RFP #782

PROFESSIONAL, TECHNICAL AND EXPERT SERVICES

Clark County Washington

RELEASE DATE: WEDNESDAY, AUGUST 5, 2020
DUE DATE: WEDNESDAY**,** AUGUST 26, 2020 by 1:30 pm

Request for Proposal for:

RAILROAD BRIDGE and RAIL ENGINEERING SERVICES

SUBMIT:
One (1) Original
Four (4) Complete Copies

of the Proposal to:

Clark County
Office of Purchasing
P.O. Box 5000
1300 Franklin Street, 6th Floor, Suite 650
Vancouver, Washington 98660
564-397-2323

*****Proposals must be date and time stamped by Purchasing staff before 1:30 pm on due date.***
****DO NOT PUT IN ANY DROP BOX LOCATED IN THE BUILDING****

****Hand Delivery Requires Entrance to the building using the North Door on the First Floor.**
****Anyone entering the building must wear a face mask****

Refer Questions to Project Manager:

Matt Hall
Section Supervisor - Project Management
Clark County Public Works
matt.hall@clark.wa.gov

ADMINISTRATIVE REQUIREMENTS - Contractors shall comply with all management and administrative requirements established by Washington Administrative Code (WAC), the Revised Code of the State of Washington (RCW), and any subsequent amendments or modifications, as applicable to providers licensed in the State of Washington.

ALL proposals submitted become the property of Clark County. It is understood and agreed that the prospective Proposer claims no proprietary rights to the ideas and written materials contained in or attached to the proposal submitted. Clark County has the right to reject or accept proprietary information.

AUTHORSHIP - Applicants must identify any assistance provided by agencies or individuals outside the proposers own organization in preparing the proposal. No contingent fees for such assistance will be allowed to be paid under any contract resulting from this RFP.

CANCELLATION OF AWARD - Clark County reserves the right to immediately cancel an award if the contractual agreement has not been entered into by both parties or if new state regulations or policy make it necessary to change the program purpose or content, discontinue such programs, or impose funding reductions. In those cases where negotiation of contract activities are necessary, Clark County reserves the right to limit the period of negotiation to sixty (60) days after which time funds may be unencumbered.

CONFIDENTIALLY - Proposer shall comply with all applicable state and federal laws governing the confidentiality of information."

CONFLICT OF INTEREST - All proposals submitted must contain a statement disclosing or denying any interest, financial or otherwise, that any employee or official of Clark County or the appropriate Advisory Board may have in the proposing agency or proposed project.

CONSORTIUM OF AGENCIES - Any consortium of companies or agencies submitting a proposal must certify that each company or agency of the consortium can meet the requirements set forth in the RFP.

COST OF PROPOSAL & AWARD - The contract award will not be final until Clark County and the prospective contractor have executed a contractual agreement. The contractual agreement consists of the following parts: (a) the basic provisions and general terms and conditions, (b) the special terms and conditions, (c) the project description and goals (Statement of Work), and (d) the budget and payment terms. Clark County is not responsible for any costs incurred prior to the effective date of the contract. Clark County reserves the right to make an award without further negotiation of the proposal submitted. Therefore, the proposal should be submitted in final form from a budgetary, technical, and programmatic standpoint.

DISPUTES - Clark County encourages the use of informal resolution to address complaints or disputes arising over any actions in implementing the provisions of this RFP. Written complaints should be addressed to Clark County – Purchasing, P.O. Box 5000, Vancouver, Washington 98666-5000.

DIVERSITY IN EMPLOYMENT AND CONTRACTING REQUIREMENTS - It is the policy of Clark County to require equal opportunity in employment and services subject to eligibility standards that may be required for a specific program. Clark County is an equal opportunity employer and is committed to providing equal opportunity in employment and in access to the provision of all county services. Clark County's Equal Employment Opportunity Plan is available at http://www.clark.wa.gov/hr/documents.html. This commitment applies regardless of race, color, religion, creed, sex, marital status, national origin, disability, age, veteran status, on-the-job injury, or sexual orientation. Employment decisions are made without consideration of these or any other factors that are prohibited by law. In compliance with department of Labor Regulations implementing Section 504 of the rehabilitation Act of 1973, as amended, no qualified handicapped individual shall be discriminated against in admission or access to any program or activity. The prospective contractor must agree to provide equal opportunity in the administration of the contract, and its subcontracts or other agreements.

ENVIRONMENTALLY RESPONSIBLE PURCHASING PROGRAM - Clark County has implemented an Environmentally Responsible Purchasing Policy with a goal to reduce negative impacts on human health and the environment. Negative environmental impacts include, but are not limited to, greenhouse gases, air pollution emissions, water contamination, waste from the manufacturing process and waste in packaging. This policy also seeks to increase: 1) water and energy efficiency; 2) renewable energy sources; 3) use of products with recycled content; 4) product durability; 5) use of products that can be recycled, reused, or composted at the end of its life cycle. Product criteria have been established on the Green Purchasing List http://www.clark.wa.gov/general-services/purchasing/erp/environmental.html

INDEPENDENT PRICE DETERMINATION - The prospective contractor guarantees that, in connection with this proposal, the prices and/or cost data have been arrived at independently, without consultation, communication, or agreement for the purpose of restricting competition. This does not preclude or impede the formation of a consortium of companies and/or agencies for purposes of engaging in jointly sponsored proposals.

INTERLOCAL AGREEMENT - Clark County has made this RFP subject to Washington State statute RCW 39.34. Therefore the bidder may, at the bidders' option, extend identical prices and services to other public agencies wishing to participate in this RFP. Each public agency wishing to utilize this RFP will issue a purchase order (or contract) binding only their agency. Each contract is between the proposer and the individual agency with no liability to Clark County.

LIMITATION - This RFP does not commit Clark County to award a contract, to pay any costs incurred in the preparation of a response to this RFP, or to procure or contract for services or supplies.

LATE PROPOSALS - A proposal received after the date and time indicated above will not be accepted. No exceptions will be made.

ORAL PRESENTATIONS - An oral presentation may be required of those prospective contractors whose proposals are under consideration. Prospective contractors may be informed that an oral presentation is desired and will be notified of the date, time and location the oral presentation is to be conducted.

OTHER AUDIT/MONITORING REQUIREMENTS - In addition, auditing or monitoring for the following purposes will be conducted at the discretion of Clark County: Fund accountability; Contract compliance; and Program performance.

PRICE WARRANT - The proposer shall warrant that the costs quoted for services in response to the RFP are not in excess of those which would be charged any other individual or entity for the same services performed by the prospective contractor, in a similar socioeconomic, geographical region.

PROTESTS - Must be submitted to the Purchasing Department.

PUBLIC SAFETY - May require limiting access to public work sites, public facilities, and public offices, sometimes without advance notice. The successful Proposer's employees and agents shall carry sufficient identification to show by whom they are employed and display it upon request to security personnel. County project managers have discretion to require the successful Proposer's employees and agents to be escorted to and from any public office, facility or work site if national or local security appears to require it.

REJECTION OF PROPOSALS - Clark County reserves the right to accept or reject any or all proposals received as a result of this RFP, to negotiate with any or all prospective contractors on modifications to proposals, to waive formalities, to postpone award, or to cancel in part or in its entirety this RFP if it is in the best interest of Clark County to do so.

SUBCONTRACTING - No activities or services included as a part of this proposal may be subcontracted to another organization, firm, or individual without the approval of Clark County. Such intent to subcontract shall be clearly identified in the proposal. It is understood that the contractor is held responsible for the satisfactory accomplishment of the service or activities included in a subcontract.

VERBAL PROPOSALS - Verbal proposals will not be considered in making the award of any contract as a result of this RFP.

WORKERS COMPENSATION INSURANCE – The contractor shall comply with R.C.W. Title 51- with minimum coverage limits of $500,000 for each accident, or provide evidence that State law does not require such coverage.

FOR ALTERNATIVE FORMATS
Clark County ADA Office: V: 564-397-2322
ADA@clark.wa.gov

Request for Proposals
Table of Contents

Request for Proposal #782
Railroad Bridge and Rail Engineering Services

Part I Proposal Requirements

Section IA General Information

1. Introduction

The purpose of this RFP is to permit the consultant community to submit qualifications for Railroad Bridge and Rail Engineering Services. Firms selected based on their qualifications will be asked to interview for final consultant selection.

2. Background

Clark County owns a 33 mile long short-line railroad used for both freight and for excursion. It also includes a rail with trail segment as well. The county does not have internal staff with railroad or structural engineering expertise and this selection process would provide those services as a resource to Clark County Public Works.

Currently, the line is being operated under lease agreements for both the freight use and for the excursion use. You can find more background information at the following website: https://www.clark.wa.gov/public-works/chelatchie-prairie-railroad. The rail line includes some segments that were recently upgraded to 115lb rail and there are 13 bridges on the line as well as a tunnel.

Clark County has received funding from the WSDOT Rail Division for three projects along the railroad corridor:

1. Railroad Bridge #12 Replacement
   Bridge #12 is located on The Cedars golf course and crosses Salmon Creek. The location is north of NE 181st Street and east of NE 142nd Avenue. Access is either through the golf course or the railroad right-of-way. A Type, Size, and Location (TS&L) Study was prepared in May, 2017 and provides additional information about this bridge. A copy of this study is included the Attachments section.

2. Railroad Bridge #20 Repair
   Bridge #20 is located along Lucia Falls Road and crosses Basket Creek. This location is east of SR 503 and next to the East Fork Lewis River. A Type, Size, and Location (TS&L) Study was prepared in October, 2019 and provides additional information about this bridge. A copy of this study is included the Attachments section.

3. Railroad Roadbed Rehabilitation
   This project includes replacing deteriorating crossties, ballast, and undercutting along the county rail line from MP 0.00 at the BNSF north/south line up to MP 14.12. The undercutting removes sub-standard ballast and soils to be replaced with new ballast.

3. Scope of Project

Railroad professional services being sought are for alternatives analysis, technical recommendations and reports, design, environmental permitting, plans/specifications, construction estimating, and design services during construction. The services sought also include inspection during construction for the Railroad Roadbed Rehabilitation project.

4. Project Funding

Funding for this work includes county funding as well as Washington State Department of Transportation (WSDOT) railroad funding.

Clark County, Washington in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, Part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to

this advertisement, disadvantaged business enterprises as defined at 49 CFR Part 26 will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin or sex in consideration for an award.

5. Timeline for Selection

The following dates are the **intended** timeline:

Proposals Due	August 26, 2020
Proposal Review/Evaluation Period	August 29 – September 2, 2020
Interviews	Week of September 14, 2020
Selection Committee Recommendation	September 21, 2020
Contract Intended to Begin	October 15, 2020

6. Employment Verification

Effective November 1, 2010, to be considered **responsive** to any formal Clark County Bid/RFP or Small Works Quote, all vendors shall submit before, include with their response or within **48 hours** after submittal, a recent copy of their E-Verify MOU or proof of pending enrollment. The awarded contractor shall be responsible to provide Clark County with the same E-Verify enrollment documentation for each sub-contractor ($25,000 or more) within thirty days after the sub-contractor starts work. Contractors and sub-contractors shall provide a report(s) showing status of new employee's hired after the date of the MOU. The status report shall be directed to the county department project manager at the end of the contract, or annually, which ever comes first. E-Verify information and enrollment is available at the Department of Homeland Security web page: www.dhs.gov/E-Verify

How to submit the MOU in advance of the submittal date:

- Hand deliver to 1300 Franklin St, Suite 650, Vancouver, WA 98660, or;
- E-mail: koni.odell@clark.wa.gov or priscilla.ricci@clark.wa.gov

Note : Sole Proprietors shall submit a letter stating exempt.

Section IB Work Requirements

1. Required Services

Clark County is seeking a consultant team to provide railroad professional engineering and environmental services to support Chelatchie Prairie Railroad. The consultant team work closely with designated county personnel on the projects described.

Subcontracting by consultants is acceptable; however, a single firm must be identified as the "prime" and subcontracts must include the necessary clauses from the Clark County contracts.

The areas of service are described below:

Railroad Engineering Services
The design and engineering will meet all American Railway Engineering and Maintenance-of-Way Association (AREMA), the Federal Railroad Administration (FRA) and US Department of Transportation (USDOT) codes, rules, standards and guidelines.

Typical engineering services may include, but not be limited to:

- Visit the project locations to review site conditions and potential layouts.
- Review environmental and geophysical context in which the project/work will be built/completed in.

- Prepare alternatives analysis and submit to the county for review.
- Prepare design drawings (plans), specifications and estimates for 30%, 60% (permitting plans), 90%, 99%, and Final submittals as appropriate.
- Participate in a plans-in-hand meetings and project walk-through or field reviews at the individual locations of the 90% designs.
- Hydraulics, geotechnical investigation, and structural engineering to address structures, foundations, and wall designs.
- Environmental documentation and permitting as required.
- Design services during construction.
- Inspection services during construction for the Railroad Roadbed Rehabilitation project.

Projects

1. Railroad Bridge #12 Replacement – The current bridge is an 11-span timber trestle carrying one trackway. Components of the bridge include caps, piles, back walls and stringers. This bridge is near the Cedars Golf Course in Vancouver, Washington. The design is currently at the 60% design phase and has been on hold for a couple of years. The work included in this proposal will pick up the design phase at 60% and verify that it still meets current design standards, environmental permitting, right-of-way and constructability needs. It will require an updated set of plans, specifications and estimates and take the design through 90%, 99% and final PS&E for bidding. It is also expected that the consultant will provide design support during the bidding and construction phases of the project.

2. Railroad Bridge #20 Repair – The current bridge is a 6-span timber trestle with four-stringer chords supported by five-post timber bents with timber caps. This work initially included other work elements, but the remaining project work is centered only around the bridge repairs. There were a number of deficiencies noted in the latest bridge inspection completed in 2015 and the bridge is currently closed to all rail traffic. The inspection noted significant deterioration in numerous timber members including stringers, bent caps, mud blocks and mud sill failures.

At this time, the county wants to explore various options and relative costs for ideas to resolve the issues noted in the inspection and to get this bridge back in service. It will initially require re-review of the work to date, verification of the work to date and what viable options are available to the county to proceed through the design and construction phases.

The work products will include – Updated TS&L, 30%, 60%, 90%, 99% and PS&E design, specifications and engineer estimates for bidding. It is also expected that the consultant will provide design support during the bidding and construction phases of the project.

3. Railroad Roadbed Rehabilitation – This work includes replacing deteriorating crossties, ballast, and undercutting along the county rail line from MP 0.00 at the BNSF north/south line up to MP 14.12. The undercutting removes sub-standard ballast and soils to be replaced with new ballast. The consultant will review the existing railroad roadbed evaluation and prepare design documents for bidding and construction

2. County Performed Work

The work to be performed by County staff is listed below:

- Management the overall project, including the internal and consultant project teams.
- Surveys – topographic and boundary.
- Assist with the development and review of specifications and other bid documents.
- Coordinate public involvement.

- Acquire all property rights necessary for the projects.
- Provide traffic control plans as needed.
- Administer grants and project funding.
- Coordinate all environmental permitting submittals and correspondence with federal, state, and local agencies.
- Coordinate contract document assembly and printing.
- Administer the bid period process.
- Manage construction of the projects and provide inspection (with assistance from the consultant on the Railroad Roadbed Rehab project.

3. Deliverables & Schedule

The following schedule is preliminary and subject to change; but provides a rough framework of timelines and expectations.

Bridge #12	
Design and Permitting Phase	October 2020 – April 2022
Construction (excluding planting, if any)	July – October 2022

Bridge #20	
Design and Permitting Phase	October 2020 – Depending on level of work determined during the Alternatives Analysis
Construction (excluding planting, if any)	Summer 2022 or Summer 2023, Depending on level of work determined during the Alternatives Analysis

Railroad Roadbed Rehabilitation	
Design and Permitting Phase	October 2020 to February 2021
Construction	April – June 2021

4. Place of Performance

Contract performance may take place in the County's facility, the Proposer's facility, a third-party location or any combination thereof.

5. Period of Performance

We estimate a contract awarded as a result of this RFP will be for a term of 3 years and is intended to begin in October, 2020.

6. Prevailing Wage (Davis Bacon)

Pursuant to State of Washington RCW 39.12, all payment for salaries and wages shall conform to State of Washington Department of Labor and Industries as prevailing wage rates. For this project select the Clark County rates that apply on the bid opening date from either of these sites:

http://www.wsdot.wa.gov/Design/ProjectDev/WageRates/default.htm

http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates

Before payment is made by the Local Agency of any sums due under this contract, the Local Agency must receive from the Contractor and each Subcontractor a copy of "Statement of Intent to Pay Prevailing Wages" (Form L & I Number 700-29) approved by the Washington State Department of Labor and Industries.

