PROJECT DEVELOPMENT APPROVAL

I-90/Cabin Creek Interchange to West Easton Interchange Phase 3 – Add Lanes/Wildlife Bridges

I-90, MP 64.34 to MP 70.60

XL5479 WIN: E09093A PIN: 509093A
December 21, 2021

SCR Regional Administrator:	Todd Trepanier, P.E.
ARA for Construction and Development:	W. Brian White, P.E.
Design Project Engineer:	Andrew Byrd, P.E.
Design Squad Supervisor:	Kenny King, P.E.
Design Team Leaders:	Brent Schilperoort, P.E., Matt Gipner, and Isaac Becker, P.E.

Washington State
Department of Transportation

Memorandum

December 21, 2021

TO: W. Brian White, P.E.
Assistant Regional Administrator for Construction and Development

FROM: Andrew Byrd, P.E.
Development Branch Project Engineer

SUBJECT: XL5479, I-90/Cabin Cr I/C to W Easton I/C
Phase 3 – Add Lanes/Wildlife Bridges
Project Development Approval Submittal

Attached for your review and approval are the Project Development Approval (PDA) documents for the I-90/Cabin Cr I/C to W Easton I/C Phase 3 – Add Lanes/Wildlife Bridges project. Please sign and route the PDA back to the SCR Project Development Office for submittal to Headquarters Design and to FHWA for their approvals. This office will route the PDA to SCR Engineering Records for retention when all approvals are obtained.

Thank you for your attention to this request. Please contact me if you have any questions or comments.

AB/jr
Attachment: Project Development Approval Submittal, Geotechnical Report, Approved Hydraulics Reports, Barrier Selection Justification Memo

cc: Greg Elder
file

PROJECT DEVELOPMENT APPROVAL

Index #	Description	In PDA?	Comments
PDA.1.0	**Introductory Documents**		
PDA.1.1	**Table of Contents**	Included	*This checklist serves as the Table of Contents.*
PDA.1.2	**Memorandum**	Included	
PDA.1.3	**Vicinity Map**	Included	
PDA.2.0	**Project Summary Documents**		
PDA.2.1	**Project Profile**	Same as DA	Project Definition, Design Decisions, BOE, etc.
PDA.2.2	**Environmental Review Summary**	Same as DA	***See DA for Project Summary Documents***
PDA.2.3	**Basis of Design**	Same as DA	
PDA.3.0	**Core Documents**		
PDA.3.1	**Design Parameter Sheets**	Included	
PDA.3.1.1	**Design Parameter sheets-Tables and Data**	Included	Tables and data that support the Design Parameter Sheets.
PDA.3.2	**Safety Analysis**	Same as DA	The Safety Analysis is included in the DA.
PDA.3.3	**Design Analysis**	N/A	Design elements meet or exceed Design Manual criteria. No design analysis is required.
PDA.3.4	**Maximum Extent Feasible**	N/A	There are no pedestrian or ADA facilities within the project limits.
PDA.3.5	**Design Variance Inventory Form**	N/A	There are no Design Variances.
PDA.3.6	**Plans for Approval**	N/A	There are no new interchanges within the project limits.
PDA.3.7	**Alignment Plans and Profiles**	N/A	Conceptual plans and profiles were included in the DA-see the contract plans for final versions.
PDA.3.8	**Cost Estimate**	Included	The most current E-base estimate is included.
PDA.4.0	**Environmental Documentation**		
PDA.4.1	**SEPA**	N/A	
PDA.4.2	**NEPA**	Required	Approved NEPA Re-evaluation March 27, 2018.

5 - DDP SUPPORTING DOCUMENTS

Index #	Description	Included In			Comments
		DA	PDA	N/A	
SD.5.1	**Access Revision Report & Non-Access Feasibility Study**	☐	☐	☒	No changes in access control.
SD.5.2	**Access Hearing**	☐	☐	☒	No changes in access control.
SD.5.3	**Access Report**	☐	☐	☒	No changes in access control.
SD.5.4	**Barrier Length of Need Calculations**	☐	☒	☐	
SD.5.5	**Bridge Vertical Clearance**	☐	☒	☐	
SD.5.6	**Fencing**	☐	☒	☐	
SD.5.7	**Geological Reports**	☐	☒	☐	Geotech Report dated August 20, 2021. Sent as separate attachment to preserve electronic signatures.

SD.5.8	**Hydraulics Report-Type A**	☐	☒	☐	Hydraulics Report approved Sept. 22, 2021. Sent as separate attachment to preserve electronic signatures. Approval Memo in PDA from State & Region Hydraulic Engr.
SD.5.8.1	**Final Hydraulic Design Report (FHD) for Hydrologic Connectivity Zones (HCZ's)**	☐	☒	☐	HCZ FHD Report approved by State Hydraulic Engineer Sept. 16, 2021. Sent as separate attachment to preserve electronic signatures.
SD.5.8.2	**Final Hydraulic Design Reports (FHD's) for Creek Connectivity**	☐	☒	☐	There are 8 Creek FHD's with differing approval dates-See PDA memo for details. Sent as separate attachment to preserve electronic signatures.
SD.5.9	**Intersection Control Evaluation (ICE)**	☐	☐	☒	No intersection controls in project.
SD.5.10	**Illumination (Additional)**	☐	☐	☒	No additional illumination on project.
SD.5.11	**ITS Systems Engineering Documentation**	☒	☒	☐	ITS Systems Engineering Analysis Worksheet from SCR Traffic Office
SD.5.12	**Materials/Surface Reports**	☐	☒	☐	
SD.5.13	**Median Crossover Approval**	☐	☒	☐	Nov 19, 2020-HQ Access & Hearings Manager
SD.5.14	**MUTCD Request for Experimentation**	☐	☐	☒	There are no bicycle facilities within the project limits.
SD.5.15	**Pedestrian Facilities**	☐	☐	☒	There are no pedestrian facilities within the project limits.
SD.5.16	**Public Art Plan**	☐	☐	☒	Public art is not included in the project.
SD.5.17	**Railroad Crossing Evaluation Team Findings**	☐	☐	☒	There are no railroad crossings within the project limits.
SD.5.18	**Railroad Grade Crossing Petitions and WUTC Orders**	☐	☐	☒	There are no railroad crossings within the project limits.
SD.5.19	**Roadside Clear Zone inventory**	☐	☐	☒	Clear Zone will be new and any/all features will be mitigated or breakaway within the project limits.
SD.5.20	**Signals Permit**	☐	☐	☒	There are no signals within the project limits.
SD.5.21	**Traffic Analysis**	☐	☒	☐	Transportation Technical Update for NEPA Re-eval Feb 22, 2018.
SD.5.22	**Value Engineering Recommendation Approval Form**	☐	☒	☐	P.E. Approval on July 9, 2018.

6 - Other Approvals and Justifications

Index #	Description	Included In			Comments
		DA	PDA	N/A	
SD.6.1	**Approvals**	☐	☐	☒	There are no additional approvals required for this project.
SD.6.2	**Justifications**	☐	☒	☐	Sent as separate attachment to preserve electronic signatures.
SD.6.2.1	**Barrier Selection Justification Memo**	☐	☒	☐	ASDE Approval on Aug 17, 2020 for 42 inch F shaped concrete safety barrier.

SD.6.3	**Design Decisions**	☐	☒	☐	*Decision to use Steel Guardrail Posts.*

7 - Other Items

Index #	Description	Included In		Comments
		DA	PDA	
SD.7.1		☐	☐	There are no other Items.

Abbreviations:

- DA = Design Approval
- DDP = Design Documentation Package
- DM = Design Manual
- PDA = Project Development Approval
- SD = Supporting Document

PROJECT DEVELOPMENT APPROVAL

I-90/Cabin Creek Interchange to West Easton Interchange
Phase 3 – Add Lanes/Wildlife Bridge

I-90, MP 64.34 to MP 70.60

XL5479 WIN: E09093A PIN: 509093A
December 21, 2021

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
South Central Region
Union Gap, Washington

SIGNATURES	Template Version 1.1
ENGINEER OF RECORD	REGION APPROVAL
This document has been prepared under my direct supervision in accordance with RCW 18.43 and appropriate WSDOT manuals. Digitally signed by Andrew D. Byrd Date: 2021.12.23 09:37:18 -08'00' Andrew D. Byrd, P.E. Development Branch Project Engineer WSDOT SC Region, 2809 Rudkin Rd Union Gap, WA 98903	Digitally signed by Brian White Date: 2021.12.23 15:47:57 -08'00' W. Brian White, P.E. Assistant Regional Administrator for Construction and Development, WSDOT SC Region
	ASSISTANT STATE DESIGN ENGINEER APPROVAL
	Digitally signed by Rick K Keniston Date: 2021.12.27 10:38:17 -08'00' Rick Keniston P.E. WSDOT Assistant State Design Engineer
	FHWA APPROVAL
	Liana Liu, P.E. Area Engineer FHWA Washington Division

PROJECT DEVELOPMENT APPROVAL MEMORANDUM

Project Description

The I-90 Snoqualmie Pass East Corridor experiences stop-and-go traffic conditions due to increasing traffic volumes, winter weather conditions, and vehicle collisions, including vehicle collisions with wildlife. The original concrete pavement is cracking and deteriorating and has been overlaid with HMA to provide stop gap solutions but is in need of replacement. Improvements to the first seven miles of this 15-mile corridor project have been completed. The remaining 8-miles of the project have been broken into Phases 3 and 4.

This project will reconstruct I-90 from the Cabin Creek Interchange to the West Easton Interchange on a new alignment and add a third lane in each direction to add capacity, improve sight distance and replace rapidly deteriorating pavement. The project will also address unstable slopes to reduce rock fall, replace truck climbing lanes where needed, enhance stream crossings, construct Hydrological Connectivity Zones (HCZs), construct new wildlife crossings, construct retaining walls, construct wildlife fencing, and replace ITS components.

The Snoqualmie Pass East Corridor was previously organized into 5 phases of construction. In July 2018, WSDOT accepted recommendations from a Value Engineering Study to combine Phase 3 and Phase 5 to provide more flexibility for a contractor to efficiently excavate and embank material between the stages, potentially attract larger more efficient contractors, and to gain efficiencies in management and organization.

As a result of combining Phases 3 and 5, the project title was changed to I-90/Cabin Creek I/C to W Easton I/C Phase 3 - Add Lanes/Wildlife Bridge. Permanent highway reconstruction limits were revised to MP 64.48 and MP 70.36, with construction limits from MP 64.15 to MP 70.60 to accomplish the permanent work (project limits MP 64.34 to MP 70.60). In addition, the I-90/Easton Hill to W Easton I/C – Replace Bridge and Build Detour project (Phase 3A) was advertised in 2020 in advance of the larger Phase 3 project.

This is an I-3 Freight & Goods project funded by Connecting Washington and is a phase of the larger I-90 Snoqualmie Pass East Project (PIN 509009B).

3 Core Document Summary

3.1 Design Parameter Sheets

All design elements meet or exceed design standards per the September 2019 Design Manual - See Design Parameter Sheets. Although the following design elements are within typical design solutions, they were evaluated due to their unique site conditions. HQ Design was consulted for direction on how we document these elements, and it was determined that a Design Analysis was not necessary.

Section 11. Side Slope

Rockfall Catchment:

The Rockfall catchment design is based on recommendations and reports from the HQ Geotechnical Office. A combination of varying slope and width V- sloped ditches with or without barrier, rockfall containment netting, and barrier will be used to capture rockfall and mitigate talus along the roadside and prevent it from entering the roadway.

Section 13. Barrier, Guardrail & Rumble Strips

Precast Concrete Barrier Type:
High Performance 42" tall F shaped concrete safety barrier (also referred to as ODOT Precast Type 42" Barrier) will be used throughout this project. This barrier has been used on previous phases of the I-90 Snoqualmie Pass East corridor and was selected for route continuity and performance criteria. Project Delivery Memo #16-03 directs that for projects with AD dates after December 31, 2019, longitudinal barriers for new permanent installations will be MASH compliant. Although this barrier meets the MASH compliant safety F-shape, the height has not been MASH tested for compliance at this time. HQ approval was obtained on August 17, 2020 for use on this phase. See Barrier Selection Justification Memo in "Other Approvals and Justifications" for details.

Fall Protection:
DM 730.04(7)(b) requires that fall protection be provided in areas where there is a possibility of a worker falling 4 feet or greater above or below the roadway. This applies to areas subject to periodic maintenance from the top of a wall and is not open to the public. A 42 inch tall post and cable fall restraint system will be constructed on top of all walls within this project. After discussions with WSDOT maintenance, it was decided that fall protection would be required on any culvert or headwall 4' or higher that is less than 10 feet from the back of the 42" tall concrete barrier, however, there are no locations within this project that fit that criterion.

3.2 Safety Analysis

A Safety Analysis was completed in February 2019 per WSDOT DM Chapter 321 (July 2018) and the "Safety Analysis Guide". See the Safety Analysis located in the Design Approval for more information.

3.3 Design Analysis

The design elements of this project were designed to meet goals established in the Basis of Design and meet the requirements given in the Design Manual. No Design Analysis is required. Any Design Decisions that do not require a Design Analysis will be documented in the Design Parameter Worksheets and supporting tables.

3.4 Maximum Extent Feasible

This is a rural interstate highway improvement project and there are no current or planned pedestrian or ADA facilities within the project limits. Maximum extent feasible is not applicable for this project.

3.5 Design Variance Inventory Form

The design of this project closely follows the Design Manual with no variances from Design Manual criteria.

3.6 Plans for Approval

The only intersecting area within the project limits is the West Easton interchange. There are no revisions to the interchange configuration and the new eastbound and westbound alignments tie into the existing on and off ramps. Plans for approval are not required for the work on the mainline leading into this interchange.

3.7 Alignment Plans and Profiles

The 8% super elevation table was used for this project with a maximum horizontal radius of 10,000 ft. The 8% table is being use for route continuity and is justified for this location as we are unable to meet the required design speed with the 6% table. The profile is designed to a maximum vertical grade of 5%. See the contract plans for alignment plans and profiles.

3.8 Cost Estimate

The following estimates were prepared and were current as of 12/21/2021 for Phase 3. The estimates include all construction costs including sales tax, contingencies, construction engineering, and below line items.

Budget (TEIS)					
PIN	Preliminary Engineering	Construction	Right of Way Acquisition	Total	Difference
509093A	$22,900,000	$315,541,000	$0	$338,441,000	
Total	**$22,900,000**	**$315,541,000**	**$0**	**$338,441,000**	
Estimate (12/9/2021)					
PIN	Preliminary Engineering	Construction	Right of Way Acquisition	Total	Difference
509093A	$24,500,000	$286,700,000	$0	$311,200,000	
Total	**$24,500,000**	**$286,700,000**	**$0**	**$311,200,000**	**$27,241,000**

*Phase 3. TEIS dated 12/1/2021.

The contract total estimate is $311,200,000. The current total estimate is 8.04% under the budgeted amount.

4 Environmental Documentation

Due to the importance of I-90 to Washington State's transportation network, WSDOT worked early and closely with FHWA and federal partners to identify risks and streamline project commitments that provide a clear roadmap for expectations and required permits to complete the multiple phases of the Snoqualmie Pass East Corridor (SPE) project. In 2008, WSDOT completed the Final EIS and Section 4(f) evaluation and FHWA issued ROD FHWA-WA-EIS-05-01-F for the I-90 SPE project. The Final EIS and FHWA Record of Decision (ROD) remain the guiding documents needed to complete the project. Design changes since the 2008 EIS have been coordinated with and endorsed by the I-90 Interdisciplinary Team (IDT) made up of state and federal resource and permit agencies who have jurisdiction on the project. A NEPA Reevaluation was completed and approved on March 27, 2018. SEPA documentation is not required for this project due to the all-encompassing NEPA and federal evaluations completed. The 16-page NEPA Re-evaluation Approval is included in this Project

Development Approval; the 366-page Final I-90 SPE Phases 3, 4 and 5 NEPA Reevaluation is stored with the Design Approval as an appendix.

The NEPA Reevaluation project limits for Environmental Documentation on the I-90 Snoqualmie Pass East Project Phases 3, 4, and 5 ends at MP 70.3. The project limits for Phase 3 were extended from MP 70.3 to MP 70.6 to update and move obsolete CCTV cameras and equipment to improve the visual quality for monitoring highway conditions. An Environmental Classification Summary (ECS) Minor Report was prepared to ensure environmental approvals for the work from MP 70.3 to 70.6. The ESC Minor Report was approved on September 20, 2021.

Supporting Documents Summary

SD.5.4 Barrier Length of Need Calculations:
These barrier location and calculations worksheets demonstrate the length of barrier needed in front of roadside hazards. All runs of barrier are represented in the sheets that comprise this document.

SD.5.5 Bridge Vertical Clearance:
The SD.5.5 Bridge Vertical Clearance Table documents the vertical clearance of all bridges within the project limits. Bridge #090/119 crossing over I-90 at the West Easton Interchange is the only existing bridge that will not be replaced by this project. The I-90 alignment will be widened at this location on the EB lanes and will add 11.5 ft to the median side of the roadway. The added width at a +2% plane section reduces the vertical clearance by 4.5 in. The new pavement elevation will still leave 16 ft 4 inches clearance at the lowest point of the bridge at the EB left fog line, which exceeds the minimum 16 ft required clearance for existing structures per DM 720.03(5)(c)(1). Existing and proposed bridge vertical clearance was verified using InRoads 3D modeling and survey data. New bridges are designed according to standards.

SD.5.6 Fencing:
The SD.5.6 Fencing Table documents fencing types and locations.

SD.5.7 Geological Report:
The Geotechnical Report is prepared by the WSDOT Geotechnical Office and provides existing geological conditions and recommendations for the aspects of the projects involving geotechnical conditions. The Geotechnical Report was completed on August 20, 2021.

SD.5.8 Hydraulics Report:
The project Hydraulics Report is developed to document the needs and methods of stormwater treatment as well as documenting the feasibility and calculations with regards to the design of permanent hydraulic features such as culverts and ditches. The Type A Hydraulics Report was signed by the Development Branch Project Engineer on September 22, 2021. The WSDOT State Hydraulic Engineer and SCR Region Hydraulic Engineer Hydraulic Report Approval memo was received on September 23, 2021.

> *SD.5.8.1 Final Hydraulic Design Report (FHD) for Hydrologic Connectivity Zones (HCZ's):*
> This report describes the design of highway drainage features to maintain and improve hydrologic connectivity within the project limits. This includes Hydrologic Connectivity

Zones (HCZ's) in the vicinity of MP67 and 67.3 that will connect various small drainages and seepage zones near Hudson Creek. The HCZ FHD Report was approved by the State Hydraulics Engineer on September 16, 2021.

SD.5.8.2 Final Hydraulic Design Reports (FHD's) for Creek Connectivity:
These reports are developed by the office of the State Hydraulic Engineer with guidance from the Washington Department of Fish and Wildlife and the United States Forest Service to provide connectivity of creeks and streams that cross the I-90 corridor within the project limits. Each FHD report assesses one stream crossing and the proposed method of providing continued connectivity. The FHD Reports are as follows:

FHD Report	Approval Date
I-90 MP 64.4 Unnamed Creek	November 29, 2021
I-90 MP 64.7 Cedar Creek	November 29, 2021
I-90 MP 65.1 Unnamed Creek	December 6, 2021
I-90 MP 65.6 Telephone Creek	December 20, 2021
I-90 MP 66.6 Hudson Creek	November 29, 2021
I-90 MP 66.8 Unnamed Creek	November 29, 2021
I-90 MP 67.1 Unnamed Creek	November 29, 2021
I-90 MP 67.8 Unnamed Creek	November 29, 2021

SD.5.11 ITS Systems Documentation:
The Intelligent Transportation Systems (ITS) Systems Engineering Analysis Worksheet is prepared by the region traffic office and documents the intelligent transportation systems being installed as part of the project as well as justifications for their need.

SD.5.12 Materials/Surface Report:
The Pavement Design Report is prepared by the Region Materials Office and reviewed by the WSDOT State Pavement Engineer. This report provides recommendations and justifications for material surfacing for the roadway design on the project.

SD.5.13 Median Crossover Approval:
The Median Crossover Location Justification is a memorandum that provides justification and approval for relocating two median crossovers on the project. Due to the realignment of the lanes, the crossovers cannot remain in their current locations. The new locations will provide better functionality and safety for maintenance personnel and the traveling public. Approval was obtained on November 19, 2020 from the WSDOT HQ Access and Hearings Manager.

SD.5.21 Traffic Analysis:
The Traffic Analysis was completed as part of the Transportation Technical Update in the NEPA Re-evaluation for Phases 3, 4, and 5 of the I-90 Snoqualmie Pass East Project. The SCR Traffic Office manager approved the analysis on February 22, 2018.

