 35% design level, project footprint maps will be prepared showing the approximate permanent and temporary real estate limits necessary to construct and operate the projects. Project footprint maps shall be prepared in coordination with the project manager, real estate division, and the sponsor.

Task 4: Prepare Draft Feasibility Report

An engineering appendix narrative description summarizing the relevant civil engineering features of the recommended plan and associated quantities will be provided

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along with the 35% design drawings for incorporation into the draft feasibility report. This text and drawings will be updated per study team comments for incorporation in the final feasibility report. It is assumed that cost estimates will be provided by the cost engineering discipline. It is also assumed that the geotechnical, H&H, ER and other disciplines will provide commentary on the recommended plan. Beyond initial input, assuming 16 additional hours to review feasibility report, attend review meetings, and coordinate/respond to review comments.

Task 5: Prepare Final Feasibility Report

The final report is considered the 100% submittal for the civil engineering discipline and will conclude the feasibility study effort estimated in this scope. The final report will include revisions to the recommended plan due to resource agency, public, and technical reviews. Review comments responses will also be coordinated and submitted.

Task 6: Washington Level Review and Approval Support

It is assumed that civil engineering effort for task six will be none to minimal.

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**3. COST ESTIMATE**

This cost estimate is resource dependent and is based on an approximate cost of \$94 per hour for civil designer (corresponds approximately to a GS-12) and \$120 per hour for supervisor level quality control reviewer (corresponds approximately to a GS-13).

<b>TASK</b>	<b>ACTIVITY</b>	<b>EFFORT (HRS)</b>	<b>COST (\$)</b>
1	Document Research and Collection of Existing Data	<b><u>76</u></b>	\$7,144
	--Collect and Review Existing Studies/data	60	
	--Field Recon	16	
2	Physical Data Collection and Existing Condition Report	<b><u>23</u></b>	\$2,240
	--Write civil engineering portion of existing condition report	20	
	--QC review by supervisor	3	
3	Formulate and Evaluate Alternative Plans and Select a Recommended Plan	<b><u>1,120</u></b>	\$105,800
	--Investigate Mainstream Realignment Scenarios	220	
	--Investigate Sediment Control Scenarios	100	
	--Investigate Road Removal/Alteration Scenarios	60	
	--Investigate Cushman Dam FERC Actions	40	
	--Develop 10% Design Drawings and Quantities	260	
	--Develop 35% Design Drawings and Quantities	400	
	--Technical review including internal and one formal ITR (responding to comments, etc) (assuming 20 hours at \$120 rate)	40	
4	Prepare Draft Feasibility Report/EIS	<b><u>96</u></b>	\$9,024
	--Complete draft engineering appendix write up and include designs and quantities	80	
	--Attend review meeting and coordinate/respond to review comments on feasibility report	16	
5	Prepare Final Feasibility Report/EIS	<b><u>50</u></b>	\$4,700
	--Complete final engineering appendix write	50	

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	up and include designs and quantities		
6	Washington Level Review and Approval Support	<u>0</u>	\$0
	--Civil engineering design support for task 6 is none to minimal	0	
	Team Meetings and Coordination	<u>144</u>	\$13,536
	--Assume 4 hours/month for 3 years	144	
	PMP Review	<u>24</u>	\$2,256
	--Assume 8 hours/year for 3 years	24	
	<b>SUBTOTAL</b>		\$144,700
	Contingencies		\$14,470
	--Assume 10%		
	Supervision and Administration		\$7,235
	--Assume 5%		
	<b>TOTAL COST (\$ ROUNDED)</b>		<b>\$166,400</b>

**GEOTECHNICAL ENGINEERING SCOPE OF WORK  
FOR**

**SKOKOMISH RIVER, WASHINGTON, ECOSYSTEM RESTORATION  
AND FLOOD DAMAGE REDUCTION FEASIBILITY STUDY**

**18 January 2006**

**1. INTRODUCTION**

**a. General**

*This geotechnical engineering scope of work contains engineering task descriptions developed for the Skokomish River, Washington, Ecosystem Restoration and Flood Damage Reduction Feasibility Study. The purpose of this feasibility study is to evaluate alternatives to restore the ecosystem and decrease flood hazards in the Skokomish River valley, including the Skokomish Indian Reservation. This document identifies the geotechnical engineering tasks that are anticipated for accomplishment of the feasibility phase of this study. The study sponsors are Mason County and the Skokomish Indian Tribe.*

*The feasibility study is broken down by six major tasks. These tasks are described in more detail in the project management plan. The level of geotechnical engineering effort needed during each of these tasks will vary.*

- 7. Task One – Document Research and Collection of Existing Data Sets*
- 8. Task Two – Physical Data Collection and Existing Condition Report*
- 9. Task Three – Formulate and Evaluate Alternative Plans and Select a Recommended Plan*
- 10. Task Four – Prepare Draft Feasibility Report/EIS*
- 11. Task Five – Prepare Final Feasibility Report/EIS*
- 12. Task Six – Washington Level Review and Approval Support*

During Task One, an extensive literature review of existing reports and studies will be conducted to determine applicability to the current study. This review will help to define future data, study, and engineering needs. During Task Two, any new physical data that is needed to define the without project conditions of the study area will be identified. This new data will be collected once a recommended plan is selected. During Task Three, previously identified alternatives will be evaluated. Alternative plans will be formulated and evaluated in detail during this phase and any detailed technical studies will be performed at this time. Alternatives will undergo technical review and a recommended plan will be determined. During Task Four, the draft feasibility report will

be completed. This report will include a geotechnical appendix. After review and comment on the draft report is completed, the final feasibility report will be completed during Task Five. The Corps and sponsors will support the tasks necessary during Task Six to support the final national review process of the feasibility report.

The geotechnical engineering discipline will be working in conjunction with civil design (CS), hydrology and hydraulic (H&H), environmental resources (ER), cost engineering (CE), and project management and planning (PM) disciplines to complete feasibility study tasks. Specific inputs from these and other disciplines will be required to complete the geotechnical engineering tasks that are outlined in this scope. Conversely, several geotechnical engineering study products will be used as inputs to tasks conducted by other disciplines during the feasibility study.

The geotechnical engineering task descriptions presented herein are based on assumptions regarding project scope, desired products, and available inputs. These assumptions, task descriptions, and task products are defined in the following sections of this document. Estimates of task cost and duration are also presented.

**b. Authorization**

Feasibility Study and Report preparation is authorized under Section 212 of the Water Resource Development Act of 1999, Flood Mitigation and Riverine Restoration Program.

**c. Study Assumptions**

These geotechnical engineering task descriptions are based on the following assumptions noted below. Additional task specific assumptions are noted in Section 2 Geotechnical Engineering Task Descriptions.

- Task descriptions only describe geotechnical engineering design specific tasks.
- Current topographic survey data, including bathymetry, will be provided in hard copy and electronically in Microstation format and be representative of current conditions for all of the project alternative locations. Assuming survey data will be of sufficient detail to perform 10% and subsequent 35% designs and quantities, including any necessary utility information. Assuming Corps of Engineers Survey Section will need to convert survey data to AEC Cadd Standard.
- Land management practices specified in the forest practices manuals of the landowners will be implemented.
- Skokomish River avulsion study prepared for Mason County will be available from HDR/Geoengineers.
- Assuming Washington State DOT study regarding Highway 101 bridge replacement and study data will be available, including design and quantities.

- Assuming Hydraulic Design, Civil engineering, Cost engineering, and environmental resources input will be provided for all design alternatives as well as real estate, economic, project management/sponsor, and public input.
- The Department of Interior's 4E requirements for the Cushman Hydroelectric Project will be or have been implemented.

#### **d. Feasibility Study Alternatives**

The specific alternatives to be examined during Task Three of the feasibility study are not yet explicitly defined. They will be selected by the project study team during the plan formulation phase of the feasibility study. For purposes of anticipating study tasks, it is assumed that approximately 50% of initial alternatives will be taken to 10% design level and approximately 25% of the alternatives will be taken to 35% design level. It is assumed that geotechnical engineering analysis of each of these components will be needed to facilitate alternative definition. Each alternative will present a unique combination of the following components:

- Mainstream Realignment – Dike removal and new dikes and/or setbacks/breaches, Reconnection of freshwater wetlands and side channels, Riparian corridor restoration/enhancement, Construction of engineered log jams and other habitat features, Floodplain stabilization and enhancement
- Sediment Control – Includes sediment stabilization, South fork mainstem stabilization, Dredging
- Road Removal/Alteration – Includes assessment and modification of the Highway 101 and Highway 106 bridge/road prisms, Reroute of high voltage and PUD power lines, Obliterate access roads in the estuary (includes Bourgalt, Old Skokomish, and Reservation Road).
- Cushman Dam FERC Actions – Cushman Dam Options

For more detailed information on these feasibility study alternatives, see Draft List of Recovery/Flood Damage Reduction Actions for Skokomish GI Feasibility Study last revised 13 January 2006 attached to PMP.

## **2. GEOTECHNICAL ENGINEERING TASK DESCRIPTIONS**

### ***Feasibility Study Tasks***

#### **Task 1: Document Research and Collection of Existing Data Sets**

**Existing studies and other information requiring geotechnical engineering critique will be reviewed. It is assumed that this task does not include data collection and that approximately 15**

**studies will be reviewed. cursory analysis will be performed as part of the research to better define existing data gaps and recommended future geotechnical data collection, study, analysis, and engineering requirements. Task one product to include recommendations for further study.**

**Site Visits & Project Meetings – Two one-day site visits to field-truth material presented in the literature. Three half-day project meetings with other study team members to discuss approach, assumptions, findings, and recommendations.**

## **Task 2: Physical Data Collection and Existing Condition Report**

*It is assumed that no additional geotechnical engineering investigations will be required to define the without project conditions. The literature review and site visits conducted during Task 1 are assumed adequate to characterize the without project conditions from a geotechnical engineering perspective. Task two product to include a memo of approximately 2 pages, identifying and summarizing the existing baseline conditions based on literature and data reviewed during Task one.*

## Task 3: Formulate and Evaluate Alternative Plans and Select a Recommended Plan

During Task three, various alternatives for the Skokomish River study area will be formulated and evaluated with the end result being a recommended alternatives plan. There will be scoping meetings, formulation briefing, and technical review during this task phase. Some of the alternatives considered will be taken to 10% design level and then a portion of those will be taken to the 35% design level and ultimately part of recommended plan. Input from other disciplines will be necessary to complete evaluations of the various alternatives. A listing of some of the necessary information is listed below along with expected discipline input.

- Existing channel cross sections (Sponsor, Survey),
- Recommended cross sections for pool riffle development, bar scalping and conveyance dredging scenarios (H&H, ER),
- Sedimentation rates (H&H),
- Sediment quantities, characteristics and spatial distribution (H&H),
- Assessment of post-dredging channel stability (H&H, GE). Assume that disposal area topography will be defined using a USGS map.
- Boundaries of the 10 river reaches within the mainstem (H&H, ER)
- Dikes to be removed, refurbished and/or relocated (H&H, ER, GE)
- Height and length of relocated/refurbished dikes (H&H)

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- Height of relocated/refurbished dikes and overtopping potential (H&H)
- Cross-sections and material specifications for dike refurbishment and reconstruction (GE, H&H)
- Source of materials for dike construction or refurbishment (GE, Sponsor)
- Potential avulsion points and other areas requiring bank protection (H&H, GE, and ER)
- Design criteria for bank protection (GE, H&H)
- Survey information (Survey, Sponsor)
- Floodplain water surface elevations at the 0.5, 1, 2, 5, 10, 25, 50 and 100-year recurrence intervals. Mapping of inundation at each recurrence interval (H&H).
- Flooding history of existing roadways and structures (Sponsor, previous studies).
- Hydraulic design criteria and required hydraulic openings for creek culverts (H&H)
- Fish passage assessment of existing culverts (ER)
- Identification of reconnection side channel locations (ER, H&H)
- Existing WADOT bridge designs and studies (WADOT, PMP)
- Approximate WSEL, channel velocities and scour depths for bridge and culvert locations under proposed designs (H&H)
- Identification of desired ecosystem restoration and hydraulic recommendations for Vance Creek (ER, H&H)

### **3.1 - Investigate Mainstream Realignment Scenarios**

**Four conceptual design scenarios and quantity estimates will be developed for each of the ten types of mainstream realignment scenarios (Dike removal, New Dikes, Setback Dikes, Dike Breaches, Two Side Channels, Vance Creek Realignment, Riparian Restoration, Engineering Log Jam (ELJ) in Mainstem, ELJ in South Fork, ELJ in North Fork). Each scenario will outline different combinations of dike refurbishment, relocation and/or removal, ELJ construction, and bank protection. Bank protection measure could include vegetation, riprap, barbs, and LWD. Collectively, it is assumed that 40,000 lineal feet of dike removal, relocation, refurbishment, ELJ and bank protection will be required as indicated in the 905b analysis. Scenario performance based on study criteria and objectives will be assessed and ease of construction will be evaluated.**

Side Channel Creation: Develop a four-drawing conceptual design of two new side channels approximately 800 feet each located in the lower portion of the Skokomish River system. Identify the area footprint of the excavation, and the estimated quantity of excavation and other materials and any culverts or bridge crossings that may be required as a result of side channel development.

Vance Creek realignment: Formulate conceptual design and quantity estimate for the tributary ecosystem restoration realignment recommended for Vance Creek. Realignment will be accomplished by removing the old channel connection to the South Fork by blocking and regarding and moving to Swift Creek. Assuming building approximately 500 feet of new channel by excavation, grading, riparian plantings, addition of stream gravels, and 2 new log jams. It is assumed that ER will provide design recommendations and H&H will provide hydraulic design criteria.

Wetland Agricultural Rotation: Assuming wetland agricultural rotation will not be estimated in this feasibility study. Assuming this will be a Natural Resource Conservation Service (NRCS) project.

Engineered Log Jams: Assuming 10 log jams will be structured in the Skokomish main stem, 2 in the South Fork of the Skokomish River, and 2 in the North Fork of the Skokomish River.

Coordinate with and review H&H, Civil, and ER information for dike removal, dike refurbishment, dike relocation, proposed types of ELJ construction and

proposed bank protection measures on a representative reach. Consider material quantities and costs, critical assumptions, and potential impacts. Cost data to be provided by the cost engineering discipline.

### 3.2 – Investigate Sediment Control Scenarios

**Formulation of 10 scenarios and quantity estimates for main stem dredging that address a combination of gravel removal and stabilization alternatives. The main stem will be broken into ten reaches and reach-specific dredging and stabilization activities will be described for each scenario (one per reach). Dredging/stabilization quantities, features and impacts relative to project criteria and objectives will be assessed and ease of construction will be evaluated.**

Investigate one time dredging of five miles of river upstream of Highway 101, selective gravel removal, and main stem stream restoration (altering stream features such as gradient, alignment, etc).

Investigate sediment stabilization in upper watershed through road decommissioning in North Fork, South Fork, and Vance Creek sub-basins. Forest Service road decommissioning is not part of this GI study.

**Five potential sites for sediment trap construction along the South Fork will be identified and two possible sediment traps designs per site will be proposed based on the estimate of annual sediment inflow provided by H&H. Material quantities and impacts relative to project criteria and objectives will be assessed. Ease of construction will be evaluated.**

Coordinate with and review of H&H, Civil, and ER information. Create three conceptual (5-10%) design drawings (pencil sketches) depicting the three recommended types of dredging activities on a representative reach. Consider material quantities and costs, critical assumptions, and potential impacts. Cost data to be provided by the cost engineering discipline.

### 3.3 – Investigate Road Removal/Alteration Scenarios

Review existing WADOT plans for proposed bridge replacements at the SR-106/Skabob Creek and SR-101/Purdy Creek crossings and summarize the quantities indicated in design drawings. This task assumes that no additional geotechnical investigations or input will be needed.