A fee of $45.00 per each "Statement of Intent to Pay Prevailing Wages" and "Affidavit of Wages Paid" is required to accompany each form submitted to this Department of Labor and Industries. The Contractor is responsible for payment of these fees and shall make all applications directly to the Department of Labor and Industries. These fees shall be incidental to all the bid items of this contract

7. Debarred/Suspended

Federally or Washington State debarred or suspended suppliers may not participate in this Request for Proposal.

All proposer's must fill out, sign and submit the "Certification Regarding Debarment, Suspension, and Other Responsibility Matter" form with their proposal to be eligible to participate.

8. Public Disclosure

This procurement is subject to the Washington Public Records Act (the "Act"), chapter 42.56 RCW. Once in the County's possession, all of the RFP Submittals shall be considered public records and available for public records inspection and copying, unless exempt under the Act.

If a Respondent or Proposer considers any portion of an RFP Submittal to be protected under the law, whether in electronic or hard copy form, the Respondent or Proposer shall clearly identify each such portion with the word "PROPRIETARY". If a request is made for disclosure of such a portion, the County will determine whether it should be made available under the Act. If the county determines that such a record(s) is subject to disclosure, the County will notify the Respondent or Proposer in writing of the request and allow the Respondent or Proposer ten (10) days to obtain a court order enjoining release of the record(s). If the Respondent or Proposer does not take such action within the ten (10) day period, the County will release the portions of the RFP Submittal deemed subject to disclosure. All Respondents and Proposers who provide RFP Submittals for this procurement accept the procedures described above and agree that the County shall not be responsible or liable in any way for any losses that the party may incur from the disclosure of records to a third party who requests them.

9. Insurance/Bond

A. Insurance

Insurance requirements are outlined in the WSDOT Local Agency A&E Professional Services Agreement

B. Proof of Insurance

Proof of Insurance shall be provided prior to the starting of the contract performance. Proof will be on an ACORD Certificate(s) of Liability Insurance, which the Proposer shall provide to Clark County. Each certificate will show the coverage, deductible and policy period. Policies shall be endorsed to state that coverage will not be suspended, voided, canceled or reduced without a 30 day written notice by mail. It is the Proposer's responsibility to provide evidence of continuing coverage during the overlap periods of the policy and the contract.

All policies must have a Best's Rating of A-VII or better.

10. Plan Holders List

All proposers are required to be listed on the plan holders list.

✓ Prior to submission of proposal, please confirm your organization is on the Plan Holders List below:

To view the Plan Holders List, please click on the link below or copy and paste into your browser.
Clark County RFP site:
http://www.clark.wa.gov/general-services/purchasing/rfp.html

- If your organization is NOT listed, submit Attachment B - Letter of Interest to ensure your inclusion.
- Proposals received by Clark County by proposers not included on the Plan Holders List may be considered non-responsive.

Part II Proposal Preparation and Submittal

Section IIA Pre-Submittal Meeting / Clarification

1. Pre-Submittal Meeting

There will be no pre-submittal meeting or site visit scheduled for this project.

2. Proposal Clarification

Questions and Requests for Clarification regarding this Request for Proposal must be directed in writing, via email, to the person listed on the cover page.

The deadline for submitting such questions/clarifications is August 20, 2020.

An addendum will be issued no later than August 21, 2020 to all recorded holders of the RFP if a substantive clarification is in order.

The Questions & Answers/Clarifications are available for review at the link below. Each proposer is strongly encouraged to review this document prior to submitting their proposal.

Clark County RFP site:
http://www.clark.wa.gov/general-services/purchasing/rfp.html

Section IIB Proposal Submission

1. Proposals Due

Sealed proposals must be received no later than the date, time and location specified on the cover of this document.

The outside of the envelope/package shall clearly identify:
1. RFP Number and;
2. TITLE and;
3. Name and Address of the Proposer.

Responses received after submittal time will not be considered and will be returned to the Proposer - unopened.

Proposals received with insufficient copies (as noted on the cover of this document) cannot be properly disseminated to the Review Committee and other reviewers for necessary action, therefore, may not be accepted.

2. Proposal

Proposals must be clear, succinct and not exceed eight (8) pages, excluding resumes, E-Verify and coversheet. Proposer's who submit more than the pages indicated may not have the additional pages of the proposal read or considered.

For purposes of review and in the interest of the County, the County encourages the use of submittal materials (i.e. paper, dividers, binders, brochures, etc.) that contain post-consumer recycled content and are readily recyclable.

The County discourages the use of materials that cannot be readily recycled such as PVC (vinyl) binders, spiral bindings, and plastic or glossy covers or dividers. Alternative bindings such as reusable/recyclable binding posts, reusable binder clips or binder rings, and recyclable cardboard/paperboard binders are examples of preferable submittal materials.

Proposers are encouraged to print/copy on both sides of a single sheet of paper wherever applicable; if sheets are printed on both sides, it is considered to be two pages. Color is acceptable, but content should not be lost by black-and-white printing or copying.

All submittals will be evaluated on the completeness and quality of the content. Only those Proposers providing complete information as required will be considered for evaluation. The ability to follow these instructions demonstrates attention to detail.

Section IIC Proposal Content

1. Cover Sheet

This form is to be used as your proposal Cover Sheet
See Cover Sheet - Attachment A

2. Project Team

Provide a summary describing the joint team organization, including the prime consultant and any sub-contractors.

The summary should contain an organizational chart showing areas of responsibilities, professional titles of pertinent positions and which team member will be the "lead" in each area (hydraulics, geotechnical, environmental, etc.).

If the team includes members from different firms, please include any past experience working together. Provide a resume for all key team members.

3. Management Approach

Describe how your teams are be managed internally as well as within the overall County/Consultant project team.

Describe how your firm evaluates projects and presents information in order for project teams to make decisions. Include information about QA/QC processes. How does your process ensure deliverables are complete, containing minimal errors? How are County review comments addressed and the responses communicated back to the project team.

4. Respondent's Capabilities

Provide up to five (5) reference projects that demonstrate experience and competence in performing the type of work requested. Include name of project owner, address, telephone number, project title and contact person. Projects demonstrating efforts with joint consultant/local agency teams are preferred.

5. Project Approach and Understanding

Not used.

6. Proposed Cost

Not used.

7. Employment Verification

Please refer to section 1A.6. – E-Verify

IMPORTANT NOTE: Include this portion of the response immediately **AFTER** the cover page, if not already on file with Clark County. Current vendors on file can be viewed at:
https://www.clark.wa.gov/general-services/purchasing-overview

Part III Proposal Evaluation & Contract Award

Section IIIA Proposal Review and Selection

1. Evaluation and Selection:

Proposals received in response to this RFP will be evaluated by a Review Committee. Committee review results and recommendations may be presented to an appropriate advisory board prior to the next step in the selection process.

The county plans to conduct interviews as a result of this proposal review and recommendation. If a sufficient number of proposals are received the county intends to interview a minimum of 3 consultant teams as part of the final selection process. The interview alone will determine the final consultant selection.

Points from this proposal review are not carried over to the interview.

2. Evaluation Criteria Scoring

Each proposal received in Response to this RFP will be objectively evaluated and rated according to a specified point system shown below.

An eighty-five (85) point system will be used, weighted against the following criteria:

Proposal Quality	10
Project Team	25
Management Approach	25
Respondent's Capabilities	25

Section IIIB Contract Award

1. Consultant Selection

The county intends to award a contract to the highest scoring consultant team based on the interviews. Since this RFP contains multiple projects, more than one consultant team may be selected for the work, based on interview results. Should the County not reach a favorable agreement with the selected team(s), the County shall suspend or terminate negotiations and commence negotiations with the next highest scoring Proposer and so on until a favorable agreement is reached.

The public may view proposal documents after contract execution. However, any proprietary information so designated by the Proposer as a 'trade secret' will not be disclosed unless the Clark County Prosecuting Attorney determines that disclosure is required. At this time, Proposers not awarded the contract, may seek additional clarification or debriefing, request time to review the selection procedures or discuss the scoring methods utilized by the evaluation committee.

2. Contract Development

The proposal and all responses provided by the successful Proposer may become a part of the final contract.

This contract will follow generally the Washington Department of Transportation Local Agency Guidelines contract with some minor edits by county counsel.

3.	Award Review	The public may view proposal documents after contract execution. However, any proprietary information so designated by the Proposer as a 'trade secret' will not be disclosed unless the Clark County Prosecuting Attorney determines that disclosure is required. At this time, Proposers not awarded the contract, may seek additional clarification or debriefing, request time to review the selection procedures or discuss the scoring methods utilized by the evaluation committee.
4.	Orientation/Kick-off Meeting	The county intends to hold a project kick-off meeting shortly after contract execution.

Request for Proposal #782
Railroad Bridge and Rail Engineering Services

Attachment A: COVER SHEET

General Information:

Legal Name of Proposing Firm _____

Street Address _____ City _____ State _____ Zip _____

Contact Person _____ Title _____

Phone _____ Fax _____

Program Location (if different than above) _____

Email Address _____

Tax Identification Number _____

ADDENDUM:

Proposer shall acknowledge receipt of Addenda by checking the appropriate box(es).

None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

NOTE: Failure to acknowledge receipt of Addendum may render the proposal non-responsive.

I certify that to the best of my knowledge the information contained in this proposal is accurate and complete and that I have the legal authority to commit this agency to a contractual agreement. I realize the final funding for any service is based upon funding levels, and the approval of the Clark County Council.

_____ _____
Authorized Signature of Proposing Firm Date

_____ _____
Printed Name Title

Request for Proposal #782
Railroad Bridge and Rail Engineering Services

Attachment B: LETTER OF INTEREST

Legal Name of Applicant Agency_____

Street Address_____

City_____ State _____ Zip _____

Contact Person _____ Title _____

Phone _____Fax_____

Program Location (if different than above) _____

Email Address _____

- All proposers are required to be included on the plan holders list.
- If your organization is NOT listed, submit the 'Letter of Interest" to ensure your inclusion.

Email Letter of Interest to*: Koni.Odell@clark.wa.gov and Priscilla.Ricci@clark.wa.gov*

Clark County web link:
http://www.clark.wa.gov/general-services/purchasing/rfp.html

This document will only be used to add a proposer to the plan holders list. Submitting this document does not commit proposer to provide services to Clark County, nor is it required to be submitted with proposal.

Proposals may be considered non-responsive if the Proposer is not listed on the plan holders list.

ATTACHMENT C

Clark County, Washington

Certification Regarding
Debarment, Suspension and Other Responsibility Matters

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____
Typed Name & Title of Authorized Representative

_____ _____
Signature of Authorized Representative Date

☐ I am unable to certify to the above statements. My explanation is attached.

Attachment D
Bridge #12

Memo

Date: Thursday, May 25, 2017

Project: Clark County – Chelatchie Prairie Railroad Bridge 12 Replacement

To: Jean Singer – Clark County

From: Donald L. McCammon, P.E.
Jason Ruth, P.E.

DONALD L. McCAMMON
STATE OF WASHINGTON
30049
REGISTERED
PROFESSIONAL ENGINEER
5/25/2017
EXPIRES: 4/15/2018

Subject: **Replacement Bridge Type, Size and Location Analysis**

Figure 1, Existing Br. 12 Looking Upstream, Bent 1 to the right.

This memo documents the type, size and location analysis performed by HDR to develop a recommended structure for the replacement of the Chelatchie Prairie Railroad Bridge 12, see Figure 1, on Clark County's railroad between Rye Junction and Chelatchie, Washington. The Portland Vancouver Junction Railroad, PVJR, currently operates trains on the railroad where the bridge is located. The current railroad bridge, which crosses Salmon Creek near Cedars, Washington, is an 11-span creosote treated timber open deck pile structure with treated timber stringers and caps supported on treated timber piling that is approximately 43-feet high and 160-feet long. In addition to crossing over Salmon Creek, the bridge crosses over paths on either side of the stream that are used for golf course access.

The bridge is not a unique structure as it is typical of many treated timber open deck pile trestles built by the railroads through the 1970's. Very few, if any, of the components date back to original construction due to the constant maintenance and member replacement that has occurred over the bridge's history.

The stream crossing was originally constructed by a predecessor railroad in the early 1900's during the initial railroad line's construction. Over the years, different bridge members have been replaced or repaired including re-driving piling. Based on the age of the structure and typical railroad practice, most of the bridge would have been extensively replaced in the 1940's or early 1950's. Extensive repairs have been performed over the last five years and more repairs are needed to maintain the bridge in a safe operating condition for today's railroad loads. However, the current PVJR Timetable notes the following load restrictions unless the load is approved in advance by the Railroad's General Manager:

- Six axle locomotives are not allowed to traverse over the structure.
- No more than two four-axle locomotives in multiple are permitted over the structure.
- Cars in excess of 132 tons gross weight are not permitted (standard cars can be up to 143 tons gross weight)

Inspection reports note extensive repairs are needed and poor structural conditions currently exist. Existing timbers and piles need replacing due to extensive decay and several bents have stacks of timber bent caps or shims that are becoming unstable and do not meet current AREMA Manual for Railway Engineering recommendations, which are generally the basis for design and maintenance of freight railroad structures in the U.S. The pile bents are rotating or "walking" and causing overall bent stability concerns. Mud sills supporting framed bents are crushing due to decay. Numerous bolts and other hardware are missing or loose and due to decay not able to be effective when tightened. As a tall and long timber structure, it is a critical feature of the railroad's infrastructure that is susceptible to a high fire risk due to the amount of pedestrian traffic under the bridge.

Based on typical freight railroad industry life cycle maintenance and repair costs, it is no longer economically feasible or prudent to continue maintaining and repairing the existing timber structure:

- The extensive list of required repairs and member replacement would not address the apparent instability of the treated timber pile substructure.
- The required bent framing to remove unstable multiple level cap conditions is expensive and would require continued increased maintenance on framing supported on questionable and potentially unstable existing bent piling.
- There is a high risk of fire damaging the structure. The County suffered extensive damage to Bridge 6 in 2011 which caused the line to be shut down. A fire on this structure, due to its height and length would be more problematic.
- In addition, today's use of heavier 6-axle locomotives and standard 268,000 to 286,000 lb. gross weight cars means the bridge would be continually overloaded if repaired or remain under current load restrictions per timetable notes.

A replacement structure is warranted to allow continued railroad operations with today's heavier loading and provide for future economic growth that would use the railroad.

Design Criteria

A copy of the detailed Design Criteria is attached to this Memo. The crossing structure's design must meet current railroad industry standards as contained in the current edition of the AREMA Manual for Railway Engineering, Manual, meet hydraulic criteria set by the County and provide for the golf course pathways. In summary, the criteria provides:

- A hydraulic opening that results in a no-rise elevation on the 100-year flood due to the crossing located in a FEMA mapped flood plain
- Cooper's E-80 Design Loading per the Manual

- Ballast deck, if a bridge, for cost effectiveness and ease of maintaining track
- Seismic design per the Manual
- Safety walkway on the downstream side of the bridge superstructure.
- Golf cart paths that pick-up trucks can use for maintenance – minimum 10' width and vertical clearance
- 2 horizontal : 1 vertical abutment embankment slopes

Replacement Alternatives

The alternatives developed used typical railroad span types suitable for the bridge site and topography, ability to be constructed given the existing bridge configuration and provide low cost solutions for the replacement. Based on the existing bridge's geometry and the hydraulic opening requirements, the following new structure alternatives were found to be feasible:

A. Precast prestressed concrete double cell box beam spans supported on precast concrete caps founded on open H-pile bents or double row pile bents. The bridge would consist of a 22-foot span on each end and 5 ~ 28-foot center spans for a length of 184-feet. The center 28-foot span, due to bridge height, would be supported by double row pile bents consisting of two rows of 3 H-pile. See Figure 2 for a typical cross section.
B. Precast prestressed concrete double cell box beam spans with a center precast prestressed single cell box girder span. The bridge would consist of two 32-foot double cell box beam spans on each end with the 54-foot single cell girder span in the center for a length of 182-feet. The center span, due to bridge height, would be supported by double row pile bents consisting of two rows of 4 H-pile. See Figures 2 and 3 for typical cross sections.
C. Precast prestressed concrete double cell box beam spans with a center Deck Plate Girder, DPG, span. The bridge would have a 20 and a 30-foot double cell beam span on each end with the center 82-foot DPG span for a total length of 182-feet. Due to the loading and height the center DPG span would be supported on double row pile bents consisting of two rows of 5 H-pile. See Figures 2 and 4 for typical cross sections.
D. Precast concrete arch structure supported on concrete footings found on H-pile foundations for the stream crossing and multi-plate culverts used the golf cart path undercrossings. A 54' span by 26' rise arch, similar to Contech's BEBO Arch, was used with 14-foot diameter Structure Steel Plate Pipes used to obtain a 10-foot by 10-foot path opening through the filled in bridge. The Arch for the waterway was estimated to be 102 feet long with wing walls and retaining walls used to shorten the length, see Figure 5 for an example installation. Each of the path culverts was estimated to be 102 feet long.
E. No-build. The existing structure would be maintained in place. This is not seen as a viable alternative due to the lower than needed load capacity for modern railroad operations and anticipated continuing life-cycle maintenance costs.