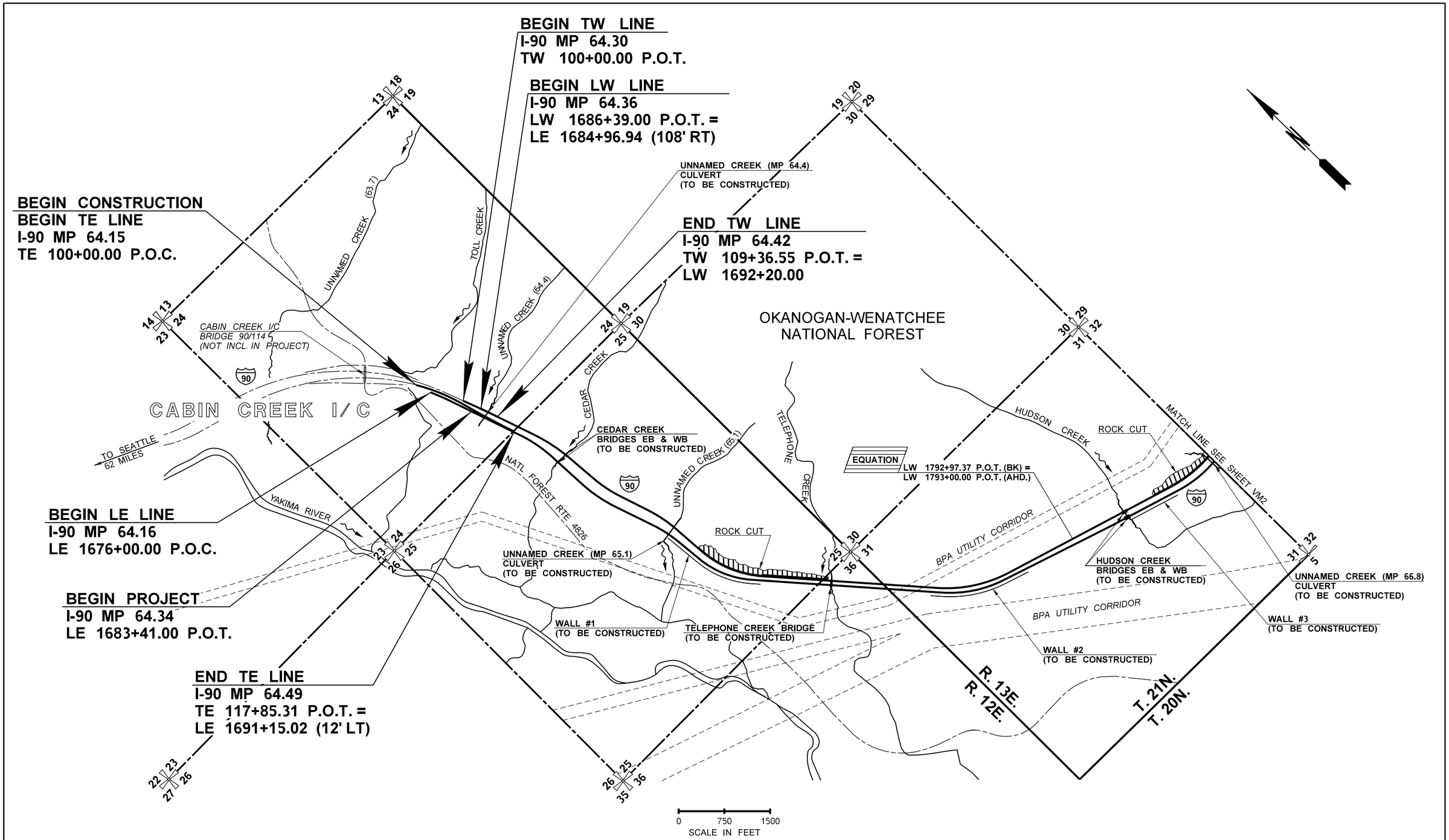
SD.5.22 Value Engineering Recommendation Form:
The Value Engineering Study workshop for the I-90 Snoqualmie Pass East Project was conducted from March 26 to March 30, 2018. The VE Recommendation form was approved on July 9, 2018.

5 Other Approvals and Justifications

SD6.2 Justifications:

SD 6.2.1 Barrier Selection Justification Memo:
This memorandum, approved by HQ on August 17, 2020, provides justification for the use of ODOT Precast Type 42 inch barrier, which is also used extensively throughout the I-90 corridor.

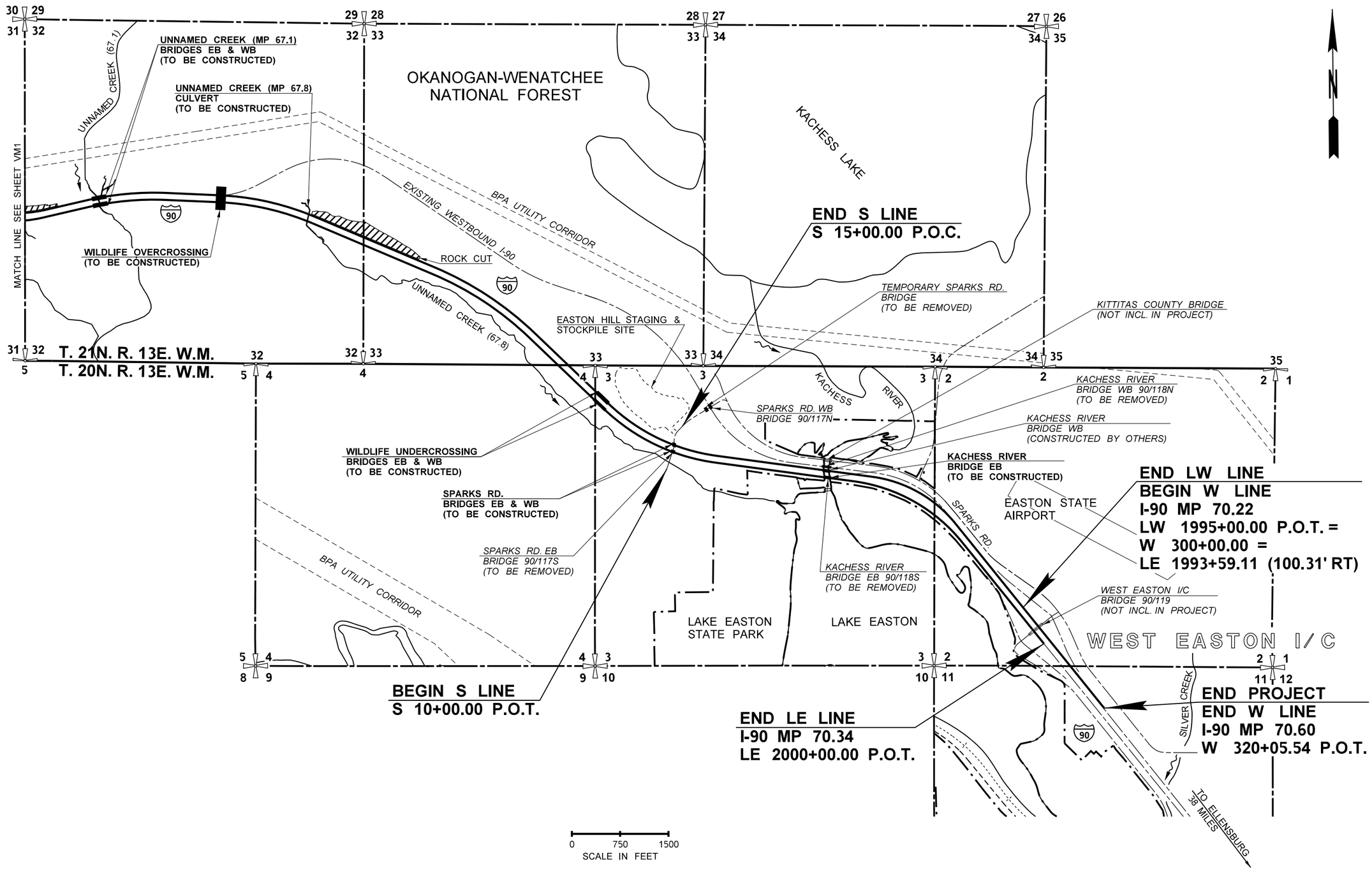
SD 6.3 Design Decisions:
This memorandum provides reasoning and concurrence for the design decision to use steel guardrail posts instead of wood throughout this project.



FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\020-Vicinity\XL5479_PS_VM.dgn								Plot 1
TIME	1:15:21 PM				REGION NO. 10	STATE WASH	FED.AID PROJ.NO.	Washington State Department of Transportation	PLAN REF NO VM1
DATE	8/19/2021							I-90 CABIN CREEK I/C TO W EASTON I/C PHASE 3 - ADD LANES/WILDLIFE BRIDGES	
PLOTTED BY	kingk				JOB NUMBER				SHEET OF SHEETS
DESIGNED BY	J. VENEGAS								
ENTERED BY	J. VENEGAS								
CHECKED BY	K. KING				CONTRACT NO.		LOCATION NO.		
PROJ. ENGR.	A. BYRD								
REGIONAL ADM.	T. TREPANIER	REVISION	DATE	BY				VICINITY MAP	

P.E. STAMP BOX DATE

P.E. STAMP BOX DATE



FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\020-Vicinity\XL5479_PS_VM.dgn						
TIME	1:15:38 PM				REGION NO. 10	STATE WASH	FED.AID PROJ.NO.
DATE	8/19/2021						
PLOTTED BY	kingk						
DESIGNED BY	J. VENEGAS				JOB NUMBER		
ENTERED BY	J. VENEGAS						
CHECKED BY	K. KING				CONTRACT NO.		LOCATION NO.
PROJ. ENGR.	A. BYRD						
REGIONAL ADM.	T. TREPANIER	REVISION	DATE	BY			

DATE
P.E. STAMP BOX

DATE
P.E. STAMP BOX

Washington State Department of Transportation

I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/WILDLIFE BRIDGES

VICINITY MAP

Plot 2
PLAN REF NO
VM2
SHEET
OF
SHEETS

PDA.3.1 Project Design Parameters

For

I-90, MP 64.34 to MP 70.6

Date: **9/23/2021** Design Manual Used: **September 2019***

Functional Classification	**Rural Interstate**
Design Year	**2041**
Design Vehicle	**WB-67**
Target Speed	**65 mph from MP 64.34 to MP 67.4 & 70 mph from MP 67.4 to MP 70.6**
Posted Speed	**65 mph from MP 64.34 to MP 67.4 & 70 mph from MP 67.4 to MP 70.6**
ADT:	**32,000**
Truck Percentage	**21%**
Right of Way Width:	**Variable**
Terrain	**Mountainous**
Access Control	**Full Limited**

***** PE Design Approval - Dec 3, 2019; Regional Design Approval - Dec 16, 2019; Design Manual Update published Dec 27, 2019. See email "Temporary Barrier and 2' Deflection" from Jim Mahugh with determination to use Sept 2019 DM standards.

Prepared By: Isaac Becker, PE ; Jeanine Richards

General Design Elements	*Detailed Design Elements (Parameters)*	*Changed Elements*	*Physical Feature/ Location*	*Design Manual Dimension (September 2019 Revision)*	*Proposed Dimension*	*Reference/Notes*
1. Lane	Number of Lanes	X	LE and LW Line	varies	3 lanes in each direction plus truck climbing lane	DM 1210.04 Final EIS 2008 Appendix P in DA NEPA Re-evaluation 2018 Attachment N in DA
	Lane Type					
	Width Tangent Roadway	X	LE and LW Line	12'	12'	DM 1232
	Width Turning Roadway	X	LE and LW Line	lane width	lane width	DM 1240.02(4) Note: Per DM 1240.02(4), for each lane in addition to two, additional width in excess of the selected lane width dimension is not needed.

General Design Elements	Detailed Design Elements (Parameters)	Changed Elements	Physical Feature/ Location	Design Manual Dimension (September 2019 Revision)	Proposed Dimension	Reference/Notes
	Lane Reduction	X	LE and LW Line	L=VT	L=VT	DM 1210.05(1)(b)
2. Median / Buffer	Median Width	X	LE and LW Line	varies	22'-53' with barrier in "urban" section; 60'-140' in "rural" section	DM Exhibit 1239-10, DM 1600.04
	Median Width Taper	X	LE and LW Line	varies	varies	DM 1210.05(2) Note: Median width taper is controlled by Lane Reduction taper (see 1. Lane) and Increase Number of Lanes taper (see 8. Horizontal Alignment)
	Buffer Width					
3. Shoulder	Shoulder Width - Inside	X	LE and LW Line	4' - 10'	4' - 10' typical See Shoulder Table 3.1	DM Exhibit 1232-1
	Shoulder Width - Outside	X	LE and LW Line	8' - 10'	10'	DM Exhibit 1232-1
	Shoulder Width Bus Only					
	Parking Lane Width					
7. Bridges	Lane Type					
	Width Tangent Roadway	X	all bridges	12' per lane	12' per lane	DM 1232
	Width Turning Roadway					
	Shoulder Width - Inside	X	all bridges	4' - 10'	4' - 10'	DM Exhibit 1232-1
	Shoulder Width - Outside	X	all bridges	8' - 10'	10'	DM Exhibit 1232-1
	Bridge Vertical Clearance		Existing Bridge 90/119	16' min over roadways	Min 17'-0.5" See Bridge Vertical Clearance Table SD.5.5	DM 720.03(5)(c)(1)
		X	new bridges	16.5' min over roadways	16.5' min over roadways	DM 720.03(5)(b)
	Structural Capacity					
	Bridge Rail	X	all bridges	42"	42"	DM 1610.07
	Bridge Approach Slab	X	all bridges	full width of bridge ends	full width of bridge ends	DM 720.03(8)
	Protective Screening					

General Design Elements	Detailed Design Elements (Parameters)	Changed Elements	Physical Feature/ Location	Design Manual Dimension (September 2019 Revision)	Proposed Dimension	Reference/Notes
8. Horizontal Alignment	Stopping Sight Distance	X	LE and LW Line	Varies with speed and grade.	Varies. See Horizontal Alignment Table 8.1	DM 1260.03(5), DM Exhibit 1260-1 DM Exhibit 1260-3
	Passing Sight Distance					
	Decision Sight Distance					
	Curve Lengths	X	LE and LW Line	curve required when maximum angle is exceeded	curves provided when maximum angle is exceeded See Horizontal Alignment Table 8.1	DM 1210.02(3)
	Horizontal Curve Radii	X	LE and LW Line	Varies with speed and superelevation	Varies See Horizontal Alignment Table 8.1	DM 1210.02(2) DM Exhibit 1250-4b
	Max. Defl. Angle w/o Curve					
	Lane Balance	X	W Easton Interchange LE W Easton Interchange LW	maintain basic number of lanes except when number of lanes is changed at interchange	maintain basic number of lanes except when number of lanes is changed at interchange	DM 1360.04(1)
	Climbing Lanes	X	LE and LW Line	Begin at point where speed reduction warrant is met and end where warrant ends.	Begin at point where speed reduction warrant is met and end where warrant ends. See Length of Grade Table 9.2 and Truck Climbing Lanes Table 9.3	DM 1270.02(3), DM Exhibit 1270-3
	Spacing betw. Interchanges					
	Spacing betw. Ramp Noses					
	Lane Width Transition					
	Increase Number of Lanes	X	LE and LW Line	4:1 taper for mainline 25:1 taper for climbing lane	4:1 taper for mainline 25:1 taper for climbing lane	DM 1210.05(1)(c) DM Exhibit 1270-3
	Channelization Taper - Left					
	Channelization Taper - Right					
	Curbs on High Speed Road					

General Design Elements	Detailed Design Elements (Parameters)	Changed Elements	Physical Feature/ Location	Design Manual Dimension (September 2019 Revision)	Proposed Dimension	Reference/Notes
9. Vertical Alignment	Stopping Sight Distance	X	LE and LW Line	Varies with speed and grade	Varies See Vertical Alignment Table 9.1	DM 1260.03, DM 1260.03(3), DM 1260.03(4) DM Exhibit 1260-1 DM Exhibit 1260-3 DM Exhibit 1260-5 DM Exhibit 1260-7
	Decision Sight Distance					
	Passing Sight Distance					
	Minimum Grade					
	Length of Grade	X	LE and LW Line	Varies with percent upgrade	Varies See Length of Grade Table 9.2	DM 1220.02(5) DM Exhibit 1220-1
	Vertical Curve Length	X	LE and LW Line	min required length = 3 x design speed	min length exceeds 3 x design speed See Vertical Alignment Table 9.1	DM 1220.02(2)
10. Cross Slope	Cross Slope Lane	X	LE and LW Line	2% typical	2% typical	DM 1250.01
	Cross Slope Shoulder	X	LE and LW Line	match lane cross slope	match lane cross slope	DM 1250.02(2)
	Cross Slope Grade Differential					
	Superelevation	X	LE and LW Line	emax=8%	emax=8%	DM 1250.03, DM Exhibit 1250-4b
	Super Transition / Runoff	X	LE and LW Line	Varies	Varies. See Superelevation Transition Table 10.1	DM 1250.06, DM Exhibit 1250-6a, DM Exhibit 1250-6c
11. Side Slope	Fill Slope	X	LE and LW Line	steepest slope allowed determined by Region Materials Engineer	as recommended in Geotechnical Report	DM 1239.03, DM Region Materials Engineer concurs with Final Geotechnical Report (see SD.5.7)
	Ditch In-Slope	X	LE and LW Line	2H:1V max	2H:1V max	DM 1239.03(1), DM Exhibit 1239-4
	Ditch Back Slope	X	LE and LW Line	2H:1V max	2H:1V max, except in rock cuts	DM 1239.03(1), DM Exhibit 1239-4
	Cut Slope	X	LE and LW Line	steepest slope allowed determined by Region Materials Engineer	as recommended in Geotechnical Report	DM 1239.03, DM Region Materials Engineer concurs with Final Geotechnical Report (see SD.5.7)
	Rockfall Catchment	X	LE and LW Line	Varies by height and condition	Varies by height and condition	DM 1239.04, Final Geotechnical Report (see SD.5.7)

General Design Elements	Detailed Design Elements (Parameters)	Changed Elements	Physical Feature/ Location	Design Manual Dimension (September 2019 Revision)	Proposed Dimension	Reference/Notes
12. Clear Zone	Clear Zone	X	LE and LW Line	Varies by speed and sideslope	Varies See Clear Zone Tables 12.1 and 12.2	DM 1600.02, DM 1600.02(1), DM 1600.02(3), DM Exhibit 1600-2
13. Barrier, Guardrail & Rumble Strips	Standard Run	X	LE and LW Line	Varies by condition	Beam Guardrail Type 31 w/steel posts, Precast Type 42" Concrete Barrier, Bridge Traffic Barrier F Shape See Barrier Tables 13.1 and 13.2	See "Steel Guardrail Post Selection Memo" SD.6.3 Design Decisions in Section 6 DM 1610.03, DM 1610.04, DM 1610.06, DM 1610.07
	Precast Concrete Barrier Type	X	LE and LW Line	Requires consult with HQ	ODOT Precast Type 42" F Shaped Concrete Barrier	See approved "Barrier Selection Justification Memo" SD.6.2.1 in Section 6.
	Length of Need	X	LE and LW Line	Varies by condition	See Length of Need worksheets in SD.5.4	DM 1610.03 (5)
	Height	X	LE and LW Line	guardrail = 31" concrete barrier = 32" new or 29" min (after overlays) bridge barrier = 36" min	guardrail = 31" concrete barrier = 42" bridge barrier = 42"	DM 1610.04(1)(a), DM 1610.06(1) and (2), DM 1610.07
	Deflection Distance	X	LE and LW Line	guardrail = 5' concrete barrier = 2' anchored barrier = 6" rigid barrier = no deflection	minimum of: guardrail = 5' concrete barrier = 2' anchored barrier = 6" rigid barrier = no deflection	DM 1610.03(3), DM Exhibit 1610-3 and Note 2 for Concrete Barrier
	Transition Section	X	LE and LW Line	Type 21	Type 21	DM Exhibit 1610-13
	End Treatment	X	LE and LW Line	buried terminal or non-flared terminal	non-flared terminal	DM 1610.04(5), DM 1610.04(5)(b)
	Rumble Strips	X		rumble strips on left and right shoulders	rumble strips on left and right shoulders	DM 1600.05(1), DM 1600.05(1)(b)
	Barrier Stiffness Transition Anchoring	**X**	LW 1741+80 and LW 1766+60	Anchors only needed on the approaching end not the trailing end.	Anchors will be placed where needed per DM.	DM 1610.06(1)
	Fall Protection	**X**	all walls	42" min	42" post and cable system	DM 730.04(7)(b)

General Design Elements	Detailed Design Elements (Parameters)	Changed Elements	Physical Feature/ Location	Design Manual Dimension (September 2019 Revision)	Proposed Dimension	Reference/Notes
14. Signals, Illumination, and ITS	Signals					
	Illumination	X	W Easton I/C	off-ramp gore areas and on-ramp acceleration tapers	off-ramp gore areas and on-ramp acceleration tapers	DM 1040
	ITS	X	LE and LW Line		corridor consistency	DM 1050
	Vertical Clearance	X	LE and LW Line	17.5' min	22'	DM 1020.03(2)
15. Signing and Delineation	Signing	X	LE and LW Line	full signing	full signing	DM 1020, Traffic Manual
	Delineation	X	LE and LW Line	full delineation	full delineation	DM 1030 SCR Pavement Marking Material Policy
	Vertical Clearance	X	LE and LW Line	17.5' min	22'	1020.03(2)
16. On/Off Connections	On/Off Connection Type					
	Acceleration length					
	Deceleration Length					
	Ramp / Mainline Taper	X	W Easton I/C On Ramp	50:1	50:1	DM Exhibit 1360-13a
	Gap Acceptance					
	Transition curve					
	Enforcement Area					
	Weave					
	Gore Area					
	Reserve Area Length					
	Reserve Area Taper					

PDA.3.1.1

Design Parameter Sheets

Tables and

Data

From: Washabaugh, Robert <WashabR@wsdot.wa.gov>
Sent: Friday, January 22, 2021 4:54 PM
To: Byrd, Andrew <ByrdA@wsdot.wa.gov>; King, Kenny <KingK@wsdot.wa.gov>
Subject: FW: Temporary Barrier and 2' Deflection

From: Mahugh, Jim <MahughJ@wsdot.wa.gov>
Sent: Wednesday, October 7, 2020 1:22 PM
To: Washabaugh, Robert <WashabR@wsdot.wa.gov>
Subject: Temporary Barrier and 2' Deflection

Hello Robert,

This email addresses I-90/Cabin Creek Interchange to West Easton Interchange Phase 3 – Add Lanes/Wildlife Bridge and the use of 2' deflection behind temporary concrete barrier.