Develop conceptual designs and quantity estimates for reroute of Tacoma Public Utilities (TPU) high voltage and PUD power lines to reduce required access to estuary/restoration locations. Assuming there will be pertinent/specific design input from utility owners to ensure proper design analysis, quantities, and assumptions.

Develop conceptual design analysis and quantity estimates for removal of Old Skokomish River Road and Bourgalt Road. Removal of roads constitutes taking it out to grade, scarifying it to reduce compaction, and then hydroseeding. Road removal is both dirt and paved roads. Develop conceptual design and quantity estimates for improving water interchange along Reservation Road. Assuming installation of 4 prefabricated 50 foot bridges to accomplish water interchange. This task assumes that bridge and road removal locations will be identified by the ER and H&H disciplines.

Coordinate with and review H&H, Civil, and ER information.

### **3.4 – Investigate Cushman Dam FERC Actions**

Various options for Cushman Dam will be considered during the conceptual phase including immediate and tiered removal of dams 1 and 2, recovery of flows in North Fork over 10 year period with fish passage structures added, construction of new third dam below dam 2 and dismantle diversion with fish passage structures added, and flow modification of Cushman dam. Assuming flow modification has already been evaluated as part of FERC license process. Flows from Cushman will be assumed as part of the GI study. For estimating purposes, assuming large scope Cushman Dam alternatives will not make it to the 10% design phase. Coordinate with and review H&H, Civil, and ER information.

#### 10% Design

Conceptual 10% design drawings and quantity estimates will be developed for each of 5 combination alternatives selected by the project study team. It is assumed that each alternative will reflect a unique combination of those measures previously investigated during Tasks 1-3 including selective gravel removal, dike removal, relocation, and/or refurbishment, sediment traps, bank protection measures, bridge improvements, natural drainage and culvert improvements. Coordinate with and review H&H, Civil, and ER information.

#### 35% Design

It is likely that the recommended plan will contribute to both flood damage reduction and improvements to instream habitat and incorporate multiple types of flood reduction and restoration alternatives. The alternative recommended by the project study team will be taken to the 35% design level. It is assumed for estimating purposes that there will be 5 miles of dredging in the South Fork and Main Stem, 10 miles of levee removal and setback along the South Fork and Main Stem, 10 new LWD habitat structures in the Main

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Stem, and 3 instream sediment stabilization structures in the South Fork. Coordinate with and review H&H, Civil, and ER information. Some of the necessary information to develop the 35% design is listed below.

- Hydraulic assessment of the recommended alternative configuration to develop hydraulic design criteria
- Assessment of floodplain inundation areas under the 0.5, 1, 2, 10, 25, 50, and 100-year recurrence intervals
- Detailed current survey and bathymetry data to support project design and quantity estimation
- Orthophotos or aerial photos of the study area
- Plans of Impacted Access Roads and Structures

Task 4: Prepare Draft Feasibility Report

A geotechnical engineering appendix narrative description summarizing the relevant geotechnical engineering features of the recommended plan and associated quantities will be provided along with the 35% design drawings for incorporation into the draft feasibility report. This text will be updated per study team comments for incorporation in the final feasibility report. It is assumed that cost estimates will be provided by the cost engineering discipline. It is also assumed that the civil, H&H, ER and other disciplines will provide commentary on the recommended plan.

Task 5: Prepare Final Feasibility Report

The final report is considered the 100% submittal for the geotechnical engineering discipline and will conclude the feasibility study effort estimated in this scope. The final report will include revisions to the recommended plan due to resource agency, public, and technical reviews. Review comments responses will also be submitted.

Task 6: Washington Level Review and Approval Support

It is assumed that the geotechnical engineering effort for task six will be minimal.

### 3. COST ESTIMATE

This cost estimate is resource dependent and is based on an approximate cost of \$94 per hour for civil designer and \$120 per hour for supervisor level quality control reviewer.

TASK	ACTIVITY	EFFORT (HRS)	COST (\$)
1	Document Research and Collection of Existing Data	<u>40</u>	\$4,200
	--Collect and Review Existing Studies/data	24	

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	--Field Recon	16	
2	Physical Data Collection and Existing Condition Report	<u>28</u>	\$2,940
	--Write geotechnical engineering portion of existing condition report	24	
	--QC review by supervisor	4	
3	Formulate and Evaluate Alternative Plans and Select a Recommended Plan	<u>460</u>	\$48,300
	--Investigate Mainstream Realignment Scenarios	80	
	--Investigate Sediment Control Scenarios	40	
	--Investigate Road Removal/Alteration Scenarios	40	
	--Investigate Cushman Dam FERC Actions	24	
	--Develop 10% Design Concepts	120	
	--Develop 35% Design Concepts	120	
	--Technical review including internal and one formal ITR (responding to comments, etc)	36	
4	Prepare Draft Feasibility Report/EIS	<u>56</u>	\$5,880
	--Complete draft geotechnical engineering appendix write up	56	
5	Prepare Final Feasibility Report/EIS	<u>24</u>	\$2520
	--Complete final geotechnical engineering appendix write up	24	
6	Washington Level Review and Approval Support	<u>4</u>	\$420
	--Civil engineering design support for task 6 is minimal	4	
	Team Meetings and Coordination	<u>144</u>	\$15,120
	--Assume 4 hours/month for 3 years	144	
	<b>SUBTOTAL</b>		\$79,380
	Contingencies		\$7,938
	--Assume 10%		
	Supervision and Administration		\$2,620
	--Assume 3%		

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	<b>TOTAL COST (\$ ROUNDED)</b>		<b>\$90,000</b>

# APPENDIX

III

**HYDROLOGIC ENGINEERING MANAGEMENT PLAN  
FOR  
SKOKOMISH RIVER, WASHINGTON, ECOSYSTEM RESTORATION  
AND FLOOD DAMAGE REDUCTION STUDY**

**1. INTRODUCTION**

**a. General.** - This Hydrologic Engineering Management Plan (HEMP) is developed for the Skokomish River, Washington, Ecosystem Restoration and Flood Damage Reduction Study. This study is evaluating several alternatives to restore the river ecosystem and reduce flood hazards on the Valley floodplain of the Skokomish River Basin, which includes the Skokomish Indian Reservation.

This HEMP specifically addresses instream habitat restoration and flood mitigation for the Skokomish River and the lower reaches of North and South Forks Skokomish River and Vance Creek. The various technical studies assessing existing and with project geomorphic, sediment transport, and flood conditions will extend to the upper watersheds of South Fork Skokomish and Vance Creek and to Cushman Dam on the North Fork Skokomish River. The objectives of this HEMP are to describe the hydrologic and hydraulic assumptions, techniques, methodologies, and costs required to evaluate the flooding and sediment transport characteristics of the project reach. This HEMP is prepared in accordance with ER 1110-2-1460, "Hydrologic Engineering Management" and EP 1110-2-9, "Hydrologic Engineering Studies Design."

**b. Authorization.** - The Feasibility Study and Report preparation is authorized under Section 209 of the Flood Control Act of 1962 (PL 87-874) which continues to provide authority for investigations in the Puget Sound region. The study sponsors are Mason County and the Skokomish Indian Tribe.

**c. Study Assumptions.** - Much work has already been conducted in the Skokomish River Basin and this analysis will rely on that available information. The H&H scope and cost estimate for this study is contingent on the following assumptions.

1. The H&H staff will be working in conjunction with the ERS staff in performing overlapping tasks. The mapping and sediment sampling of channel invert composition for sediment transport purposes, will dovetail with ERS identification of spawning gravel locations. Identification of reaches for sediment transport budgeting and ERS definition will be coordinated and consistently defined.

2. Topographic data are available and will be provided by the Sponsors in digital format. New stream channel topography will be collected and used to update the hydraulic models.

3. All hydrologic data are current and available for use in the various hydraulics

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and sediment transport applications.

4. The Skokomish River HEC-RAS model previously developed for WDOT will be available to use as a starting point for estimating water surface elevations, flooded areas and damages. Modifications to this model will be necessary to meet study requirements for flood water elevations across the valley floor.

5. A Bureau of Reclamation (BoR) FY06 study will provide a basin scale geologic and geomorphic evaluation of the study area. See BoR scope of work in attachment 2.

6. An evaluation of potential Skokomish River avulsions will be available from the HDR/Geoengineers 2005 study prepared for Mason County.

7. Bedload measurements will not be taken unless a critical need is identified during the early phases of the analysis.

## 2. STUDY PHASING

**a. General** – This effort is intended to assist the evaluation of alternatives to restore the riverine ecosystem and reduce flood hazards through the execution of applied engineering geomorphology, and hydraulic and sediment engineering studies of the Skokomish River Valley, Washington. The basic sequence of this work will be:

1. Define the existing geomorphic conditions of the upper watersheds and the Skokomish River, including the identification of the existing sediment sources and volumes. This phase includes review of previous reports, field work, and the work to be conducted by the BoR.

2. Modify the existing HEC-RAS hydraulic model to define existing flood hazards and identify potential flood damage reductions measures.

3. Develop an HEC-6 sediment transport model which reflects current topographic, sediment transport and sediment deposition conditions.

4. Correlate the fluvial geomorphology and sediment transport findings and the ERS findings regarding fisheries habitat and spawning locations to describe existing river conditions.

5. Develop and assess alternative measures which may reduce flood damages, improve the fisheries habitats, and/or improve the channel and sediment transport conditions.

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The proposed study efforts are to be completed in eight (8) phases identified as Existing Data Collection and Field Reconnaissance; Physical Data Collection; Hydraulic Engineering Analysis ( without project conditions); Sediment Engineering Analyses ( without project conditions); Hydraulic and Sediment Engineering Design (Project Conditions); Draft Report; Technical Review; and Final Report. A supporting task, the Geomorphic Analysis of without project conditions will be conducted by the BoR.

## **b. Phase 1 - Existing Data Collection and Field Reconnaissance.**

1. The team member shall familiarize themselves with the study area through discussions with the Sponsor's and appropriate Seattle District personnel and visits to the project site.

2. From the appropriate Federal, State and local agencies, the team member shall collect and assemble the pertinent data necessary to conduct the field reconnaissance and the geomorphic, sediment transport and channel stability analyses of the study area. This data includes all hydraulic, hydrologic, channel geometry, sediment, geologic, and structural data available from existing models and reports.

3. The team member shall conduct a technical review of existing reports and models. The scopes of Phases 2 through 8 may be revised following this technical review to adjust for the available information. A summary report detailing the technical review and findings will be prepared and shared with the study team.

## **c. Phase 2 – Physical Data Collection**

1. A geomorphologist and hydraulic engineer shall conduct a field reconnaissance of the floodplain of the Skokomish Valley and of the stream channels and contributory watersheds. The goals of the field reconnaissance are to identify the significant hydraulic and geomorphic features. Typical of those features are the depth and hydraulic roughness of stream and floodplain channels, bank failure mechanisms, existing and potential geomorphic problem areas (such as bank erosion, aggradation, degradation, channel avulsions, multi-branching channels), sampling locations for sources and sinks of channel material, and existing bank protection sites.

2. Riverbed material sampling will be necessary to define the type of sediments in the channel along the entire length of the Main Stem, ten miles upstream on the South Fork, five miles upstream on the North Fork and three miles upstream on Vance Creek. Some channel bed and bank material gradation data for the study area may be available from the BoR's geomorphic analysis and other sources. However, it is estimated that the following number and type of samples will be collected for this study.

Channel Bottom (Surface)	40
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Channel Bottom (Subsurface)	20 (1-3 feet deep)
Channel Banks	20
Boreholes (or backhoe)	10 (up to 10 feet deep)

The gradation of the surface material samples on the channel bottom may be determined in the field by use of the Wolman count or similar method. The gradation of the subsurface material samples on the channel bottom, the channel bank samples and the boreholes shall be determined by laboratory methods. The gradation of the subsurface samples shall be determined by a sieve analysis down to the #200 sieve size. The gradation of the bank material samples shall be determined by a sieve analysis down to the #200 sieve size and by a hydrometer analysis if fine materials less than 0.062 mm in size are present to determine the percentage of clay and silt size materials present in the sample. Laboratory testing for the sediment sample gradation analyses shall follow standard ASTM testing procedures. All sediment sampling shall adhere to the criteria set forth in EM 1110-2-4000, "Sedimentation Investigations of Rivers and Reservoirs" or TFW Monitoring Program Method Manual for the Spawning Gravel Composition Survey (Schuett-Hames et al., 1999)

3. Sediment transport measurements are not being recommended at this time. The measurement of bedload (gravel transport) is a difficult and time consuming activity. While measurements could add significantly to the level of confidence in the sediment transport analysis, this activity should be deferred until a specific, critical need is identified.

#### d. Phase 3 - Hydraulic Engineering Analysis ( without project conditions)

1. The WDOT HEC-RAS hydraulic model of the main stem and South Fork Skokomish River, being updated by WEST Consultants for WDOT, will be the basis for the flood elevations and flooded areas analysis. This model will be improved to better represent the complex flood flow conditions that exist in the Skokomish Valley. Emphasis will be on flood conditions along the potential channel avulsion paths identified in the HDR/Geoengineers channel avulsion study being done for Mason County and around the Skokomish Indian Reservation.

2. The multiple potential overflow channels upstream of Highway 101 and the interactions between the river and wetlands in the vicinity of the Reservation make this a complex hydraulic analysis. The stream channel geometry will be updated with the new survey data collected for this study. If necessary, the floodplain channels will be modified using the County's 2-ft contour topographic maps. The model will be calibrated to reproduce flow patterns and flood heights observed during two recent flood events. Because of the sediment accumulations in the main channel, either the 1994 or 2006 channel survey may be used for calibration, depending on the timing of the flood events selected for calibration.

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3. A series of hypothetical floods, 2-, 5-, 10, 50-, and 100-yr floods, will be modeled to predict flood elevations and flooded areas. A risk and uncertainty analysis for flood conditions will also be prepared. The results will be used in the economic flood damage assessment and to design flood damage reduction alternatives.

e. Phase 4 - Sediment Engineering Analyses ( without project conditions):

1. An analysis will be conducted, incorporating the results of the BoR geomorphic analyses, to determine: the sediment yield of the watershed upstream of the project reach as well as that of the tributaries to the project reach; the disposition of these sediments under average annual as well as single event flood conditions; and, the stability (both laterally and vertically) of the stream channels within the study reach. A minimum of two design level events, in addition to average annual conditions will be evaluated. This analysis shall be conducted in accordance with the Corps' EM1110-2-4000, "Sedimentation Investigations of Rivers and Reservoirs". These analyses shall include the following items.

2. Sediment Yield Estimate: Watershed scale sediment yield estimates will be made for sediment delivered to the upstream end of the study reach and from each tributary to the mainstems of the project reach. The estimates will be based on input from the BoR geomorphic analyses and utilize methods appropriate for estimating watershed sediment yields. Up to four different methods for estimating sediment yield that are appropriate for the basin characteristics and data available shall be utilized. Those estimates will be evaluated and one selected for each watershed as the best available estimate. The evaluation shall consider the available data, data from similar watersheds and the sensitivity of the estimates to changes in the input parameters, and will discuss the level of confidence of the selected sediment yields.

3. Sediment Transport Analysis – Sediment transport analyses will be conducted of the without project conditions along the main stem and the lower few miles (3-5 miles) of the South Fork and Vance Creek. A computer program capable of simulating the movement of sediment through the reach and changes to bed elevation and bed material gradation with the passage of a flow hydrograph through the study reach, (such as the U.S. Army Corps of Engineers' HEC-6, "Scour and Deposition in Rivers and Reservoirs") shall be used for the sediment transport analysis. The model routes an incoming sediment load through the study reach, and computes erosion and deposition volumes and sediment transport for individual river segments.

Field observation, geomorphic analyses, and bed material gradations will be evaluated to determine the riverbed material types and size distributions. As part of the sediment transport analysis, a sediment discharge versus water discharge rating curve shall be developed at the upstream limit of the study reach on the Skokomish Rivers and any major tributaries to the study reach. The sediment transport model will be used to assess sedimentation for "average annual" conditions and for two design floods.