Other alternatives such as use of steel wide flange beams instead of precast, prestressed concrete beams or a single 180-foot DPG span were noted as being more expensive alternatives based on information from other similar contemporary railroad projects and not studied further. Spill through abutments are used as the preferred abutment type as massive

wall abutments, while typically providing a shorter length structure, result in a more expensive structure overall. Use of precast concrete minimizes the construction time frame which reduces the impact on golf course use. Typical span type cross sections are shown below in Figures 2-4.

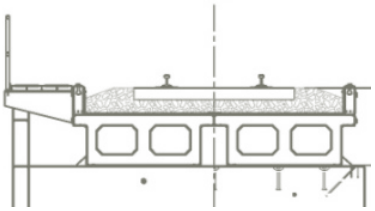


Fig. 2, Typical Double Cell Span

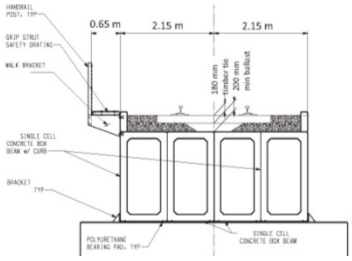


Fig. 3, Typical Single Cell Span

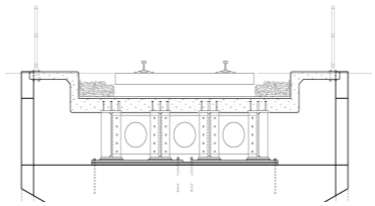


Fig. 4, Typical Beam or DPG Span

Figure 5, Example Arch Culvert Installation

Alternatives Conceptual Opinion of Probable Construction Cost Summary

Using typical railroad order of magnitude costs for each structure type adjusted for the bridge height as well as fabricator suggested costs for structure components, conceptual opinions of probable construction costs were developed to allow a relative comparison of each alternative. Details of the Opinion of Probable Construction Cost summarized in Table 1 are included in Attachment A.

Table 1: Conceptual Opinion of Probable Construction Cost Summary

Alternative	Estimated Cost	Remarks
A. Concrete Double Cell Box Girder Spans	$1,800,000	44 pile, center bents in main waterway
B. Concrete Double Cell and Single Cell Box Girder Spans	$1,600,000	32 pile, center bents in edges of waterway
C. Concrete Double Cell and Steel DPG Span	$2,100,000	36 pile, bents out of water
D. Concrete Arch culvert w/ SSPP culverts for paths	$2,500,000	54-pile foundation for arch, wing walls, retaining walls, path adjustment and embankment construction
E. No Build	NA	Not viable due to load capacity, anticipated life cycle maintenance costs, unstable foundation pile and fire risk

The Opinion of Probable Construction Cost is based on the Contractor having access across golf course property to the bridge adjacent to the existing railroad right-of-way. A work bridge would be used to cross Salmon Creek to facilitate construction. Standard Washington State Best Management Practices (BMP's) would be used for the stormwater pollution prevention plan (SWPPP). Delivery of major bridge components to the work area would be by truck and transported to the bridge site by use of rail mounted equipment or along the access road. Arrangements would be made for a lay down area near the NE 181st Street at-grade crossing and areas within the existing railroad right-of-way.

These estimated costs are based on 2017 dollars, not adjusted for inflation for potential year of construction, and are only base construction costs without sales tax, engineering costs or minor items that are similar to each alternative to allow ease of comparison of the Alternatives.

Towards the end of this Memo, the Opinion of Probable Project cost is provided in 2017 dollars for the recommended alternate. The Project Cost for the recommended alternate is detailed and includes potential right-of-way, design and management costs to develop an initial project budget.

Alternatives Analysis Comparison Factors

The alternatives were compared using the following factors. These factors were developed based on project issues identified by Clark County and typical railroad industry approaches to the project's construction. A brief discussion is included that presents the factor's project implications and what were viewed as a positive or negative feature of the factor.

Constructability – The alternative needs to be constructed or allow construction in phases. Alternatives that can reduce train traffic impacts, do not require a shoofly and have features that local contractors are familiar with and only require a one-time construction period would be viewed as being favorable to the project and meeting project criteria. Comparison is made based on the most common anticipated method of construction for each alternative. Details on potential methods for the recommended alternate are provided towards the end of this memo.

- Can the alternative be constructed without impacting train traffic except for actual span setting?
- Can the alternative be constructed in a reduced time frame if the track were out of service?
- Would a shoofly be required?
- Can local contractors perform the field work required?
- Are the structure components able to be fabricated and delivered to meet the project schedule?
- Can the alternative be constructed while maintaining or minimizing impact to the golf course users.
- Are structure components pre-fabricated, reducing in-field erection cost and time?

Cost – an alternate that meets the project requirements while having the lowest overall construction cost is preferred.

Aesthetics – an alternate that can incorporate aesthetic features is preferred. This may include colorized concrete and use of form liners to replicate a stone or wood finish fascia. For historical purposes, a pile bent supported bridge maintains the look of the existing structure even though span lengths are different.

Maintenance - does the alternative minimize future maintenance costs? The County and its railroad operations contractor will be responsible for the bridge inspection and maintenance, options that reduce long term maintenance costs would be preferred.

View Shed – does the alternative provide for a good view shed of the adjacent areas? Alternatives that provide a line of site between fairways on the golf course are preferred.

Hydraulics – does the alternative meet the Design Requirements for a "no-rise" result as required by Clark County Code? The bridge crossing is located in a mapped FEMA flood plain. Providing an opening with a "no-rise" or decrease in the 100-year water surface elevation is preferred. Alternatives that do not maintain or slightly reduce the water surface elevation do not meet project criteria.

Right-of-Way – does the proposed project have toes of slopes that stay within existing right-of-way or will a construction easement or land purchase be required. Will Golf Course impacts require temporary crossings of Salmon Creek outside the railroad right-of-way? Can the project be phased to minimize golf course impacts or can it be built during a "slow" period where a 9-hole course could be used to minimize total length of impact.

Environmental – does the proposed alternative require permanent work within the ordinary high water limits or normal low-flow channel? Can work be completed within the Washington Department of Fish and Wildlife recommended in-water work window for salmonid species (August 1 through August 31)? Does the proposed work fall within the requirements for US Army Corps of Engineers Nationwide Permit #3 or #14?

The Alternatives Evaluation Matrix shown below summarizes the comparison using the factors identified above. Experience from similar bridge replacement projects to that of Bridge 12 coupled with conceptual design calculations of bridge design elements were used in its development. In this chart the following graphics were used to depict favorable, less favorable or least favorable impacts to project goals.

- ○ - Least impact, lowest cost, meets criteria, "best" alternative
- ◘ - Some impact, median cost, closely meets criteria, "intermediate" alternative
- ● - Major impact, highest cost, does not meet criteria, "least favorable" alternative

Table 2, Alternative Evaluation Matrix

Alternative	A Dbl Cell Box	B Dbl & Sgl Cell Box	C Dbl Cell & DPG Span	D Arch Culvert & Path Culverts	E No Build
Constructability	◎	◎	◎	●	●
Cost	◎	○	◎	●	NA
Aesthetics	○	○	○	●	◎
Maintenance	○	○	◎	○	●
View Shed	○	○	○	●	◎
Hydraulics	●*	○	○	○	○
Right-of-way	◎	◎	◎	●	○
Environmental	●	◎	○	●	●

* Does not meet no-rise hydraulic criteria, causes higher 100-yr water surface elevation, fatal flaw.

Alternatives Analysis Summary

Alternative A, Construct a new 7-span double cell box girder bridge replacing the existing timber trestle. Alternative A was found to:

- Be constructible in one or two months but would impact the golf course near the bridge or require temporary bridges over Salmon Creek to maintain accessibility for golfers during construction. Precast concrete material has less lead time than structural steel. Requires additional BMP's for performing pile bent construction within the normal waterway.
- Railroad can stay open except for short time periods of 8 hours to drive pile and set caps and a three day period to set spans and reconstruct track across the new structure.
- Due to additional piling, cost is slightly higher than other options even though the actual spans are slightly less costly.
- Use of precast prestressed spans results in a relatively low future maintenance effort and cost.
- More visual opening is created than the existing structure due to less substructure units.
- Hydraulic criteria is not met. The two bents in the main part of the waterway cause a predicted increase of almost eight inches for the 100-year event. As a result, this alternative has a fatal flaw.
- Constructing bents within the ordinary high water or normal flow channel is not preferred for salmonid stream habitat.
- Cutting off the existing timber pile bents 2-feet below the groundline within the ordinary high water or normal flow channel will be required.
- US Army Corps of Engineers Nationwide Permit #3 is useable for this alternative.
- Construction within ordinary high water limits can be completed within the recommended in-water work window.

Alternative B, Construct a new 5-span double and single cell box girder bridge replacing the existing timber trestle. Alternative B was found to:

- Be constructible in one or two months but would impact the golf course near the bridge or require temporary bridges over Salmon Creek to maintain accessibility for golfers during construction. Precast concrete material has less lead time than structural steel. Substructure construction is out of the main water way.
- Railroad can stay open except for short time periods of 8 hours to drive pile and set caps and a three day period to set spans and reconstruct track across the new structure.
- Lowest cost alternative
- Use of precast prestressed spans results in a relatively low future maintenance effort and cost.
- More visual opening is created than the existing structure due to less substructure units. Slightly better opening than Alternative A.
- Hydraulic criteria is met with a predicted slight lowering of the 100-year water surface.
- Avoids construction, except for cutting off the existing timber piling 2-feet below groundline, within the ordinary high water and normal flow channel which is preferred for salmonid stream habitat.
- US Army Corps of Engineers Nationwide Permit #3 is useable for this alternative.
- Construction within ordinary high water limits can be completed within the recommended in-water work window.

Alternative C, Construct a new 5-span double cell box girder and center DPG span bridge replacing the existing timber trestle. Alternative C was found to:

- Be constructible in one or two months but would impact the golf course near the bridge or require temporary bridges over Salmon Creek to maintain accessibility for golfers during construction. Structural steel has almost double the lead time for fabrication than precast concrete. Substructure construction is out of the flood way.
- Railroad can stay open except for short time periods of 8 hours to drive pile and set caps and a three day period to set spans and reconstruct track across the new structure.
- Larger cranes would be required due to the DPG span weight increasing space needed for construction causing more impact on adjacent Golf Course.
- Due to use of a longer steel DPG span and slightly more additional piling that Alternative B, cost is estimated to be higher than Alternatives A and B.
- Slightly more visual opening but similar to Alternative B.
- Use of a structural steel DPG span results in a relatively moderate future maintenance effort and cost.
- Due to anticipated bent locations, will require more retaining walls and larger shift of golf cart paths into abutment embankments. Will be more difficult to maintain use of at least one golf cart path during construction.
- Hydraulic criteria is met with all substructure being outside of the 100-yr event. Water surface will be lowered.

- Avoids construction, except for cutting off the existing timber piling 2-feet below groundline, within the ordinary high water and normal flow channel which is preferred for salmonid stream habitat. Also avoids construction within the 100-year floodway.
- US Army Corps of Engineers Nationwide Permit #3 is useable for this alternative.
- Construction within ordinary high water limits can be completed within the recommended in-water work window.

Alternative D, Construct a new "BEBO" Arch crossing of Salmon Creek and install two culverts in the embankment to pass the golf cart paths through. Alternative D was found to:

- Be constructible in two to three months. However, due to excavation for footings, driving piling and placement of foundations and arch, temporary use of golf cart paths through the existing bridge opening would not be feasible.
- Due to placement of foundation, the existing bridge bents need to be removed in order to construct, shutting the railroad down for the duration of construction.
- Extensive retaining walls and wing walls would be required to minimize the arch and culvert lengths will meeting embankment slope requirements.
- Will create a high embankment fill over the arch that blocks view shed from one side of the embankment to the other.
- Golf cart paths, passing through the embankment in culverts, will have limitations on vertical and horizontal clearance for future use of maintenance equipment by the Golf Course.
- Construction will cause temporary impacts on Salmon Creek and require dewatering during foundation construction. Dewatering will require sedimentation ponds near the construction site before the water can re-enter the creek. Water flow in the channel may be diverted by using a culvert to allow the arch foundation areas to remain dry while foundation work is completed.
- Due to excavation, the existing channel will be replaced with a new constructed "natural" low flow channel.
- Use of a precast concrete arch results in a relatively low future maintenance effort and cost.
- Construction within ordinary high water limits cannot be completed within the recommended in-water work window.
- Will create an approximate covered 100 foot length of the channel. The provided low flow channel through the arch will need to be constructed to meet natural salmonid habitat conditions.
- Due to the channel restoration work, existing pile will need to be cut-off and removed to a deeper depth.
- Does meet the "no-rise" criteria with a predicted 100-yr water surface elevation approximately seven inches below existing.
- US Army Corps of Engineers Nationwide Permit #14 is useable for this alternative.

Alternative E, No Build. Alternative E was found to:

- Not meet project criteria.

- The life cycle costs of continuing maintenance and a future replacement at more expense result in a higher overall cost than replacement costs.
- Does not allow use of the structure by today's 6-axle locomotives and standard 286K cars.
- Does maintain existing conditions for the stream and structure within the flow channel and existing golf cart paths.
- Except for repair work causing closures on an unplanned basis, the golf course undercrossings can remain open.

Recommended Alternate

Based on the analysis performed, the HDR recommended Alternative with least impacts and lowest cost that meets the Project's design criteria is Alternative B, shown in Figure 6. This alternative uses prestressed, precast concrete double cell beam approach spans with a 54-foot single cell box girder span over Salmon Creek. It can be constructed during train free intervals while maintaining train traffic daily except when span setting occurs. It can also allow for phasing to at least maintain one golf cart path open during construction although the open path may switch from side to side of the creek.

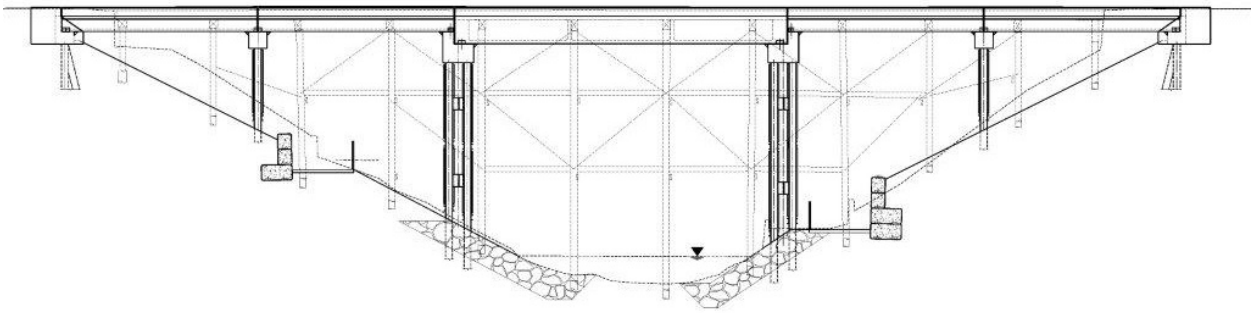


Figure 6, Elevation View of Recommended Alternate B, looking downstream

Additional Construction Considerations

In addition to the base considerations used to compare and recommend an alternative for selection by Clark County, additional items that affect the project cost, common to all alternatives, need to be considered for inclusion in the Project. These items include:

- Right-of-way considerations that will drive the need for temporary construction easements or land acquisition.
- Obtaining the lease agreement between the Cedars at Salmon Creek Golf Course and Clark County
  - Impacts on the golf course operations and potential needs for temporary golf path bridges across Salmon Creek or partial golf course closure during construction
  - Construction phasing to maintain at least one golf cart path open under the bridge during construction

- Construction within the recommended in-water work window (August 1 through August 31) for salmonid species and habitat known to occur in Salmon Creek.
- Existing approximate 4-foot D_{50} rip rap lining channel banks upstream and downstream as well as through the bridge apparently placed by the Golf Course to protect the golf cart paths and golf course features.

Costs for completing design, providing construction management and administration of the design and construction process by the County need to be included. This report develops the recommended alternate for the project to a conceptual 10% design. A 20% contingency will be included in the project cost to address project unknowns and risk associated with unknowns.