In December 2019, the WSDOT Design Manual changed the deflection for unanchored temporary concrete barrier from 2' to 3' (see Design Manual Exhibit 1610-3, September 2019 & December 2019). This project received Design Approval on the following dates:

- Project Engineer: 12/3/19
- SC Region Assistant Regional Administrator: 12/16/19
- WSDOT HQ Design: 1/6/2020
- FHWA: 1/9/2020

The December 2019 Design Manual was published on December 27, 2019. Since the process for approving the Design Approval began prior to the release of the December 2019 Design Manual, I will agree that the project must meet the September 2019 version of the Design Manual, which means 2' deflection behind unanchored temporary concrete barrier. It is also important to note that no change was made to the document from the point it was first signed on 12/3/19 to the time of the last signature on 1/9/2020.

For design documentation purposes, please insert this email into your Traffic Management Plan as justification for using the 2' deflection on unanchored temporary concrete barrier.

Jim Mahugh
Assistant State Design Engineer
Office: (360)705-7245 | Cell: (509)969-7364
Design Support Web Site

Shoulder Table 3.1

LW Line					*LE Line*				
Line	***Begin Station***	***End Station***	***Inside Shoulder Width (ft)***	***Outside Shoulder Width (ft)***	***Line***	***Begin Station***	***End Station***	***Inside Shoulder Width (ft)***	***Outside Shoulder Width (ft)***
TW	100+00	103+48.33	4'	10'	TE	100+00	110+15.58	10'	10'
LW	1686+39	1688+00	4' to 10' taper	10'	LE	1683+41	1691+00	10'	40' to 10' taper
LW	1688+00	1701+56	10'	10'	LE	1691+00	1699+77	10'	10'
LW	1701+56	1701+87	Bridge w/10' shlds		LE	1699+77	1700+09	Bridge w/10' shlds	
LW	1701+87	1751+48	10'	10'	LE	1700+09	1750+47	10'	10'
LW	1751+48	1751+79	Bridge w/10' shlds		LE	1750+47	1750+78	Bridge w/10' shlds	
LW	1751+79	1801+94	10'	10'	LE	1750+78	1801+33	10'	10'
LW	1801+94	1803+14	Bridge w/10' shlds		LE	1801+33	1802+77	Bridge w/10' shlds	
LW	1803+14	1829+88	10'	10'	LE	1802+77	1829+70	10'	10'
LW	1829+88	1832+80	Bridge w/10' shlds		LE	1829+70	1832+95	Bridge w/10' shlds	
LW	1832+80	1847+73	10'	10'	LE	1832+95	1847+48	10'	10'
LW	1847+73	1848+24	10' to 8' taper	10'	LE	1847+48	1848+99	10' to 4' taper	10'
LW	1848+24	1854+00	8'	10'	LE	1848+99	1916+22	4'	10'
LW	1854+00	1858+55	8' to 4' taper	10'	LE	1916+22	1919+13	4' Bridge	10'
LW	1858+55	1916+83	4'	10'	LE	1919+13	1931+14	4'	10'
LW	1916+83	1919+74	4' Bridge	10'	LE	1931+14	1929+64	4' to 10' taper	10'
LW	1919+74	1931+58	4'	10'	LE	1929+64	1931+14	10'	10'
LW	1931+58	1932+18	4' Bridge	10'	LE	1931+14	1931+74	4' Bridge	10'
LW	1932+18	1955+33	4'	10'	LE	1931+74	1955+21	4'	10'
LW	1955+33	1956+59	4' Bridge	10'	LE	1955+21	1956+47	4' Bridge	10'
LW	1956+59	1971+28	4'	10'	LE	1956+47	1981+87	4'	10'
LW	1971+28	1979+00	4'	on-ramp	LE	1981+87	1986+95	4'	off-ramp
LW	1979+00	1987+73	4' to 10' taper	on-ramp	LE	1986+95	2000+00	4'	Varies 10'-20'
LW	1987+73	1993+00	10' to 16' taper	15' to 11' taper					
LW	1993+00	1995+00	16' to 4' taper	11' to 10' taper					
W	300+00	308+00	4'	10'					

Comments: Per DM Exhibit 1232-1, In mountainous terrain, inside shoulder may be reduced to 4 ft on facilities up to 6 lanes.
On and off ramp outside shoulders are 8'.

Horizontal Alignment Table 8.1

							Horizontal Geometry					Stopping Sight Distance			
Design Speed, V (mph)	***Line***	***Begin Station***	***PI Station***	***End Station***	***Grade, G (%)***	**Super-elevation (%)**	**Required Minimum Curve Radius, (ft)**	**Design Curve Radii, R, (ft)**	**Curve Direction**	**Required Minimum Curve Length, (ft)**	**Design Curve Length, (ft)**	**Required minimum Sight Distance, (ft)**	**M**	**Calculated Horizontal Sight Distance, S, (ft)**	**Proposed Sight Distance (3D Sight Distance), (ft)**
65	LW	1695+65.94	1699+16.86	1702+64.14	2.22	6	2,800	2,800	Right	500	698	645	16	*599*	**741**
65	LW	1707+84.80	1710+45.94	1713+04.64	2.22	7	2,200	2,200	Left	500	520	645	38	*819*	
65	LW	1718+33.83	1721+07.68	1723+78.73	-0.55	7	2,200	2,200	Right	500	545	645	16	*531*	**679**
65	LW	1729+23.77	1734+96.19	1740+28.06	3.83	8	1,500	1,700	Left	500	1,104	694	38	*720*	
65	LW	1768+45.35	1775+22.19	1781+64.22	-0.85	7	2,200	2,380	Left	500	1,319	645	16	*552*	**733**
65	LW	1811+05.60	1817+03.80	1822+73.76	3.18	7	2,200	2,200	Left	500	1,168	685	26	*677*	**825**
65	LW	1829+04.63	1835+34.28	1841+56.18	0.63	4	4,500	4,608	Right	500	1,252	645	16	*768*	
70	LW	1849+75.05	1857+49.97	1865+08.49	-5.00	5	4,000	4,308	Right	500	1,533	668	14	*695*	
70	LW	1885+27.34	1894+65.60	1903+83.18	-4.36	5	4,000	5,108	Right	500	1,856	675	66	*1644*	
70	LW	1919+82.46	1929+57.94	1938+68.72	-4.36	7	2,600	3,000	Left	500	1,886	675	16	*620*	**850**
70	LW	1963+11.21	1971+08.38	1978+28.34	2.25	7	1,800	2,000	Right	500	1,517	730	70	*1061*	
65	LE	1692+36.49	1695+47.43	1698+54.28	-1.39	7	2,200	2,200	Right	500	618	645	16	*531*	**777**
65	LE	1705+21.44	1708+59.07	1711+92.30	-0.64	7	2,200	2,400	Left	500	671	645	30	*760*	
65	LE	1718+66.99	1721+23.08	1723+76.87	3.83	7	2,200	2,200	Right	500	510	604	16	*531*	**785**
65	LE	1728+22.83	1733+04.88	1737+55.65	3.83	8	1,500	1,500	Left	500	933	604	22	*514*	**725**
65	LE	1768+83.36	1774+16.72	1779+24.62	-0.85	8	1,500	1,950	Left	500	1,041	645	30	*685*	
65	LE	1798+18.47	1799+19.31	1800+20.15	3.00	2	10,000	10,000	Left	500	202	612	16	*1131*	
65	LE	1811+45.59	1816+75.81	1821+81.00	0.72	8	1,500	1,950	Left	500	1,035	645	36	*751*	
65	LE	1829+09.22	1835+24.11	1841+31.43	0.72	4	4,500	4,500	Right	500	1,222	645	16	*759*	
70	LE	1849+50.31	1857+05.80	1864+45.30	-5.00	5	4,000	4,200	Right	500	1,495	806	19	*799*	**1754**
70	LE	1884+64.15	1893+82.58	1902+80.75	-5.00	5	4,000	5,000	Right	500	1,817	806	54	*1471*	
70	LE	1918+80.03	1928+90.63	1938+34.20	-4.23	8	1,800	3,108	Left	500	1,954	792	16	*631*	**903**
70	LE	1960+04.86	1970+40.55	1979+76.06	0.76	7	2,600	2,600	Right	500	1,971	645	16	*577*	**855**

Comments:

Minimum curve radius requirements per DM Exhibit 1250-4b, Superelevation Rates (8% Max)

Required Sight Distance (grade <3%) per DM Exhibit 1260-1. Required Sight Distance (grade>3%) per DM Exhibit 1260-3.

Horizontal stopping sight distance calculated per DM Exhibit 1260-09.

3D Sight Distance values represent output from 3D modeling software analysis, InRoads' WSDOT Roadway Visibility Reports. Roadway Visibility Reports analyze both horizontal and vertical model elements to calculate available sight distance and identify sight distance obstructions.

```
            Project Name: XL5479_Mainline - final
             Description: Mainline algs for LE and LW
Horizontal Alignment Name: LW
             Description: westbound I-90 Phase 3 alignment MP 64 to MP 70
                   Style: AL HW CLinePSENew
                                          STATION      NORTHING       EASTING

Element: Linear
         P.O.B.  (        )         1686+39.00   1043609.898   1774022.079
           P.C.  (        )         1695+65.94   1042728.391   1774308.710
         Tangent Direction:   S 18^00'45.00" E
            Tangent Length:            926.937

Element: Circular
           P.C.  (        )         1695+65.94   1042728.391   1774308.710
           P.I.  (        )         1699+16.86   1042394.667   1774417.224
           C.C.  (        )                      1041862.563   1771645.941
           P.T.  (        )         1702+64.14   1042044.486   1774440.024
                    Radius:           2800.000
                     Delta:       14^17'14.00" Right
  Degree of Curvature(Arc):        2^02'46.60"
                    Length:            698.205
                   Tangent:            350.923
                     Chord:            696.398
           Middle Ordinate:             21.735
                  External:             21.905
         Tangent Direction:   S 18^00'45.00" E
          Radial Direction:   S 71^59'15.00" W
           Chord Direction:   S 10^52'08.00" E
          Radial Direction:   S 86^16'29.00" W
         Tangent Direction:   S  3^43'31.00" E

Element: Linear
           P.T.  (        )         1702+64.14   1042044.486   1774440.024
           P.C.  (        )         1707+84.80   1041524.931   1774473.853
         Tangent Direction:   S  3^43'31.00" E
            Tangent Length:            520.655

Element: Circular
           P.C.  (        )         1707+84.80   1041524.931   1774473.853
           P.I.  (        )         1710+45.94   1041264.344   1774490.820
           C.C.  (        )                      1041667.870   1776669.204
           P.T.  (        )         1713+04.64   1041014.970   1774568.319
                    Radius:           2200.000
                     Delta:       13^32'19.00" Left
  Degree of Curvature(Arc):        2^36'15.67"
                    Length:            519.845
                   Tangent:            261.139
                     Chord:            518.637
           Middle Ordinate:             15.337
                  External:             15.444
         Tangent Direction:   S  3^43'31.00" E
          Radial Direction:   S 86^16'29.00" W
           Chord Direction:   S 10^29'40.50" E
          Radial Direction:   S 72^44'10.00" W
         Tangent Direction:   S 17^15'50.00" E

Element: Linear
           P.T.  (        )         1713+04.64   1041014.970   1774568.319
           P.C.  (        )         1718+33.83   1040509.625   1774725.367
         Tangent Direction:   S 17^15'50.00" E
            Tangent Length:            529.186

Element: Circular
           P.C.  (        )         1718+33.83   1040509.625   1774725.367
           P.I.  (        )         1721+07.68   1040248.111   1774806.638
           C.C.  (        )                      1039856.724   1772624.481
           P.T.  (        )         1723+78.73   1039974.654   1774821.318
                    Radius:           2200.000
                     Delta:       14^11'28.00" Right
  Degree of Curvature(Arc):        2^36'15.67"
                    Length:            544.900
                   Tangent:            273.851
                     Chord:            543.508
           Middle Ordinate:             16.849
                  External:             16.979
         Tangent Direction:   S 17^15'50.00" E
          Radial Direction:   S 72^44'10.00" W
           Chord Direction:   S 10^10'06.00" E
```

Phase 3 LW roadway built from 1686+39 to 1995+00

See Contract Plans for final details.

```
         Radial Direction:   S 86^55'38.00" W
        Tangent Direction:   S  3^04'22.00" E

Element: Linear
          P.T.  (        )         1723+78.73   1039974.654   1774821.318
          P.C.  (        )         1729+23.77   1039430.392   1774850.535
        Tangent Direction:   S  3^04'22.00" E
           Tangent Length:            545.045

Element: Circular
          P.C.  (        )         1729+23.77   1039430.392   1774850.535
          P.I.  (        )         1734+96.19   1038858.799   1774881.219
          C.C.  (        )                      1039521.520   1776548.090
          P.T.  (        )         1740+28.06   1038422.178   1775251.384
                   Radius:            1700.000
                    Delta:        37^13'06.00" Left
  Degree of Curvature(Arc):         3^22'13.22"
                   Length:            1104.290
                  Tangent:             572.416
                    Chord:            1084.977
          Middle Ordinate:              88.880
                 External:              93.784
        Tangent Direction:   S  3^04'22.00" E
         Radial Direction:   S 86^55'38.00" W
          Chord Direction:   S 21^40'55.00" E
         Radial Direction:   S 49^42'32.00" W
        Tangent Direction:   S 40^17'28.00" E

Element: Linear
          P.T.  (        )         1740+28.06   1038422.178   1775251.384
          P.C.  (        )         1768+45.35   1036273.243   1777073.240
        Tangent Direction:   S 40^17'28.00" E
           Tangent Length:            2817.282

Element: Circular
          P.C.  (        )         1768+45.35   1036273.243   1777073.240
          P.I.  (        )         1775+22.19   1035756.968   1777510.936
          C.C.  (        )                      1037812.321   1778888.629
          P.T.  (        )         1781+64.22   1035548.276   1778154.804
                   Radius:            2380.000
                    Delta:        31^45'01.00" Left
  Degree of Curvature(Arc):         2^24'26.59"
                   Length:            1318.870
                  Tangent:             676.844
                    Chord:            1302.059
          Middle Ordinate:              90.773
                 External:              94.372
        Tangent Direction:   S 40^17'28.00" E
         Radial Direction:   S 49^42'32.00" W
          Chord Direction:   S 56^09'58.50" E
         Radial Direction:   S 17^57'31.00" W
        Tangent Direction:   S 72^02'29.00" E

Element: Linear
          P.T.  (        )         1781+64.22   1035548.276   1778154.804
            BK. (        )         1792+97.37   1035198.892   1779232.748
          AHD.  (        )       A 1793+00.00   1035198.892   1779232.748
          P.C.  (        )       A 1811+05.60   1034642.171   1780950.378
        Tangent Direction:   S 72^02'29.00" E
           Tangent Length:            2938.751

Element: Circular
          P.C.  (        )       A 1811+05.60   1034642.171   1780950.378
          P.I.  (        )       A 1817+03.80   1034457.728   1781519.435
          C.C.  (        )                      1036734.986   1781628.704
          P.T.  (        )       A 1822+73.76   1034586.840   1782103.538
                   Radius:            2200.000
                    Delta:        30^25'23.00" Left
  Degree of Curvature(Arc):         2^36'15.67"
                   Length:            1168.161
                  Tangent:             598.202
                    Chord:            1154.487
          Middle Ordinate:              77.080
                 External:              79.878
        Tangent Direction:   S 72^02'29.00" E
         Radial Direction:   S 17^57'31.00" W
          Chord Direction:   S 87^15'10.50" E
         Radial Direction:   S 12^27'52.00" E
        Tangent Direction:   N 77^32'08.00" E
```

```
Element: Linear
           P.T.  (        )       A 1822+73.76   1034586.840   1782103.538
           P.C.  (        )       A 1829+04.63   1034723.003   1782719.539
         Tangent Direction:   N 77^32'08.00" E
            Tangent Length:            630.871

Element: Circular
           P.C.  (        )       A 1829+04.63   1034723.003   1782719.539
           P.I.  (        )       A 1835+34.28   1034858.902   1783334.346
           C.C.  (        )                      1030223.613   1783714.101
           P.T.  (        )       A 1841+56.18   1034824.882   1783963.073
                    Radius:           4608.000
                     Delta:       15^33'42.00" Right
  Degree of Curvature(Arc):        1^14'36.23"
                    Length:           1251.543
                   Tangent:            629.647
                     Chord:           1247.700
           Middle Ordinate:             42.425
                  External:             42.819
         Tangent Direction:   N 77^32'08.00" E
          Radial Direction:   S 12^27'52.00" E
           Chord Direction:   N 85^18'59.00" E
          Radial Direction:   S  3^05'50.00" W
         Tangent Direction:   S 86^54'10.00" E

Element: Linear
           P.T.  (        )       A 1841+56.18   1034824.882   1783963.073
           P.C.  (        )       A 1849+75.05   1034780.638   1784780.754
         Tangent Direction:   S 86^54'10.00" E
            Tangent Length:            818.876

Element: Circular
           P.C.  (        )       A 1849+75.05   1034780.638   1784780.754
           P.I.  (        )       A 1857+49.97   1034738.769   1785554.538
           C.C.  (        )                      1030478.931   1784547.991
           P.T.  (        )       A 1865+08.49   1034429.875   1786265.227
                    Radius:           4308.000
                     Delta:       20^23'40.00" Right
  Degree of Curvature(Arc):        1^19'47.95"
                    Length:           1533.433
                   Tangent:            774.916
                     Chord:           1525.351
           Middle Ordinate:             68.048
                  External:             69.140
         Tangent Direction:   S 86^54'10.00" E
          Radial Direction:   S  3^05'50.00" W
           Chord Direction:   S 76^42'20.00" E
          Radial Direction:   S 23^29'30.00" W
         Tangent Direction:   S 66^30'30.00" E

Element: Linear
           P.T.  (        )       A 1865+08.49   1034429.875   1786265.227
           P.C.  (        )       A 1885+27.34   1033625.128   1788116.756
         Tangent Direction:   S 66^30'30.00" E
            Tangent Length:           2018.856

Element: Circular
           P.C.  (        )       A 1885+27.34   1033625.128   1788116.756
           P.I.  (        )       A 1894+65.60   1033251.122   1788977.253
           C.C.  (        )                      1028940.489   1786080.628
           P.T.  (        )       A 1903+83.18   1032595.728   1789648.665
                    Radius:           5108.000
                     Delta:       20^49'00.00" Right
  Degree of Curvature(Arc):        1^07'18.07"
                    Length:           1855.835
                   Tangent:            938.261
                     Chord:           1845.645
           Middle Ordinate:             84.051
                  External:             85.457
         Tangent Direction:   S 66^30'30.00" E
          Radial Direction:   S 23^29'30.00" W
           Chord Direction:   S 56^06'00.00" E
          Radial Direction:   S 44^18'30.00" W
         Tangent Direction:   S 45^41'30.00" E

Element: Linear
           P.T.  (        )       A 1903+83.18   1032595.728   1789648.665
           P.C.  (        )       A 1919+82.46   1031478.598   1790793.097
```

```
        Tangent Direction:   S 45^41'30.00" E
           Tangent Length:          1599.283

Element: Circular
          P.C.  (        )       A 1919+82.46   1031478.598   1790793.097
          P.I.  (        )       A 1929+57.94   1030797.205   1791491.144
          C.C.  (        )                      1033625.372   1792888.655
          P.T.  (        )       A 1938+68.72   1030656.669   1792456.450
                   Radius:           3000.000
                    Delta:       36^01'30.00" Left
  Degree of Curvature(Arc):        1^54'35.49"
                   Length:           1886.265
                  Tangent:            975.483
                    Chord:           1855.347
          Middle Ordinate:            147.033
                 External:            154.610
        Tangent Direction:   S 45^41'30.00" E
         Radial Direction:   S 44^18'30.00" W
          Chord Direction:   S 63^42'15.00" E
         Radial Direction:   S  8^17'00.00" W
        Tangent Direction:   S 81^43'00.00" E

Element: Linear
          P.T.  (        )       A 1938+68.72   1030656.669   1792456.450
          P.C.  (        )       A 1963+11.21   1030304.783   1794873.459
        Tangent Direction:   S 81^43'00.00" E
           Tangent Length:          2442.490

Element: Circular
          P.C.  (        )       A 1963+11.21   1030304.783   1794873.459
          P.I.  (        )       A 1971+08.38   1030189.937   1795662.304
          C.C.  (        )                      1028325.648   1794585.322
          P.T.  (        )       A 1978+28.34   1029563.950   1796155.866
                   Radius:           2000.000
                    Delta:       43^27'45.00" Right
  Degree of Curvature(Arc):        2^51'53.24"
                   Length:           1517.127
                  Tangent:            797.161
                    Chord:           1481.014
          Middle Ordinate:            142.138
                 External:            153.013
        Tangent Direction:   S 81^43'00.00" E
         Radial Direction:   S  8^17'00.00" W
          Chord Direction:   S 59^59'07.50" E
         Radial Direction:   S 51^44'45.00" W
        Tangent Direction:   S 38^15'15.00" E

Element: Linear
          P.T.  (        )       A 1978+28.34   1029563.950   1796155.866
        P.O.E.  (        )       A 1995+00.00   1028251.244   1797190.875
        Tangent Direction:   S 38^15'15.00" E
           Tangent Length:          1671.658
```

```
            Project Name: XL5479_Mainline - final
             Description: Mainline algs for LE and LW
Horizontal Alignment Name: LE
             Description: Eastbound I-90 Phase 3 alignment MP 64 to MP 70
                   Style: AL HW CLinePSENew
                                      STATION      NORTHING       EASTING

Element: Circular
           P.C.  (        )         1676+00.00   1044424.215   1773627.359
           P.I.  (        )         1677+69.88   1044268.151   1773694.475
           C.C.  (        )                      1042962.462   1770228.347
           P.T.  (        )         1679+39.53   1044106.593   1773747.007
                    Radius:            3700.000
                     Delta:         5^15'27.83" Right
  Degree of Curvature(Arc):         1^32'54.72"
                    Length:             339.529
                   Tangent:             169.884
                     Chord:             339.410
           Middle Ordinate:               3.894
                  External:               3.898
         Tangent Direction:   S 23^16'12.83" E
          Radial Direction:   S 66^43'47.17" W
           Chord Direction:   S 20^38'28.91" E
          Radial Direction:   S 71^59'15.00" W
         Tangent Direction:   S 18^00'45.00" E

Element: Linear
           P.T.  (        )         1679+39.53   1044106.593   1773747.007
           P.C.  (        )         1692+36.49   1042873.195   1774148.060
         Tangent Direction:   S 18^00'45.00" E
            Tangent Length:           1296.964

Element: Circular
           P.C.  (        )         1692+36.49   1042873.195   1774148.060
           P.I.  (        )         1695+47.43   1042577.493   1774244.210
           C.C.  (        )                      1042192.901   1772055.884
           P.T.  (        )         1698+54.28   1042266.727   1774254.645
                    Radius:            2200.000
                     Delta:        16^05'22.00" Right
  Degree of Curvature(Arc):         2^36'15.67"
                    Length:             617.790
                   Tangent:             310.941
                     Chord:             615.762
           Middle Ordinate:              21.650
                  External:              21.865
         Tangent Direction:   S 18^00'45.00" E
          Radial Direction:   S 71^59'15.00" W
           Chord Direction:   S  9^58'04.00" E
          Radial Direction:   S 88^04'37.00" W
         Tangent Direction:   S  1^55'23.00" E

Element: Linear
           P.T.  (        )         1698+54.28   1042266.727   1774254.645
           P.C.  (        )         1705+21.44   1041599.947   1774277.033
         Tangent Direction:   S  1^55'23.00" E
            Tangent Length:           667.155

Element: Circular
           P.C.  (        )         1705+21.44   1041599.947   1774277.033
           P.I.  (        )         1708+59.07   1041262.507   1774288.363
           C.C.  (        )                      1041680.485   1776675.681
           P.T.  (        )         1711+92.30   1040941.290   1774392.352
                    Radius:            2400.000
                     Delta:        16^00'56.00" Left
  Degree of Curvature(Arc):         2^23'14.37"
                    Length:             670.858
                   Tangent:             337.630
                     Chord:             668.676
           Middle Ordinate:              23.402
                  External:              23.632
         Tangent Direction:   S  1^55'23.00" E
          Radial Direction:   S 88^04'37.00" W
           Chord Direction:   S  9^55'51.00" E
          Radial Direction:   S 72^03'41.00" W
         Tangent Direction:   S 17^56'19.00" E

Element: Linear
           P.T.  (        )         1711+92.30   1040941.290   1774392.352
           P.C.  (        )         1718+66.99   1040299.392   1774600.157
```