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The sediment transport analysis, including model inputs, sediment routings, areas of erosion and deposition, and physical features restricting sediment transport shall be fully described in the report text and sample computations given in the report appendices.

4. Channel Stability Analyses - In concert with information about the erodibility of channel and bank materials developed from the geomorphic and sediment transport analyses, determine the channel stability characteristics of the study reach under the without project conditions, and identify areas in the study reach where channel stability problems under project conditions may be anticipated. These analyses shall follow Corps guidance found in EC 1110-8-1, "*Stability of Flood Control Channels*" and/or other industry standard practices.

5. Sediment Budget for the Without Project Conditions - Develop sediment budgets for average annual and design flood conditions for each unique river reach. Fully identify in the sediment budgets:

(a) All inflowing sediment sources (upstream end, tributaries, channel and bank erosion, etc.)

(b) All outflowing sediments (downstream end, channel and overbank deposition, flow diversions, etc.)

(c) Compute an "imbalance" value (if any)

### **f. Phase 5 – Hydraulic and Sediment Engineering Design (Without Project Conditions)**

1. Once the existing hydraulic and sedimentation conditions have been defined, an engineering analysis shall be conducted of project alternatives. The following hydraulic and sediment engineering tasks are based on designing and evaluating these likely alternatives:

Dredging

Setback Levees

Diversion

Dam removal or flow re-regulation

Log jams to control flow at avulsion points

Large Woody Debris (LWD) and log jams for habitat

Instream stabilization of South Fork bed sediment

Culvert replacement in upper watershed

Sediment source control in upper watershed

Reconnection of freshwater wetlands and side channels

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2. 10 Percent Design. A preliminary design shall be prepared for each of the above alternatives. The design in this step of the study will include the general hydraulic features such as ; the location and volume of dredging, the height and alignment of setback levees, the alignment, width and height of a diversion channel, the location and size of log jams or LWD, etc. These designs shall be prepared in cooperation with the Study Team (includes the Sponsors), local citizens, State and Federal resource agencies, and other interested parties. There is likely to be more than one option for each of the alternatives under consideration.

3. Hydraulic Evaluation of 10 Percent Alternatives. Utilizing the models, analytical tools, and results from the without project conditions analyses in Phases 1-4 above, each alternatives shall be evaluated to determine the effects on flood water surface elevations and flooded areas, sediment yields, sediment transport, sediment budget, fluvial geomorphology, and fisheries habitat. The two design floods and average annual conditions will be evaluated. The hydraulic and sedimentation characteristics each alternative will be compared to the without project conditions to determine its effectiveness for accomplishing the project goals of flood hazard reduction and restore riverine ecosystem, and to measure the potential environmental impacts.

4. 35 Percent Design. The recommended alternative is likely to be a combination of measures that contribute to both instream habitat improvement and flood damage reduction. For purposes of this estimate, those measures shall consist of 5 miles of dredging in the South Fork and Main Stem, 10 miles of levee along the South Fork and Main Stem, 1 new LWD habitat structure per mile in the Main Stem (10 total), and 3 instream sediment stabilization structures in the South Fork. Hydraulic analyses will look at combinations of dredging and levee alignments/heights to identify the optimum solution. LWD structures will be located and sized based on river hydraulics, geomorphology, and habitat requirements. The locations and general size of instream stabilization structures will be based on gravel supply, river hydraulics and geomorphology.

**g. Phase 6 - Draft Report** - A Draft Report shall be prepared, which shall include maps, drawings, illustrations, etc. as stated in the criteria for data presentation. The submittal shall constitute substantial completion of the total study effort. The technical hydrologic, hydraulic, and sedimentation report will be prepared as prescribed in EC 1110-2-281, "Requirements of River Hydraulic Studies," dated 30 May 1994, and conforming to ER 1110-2-1150, "Engineering and Design for Civil Works Projects," Appendices A and D, dated 31 March 1994. The report will present a description of the data used, methods employed, assumptions made, and results obtained and will be constructed as an Appendix to an overall study report. This report will undergo an independent technical review (ITR).

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1. Analytical Methods - Methods of analysis, supporting reasons for adopting selected methods, and associated relationships to features selection will be discussed. Model development, calibration, verification, and application will be presented. Computer programs used in the study will be documented and certified as required by Corps Headquarters.

2. Results and Interpretations - The report will not only present hydrologic and hydrodynamic details of the modeling effort but also a full engineering interpretation of those results. This interpretation will include descriptions of performance and function of the system for the full range of possible scenarios.

**h. Phase 7 - Technical Review** - The technical review process for this study will be in accordance with ER 1110-1-12 "Engineering and Design Quality Management". As a component to the Quality Control Plan, technical review will be performed on two levels. First, a detailed interdisciplinary review will be conducted to ensure that the findings of all studies are properly coalesced. This macro review will be performed as required throughout the study to check for discrepancies, disconnects, and interference between technical team members or technical/management interfaces. Second, an independent technical review of the specific H&H studies will be performed as required to ensure technical soundness of methodologies, techniques, assumptions, and results.

**i. Phase 8 - Final Report.** The Final Report will include revisions that resolve issues raised during the technical, resource agency, and public review. The report shall include maps, drawings, illustrations, etc. as stated in the criteria for data presentation. The submittal shall constitute 100 percent of the total study effort. An annotated and backchecked set of review comments shall be submitted to comply with ITR requirements.

## 3. COST ESTIMATE

**a. General.** An outline scope of work and associated cost estimate are presented below. The estimate represents the effort and detail as previously described. The cost estimate is resource dependent and is based on an approximate average hourly cost of \$95.

### TIME AND COST ESTIMATE

PHASE COST	ACTIVITY	EFFORT
\$		Hours

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1	Existing Data Collection and Field Reconnaissance	<b>200</b>
	<b>19,000</b>	
	a. Collect and Review Existing Materials	160
	b. Field Recon	40
2	Physical Data Collection	<b>240</b>
	<b>22,800</b>	
	a. Sediment Sampling and Testing	160
	b. Field Recon	80
	Geomorphic Analysis of Without Project Conditions	<b>0</b>
	<b>0</b>	
	<i>This task will be conducted by the Bureau of Reclamation and HDR/Geoengineers</i>	
3	Hydraulic Engineering Analysis	400
	<b>38,000</b>	
	a. Obtain Model and Update Geometry	40
	b. Calibrate Model	200
	c. Hypothetical Floods	40
	d. Risk and Uncertainty Analysis	120
4	Sediment Engineering – Without Project Conditions	<b>720</b>
	<b>70,000</b>	
	a. Sediment Yield	160
	b. Sediment Routings	400
	c. Sediment Budget	40
	d. Channel Stability	120
5	Hydraulic and Sediment Engineering Design	<b>480</b>
	<b>45,600</b>	
	a. 10 Percent Design	160
	b. Hydraulic Evaluation	120
	c. 35 Percent Design	200

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6	Draft Report	160
	<b>15,200</b>	
	a. Composition	120
	b. CADD	40
7	Technical Review	280
	<b>28,000</b>	
	a. Internal NWS review	120
	b. ITR	160
8	Final Report	50
<b>4,800</b>		
	a. Composition	40
	b. CADD	10
9	Team meetings and Coordination 4 hrs/month for 3 years	144
	<b>14,000</b>	
10.	Contingencies 10%	
	<b>23,200</b>	
11.	Supervision and Administration 5%	
	<b>15,000</b>	
<b>TOTALS</b>		<b>2,474</b>
<b>295,600</b>		

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### REFERENCES

- EM 1110-2-1205, Environmental Engineering for Flood Control Channels  
EM 1110-2-1413, Hydrologic Analysis of Interior Areas, 15 Jan 87  
EM 1110-2-1416, River Hydraulics 15 Oct 93  
EM 1110-2-1418, Channel Stability Assessment for Flood Control Projects, 31 Oct 94  
EM 1110-2-1419, Hydrologic Engineering Requirements for Flood Reduction Studies, 13 Jan 95  
EM 1110-2-1601, Hydraulic Design of Flood Control Channels, 30 Jun 94  
EM 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies  
EM 1110-2-1913, Design and Construction of Levees, 30 Apr 00  
ER 1105-2-20, Project Purpose Planning Guidance, 1982  
ER 1105-2-30, General Planning Principles, 1982  
ER 1105-2-101, Risk-Based Analysis for Evaluation of Hydrology/Hydraulics, Geotechnical Stability, and Economics in Flood Damage Reduction Studies, 1 Mar 96  
ER 1110-2-1405, Hydraulic Design for Local Flood Protection Projects, 30 Sep 82  
ETL 1110-2-299, Overtopping of Flood Control Levees and Floodwalls, 22 Aug 1986  
ETL 1110-2-540, Hydrologic Aspects of Flood Warning-Preparedness Programs, 30 Sep 96
- Schuett-Hames, D., R. Conrad, A. Pleus, and M. McHenry. 1999. TFW Monitoring Program Method Manual for the Salmonid Spawning Gravel Composition Survey. Prepared for the Washington State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-99-001. DNR #101. March.

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## ATTACHMENT 1

*This task was in the original H&H scope of work, but has been removed because the Bureau of Reclamation and private consultants are conducting similar studies. See attachment 2 for BoR scope of work.*

### **d. Phase 3 - Geomorphic Analysis of Without Project Conditions.**

*1. The team member shall perform a feasibility level geomorphic analysis of the study area, which shall be used in support of the sediment yield, sediment transport and channel stability analysis of existing and project conditions through the project reach. Using the available data, the geomorphic shall include the following items:*

*(a) Evaluate Channel Morphology. This includes using available data for the study area, comparison of channel surveys (cross section and profile) and evaluation of bank and bed materials to evaluate past and present channel behavior. Compare morphologic characteristics of leveed versus non-leveed sections of the study area. Determine if there are any trends, which relate specifically to the existing flood control project through the study area.*

*(b) Evaluate Basin and Channel Geology. Define the geologic characteristics of the area and how it has affected the past and present behavior of the study reach and its tributaries, and how it might affect the future streamcourse behavior within the study area (particularly with regards to bed and bank erosion and channel meandering*

*(c) Integrate Basin and River Hydrology with Channel Morphology and Behavior. Identify past events, which have played a dominant role in channel formation, particularly flows and flow durations anticipated.*

*(d) Evaluate Sedimentology of Basin and Channel. Based on available data, field observation and samples, evaluate the material types, size distributions and erodibility of channel and bank materials in the study reach. Identify the various bank failure mechanisms (hydraulic, geotechnical, etc.) found along the study reach. Identify existing and potential problem areas (such as bank erosion, aggradation, degradation, channel cutoff, multi-branching channels, etc.) as well as sources and sinks of materials and existing bank protection sites.*

*(e) Evaluate Effects of Vegetation from a Geomorphic Standpoint on Channel Behavior. Determine the role of vegetation, if any, on channel behavior, including in-channel and bank natives as well as source area vegetative cover.*

*2. From 1. above, the team member shall develop river reach and/or watershed subarea boundaries based on generally similar geomorphic characteristics. Work items shall be addressed according to the developed river reaches and/or watershed subareas and the original assumption may be adjusted accordingly.*

*3. Based on the field reconnaissance, available data and geomorphic analyses, the team member shall identify specific geomorphic characteristics of the stream channel and watershed upstream of and within the project reach which would affect the sediment yield into the project reach and the channel stability within the study reach. Particular concerns to be addressed are threshold channel slopes and planform.*

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## ATTACHMENT 2

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### **Skokomish River Draft Scope of Work**

#### **INTRODUCTION**

The Skokomish River Basin consists of the main stem (about 10 miles), North and South Forks, Vance Creek and 260 miles of other tributaries. The river collects runoff from approximately 240 square miles of river basin then flows into the southern Hood canal - an arm of the Puget Sound. The river flows out into a broad flat alluvial plain in the Skokomish Valley. Flooding has always occurred in the basin, but several studies have concluded it has been exasperated through aggradation in the last century, caused by human disturbances in the basin.

The North Fork (NF) of the Skokomish River is dammed and most flow diverted out of the basin for power generation. The South Fork (SF) has been heavily logged and apparently has several decades of increased sediment loading stored in the channel that has not yet been transported downstream below the confluence (Watershed Analysis, 1995). As the additional sediment in the South Fork is transported downstream with the continued decrease in flow from the North Fork it could accelerate any sediment aggradation already occurring below the confluence of the North and South Forks.

Flooding and high water tables are frequent, which is thought to occur from channel aggradation over last several decades. Channel conveyance is thought to have drastically reduced in the Skokomish below the confluence. Cushman Dam operations (City of Tacoma) and upper watershed management (Forest Service and Green Diamond/Simpson) will need to be considered in developing with and without project descriptions. Downstream levees are not well maintained and provide limited protection.

Many of the past studies have only looked at portions of the basin and very few have taken a system-wide approach. The U.S. Army Corps of Engineers (USACE) has recently re-started a general investigation (GI) with a system-based approach to evaluate potential management actions in the basin that could result in meeting the following watershed objective:

- Maintain a sustainable river alignment (acceptable channel migration zone)
- Endangered species recovery in the river
- Maintain agricultural land use in the river valley
- Provide some flood protection in the valley
- Maintain a sustainable ground water table
- Time span (100 years?)

The GI is a comprehensive watershed study with flood damage reduction and environmental restoration as the main goals. The Project Management Plan (PMP) and Feasibility Cost Share Agreement are the first products to be developed during fall of 2006 with Mason County and the Skokomish Indian Tribe (SIT) as co-sponsors. The Skokomish Tribe has requested technical assistance from the Bureau of Reclamation in support of the feasibility report/EIS that will be developed by USACE.

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## **RECLAMATION STUDY APPROACH**

At a recent meeting with USACE, the Skokomish Indian Tribe, and Mason County three study questions and related tasks for Reclamation were identified that would mesh well with the USACE GI study without duplicating any tasks being accomplished by other agencies:

**QUESTION 1:** The channel is currently thought to be at a high risk for avulsion due to observations of aggradation and reduced conveyance at key locations such as the Highway 101 Bridge. Because the south side of the valley is generally lower in elevation, it seems likely that the highest risk for channel avulsion is to the south. However, the recent channel avulsion occurred to the north. What locations have the most potential for river avulsion based on geologic and geomorphic conditions?

**TASK 1:** Conduct geologic mapping of Skokomish River (10 miles below confluence) to evaluate the potential for channel avulsion and identify key locations that could be managed if the desired objective by stakeholders is to prevent avulsion.

**QUESTION 2:** If a channel and floodplain network is designed to convey a design flow rate, is such a design sustainable over the long-term?

**TASK 2:** Develop a system scale sediment budget and transport analysis, using available data, to prediction future sediment transport through the river corridor. The analysis would look at existing and future land-use conditions and management alternatives identified by GI study.

**QUESTION 3:** Currently many of the floodplain channels have been artificially blocked causing flows to spill over onto the rest of the valley floor during floods. As floods recede, fish become stranded on the floodplain. One management alternative being considered is to design the mainstem channel to convey a portion of flood flows and allow some of the remaining portion of the flood flows to be routed into designated floodplain channels that could provide flood relief and fish passage. Given this alternative, will the main channel still be able to handle the future sediment loads with the reduced flow, and will the conveyance and flow paths be acceptable to prevent fish from getting stranded?

**TASK 3:** Apply a 2D numerical model to evaluate how individual floods would be routed through the lower river and floodplain for potential management alternatives developed in later stages of the GI study. The 2D model would supplement a 1D model by the Corps, which would be applied over time scales of decades.