Right-of-way – Existing survey plats do not agree with the original right-of-way information contained in the railroad 1924 Valuation Maps. The 1988 survey by Olson Engineering noted a discrepancy between the right-of-way records and what they surveyed. It appears that at one time, someone did a property locate that did not use the correct take-off railroad stationing and that the boundary surveyed in 1988 is shifted 80-feet. This means the embankment earthwork for the proposed railroad east, geographic north abutment would occur off the right-of-way as it is currently shown in County land records. It is recommended that a thorough search of the records be completed to document the correct right-of-way which may also, as the discrepancy is resolved, require resetting of property pins. Due to not knowing which right-of-way is correct, a right-of-way allowance is included in the Project Cost. This allowance should, in the worst case, cover the cost of obtaining a construction easement or purchasing additional right-of-way.

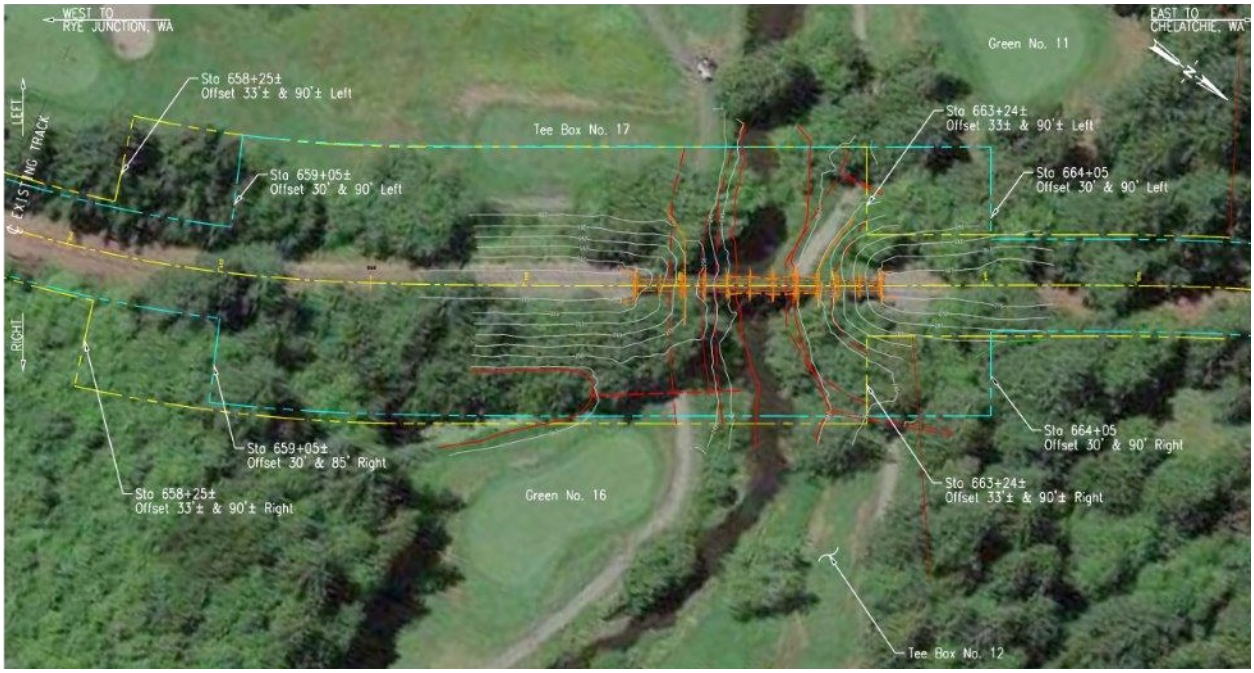


Figure 7, Right-of-Way Issues

The right-of-way issues are illustrated in Figure 7. The yellow line denotes the as surveyed boundary and the blue denotes the original railroad record boundaries.

Cedars at Salmon Creek Golf Course Lease Agreement – Typical railroad methodology would require a lease agreement across the railroad right-of-way for the golf course cart paths. In addition to the actual crossings under the bridge, one tee, the fringe on at least one green and the fairways and golf cart paths extend onto railroad right-of-way railroad west of the bridge. The lease agreement would typically have an indemnification clause protecting the County/Railroad from being sued if an accident or injury occurred on railroad property. The lease agreement would also have language addressing the railroad's need to perform work that results in modifications or temporary closure of the paths and the responsibilities of the parties to:

- Maintain golf course operations by using temporary spans across Salmon Creek and/or phased construction to maintain at least one path under the bridge.
- Allow for use of property on or adjacent to railroad right-of-way to access the bridge site by a contractor.
    - The golf cart path which meanders in and out of railroad right-of-way from NE 181st Street to the bridge may need temporary shifting to allow use of the railroad property as an access road to the construction site.
- Allow for a temporary closure of the Golf Course with provisions for advance notice timing and length of allowed closure.
- Worst case would be timing for a notice of lease cancellation.

Allowances are included in the Project Cost to cover anticipated construction costs based on using temporary prefabricated, golf cart only, bridges on temporary spread footing abutments bridging the creek during normal flow and temporary 6-foot wide golf cart paths using a gravel surface laid on a geotextile fabric base for ease of removal. Costs are also included for a temporary access road to the bridge site, temporary work bridge over the creek, clearing and grubbing and temporary erosion control measures.

Recommended in-water work window for construction – The Washington Department of Fish and Wildlife recommends an in-water work window in Salmon Creek from August 1 through August 31. Based on site geometry and the normal flow channel, contractor work bridges can bridge over the creek and our recommended alternate avoids construction in the waterway. Construction can be timed so that the cutting off of piling on the current structure can occur during the in-water work window. Temporary golf cart structures would also need to be long enough to avoid in-water work. However, the in-water work window conflicts with prime golf course use and needs resolution of the lease agreement with the golf course and agreement on how impacts will be handled. Cost allowances are included in the Project Cost to cover anticipated unknown contractor costs for longer work, access roads and temporary golf cart bridges, additional BMP's to meet SWPPP requirements and other unknowns due to the one month allowed in-water work window. There is other construction outside the creek boundaries which creates some flexibility in the contractor's work methods.

Existing rip rap – Existing riprap at the bridge location was likely placed to protect the golf cart path rather than the bridge or abutments. Based on field observations documented through 18 years of bridge inspections by HDR, the channel is not degrading and the existing timber bents

are not being scoured out. The rip rap appears to have been placed by the Golf Course 15 to 20 or so years ago as a result of a flood event that damaged the golf cart paths and portions of the golf course. Given the stream velocities, the rip rap, approximately a 4-foot D_{50} size, was possibly not sized using engineering calculations and due to its condition, was simply "dumped" along the banks. During construction of the new bridge, the rip rap in the new bent area will be shifted away and then moved back to its existing location in order to remove or cut off the existing timber piling and to drive piling for the new bridge. We suggest that plans and special provisions show "dress and restore existing rip rap" so contractor is on notice of work that is required. As the rip rap was placed by the Golf Course and extends upstream and downstream of the bridge, it should not be required of the County to take responsibility for new design. Preliminary Hydraulics and Hydrology work indicates that predicted 100-year stream velocities are below the threshold that would require riprap to protect bridge components per BNSF and UPRR guidelines used as the basis for rip rap sizing in the project's Design Criteria document.

Opinion of Probable Conceptual Project Cost

As noted in the alternatives analysis, only base costs for the structure were compared as the remainder of the project costs would be similar. The total project cost includes contingency, sales tax, engineering for completion of design, final permitting, construction management and testing and county project administration costs. The allowances as noted above in the Additional Construction Considerations section have also been included.

The contractor can complete the bridge under several different schedule methodologies:

- Construct the substructure while maintaining train traffic during non-contractor work hours. Contractor uses standard cranes and other off-track equipment.
  - Pile can be driven through and around the existing superstructure and track on the bridge approaches.
  - Use 8-hour windows for setting caps and placing temporary falsework to support the track at the new abutments.
  - Use three days of train free time to set spans and complete the track reconstruction across the new bridge.
  - This type of construction can allow for phasing of work so one golf cart path, with temporary cover, can be maintained as work progresses. The path used would shift from one side to the other as work is performed in each side of the creek.
  - Project start and completion would occur to allow the existing pile removal during the allowed work window in August.

  This methodology may take two to three months to complete the work, which doesn't include time for material procurement.

- Construct the substructure while maintaining train traffic during non-contractor work hours. Contractor uses specialized on track equipment.
  - Pile can be driven through and around the existing superstructure and track on the bridge approaches using track mounted cranes.

- Use 8-hour windows for setting caps and placing temporary falsework to support the track at the new abutments using track mounted cranes
- Use three days of train free time to set spans and complete the track reconstruction across the new bridge or work between trains with on track equipment. Girders and spans may need setting on falsework adjacent to the existing bridge to facilitate the safe lifting of the heavy components.
- This type of construction can allow for phasing of work so one golf cart path, with temporary cover, can be maintained as work progresses. The path used would shift from one side to the other as work is performed in each side of the creek.
- Project start and completion would occur to allow the existing pile removal during the allowed work window in August.

This methodology may take two to three months to complete the work, which doesn't include time for material procurement. However, the existing bridge is load restricted and the track mounted cranes may not be safe to operate on the existing structure. Two on track cranes could be used, but there is not a siding with in an easy, short travel distance of the bridge site to allow for ease of clearing track.

- Take the track out of service and construct the bridge in an expedited fashion.
  - Removal of the bridge except for in-water piling could occur as needed to expedite substructure and cap placement.
  - To avoid delaying construction, it may be necessary to close the golf paths to provide a safe environment around the construction site.
    - Overall impact to the golf course may be less due to the shortened time frame.
  - Project start and completion would occur to allow the existing pile removal during the allowed work window in August.

This type of construction would allow for bridge completion in one to 1 ½ months, which doesn't include time for material procurement.

Table 3 presents the Opinion of Probable Project Cost for the recommended alternate based on the 10% design effort used to progress the project through the TS&L Phase. This estimate is based on typical unit costs for similar railroad work on an active railway performed by a contractor. As the estimate is refined during future engineering phases, the unit costs and total costs for each item may be adjusted and the contingency amount will be reduced as more details are developed. The allowance for engineering and design is for work moving forward and does not include the engineering completed during this current phase.

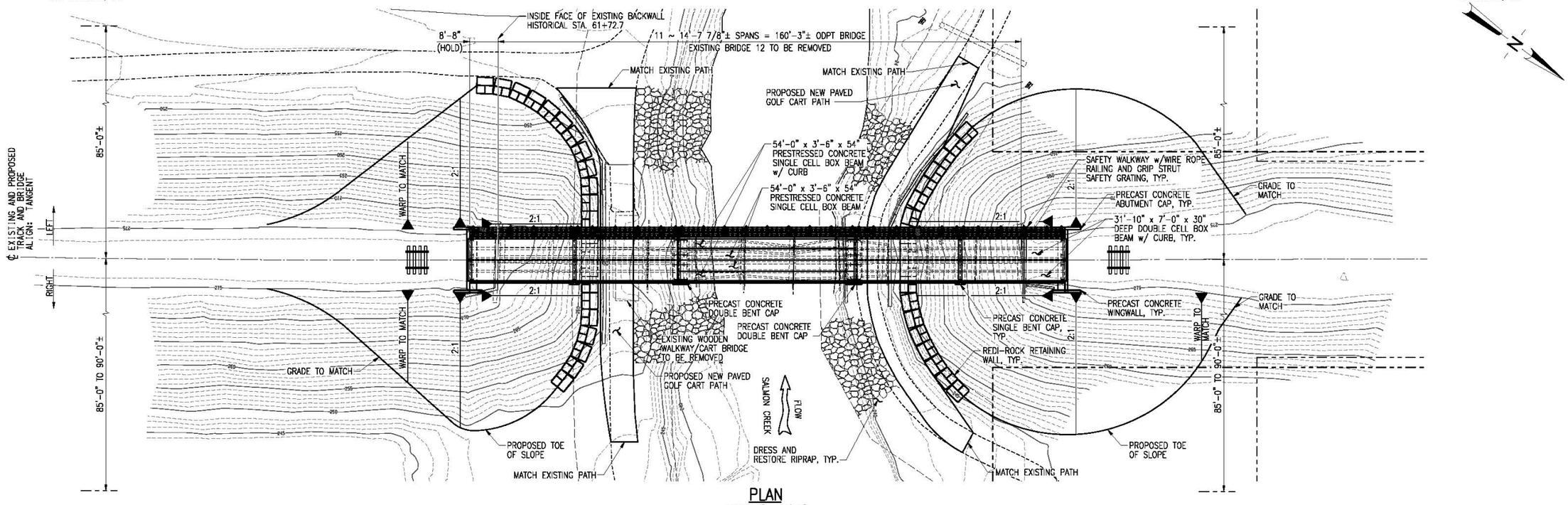
Table 3, Recommended Alternative Opinion of Probable Project Cost

					Job No.:	Project 10055450, Task 5.0		
HDR Computation		Opinion of Probable Project Cost - 2017 Dollars, 10% Design Effort						
Project:	Clark County BR 12				*Computed:*	PJG	*Date:*	4/26/2017
Subject:	TS&L Study				*Checked:*	DLM	*Date:*	5/1/2017
Task:	Recommended Alternative				*Sheet No.:*		*Of:*	

RECOMMENDED ALTERNATIVE B - ONE 54' SGL MAIN SPAN, FOUR 32' DBL APPROACH SPANS

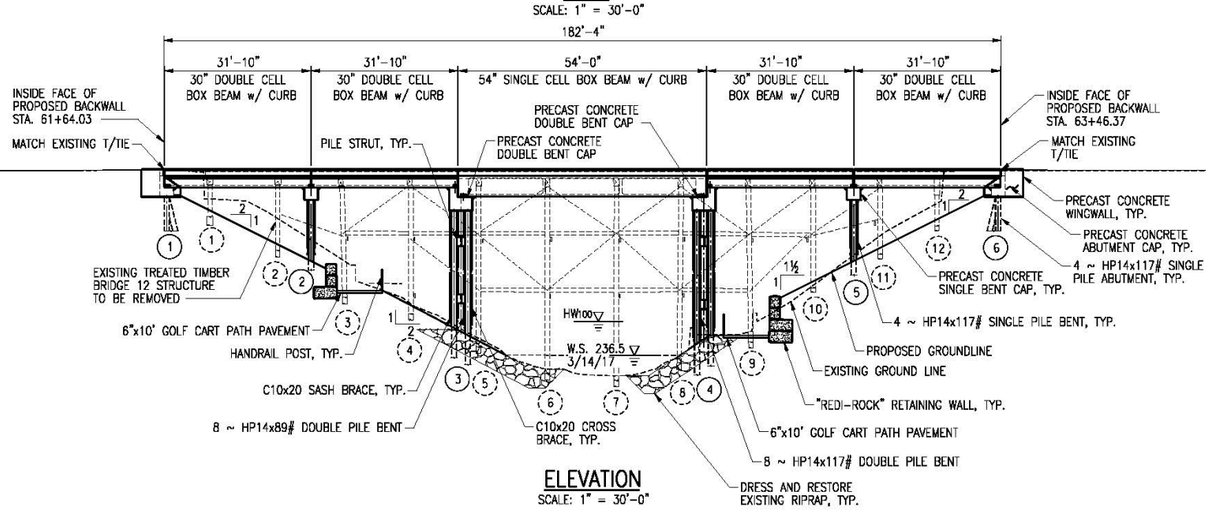
ITEM	*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*			
Mobilization (10%)	LS	$ 143,587	1	$ 143,587			
Temporary Erosion Control	LS	$ 40,000	1	$ 40,000			
Temporary Access Road, Path and Work Bridges	LS	$ 80,000	1	$ 80,000			
Clearing and Grubbing	LS	$ 10,000	1	$ 10,000			
Demolish Existing Timber Bridge	LS	$ 30,000	1	$ 30,000			
Furnish & Drive Steel Pile HP14x117	LF	$ 135	2,560	$ 345,600			
Pile Driving Point	EA	$ 200	32	$ 6,400			
Pile Splices	EA	$ 400	32	$ 12,800			
Dynamic Load Test	EA	$ 5,000	2	$ 10,000			
Re-drive Test Pile	EA	$ 2,000	2	$ 4,000			
Bent Bracing Steel	LB	$ 3	18,848	$ 56,544			
Precast Concrete Abut. Cap	EA	$ 9,000	2	$ 18,000			
Precast Concrete Bent Cap	EA	$ 6,000	2	$ 12,000			
Precast Concrete Stepped Dbl Bent Cap	EA	$ 7,500	2	$ 15,000			
Precast Concrete Wingwall	EA	$ 2,500	4	$ 10,000			
Shipping Precast Members	EA	$ 4,000	22	$ 88,000			
Erecting Precast Members	LS	$ 100,000	1	$ 100,000			
Prestressed Concrete 30" DBL	LF	$ 650	256	$ 166,400			
Prestressed Concrete 54" SGL	LF	$ 800	216	$ 172,800			
Elastomeric Bearing Pad	EA	$ 2,500	20	$ 50,000			
Grip Strut Walkway	LF	$ 25	183	$ 4,575			
Wire Rope Handrailing	LF	$ 25	183	$ 4,575			
Structure Excavation	CY	$ 35	225	$ 7,875			
Bridge End Backfill	CY	$ 35	100	$ 3,500			
Flowfill Backfill	CY	$ 150	50	$ 7,500			
Riprap (4' thick, D50 = ?)	CY	$ 150	400	$ 60,000			
Retaining Wall - Redi-Rock	SF	$ 65	500	$ 32,500			
Golf Cart Paths	LF	$ 130	240	$ 31,200			
Track Work	TF	$ 200	283	$ 56,600			
			Subtotal =	$ 1,579,456		$ 8,663	/ TF
Bridge length (ft) =	182.33						
			RR Bridge Subtotal =	$ 1,579,456			
			Contingency =	$ 315,891	20%		
			Construction Cost =	$ 1,895,347		$ 10,395	/ TF
			Engineering & Design =	$ 189,535	10%		
			Permitting =	$ 56,860	3%		
			Construction Management & Testing =	$ 189,535	10%		
			County Project Administration =	$ 189,535	10%		
			Right-of-Way Allowance =	$ 30,000			
			WA Sales Tax =	$ 159,209	8.4%		
			Project Estimate =	**$ 2,710,021**			

The results of the geotechnical engineering work being performed will be used to further refine the quantities and costs. As the details on accessing the site and mitigating impacts to the golf course are agreed upon, further modifications to the work will be determined further adjusting the project cost. The exhibit sheet for the recommended alternate follows.