Phase 3 LE roadway built from 1683+41 to 2000+00

Section from 1676+00 to 1683+41 is future embankment for Phase 4.

See Contract Plans for final details.

```
        Tangent Direction:   S 17^56'19.00" E
           Tangent Length:           674.697

Element: Circular
           P.C.  (        )         1718+66.99   1040299.392   1774600.157
           P.I.  (        )         1721+23.08   1040055.757   1774679.031
           C.C.  (        )                      1039621.797   1772507.106
           P.T.  (        )         1723+76.87   1039800.520   1774699.834
                    Radius:           2200.000
                     Delta:       13^16'44.00" Right
  Degree of Curvature(Arc):        2^36'15.67"
                    Length:            509.873
                   Tangent:            256.084
                     Chord:            508.732
           Middle Ordinate:             14.755
                  External:             14.854
        Tangent Direction:   S 17^56'19.00" E
         Radial Direction:   S 72^03'41.00" W
          Chord Direction:   S 11^17'57.00" E
         Radial Direction:   S 85^20'25.00" W
        Tangent Direction:   S  4^39'35.00" E

Element: Linear
           P.T.  (        )         1723+76.87   1039800.520   1774699.834
           P.C.  (        )         1728+22.83   1039356.034   1774736.063
        Tangent Direction:   S  4^39'35.00" E
           Tangent Length:           445.960

Element: Circular
           P.C.  (        )         1728+22.83   1039356.034   1774736.063
           P.I.  (        )         1733+04.88   1038875.577   1774775.224
           C.C.  (        )                      1039477.891   1776231.105
           P.T.  (        )         1737+55.65   1038507.884   1775086.952
                    Radius:           1500.000
                     Delta:       35^37'53.00" Left
  Degree of Curvature(Arc):        3^49'10.99"
                    Length:            932.828
                   Tangent:            482.051
                     Chord:            917.868
           Middle Ordinate:             71.932
                  External:             75.555
        Tangent Direction:   S  4^39'35.00" E
         Radial Direction:   S 85^20'25.00" W
          Chord Direction:   S 22^28'31.50" E
         Radial Direction:   S 49^42'32.00" W
        Tangent Direction:   S 40^17'28.00" E

Element: Linear
           P.T.  (        )         1737+55.65   1038507.884   1775086.952
           P.C.  (        )         1768+83.36   1036122.168   1777109.550
        Tangent Direction:   S 40^17'28.00" E
           Tangent Length:          3127.705

Element: Circular
           P.C.  (        )         1768+83.36   1036122.168   1777109.550
           P.I.  (        )         1774+16.72   1035715.335   1777454.461
           C.C.  (        )                      1037383.177   1778596.949
           P.T.  (        )         1779+24.62   1035540.685   1777958.418
                    Radius:           1950.000
                     Delta:       30^35'41.00" Left
  Degree of Curvature(Arc):        2^56'17.68"
                    Length:           1041.258
                   Tangent:            533.363
                     Chord:           1028.932
           Middle Ordinate:             69.089
                  External:             71.627
        Tangent Direction:   S 40^17'28.00" E
         Radial Direction:   S 49^42'32.00" W
          Chord Direction:   S 55^35'18.50" E
         Radial Direction:   S 19^06'51.00" W
        Tangent Direction:   S 70^53'09.00" E

Element: Linear
           P.T.  (        )         1779+24.62   1035540.685   1777958.418
           P.C.  (        )         1798+18.47   1034920.540   1779747.857
        Tangent Direction:   S 70^53'09.00" E
           Tangent Length:          1893.851

Element: Circular
```

```
          P.C.  (        )         1798+18.47   1034920.540   1779747.857
          P.I.  (        )         1799+19.31   1034887.519   1779843.142
          C.C.  (        )                      1044369.220   1783022.373
          P.T.  (        )         1800+20.15   1034856.425   1779939.074
                   Radius:           10000.000
                    Delta:        1^09'20.00" Left
  Degree of Curvature(Arc):        0^34'22.65"
                   Length:              201.682
                  Tangent:              100.845
                    Chord:              201.679
          Middle Ordinate:                0.508
                 External:                0.508
        Tangent Direction:   S 70^53'09.00" E
         Radial Direction:   S 19^06'51.00" W
          Chord Direction:   S 71^27'49.00" E
         Radial Direction:   S 17^57'31.00" W
        Tangent Direction:   S 72^02'29.00" E

Element: Linear
          P.T.  (        )         1800+20.15   1034856.425   1779939.074
          P.C.  (        )         1811+45.59   1034509.419   1781009.679
        Tangent Direction:   S 72^02'29.00" E
           Tangent Length:           1125.438

Element: Circular
          P.C.  (        )         1811+45.59   1034509.419   1781009.679
          P.I.  (        )         1816+75.81   1034345.935   1781514.071
          C.C.  (        )                      1036364.414   1781610.923
          P.T.  (        )         1821+81.00   1034460.375   1782031.798
                   Radius:           1950.000
                    Delta:       30^25'23.00" Left
  Degree of Curvature(Arc):        2^56'17.68"
                   Length:           1035.416
                  Tangent:            530.225
                    Chord:           1023.295
          Middle Ordinate:             68.321
                 External:             70.801
        Tangent Direction:   S 72^02'29.00" E
         Radial Direction:   S 17^57'31.00" W
          Chord Direction:   S 87^15'10.50" E
         Radial Direction:   S 12^27'52.00" E
        Tangent Direction:   N 77^32'08.00" E

Element: Linear
          P.T.  (        )         1821+81.00   1034460.375   1782031.798
          P.C.  (        )         1829+09.22   1034617.549   1782742.850
        Tangent Direction:   N 77^32'08.00" E
           Tangent Length:            728.215

Element: Circular
          P.C.  (        )         1829+09.22   1034617.549   1782742.850
          P.I.  (        )         1835+24.11   1034750.263   1783343.246
          C.C.  (        )                      1030223.613   1783714.101
          P.T.  (        )         1841+31.43   1034717.040   1783957.238
                   Radius:           4500.000
                    Delta:       15^33'42.00" Right
  Degree of Curvature(Arc):        1^16'23.66"
                   Length:           1222.210
                  Tangent:            614.890
                    Chord:           1218.457
          Middle Ordinate:             41.431
                 External:             41.816
        Tangent Direction:   N 77^32'08.00" E
         Radial Direction:   S 12^27'52.00" E
          Chord Direction:   N 85^18'59.00" E
         Radial Direction:   S  3^05'50.00" W
        Tangent Direction:   S 86^54'10.00" E

Element: Linear
          P.T.  (        )         1841+31.43   1034717.040   1783957.238
          P.C.  (        )         1849+50.31   1034672.796   1784774.918
        Tangent Direction:   S 86^54'10.00" E
           Tangent Length:            818.876

Element: Circular
          P.C.  (        )         1849+50.31   1034672.796   1784774.918
          P.I.  (        )         1857+05.80   1034631.976   1785529.304
          C.C.  (        )                      1030478.931   1784547.991
          P.T.  (        )         1864+45.30   1034330.827   1786222.177
```

```
                  Radius:          4200.000
                   Delta:      20^23'40.00" Right
  Degree of Curvature(Arc):       1^21'51.07"
                  Length:          1494.991
                 Tangent:           755.489
                   Chord:          1487.111
          Middle Ordinate:            66.342
                 External:            67.407
        Tangent Direction:   S 86^54'10.00" E
         Radial Direction:   S  3^05'50.00" W
          Chord Direction:   S 76^42'20.00" E
         Radial Direction:   S 23^29'30.00" W
        Tangent Direction:   S 66^30'30.00" E

Element: Linear
          P.T.  (        )        1864+45.30   1034330.827   1786222.177
          P.C.  (        )        1884+64.15   1033526.079   1788073.706
        Tangent Direction:   S 66^30'30.00" E
           Tangent Length:          2018.856

Element: Circular
          P.C.  (        )        1884+64.15   1033526.079   1788073.706
          P.I.  (        )        1893+82.58   1033159.981   1788916.009
          C.C.  (        )                      1028940.489   1786080.628
          P.T.  (        )        1902+80.75   1032518.444   1789573.224
                  Radius:          5000.000
                   Delta:      20^49'00.00" Right
  Degree of Curvature(Arc):       1^08'45.30"
                  Length:          1816.597
                 Tangent:           918.423
                   Chord:          1806.622
          Middle Ordinate:            82.274
                 External:            83.650
        Tangent Direction:   S 66^30'30.00" E
         Radial Direction:   S 23^29'30.00" W
          Chord Direction:   S 56^06'00.00" E
         Radial Direction:   S 44^18'30.00" W
        Tangent Direction:   S 45^41'30.00" E

Element: Linear
          P.T.  (        )        1902+80.75   1032518.444   1789573.224
          P.C.  (        )        1918+80.03   1031401.314   1790717.657
        Tangent Direction:   S 45^41'30.00" E
           Tangent Length:          1599.283

Element: Circular
          P.C.  (        )        1918+80.03   1031401.314   1790717.657
          P.I.  (        )        1928+90.63   1030695.391   1791440.833
          C.C.  (        )                      1033625.372   1792888.655
          P.T.  (        )        1938+34.20   1030549.795   1792440.891
                  Radius:          3108.000
                   Delta:      36^01'30.00" Left
  Degree of Curvature(Arc):       1^50'36.58"
                  Length:          1954.170
                 Tangent:          1010.600
                   Chord:          1922.139
          Middle Ordinate:           152.326
                 External:           160.176
        Tangent Direction:   S 45^41'30.00" E
         Radial Direction:   S 44^18'30.00" W
          Chord Direction:   S 63^42'15.00" E
         Radial Direction:   S  8^17'00.00" W
        Tangent Direction:   S 81^43'00.00" E

Element: Linear
          P.T.  (        )        1938+34.20   1030549.795   1792440.891
          P.C.  (        )        1960+04.86   1030237.073   1794588.898
        Tangent Direction:   S 81^43'00.00" E
           Tangent Length:          2170.652

Element: Circular
          P.C.  (        )        1960+04.86   1030237.073   1794588.898
          P.I.  (        )        1970+40.55   1030087.862   1795613.789
          C.C.  (        )                      1027664.197   1794214.320
          P.T.  (        )        1979+76.06   1029274.821   1796255.371
                  Radius:          2600.000
                   Delta:      43^26'21.00" Right
  Degree of Curvature(Arc):       2^12'13.26"
                  Length:          1971.207
```

```
                 Tangent:          1035.695
                   Chord:          1924.334
     Middle Ordinate:             184.584
             External:            198.690
   Tangent Direction:   S 81^43'00.00" E
    Radial Direction:   S  8^17'00.00" W
     Chord Direction:   S 59^59'49.50" E
    Radial Direction:   S 51^43'21.00" W
   Tangent Direction:   S 38^16'39.00" E

Element: Linear
     P.T.  (        )         1979+76.06   1029274.821   1796255.371
   P.O.E.  (        )         2000+00.00   1027685.990   1797509.142
   Tangent Direction:   S 38^16'39.00" E
      Tangent Length:          2023.938
```

LW - Sight Distance via InRoads Roadway Visibility Tool

Median lane

Sight distance checked for direction of travel (looking back on station)

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 7:16am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1995+00.00
Stop Station: A 1946+00.00
Interval: 50.000

Sight Distance: 730.000
Relaxed Distance: 730.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	A 1994+50.00	18.000	2216.068
Object Position:	A 1987+20.00	18.000	2218.418
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1994+00.00	18.000	2216.340
Object Position:	A 1986+70.00	18.000	2218.687
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1993+50.00	18.000	2216.601
Object Position:	A 1986+20.00	18.000	2218.963
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1993+00.00	18.000	2216.836
Object Position:	A 1985+70.00	18.000	2219.239
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1992+50.00	18.000	2217.097
Object Position:	A 1985+20.00	18.000	2219.526
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1992+00.00	18.000	2217.364
Object Position:	A 1984+70.00	18.000	2219.800
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	A 1991+50.00	18.000	2217.634
Object Position:	A 1984+20.00	18.000	2220.061
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1991+00.00	18.000	2217.935
Object Position:	A 1983+70.00	18.000	2220.341
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1990+50.00	18.000	2218.219
Object Position:	A 1983+20.00	18.000	2220.622
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1990+00.00	18.000	2218.477
Object Position:	A 1982+70.00	18.000	2220.870
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1989+50.00	18.000	2218.730
Object Position:	A 1982+20.00	18.000	2221.125
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1989+00.00	18.000	2218.987
Object Position:	A 1981+70.00	18.000	2221.396
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1988+50.00	18.000	2219.251
Object Position:	A 1981+20.00	18.000	2221.445
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1988+00.00	18.000	2219.524
Object Position:	A 1980+70.00	18.000	2221.549
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1987+50.00	18.000	2219.775
Object Position:	A 1980+20.00	18.000	2221.642
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1987+00.00	18.000	2220.018
Object Position:	A 1979+70.00	18.000	2221.695

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1986+50.00	18.000	2220.298
Object Position:	A 1979+20.00	18.000	2221.685
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1986+00.00	18.000	2220.573
Object Position:	A 1978+70.00	18.000	2221.581
Obstruction:	No Obstruction		
Sight Distance:	1434.698		
Eye Position:	A 1985+50.00	18.000	2220.854
Object Position:	A 1978+19.94	18.000	2221.441
Obstruction:	No Obstruction		
Sight Distance:	1378.298		
Eye Position:	A 1985+00.00	18.000	2221.146
Object Position:	A 1977+69.48	18.000	2221.213
Obstruction:	No Obstruction		
Sight Distance:	1323.320		
Eye Position:	A 1984+50.00	18.000	2221.408
Object Position:	A 1977+18.99	18.000	2220.928
Obstruction:	No Obstruction		
Sight Distance:	1272.631		
Eye Position:	A 1984+00.00	18.000	2221.664
Object Position:	A 1976+68.45	18.000	2220.759
Obstruction:	No Obstruction		
Sight Distance:	1228.732		
Eye Position:	A 1983+50.00	18.000	2221.969
Object Position:	A 1976+17.83	18.000	2220.529
Obstruction:	No Obstruction		
Sight Distance:	1190.837		
Eye Position:	A 1983+00.00	18.000	2222.225
Object Position:	A 1975+67.14	18.000	2220.221
Obstruction:	No Obstruction		
Sight Distance:	1155.074		
Eye Position:	A 1982+50.00	18.000	2222.457
Object Position:	A 1975+16.38	18.000	2219.849
Obstruction:	No Obstruction		
Sight Distance:	1121.776		

	Station	Offset	Elevation
Eye Position:	A 1982+00.00	18.000	2222.734
Object Position:	A 1974+65.53	18.000	2219.397
Obstruction:	No Obstruction		
Sight Distance:	1090.085		
Eye Position:	A 1981+50.00	18.000	2222.930
Object Position:	A 1974+14.63	18.000	2218.875
Obstruction:	No Obstruction		
Sight Distance:	1063.918		
Eye Position:	A 1981+00.00	18.000	2223.000
Object Position:	A 1973+63.68	18.000	2218.282
Obstruction:	No Obstruction		
Sight Distance:	1049.018		
Eye Position:	A 1980+50.00	18.000	2223.078
Object Position:	A 1973+12.71	18.000	2217.614
Obstruction:	No Obstruction		
Sight Distance:	1040.096		
Eye Position:	A 1980+00.00	18.000	2223.145
Object Position:	A 1972+61.75	18.000	2216.870
Obstruction:	No Obstruction		
Sight Distance:	1033.234		
Eye Position:	A 1979+50.00	18.000	2223.179
Object Position:	A 1972+10.85	18.000	2216.058
Obstruction:	No Obstruction		
Sight Distance:	1027.952		
Eye Position:	A 1979+00.00	18.000	2223.143
Object Position:	A 1971+60.04	18.000	2215.176
Obstruction:	No Obstruction		
Sight Distance:	1024.072		
Eye Position:	A 1978+50.00	18.000	2223.030
Object Position:	A 1971+09.39	18.000	2214.225
Obstruction:	No Obstruction		
Sight Distance:	1021.778		
Eye Position:	A 1978+00.00	18.000	2222.862
Object Position:	A 1970+59.14	18.000	2213.211
Obstruction:	No Obstruction		
Sight Distance:	1020.146		
Eye Position:	A 1977+50.00	18.000	2222.610