These tasks would be phased in coordination with the USACE GI study and other ongoing efforts in the basin. Reclamation proposes working on the Skokomish in phases:

1. Acquisition, review and validation of existing geology, sediment, topography, and hydrology data pertaining to proposed Reclamation tasks (many of reports referencing this data have been acquired but actual data has not)
2. Field data collection and review
3. Synthesis of gathered information
4. Development of alternative assessment tools

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5. Application and calibration of models to existing and historical conditions
6. Possible refinement of models and input data based on stakeholder response
7. Prediction of future channel response to proposed management alternatives from GI Study using assessment tools

The geologic mapping, sediment budget, and 2D model for the without project conditions would be established as part of Phase 1 to understand the present system and have analysis tools ready to apply. As management alternatives for the EIS are developed, additional sediment analysis and modeling would be conducted to evaluate these options and provide a comparison to the without project conditions provided these data could be collected without increasing the total project cost detailed in the Feasibility Cost Share Agreement.

### **BUDGET REQUEST**

We propose to develop the budget request in a phased approach to allow for integration with the USACE as their scope of work and new information develops as the study progresses. With this strategy in mind, a budget estimate is presented in the table below with requests designated for fiscal year 2006 (FY06), and out years left to be developed. The budget is developed for FY06 for accomplishing initial data collection of known data gaps and establishment of tools for the without project conditions. Some estimates for model input would not be made until more is known about whether it is necessary to collect these data (i.e. bedload and suspended load data).

This budget request was developed on a priority basis so funds could be allocated on a basis of availability and schedule needs. If the total funding allocation cannot be granted for FY06, lower priority tasks not funded would be delayed into the next fiscal year or until additional funding becomes available later in the year.

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Table 1. Budget request for FY2006 to establish existing conditions analysis tools.

CATEGORY	TASK DETAILS	Priority 1	Priority 2	Priority 3	Individual Task Total	Cumulative Task Total
		Oct to Nov, 2005	Dec 05 to Sept 06	Dec 05 to Sept 06		
Avulsion Assessment	Gather existing data	\$1,500	\$1,500		\$3,000	\$3,000
	Geologic field mapping lower 10 miles	\$9,600			\$9,600	\$12,600
	Reconnaissance of upper basin	\$9,000			\$9,000	\$21,600
	Stereo pairs aerial photo	\$1,500			\$1,500	\$23,100
	Radiocarbon dating		\$5,000		\$5,000	\$28,100
	Reach analysis and synthesis with other data		\$10,000		\$10,000	\$38,100
	Geologic map present conditions (in GIS)		\$18,000		\$18,000	\$56,100
	Historical channel change photo analysis			\$30,000	\$30,000	\$86,100
Sediment Budget and Transport	Gather and process existing sediment budget data					
	Field trip with geologists to map sediment sources in basin (combine with stakeholder meeting)	\$2,500			\$2,500	\$88,600
	Pebble count data	\$9,000			\$9,000	\$97,600
	Develop sediment budget model			Mason County?		\$97,600
	Sediment transport analysis utilizing 1D model from ACOE		\$15,000		\$15,000	\$112,600
2D Modeling	Collect new cross-sections lower 10 miles			\$15,000	\$15,000	\$127,600
	Collect water surface elevations at bankfull flow in river for calibration					\$127,600
	Establish existing conditions grid					\$127,600
	Establish hydrology for model runs			\$5,000	\$5,000	\$132,600
				\$5,000	\$5,000	\$137,600

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CATEGORY	TASK DETAILS	Priority 1	Priority 2	Priority 3	Individual Task Total	Cumulative Task Total
		Oct to Nov, 2005	Dec 05 to Sept 06	Dec 05 to Sept 06		
	Calibrate model for existing conditions			\$15,000	\$15,000	\$152,600
Documentation	Prepare interim report			\$20,000	\$20,000	\$172,600
Project management	Client Liaison	\$1,500			\$1,500	\$174,100
	Mgmt, meetings, coordination with stakeholders (includes field trip)			\$20,000	\$20,000	\$194,100
INDIVIDUAL TOTALS BY PRIORITY LEVEL						
					\$34,600	
					\$49,500	
					\$110,000	
					CUMULATIVE FY2006 TOTAL	
						\$194,100

## **DETAILED TASK DESCRIPTIONS**

### *Task 1: Channel Avulsion Assessment*

Information in the basin is available to describe the geology at a gross scale, but detailed mapping to identify local controls and influences on the channel have not been identified. Soils along the river have been identified along the surface of the valley, but profiles and ages have not been established which are needed to fully investigate the potential for future channel avulsion given management alternatives that will be identified by the GIS study. The channel avulsion assessment would consist of the following study approach:

1. Geologic field mapping of lower 10 miles (October 2005)
  - a. Surface identification to identify the potential for erosion along areas the river runs against
  - b. Geologic controls to identify their influence on past, present, and future channel predictions
  - c. Unique geomorphic reaches
  - d. Sediment sources to establish information for the sediment budget
  - e. Radiocarbon dating to establish the last time the river occupied terrace surfaces outside the active flood plain.
2. Soil/stratigraphic descriptions of banks lining the Skokomish River to identify potential for erosion (October 2005)
3. Reconnaissance of upper drainages above confluence of NF and SF (November 2005)
4. Synthesis of new geologic mapping data with available literature and information (November to December 2005)
  - a. USGS groundwater studies
  - b. USGS geologic map
  - c. Surface soil map
  - d. Local knowledge of past river avulsions
  - e. Other relevant reports
5. GIS map product to develop all field mapping data into a standard form easily documented and accessible to other stakeholders (December 2005)
6. Historical aerial photography assessment to look at past river channel movement as an indicator of future channel movement and to map areas of river not accessible in field (Winter through Spring 2005-2006)
7. Integration of geologic data with sediment budget analysis to look at potential for avulsion (Spring 2006)

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8. Interim report development of data gathered and analysis (Summer or Fall 2006)

### *Task 2: Sediment Budget and Transport Analysis*

The first step for a sediment budget and transport analysis are to identify the existing sediment sources, topography, and discharge data in the basin to evaluate if there are any data gaps. After validation of the existing data, we propose to do a first cut at a sediment budget with existing data, making estimates for any areas of data gaps. After stakeholder evaluation of the results, if there was a concern over the level of uncertainty for some of the sediment budget components for which estimates were made, recommendations would then be made to collect new data to fill in the gaps assuming that methods are available. Recommendations could be made to collect new data based on a lack of data or because data are outdated or poorly documented. The sediment budget and transport analysis would consist of the following tasks:

1. Review all of the existing sediment studies and data to determine what information is available for analysis.
  - a. Define hillslope sediment yield for the South Fork by evaluating watershed study and make refinements as necessary.
  - b. Define amount of sediment in storage in terraces in South Fork by evaluating existing studies and other methodologies.
2. Determine sediment transport capacity of the South Fork channel. This estimate will be refined by the collection of bed material samples and possibly bed load samples.
3. Determine the sediment transport capacity and sediment yield for the North Fork. This estimate will be based on the hydraulic capacity of the channel to transport sediment and by estimating sediment yield from hillslopes, sediment stored in terraces, and sediment transport of the main channel. These estimates may be supplemented by reservoir sediment surveys, if the data are available. The assumption will be made that the North Fork, upstream from the reservoirs, represents a pristine environment and may represent how much sediment came off of the South Fork prior to logging.
4. Determine the sediment load, amount stored in the terraces and the wide alluvial valley of the main channel downstream in the Skokomish valley. This will be accomplished by studying changes in aerial photography and lidar data. Bed material and possibly bed load measurements may be used to help with the analysis of the main channel sediment transport.
5. The amount of sediment stored in the delta of the Hood Canal will also be estimated through the use of aerial photography and lidar data.
6. Several tools will be used to enhance the analysis of all of the sediment volumes. One program is known as SIAM, created by David Mooney (one of our

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engineers), and this program estimates general sediment transport rates in the main channels of the river system.

## *Draft Document Prepared by Bureau of Reclamation*

7. The analysis will be summarized in an Excel spreadsheet that describes each reach of the river in terms of the different sediment volumes and transport rates for the without project conditions. The model will be used to evaluate future scenarios to understand how to manage sediment in the main channel of the Skokomish River.

### *Task 3: 2D Hydraulic Model*

1. Collect new cross-sections lower 10 miles
2. Collect water surface elevations at bankfull flow in river for calibration
3. Establish the without project conditions grid
4. Establish hydrology for model runs
5. Calibrate model for the without project conditions

### **COLLABORATOR PARTICIPATION**

To assist Reclamation and the GI study, certain tasks have been identified that could be performed by stakeholders collaborating with Reclamation and USACE.

1. Field access needs – Mason County and Skokomish Tribe?
2. GIS data base – managed by Skokomish Tribe
3. Historical aerial photo investigation – USACE
4. Historical survey data investigation – Mason County
5. Collection of new survey data cross-sections – Mason County
6. Collection of new pebble count data at cross-sections – Mason County? Skokomish Tribe?
7. Gathering information from past South Fork Studies - Forest Service and Green Diamond Timber Company
8. City of Tacoma – notification of operational reservoir releases so they can be monitored for sediment transport analysis

# APPENDIX



PROJECT MANAGEMENT PLAN  
FOR FEASIBILITY PHASE STUDY  
OF SKOKOMISH RIVER

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Environmental Studies Scope of Work  
For  
The Skokomish River Flood Mitigation and River Restoration Study  
Mason County, Washington

1. Introduction.

a. General. This effort is intended to assist the evaluation of alternatives to restore riverine ecosystem. This action includes environmental data collection and the determination of environmental impacts of alternative plans. A number of discrete tasks have been identified, as described below. Work will lead to preparation of an EIS, plus appropriate written narrative for the feasibility report. The work will be performed by the Government, its contracting agents, and the Sponsor. Reference: ER 1105-2-100, ER 200-2-2. The following tasks are necessary to complete the work effort:

- 1) Describe the baseline environmental conditions in the Skokomish Watershed
- 2) Scope project focus and develop purpose statement
- 3) Identify potential restoration and flood damage reduction alternatives in the watershed
- 4) Prioritize various alternatives and help develop metrics for incremental analysis of alternatives
- 5) Assess impacts of proposed alternatives (up to 10% design level, with 35% design for selected alternative)
- 6) Prepare NEPA documentation
- 7) Prepare necessary documentation for compliance with applicable environmental laws and regulations.

b. Study Assumptions. A large amount of the baseline information will come from existing sources. H&H will assist in the geomorphic assessment of the river and will provide basic geomorphic conditions for the selected restoration sites. In addition, ERS will work closely with H&H to identify key areas where hydrologic conditions need to be identified (e.g. spawning areas, side channels). Establishment of water surface elevations for restoration sites will be critical for proper design of those features. ERS will work with Economics Section to develop metrics for evaluation of incremental costs and benefits of proposed alternatives. ERS will also develop the ecological framework for evaluating benefits. It is assumed that an EIS will be needed for NEPA documentation due to the controversial nature/history of the watershed, the complex nature of the watershed study, and the presence of multiple stakeholders. A firm decision will be made with initial scoping. This SOW assumes that an EIS will be done. ERS will work the PM and PAO

PROJECT MANAGEMENT PLAN  
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to refine the communication plan, set up public meetings, and collect comments of from stakeholders. ERS will work with the design team to identify environmental parameters necessary for successful design of alternatives.

For study development, it is assumed that a combination of individual restoration actions and larger scale system wide treatments will be examined. A list of actions is included in appendix A.

2. Study Phasing

- a. General – The study will follow a logical progression starting with collection of existing and new data simultaneous with scoping and development of well defined alternatives purpose and objectives. This will be followed by identification and development of actions (measures) and prioritization of those alternatives. Designs will then be developed for the projects and various combinations will be examined to develop alternatives. Once project designs are developed along with alternatives, assessment of project impacts, costs, and benefits can begin followed by an incremental analysis. NEPA documentation and permit compliance will have begun with the development of the environmental baseline and project formulation and will be completed after alternatives have been developed.

3. Study Tasks – The following task and subtasks will be necessary for completion of the feasibility study:

- a. Describe the baseline environmental conditions in the Skokomish Watershed
  - 1) A literature search and compilation of existing data will be accomplished to collect all pertinent information for use in assessing project impacts. Some of the information will be in the Geographical Information System (GIS) format and will be entered on the Seattle District GIS for overlaying on study and or report maps. A review of existing information on wetlands and riparian stands in the project area will be accomplished. Initial coordination with the Washington State Historic Preservation Officer will be started. A gap analysis will be conducted and additional studies might be recommended.
  - 2) A large number of studies have already been conducted in the Skokomish watershed pertaining to the Cushman Project Relicensing. Existing and future conditions (flushing flows) for aquatic resources have already been identified in the FERC

documentation. The studies identified below would fill in gaps in the existing data:

a) Environmental Data Survey (GIS) - Some information collected from existing resources will be added to the Seattle District GIS to aid in graphical presentation of data.

b) Instream Woody Debris and Pool Volume Survey - Tribal biologists have identified that the lack of wood and pools in the lower river are limiting factors in fish production. In conjunction with the geomorphic analysis and reach analysis, large wood debris (LWD) quantities, and pool volumes will be surveyed using a protocol such as the Timber, Fish & Wildlife methodology. The results of this survey will be factored in to the reach analysis, and also be used to develop recommendations for long-term wood management in the river.

c) Reach Analysis - In conjunction with the geomorphic analysis, and LWD/Pool Volume Survey, a reach analysis will be conducted to assess the potential to use LWD to change channel morphology and provide bank stabilization where needed. The reach analysis will examine existing cross sections, historic reconstructions of the channel form and meanders, and sediment information to develop a plan for placing a series of engineered log jams (ELJs), as well as preliminary design details for these structures.

d) Fisheries Survey (Outmigration Study - Screw Trap) - Adequate information exists on spawning in the mainstem and tributaries. However, information is lacking on juvenile outmigration. A sampling design will be developed in conjunction with agency and tribal staff. One screwtrap would be placed in the mainstem, and a second would be placed in various side channel locations to collect baseline data on outmigrants. The data collected would provide information on potential production increases from various restoration actions.

e) Riparian/Wetland Survey. A field survey will be completed to upgrade the existing riparian and wetland surveys for the project area so as to evaluate the quality and extent of vegetation and wetlands along the Skokomish River in the area of the potential project. An evaluation of potential project impacts to existing vegetation and

wetlands in the proposed project areas will be conducted. This information will be used in the EIS to assess impacts, as well as to provide additional documentation for the 404(b)(1) analysis.

f) Cultural Resource Overview - This action includes inventory and assessment required to determine the impacts of alternative restoration measures upon historic and cultural resources. Existing cultural resources information and cursory field investigations by trained archaeologists will be considered in screening alternative measures and possible locations for new structures. Further work will consist of collecting existing cultural resources information and conducting an initial inventory and assessment of archeological and cultural resources. Additional site specific work will be accomplished in Plans and Specifications to complete site documentation. This work will be performed by the Government, in consultation with the Washington State Historical Preservation Office.  
References: National Historic Preservation Act of 1966, Archeological and Historical Preservation Act of 1974, National Environmental Policy Act of 1969, Executive Order 11593 (Protection and Enhancement of the Cultural Environment), Native American Religious Freedom Act.

g) Water Quality Analysis – Existing water quality information will be reviewed and consolidated.

h) IBI - Using Index of Biotic Integrity (IBI) method for biological monitoring is usually used to determine the impacts of human activity (forestry, agriculture, urban development, recreation, grazing, etc) in urban streams. Although the Skokomish is not an urban stream this method may still be useful and less expensive than other monitoring methods. In particular it may be useful for monitoring side channel restoration projects that include LWD placement and riparian plantings.

i) Spawner survey - Continuing to conduct spawner surveys especially the spawner distribution aspect will be very useful in determining if our projects designed to reduce aggradation of substrate are performing as intended. While geomorphologic studies can determine if an area is not aggrading or aggrading at a rate prior to project

construction, spawner distribution surveys will help determine if our goal to also provide spawning habitat has been achieved.