PLAN

SCALE: 1" = 30'-0"



ELEVATION

SCALE: 1" = 30'-0"

GENERAL NOTES

EXISTING TREATED TIMBER STRUCTURE SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH THE SPECIFICATIONS. EXISTING BENTS AND EXPOSED PILE CUTOFFS SHALL BE REMOVED ONE FOOT BELOW PROPOSED OR EXISTING GROUNDLINE OR TWO FEET BELOW T/TIE, WHICHEVER IS LOWER.

LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE AND MAY BE INCOMPLETE

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 "It's the Law" NORTHWEST UTILITIES NOTIFICATION CENTER

CLARK COUNTY, WASHINGTON

TRANSPORTATION PROGRAM

PUBLIC WORKS ENGINEERING & CONSTRUCTION DIVISION

HDR

DONALD L. McCAMMON STATE OF WASHINGTON 30849 REGISTERED PROFESSIONAL ENGINEER

PVJR RAILROAD BRIDGE 12 REPLACEMENT, NEAR CEDARS, WA

ALTERNATE B
SINGLE CELL MAIN SPAN

DATE 05/2017

X

1 OF 1

Attachment A. Opinions of Probable Alternatives Construction Cost

HDR Computation

					Job No.:	Project 10055450, Task 5.0		
Project:	Clark County BR 12				*Computed:*	PJG	*Date:*	4/26/2017
Subject:	TS&L Study				*Checked:*	DLM	*Date:*	5/1/2017
Task:	Structure Alternatives				*Sheet No.:*		*Of:*	

ALTERNATIVE A - TWO 22' & FIVE 28' DBL SPANS

ITEM	*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*			
Mobilization (10%)	LS	$ 134,691	1	$ 134,691			
Demolish Existing Timber Bridge	LS	$ 30,000	1	$ 30,000			
Furnish & Drive Steel Pile HP14x117	LF	$ 135	3,520	$ 475,200			
Pile Driving Point	EA	$ 200	44	$ 8,800			
Pile Splices	EA	$ 400	44	$ 17,600			
Dynamic Load Test	EA	$ 5,000	2	$ 10,000			
Re-drive Test Pile	EA	$ 2,000	2	$ 4,000			
Bent Bracing Steel	LB	$ 3.00	34,496	$ 103,488			
Precast Concrete Abut. Cap	EA	$ 9,000	2	$ 18,000			
Precast Concrete Bent Cap	EA	$ 6,000	6	$ 36,000			
Precast Concrete Wingwall	EA	$ 2,500	4	$ 10,000			
Shipping Precast Members	EA	$ 4,000	26	$ 104,000			
Erecting Precast Members	LS	$ 100,000	1	$ 100,000			
Prestressed Concrete 30" DBL	LF	$ 650	368	$ 239,200			
Elastomeric Bearing Pad	EA	$ 2,500	28	$ 70,000			
Grip Strut Walkway	LF	$ 25	185	$ 4,625			
Wire Rope Handrailing	LF	$ 25	185	$ 4,625			
Structure Excavation	CY	$ 35	225	$ 7,875			
Bridge End Backfill	CY	$ 35	100	$ 3,500			
Flowfill Backfill	CY	$ 150	50	$ 7,500			
Riprap (4' thick, D50 = ?)	CY	$ 150	400	$ 60,000			
Retaining Wall - Redi-Rock	SF	$ 65	500	$ 32,500			
			Subtotal =	$ 1,481,604		$ 8,038	/ TF
Bridge length (ft) =	184.33						
			RR Bridge Subtotal =	$ 1,481,604			
			Contingency =	$ 296,320.86	20%		
			RR BRIDGE Total =	**$ 1,777,925**		$ 9,645	/ TF

HDR Computation					Job No.:	Project 10055450, Task 5.0		
Project:	Clark County BR 12				Computed:	PJG	Date:	4/26/2017
Subject:	TS&L Study				Checked:	DLM	Date:	5/1/2017
Task:	Structure Alternatives				Sheet No.:		Of:	

ALTERNATIVE B - ONE 54' SGL MAIN SPAN, FOUR 32' DBL APPROACH SPANS

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL			
Mobilization (10%)	LS	$ 121,807	1	$ 121,807			
Demolish Existing Timber Bridge	LS	$ 30,000	1	$ 30,000			
Furnish & Drive Steel Pile HP14x117	LF	$ 135	2,560	$ 345,600			
Pile Driving Point	EA	$ 200	32	$ 6,400			
Pile Splices	EA	$ 400	32	$ 12,800			
Dynamic Load Test	EA	$ 5,000	2	$ 10,000			
Re-drive Test Pile	EA	$ 2,000	2	$ 4,000			
Bent Bracing Steel	LB	$ 3.00	18,848	$ 56,544			
Precast Concrete Abut. Cap	EA	$ 9,000	2	$ 18,000			
Precast Concrete Bent Cap	EA	$ 6,000	2	$ 12,000			
Precast Concrete Stepped Dbl Bent Cap	EA	$ 7,500	2	$ 15,000			
Precast Concrete Wingwall	EA	$ 2,500	4	$ 10,000			
Shipping Precast Members	EA	$ 4,000	22	$ 88,000			
Erecting Precast Members	LS	$ 100,000	1	$ 100,000			
Prestressed Concrete 30" DBL	LF	$ 650	256	$ 166,400			
Prestressed Concrete 54" SGL	LF	$ 800	216	$ 172,800			
Elastomeric Bearing Pad	EA	$ 2,500	20	$ 50,000			
Grip Strut Walkway	LF	$ 25	183	$ 4,575			
Wire Rope Handrailing	LF	$ 25	183	$ 4,575			
Structure Excavation	CY	$ 35	225	$ 7,875			
Bridge End Backfill	CY	$ 35	100	$ 3,500			
Flowfill Backfill	CY	$ 150	50	$ 7,500			
Riprap (4' thick, D50 = ?)	CY	$ 150	400	$ 60,000			
Retaining Wall - Redi-Rock	SF	$ 65	500	$ 32,500			
			Subtotal =	$ 1,339,876		$ 7,349	/ TF
Bridge length (ft) =	182.33						
			RR Bridge Subtotal =	$ 1,339,876			
			Contingency =	$ 267,975.18	20%		
			RR BRIDGE Total =	**$ 1,607,851**		$ 8,818	/ TF

					Job No.:	Project 10055450, Task 5.0			
HDR Computation									
Project:	Clark County BR 12				*Computed:*	PJG	*Date:*	4/26/2017	
Subject:	TS&L Study				*Checked:*	DLM	*Date:*	5/1/2017	
Task:	Structure Alternatives				*Sheet No.:*		*Of:*		

ALTERNATIVE C - ONE 82' DPG MAIN SPAN, TWO 20' & TWO 30' DBL APPROACH SPANS

ITEM	*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*			
Mobilization (10%)	LS	$ 157,347	1	$ 157,347			
Demolish Existing Timber Bridge	LS	$ 30,000	1	$ 30,000			
Furnish & Drive Steel Pile HP14x117	LF	$ 135	2,880	$ 388,800			
Pile Driving Point	EA	$ 200	36	$ 7,200			
Pile Splices	EA	$ 400	36	$ 14,400			
Dynamic Load Test	EA	$ 5,000	2	$ 10,000			
Re-drive Test Pile	EA	$ 2,000	2	$ 4,000			
Bent Bracing Steel	LB	$ 3.00	18,848	$ 56,544			
Precast Concrete Abut. Cap	EA	$ 9,000	2	$ 18,000			
Precast Concrete Bent Cap	EA	$ 6,000	2	$ 12,000			
Precast Concrete Stepped Dbl Bent Cap	EA	$ 7,500	2	$ 15,000			
Precast Concrete Wingwall	EA	$ 2,500	4	$ 10,000			
Shipping Precast Members	EA	$ 4,000	18	$ 72,000			
Erecting Precast Members	LS	$ 75,000	1	$ 75,000			
Prestressed Concrete 30" DBL	LF	$ 650	200	$ 130,000			
Structural Steel - DPG	LB	$ 3.50	160,000	$ 560,000			
Elastomeric Bearing Pad	EA	$ 2,500	20	$ 50,000			
Grip Strut Walkway	LF	$ 25	183	$ 4,575			
Wire Rope Handrailing	LF	$ 25	183	$ 4,575			
Structure Excavation	CY	$ 35	225	$ 7,875			
Bridge End Backfill	CY	$ 35	100	$ 3,500			
Flowfill Backfill	CY	$ 150	50	$ 7,500			
Riprap (4' thick, D50 = ?)	CY	$ 150	400	$ 60,000			
Retaining Wall - Redi-Rock	SF	$ 65	500	$ 32,500			
			Subtotal =	$ 1,730,816		$ 9,493	/ TF
	Bridge length (ft) =	182.33					
			RR Bridge Subtotal =	$ 1,730,816			
			Contingency =	$ 346,163	20%		
			RR BRIDGE Total =	**$ 2,076,979**		$ 11,391	/ TF

					Job No.:	Project 10055450, Task 5.0		
HDR Computation								
Project:	Clark County BR 12				Computed:	PJG	Date:	4/26/2017
Subject:	TS&L Study				Checked:	DLM	Date:	5/1/2017
Task:	Structure Alternatives				Sheet No.:		Of:	

ALTERNATIVE D - ONE 54' ARCH SPAN, TWO 14' DIA MULTIPLATES

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
Mobilization (10%)	LS	$ 192,024	1	$ 192,024
Demolish Existing Timber Bridge	LS	$ 30,000	1	$ 30,000
Furnish & Drive Steel Pile HP14x117	LF	$ 135	2,160	$ 291,600
Pile Driving Point	EA	$ 200	54	$ 10,800
Pile Splices	EA	$ 400	54	$ 21,600
Dynamic Load Test	EA	$ 5,000	2	$ 10,000
Re-drive Test Pile	EA	$ 2,000	2	$ 4,000
CIP Concrete for Arch Footings	CY	$ 650	144	$ 93,600
CIP Concrete Arch Retaining Walls	SF	$ 75	1,680	$ 126,000
CIP Concrete Path Retaining Walls	SF	$ 75	1,060	$ 79,500
54' Arch Rib, Furnish FOB	LS	$ 546,267	1	$ 546,267
54' Arch Rib, Install	LS	$ 100,000	1	$ 100,000
14' dia Multiplate, Furnish FOB	LS	$ 120,133	1	$ 120,133
14' dia Multiplate, Install	LS	$ 40,000	1	$ 40,000
Handrailing	LF	$ 25	210	$ 5,250
Structure Excavation	CY	$ 35	6,500	$ 227,500
Structure Backfill	CY	$ 35	5,000	$ 175,000
Streambed Restoration	LS	$ 30,000	1	$ 30,000
Granular Bedding for Multiplates (2' thick)	CY	$ 35	212	$ 7,404
Granular Bedding for Arch Footings (1' thick)	CY	$ 35	45	$ 1,587
			Subtotal =	$ 2,112,265
			RR Arch Subtotal =	$ 2,112,265
			Contingency =	$ 422,453 (20%)
			RR ARCH Total =	**$ 2,534,718**

Attachment B. Hydraulics and Hydrology Memorandum

Attachment C, Design Criteria

Attachment E
Bridge #20

TS&L Study

Clark County, WA – Bridge 20

Bridge Replacement Study

October 8, 2019

Prepared by: HDR Engineering, Inc.

700 SW Higgins Avenue
Suite 200
Missoula, MT 59803-1489

Phone: (406) 532-2225
Fax: (406) 532-2241
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Introduction and Project Background

Clark County, WA, owner of the Chelatchie Prairie Railroad, requested HDR to verify a proposed culvert replacement for Bridge 20, which was proposed to be constructed in the summer of 2019. Bridge 20 is located at railroad Mile Post 20.43 (historical railroad survey station 1083+98.7) over Basket Creek, near railroad station Wall, Washington. The location is near the City of Heisson, Clark County, Washington, between NE Basket Flat Road and the East Fork Lewis River. A vicinity map of the project location within Clark County is shown in Figure 1.

Figure 1 – Vicinity Map, Clark County BR 20 Project Location

Washington's Department of Fish and Wildlife, WDFW, requirements for crossings of waterways. HDR proposed a two-barrel culvert option with 72" diameter CMP culverts which met hydraulic criteria for the site and was a typical freight railroad solution to provide drainage under the track. A request was made with the Washington Department of Fish and Wildlife to obtain an engineering variance from a single barrel culvert requirement in order to meet the hydraulic requirements and avoid costlier construction. After multiple discussions between HDR, Clark County, and WDFW, a determination was made by the WDFW on July 30, 2019 that a two-barrel option would not be accepted nor would an upstream water surface increase greater than 1-foot. Because of this determination by WDFW, HDR was requested to identify a different drainage structure type and associated project costs instead of completing the single barrel culvert construction plans as originally scoped.

This Type, Size, and Location (TS&L) study is presented to identify drainage structure replacement alternatives to replace Bridge 20. A three, precast concrete double cell span

bridge supported on precast concrete caps founded on exposed steel H-pile socketed into the existing bedrock is the recommended drainage structure that meets hydraulic requirements, permitting requirements and minimizes construction impacts at the lowest construction cost.

TS&L Design Criteria

The TS&L study evaluated alternatives using total estimated project cost as the basis for ranking the alternatives. The lowest cost alternative which meets the design criteria is considered the preferred design. The following design criteria were used to develop and evaluate the bridge alternatives, consistent with Clark County's Flood Plain Management guidelines and freight railroad industry practice:

- H&H Considerations
    - Adhere to Clark County Flood Plain Management guidelines.
    - Maximum 1-foot rise in the backwater stream elevation during the 100-year storm event.
    - Maximum stream velocity through the bridge structure of approximately 6 fps to preclude the need for scour mitigation measures.
    - Maintain existing low flow channel geometry to the extent practicable.
    - Maintain the 50-year storm event water surface elevation below the bridge low chord or culvert top invert.
    - The 100-year event water surface elevation could not be higher than 1-foot above the top invert for a culvert or, in the case of a bridge, could not be higher than the subgrade approaching the bridge.
    - Per the WDFW, the drainage structure could not be narrower than 15-feet (equivalent to 1.5 times 2-year bank full width).
- Bridge Design Considerations
    - Maximum 2H:1V embankment slopes.
    - Maintain existing Top of Tie (Base of Rail) elevations.
    - Ballast deck, prestressed-precast concrete spans are preferred with 15 inches of ballast from Top of Tie to Top of Deck.
    - Precast concrete substructure elements welded to driven or socketed steel H-pile per typical freight railroad practice.
- Construction and Cost Considerations
    - Equipment size and access requirements to construct bridge.
    - Environmental impacts due to construction.
    - Fabrication and material cost of components.
    - Minimize impacts to rail service during construction.