	Station	Offset	Elevation
	A 1970+09.14	18.000	2212.134
Obstruction:	No Obstruction		
Sight Distance:	1018.022		
Eye Position:	A 1977+00.00	18.000	2222.367
Object Position:	A 1969+59.14	18.000	2211.016
Obstruction:	No Obstruction		
Sight Distance:	901.967		
Eye Position:	A 1976+50.00	18.000	2222.182
Object Position:	A 1969+09.14	18.000	2209.893
Obstruction:	No Obstruction		
Sight Distance:	888.547		
Eye Position:	A 1976+00.00	18.000	2221.927
Object Position:	A 1968+59.14	18.000	2208.768
Obstruction:	No Obstruction		
Sight Distance:	876.878		
Eye Position:	A 1975+50.00	18.000	2221.602
Object Position:	A 1968+09.14	18.000	2207.633
Obstruction:	No Obstruction		
Sight Distance:	867.727		
Eye Position:	A 1975+00.00	18.000	2221.209
Object Position:	A 1967+59.14	18.000	2206.511
Obstruction:	No Obstruction		
Sight Distance:	859.817		
Eye Position:	A 1974+50.00	18.000	2220.743
Object Position:	A 1967+09.14	18.000	2205.391
Obstruction:	No Obstruction		
Sight Distance:	853.949		
Eye Position:	A 1974+00.00	18.000	2220.210
Object Position:	A 1966+59.14	18.000	2204.261
Obstruction:	No Obstruction		
Sight Distance:	847.855		
Eye Position:	A 1973+50.00	18.000	2219.606
Object Position:	A 1966+09.14	18.000	2203.143
Obstruction:	No Obstruction		
Sight Distance:	840.426		
Eye Position:	A 1973+00.00	18.000	2218.933
Object Position:	A 1965+59.14	18.000	2202.026
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	830.421		
Eye Position:	A 1972+50.00	18.000	2218.189
Object Position:	A 1965+09.14	18.000	2200.968
Obstruction:	No Obstruction		
Sight Distance:	822.827		
Eye Position:	A 1972+00.00	18.000	2217.376
Object Position:	A 1964+59.14	18.000	2200.000
Obstruction:	No Obstruction		
Sight Distance:	815.644		
Eye Position:	A 1971+50.00	18.000	2216.493
Object Position:	A 1964+09.14	18.000	2199.115
Obstruction:	No Obstruction		
Sight Distance:	809.905		
Eye Position:	A 1971+00.00	18.000	2215.541
Object Position:	A 1963+59.14	18.000	2198.513
Obstruction:	No Obstruction		
Sight Distance:	815.366		
Eye Position:	A 1970+50.00	18.000	2214.519
Object Position:	A 1963+09.14	18.000	2197.990
Obstruction:	No Obstruction		
Sight Distance:	824.178		
Eye Position:	A 1970+00.00	18.000	2213.428
Object Position:	A 1962+59.69	18.000	2197.574
Obstruction:	No Obstruction		
Sight Distance:	836.150		
Eye Position:	A 1969+50.00	18.000	2212.304
Object Position:	A 1962+10.41	18.000	2197.184
Obstruction:	No Obstruction		
Sight Distance:	843.844		
Eye Position:	A 1969+00.00	18.000	2211.180
Object Position:	A 1961+61.26	18.000	2196.908
Obstruction:	No Obstruction		
Sight Distance:	850.988		
Eye Position:	A 1968+50.00	18.000	2210.055
Object Position:	A 1961+12.17	18.000	2196.712
Obstruction:	No Obstruction		
Sight Distance:	857.064		

	Station	Offset	Elevation
	A 1968+00.00	18.000	2208.928
Object Position:	A 1960+63.12	18.000	2196.593
Obstruction:	No Obstruction		
Sight Distance:	863.747		
Eye Position:	A 1967+50.00	18.000	2207.803
Object Position:	A 1960+14.07	18.000	2196.593
Obstruction:	No Obstruction		
Sight Distance:	875.497		
Eye Position:	A 1967+00.00	18.000	2206.679
Object Position:	A 1959+64.98	18.000	2196.609
Obstruction:	No Obstruction		
Sight Distance:	883.815		
Eye Position:	A 1966+50.00	18.000	2205.553
Object Position:	A 1959+15.85	18.000	2196.536
Obstruction:	No Obstruction		
Sight Distance:	879.793		
Eye Position:	A 1966+00.00	18.000	2204.430
Object Position:	A 1958+66.66	18.000	2196.552
Obstruction:	No Obstruction		
Sight Distance:	877.816		
Eye Position:	A 1965+50.00	18.000	2203.317
Object Position:	A 1958+17.39	18.000	2196.632
Obstruction:	No Obstruction		
Sight Distance:	875.756		
Eye Position:	A 1965+00.00	18.000	2202.272
Object Position:	A 1957+68.04	18.000	2196.796
Obstruction:	No Obstruction		
Sight Distance:	873.847		
Eye Position:	A 1964+50.00	18.000	2201.319
Object Position:	A 1957+18.62	18.000	2197.044
Obstruction:	No Obstruction		
Sight Distance:	873.246		
Eye Position:	A 1964+00.00	18.000	2200.502
Object Position:	A 1956+69.15	18.000	2197.374
Obstruction:	No Obstruction		
Sight Distance:	872.371		
Eye Position:	A 1963+50.00	18.000	2199.913
Object Position:	A 1956+19.62	18.000	2197.794

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	870.391		
Eye Position:	A 1963+00.00	18.000	2199.405
Object Position:	A 1955+70.00	18.000	2198.283
Obstruction:	No Obstruction		
Sight Distance:	867.732		
Eye Position:	A 1962+50.00	18.000	2198.979
Object Position:	A 1955+20.00	18.000	2198.857
Obstruction:	No Obstruction		
Sight Distance:	865.132		
Eye Position:	A 1962+00.00	18.000	2198.627
Object Position:	A 1954+70.00	18.000	2199.517
Obstruction:	No Obstruction		
Sight Distance:	862.656		
Eye Position:	A 1961+50.00	18.000	2198.365
Object Position:	A 1954+20.00	18.000	2200.265
Obstruction:	No Obstruction		
Sight Distance:	860.872		
Eye Position:	A 1961+00.00	18.000	2198.185
Object Position:	A 1953+70.00	18.000	2201.093
Obstruction:	No Obstruction		
Sight Distance:	859.124		
Eye Position:	A 1960+50.00	18.000	2198.088
Object Position:	A 1953+20.00	18.000	2202.007
Obstruction:	No Obstruction		
Sight Distance:	857.418		
Eye Position:	A 1960+00.00	18.000	2198.080
Object Position:	A 1952+70.00	18.000	2202.999
Obstruction:	No Obstruction		
Sight Distance:	855.481		
Eye Position:	A 1959+50.00	18.000	2198.079
Object Position:	A 1952+20.00	18.000	2204.063
Obstruction:	No Obstruction		
Sight Distance:	853.660		
Eye Position:	A 1959+00.00	18.000	2198.030
Object Position:	A 1951+70.00	18.000	2205.231
Obstruction:	No Obstruction		
Sight Distance:	854.311		

	Station	Offset	Elevation
Eye Position:	A 1958+50.00	18.000	2198.065
Object Position:	A 1951+20.00	18.000	2206.471
Obstruction:	No Obstruction		
Sight Distance:	854.322		
Eye Position:	A 1958+00.00	18.000	2198.179
Object Position:	A 1950+70.00	18.000	2207.793
Obstruction:	No Obstruction		
Sight Distance:	854.344		
Eye Position:	A 1957+50.00	18.000	2198.377
Object Position:	A 1950+20.00	18.000	2209.198
Obstruction:	No Obstruction		
Sight Distance:	854.326		
Eye Position:	A 1957+00.00	18.000	2198.659
Object Position:	A 1949+70.00	18.000	2210.686
Obstruction:	No Obstruction		
Sight Distance:	854.325		
Eye Position:	A 1956+50.00	18.000	2199.023
Object Position:	A 1949+20.00	18.000	2212.256
Obstruction:	No Obstruction		
Sight Distance:	854.327		
Eye Position:	A 1956+00.00	18.000	2199.471
Object Position:	A 1948+70.00	18.000	2213.909
Obstruction:	No Obstruction		
Sight Distance:	854.288		
Eye Position:	A 1955+50.00	18.000	2200.000
Object Position:	A 1948+20.00	18.000	2215.645
Obstruction:	No Obstruction		
Sight Distance:	854.291		
Eye Position:	A 1955+00.00	18.000	2200.611
Object Position:	A 1947+70.00	18.000	2217.463
Obstruction:	No Obstruction		
Sight Distance:	854.377		
Eye Position:	A 1954+50.00	18.000	2201.305
Object Position:	A 1947+20.00	18.000	2219.364
Obstruction:	No Obstruction		
Sight Distance:	854.369		
Eye Position:	A 1954+00.00	18.000	2202.083

	Station	Offset	Elevation
	A 1946+70.00	18.000	2221.347
Obstruction:	No Obstruction		
Sight Distance:	855.268		
Eye Position:	A 1953+50.00	18.000	2202.943
Object Position:	A 1946+20.00	18.000	2223.407
Obstruction:	No Obstruction		
Sight Distance:	860.789		
Eye Position:	A 1953+00.00	18.000	2203.886
Object Position:	A 1945+70.00	18.000	2225.555
Obstruction:	No Obstruction		
Sight Distance:	873.934		
Eye Position:	A 1952+50.00	18.000	2204.911
Object Position:	A 1945+20.00	18.000	2227.731
Obstruction:	No Obstruction		
Sight Distance:	892.076		
Eye Position:	A 1952+00.00	18.000	2206.017
Object Position:	A 1944+70.00	18.000	2229.911
Obstruction:	No Obstruction		
Sight Distance:	914.028		
Eye Position:	A 1951+50.00	18.000	2207.209
Object Position:	A 1944+20.00	18.000	2232.091
Obstruction:	No Obstruction		
Sight Distance:	940.195		
Eye Position:	A 1951+00.00	18.000	2208.482
Object Position:	A 1943+70.00	18.000	2234.271
Obstruction:	No Obstruction		
Sight Distance:	971.783		
Eye Position:	A 1950+50.00	18.000	2209.837
Object Position:	A 1943+20.00	18.000	2236.451
Obstruction:	No Obstruction		
Sight Distance:	1010.008		
Eye Position:	A 1950+00.00	18.000	2211.275
Object Position:	A 1942+70.00	18.000	2238.631
Obstruction:	No Obstruction		
Sight Distance:	1033.063		
Eye Position:	A 1949+50.00	18.000	2212.796
Object Position:	A 1942+20.00	18.000	2240.811
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1044.969		
Eye Position:	A 1949+00.00	18.000	2214.399
Object Position:	A 1941+70.00	18.000	2242.991
Obstruction:	No Obstruction		
Sight Distance:	1050.177		
Eye Position:	A 1948+50.00	18.000	2216.085
Object Position:	A 1941+20.00	18.000	2245.171
Obstruction:	No Obstruction		
Sight Distance:	1048.865		
Eye Position:	A 1948+00.00	18.000	2217.854
Object Position:	A 1940+70.00	18.000	2247.351
Obstruction:	No Obstruction		
Sight Distance:	1041.361		
Eye Position:	A 1947+50.00	18.000	2219.705
Object Position:	A 1940+20.00	18.000	2249.531
Obstruction:	No Obstruction		
Sight Distance:	1041.374		
Eye Position:	A 1947+00.00	18.000	2221.639
Object Position:	A 1939+70.00	18.000	2251.847
Obstruction:	No Obstruction		
Sight Distance:	1058.216		
Eye Position:	A 1946+50.00	18.000	2223.656
Object Position:	A 1939+20.00	18.000	2254.166
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1946+00.00	18.000	2225.754
Object Position:	A 1938+70.00	18.000	2256.571
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 7:58am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1950+00.00
Stop Station: A 1887+00.00
Interval: 50.000

Sight Distance: 675.000
Relaxed Distance: 675.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	A 1950+00.00	18.000	2211.275
Object Position:	A 1943+25.00	18.000	2236.233
Obstruction:	No Obstruction		
Sight Distance:	976.891		
Eye Position:	A 1949+50.00	18.000	2212.796
Object Position:	A 1942+75.00	18.000	2238.413
Obstruction:	No Obstruction		
Sight Distance:	997.076		
Eye Position:	A 1949+00.00	18.000	2214.399
Object Position:	A 1942+25.00	18.000	2240.593
Obstruction:	No Obstruction		
Sight Distance:	1007.093		
Eye Position:	A 1948+50.00	18.000	2216.085
Object Position:	A 1941+75.00	18.000	2242.773
Obstruction:	No Obstruction		
Sight Distance:	1013.183		
Eye Position:	A 1948+00.00	18.000	2217.854
Object Position:	A 1941+25.00	18.000	2244.953
Obstruction:	No Obstruction		
Sight Distance:	1006.956		
Eye Position:	A 1947+50.00	18.000	2219.705
Object Position:	A 1940+75.00	18.000	2247.133
Obstruction:	No Obstruction		
Sight Distance:	1002.269		

	Station	Offset	Elevation
Eye Position:	A 1947+00.00	18.000	2221.639
Object Position:	A 1940+25.00	18.000	2249.313
Obstruction:	No Obstruction		
Sight Distance:	996.976		
Eye Position:	A 1946+50.00	18.000	2223.656
Object Position:	A 1939+75.00	18.000	2251.607
Obstruction:	No Obstruction		
Sight Distance:	1004.839		
Eye Position:	A 1946+00.00	18.000	2225.754
Object Position:	A 1939+25.00	18.000	2253.929
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1945+50.00	18.000	2227.924
Object Position:	A 1938+75.00	18.000	2256.327
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1945+00.00	18.000	2230.103
Object Position:	A 1938+25.24	18.000	2258.705
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1944+50.00	18.000	2232.283
Object Position:	A 1937+75.53	18.000	2261.079
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1944+00.00	18.000	2234.463
Object Position:	A 1937+25.80	18.000	2263.268
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1943+50.00	18.000	2236.643
Object Position:	A 1936+76.04	18.000	2265.430
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1943+00.00	18.000	2238.823
Object Position:	A 1936+26.25	18.000	2267.598
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1942+50.00	18.000	2241.003
Object Position:	A 1935+76.43	18.000	2269.770

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1942+00.00	18.000	2243.183
Object Position:	A 1935+26.58	18.000	2271.944
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1941+50.00	18.000	2245.363
Object Position:	A 1934+76.71	18.000	2274.119
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1941+00.00	18.000	2247.543
Object Position:	A 1934+26.83	18.000	2276.299
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1940+50.00	18.000	2249.723
Object Position:	A 1933+76.94	18.000	2278.469
Obstruction:	No Obstruction		
Sight Distance:	768.218		
Eye Position:	A 1940+00.00	18.000	2251.903
Object Position:	A 1933+27.07	18.000	2280.645
Obstruction:	No Obstruction		
Sight Distance:	759.677		
Eye Position:	A 1939+50.00	18.000	2254.272
Object Position:	A 1932+77.23	18.000	2282.815
Obstruction:	No Obstruction		
Sight Distance:	758.795		
Eye Position:	A 1939+00.00	18.000	2256.645
Object Position:	A 1932+27.43	18.000	2284.987
Obstruction:	No Obstruction		
Sight Distance:	757.099		
Eye Position:	A 1938+50.00	18.000	2259.025
Object Position:	A 1931+77.62	18.000	2287.159
Obstruction:	No Obstruction		
Sight Distance:	756.894		
Eye Position:	A 1938+00.00	18.000	2261.406
Object Position:	A 1931+27.62	18.000	2289.339
Obstruction:	No Obstruction		
Sight Distance:	756.853		

	Station	Offset	Elevation
Eye Position:	A 1937+50.00	18.000	2263.704
Object Position:	A 1930+77.62	18.000	2291.519
Obstruction:	No Obstruction		
Sight Distance:	756.833		
Eye Position:	A 1937+00.00	18.000	2265.885
Object Position:	A 1930+27.62	18.000	2293.699
Obstruction:	No Obstruction		
Sight Distance:	756.831		
Eye Position:	A 1936+50.00	18.000	2268.064
Object Position:	A 1929+77.62	18.000	2295.880
Obstruction:	No Obstruction		
Sight Distance:	756.823		
Eye Position:	A 1936+00.00	18.000	2270.243
Object Position:	A 1929+27.62	18.000	2298.060
Obstruction:	No Obstruction		
Sight Distance:	756.842		
Eye Position:	A 1935+50.00	18.000	2272.423
Object Position:	A 1928+77.62	18.000	2300.248
Obstruction:	No Obstruction		
Sight Distance:	756.834		
Eye Position:	A 1935+00.00	18.000	2274.603
Object Position:	A 1928+27.62	18.000	2302.424
Obstruction:	No Obstruction		
Sight Distance:	756.825		
Eye Position:	A 1934+50.00	18.000	2276.783
Object Position:	A 1927+77.62	18.000	2304.608
Obstruction:	No Obstruction		
Sight Distance:	756.851		
Eye Position:	A 1934+00.00	18.000	2278.965
Object Position:	A 1927+27.62	18.000	2306.788
Obstruction:	No Obstruction		
Sight Distance:	756.835		
Eye Position:	A 1933+50.00	18.000	2281.144
Object Position:	A 1926+77.62	18.000	2308.961
Obstruction:	No Obstruction		
Sight Distance:	756.824		
Eye Position:	A 1933+00.00	18.000	2283.324

	Station	Offset	Elevation
	A 1926+27.62	18.000	2311.148
Obstruction:	No Obstruction		
Sight Distance:	756.834		
Eye Position:	A 1932+50.00	18.000	2285.504
Object Position:	A 1925+77.62	18.000	2313.328
Obstruction:	No Obstruction		
Sight Distance:	756.837		
Eye Position:	A 1932+00.00	18.000	2287.683
Object Position:	A 1925+27.62	18.000	2315.508
Obstruction:	No Obstruction		
Sight Distance:	756.837		
Eye Position:	A 1931+50.00	18.000	2289.864
Object Position:	A 1924+77.62	18.000	2317.684
Obstruction:	No Obstruction		
Sight Distance:	756.830		
Eye Position:	A 1931+00.00	18.000	2292.043
Object Position:	A 1924+27.62	18.000	2319.868
Obstruction:	No Obstruction		
Sight Distance:	756.844		
Eye Position:	A 1930+50.00	18.000	2294.224
Object Position:	A 1923+77.62	18.000	2322.048
Obstruction:	No Obstruction		
Sight Distance:	756.835		
Eye Position:	A 1930+00.00	18.000	2296.403
Object Position:	A 1923+27.62	18.000	2324.220
Obstruction:	No Obstruction		
Sight Distance:	756.822		
Eye Position:	A 1929+50.00	18.000	2298.584
Object Position:	A 1922+77.62	18.000	2326.404
Obstruction:	No Obstruction		
Sight Distance:	756.829		
Eye Position:	A 1929+00.00	18.000	2300.764
Object Position:	A 1922+27.62	18.000	2328.588
Obstruction:	No Obstruction		
Sight Distance:	756.845		
Eye Position:	A 1928+50.00	18.000	2302.945
Object Position:	A 1921+77.62	18.000	2330.768
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	756.845		
Eye Position:	A 1928+00.00	18.000	2305.125
Object Position:	A 1921+27.62	18.000	2332.940
Obstruction:	No Obstruction		
Sight Distance:	757.098		
Eye Position:	A 1927+50.00	18.000	2307.305
Object Position:	A 1920+77.62	18.000	2335.119
Obstruction:	No Obstruction		
Sight Distance:	757.571		
Eye Position:	A 1927+00.00	18.000	2309.485
Object Position:	A 1920+27.62	18.000	2337.109
Obstruction:	No Obstruction		
Sight Distance:	759.750		
Eye Position:	A 1926+50.00	18.000	2311.664
Object Position:	A 1919+77.60	18.000	2339.092
Obstruction:	No Obstruction		
Sight Distance:	769.179		
Eye Position:	A 1926+00.00	18.000	2313.845
Object Position:	A 1919+27.35	18.000	2341.083
Obstruction:	No Obstruction		
Sight Distance:	784.991		
Eye Position:	A 1925+50.00	18.000	2316.025
Object Position:	A 1918+77.16	18.000	2343.070
Obstruction:	No Obstruction		
Sight Distance:	804.730		
Eye Position:	A 1925+00.00	18.000	2318.205
Object Position:	A 1918+27.02	18.000	2345.145
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1924+50.00	18.000	2320.385
Object Position:	A 1917+76.90	18.000	2347.330
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1924+00.00	18.000	2322.565
Object Position:	A 1917+26.78	18.000	2349.515
Obstruction:	No Obstruction		
Sight Distance:	2772.138		