- 3) An the without project conditions report based on **existing** information will be written for HQ review.
- b. Scope project focus and develop purpose statement
    - 1) Conduct Initial Public and Agency meetings to identify stakeholders - A series of public and agency meetings will be conducted to identify project purpose and need as well as possible alternatives. Public comments will be recorded.
    - 2) Prepare Notice of Intent to prepare an EIS – Based on initial scoping of the project, an EIS will be required. However, this could change once project scope is determined.
    - 3) Working with the project sponsors and evaluating stakeholders comments, a clear project purpose statement and corresponding objectives will be developed.
  - c. Identify potential restoration and flood damage reduction projects in the watershed – Work with study team, sponsors and stakeholders to determine project elements and alternatives.
  - d. Prioritize various projects and help develop metrics for incremental analysis of projects.
    - 1) Based on the results of the reach analysis, riparian survey, the wetland survey, the fishery studies, and the cultural resources assessment, alternative restoration measures will be developed, screened, and selected restoration measures designed for inclusion in the recommended project.
    - 2) Aquatic and Terrestrial Habitat Analyses. For analysis of incremental impacts potential projects will be evaluated using methodology to identify structural components and processes that are important to the restoration of salmonid habitat and other ecosystem functions within the study area.
  - e. Assess impacts of proposed projects (up to 10% design level, with 35% design for selected alternative)

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- 1) Basic impact analysis will be conducted for all pertinent environmental resources
  - 2) Assessment of Environmental Impacts of Sediment Mobilization. While the long term effects of changes in channel morphology due to initiation of FERC 4e flow conditions have been identified, impacts from dredging of the channel have not been documented. This analysis will take data from the H&H sediment study and based on review of existing literature will determine what impacts will occur to fish and water quality resources if dredging is done. This information is key to developing adequate documentation for ESA coordination.
- f. Prepare NEPA documentation – With the completion of the data collection and analysis, an EIS will be prepared to cover environmental documentation for the National Environmental Policy Act. In addition, coordination and processing of documentation to comply with other pertinent acts will be initiated.
- 1) Prepare Draft EIS – The without project conditions report will be added on to develop the affected environment section of the EIS. Information from the FWCA and studies will be used to refine the baseline conditions section and the impacts section. A preliminary EIS will be prepared for internal review followed by Public Draft for comment. In developing the draft EIS, the purpose and need section started will be finalized, and alternatives will be developed. The alternatives will be screened and prioritized, with a suite of feasible alternatives being examined in detail in the EIS including a preferred alternative.
  - 2) Prepare Final EIS - A final EIS will be prepared based on responses to public comments.
  - 3) Prepare ROD - The EIS process will be completed with preparation of a ROD after the appropriate time period required by law.
  - 4) ITR of Draft and Final EIS
- g. Prepare necessary documentation for compliance with applicable environmental laws and regulations. - Compliance with several laws and regulations is required for advancing the project through the feasibility phase. This will require extensive coordination with Federal, state and local agencies as well as tribes. Several major compliance items are listed below. In addition, compliance with Section 106 of the National Historic

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Preservation Act is covered under Cultural Resources Overview item in the Environmental Studies Section. With the completion of the data collection and analysis, coordination and processing of documentation to comply with other pertinent acts will be initiated.

- 1) Fish and Wildlife Coordination Act Report. This action includes coordination with, and studies conducted by, USFWS, as required by the Fish and Wildlife Coordination Act (FWCA). USFWS activities will include interagency and tribal coordination, planning and evaluation of the impacts of alternative measures and plans on fish and wildlife resources, preparation of one planning aid letter (PAL), and a draft and a final FWCA Report for inclusion in the FR. Related activities by the Government will include preparation and coordination of statements of work and related fund transfer documents for planning activities by USFWS, plus review of the draft and the final FWCA Report by the Government and the Sponsor.  
Reference: Fish and Wildlife Coordination Act of 1958 (PL 85-624, as amended).
- 2) Endangered Species Coordination. The endangered species (ES) coordination will be completed with the preparation of a biological assessment identifying possible impacts to ES found in the project area. It is anticipated that formal section 7 consultation will be required if dredging is required to improve channel conveyance, and will result in increased time for consultation and preparation of a Biological Opinion by the Services.
- 3) Wetlands, Section 404 Evaluation - A public notice on the proposed project will be prepared and distributed and a Section 404(b)1 evaluation will be prepared to document and assess potential wetlands impacts and coordinate restoration actions. Included in the process is coordination with Ecology and EPA to secure a 401 Water Quality Certification for the project. There is a potential to invoke 404(r) to waive the 401 Certification requirement.
- 4) Coastal Zone Management Act – A Coastal Consistency Determination (CCD) will be prepared to document consistency with NOAA approved Shoreline Plans. The CCD will be coordinated with Ecology and EPA.
- 5) Clean Air Act Compliance – An analysis of the proposed action will be conducted to determine if the action will result in releases of air pollutants in exceedance of the limits defined in the Clean Air Act regulations.

APPENDIX A – List of Potential Projects

CENPS-PM-PL-ER

**See Updated project list on V: drive**

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Skokomish GI

Cultural Resource Issues –Historic Properties (Lauren McCroskey)

While this piece of the study will very small as compared to other aspects, it would be preferable to undertake an historical overview of the project area, before final decisions are made about the drainage restoration. That way, if there are significant historic property issues – buildings, structures, historic land use areas, etc. – they can be identified early and decisions can be made to avoid or mitigate their loss or alteration. This is, of course, also true of archaeological and cultural property concerns, as Dave Rice will address.

In addition, historical research may contribute some additional insights into the way the valley has been used and particular land use areas/alterations/adaptations. This information might be relevant to larger restoration goals.

Based on our tour, I couldn't conclude there were historic properties concerns in the project area. However, from the cursory review it seems unlikely that many significant properties (listed in or eligible for listing in the National Register of Historic Places) will be encountered, and thereby require mitigation.

Some potential properties and issues to address:

- Earliest white settlement patterns and associated property types
- Identification of ferry landing/location (possible historic archaeological concerns?)
- Historical overview of agricultural modifications – farming methods, crops, animals, vegetation/plantings, rerouting streams and channels (Richert Farm history, for example)
- Pattern of 1910-1930s farm dwellings, barns, and outbuildings – some may be good representatives of that era and therefore significant
- Grange building – this one did appear eligible

Potential Costs: \$8,000

- Historical research, local interviews, review of local sources, records search
- On site field review and evaluation of properties
- Preparation of historical narrative/overview with inventory/index of properties

Mitigation: Unlikely and needed only if significant properties are determined eligible and will be removed or altered.

- Photo documentation to supplement the above historical narrative/data.
- Costs – number of properties/photos would be a separate item, but are not known at this time.

# APPENDIX

G

CENWS-PM-PL

January 2006

MEMORANDUM FOR THE RECORD

SUBJECT: Economic Section time and Cost Estimate for Skokomish River GI  
Feasibility Study

**I Environmental Restoration**

Benefits for environmental projects are quantified in non-monetary terms (typically in terms of “habitat units” or functional capacity units”). Since the benefits and costs for environmental projects are not measured in consistent terms, a direct benefit/cost analysis is not possible. Therefore, Corps policy requires completion of an Incremental Cost Analysis to assist in the plan evaluation and selection process, using IWR-Plan. The following steps are required for an incremental cost analysis

**Required data for Economics Analysis:**

- Habitat suitability indices (HSI’s), acreage and habitat units (HU’s) for each species for baseline and future without-project conditions. Typically developed by the project biologist in conjunction with the economist.
- HSI’s, acreage, HU’s and cost estimates for each alternative/management measure and increment (projected over period of analysis).
- Identification of which measures that can and cannot be implemented together, dependencies, etc.
- Estimates of ranges or standard deviations for habitat values and potential costs.

**Economic Tasks**

Estimates are based on completing work on four alternative (individual) restoration projects

- 1) Cost Analysis – Coordinate with Cost Engineering and Environmental Resources to determine the costs of separable management measures and increments, including construction, operation and maintenance and estimated real estate costs. Determine annualized costs for alternatives/measures based upon construction costs, periods of construction and the current Federal discount rate. ( 280 Hours; or - 4 alternative projects / 280 hours = 70 hours per project)
- 2) Determination of Average Annual Habitat Units – Based upon existing, base year, and projected habitat values provided by Environmental Resources staff for without project conditions and various management measures, develop estimates of average annual habitat units. ( 100 Hours; or – 4 alternative projects / 100

hours = 25 hours per project)

- 3) IWR Plan Program Input/Preparation – Input average annual costs and average annual habitat values for all management measures and increments. Through coordination with Study Team, determine dependencies, etc., between alternatives and input into program. Also, incorporate probability distributions or ranges for benefit and cost estimates. ( 240 Hours; or – 4 alternative projects / 240 hours = 60 hours per project)
- 4) Review and Analyze – Determine cost efficient and best-buy restoration plans utilizing the IWR-Plan model. Perform additional iterations to incorporate planning constraints, conduct “what if” analysis, refine estimates etc. Generate graphics displaying results of the incremental analysis, including the risk and uncertainty analysis. ( 240 Hours; or 4 alternative projects / 240 hours = 60 hours per project)

TIME REQUIRED: 860 Hours

## **II Flood Control Benefit/Cost Analysis**

Review of Corps and local sponsor technical data, study area and floodplain will be defined. Flood damage analysis will be assessed for the entire study area but will focus on those areas where flooding will be the greatest. The following tasks will be required:

- 1) Property inventory – In order to develop an inventory of property susceptible to flooding, overflow mapping will be required. Aerial photography and topographical elevation maps will also be required. Once a delineation is available, a site survey will be conducted to determine the first floor elevations, condition, and construction class of floodplain properties. Square footage estimates will be developed through real estate databases and measurements from aerial photography if necessary. ( 60 Hours)
- 2) Determine Floodplain Property Values – Based upon the square footage estimates, condition, and type of construction, depreciated replacement costs will be estimated for all floodplain properties. Contents will be estimated as a percentage of structure values or using the IRW damage tables. A site specific content survey will not be conducted, since flood control is not the primary purpose of the feasibility study and exiting flood problems appear to be limited ( 40 Hours)
- 3) Structure & Content Damage Analysis – The HEC-FDA program will be utilized to derive estimates of without project flood damages. Required input for the program will include the property inventory, water surface profiles

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(Base Year and Future Conditions), and depth/damage curves. Risk & Uncertainty Analysis will also be conducted. Required HEC-FDA program parameters for the R&U analysis include hydrologic estimates of standard deviation, skew and periods of record, hydraulic estimates of stage/discharge standard errors, as well as probability distributions for property values. ( 60 Hours)

Time and Travel Delays - Economic costs will be calculated for addition time required to re-route traffic around inundated highways and roads (base year and future without project condition). Residual costs will be calculated for each of the with project alternatives. ( 40 Hours)

- 4) Analysis of Alternatives – The HEC-FDA model will be used to quantify residual damages and damages reduced for each alternative. New water surface profiles will be required for each alternative. ( 60 Hours)
- 5) Benefit/Cost Analysis – Annualized estimates of project costs and benefits will be developed and the benefit/cost analysis will be completed to identify the National Economic Development plan. ( 40 Hours)

TIME REQUIRED: 300 Hours

### **III Erosion Damage Analysis**

Through coordination with Engineering, land areas susceptible to erosion that contain damageable property will be identified. Expected annual erosion damages will be computed, and potential benefits will be quantified.

- 1) Property inventory – In order to develop an inventory of property susceptible to erosion damages, erosion zone mapping, including aerial photography, will be required. Once a delineation is available, a site survey will be conducted to determine the condition, and construction class of erosion zone properties. Square footage estimates will be developed through real estate databases and measurements from aerial photography if necessary. Potential public infrastructure susceptible to damage will also be identified. ( 60 Hours)
- 2) Determine Erosion Zone Property Values – Based upon the square footage estimates, condition, and type of construction, depreciated replacement costs will be estimated for all erosion zone properties. Contents will be estimated as a percentage of structure values. A site-specific content survey will not be conducted, since erosion damage reduction is not the primary focus of the feasibility study. (80 Hours)

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- 3) Structure & Content Damage Analysis – A Monte Carlo simulation model will be developed to forecast potential erosion damages. Erosion distances by flood frequency will be required for this analysis, as well as standard deviations or ranges. The model will account for potential future loss of floodplain infrastructure throughout the period of analysis, as well as land loss as appropriate. ( 80 hours)
- 4) Analysis of Alternatives – Reductions in expected annual damages will be determined based upon the effectiveness of alternatives in alleviating future erosion. The Monte Carlo simulation model will be adjusted based upon information provided by Engineering. ( 40 Hours)

TIME REQUIRED: 260 Hours

#### **IV System of Accounts**

Principles and Guidelines (P&G) establishes the basic framework for project evaluations used by the Corps. It provides four accounts for the evaluation of proposed Federal projects. These accounts are:

- National Economic Development (NED)
- Environmental Quality (EQ)
- Regional Economic Development (RED)
- Other Social Effects (OSE)

These four accounts are consistent with NEPA requirements regarding the significant effects of a plan on the human environment and also address impacts on social well being.

The EQ account shows the effects on ecological, cultural and aesthetic attributes of significant natural and cultural resources that cannot be measured in monetary terms. The OSE account shows the impact of a plan on life, health and safety. The RED account presents the economic effects at the regional level, including income and employment effects. The NED account is required as a basis for the evaluation and display of alternative plans and is expressed in monetary terms. Data will be compiled and presented in table format for each of the accounts. (80 Hours)

TIME REQUIRED: 80 Hours

#### **V Meetings and Report Preparation**

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Preparation of the summary draft report for each of the restoration and damage analyses (assume approximately - 40 hours, respond to ITR comments - 20 hours)  
Attend team meetings, site visits and other project related meeting to clarify or coordinate activities (40 hours)

TIME REQUIRED: 100

Summary

<b>TASK</b>	<b>HOURS</b>	<b>COST</b>
Environmental Incremental Cost Analysis	860	\$ 81,700
Flood Control Benefit/Cost Analysis	300	\$ 28,500
Erosion Damage Analysis	260	\$ 24,700
System of Accounts	80	\$ 7,600
Meetings and Report Preparation	100	\$ 9,500
	<b>TOTAL</b>	<b>\$ 152,000</b>

\* Costs calculated based on 2006 rates for GS 12 Economist at \$95/hour

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# APPENDIX

H

**REAL ESTATE FOR PMP FOR FEASIBILITY PHASE STUDY  
FOR THE  
SKOKOMISH RIVER GENERAL INVESTIGATION  
Ecosystem Restoration and Flood Damage Reduction Study**

During the feasibility phase Real Estate Division will perform an assessment of the real estate requirements (i.e. lands, easements, and rights-of-way necessary for project construction and subsequent operation and maintenance) that support the preferred alternative in the project decision document. Work products include the following:

- Real Estate participation with the Project Manager (PM) and other district elements in the feasibility study and Project Management Plan (PMP) preparation. Meetings with the Non-Federal Sponsor (NFS) to discuss the general real estate process and to attend project status meetings with the PM, Project Delivery Team (PDT) and NFS.
- Procure title information for the proposed project lands. Purchase limited/litigation liability guarantee title for the proposed projects, current vesting deeds and any leases associated thereto, all exceptions to title, plus all documents associated with exceptions and legal descriptions, and list of third party interests when information is not available from or provided by the non-federal sponsor. If Indian Allotment Trust Lands and Tribal lands are involved in the proposed projects, the Skokomish Tribe or Bureau of Indian Affairs (BIA) will need to provide ownership information.
- Rights-of-Entry (ROE). Obtain ROE's for study investigations that require ground disturbance activities or where verbal permission from the landowner is not received for non-ground disturbance activities. Mason County Assessor's Office will need to provide full size tax assessor's maps cross-referenced with tax parcel number and taxpayers name. If Indian Allotment Trust Lands and Tribal lands are involved in the proposed projects, the Skokomish Tribe or Bureau of Indian Affairs (BIA) will need to provide ownership information.
- A real estate drawing for the Real Estate Plan (REP) that clearly delineates the project area, acreage, property ownerships within the project site, and estates required to support construction and subsequent operation and maintenance of the proposed project. The drawing would include utilities and facilities to be relocated and any potential hazardous substance areas regulated under CERCLA.
- Facility and Utility Relocations and Preliminary Attorney's Opinions of Compensability during feasibility. Identification of roads, railroads, pipelines, utilities, bridges etc. within the proposed project. Meetings and discussions with the NFS and PDT to determine the impact of the project on the facilities/utilities and determine the plan for remediation.
- Analysis and Application of Navigational Servitude. This involves discussions within the District (i.e. Real Estate Division, Office of Counsel, and Planning Branch) and

subsequent coordination with COE Headquarters regarding the appropriate application of navigational servitude for project sites located in navigable waters. OC/RE Attorney analysis if navigational servitude is appropriate for this study. It also considers the nexus between navigation, commerce and environmental projects.