Note that for the length of crossing for this structure replacement, steel superstructure construction is not considered cost effective as the spans would add 25% to 30% additional cost compared to the proposed concrete superstructure alternatives. Other options considered, but not evaluated include a single barrel precast concrete arch structure and reinforced concrete

box structure. Given a required span length of 15-feet to meet WDFW requirements, a concrete arch would not fit within the existing bridge profile and meet minimum fill requirements. The reinforced concrete box structure could be constructed to meet minimum depth of fill requirements and WDFW span requirements. However, the construction impacts to keeping the track in service were deemed to be too great to consider this alternative at this time. This option could be pursued further if track service is not required to be maintained. Additionally, the environmental impacts within the Ordinary High Water (OHw) level, while similar to the original culvert options, are much greater than the bridge options as foundations would need to be excavated and installed for both the arch and box structures. The two alternatives determined to be viable options per the TS&L study are:

1. Single span bridge consisting of the following:
    a. 1~60-foot long, 60-inch deep single cell prestressed-precast concrete girder span (4 girders per span).
    b. 2~precast concrete abutment caps founded on 5~steel H-piles each.
    c. Due to structure depth, wingwall extensions running parallel to the track will be H-pile supported at the abutments.
2. Three span bridge consisting of the following
    a. 74’ long, 30-inch deep, 3-span double cell prestressed-precast concrete beam spans with 1~30-foot long main span and 2~22-foot long approach spans, one to each side of the main span (2 beams per span).
    b. 2~precast concrete bent caps founded on 4~steel H-piles each.
    c. 2~precast concrete abutment caps founded on 3~steel H-piles each.
    d. Wingwall extensions, due to the shorter structure depth, are supported on the sides of the abutment caps and do not require pile supports.

Hydrologic and Hydraulic Analysis

Summary of Analysis

An H&H analysis was conducted for existing conditions, previously proposed culvert options, and the currently proposed bridge options. Due to the restrictions placed on the culvert designs, these options were not considered viable replacement options through either hydraulic analysis or permitting issues.

Both of the bridge design Alternatives 1 and 2 presented above meet the H&H requirements as noted in the TS&L study design criteria. Tables 1 and 2 provide a summary of the proposed conditions in comparison to the existing conditions with regard to water surface elevations (WSE) and flow velocities for the bridge design alternatives:

Table 1 - Alternative 1 Hydraulic Summary

Storm Event	Existing Conditions		Alternative 1 – Single Span Option			
	WSE (ft)	Velocity (fps)	Proposed WSE (ft)	WSE Inc. (+) /Dec. (-) (ft)	Proposed Velocity (fps)	Velocity Inc. (+) /Dec. (-) (fps)
2-Year	484.5	3.4	484.3	-0.2	4.0	+0.6
50-Year	485.5	5.2	485.5	0.0	5.5	+0.3
100-Year	487.3	5.5	485.7	-1.6	5.7	+0.2

Table 2 - Alternative 2 Hydraulic Summary

Storm Event	Existing Conditions		Alternative 2 – Three Span Option			
	WSE (ft)	Velocity (fps)	Proposed WSE (ft)	WSE Inc. (+) /Dec. (-) (ft)	Proposed Velocity (fps)	Velocity Inc. (+) /Dec. (-) (fps)
2-Year	484.5	3.4	484.4	-0.1	3.9	+0.5
50-Year	485.5	5.2	485.3	-0.2	5.9	+0.7
100-Year	487.3	5.5	485.5	-1.8	6.2	+0.7

Hydrology and Existing Conditions

The existing bridge is a 6-span open-deck pile trestle (ODPT) structure approximately 93 feet long and 15 feet tall. The structure is composed of a creosote treated timber open-deck on timber stringers. The substructure is a combination of driven creosote treated timber pile bents and abutments and framed creosote treated timber bents on timber and/or concrete sills founded on bedrock. The bridge is approximately perpendicular to the stream channel. At the bridge crossing, the channel banks are heavily vegetated, and the overbanks extend into a wooded area (Figures 2 and 3).

Figure 2 – Bridge Site Aerial View

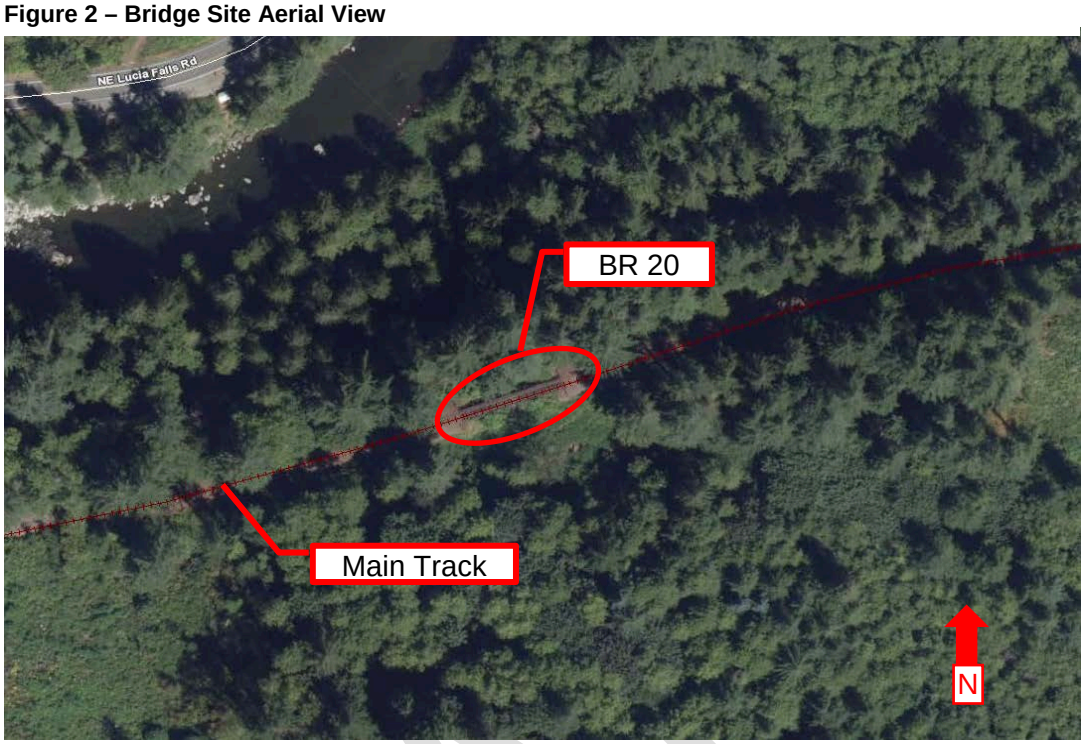


Figure 3 – View of Channel Looking Upstream Through Bridge

The USGS StreamStats web application, which utilizes regional regression equations, was used to determine peak discharges. Table 3 lists the flows that were used in the HEC-RAS model. The direction of flow is from geographic south to north with an average channel slope of 0.06 feet/foot.

Table 3 - Flow Rate Summary

Recurrence Interval	Flow Rate (cfs)
2-Year	67
50-Year	188
100-Year	216

Hydraulic Design Criteria

The bridge crossing is located in an area of minimal flood hazard (Zone X) per FEMA flood hazard maps (Panel 53011C0275D, effective date of September 5, 2012) as shown in Exhibit 1 in Appendix A. Clark County Flood Plain guidelines requires improvements outside of special flood hazard areas to certify that there is less than 1-foot of rise to the 100-year WSE. The bridge design criteria requires that the low chord of the structure is above the 50-year event WSE, and the 100-year event WSE cannot be above the railroad subgrade or more than 1-foot above the low chord.

Washington Department of Fish and Wildlife (WDFW) has determined that Basket Creek is a fish bearing stream supporting Rainbow Trout, Coho Salmon, and Winter Steelhead runs (http://apps.wdfw.wa.gov/salmonscape/map.html, accessed June 2019).

Existing Hydraulic Analysis

A limited bridge and site survey was conducted in October 2018 by Clark County. All elevations contained in this report are referenced to the North American Vertical Datum of 1988 (NAVD 88). The survey included elevation and location data for the track, limits of the bridge structure, topographic data in the immediate vicinity of the bridge, and channel cross-sectional geometry upstream and downstream of the bridge. The survey data was used to create the hydraulic model for the bridge. The hydraulic model for Clark County Bridge 20 was created in HEC-RAS version 5.0.7 to simulate the existing and proposed conditions.

The existing ODPT bridge is approximately 93 feet long consisting of 6~15.5 foot long spans. The top of rail elevation at the low end of the bridge is 500.20 feet. The existing low chord elevation was not surveyed. The low chord elevation was estimated to be 497.57 feet assuming standard geometry for the rail and tie plate, timber deck tie, and timber stringer using former Northern Pacific Railroad timber bridge standards. The existing bridge crosses Basket Creek between two approach fills and has 7 treated timber bents including the abutments. The assumptions for the standard bridge geometry are below:

- 7.5” combined rail and tie plate height
- 8” deep timber tie

- 16” deep stringer
- Total depth from top of rail to low chord = 31.5 inches (2.63 feet)

The existing bridge is perpendicular to the flow of the channel. The existing abutments sit normal to the track and bridge. The boundary condition downstream of the structure was based on a normal depth of 0.06 feet/foot. A Manning’s ‘n’ value of 1.0 was used for the overbanks due to the dense brush outside of the main channel. A Manning’s ‘n’ value of 0.04 was used for the main channel assuming a clean channel bottom with light brush on the side.

Alternatives Evaluation

Replacement of the existing bridge by either culverts or a bridge was evaluated. Table 4 shows the results of the alternatives evaluation and predicted WSE results. Because the length of the proposed culvert alternatives exceed the reach lengths of the modeled bounding cross sections for the existing bridge, the culvert results are shown for the cross section upstream of the proposed culverts, cross section 105.7. The existing and proposed bridges, and subsequent sections of this report, include results immediately upstream of the existing and proposed bridges, at cross section 72.7. The alternatives are described further below.

Table 4 - Resulting WSEs for Alternatives

Alternate No.	Description	WSE 50-year event		WSE 100-year event	
		XS 72.7	XS 105.7	XS 72.7	XS 105.7
-	Existing Conditions	485.5	486.1	485.7	486.3
1	60’ Single Span Bridge	485.5		485.7	
2	74’ Three Span Bridge	485.3		485.5	
3*	Single 9’ Dia. CMP Culvert		487.8		488.0
4**	Dual 6’ Dia. CMP Culverts		487.0		487.3

*The predicted 100-year water surface elevation of 488.0 is an increase of 1.7-feet, 0.7-feet greater than the allowable 1-foot.

**Dual culverts were not an acceptable alternative to the WDFW.

Proposed Bridges

The two proposed bridge alternatives for replacement of Bridge 20 at Basket Creek station 0+66.8 from the confluence with the East Fork Lewis River (railroad milepost 20.43) consist of:

1. Single span bridge consisting of the following:
    a. 1~60-foot long, 60-inch deep single cell prestressed-precast concrete girder span (4 girders per span)
    b. 2~precast concrete abutment caps founded on steel H-piles
2. Three span bridge consisting of the following
    a. 74’ long, 30-inch deep, 3-span double cell prestressed-precast concrete girder spans with 1~30-foot long main span and 2~22-foot long approach spans, one to each side of the main span (2 girders per span)
    b. 4~precast concrete abutment/bent caps founded on steel H-piles

The top of rail elevation and grade for both bridge alternates match the existing top of rail elevation and grade. The existing low chord elevation is 497.57 feet and the proposed low chord elevations are 493.53 feet for Alternative 1 and 495.93 feet for Alternative 2. The proposed low chords are both well above the predicted 50- and 100-year WSEs. Embankment slopes of 2H:1V maximum were used to determine the channel cross section. The exhibit drawings in Appendix A show the two Alternatives with approximate location over the existing channel. During final design, the locations would be adjusted to optimize cut and fill sections to a configuration which results in the lowest cost option.

Both bridges are perpendicular to the flow of the channel with bents parallel to the existing channel flow, normal to the track and bridge. The surrounding area and main channel for the proposed bridge will have similar vegetation to the existing bridge model once it becomes established. The same Manning 'n' values were used in the proposed bridges that were used in the existing bridge.

Neither bridge option raised the predicted 100-year water surface elevation. The 50-year WSE does not change for Alternative 1 and is reduced by 0.2 feet for Alternative 2. Both bridges meet Clark County's Flood Plain Management guidelines for water surface elevations.

Both bridge options marginally increased the flow velocities immediately upstream of the bridge due to reducing the overall bridge length and bringing the abutment embankments closer to the channel banks. For the 100-year storm event, the flow velocities at the cross section immediately upstream of the bridge increased by 0.2 feet per second for Alternative 1 and 0.7 feet per second for Alternative 2. Both bridges maintain flow velocities of approximately 6 feet per second or less which precludes the need for scour mitigation per standard railroad industry practice and no evidence of scour in the existing stable vegetation condition. The flow velocities at the cross section immediately downstream of the bridge do not change for either option. Although the downstream velocities exceed 6 feet per second, no scour mitigation is necessary as the existing banks are stable at the current velocity.

Proposed Culverts

Clark County originally proposed replacement of the bridge with a single barrel, 9 foot (108 inch) diameter CMP culvert (Alternative 3 in Table 4). The culvert was modeled with the bottom invert embedded 1.5 feet into the stream bed to allow for a wider flow area through the culvert. However, the model indicated that the resulting water surface elevation (WSE) for the 100-year flood event resulted in a rise of 1.7 feet, which exceeds the allowable 1.0 foot rise for areas of minimal flood hazard.

As a result, another alternative culvert option was considered that could be constructed within the existing bridge configuration, while still resulting in no greater than 1.0 foot of rise to the 100-year WSE. The proposed Alternative 4 in Table 4 was two 6 foot (72 inch) diameter CMP culverts, spaced at 12 feet center-to-center. These culverts were also modeled with the bottom invert embedded 1.5 feet into the stream bed to allow for a wider flow area. The model indicated 1.0 feet of rise for the 100-year event WSE, which meets the required Clark County Flood Plain guidelines.

The culvert alternatives were discussed with state permitting agencies, including the WDFW. As mentioned previously, although the hydraulic analysis indicated a single barrel culvert was not viable due to the rise in water surface elevation exceeding the allowable 1.0 foot of rise, the dual option was equally determined not viable. The WDFW expressed concern that debris could potentially block the culverts and cause the railroad embankment to wash out, damaging the critical fish habitat downstream. Because of the WDFW stance on prohibition of multi-barrel culverts and that the single barrel culvert option does not meet hydraulic design criteria, neither culvert option was considered viable and are not discussed further in this report.

H&H Results

The existing and proposed bridge alternative water surface elevations and velocities at river stations immediately upstream and downstream of the structures are provided in Table 5 below. A detailed summary of the hydraulic analysis is provided in Figure 4 on the following page.

Table 5 - 100-Year Event Results

River Station (ft)	Existing Bridge		Proposed Single Span Bridge			Proposed Three Span Bridge		
	WSE (ft)	V (ft/s)	WSE (ft)	WSE Diff. (ft)	V (ft/s)	WSE (ft)	WSE Diff. (ft)	V (ft/s)
72.7 (US)	485.7	5.55	485.7	0.0	5.69	485.5	-0.2	6.18
66.84	Bridge 20 (Centerline)							
60.5 (DS)	484.6	7.42	484.6	0.0	7.42	484.6	0.0	7.42

Figure 4 – Hydraulic Analysis Summary

Date: 6/6/2019 **Engineer:** Stephanie Williams
Culvert: ☐ **Bridge:** ☒
Office: HDR **QC Reviewer:** T.J. Yerdon **QC Review Date:** 8/23/2019
Stream Name: Basket Creek **Lat./Long.:** 45.835982° N, 122.464994° W
State: WA **County:** Clark **Section:** 17 **Township:** 04N **Range:** 03E

Hydrology:

Drainage Area: 1.14 ☒ **mi²** ☐ **acres**
Channel Slope: 0.06 ft/ft
Q_2: 67 (cfs) **Q_{50}:** 188 (cfs) **Q_{100}:** 216 (cfs)
Method Used: USGS StreamStats

Downstream Boundary Condition:

Known 2 Yr WSE: ft ☐ **Yes** ☒ **No**
Tailwater: ☐ **Yes** ☒ **No**
Normal Depth: 0.06 ft/ft
Source Used: Normal Depth

Existing Hydraulics:

Method: HEC-RAS
Structure Type: Six Span timber ODPT Bridge
Size/Length: 6 ~ 15.5' (ft) span, total span ~ 93'
Top of Rail Elevation: 500.20 (ft) **Top of Subgrade Elevation:** 497.07 (ft)
Top of Tie Elevation: 499.57 (ft) **Low Chord Elevation:** 497.57 (ft)
US 100 YR Vel: 5.5 (fps) **DS 100 YR Vel:** 7.4 (fps)
2 YR WSE: 484.5 (ft) **50 YR WSE:** 485.5 (ft)
100 YR WSE: 485.7 (ft) **Backwater XS location:** 72.7

Proposed Hydraulics (Single Span Bridge):

Method: HEC-RAS
Structure Type: 60" (in) Deep Prestressed-Precast Concrete Single Cell Box Girders
Size/Length: 1 ~ 60' (ft) span
Top of Rail Elevation: 500.40 (ft) **Top of Subgrade Elevation:** 497.27 (ft)
Top of Tie Elevation: 499.78 (ft) **Low Chord Elevation:** 493.53 (ft)
US 100 YR Vel: 5.7 (fps) **DS 100 YR Vel:** 7.4 (fps)
2 YR WSE: 484.3 (ft) **50 YR WSE:** 485.5 (ft)
100 YR WSE: 485.7 (ft) **Backwater XS location:** 72.7

Proposed Hydraulics (Three Span Bridge):

Method: HEC-RAS
Proposed Structure: 30" (in) Deep Prestressed-Precast Concrete Double Cell Box Girders
Size/Length: 2 ~ 22' (ft) span, with 1 ~30' (ft) span, for a total bridge length of 74' (ft)
Top of Rail Elevation: 500.30 (ft.) **Top of Subgrade Elevation:** 497.17 (ft.)
Top of Tie Elevation: 499.68 (ft.) **Low Chord Elevation:** 495.93 (ft.)
US 100 YR Vel: 6.2 (fps) **DS 100 YR Vel:** 7.4 (fps)
2 YR WSE: 484.4 (ft) **50 YR WSE:** 485.3 (ft)
100 YR WSE: 485.5 (ft) **Backwater XS location:** 72.7

Cost Analysis and Other Considerations

Estimates of probable construction cost for the project were completed to aid in the evaluation of the two bridge alternatives. The cost estimates used recent bid items for Washington State Department of Transportation (WSDOT) projects, fabricator estimates for major components, and recent project costs for similar freight railroad projects.