	Station	Offset	Elevation
	A 1923+50.00	18.000	2324.745
Object Position:	A 1916+76.66	18.000	2351.701
Obstruction:	No Obstruction		
Sight Distance:	2554.116		
Eye Position:	A 1923+00.00	18.000	2326.923
Object Position:	A 1916+26.52	18.000	2353.886
Obstruction:	No Obstruction		
Sight Distance:	2341.684		
Eye Position:	A 1922+50.00	18.000	2329.105
Object Position:	A 1915+76.36	18.000	2356.073
Obstruction:	No Obstruction		
Sight Distance:	1174.760		
Eye Position:	A 1922+00.00	18.000	2331.285
Object Position:	A 1915+26.17	18.000	2358.262
Obstruction:	No Obstruction		
Sight Distance:	1191.536		
Eye Position:	A 1921+50.00	18.000	2333.465
Object Position:	A 1914+75.94	18.000	2360.452
Obstruction:	No Obstruction		
Sight Distance:	1206.654		
Eye Position:	A 1921+00.00	18.000	2335.644
Object Position:	A 1914+25.69	18.000	2362.643
Obstruction:	No Obstruction		
Sight Distance:	1219.497		
Eye Position:	A 1920+50.00	18.000	2337.730
Object Position:	A 1913+75.41	18.000	2364.835
Obstruction:	No Obstruction		
Sight Distance:	1251.575		
Eye Position:	A 1920+00.00	18.000	2339.710
Object Position:	A 1913+25.12	18.000	2367.028
Obstruction:	No Obstruction		
Sight Distance:	1313.716		
Eye Position:	A 1919+50.00	18.000	2341.689
Object Position:	A 1912+75.00	18.000	2369.213
Obstruction:	No Obstruction		
Sight Distance:	1758.405		
Eye Position:	A 1919+00.00	18.000	2343.669
Object Position:	A 1912+25.00	18.000	2371.393

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1800.041		
Eye Position:	A 1918+50.00	18.000	2345.646
Object Position:	A 1911+75.00	18.000	2373.573
Obstruction:	No Obstruction		
Sight Distance:	1833.159		
Eye Position:	A 1918+00.00	18.000	2347.823
Object Position:	A 1911+25.00	18.000	2375.753
Obstruction:	No Obstruction		
Sight Distance:	1803.644		
Eye Position:	A 1917+50.00	18.000	2350.003
Object Position:	A 1910+75.00	18.000	2377.933
Obstruction:	No Obstruction		
Sight Distance:	1771.784		
Eye Position:	A 1917+00.00	18.000	2352.183
Object Position:	A 1910+25.00	18.000	2380.113
Obstruction:	No Obstruction		
Sight Distance:	1740.111		
Eye Position:	A 1916+50.00	18.000	2354.363
Object Position:	A 1909+75.00	18.000	2382.293
Obstruction:	No Obstruction		
Sight Distance:	1708.136		
Eye Position:	A 1916+00.00	18.000	2356.543
Object Position:	A 1909+25.00	18.000	2384.473
Obstruction:	No Obstruction		
Sight Distance:	1675.125		
Eye Position:	A 1915+50.00	18.000	2358.723
Object Position:	A 1908+75.00	18.000	2386.653
Obstruction:	No Obstruction		
Sight Distance:	1642.201		
Eye Position:	A 1915+00.00	18.000	2360.903
Object Position:	A 1908+25.00	18.000	2388.833
Obstruction:	No Obstruction		
Sight Distance:	1609.032		
Eye Position:	A 1914+50.00	18.000	2363.083
Object Position:	A 1907+75.00	18.000	2391.013
Obstruction:	No Obstruction		
Sight Distance:	1575.238		

	Station	Offset	Elevation
Eye Position:	A 1914+00.00	18.000	2365.263
Object Position:	A 1907+25.00	18.000	2393.193
Obstruction:	No Obstruction		
Sight Distance:	1541.095		
Eye Position:	A 1913+50.00	18.000	2367.443
Object Position:	A 1906+75.00	18.000	2395.373
Obstruction:	No Obstruction		
Sight Distance:	1506.909		
Eye Position:	A 1913+00.00	18.000	2369.623
Object Position:	A 1906+25.00	18.000	2397.544
Obstruction:	No Obstruction		
Sight Distance:	1469.452		
Eye Position:	A 1912+50.00	18.000	2371.803
Object Position:	A 1905+75.00	18.000	2399.490
Obstruction:	No Obstruction		
Sight Distance:	1368.049		
Eye Position:	A 1912+00.00	18.000	2373.983
Object Position:	A 1905+25.00	18.000	2401.470
Obstruction:	No Obstruction		
Sight Distance:	1282.267		
Eye Position:	A 1911+50.00	18.000	2376.163
Object Position:	A 1904+75.00	18.000	2403.449
Obstruction:	No Obstruction		
Sight Distance:	1202.492		
Eye Position:	A 1911+00.00	18.000	2378.343
Object Position:	A 1904+25.00	18.000	2405.456
Obstruction:	No Obstruction		
Sight Distance:	1133.602		
Eye Position:	A 1910+50.00	18.000	2380.523
Object Position:	A 1903+74.98	18.000	2407.433
Obstruction:	No Obstruction		
Sight Distance:	1063.361		
Eye Position:	A 1910+00.00	18.000	2382.703
Object Position:	A 1903+24.80	18.000	2409.414
Obstruction:	No Obstruction		
Sight Distance:	1001.809		
Eye Position:	A 1909+50.00	18.000	2384.883

	Station	Offset	Elevation
	A 1902+74.62	18.000	2411.570
Obstruction:	No Obstruction		
Sight Distance:	979.525		
Eye Position:	A 1909+00.00	18.000	2387.063
Object Position:	A 1902+24.43	18.000	2413.762
Obstruction:	No Obstruction		
Sight Distance:	967.101		
Eye Position:	A 1908+50.00	18.000	2389.243
Object Position:	A 1901+74.23	18.000	2415.949
Obstruction:	No Obstruction		
Sight Distance:	955.827		
Eye Position:	A 1908+00.00	18.000	2391.423
Object Position:	A 1901+24.02	18.000	2418.138
Obstruction:	No Obstruction		
Sight Distance:	946.552		
Eye Position:	A 1907+50.00	18.000	2393.603
Object Position:	A 1900+73.79	18.000	2420.328
Obstruction:	No Obstruction		
Sight Distance:	938.714		
Eye Position:	A 1907+00.00	18.000	2395.783
Object Position:	A 1900+23.56	18.000	2422.518
Obstruction:	No Obstruction		
Sight Distance:	932.339		
Eye Position:	A 1906+50.00	18.000	2397.963
Object Position:	A 1899+73.33	18.000	2424.708
Obstruction:	No Obstruction		
Sight Distance:	927.107		
Eye Position:	A 1906+00.00	18.000	2400.033
Object Position:	A 1899+23.08	18.000	2426.901
Obstruction:	No Obstruction		
Sight Distance:	927.992		
Eye Position:	A 1905+50.00	18.000	2402.006
Object Position:	A 1898+72.84	18.000	2429.092
Obstruction:	No Obstruction		
Sight Distance:	933.801		
Eye Position:	A 1905+00.00	18.000	2403.986
Object Position:	A 1898+22.61	18.000	2431.279
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	940.032		
Eye Position:	A 1904+50.00	18.000	2405.966
Object Position:	A 1897+72.39	18.000	2433.469
Obstruction:	No Obstruction		
Sight Distance:	947.956		
Eye Position:	A 1904+00.00	18.000	2407.946
Object Position:	A 1897+22.18	18.000	2435.658
Obstruction:	No Obstruction		
Sight Distance:	957.451		
Eye Position:	A 1903+50.00	18.000	2409.926
Object Position:	A 1896+72.11	18.000	2437.843
Obstruction:	No Obstruction		
Sight Distance:	968.487		
Eye Position:	A 1903+00.00	18.000	2411.964
Object Position:	A 1896+22.11	18.000	2440.023
Obstruction:	No Obstruction		
Sight Distance:	975.439		
Eye Position:	A 1902+50.00	18.000	2414.143
Object Position:	A 1895+72.11	18.000	2442.199
Obstruction:	No Obstruction		
Sight Distance:	973.168		
Eye Position:	A 1902+00.00	18.000	2416.324
Object Position:	A 1895+22.11	18.000	2444.381
Obstruction:	No Obstruction		
Sight Distance:	970.664		
Eye Position:	A 1901+50.00	18.000	2418.504
Object Position:	A 1894+72.11	18.000	2446.561
Obstruction:	No Obstruction		
Sight Distance:	965.404		
Eye Position:	A 1901+00.00	18.000	2420.684
Object Position:	A 1894+22.11	18.000	2448.739
Obstruction:	No Obstruction		
Sight Distance:	958.985		
Eye Position:	A 1900+50.00	18.000	2422.864
Object Position:	A 1893+72.11	18.000	2450.919
Obstruction:	No Obstruction		
Sight Distance:	951.543		

	Station	Offset	Elevation
	A 1900+00.00	18.000	2425.044
Object Position:	A 1893+22.11	18.000	2453.103
Obstruction:	No Obstruction		
Sight Distance:	943.069		
Eye Position:	A 1899+50.00	18.000	2427.224
Object Position:	A 1892+72.11	18.000	2455.299
Obstruction:	No Obstruction		
Sight Distance:	934.826		
Eye Position:	A 1899+00.00	18.000	2429.404
Object Position:	A 1892+22.11	18.000	2457.508
Obstruction:	No Obstruction		
Sight Distance:	927.266		
Eye Position:	A 1898+50.00	18.000	2431.584
Object Position:	A 1891+72.11	18.000	2459.733
Obstruction:	No Obstruction		
Sight Distance:	920.965		
Eye Position:	A 1898+00.00	18.000	2433.764
Object Position:	A 1891+22.11	18.000	2461.972
Obstruction:	No Obstruction		
Sight Distance:	915.304		
Eye Position:	A 1897+50.00	18.000	2435.944
Object Position:	A 1890+72.11	18.000	2464.228
Obstruction:	No Obstruction		
Sight Distance:	910.493		
Eye Position:	A 1897+00.00	18.000	2438.124
Object Position:	A 1890+22.11	18.000	2466.504
Obstruction:	No Obstruction		
Sight Distance:	906.965		
Eye Position:	A 1896+50.00	18.000	2440.304
Object Position:	A 1889+72.11	18.000	2468.793
Obstruction:	No Obstruction		
Sight Distance:	903.438		
Eye Position:	A 1896+00.00	18.000	2442.484
Object Position:	A 1889+22.11	18.000	2471.098
Obstruction:	No Obstruction		
Sight Distance:	900.422		
Eye Position:	A 1895+50.00	18.000	2444.663
Object Position:	A 1888+72.11	18.000	2473.416

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	897.763		
Eye Position:	A 1895+00.00	18.000	2446.844
Object Position:	A 1888+22.11	18.000	2475.756
Obstruction:	No Obstruction		
Sight Distance:	896.230		
Eye Position:	A 1894+50.00	18.000	2449.024
Object Position:	A 1887+72.11	18.000	2478.103
Obstruction:	No Obstruction		
Sight Distance:	895.453		
Eye Position:	A 1894+00.00	18.000	2451.204
Object Position:	A 1887+22.11	18.000	2480.472
Obstruction:	No Obstruction		
Sight Distance:	896.447		
Eye Position:	A 1893+50.00	18.000	2453.384
Object Position:	A 1886+72.11	18.000	2482.857
Obstruction:	No Obstruction		
Sight Distance:	897.638		
Eye Position:	A 1893+00.00	18.000	2455.569
Object Position:	A 1886+22.11	18.000	2485.258
Obstruction:	No Obstruction		
Sight Distance:	902.491		
Eye Position:	A 1892+50.00	18.000	2457.769
Object Position:	A 1885+72.11	18.000	2487.788
Obstruction:	No Obstruction		
Sight Distance:	935.622		
Eye Position:	A 1892+00.00	18.000	2459.985
Object Position:	A 1885+22.12	18.000	2490.392
Obstruction:	No Obstruction		
Sight Distance:	996.175		
Eye Position:	A 1891+50.00	18.000	2462.217
Object Position:	A 1884+72.31	18.000	2493.062
Obstruction:	No Obstruction		
Sight Distance:	1099.233		
Eye Position:	A 1891+00.00	18.000	2464.465
Object Position:	A 1884+22.53	18.000	2495.716
Obstruction:	No Obstruction		
Sight Distance:	1224.212		

	Station	Offset	Elevation
Eye Position:	A 1890+50.00	18.000	2466.728
Object Position:	A 1883+72.76	18.000	2498.384
Obstruction:	No Obstruction		
Sight Distance:	1406.304		
Eye Position:	A 1890+00.00	18.000	2469.010
Object Position:	A 1883+23.00	18.000	2501.065
Obstruction:	No Obstruction		
Sight Distance:	1684.817		
Eye Position:	A 1889+50.00	18.000	2471.305
Object Position:	A 1882+73.24	18.000	2503.703
Obstruction:	No Obstruction		
Sight Distance:	2042.081		
Eye Position:	A 1889+00.00	18.000	2473.617
Object Position:	A 1882+23.48	18.000	2506.191
Obstruction:	No Obstruction		
Sight Distance:	2155.687		
Eye Position:	A 1888+50.00	18.000	2475.945
Object Position:	A 1881+73.71	18.000	2508.680
Obstruction:	No Obstruction		
Sight Distance:	2213.916		
Eye Position:	A 1888+00.00	18.000	2478.289
Object Position:	A 1881+23.93	18.000	2511.169
Obstruction:	No Obstruction		
Sight Distance:	2409.552		
Eye Position:	A 1887+50.00	18.000	2480.649
Object Position:	A 1880+74.15	18.000	2513.658
Obstruction:	No Obstruction		
Sight Distance:	2545.769		
Eye Position:	A 1887+00.00	18.000	2483.025
Object Position:	A 1880+24.35	18.000	2516.147
Obstruction:	No Obstruction		
Sight Distance:	2732.301		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:57am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1891+00.00
Stop Station: A 1843+00.00
Interval: 50.000

Sight Distance: 668.000
Relaxed Distance: 668.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	A 1891+00.00	18.000	2464.465
Object Position:	A 1884+29.54	18.000	2495.332
Obstruction:	No Obstruction		
Sight Distance:	1189.474		
Eye Position:	A 1890+50.00	18.000	2466.728
Object Position:	A 1883+79.76	18.000	2497.998
Obstruction:	No Obstruction		
Sight Distance:	1359.828		
Eye Position:	A 1890+00.00	18.000	2469.010
Object Position:	A 1883+30.00	18.000	2500.678
Obstruction:	No Obstruction		
Sight Distance:	1618.571		
Eye Position:	A 1889+50.00	18.000	2471.305
Object Position:	A 1882+80.24	18.000	2503.346
Obstruction:	No Obstruction		
Sight Distance:	2005.325		
Eye Position:	A 1889+00.00	18.000	2473.617
Object Position:	A 1882+30.48	18.000	2505.841
Obstruction:	No Obstruction		
Sight Distance:	2151.128		
Eye Position:	A 1888+50.00	18.000	2475.945
Object Position:	A 1881+80.71	18.000	2508.330
Obstruction:	No Obstruction		
Sight Distance:	2206.680		

	Station	Offset	Elevation
Eye Position:	A 1888+00.00	18.000	2478.289
Object Position:	A 1881+30.93	18.000	2510.819
Obstruction:	No Obstruction		
Sight Distance:	2394.599		
Eye Position:	A 1887+50.00	18.000	2480.649
Object Position:	A 1880+81.15	18.000	2513.308
Obstruction:	No Obstruction		
Sight Distance:	2537.128		
Eye Position:	A 1887+00.00	18.000	2483.025
Object Position:	A 1880+31.35	18.000	2515.797
Obstruction:	No Obstruction		
Sight Distance:	2699.179		
Eye Position:	A 1886+50.00	18.000	2485.417
Object Position:	A 1879+81.54	18.000	2518.288
Obstruction:	No Obstruction		
Sight Distance:	2782.165		
Eye Position:	A 1886+00.00	18.000	2487.825
Object Position:	A 1879+31.73	18.000	2520.779
Obstruction:	No Obstruction		
Sight Distance:	2754.071		
Eye Position:	A 1885+50.00	18.000	2490.423
Object Position:	A 1878+81.91	18.000	2523.270
Obstruction:	No Obstruction		
Sight Distance:	2713.633		
Eye Position:	A 1885+00.00	18.000	2493.062
Object Position:	A 1878+32.00	18.000	2525.765
Obstruction:	No Obstruction		
Sight Distance:	2664.403		
Eye Position:	A 1884+50.00	18.000	2495.719
Object Position:	A 1877+82.00	18.000	2528.266
Obstruction:	No Obstruction		
Sight Distance:	2478.662		
Eye Position:	A 1884+00.00	18.000	2498.391
Object Position:	A 1877+32.00	18.000	2530.766
Obstruction:	No Obstruction		
Sight Distance:	2275.822		
Eye Position:	A 1883+50.00	18.000	2501.079
Object Position:	A 1876+82.00	18.000	2533.266

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	2147.154		
Eye Position:	A 1883+00.00	18.000	2503.778
Object Position:	A 1876+32.00	18.000	2535.765
Obstruction:	No Obstruction		
Sight Distance:	2033.102		
Eye Position:	A 1882+50.00	18.000	2506.365
Object Position:	A 1875+82.00	18.000	2538.265
Obstruction:	No Obstruction		
Sight Distance:	1969.645		
Eye Position:	A 1882+00.00	18.000	2508.866
Object Position:	A 1875+32.00	18.000	2540.766
Obstruction:	No Obstruction		
Sight Distance:	1942.246		
Eye Position:	A 1881+50.00	18.000	2511.366
Object Position:	A 1874+82.00	18.000	2543.266
Obstruction:	No Obstruction		
Sight Distance:	1913.652		
Eye Position:	A 1881+00.00	18.000	2513.865
Object Position:	A 1874+32.00	18.000	2545.766
Obstruction:	No Obstruction		
Sight Distance:	1883.992		
Eye Position:	A 1880+50.00	18.000	2516.365
Object Position:	A 1873+82.00	18.000	2548.265
Obstruction:	No Obstruction		
Sight Distance:	1854.634		
Eye Position:	A 1880+00.00	18.000	2518.865
Object Position:	A 1873+32.00	18.000	2550.765
Obstruction:	No Obstruction		
Sight Distance:	1826.219		
Eye Position:	A 1879+50.00	18.000	2521.365
Object Position:	A 1872+82.00	18.000	2553.265
Obstruction:	No Obstruction		
Sight Distance:	1797.188		
Eye Position:	A 1879+00.00	18.000	2523.865
Object Position:	A 1872+32.00	18.000	2555.765
Obstruction:	No Obstruction		
Sight Distance:	1771.261		

	Station	Offset	Elevation
Eye Position:	A 1878+50.00	18.000	2526.365
Object Position:	A 1871+82.00	18.000	2558.266
Obstruction:	No Obstruction		
Sight Distance:	1746.798		
Eye Position:	A 1878+00.00	18.000	2528.865
Object Position:	A 1871+32.00	18.000	2560.766
Obstruction:	No Obstruction		
Sight Distance:	1726.573		
Eye Position:	A 1877+50.00	18.000	2531.366
Object Position:	A 1870+82.00	18.000	2563.265
Obstruction:	No Obstruction		
Sight Distance:	1708.784		
Eye Position:	A 1877+00.00	18.000	2533.866
Object Position:	A 1870+32.00	18.000	2565.765
Obstruction:	No Obstruction		
Sight Distance:	1698.152		
Eye Position:	A 1876+50.00	18.000	2536.366
Object Position:	A 1869+82.00	18.000	2568.265
Obstruction:	No Obstruction		
Sight Distance:	1701.148		
Eye Position:	A 1876+00.00	18.000	2538.865
Object Position:	A 1869+32.00	18.000	2570.765
Obstruction:	No Obstruction		
Sight Distance:	1763.889		
Eye Position:	A 1875+50.00	18.000	2541.365
Object Position:	A 1868+82.00	18.000	2573.266
Obstruction:	No Obstruction		
Sight Distance:	1714.041		
Eye Position:	A 1875+00.00	18.000	2543.866
Object Position:	A 1868+32.00	18.000	2575.765
Obstruction:	No Obstruction		
Sight Distance:	1664.193		
Eye Position:	A 1874+50.00	18.000	2546.366
Object Position:	A 1867+82.00	18.000	2578.265
Obstruction:	No Obstruction		
Sight Distance:	1614.346		
Eye Position:	A 1874+00.00	18.000	2548.866