- A valuation estimate of the lands, or gross appraisal, (i.e. reasonable cost estimate of the real estate interests for the proposed project) is prepared for planning and budgeting purposes.
- A physical taking analysis, separate from the REP, that briefly describes the nature and extent of the flooding that might occur as a result of the redirection of water caused by, but not limited to, levee removal or the construction of levee spreaders, and whether additional acquisition of lands are required. The taking analysis provides a reasoned conclusion on whether the expected induced flooding would rise to a level of a taking for which just compensation would be owed. The conclusion of this analysis will be included in the REP.
- A relocation survey and plan that identifies the relocation assistance benefits anticipated to be required in accordance with Public Law 91-646 including the number of persons, farms and businesses to be displaced by the project and estimated costs. The survey must also describe the availability of replacement housing and any need for last resort housing benefits. The relocation survey is a three step process. First, determine the eligibility of the displacee; second, resolve eligibility issues; and third, quantify the benefits.
- A real estate plan (REP) is the real estate work product that supports project plan formulation and includes a discussion of significant topics and the reason for supporting each conclusion presented. It identifies and describes the lands, easements, rights-of-way, relocations, and disposals (LERRD) necessary for the construction, operation, and maintenance of the project, including total acreage broken down by estate (property interest) and duration of easements required.
- A baseline cost estimate for the real estate (BCERE). The BCERE includes the fair market value of the LER required for the construction, operation and maintenance of a proposed project, including but not limited to those required for relocations, borrow material, and dredged or excavated material disposal; the costs of relocating displacees from residences, farms, or businesses under P.L. 91-646, as amended; the incidental acquisition costs for both the Government and the NFS; and estimated risk contingency costs.
- A. E. Hamilton, Chief of Realty Services, will be the Independent Technical Reviewer.

Issues to investigate during the feasibility phase include, but are not limited to the following:

- The ownership of the Skokomish riverbed.
- The ownership of the dredged material removed from the Skokomish riverbed.
- The location of the southern boundary of the Skokomish Tribal Reservation at the Skokomish River.

- The extent of downstream flooding caused by the redirection of water and whether additional acquisition of lands is required.
- The extent of possible relocations of residences, farms and/or business under PL 91-646.
- The presence of hazardous, toxic, or radioactive wastes that may be located in the proposed project sites.
- The possibility that property within the proposed study area was previously acquired under the Hazard Mitigation Grant Program (HGMP).

#### LIST OF REAL ESTATE PROJECT TEAM MEMBERS

A. E. Hamilton	Chief of Realty Services
Wanda Gentry	Real Estate Cost Share Program Manager
Bruce Rohde	Office of Counsel Real Estate Attorney
Vacant Position - TBD	Review Appraiser
Karen Brooks	Realty Specialist
Sarah Gilbertson	Realty Technician



**REAL ESTATE TASKS AND COST ESTIMATES  
FOR FCSA SCOPE OF STUDIES FOR  
SKOKOMISH RIVER GENERAL INVESTIGATION  
Mason County, Washington**

CE Preparation Date February 13, 2006

DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>1. ATTEND FEASIBILITY STUDY MEETINGS</b>					
Real Estate participation with the Project Manager (PM) and other district elements and Non-federal Sponsor (NFS) in feasibility study, and PCA requirement discussions. Meetings with the NFS to discuss the general real estate process, and attend project status meetings with the PM and other Project Delivery Team members (PDT). Duration of effort spreads over the feasibility phase. Estimate 2 hours per meeting for 72 meetings.					
<b>Duration: This work effort is not consecutive, and runs through the Feasibility Phase.</b>					
<b>Labor</b>					
Realty Specialist [G3N0A00]	18	@	\$612	=	\$11,016
R. E. Cost-Share Program Manager [G3N0A00]	4	@	\$800	=	\$3,200
RS Realty Technician [G3N0A00]	1	@	\$451	=	\$451
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
Office of Counsel (property) Attorney [G3E0000]	5	@	\$602	=	\$3,010
Review Appraiser [G3N0P00]	4	@	\$898	=	\$3,592
Appraiser [G3N0P00]	2	@	\$756	=	\$1,512
Contract Appraiser [Other Costs]	2	@	\$1,800	=	\$3,600
Lead Cartographer [G3N0P00]	2	@	\$705	=	\$1,410
<b>Non-labor costs</b>					
CADD Costs	2	@	\$96	=	\$192
<b>Subtotal Item 1</b>				=	<b>\$28,223</b>

**2. CONFERENCES**

Attend all feasibility review conferences. Review and comment on all subsequent MFR's and Planning Guidance Memorandums (PGM's). Prepare for attendance at the meeting, and tasks as a result of the meeting.

**DURATION: Work effort duration is consecutive.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	3	@	\$612	=	\$1,836
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
Chief, R.E. Division S&A [G3N0000]	0.5	@	\$1,218	=	\$609
Chief, Realty Services Branch S&A [G3N0A00]	0.75	@	\$1,030	=	\$773
<b>Subtotal Item 2</b>				=	<b>\$5,058</b>

**3. COORDINATION**

Internal coordination with the Project Manager and other appropriate District disciplines, including Real Estate Division elements to formulate the information and work products needed to support the Real Estate Plan (REP) requirements for the proposed project.

Full coordination, meetings and discussions with the NFS, Project Manager, Civil Design and/or Planning Branch contractor to identify what the impacts to the facilities/utilities are from the proposed project; and what the plan is for remediation.

This effort includes technical meetings to discuss what information or work products are needed, as well as when the work products are needed for Real Estate Division and the Office of Counsel (property) attorney to initiate the work on the Attorney's Preliminary Opinion of Compensability.

This also includes meetings with the engineering team or contractor to scope the most efficient approach of relating the proposed project design to the real estate information for creating real estate drawing(s) that show the land ownership in relationship to the proposed project footprint, any significant utilities and facilities to be relocated, and any known or potential HTRW lands.

**Duration is not consecutive, but precedes most of the real estate work product effort, and ends with preparation of the REP.**

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>Labor</b>					
Realty Specialist [G3N0A00]	12	@	\$612	=	\$7,344
R. E. Cost-Share Program Manager [G3N0A00]	4	@	\$800	=	\$3,200
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Lead Cartographer [G3N0P00]	2	@	\$705	=	\$1,410
Cartographer [G3N0P00]	0	@	\$649	=	\$0
Review Appraiser [G3N0P00]	3	@	\$898	=	\$2,694
Contract Appraiser [Other Costs]	0	@	\$1,800	=	\$0
Appraiser [G3N0P00]	0	@	\$756	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	2	@	\$240	=	\$480
Office of Counsel (property) Attorney [G3E0000]	8	@	\$602	=	\$4,816
Chief, R.E. Division S&A [G3N0000]	1	@	\$1,218	=	\$1,218
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
Labor Subtotal					\$23,222
<b>Non-Labor Costs</b>					
CADD Costs	2	@	\$96	=	\$192
<b>Subtotal Item 3</b>					\$23,414

**4. PROCURE TITLE INFORMATION FOR PROPOSED PROJECT LANDS**

For project study area, purchase limited litigation liability guarantee from a title company to obtain land ownership information for the proposed project footprint. Purchase will include current vesting deeds and any leases associated there to; all exceptions to both, plus all documents associated with exceptions and legal descriptions.

Purchase will include current vesting deeds and any leases associated there to; all exceptions to both, plus all documents associated with exceptions and legal descriptions.

For lands within the Skokomish Tribes Reservation Boundary, this estimate is based on the assumption that the Tribe and or Bureau of Indian Affairs (BIA) will provide the landownership information cross-referenced to an ownership information list.

The Project Manager will need to provided Real Estate Division with funding and or PR&C with adequate funding for Contracting Division's work effort. This estimate is based on the need to purchase and review 200 title reports.

**Duration is mostly consecutive except for title review activities. Contracting Division effort is provided below under Non-Labor Costs and based on Contracting Division's fee schedule.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	10	@	\$612	=	\$6,120
R. E. Cost-Share Program Manager [G3N0A00]	4	@	\$800	=	\$3,200
RS Realty Technician [G3N0A00]	7	@	\$451	=	\$3,157
Office of Counsel (property) Attorney [G3E0000]	10	@	\$602	=	\$6,020
RS Realty Technician (Contractor Sarah Gilbertson)	5	@	\$240	=	\$1,200
Chief, Realty Services S&A [G3N0A00]	1	@	\$1,030	=	\$1,030
Subtotal Labor					\$20,727
<b>Non-Labor Costs</b>					
Purchase land ownership information from title company. Estimate 200 title reports.	200	@	\$425	=	\$85,000
Contract Division Costs (Est. based on fee schedule)			\$25,000	=	\$25,000
Visa Purchase Cost (N/A for this task.)				=	\$0
Subtotal Other Costs					\$110,000
<b>Subtotal Item 4</b>					\$130,727

**5. RIGHTS-OF-ENTRY (ROE)**

If land access is needed to evaluate potential environmental sites, this is a valid task. If access is by water and no ground disturbance activities take place, the ROE requirement is negotiable.

This task is based on the need to obtained ROE's for approximately 210 parcels for HTRW and other investigation studies may be necessary.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<p>Areas needed to support COE field investigations activities must be identified early in the feasibility phase. Areas where ROE's are needed should be identified by priority areas, and cover all project disciplines needs (i.e. environmental, HTRW, geotechnical, cultural resources investigations, surveys etc.) needs.</p> <p>This estimate is based on the assumption that title information under item number 4 will be purchased prior to this work activity and that only 10 additional parcels outside the basic project footprint will be needed to support this activity. This estimate is also based on the assumption that ownership information will be made available from BIA or the Tribe for Tribal Reservations lands. For areas outside the proposed project footprint, other than Tribal Reservation lands, only a limited title plant search (i.e. assessors maps cross referenced with parcel numbers and tax payers' names) for 10 additional parcels is needed from the title company. Further, purchase of title information for ROE work is only needed if GIS information is not available and provided by Mason County when this task must be performed.</p> <p>Prepare basic ROE exhibits and standard ROE documents. Obtain ROE's wherever COE study activities include ground disturbing activities, HTRW investigations, geotechnical investigation, cultural resources reconnaissance, environmental evaluations, survey work, etc. Estimate is based on need to obtain 210 ROEs. The 210 ROE estimate amount might increase or decrease depending on the actual number of ROEs identified as required. Quad maps or county assessor's maps will be used as exhibits to ROE.</p> <p><b>Duration:</b> Work effort is not consecutive. This task should be planned for the beginning of feasibility phase <b>before</b> COE technical offices need access for ground disturbance activities.</p> <p>Real Estate Division requires at least 120 days lead time to obtain the ROE's before District elements begin any ground disturbance activities. A list of minimum information requirements will be provided by separate cover or upon request.</p>					
<b>Labor</b>					
Realty Specialist [G3N0A00]	10	@	\$612	=	\$6,120
R. E. Cost-Share Program Manager [G3N0A00]	4	@	\$800	=	\$3,200
RS Realty Technician [G3N0A00]	55	@	\$451	=	\$24,805
Office of Counsel (property) Attorney [G3E0000]	6	@	\$602	=	\$3,612
RS Realty Technician (Contractor Sarah Gilbertson)	15	@	\$240	=	\$3,600
Chief, R.E. Division S&A [G3N0000]	1	@	\$1,218	=	\$1,218
Chief, R.E. Division Secretary [G3N0000]	0.5	@	\$359	=	\$180
Chief, Realty Services S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
<b>Subtotal Labor</b>					<b>\$44,795</b>
<b>Non-Labor Costs</b>					
Purchase additional land ownership information from title company. Estimate 10 title reports.	10	@	\$425	=	\$4,250
Contracting Division (Cost Est. from Fee Schedule)			\$1,500	=	\$1,500
Visa Costs			\$0	=	\$0
Reprographics (Mylars-bluelines-1/2 size)				=	\$0
<b>Subtotal Other Costs</b>					<b>\$5,750</b>
<b>Subtotal Item 5</b>				=	<b>\$50,545</b>

**6. FACILITY AND UTILITY RELOCATIONS AND ATTORNEY'S OPINION OF COMPENSABILITY**

Facility and Utility relocations include identifying roads, railroads, pipelines, utilities, bridges etc. within the proposed Project footprint. The objective is for the Real Estate Plan (REP) to match the section of the Engineering Design portion of the report along with the results of a Attorney's Preliminary Opinion of Compensability summarized.

Meetings and discussions with the NFS, Project Manager and full coordination with the engineering team members to identify what the impact is to the facilities/utilities from the project, and what the plan is for the remediation. Includes obtaining and using existing inventory of the facilities and utilities within the proposed project footprint, as provided by Mason County and/or Skokomish Tribe, cross-referenced to documents of record and the proposed remediation needed.

This cost estimate is based on ten (10) facility and utility relocations.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>Duration is not consecutive, but an initial draft opinion is needed in order to determine real estate requirements, initiate any appraisal work, the real estate plan or the baseline real estate cost estimate tasks. Project and or LER drawings need to show significant utility and facilities to be relocated.</b>					
<b>Labor</b>					
R. E. Cost-Share Program Manager [G3N0A00]	3	@	\$800	=	\$2,400
Realty Specialist [G3N0A00]	7	@	\$612	=	\$4,284
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
Office of Counsel (property) Attorney [G3E0000]	13	@	\$602	=	\$7,826
Chief, R.E. Division S&A [G3N0000]	1	@	\$1,218	=	\$1,218
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
Labor Subtotal					\$18,028
<b>Subtotal Item 6</b>				=	\$18,028

**7. REAL ESTATE DISCUSSIONS ON APPLICATION  
OF NAVIGATIONAL SERVITUDE**

Discussions, policy and legal investigations regarding the appropriate application of navigational servitude for project lands located in navigable waters. To initiate this investigation, Real Estate Division will need the preferred alternative footprint with the GLO Plats (when and where available) superimposed over the project footprint.

An Office of Counsel (property) attorney will perform a legal and policy review to determine if the application of navigational servitude is appropriate for the proposed project. The results of this investigation will be documented in a legal memo.

The results of the attorney's investigation will include a discussion on the application of navigational servitude, and proposed deviations from policy. The attorney's effort will including forwarding any policy deviations or questions as the availability of navigational servitude to CERRE-AP who will coordinate with the appropriate HQ USACE elements and provide a response. The results of the attorney's investigation and HQ USACE coordination and response must be completed before finalizing the LER drawings, see item number 10, including the appraisal effort - see item 12, and completion of the REP - see item number 14.