Detailed breakdowns of the opinion of probable project and construction cost for each alternative can be found in Appendix B. A summary of the opinion of probable project and construction cost for each alternative is in Table 6 below. The costs presented below include design, construction, and total project costs for comparison. All costs are in 2019 dollars and are not adjusted for a future construction year. Each design cost includes geotechnical investigation/recommendations, engineering for detailing/design of the new structure, bid and construction support, plus 10% contingency. Each construction cost includes 10% mobilization, demolition of the existing structure, construction of the new structure, and 20% contingency. Values do not include County administrative costs, environmental and permitting costs, construction management costs, WA sales tax, or other overhead cost considerations. As seen in the table, overall project costs are similar, but the three span alternative results in a lower total project cost than the single span option.

Table 6 – Opinion of Probable Project Cost Summary

Alternative	Design Cost	Construction Cost	Total Cost
1: Single Span Bridge	$108,810	$789,060	$897,900
2: Three Span Bridge	$97,420	$685,530	$783,000

Geotechnical Considerations

Based on limited available geotechnical data, bedrock depth is estimated to be relatively shallow. The existing low flow channel appears to flow directly on top of the bedrock which places the depth of rock approximately 17 feet below top of tie. Typical driven piles for the bridge types under consideration require a minimum of 35 feet of overburden above bedrock to preclude socketing. Because of the anticipated shallow rock depth, proposed piles are

assumed to be socketed into the bedrock and encased in concrete to provide adequate lateral and seismic stability.

HDR recommends performing at least one geotechnical boring to confirm bedrock depths and to test the quality of rock for resisting lateral loads which will help determine the required rock socket depth and aid in refining the opinion of probable construction cost. Additionally, each proposed bent location should be probed to determine depth to bedrock on the existing embankments to better estimate construction costs and to ensure adequate piling is on hand during construction. Costs for a geotechnical investigation with a single boring and probing Alternative 1 and Alternative 2. Alternative 1 does not require any drilling for rock sockets within the OHw as all work will occur on the embankments; however, as currently shown in the exhibit drawings, the channel will be reshaped through the bridge to maintain water surface elevations and better match the proposed bridge configuration. This configuration or bridge length could be adjusted to limit the extents and impacts of the channel work. Alternative 2 will have interior bents placed at the edges of the OHw limits and will fill a small section on the east bank pending any configuration changes during final design. In order to drill the rock sockets for the interior bents, there will be work which occurs within the OHw limits. Again, these impacts have not been quantified due to the preliminary nature of the design and uncertainty as to permitting requirements.

Both alternatives will use a causeway composed of clean rocky material, separated from the substrata by geotextile fabric with culverts used to temporarily handle flow from Basket Creek during construction. It was assumed that State of Washington Best Management Practices would be followed for both alternatives. This involves not only the standards used for the causeway and temporary maintenance of water flow, but use of sediment collection barriers in the water that would allow fish passage and use of silt fence to avoid contaminated run-off.

Construction Considerations

Construction requirements for each alternative differ due to the span types involved with each option. While Alternative 1 results in lower installation costs due to a fewer number of bents and piles, this is offset by the complexity of fabricating the single cell box girders compared to the double cell box girders. Based on information received from prestressed concrete fabricators in the freight rail industry, the costs of fabricating a single cell box girder span superstructure compared to a double cell box girder span superstructure are $2,000 per foot of bridge (4 girders per span) and $700 per foot of bridge (2 beams per span) respectively.

Another difference in construction costs between the two span types is the additional work required to install the spans on the bridge. Besides the crane size differences mentioned in the environmental considerations above, single cell box girder construction requires installation of post-tensioned tie rods between the girders to provide lateral stability and ensure that the girders act as a single unit in supporting the railroad live load. Conversely, the double cell beams do not require either of these items as the beams are independently stable laterally and have a relatively small contact area between the beam flanges which is less susceptible to

damage due to water penetration. The additional effort for the single cell span installation offset the savings from installing fewer spans.

Due to the height of the single cell box girders, a typical cantilevered wingwall design may not be feasible without additional restraint at the free end of the wingwall panel due to the increased length and height required to maintain 2H:1V slopes around the abutment head of bank. To mitigate this, a soldier pile is assumed to be placed at the free end of each wingwall panel to provide additional lateral support. The double cell box beams are short enough that typical cantilevered wingwalls are assumed to be adequate based on industry practice.

Waterproofing of the bridge deck was not considered as the existing structure is an open deck structure which did not prevent water passage to the creek below. Additionally, the structure is not spanning any areas accessible to pedestrian, vehicle, or marine traffic which would require waterproofing to protect those vehicles and people if they crossed under the bridge.

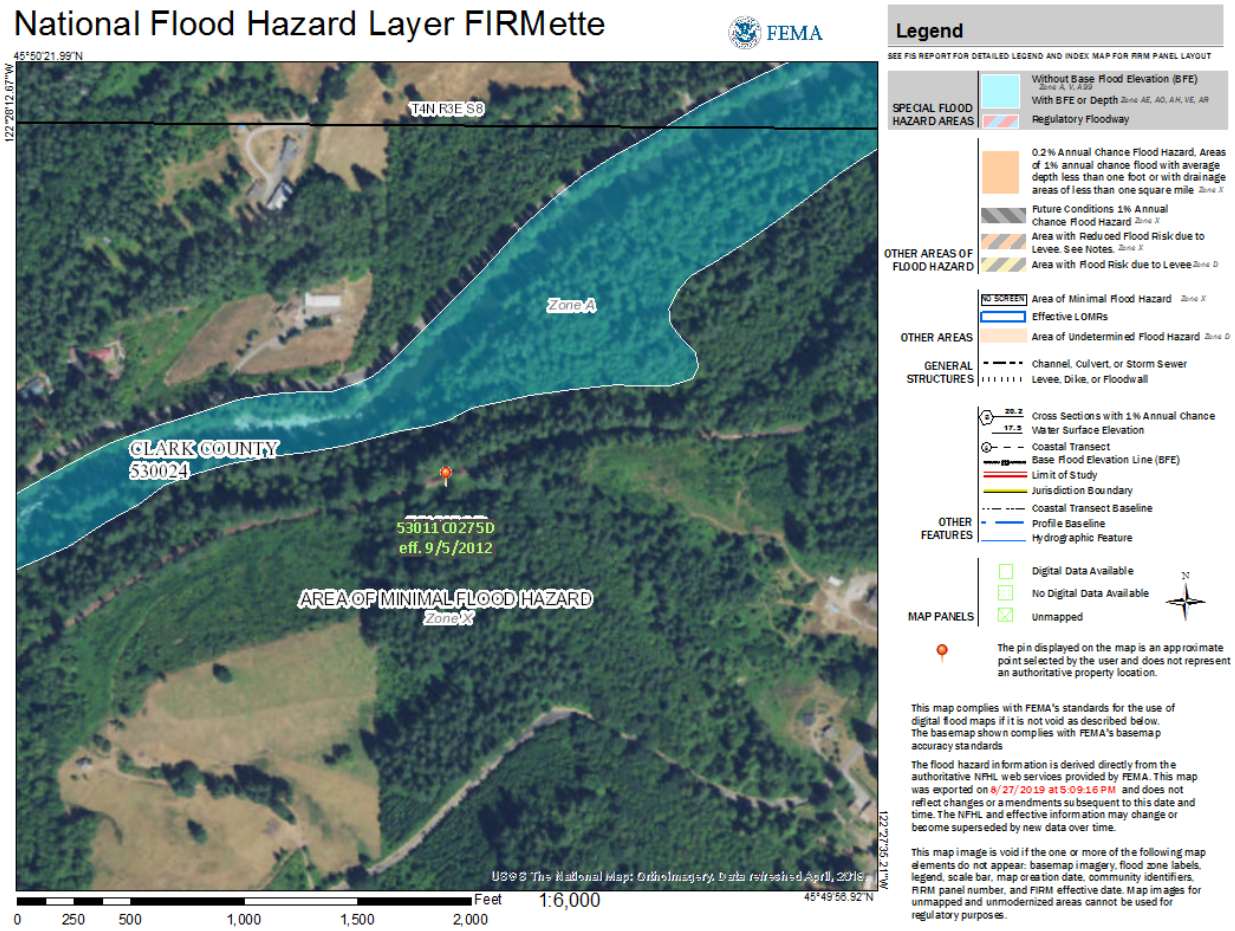
TS&L Conclusions

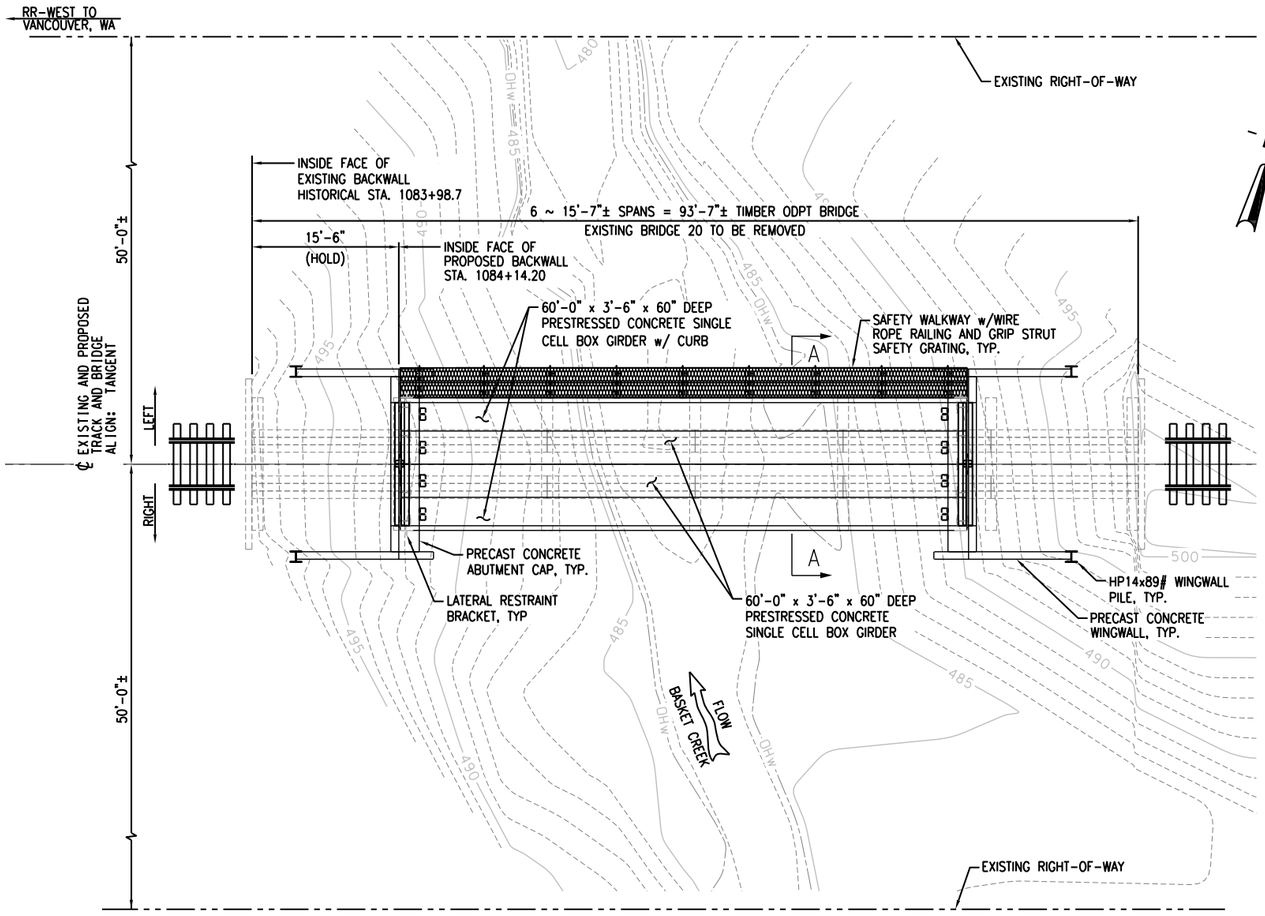
Based on the results of the H&H analysis, preliminary cost estimates, and estimated impacts, HDR's opinion is that Alternative 2, 3-span double cell box beam bridge, is the preferred bridge replacement alternative. The alternative provides a slightly lower cost while also providing easier construction methods, and a more typical configuration per freight rail industry standards. Environmental impacts have not been quantified for this study and may impact overall project costs and permitting effort as they are investigated further during final design. The opinion of probable project cost of the 3-span bridge option is estimated as $783,000 (2019 dollars) and includes estimated costs to complete geotechnical investigations and recommendations, engineering for detailing/design of the new structure, bid and construction support, removal of the existing structure, and construction of the new structure. The costs include a 10% design and engineering contingency and 20% construction contingency. The cost does not include environmental or other permitting costs, County administrative costs, construction management costs, WA sales tax, or other overhead costs which are assumed to be handled by Clark County.

The alternatives analysis completed for this report does not preclude the possibilities of modifications to the proposed bridge concepts. One change in particular that could be looked at further during detailed design would be to make all the spans in the 3-span option equal length (approximately 25' each). This could allow prestressed concrete slab spans to be used instead of box beams which may result in additional cost savings. This option was not considered as the bents would encroach on the existing low flow channel banks rather than the overbanks as currently shown, which could result in additional permitting effort and environmental constraints. However, during detailed design these impacts could be evaluated to determine the most efficient 3-span configuration.