	Station	Offset	Elevation
	A 1867+32.00	18.000	2580.659
Obstruction:	No Obstruction		
Sight Distance:	1564.161		
Eye Position:	A 1873+50.00	18.000	2551.365
Object Position:	A 1866+82.00	18.000	2582.994
Obstruction:	No Obstruction		
Sight Distance:	1475.927		
Eye Position:	A 1873+00.00	18.000	2553.865
Object Position:	A 1866+32.00	18.000	2585.290
Obstruction:	No Obstruction		
Sight Distance:	1291.087		
Eye Position:	A 1872+50.00	18.000	2556.365
Object Position:	A 1865+82.00	18.000	2587.600
Obstruction:	No Obstruction		
Sight Distance:	1190.181		
Eye Position:	A 1872+00.00	18.000	2558.865
Object Position:	A 1865+32.00	18.000	2589.900
Obstruction:	No Obstruction		
Sight Distance:	1103.884		
Eye Position:	A 1871+50.00	18.000	2561.365
Object Position:	A 1864+81.90	18.000	2592.167
Obstruction:	No Obstruction		
Sight Distance:	1022.894		
Eye Position:	A 1871+00.00	18.000	2563.865
Object Position:	A 1864+31.68	18.000	2594.521
Obstruction:	No Obstruction		
Sight Distance:	976.038		
Eye Position:	A 1870+50.00	18.000	2566.365
Object Position:	A 1863+81.46	18.000	2597.034
Obstruction:	No Obstruction		
Sight Distance:	976.835		
Eye Position:	A 1870+00.00	18.000	2568.866
Object Position:	A 1863+31.23	18.000	2599.548
Obstruction:	No Obstruction		
Sight Distance:	995.295		
Eye Position:	A 1869+50.00	18.000	2571.366
Object Position:	A 1862+80.98	18.000	2602.061
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1058.870		
Eye Position:	A 1869+00.00	18.000	2573.865
Object Position:	A 1862+30.72	18.000	2604.571
Obstruction:	No Obstruction		
Sight Distance:	1155.081		
Eye Position:	A 1868+50.00	18.000	2576.365
Object Position:	A 1861+80.44	18.000	2607.071
Obstruction:	No Obstruction		
Sight Distance:	1136.658		
Eye Position:	A 1868+00.00	18.000	2578.865
Object Position:	A 1861+30.15	18.000	2609.527
Obstruction:	No Obstruction		
Sight Distance:	1122.189		
Eye Position:	A 1867+50.00	18.000	2581.356
Object Position:	A 1860+79.85	18.000	2611.916
Obstruction:	No Obstruction		
Sight Distance:	1110.356		
Eye Position:	A 1867+00.00	18.000	2583.648
Object Position:	A 1860+29.55	18.000	2614.240
Obstruction:	No Obstruction		
Sight Distance:	1101.192		
Eye Position:	A 1866+50.00	18.000	2585.955
Object Position:	A 1859+79.26	18.000	2616.499
Obstruction:	No Obstruction		
Sight Distance:	1094.407		
Eye Position:	A 1866+00.00	18.000	2588.255
Object Position:	A 1859+28.98	18.000	2618.693
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1865+50.00	18.000	2590.555
Object Position:	A 1858+78.72	18.000	2620.820
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1865+00.00	18.000	2592.848
Object Position:	A 1858+28.51	18.000	2622.879
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	A 1864+50.00	18.000	2595.149
Object Position:	A 1857+78.51	18.000	2624.870
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1864+00.00	18.000	2597.606
Object Position:	A 1857+28.51	18.000	2626.793
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1863+50.00	18.000	2600.106
Object Position:	A 1856+78.51	18.000	2628.659
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1863+00.00	18.000	2602.606
Object Position:	A 1856+28.51	18.000	2630.456
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1862+50.00	18.000	2605.106
Object Position:	A 1855+78.51	18.000	2632.187
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1862+00.00	18.000	2607.605
Object Position:	A 1855+28.51	18.000	2633.858
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1861+50.00	18.000	2610.068
Object Position:	A 1854+78.51	18.000	2635.459
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1861+00.00	18.000	2612.469
Object Position:	A 1854+28.51	18.000	2637.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1860+50.00	18.000	2614.805
Object Position:	A 1853+78.51	18.000	2638.481
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1860+00.00	18.000	2617.078
Object Position:	A 1853+28.51	18.000	2639.893

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1859+50.00	18.000	2619.286
Object Position:	A 1852+78.51	18.000	2641.243
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1859+00.00	18.000	2621.429
Object Position:	A 1852+28.51	18.000	2642.527
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1858+50.00	18.000	2623.510
Object Position:	A 1851+78.51	18.000	2643.748
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1858+00.00	18.000	2625.526
Object Position:	A 1851+28.51	18.000	2644.906
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1857+50.00	18.000	2627.478
Object Position:	A 1850+78.51	18.000	2646.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1857+00.00	18.000	2629.366
Object Position:	A 1850+28.51	18.000	2647.068
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1856+50.00	18.000	2631.192
Object Position:	A 1849+78.51	18.000	2648.249
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1856+00.00	18.000	2632.952
Object Position:	A 1849+28.71	18.000	2649.337
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1855+50.00	18.000	2634.648
Object Position:	A 1848+78.97	18.000	2650.265
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	A 1855+00.00	18.000	2636.282
Object Position:	A 1848+29.25	18.000	2651.034
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1854+50.00	18.000	2637.849
Object Position:	A 1847+79.55	18.000	2651.739
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1854+00.00	18.000	2639.354
Object Position:	A 1847+29.85	18.000	2652.382
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1853+50.00	18.000	2640.794
Object Position:	A 1846+80.14	18.000	2652.963
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1853+00.00	18.000	2642.171
Object Position:	A 1846+30.43	18.000	2653.480
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1852+50.00	18.000	2643.484
Object Position:	A 1845+80.70	18.000	2653.932
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1852+00.00	18.000	2644.733
Object Position:	A 1845+30.97	18.000	2654.324
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1851+50.00	18.000	2645.917
Object Position:	A 1844+81.21	18.000	2654.650
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1851+00.00	18.000	2647.038
Object Position:	A 1844+31.45	18.000	2654.915
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1850+50.00	18.000	2648.095

	Station	Offset	Elevation
	A 1843+81.67	18.000	2655.115
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1850+00.00	18.000	2649.252
Object Position:	A 1843+31.88	18.000	2655.251
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1849+50.00	18.000	2650.380
Object Position:	A 1842+82.00	18.000	2655.325
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1849+00.00	18.000	2651.421
Object Position:	A 1842+32.00	18.000	2655.335
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1848+50.00	18.000	2652.221
Object Position:	A 1841+82.00	18.000	2655.257
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1848+00.00	18.000	2652.958
Object Position:	A 1841+31.91	18.000	2654.941
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1847+50.00	18.000	2653.631
Object Position:	A 1840+81.71	18.000	2654.621
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1847+00.00	18.000	2654.240
Object Position:	A 1840+31.51	18.000	2654.373
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1846+50.00	18.000	2654.784
Object Position:	A 1839+81.29	18.000	2654.068
Obstruction:	No Obstruction		
Sight Distance:	1231.221		
Eye Position:	A 1846+00.00	18.000	2655.265
Object Position:	A 1839+31.06	18.000	2653.752
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1203.079		
Eye Position:	A 1845+50.00	18.000	2655.682
Object Position:	A 1838+80.82	18.000	2653.436
Obstruction:	No Obstruction		
Sight Distance:	1179.404		
Eye Position:	A 1845+00.00	18.000	2656.034
Object Position:	A 1838+30.57	18.000	2653.118
Obstruction:	No Obstruction		
Sight Distance:	1159.607		
Eye Position:	A 1844+50.00	18.000	2656.324
Object Position:	A 1837+80.30	18.000	2652.802
Obstruction:	No Obstruction		
Sight Distance:	1143.265		
Eye Position:	A 1844+00.00	18.000	2656.548
Object Position:	A 1837+30.03	18.000	2652.486
Obstruction:	No Obstruction		
Sight Distance:	1119.636		
Eye Position:	A 1843+50.00	18.000	2656.711
Object Position:	A 1836+79.75	18.000	2652.169
Obstruction:	No Obstruction		
Sight Distance:	1068.304		
Eye Position:	A 1843+00.00	18.000	2656.807
Object Position:	A 1836+29.48	18.000	2651.852
Obstruction:	No Obstruction		
Sight Distance:	1032.205		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:03am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1847+00.00
Stop Station: A 1815+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	A 1847+00.00	18.000	2654.240
Object Position:	A 1840+54.60	18.000	2654.495
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1846+50.00	18.000	2654.784
Object Position:	A 1840+04.39	18.000	2654.213
Obstruction:	No Obstruction		
Sight Distance:	1222.918		
Eye Position:	A 1846+00.00	18.000	2655.265
Object Position:	A 1839+54.17	18.000	2653.898
Obstruction:	No Obstruction		
Sight Distance:	1192.866		
Eye Position:	A 1845+50.00	18.000	2655.682
Object Position:	A 1839+03.94	18.000	2653.581
Obstruction:	No Obstruction		
Sight Distance:	1167.644		
Eye Position:	A 1845+00.00	18.000	2656.034
Object Position:	A 1838+53.69	18.000	2653.264
Obstruction:	No Obstruction		
Sight Distance:	1146.629		
Eye Position:	A 1844+50.00	18.000	2656.324
Object Position:	A 1838+03.43	18.000	2652.948
Obstruction:	No Obstruction		
Sight Distance:	1129.267		

	Station	Offset	Elevation
Eye Position:	A 1844+00.00	18.000	2656.548
Object Position:	A 1837+53.16	18.000	2652.631
Obstruction:	No Obstruction		
Sight Distance:	1115.187		
Eye Position:	A 1843+50.00	18.000	2656.711
Object Position:	A 1837+02.89	18.000	2652.314
Obstruction:	No Obstruction		
Sight Distance:	1055.465		
Eye Position:	A 1843+00.00	18.000	2656.807
Object Position:	A 1836+52.63	18.000	2651.998
Obstruction:	No Obstruction		
Sight Distance:	1012.652		
Eye Position:	A 1842+50.00	18.000	2656.839
Object Position:	A 1836+02.37	18.000	2651.681
Obstruction:	No Obstruction		
Sight Distance:	982.276		
Eye Position:	A 1842+00.00	18.000	2656.809
Object Position:	A 1835+52.13	18.000	2651.365
Obstruction:	No Obstruction		
Sight Distance:	961.070		
Eye Position:	A 1841+50.00	18.000	2656.553
Object Position:	A 1835+01.93	18.000	2651.048
Obstruction:	No Obstruction		
Sight Distance:	956.648		
Eye Position:	A 1841+00.00	18.000	2656.195
Object Position:	A 1834+51.93	18.000	2650.733
Obstruction:	No Obstruction		
Sight Distance:	959.330		
Eye Position:	A 1840+50.00	18.000	2655.973
Object Position:	A 1834+01.93	18.000	2650.418
Obstruction:	No Obstruction		
Sight Distance:	953.559		
Eye Position:	A 1840+00.00	18.000	2655.686
Object Position:	A 1833+51.93	18.000	2650.103
Obstruction:	No Obstruction		
Sight Distance:	951.924		
Eye Position:	A 1839+50.00	18.000	2655.371
Object Position:	A 1833+01.93	18.000	2649.788

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	951.886		
Eye Position:	A 1839+00.00	18.000	2655.056
Object Position:	A 1832+51.93	18.000	2649.473
Obstruction:	No Obstruction		
Sight Distance:	955.372		
Eye Position:	A 1838+50.00	18.000	2654.741
Object Position:	A 1832+01.93	18.000	2649.158
Obstruction:	No Obstruction		
Sight Distance:	1084.334		
Eye Position:	A 1838+00.00	18.000	2654.426
Object Position:	A 1831+51.93	18.000	2648.843
Obstruction:	No Obstruction		
Sight Distance:	1092.012		
Eye Position:	A 1837+50.00	18.000	2654.111
Object Position:	A 1831+01.93	18.000	2648.528
Obstruction:	No Obstruction		
Sight Distance:	1104.496		
Eye Position:	A 1837+00.00	18.000	2653.796
Object Position:	A 1830+51.93	18.000	2648.213
Obstruction:	No Obstruction		
Sight Distance:	1123.809		
Eye Position:	A 1836+50.00	18.000	2653.481
Object Position:	A 1830+01.93	18.000	2647.898
Obstruction:	No Obstruction		
Sight Distance:	1152.053		
Eye Position:	A 1836+00.00	18.000	2653.166
Object Position:	A 1829+51.93	18.000	2647.583
Obstruction:	No Obstruction		
Sight Distance:	1192.223		
Eye Position:	A 1835+50.00	18.000	2652.851
Object Position:	A 1829+01.93	18.000	2647.483
Obstruction:	No Obstruction		
Sight Distance:	1251.565		
Eye Position:	A 1835+00.00	18.000	2652.536
Object Position:	A 1828+52.15	18.000	2647.384
Obstruction:	No Obstruction		
Sight Distance:	1850.712		

	Station	Offset	Elevation
Eye Position:	A 1834+50.00	18.000	2652.221
Object Position:	A 1828+02.39	18.000	2647.283
Obstruction:	No Obstruction		
Sight Distance:	1737.330		
Eye Position:	A 1834+00.00	18.000	2651.906
Object Position:	A 1827+52.64	18.000	2647.193
Obstruction:	No Obstruction		
Sight Distance:	1629.950		
Eye Position:	A 1833+50.00	18.000	2651.591
Object Position:	A 1827+02.91	18.000	2647.094
Obstruction:	No Obstruction		
Sight Distance:	1528.728		
Eye Position:	A 1833+00.00	18.000	2651.276
Object Position:	A 1826+53.18	18.000	2646.781
Obstruction:	No Obstruction		
Sight Distance:	1433.540		
Eye Position:	A 1832+50.00	18.000	2650.961
Object Position:	A 1826+03.44	18.000	2646.467
Obstruction:	No Obstruction		
Sight Distance:	1345.190		
Eye Position:	A 1832+00.00	18.000	2650.646
Object Position:	A 1825+53.70	18.000	2646.154
Obstruction:	No Obstruction		
Sight Distance:	1263.567		
Eye Position:	A 1831+50.00	18.000	2650.331
Object Position:	A 1825+03.94	18.000	2645.841
Obstruction:	No Obstruction		
Sight Distance:	1189.022		
Eye Position:	A 1831+00.00	18.000	2650.016
Object Position:	A 1824+54.18	18.000	2645.527
Obstruction:	No Obstruction		
Sight Distance:	1121.172		
Eye Position:	A 1830+50.00	18.000	2649.701
Object Position:	A 1824+04.40	18.000	2645.213
Obstruction:	No Obstruction		
Sight Distance:	1058.923		
Eye Position:	A 1830+00.00	18.000	2649.386

	Station	Offset	Elevation
	A 1823+54.61	18.000	2645.070
Obstruction:	No Obstruction		
Sight Distance:	1001.876		
Eye Position:	A 1829+50.00	18.000	2649.075
Object Position:	A 1823+04.81	18.000	2644.927
Obstruction:	No Obstruction		
Sight Distance:	948.689		
Eye Position:	A 1829+00.00	18.000	2648.977
Object Position:	A 1822+55.13	18.000	2644.769
Obstruction:	No Obstruction		
Sight Distance:	898.828		
Eye Position:	A 1828+50.00	18.000	2648.883
Object Position:	A 1822+05.52	18.000	2644.533
Obstruction:	No Obstruction		
Sight Distance:	859.155		
Eye Position:	A 1828+00.00	18.000	2648.782
Object Position:	A 1821+55.89	18.000	2644.176
Obstruction:	No Obstruction		
Sight Distance:	829.001		
Eye Position:	A 1827+50.00	18.000	2648.684
Object Position:	A 1821+06.22	18.000	2643.666
Obstruction:	No Obstruction		
Sight Distance:	806.239		
Eye Position:	A 1827+00.00	18.000	2648.576
Object Position:	A 1820+56.50	18.000	2643.111
Obstruction:	No Obstruction		
Sight Distance:	789.058		
Eye Position:	A 1826+50.00	18.000	2648.261
Object Position:	A 1820+06.72	18.000	2642.516
Obstruction:	No Obstruction		
Sight Distance:	776.135		
Eye Position:	A 1826+00.00	18.000	2647.946
Object Position:	A 1819+56.89	18.000	2641.877
Obstruction:	No Obstruction		
Sight Distance:	766.049		
Eye Position:	A 1825+50.00	18.000	2647.631
Object Position:	A 1819+07.01	18.000	2641.194
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	758.689		
Eye Position:	A 1825+00.00	18.000	2647.316
Object Position:	A 1818+57.11	18.000	2640.470
Obstruction:	No Obstruction		
Sight Distance:	752.941		
Eye Position:	A 1824+50.00	18.000	2647.001
Object Position:	A 1818+07.21	18.000	2639.703
Obstruction:	No Obstruction		
Sight Distance:	748.742		
Eye Position:	A 1824+00.00	18.000	2646.686
Object Position:	A 1817+57.32	18.000	2638.894
Obstruction:	No Obstruction		
Sight Distance:	745.542		
Eye Position:	A 1823+50.00	18.000	2646.554
Object Position:	A 1817+07.49	18.000	2638.043
Obstruction:	No Obstruction		
Sight Distance:	743.560		
Eye Position:	A 1823+00.00	18.000	2646.419
Object Position:	A 1816+57.75	18.000	2637.154
Obstruction:	No Obstruction		
Sight Distance:	742.635		
Eye Position:	A 1822+50.00	18.000	2646.242
Object Position:	A 1816+07.96	18.000	2636.220
Obstruction:	No Obstruction		
Sight Distance:	742.357		
Eye Position:	A 1822+00.00	18.000	2646.015
Object Position:	A 1815+57.96	18.000	2635.240
Obstruction:	No Obstruction		
Sight Distance:	742.318		
Eye Position:	A 1821+50.00	18.000	2645.617
Object Position:	A 1815+07.96	18.000	2634.216
Obstruction:	No Obstruction		
Sight Distance:	742.303		
Eye Position:	A 1821+00.00	18.000	2645.098
Object Position:	A 1814+57.96	18.000	2633.153
Obstruction:	No Obstruction		
Sight Distance:	742.440		

	Station	Offset	Elevation
	A 1820+50.00	18.000	2644.535
Object Position:	A 1814+07.96	18.000	2632.044
Obstruction:	No Obstruction		
Sight Distance:	742.450		
Eye Position:	A 1820+00.00	18.000	2643.931
Object Position:	A 1813+57.96	18.000	2630.894
Obstruction:	No Obstruction		
Sight Distance:	742.360		
Eye Position:	A 1819+50.00	18.000	2643.285
Object Position:	A 1813+07.96	18.000	2629.701
Obstruction:	No Obstruction		
Sight Distance:	742.466		
Eye Position:	A 1819+00.00	18.000	2642.595
Object Position:	A 1812+57.96	18.000	2628.466
Obstruction:	No Obstruction		
Sight Distance:	742.611		
Eye Position:	A 1818+50.00	18.000	2641.863
Object Position:	A 1812+07.96	18.000	2627.188
Obstruction:	No Obstruction		
Sight Distance:	743.083		
Eye Position:	A 1818+00.00	18.000	2641.088
Object Position:	A 1811+57.96	18.000	2625.718
Obstruction:	No Obstruction		
Sight Distance:	745.813		
Eye Position:	A 1817+50.00	18.000	2640.272
Object Position:	A 1811+07.96	18.000	2624.141
Obstruction:	No Obstruction		
Sight Distance:	756.951		
Eye Position:	A 1817+00.00	18.000	2639.412
Object Position:	A 1810+57.65	18.000	2622.512
Obstruction:	No Obstruction		
Sight Distance:	776.240		
Eye Position:	A 1816+50.00	18.000	2638.511
Object Position:	A 1810+07.42	18.000	2620.833
Obstruction:	No Obstruction		
Sight Distance:	800.850		
Eye Position:	A 1816+00.00	18.000	2637.566
Object Position:	A 1809+57.28	18.000	2619.241

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	833.523		
Eye Position:	A 1815+50.00	18.000	2636.580
Object Position:	A 1809+07.18	18.000	2617.704
Obstruction:	No Obstruction		
Sight Distance:	877.903		
Eye Position:	A 1815+00.00	18.000	2635.550
Object Position:	A 1808+57.08	18.000	2616.128
Obstruction:	No Obstruction		
Sight Distance:	939.759		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:48am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1819+00.00
Stop Station: 1781+00.00
Interval: 50.000

Sight Distance: 685.000
Relaxed Distance: 685.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	A 1819+00.00	18.000	2642.595
Object Position:	A 1812+17.83	18.000	2627.444
Obstruction:	No Obstruction		
Sight Distance:	778.505		
Eye Position:	A 1818+50.00	18.000	2641.863
Object Position:	A 1811+67.83	18.000	2626.025
Obstruction:	No Obstruction		
Sight Distance:	779.849		
Eye Position:	A 1818+00.00	18.000	2641.088
Object Position:	A 1811+17.83	18.000	2624.457
Obstruction:	No Obstruction		
Sight Distance:	787.747		
Eye Position:	A 1817+50.00	18.000	2640.272
Object Position:	A 1810+67.58	18.000	2622.844
Obstruction:	No Obstruction		
Sight Distance:	803.893		
Eye Position:	A 1817+00.00	18.000	2639.412
Object Position:	A 1810+17.35	18.000	2621.174
Obstruction:	No Obstruction		
Sight Distance:	824.200		
Eye Position:	A 1816+50.00	18.000	2638.511
Object Position:	A 1809+67.21	18.000	2619.540
Obstruction:	No Obstruction		
Sight Distance:	850.478		