**Duration: The duration for this task is dependent upon the receipt of adequate project information, the complexity of the issues, and need to obtain higher authority approval.**

<b>Labor</b>					
Office of Counsel (property) Attorney [G3E0000]	7	@	\$602	=	\$4,214
RS Realty Technician (Contractor Sarah Gilbertson)	0.25	@	\$240	=	\$60
Chief, R.E. Division S&A [G3N0000]	0.5	@	\$1,218	=	\$609
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
Realty Specialist [G3N0A00]	3	@	\$612	=	\$1,836
<b>Subtotal Item 7</b>				=	\$10,379

**REAL ESTATE TASKS AND COST ESTIMATES  
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Mason County, Washington**

**CE Preparation Date February 13, 2006**

DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>8. PHYSICAL TAKING ANALYSIS</b>					
A written analysis separate from the REP that briefly describes the nature and extent of the flooding that might occur as a result of the redirection of water caused by, but not limited to, levee removal or the construction of levee spreaders, and whether additional acquisition of lands are required. The taking analysis provides a reasoned conclusion on whether the expected induced flooding would rise to a level of a taking for which just compensation would be owed. The conclusion of this analysis will be included in the REP. Information needed: facts relating to the depth, frequency, duration, and extent of the expected induced flooding. This task is based on the need to investigate nine (9) sites.					
<b>Duration is dependent on the availability of needed information.</b>					
<b>Labor</b>					
Office of Counsel (property) Attorney [G3E0000]	12	@	\$602	=	\$7,224
RS Realty Technician (Contractor Sarah Gilbertson)	2	@	\$240	=	\$480
Chief, R.E. Division S&A [G3N0000]	0.5	@	\$1,218	=	\$609
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Chief, Realty Services Branch S&A [G3N0A00]	1	@	\$1,030	=	\$1,030
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
Realty Specialist [G3N0A00]	4	@	\$612	=	\$2,448
<b>Subtotal Item 8</b>				=	<b>\$13,391</b>

**9. REAL ESTATE REQUIREMENTS**

To initiate this task, Real Estate Division must receive preliminary design drawings showing project feature locations and general descriptions. Establish specific real estate requirements, including identifying standard estates, as necessary, and use of existing estates or development of non-standard estates, when necessary. This cost estimate assumes non-standard estates will be needed for the proposed project. This estimate assumes the estates will be approved with the report approval. This task includes coordination of appropriate environmental estates with PM and ERS. This also includes investigating the possibility of any properties within the proposed project footprint were acquired using FEMA funds.

**Duration is dependent upon availability and receipt of preliminary design drawings, written description of project features.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	5	@	\$612	=	\$3,060
R. E. Cost-Share Program Manager [G3N0A00]	3	@	\$800	=	\$2,400
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Office of Counsel (property) Attorney [G3E0000]	5	@	\$602	=	\$3,010
RS Realty Technician (Contractor Sarah Gilbertson)	0	@	\$240	=	\$0
Chief, R.E. Division S&A [G3N0000]	1	@	\$1,218	=	\$1,218
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
<b>Subtotal Item 9</b>				=	<b>\$11,748</b>

**10. PREPARE PRELIMINARY REAL ESTATE DRAWINGS FOR REAL ESTATE PLAN**

This serves as the Federal Government's cost estimate for this task when the task will be accomplished by the NFS or Planning Branch contractor.

Prepare preliminary real estate drawings for the Real Estate Plan. This estimate assumes the following:

- (a) Ownership plat maps will be purchased under item number 4 of this cost estimate, except for BIA right of way information and drawings to be provided by the Tribe or BIA.
- (b) The project plan is for 18 sites involving a combination of fee and easement property interests.
- (c) Estimate the need for 18 permanent access easements to the 18 non-contiguous sites.
- (d) Estimate the need for 10 temporary staging area sites during construction.
- (e) Estimate the need for 5 temporary disposal sites.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<p>(f) Approximately 200 parcels of land and ownerships are involved.</p> <p>(g) COE Planning Contractor will prepare preliminary and final feasibility LER drawings using County Assessor's maps, or GIS information if available when it comes time to do this task. If the NFS or Planning Contractor is performing the design work and project footprint, this task should be combined with that task.</p> <p>(h) The COE Planning Contractor or NFS will complete the final LER drawing for REP and Gross Appraisal task.</p> <p><b>Duration: Work effort is mostly consecutive work days within a 60 day period.</b></p>					
<b>Labor</b>					
Lead Cartographer (Incl. S&A) [G3N0P00]	7	@	\$705	=	\$4,935
Cartographer [G3N0P00]	26	@	\$649	=	\$16,874
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
Realty Specialist [G3N0A00]	7	@	\$612	=	\$4,284
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
R. E. Cost-Share Program Manager [G3N0A00]	3	@	\$800	=	\$2,400
Chief, Realty Services Branch S&A [G3N0A00]	1	@	\$1,030	=	\$1,030
<b>Labor Subtotal</b>				=	<b>\$29,763</b>
<b>Non-Labor Costs</b>					
CADD Costs [\$12/hr x 8 hrs=\$96]	32	@	\$96	=	\$3,072
Reprographics (Mylars-bluelines-1/2 size)				=	\$0
<b>Subtotal Other Costs</b>				=	<b>\$3,072</b>
<b>Subtotal Item 10</b>				=	<b>\$32,835</b>

**11. PERFORM PL 91-646 RELOCATION SURVEY**

The effort for this task is for performing a PL 91-646 investigation to determine if the proposed project alternative for the Skokomish River Project will cause a displacement of residences, farms and/or business as result of implementing the project. The investigation and determination is based on a three step (3) step process.

**Step I:**

a. Delivery of a proposed project footprint to Real Estate Division, and an in field survey with Project Managers and others, as needed to determine and categorize the types impacts, on residences (owners and occupants) farms, and businesses to be affected by the acquisitions needed (i.e. fee, easement, leases etc.) to support each proposed preferred feasibility project sites.

b. Prepare inventory to determine potential relocation benefits, and transition to Step II.

Note: The COE review appraiser might be involved in items a. and b. under this step.

**Step II:** Resolve Eligibility Issues: Office of Counsel can provide a legal opinion on eligibility issues.

**STEP III:** Quantify Benefits.

a. Real Estate Division, with any necessary input from Office of Counsel, will determine the number of residences, farms or businesses eligible for benefits as determined in Steps 1 and 2, including projected benefit amounts.

b. Summarize results in REP.

c. Use inventory to identify next steps, and develop project milestones for project construction, and developing Real Estate Division Baseline Cost Estimate for the next project phases.

**Duration of this work task is not consecutive but precedes development of the REP, and follows the determination of the application of navigational servitude.**

**Labor**

Realty Specialist [G3N0A00]	25	@	\$612	=	\$15,300
R. E. Cost-Share Program Manager [G3N0A00]	1	@	\$800	=	\$800
RS Realty Technician (Contractor Sarah Gilbertson)	0	@	\$240	=	\$0
Office of Counsel (property) Attorney [G3E0000]	2	@	\$602	=	\$1,204
Chief, R.E. Division S&A [G3N0000]	0.25	@	\$1,218	=	\$305
RS Realty Technician [G3N0A00]	8	@	\$451	=	\$3,608
Chief, Realty Services Branch S&A [G3N0A00]	1	@	\$1,030	=	\$1,030

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<i>Subtotal Item 11</i>				=	\$22,247

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
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**12. PREPARE LAND COST ESTIMATE**

This effort typically includes a two step process, that is performing a 10% evaluation effort for the proposed project alternatives; and second performing the land cost estimate task for the preferred plan.

**STEP I:** The 10% evaluation effort includes the District PM tasking a Planning Contractor to provide assessor's maps, including the larger parcel, and surrounding ownerships in addition to assessor's information (i.e. assessed values, zoning), and cross-referencing the ownership information to the assessor's maps.

**STEP II:** The Contract Appraiser prepares the land cost estimate for the land payments sub-feature of the M-CACES 01 Lands and Damages account. The Review Appraiser will write a scope of work for the contract appraisal. The Review Appraiser's estimated time covers contract and review effort. This effort includes developing a Base Data book and separate parcel appraisals. Appraisal Report will be a "restricted format appraisal" and appraise the taking only, plus damages to the remainder. This effort is based on the following:

- (a) The project plan is for 18 sites involving a combination of fee and easement property interests.
- (b) Estimate the need for 18 permanent access easements to the 18 non-contiguous sites.
- (c) Estimate the need for 10 temporary staging area sites during construction.
- (d) Estimate the need for 5 temporary disposal sites.
- (e) Approximately 200 parcels of land and ownerships are involved.

Work effort for this project also assumes and considers approval duration for NWD final Land Cost Estimates for estimates over \$150,000. Funding of higher authority approval is not included in this cost estimate.

**Note:** Higher authority approval effort by NWD requires review duration of at least 15 working days. USACE review duration requires at least 15 working days.

**Duration:** Mostly consecutive days within a 180 day period, not including higher authority approval. Add an additional 30 days to the project schedule for higher authority approval.

**Labor**

Appraiser [G3N0P00]	0	@	\$756	=	\$0
Contract Appraiser [Other Costs]	150	@	\$1,800	=	\$270,000
Review Appraiser [G3N0P00]	35	@	\$898	=	\$31,430
Realty Specialist [G3N0A00]	6	@	\$612	=	\$3,672
RS Realty Technician (Contractor Sarah Gilbertson)	0	@	\$240	=	\$0
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Division Chief Secretary [G3N0000]	1	@	\$359	=	\$359
Chief R. E. Division S&A [G3N0000]	1	@	\$1,218	=	\$1,218
<b>Labor Subtotal</b>					<b>\$308,279</b>
<b>Non-Labor Costs</b>					
Contracting Division Costs			\$25,000	=	\$25,000
Government Vehicle (\$50/day)	17	@	\$50	=	\$850
Miscellaneous Supplies (film, maps etc.)			\$150	=	\$150
Reprographics (mylars, copies, etc.)			\$2,000	=	\$2,000
<b>Other Costs Subtotal</b>					<b>\$28,000</b>
<b>Subtotal Item 12</b>				=	<b>\$336,279</b>

**13. PREPARE A BASELINE COST ESTIMATE FOR REAL ESTATE IN M-CACES FORMAT**

This estimate includes Real Estate Division effort to determine both the Federal and Non-Federal administrative and incidental costs associated with LERRD acquisition. Includes coordinating with Non-Federal Sponsor to determine these costs.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>Duration: Estimate 15 non-consecutive days.</b>					
<b>Labor</b>					
Realty Specialist [G3N0A00]	7	@	\$612	=	\$4,284
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Review Appraiser [G3N0P00]	0.5	@	\$898	=	\$449
Office of Counsel (property) Attorney [G3E0000]	0.5	@	\$602	=	\$301
Lead Cartographer [G3N0P00]	0.5	@	\$705	=	\$353
Cartographer [G3N0P00]	0	@	\$649	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	2	@	\$240	=	\$480
Chief, R.E. Division S&A [G3N0000]	0.25	@	\$1,218	=	\$305
Chief, Realty Services Branch S&A [G3N0A00]	0.5	@	\$1,030	=	\$515
<b>Labor Subtotal</b>					<b>\$8,287</b>
<b>Non-Labor Costs</b>					
CADD Costs [\$12/hr x 8 hrs = \$96]	0.5	@	\$96	=	\$48
<b>Subtotal Item 13</b>					<b>\$8,335</b>

**14. PREPARE A REAL ESTATE PLAN (REP) FOR THE FEASIBILITY REPORT**

Prepare REP that describes the minimum real estate needed in support of the project plan formulation, including estimated costs and schedules. Assesses Non-Federal Sponsor's real estate capability and prepare assessment for inclusion with project decision document.

**Duration: Estimate 25 non-consecutive days.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	23	@	\$612	=	\$14,076
R. E. Cost-Share Program Manager [G3N0A00]	7	@	\$800	=	\$5,600
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	4	@	\$240	=	\$960
Chief, R.E. Division S&A [G3N0000]	0.25	@	\$1,218	=	\$305
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
<b>Subtotal Item 14</b>					<b>\$23,001</b>

**15. REVIEW AND COMMENT ON DRAFT AND FINAL PMP**

Review and comment on summary of real estate requirements, schedules, baseline cost estimate, project management plan, and any accompanying exhibits.

<b>Labor</b>					
Realty Specialist [G3N0A00]	5	@	\$612	=	\$3,060
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Review Appraiser [G3N0P00]	1	@	\$898	=	\$898
Contract Appraiser [Other Costs]	0	@	\$1,800	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
Chief, Realty Services S&A [G3N0A00]	1	@	\$1,030	=	\$1,030
<b>Subtotal Item 15</b>					<b>\$6,828</b>

**16. STUDY TEAM REVIEW**

Study Team review, comment, coordination, and revisions of the feasibility report.

<b>Labor</b>					
Realty Specialist [G3N0A00]	4	@	\$612	=	\$2,448
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
Chief, R.E. Division S&A [G3N0000]	0.25	@	\$1,218	=	\$305
Chief, Realty Services Branch S&A [G3N0A00]	1	@	\$1,030	=	\$1,030
<b>Subtotal Item 16</b>					<b>\$5,623</b>

**17. ASCERTAIN NON-FEDERAL SPONSORS' LEGAL AUTHORITIES**

Preliminary coordination with the Project Manager and Economist in initial identification of a potential Non-Federal Sponsor. Investigate the legal authority of the Non-Federal Sponsor and make a firm determination that such entity has full legal authority to obligate itself to execute and perform the requirements of local cooperation. This estimate includes review of the Non-Federal Sponsor's legal authority to acquire and hold title to land.

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Duration: Initiate legal memo activity upon identification of a potential Non-Federal Sponsor and complete by date of draft decision document.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
<b>Labor</b>					
Realty Specialist [G3N0A00]	2	@	\$612	=	\$1,224
R. E. Cost-Share Program Manager [G3N0A00]	1	@	\$800	=	\$800
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
Office of Counsel (property) Attorney [G3E0000]	3	@	\$602	=	\$1,806
RS Realty Technician (Contractor Sarah Gilbertson)	1	@	\$240	=	\$240
<b>Subtotal Item 17</b>				=	<b>\$4,070</b>

**18. PROJECT COOPERATION AGREEMENT (PCA) AND DEVIATION REPORT**

Participate with Project Manager and Office of Counsel Attorney in drafting, review, and comment on the preliminary draft PCA. Provide input to PCA deviations, as necessary.

<b>Labor</b>					
Realty Specialist [G3N0A00]	1	@	\$612	=	\$612
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	0	@	\$240	=	\$0
R. E. Cost-Share Program Manager [G3N0A00]	4	@	\$800	=	\$3,200
<b>Subtotal Item 18</b>				=	<b>\$3,812</b>

**19. INDEPENDENT TECHNICAL REVIEW (ITR) OF DECISION DOCUMENT**

Includes review time, meeting with technical review team, and coordinating with study team member to address/resolve issues associated with the feasibility report.

**Duration: Non-consecutive 15-30 days± depending on complexity of issues.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	7	@	\$1,030	=	\$7,210
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
R. E. Cost-Share Program Manager [G3N0A00]	1	@	\$800	=	\$800
RS Realty Technician (Contractor Sarah Gilbertson)	0	@	\$240	=	\$0
Chief, R. E. Div S&A [G3N0000]	1	@	\$1,218	=	\$1,218
<b>Subtotal Item 19</b>				=	<b>\$9,228</b>

**20. REVISE COMMENT AND COORDINATE RESPONSE TO TECHNICAL REVIEW AND HIGHER AUTHORITY REVIEW COMMENTS**

Discuss and make revisions as appropriate to the feasibility report based on comments raised as a result of technical and higher authority reviews.

**Duration: Days non-consecutive. Estimate 15-30 days+ depending on complexity of issues to resolve.**

<b>Labor</b>					
Realty Specialist [G3N0A00]	4	@	\$612	=	\$2,448
RS Realty Technician [G3N0A00]	0	@	\$451	=	\$0
R. E. Cost-Share Program Manager [G3N0A00]	2	@	\$800	=	\$1,600
Office of Counsel (property) Attorney [G3E0000]	1	@	\$602	=	\$602
Review Appraiser [G3N0P00]	1	@	\$898	=	\$898
Cartographer [G3N0P00]	0	@	\$649	=	\$0
RS Realty Technician (Contractor Sarah Gilbertson)	2	@	\$240	=	\$480
Chief, R.E. Division S&A [G3N0000]	0.5	@	\$1,218	=	\$609
Chief, Realty Services Branch S&A [G3N0A00]	2	@	\$1,030	=	\$2,060
<b>Labor Subtotal</b>					<b>\$8,697</b>
<b>Non-Labor Costs</b>					
CADD Costs [\$12/hr x 8 hrs = \$96]		@	\$96	=	\$0
<b>Subtotal Item 20.</b>				=	<b>\$8,697</b>

**21. REAL ESTATE PROJECT MANAGEMENT**

General oversight activities, (i.e. policy and process guidance, upward reporting activities, issue resolution and all other real estate analysis, etc. not otherwise addressed under specific tasks and SOW).