Appendix A – Exhibits

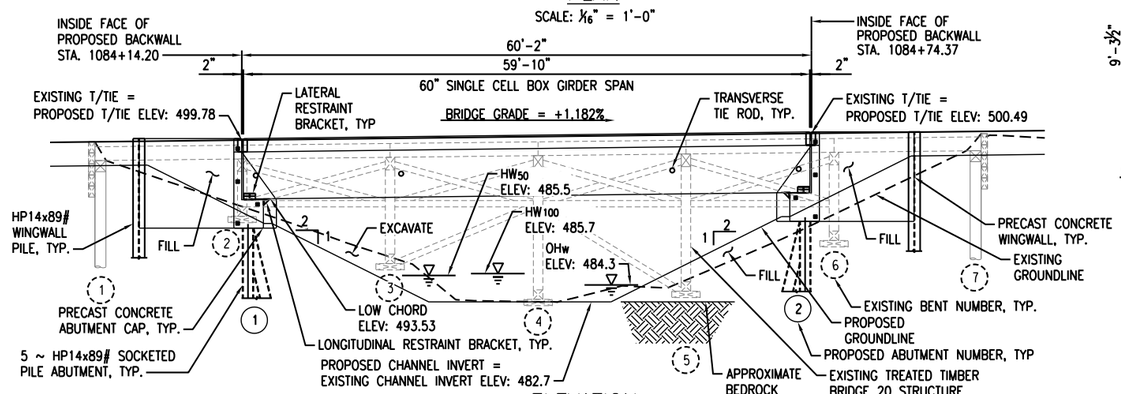
Exhibit 1 - FEMA Flood Hazard Map





PLAN

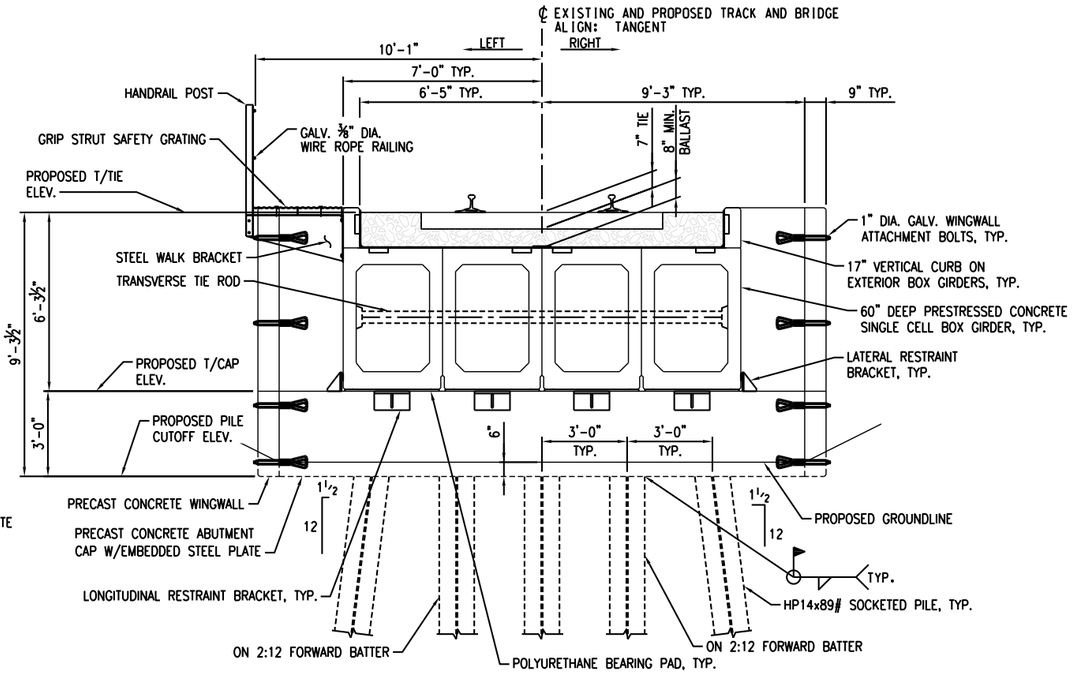
SCALE: 1/16" = 1'-0"



ELEVATION

SCALE: 1/16" = 1'-0"

WALKWAY AND RAILING NOT SHOWN FOR CLARITY.



SECTION A–A

SCALE: 3/16" = 1'-0"

EXISTING BRIDGE NOT SHOWN FOR CLARITY
LOOKING RR EAST

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR OVERHEAD UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION.

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555 "It's the Law" NORTHWEST UTILITIES NOTIFICATION CENTER

CLARK COUNTY, WASHINGTON

TRANSPORTATION PROGRAM

PUBLIC WORKS
ENGINEERING & CONSTRUCTION DIVISION

HDR

CONCEPTUAL PLAN
NOT FOR CONSTRUCTION

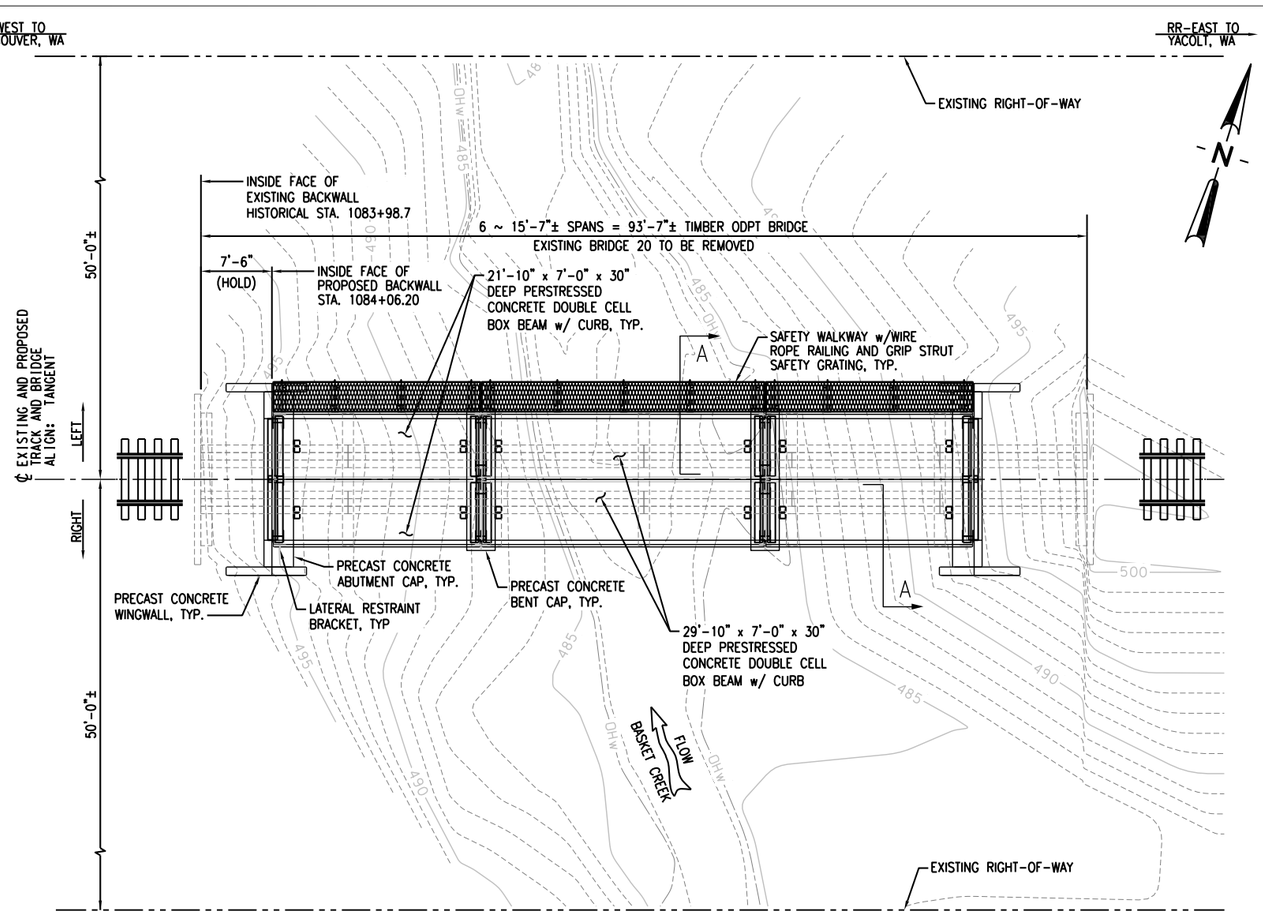
REPLACE CHELATCHIE PRAIRIE RR BR. 20, NEAR HEISSON, WA

GENERAL PLAN AND ELEVATION SINGLE SPAN OPTION

DATE 09/2019

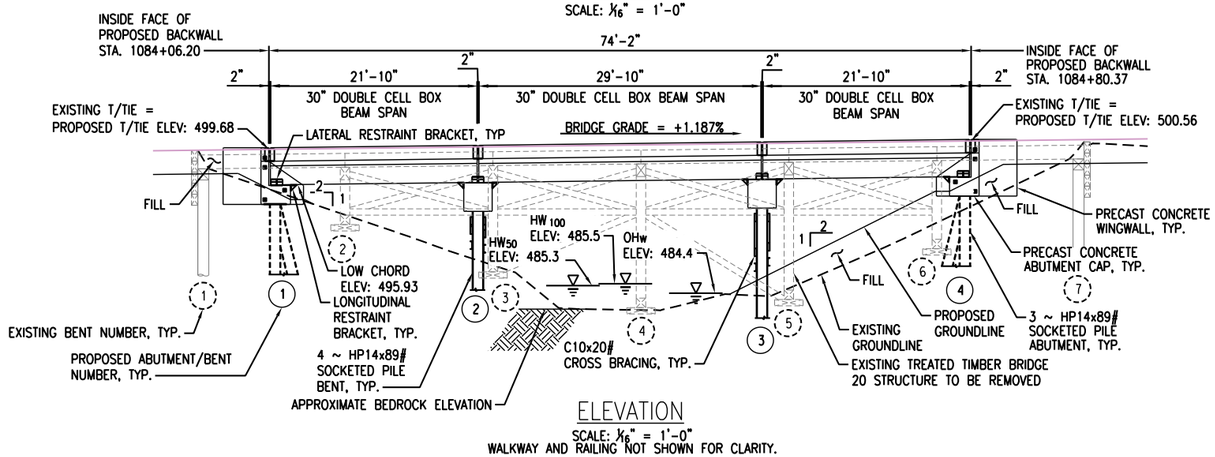
EX-01

1 OF 1



PLAN

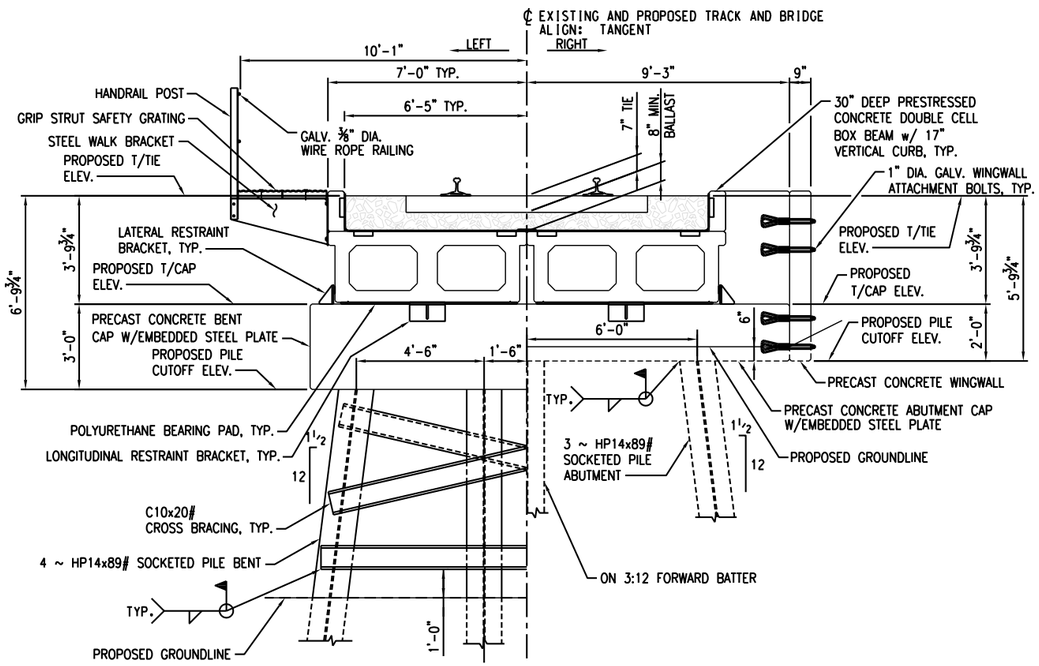
SCALE: 1/16" = 1'-0"



ELEVATION

SCALE: 1/16" = 1'-0"

WALKWAY AND RAILING NOT SHOWN FOR CLARITY.



BENT HALF SECTION ABUTMENT HALF SECTION

SECTION A–A

SCALE: 3/16" = 1'-0"

EXISTING BRIDGE NOT SHOWN FOR CLARITY

LOOKING RR EAST

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR OVERHEAD UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION.

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CLARK COUNTY, WASHINGTON

TRANSPORTATION PROGRAM

PUBLIC WORKS ENGINEERING & CONSTRUCTION DIVISION

HDR

CONCEPTUAL PLAN NOT FOR CONSTRUCTION

REPLACE CHELATCHIE PRAIRIE RR BR. 20, NEAR HEISSON, WA

GENERAL PLAN AND ELEVATION THREE SPAN OPTION

DATE 09/2019

EX-02

1 OF 1

Appendix B – Cost Estimates

Alternative 1: Single Span Bridge – Cost Estimates

Construction Costs					
Bid Item #	Item	QTY	Unit	Unit Cost	Bid Item Cost
1	Mobilization, 10%	1	LS	$ 58,777.00	$ 59,780
2	Install and Manage BMPs	1	LS	$ 5,000.00	$ 5,000
3	Clearing and Grubbing[1]	1.0	AC.	$ 35,000.00	$ 35,000
4	Demo Existing Structure[2]	1	LS	$ 100,000.00	$ 100,000
5	Structural Excavation	350	CY	$ 30.00	$ 10,500
6	Structural Fill	140	CY	$ 30.00	$ 4,200
7	Install Bridge[3]	1	LS	$ 70,000.00	$ 70,000
8	60" Single Cell Box Girders[4]	60	TF	$ 2,400.00	$ 144,000
9	CDF Fill @ Abutment	56	CY	$ 160.00	$ 8,960
10	Abutment Cap	2	EA	$ 9,000.00	$ 18,000
11	Wingwalls	4	EA	$ 3,000.00	$ 12,000
12	Furnish HP14x89# Piling	360	LF	$ 89.00	$ 32,040
13	Drill and Core Piling	360	LF	$ 300.00	$ 108,000
14	Socket Concrete	28	CY	$ 500.00	$ 14,000
15	Track Work	113	LF	$ 150.00	$ 16,950
16	Walkway & Handrail	80	LF	$ 75.00	$ 6,000
17	Precast Freight Cost	1	LS	$ 3,120.00	$ 3,120
18	Miscellaneous Steel[5]	1	LS	$ 10,000.00	$ 10,000
				Subtotal	$ 657,550
				Contingency 20%	$ 131,510
				Total Probable Construction Cost	$ 789,060
				cost per bridge foot	$ 13,151

Design Costs					
Bid Item #	Item	QTY	Unit	Unit Cost	Bid Item Cost
1	Geotechnical Investigation	1	LS	$ 20,000.00	$ 20,000
2	Engineering Services, 10% [6]	1	LS	$ 78,906.00	$ 78,906
				Subtotal	$ 98,910
				Contingency 10%	$ 9,891
				Total Probable Design Cost	$ 108,810
				Total Probable Project Cost	$ 897,870

1. Includes 1000' access road
2. Includes haul and proper disposal of treated timber materials
3. Includes labor and equipment to place and set structural elements
4. Includes elastomeric bearing pads
5. Allowance for miscellaneous steel items (deck plates, brackets, etc.)

Alternative 2: Three Span Bridge – Cost Estimates

Construction Costs					
Bid Item #	Item	QTY	Unit	Unit Cost	Bid Item Cost
1	Mobilization, 10%	1	LS	$ 50,933.00	$ 51,940
2	Install and Manage BMPs	1	LS	$ 5,000.00	$ 5,000
3	Clearing and Grubbing[1]	1.0	AC.	$ 35,000.00	$ 35,000
4	Demo Existing Structure[2]	1	LS	$ 100,000.00	$ 100,000
5	Structural Excavation	250	CY	$ 30.00	$ 7,500
6	Structural Fill	100	CY	$ 30.00	$ 3,000
7	Install Bridge[3]	1	LS	$ 54,000.00	$ 54,000
8	30" Double Cell Box Girders[4]	74	TF	$ 1,200.00	$ 88,800
9	CDF Fill @ Abutments	56	CY	$ 160.00	$ 8,960
10	Abutment Cap	2	EA	$ 8,000.00	$ 16,000
11	Bent Cap	2	EA	$ 6,000.00	$ 12,000
12	Wingwalls	4	EA	$ 2,000.00	$ 8,000
13	Furnish HP14x89# Piling	370	LF	$ 89.00	$ 32,930
14	Drill and Core Piling	282	LF	$ 300.00	$ 84,600
15	Socket Concrete	40	CY	$ 500.00	$ 20,000
16	Furnish & Install C10x20# Cross Bracing	2640	LBS	$ 3.00	$ 7,920
17	Track Work	113	LF	$ 150.00	$ 16,950
18	Walkway & Handrail	74	LF	$ 75.00	$ 5,550
19	Precast Freight Cost	1	LS	$ 3,120.00	$ 3,120
20	Miscellaneous Steel[5]	1	LS	$ 10,000.00	$ 10,000
				Subtotal	$ 571,270
				Contingency 20%	$ 114,254
				Total Probable Construction Cost	$ 685,530
				cost per bridge foot	$ 9,264

Design Costs					
Bid Item #	Item	QTY	Unit	Unit Cost	Bid Item Cost
1	Geotechnical Investigation	1	LS	$ 20,000.00	$ 20,000
2	Engineering Services, 10% [6]	1	LS	$ 68,553.00	$ 68,553
				Subtotal	$ 88,560
				Contingency 10%	$ 8,856
				Total Probable Design Cost	$ 97,420
				Total Probable Project Cost	$ 782,950

1. Includes 1000' access road
2. Includes haul and proper disposal of treated timber materials
3. Includes labor and equipment to place and set structural elements
4. Includes elastomeric bearing pads
5. Allowance for miscellaneous steel items (deck plates, brackets, etc.)