**Duration: Days non-consecutive throughout the Feasibility Phase.**

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<b>Labor</b>					
R. E. Cost-Share Program Manager [G3N0A00]	39	@	\$800	=	\$31,200
Chief Realty Services S&A [G3N0A00]	9.25	@	\$1,030	=	\$9,528
Chief R. E. Div S&A [G3N0000]	0	@	\$1,218	=	\$0
<b>Subtotal Item 21</b>				=	<b>\$40,728</b>

**22. RE DIV ADMINISTRATIVE SUPPORT/TECHNICAL RESOURCES**

**BRANCH [OFFICE CODE: NWS-RE-TR]**

P&C budgeted effort is for a four year period.

Cost to establish and maintain main real estate files. a.

Mail and File Clerk [G3N0P00]	4	@	\$344	=	\$1,376
b. CEFMS activities.					
Office Automation Clerk - Timekeeper [Contractor Megan Christophel]	4	@	\$451	=	\$1,804
b. CEFMS support to create and amend labor and CADD distribution PR&C's.					
Budget Technician [G3N0P00]	4	@	\$451	=	\$1,804
c. CEFMS support to create, amend and/or approve and maintain labor PR&C's for Real Estate Division. Provide monthly expenditure report. This estimate assumes work item/resource plan is created by PPMD Project Manager.					
Realty Specialist [G3N0P00]	4	@	\$668	=	\$2,672
d. REMIS systems support					
Information Technician Specialist [G3N0P00]	4	@	\$623	=	\$2,492
e. Branch Chief, Supervisor Realty Specialist, S&A [G3N0P00]	4	@	\$844	=	\$3,376
<b>Subtotal Item 22</b>				=	<b>\$13,524</b>

**TOTAL REAL ESTATE DIVISION COST**

<b>Subtotal (Items 1-22)</b>		=	\$806,720
Contingency of	32%	=	\$258,150
<b>GRAND TOTAL (Rounded)</b>		=	<b>\$1,065,000</b>

**Notes:**

- This cost estimate is based on District overhead (20%) and departmental overhead (54%) rates for FY 2006 salary rates as of Jan 22, 2006.
- This cost estimate includes a 32% contingency fee due to the limited known information. This contingency fee includes 2% to cover potential labor rate increases later this year. Costs could be greater or less depending on the actual project study plan; and the availability, timeliness, and quality of information provided to Real Estate Division.
- Funding (CEFMS, P2, Contracting Div, etc.):**
  - See attached summary sheet for total effort by organization code and for contract employee.
  - For contract employee's time and effort establish the activity in P2, the resource code to budget is "OTHFACSVCS." For creating a PR&C in CEFMS, the resource code is "FBA-CASU".
  - Technical Reviewer should be funded separately, with technical review activities handled separate of the PDT.
  - For organization code G3N0P00 issue a labor number and funding for the different work activities for Budget, Cadastral and Appraisal. See P2 Summary section for total dollars for each work unit (Budget, Cadastral and Appraisal).
  - See estimates for Contracting Division support under items 4, 5, and 12.
- Most days of work are not consecutive.
- Project Assumptions and General Information:**

This feasibility cost estimate is based on the following assumptions::

- This cost estimate is for an ecosystem restoration study, with secondary flood control.
- Mason County and the Skokomish Tribe are the Non-federal Sponsors.
- Real Estate Division work effort and assumptions were developed using the following information:
  - \* 10 miles of levee removal (4 proposed project sites) and construct setback levees (3 proposed project sites) along the South Fork and Main Stem;
  - \* 10 new Large Woody Debris (LWD) or Engineered Log Jams (ELJ) habitat structures in the Main Stem (considered as one proposed project site);

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- \* 3 new instream sediment stabilization structures in the South Fork (3 proposed project sites);
- \* 2 miles of road removal within the Skokomish Indian Reservation (3 proposed project sites);
- \* One spreader levee located on the south side of the Main Stem (1 proposed project site);
- \* Riparian planting to be associated with the above projects (included in the proposed project sites listed above).

The estimate does NOT include any proposed projects for:

- \* Cushman Dam, revisions to Cushman or the Diversion Dam, or construction of a new dam.
- \* Wetland agricultural rotation.
- \* Road and bridge modifications at SR 101 and SR 106.
- \* Rerouting TPU high voltage lines and PUD power lines or sub-stations.
- \* Sediment stabilization in the upper watersheds of Vance Creek and the North and South Fork.
- \* Reconnection of 500 acres freshwater wetlands with two 800 foot side channels on the lower Skokomish River.
- \* Vance Creek realignment.
- \* Removal of Bourgal Road.
- \* Installation of 4 prefab 50 foot bridges on Reservation Road.
- \* Diversion channels

d. Real Estate Division's effort and cost estimate is based on evaluation of approximately 24 project sites. The large wood debris sites are being considered as 10 separate sites for the purposes of this estimate.

e. Approximately 18 sites will be mapped, appraised and described in the real estate plan.

f. There will be changes in the scope of work, effort, and number of sites as the study progresses. All work tasks will be reevaluated before actual work is initiated to determine any changes in level of effort, dollars and time needed to complete a task.

g. For lands not part of the Skokomish Reservation, ownership plat maps cross-referenced to a list of ownerships, types of zoning and assessed values will be purchased under Item number 4 of this cost estimate if not otherwise available and provided by Mason County.

h. Ownership information for lands part of the Skokomish Reservation will be provided by the Tribe and or Bureau of Indian Affairs (BIA).

i. Approximately 200 ownerships are involved with an additional 10 ownerships for right of entry work to support field studies being performed by COE personnel.

j. The Engineering team, contractor or NFS's will prepare and provide preliminary real estate drawings (conceptual plan) using County assessor maps and BIA maps superimposed over the proposed project footprints for the preferred alternatives (i.e. each non-contiguous project site). The proposed project footprints will include any significant utilities and facilities to be relocated, and any known location of any HTRW (CERCLA) lands. There will be at least 5 reviews by COE, Real Estate Division before the real estate drawings are final for the feasibility report (i.e. preliminary initial review, two (2) interim reviews, draft final review, and final drawing review.) The initial copy of the preliminary review map will be used by Real Estate Division to determine the necessary property interests needed for each site. The real estate requirements, and review comments will be provided to person(s) responsible for preparing the real estate mapping work.

k. The Engineering team, contractor or NFS's will provide the final real estate drawings in order for Real Estate Division to initiate the following tasks and work products: Land Cost Estimate (Gross Appraisal; Real Estate Plan (REP); Attorney's Opinion of Compensability, Induced Flooding Taking Analysis, and Real Estate Division Baseline Cost Estimate.

**PL 91-646 Task Assumptions**

The estimate is based on the possibility of 30 residences, farms, or business that might need to be relocated as a result of the proposed project.

Investigation and determination if PL 91-646 Relocations will apply is based on a three (3) step process identified as follows:

**Step I:**

a. Delivery of a proposed project footprint to Real Estate Division, and an in field survey with Project Managers and others, as needed to determine and categorize the types impacts, on residences (owners and occupants) farms, and businesses to be affected by the acquisitions needed (i.e. fee, easement, leases etc.) to support each proposed preferred feasibility project sites.

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b. Prepare inventory to determine potential relocation benefits, and transition to Step II.

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Note: The COE review appraiser might be involved in items a. and b. under this step.

**Step II:** Resolve Eligibility Issues: Office of Counsel can provide a legal opinion on eligibility issues.

**STEP III:** Quantify Benefits.

a. Real Estate Division, with any necessary input from Office of Counsel, will determine the number of residencies, farms or businesses eligible for benefits as determined in Steps 1 and 2, including projected benefit amounts.

b. Summarize results in REP.

c. Use inventory to identify next steps, and develop project milestones for project construction, and developing Real Estate Division Baseline Cost Estimate for the next project phases.

**HTRW/CERCLA Task Assumptions:**

a. Real Estate Division will receive a copy of the draft and final HTRW investigation findings.

b. Lands determined to contain HTRW will be delineated on the real estate drawing by Engineering Team or Contractor.

**Navigational Servitude**

a. Real Estate Division will receive a copy of the proposed project alternatives and footprints with landownership information and GLO plat information superimposed.

b. COE Office of Counsel (property) attorney will use drawings provided to perform a legal and policy review, determine if application of navigational servitude needs HQUSACE review and approval before providing the district with a final opinion.

**Opinion of Compensability**

Real Estate Division will receive from the Engineering Team or NFS's the following items:

- a. Inventory list of what facilities and utilities will be impacted by the project.
- b. Proposed remediation of the facilities and utilities to be relocated to accommodate the federally assisted project.
- c. Inventory list of facilities and utilities cross-referenced to the document of record.
- d. Copy of the agreement that allows utility or facility to be in place.
- e. Assume 10 facility and utility owners are involved.

**ROE's**

Assume 210 parcels for HTRW and other investigation studies may be necessary. Ownership information might be available from NFS, BIA and or obtained from the title company for lands outside of the reservation boundary. The estimate for this item includes the need for a title plant search from the title company for at least 10 additional parcels not covered under item number 4 of this cost estimate.

Anticipate initiating this activity early in the feasibility phase, based on needs identified by district elements to the PM.

**Land Cost Estimate - Gross Appraisal**

The appraisal effort might be reduced if the preferred plan includes less sites. Review Appraiser will write SOW for Contracting out appraisal assignment. Contract appraiser will prepare a basic data book and separate parcel appraisals, following a "restricted format, and appraise the taking only and damages to the remainder.

Real Estate Division Administrative Support/Technical Resources Branch (NWS-E-TRI) will need a PR&C for the Appraisal Contract and a PR&C to pay the Contracting Division fee.

The appraisal effort might be reduced if the preferred plan includes less sites. Currently the appraisal effort is based on the following information.

- (a) The project plan is for 18 sites involving a combination of fee and easement property interests.
- (b) Estimate the need for 18 permanent access easements to the 18 non-contiguous sites.
- (c) Estimate the need for 10 temporary staging area sites during construction.
- (d) Estimate the need for 5 temporary disposal sites.

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(e) Approximately 200 parcels of land and ownerships are involved.

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DESCRIPTION OF WORK	PERSON- DAYS	@	RATE	=	COSTS
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**Real Estate Mapping**

LER Mapping will be performed by the engineering team or NFS's contractor or COE Planning Contractor.

General real estate assumptions for LER mapping are stated below. The cost and effort could be more or less depending on the availability of information, number of sites etc.

The Real Estate LER mapping estimate is the Government estimate for evaluating any proposals provided by the Planning Contractor for this task.

- (a) The project plan is for 18 sites involving a combination of fee and easement property interests.
- (b) Estimate the need for 18 permanent access easements to the 18 non-contiguous sites.
- (c) Estimate the need for 10 temporary staging area sites during construction.
- (d) Estimate the need for 5 temporary disposal sites.
- (e) Approximately 200 parcels of land and ownerships are involved.



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Summary Sheet by Organization Code

Feasibility Phase	O of Chief		O of C		RS		G3N0A00		G3N0P00		G3N0000		G3N0000		OTHFACSVCS		CADD		Other Costs		Contracting Division		
	G3N0000	Labor	G3E0000	Labor	G3N0A00	Labor	G3N0A00	Labor	G3N0P00	Labor	G3N0000	Travel	G3N0000	Vehicle Miles	G3N0000	Travel	G3N0000	Non-labor	G3N0000	Non-labor	Non-labor	G3S3P0D00	G3S3P0D00
7 Real Estate Discussions on application of navigational servitude	\$ 609.00		\$ 4,214.00		\$ 2,060.00		\$ 1,836.00																
SUBTOTAL	\$ -		\$ -		\$ 3,436.00		\$ -																
8 PHYSICAL TAKING ANALYSIS	\$ 609.00		\$ 7,224.00		\$ 1,030.00		\$ 1,600.00																
SUBTOTAL	\$ 609.00		\$ 7,224.00		\$ 5,078.00		\$ -																
9 Real Estate Requirements	\$ 1,218.00		\$ 3,010.00		\$ 3,060.00		\$ 2,060.00																
SUBTOTAL	\$ 1,218.00		\$ 3,010.00		\$ 7,520.00		\$ 2,400.00																
10 Prepare Preliminary Real Estate Drawings for Real Estate Plan	\$ -		\$ -		\$ 2,400.00		\$ -																
SUBTOTAL	\$ -		\$ -		\$ 7,714.00		\$ -																
11 Perform PL 91-646 Relocation Survey	\$ 305.00		\$ 1,204.00		\$ 15,300.00		\$ 3,608.00																
SUBTOTAL	\$ 305.00		\$ 1,204.00		\$ 20,738.00		\$ 1,030.00																
12 Prepare Land Cost Estimate	\$ 359.00		\$ 1,218.00		\$ 3,672.00		\$ 1,600.00																
SUBTOTAL	\$ 1,577.00		\$ -		\$ 5,272.00		\$ -																
13 Prepare a Baseline Cost Estimate for Real Estate in M-CACES Format	\$ 305.00		\$ 301.00		\$ 4,284.00		\$ 515.00																
SUBTOTAL	\$ 305.00		\$ 301.00		\$ 6,399.00		\$ 1,600.00																

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Summary Sheet by Organization Code														
Feasibility Phase	O of Chief		O of C		RS		G3N0P00		G3N0000		OTHFACSVCS		Contracting Division	
	G3N0000	Labor	G3E0000	Labor	G3N0A00	Labor	G3N0P00	Cadastral	Appraisal	Vehicle Miles	Travel	CADD	Other Costs	GS3P0D00
14 Prepare a Real Estate Plan (REP) For the Feasibility Report	\$ 305.00				\$ 14,076.00						\$ 960.00			
					\$ 5,600.00									
					\$ 2,060.00									
<b>SUBTOTAL</b>	<b>\$ 305.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 21,736.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 960.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
15 Review and Comment on Draft and Final PMP					\$ 3,060.00						\$ 240.00			
					\$ 1,600.00				\$ 898.00					
					\$ 1,030.00									
<b>SUBTOTAL</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 5,690.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 898.00</b>	<b>\$ -</b>	<b>\$ 240.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
16 Study Team Review					\$ 2,448.00						\$ 240.00			
					\$ 1,600.00									
					\$ 1,030.00									
<b>SUBTOTAL</b>	<b>\$ 305.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 5,078.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 240.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
17 Ascertain non-Federal Sponsors Legal Authorities					\$ 1,224.00						\$ 240.00			
					\$ 500.00									
<b>SUBTOTAL</b>	<b>\$ -</b>	<b>\$ 1,805.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 2,024.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 240.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
18 Project Cooperation Agreement (PCA) and Deviation Report					\$ 612.00						\$ -			
					\$ 3,200.00									
<b>SUBTOTAL</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 3,812.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
19 Independent Technical Review (ITR) of Decision					\$ 7,210.00						\$ -			
					\$ 800.00									
<b>SUBTOTAL</b>	<b>\$ 1,218.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 8,010.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
20 Revise Comment and Coordinate Response Technical Review and High Authority Review Comments					\$ 2,448.00						\$ 480.00			
					\$ 1,600.00									
					\$ 2,060.00				\$ 898.00					
<b>SUBTOTAL</b>	<b>\$ 605.00</b>	<b>\$ 602.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 6,108.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 898.00</b>	<b>\$ -</b>	<b>\$ 480.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>











# APPENDIX

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