	Station	Offset	Elevation
Eye Position:	A 1816+00.00	18.000	2637.566
Object Position:	A 1809+17.13	18.000	2618.014
Obstruction:	No Obstruction		
Sight Distance:	885.380		
Eye Position:	A 1815+50.00	18.000	2636.580
Object Position:	A 1808+67.08	18.000	2616.445
Obstruction:	No Obstruction		
Sight Distance:	932.415		
Eye Position:	A 1815+00.00	18.000	2635.550
Object Position:	A 1808+17.02	18.000	2614.854
Obstruction:	No Obstruction		
Sight Distance:	998.045		
Eye Position:	A 1814+50.00	18.000	2634.478
Object Position:	A 1807+66.94	18.000	2613.261
Obstruction:	No Obstruction		
Sight Distance:	1093.656		
Eye Position:	A 1814+00.00	18.000	2633.363
Object Position:	A 1807+16.82	18.000	2611.667
Obstruction:	No Obstruction		
Sight Distance:	1240.597		
Eye Position:	A 1813+50.00	18.000	2632.206
Object Position:	A 1806+66.64	18.000	2610.072
Obstruction:	No Obstruction		
Sight Distance:	1482.911		
Eye Position:	A 1813+00.00	18.000	2631.007
Object Position:	A 1806+16.40	18.000	2608.474
Obstruction:	No Obstruction		
Sight Distance:	1923.255		
Eye Position:	A 1812+50.00	18.000	2629.765
Object Position:	A 1805+66.11	18.000	2606.875
Obstruction:	No Obstruction		
Sight Distance:	1820.238		
Eye Position:	A 1812+00.00	18.000	2628.481
Object Position:	A 1805+15.76	18.000	2605.274
Obstruction:	No Obstruction		
Sight Distance:	1618.738		
Eye Position:	A 1811+50.00	18.000	2626.980
Object Position:	A 1804+65.38	18.000	2603.671

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1577.120		
Eye Position:	A 1811+00.00	18.000	2625.397
Object Position:	A 1804+15.00	18.000	2602.070
Obstruction:	No Obstruction		
Sight Distance:	1572.115		
Eye Position:	A 1810+50.00	18.000	2623.770
Object Position:	A 1803+65.00	18.000	2600.479
Obstruction:	No Obstruction		
Sight Distance:	1593.468		
Eye Position:	A 1810+00.00	18.000	2622.094
Object Position:	A 1803+15.00	18.000	2598.890
Obstruction:	No Obstruction		
Sight Distance:	1649.174		
Eye Position:	A 1809+50.00	18.000	2620.521
Object Position:	A 1802+65.00	18.000	2597.300
Obstruction:	No Obstruction		
Sight Distance:	1637.688		
Eye Position:	A 1809+00.00	18.000	2618.982
Object Position:	A 1802+15.00	18.000	2595.710
Obstruction:	No Obstruction		
Sight Distance:	1605.142		
Eye Position:	A 1808+50.00	18.000	2617.403
Object Position:	A 1801+65.00	18.000	2594.120
Obstruction:	No Obstruction		
Sight Distance:	1598.753		
Eye Position:	A 1808+00.00	18.000	2615.813
Object Position:	A 1801+15.00	18.000	2592.529
Obstruction:	No Obstruction		
Sight Distance:	1598.402		
Eye Position:	A 1807+50.00	18.000	2614.223
Object Position:	A 1800+65.00	18.000	2590.940
Obstruction:	No Obstruction		
Sight Distance:	1593.261		
Eye Position:	A 1807+00.00	18.000	2612.633
Object Position:	A 1800+15.00	18.000	2589.349
Obstruction:	No Obstruction		
Sight Distance:	1576.230		

	Station	Offset	Elevation
Eye Position:	A 1806+50.00	18.000	2611.042
Object Position:	A 1799+65.00	18.000	2587.760
Obstruction:	No Obstruction		
Sight Distance:	1553.920		
Eye Position:	A 1806+00.00	18.000	2609.453
Object Position:	A 1799+15.00	18.000	2586.170
Obstruction:	No Obstruction		
Sight Distance:	1527.452		
Eye Position:	A 1805+50.00	18.000	2607.863
Object Position:	A 1798+65.00	18.000	2584.580
Obstruction:	No Obstruction		
Sight Distance:	1498.674		
Eye Position:	A 1805+00.00	18.000	2606.272
Object Position:	A 1798+15.00	18.000	2582.990
Obstruction:	No Obstruction		
Sight Distance:	1468.175		
Eye Position:	A 1804+50.00	18.000	2604.683
Object Position:	A 1797+65.00	18.000	2581.399
Obstruction:	No Obstruction		
Sight Distance:	1436.022		
Eye Position:	A 1804+00.00	18.000	2603.093
Object Position:	A 1797+15.00	18.000	2579.810
Obstruction:	No Obstruction		
Sight Distance:	1402.906		
Eye Position:	A 1803+50.00	18.000	2601.503
Object Position:	A 1796+65.00	18.000	2578.220
Obstruction:	No Obstruction		
Sight Distance:	1368.780		
Eye Position:	A 1803+00.00	18.000	2599.913
Object Position:	A 1796+15.00	18.000	2576.630
Obstruction:	No Obstruction		
Sight Distance:	1333.990		
Eye Position:	A 1802+50.00	18.000	2598.323
Object Position:	A 1795+65.00	18.000	2575.040
Obstruction:	No Obstruction		
Sight Distance:	1298.293		
Eye Position:	A 1802+00.00	18.000	2596.733

	Station	Offset	Elevation
	A 1795+15.00	18.000	2573.450
Obstruction:	No Obstruction		
Sight Distance:	1262.083		
Eye Position:	A 1801+50.00	18.000	2595.143
Object Position:	A 1794+65.00	18.000	2571.859
Obstruction:	No Obstruction		
Sight Distance:	1225.339		
Eye Position:	A 1801+00.00	18.000	2593.553
Object Position:	A 1794+15.00	18.000	2570.270
Obstruction:	No Obstruction		
Sight Distance:	1188.150		
Eye Position:	A 1800+50.00	18.000	2591.963
Object Position:	A 1793+65.00	18.000	2568.679
Obstruction:	No Obstruction		
Sight Distance:	1150.333		
Eye Position:	A 1800+00.00	18.000	2590.372
Object Position:	A 1793+15.00	18.000	2567.089
Obstruction:	No Obstruction		
Sight Distance:	1112.484		
Eye Position:	A 1799+50.00	18.000	2588.783
Object Position:	1792+65.00	18.000	2565.499
Obstruction:	No Obstruction		
Sight Distance:	1073.997		
Eye Position:	A 1799+00.00	18.000	2587.193
Object Position:	1792+15.00	18.000	2563.909
Obstruction:	No Obstruction		
Sight Distance:	1035.323		
Eye Position:	A 1798+50.00	18.000	2585.603
Object Position:	1791+65.00	18.000	2562.325
Obstruction:	No Obstruction		
Sight Distance:	997.177		
Eye Position:	A 1798+00.00	18.000	2584.013
Object Position:	1791+15.00	18.000	2560.791
Obstruction:	No Obstruction		
Sight Distance:	965.363		
Eye Position:	A 1797+50.00	18.000	2582.422
Object Position:	1790+65.00	18.000	2559.316
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	939.827		
Eye Position:	A 1797+00.00	18.000	2580.833
Object Position:	1790+15.00	18.000	2557.900
Obstruction:	No Obstruction		
Sight Distance:	919.253		
Eye Position:	A 1796+50.00	18.000	2579.243
Object Position:	1789+65.00	18.000	2556.544
Obstruction:	No Obstruction		
Sight Distance:	902.687		
Eye Position:	A 1796+00.00	18.000	2577.653
Object Position:	1789+15.00	18.000	2555.248
Obstruction:	No Obstruction		
Sight Distance:	889.464		
Eye Position:	A 1795+50.00	18.000	2576.063
Object Position:	1788+65.00	18.000	2554.010
Obstruction:	No Obstruction		
Sight Distance:	878.660		
Eye Position:	A 1795+00.00	18.000	2574.473
Object Position:	1788+15.00	18.000	2552.832
Obstruction:	No Obstruction		
Sight Distance:	870.097		
Eye Position:	A 1794+50.00	18.000	2572.883
Object Position:	1787+65.00	18.000	2551.712
Obstruction:	No Obstruction		
Sight Distance:	863.162		
Eye Position:	A 1794+00.00	18.000	2571.293
Object Position:	1787+15.00	18.000	2550.652
Obstruction:	No Obstruction		
Sight Distance:	857.801		
Eye Position:	A 1793+50.00	18.000	2569.703
Object Position:	1786+65.00	18.000	2549.652
Obstruction:	No Obstruction		
Sight Distance:	853.795		
Eye Position:	A 1793+00.00	18.000	2568.112
Object Position:	1786+15.00	18.000	2548.710
Obstruction:	No Obstruction		
Sight Distance:	850.928		

	Station	Offset	Elevation
	1792+50.00	18.000	2566.522
Object Position:	1785+65.00	18.000	2547.828
Obstruction:	No Obstruction		
Sight Distance:	849.131		
Eye Position:	1792+00.00	18.000	2564.932
Object Position:	1785+15.00	18.000	2547.005
Obstruction:	No Obstruction		
Sight Distance:	848.387		
Eye Position:	1791+50.00	18.000	2563.359
Object Position:	1784+65.00	18.000	2546.241
Obstruction:	No Obstruction		
Sight Distance:	848.345		
Eye Position:	1791+00.00	18.000	2561.842
Object Position:	1784+15.00	18.000	2545.537
Obstruction:	No Obstruction		
Sight Distance:	840.151		
Eye Position:	1790+50.00	18.000	2560.385
Object Position:	1783+65.00	18.000	2544.892
Obstruction:	No Obstruction		
Sight Distance:	828.504		
Eye Position:	1790+00.00	18.000	2558.987
Object Position:	1783+15.00	18.000	2544.305
Obstruction:	No Obstruction		
Sight Distance:	816.298		
Eye Position:	1789+50.00	18.000	2557.649
Object Position:	1782+65.00	18.000	2543.865
Obstruction:	No Obstruction		
Sight Distance:	810.249		
Eye Position:	1789+00.00	18.000	2556.370
Object Position:	1782+15.00	18.000	2543.615
Obstruction:	No Obstruction		
Sight Distance:	808.216		
Eye Position:	1788+50.00	18.000	2555.150
Object Position:	1781+65.00	18.000	2543.423
Obstruction:	No Obstruction		
Sight Distance:	810.492		
Eye Position:	1788+00.00	18.000	2553.989
Object Position:	1781+15.36	18.000	2543.292

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	815.240		
Eye Position:	1787+50.00	18.000	2552.888
Object Position:	1780+65.72	18.000	2543.173
Obstruction:	No Obstruction		
Sight Distance:	817.110		
Eye Position:	1787+00.00	18.000	2551.845
Object Position:	1780+16.04	18.000	2542.942
Obstruction:	No Obstruction		
Sight Distance:	809.117		
Eye Position:	1786+50.00	18.000	2550.862
Object Position:	1779+66.31	18.000	2542.768
Obstruction:	No Obstruction		
Sight Distance:	802.527		
Eye Position:	1786+00.00	18.000	2549.939
Object Position:	1779+16.54	18.000	2542.656
Obstruction:	No Obstruction		
Sight Distance:	797.049		
Eye Position:	1785+50.00	18.000	2549.074
Object Position:	1778+66.72	18.000	2542.609
Obstruction:	No Obstruction		
Sight Distance:	792.628		
Eye Position:	1785+00.00	18.000	2548.269
Object Position:	1778+16.86	18.000	2542.609
Obstruction:	No Obstruction		
Sight Distance:	788.961		
Eye Position:	1784+50.00	18.000	2547.523
Object Position:	1777+66.96	18.000	2542.684
Obstruction:	No Obstruction		
Sight Distance:	786.239		
Eye Position:	1784+00.00	18.000	2546.837
Object Position:	1777+17.03	18.000	2542.798
Obstruction:	No Obstruction		
Sight Distance:	783.531		
Eye Position:	1783+50.00	18.000	2546.209
Object Position:	1776+67.11	18.000	2542.988
Obstruction:	No Obstruction		
Sight Distance:	782.468		

	Station	Offset	Elevation
Eye Position:	1783+00.00	18.000	2545.641
Object Position:	1776+17.20	18.000	2543.226
Obstruction:	No Obstruction		
Sight Distance:	781.155		
Eye Position:	1782+50.00	18.000	2545.286
Object Position:	1775+67.35	18.000	2543.522
Obstruction:	No Obstruction		
Sight Distance:	779.334		
Eye Position:	1782+00.00	18.000	2545.051
Object Position:	1775+17.57	18.000	2543.877
Obstruction:	No Obstruction		
Sight Distance:	779.508		
Eye Position:	1781+50.00	18.000	2544.876
Object Position:	1774+67.81	18.000	2544.284
Obstruction:	No Obstruction		
Sight Distance:	781.938		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:06am

Surface(s): LW 3

Alignment Name: LW
Start Station: 1785+00.00
Stop Station: 1740+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1785+00.00	18.000	2548.269
Object Position:	1778+56.77	18.000	2542.602
Obstruction:	No Obstruction		
Sight Distance:	754.943		
Eye Position:	1784+50.00	18.000	2547.523
Object Position:	1778+06.92	18.000	2542.616
Obstruction:	No Obstruction		
Sight Distance:	751.358		
Eye Position:	1784+00.00	18.000	2546.837
Object Position:	1777+57.03	18.000	2542.697
Obstruction:	No Obstruction		
Sight Distance:	748.721		
Eye Position:	1783+50.00	18.000	2546.209
Object Position:	1777+07.14	18.000	2542.828
Obstruction:	No Obstruction		
Sight Distance:	746.494		
Eye Position:	1783+00.00	18.000	2545.641
Object Position:	1776+57.26	18.000	2543.024
Obstruction:	No Obstruction		
Sight Distance:	745.140		
Eye Position:	1782+50.00	18.000	2545.287
Object Position:	1776+07.42	18.000	2543.273
Obstruction:	No Obstruction		
Sight Distance:	742.996		

	Station	Offset	Elevation
Eye Position:	1782+00.00	18.000	2545.051
Object Position:	1775+57.66	18.000	2543.584
Obstruction:	No Obstruction		
Sight Distance:	741.672		
Eye Position:	1781+50.00	18.000	2544.876
Object Position:	1775+07.90	18.000	2543.953
Obstruction:	No Obstruction		
Sight Distance:	742.766		
Eye Position:	1781+00.00	18.000	2544.759
Object Position:	1774+57.90	18.000	2544.369
Obstruction:	No Obstruction		
Sight Distance:	745.958		
Eye Position:	1780+50.00	18.000	2544.590
Object Position:	1774+07.90	18.000	2544.794
Obstruction:	No Obstruction		
Sight Distance:	747.733		
Eye Position:	1780+00.00	18.000	2544.377
Object Position:	1773+57.90	18.000	2545.223
Obstruction:	No Obstruction		
Sight Distance:	748.269		
Eye Position:	1779+50.00	18.000	2544.224
Object Position:	1773+07.90	18.000	2545.648
Obstruction:	No Obstruction		
Sight Distance:	748.565		
Eye Position:	1779+00.00	18.000	2544.130
Object Position:	1772+57.90	18.000	2546.070
Obstruction:	No Obstruction		
Sight Distance:	748.865		
Eye Position:	1778+50.00	18.000	2544.095
Object Position:	1772+07.90	18.000	2546.494
Obstruction:	No Obstruction		
Sight Distance:	749.015		
Eye Position:	1778+00.00	18.000	2544.120
Object Position:	1771+57.90	18.000	2546.919
Obstruction:	No Obstruction		
Sight Distance:	749.003		
Eye Position:	1777+50.00	18.000	2544.204
Object Position:	1771+07.90	18.000	2547.344

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	749.422		
Eye Position:	1777+00.00	18.000	2544.347
Object Position:	1770+57.90	18.000	2547.773
Obstruction:	No Obstruction		
Sight Distance:	749.356		
Eye Position:	1776+50.00	18.000	2544.549
Object Position:	1770+07.90	18.000	2548.194
Obstruction:	No Obstruction		
Sight Distance:	750.297		
Eye Position:	1776+00.00	18.000	2544.811
Object Position:	1769+57.90	18.000	2548.613
Obstruction:	No Obstruction		
Sight Distance:	750.377		
Eye Position:	1775+50.00	18.000	2545.132
Object Position:	1769+07.90	18.000	2548.895
Obstruction:	No Obstruction		
Sight Distance:	752.669		
Eye Position:	1775+00.00	18.000	2545.512
Object Position:	1768+57.90	18.000	2549.007
Obstruction:	No Obstruction		
Sight Distance:	763.201		
Eye Position:	1774+50.00	18.000	2545.935
Object Position:	1768+07.65	18.000	2549.104
Obstruction:	No Obstruction		
Sight Distance:	783.064		
Eye Position:	1774+00.00	18.000	2546.360
Object Position:	1767+57.42	18.000	2549.175
Obstruction:	No Obstruction		
Sight Distance:	808.207		
Eye Position:	1773+50.00	18.000	2546.785
Object Position:	1767+07.25	18.000	2549.276
Obstruction:	No Obstruction		
Sight Distance:	841.908		
Eye Position:	1773+00.00	18.000	2547.210
Object Position:	1766+57.13	18.000	2549.481
Obstruction:	No Obstruction		
Sight Distance:	888.093		

	Station	Offset	Elevation
Eye Position:	1772+50.00	18.000	2547.635
Object Position:	1766+07.03	18.000	2549.649
Obstruction:	No Obstruction		
Sight Distance:	953.027		
Eye Position:	1772+00.00	18.000	2548.060
Object Position:	1765+56.91	18.000	2549.781
Obstruction:	No Obstruction		
Sight Distance:	1048.923		
Eye Position:	1771+50.00	18.000	2548.485
Object Position:	1765+06.76	18.000	2549.879
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1771+00.00	18.000	2548.910
Object Position:	1764+56.58	18.000	2549.941
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1770+50.00	18.000	2549.335
Object Position:	1764+06.35	18.000	2549.965
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1770+00.00	18.000	2549.760
Object Position:	1763+56.08	18.000	2549.954
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1769+50.00	18.000	2550.174
Object Position:	1763+05.76	18.000	2549.907
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1769+00.00	18.000	2550.406
Object Position:	1762+55.41	18.000	2549.825
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1768+50.00	18.000	2550.535
Object Position:	1762+05.04	18.000	2549.703
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1768+00.00	18.000	2550.628

	Station	Offset	Elevation
	1761+55.00	18.000	2549.548
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1767+50.00	18.000	2550.685
Object Position:	1761+05.00	18.000	2549.357
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1767+00.00	18.000	2550.809
Object Position:	1760+55.00	18.000	2549.140
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1766+50.00	18.000	2551.008
Object Position:	1760+05.00	18.000	2548.920
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1766+00.00	18.000	2551.172
Object Position:	1759+55.00	18.000	2548.700
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1765+50.00	18.000	2551.299
Object Position:	1759+05.00	18.000	2548.480
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1765+00.00	18.000	2551.391
Object Position:	1758+55.00	18.000	2548.260
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1764+50.00	18.000	2551.448
Object Position:	1758+05.00	18.000	2548.040
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1764+00.00	18.000	2551.468
Object Position:	1757+55.00	18.000	2547.820
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1763+50.00	18.000	2551.452
Object Position:	1757+05.00	18.000	2547.600
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1763+00.00	18.000	2551.401
Object Position:	1756+55.00	18.000	2547.380
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1762+50.00	18.000	2551.314
Object Position:	1756+05.00	18.000	2547.160
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1762+00.00	18.000	2551.191
Object Position:	1755+55.00	18.000	2546.940
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1761+50.00	18.000	2551.032
Object Position:	1755+05.00	18.000	2546.720
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1761+00.00	18.000	2550.837
Object Position:	1754+55.00	18.000	2546.500
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1760+50.00	18.000	2550.618
Object Position:	1754+05.00	18.000	2546.280
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1760+00.00	18.000	2550.398
Object Position:	1753+55.00	18.000	2546.060
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+50.00	18.000	2550.178
Object Position:	1753+05.00	18.000	2545.840
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+00.00	18.000	2549.958
Object Position:	1752+55.00	18.000	2545.620
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1758+50.00	18.000	2549.738
Object Position:	1752+05.00	18.000	2545.400
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1758+00.00	18.000	2549.518
Object Position:	1751+55.00	18.000	2545.180
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+50.00	18.000	2549.298
Object Position:	1751+05.00	18.000	2544.959
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+00.00	18.000	2549.078
Object Position:	1750+55.00	18.000	2544.710
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+50.00	18.000	2548.858
Object Position:	1750+05.00	18.000	2544.418
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+00.00	18.000	2548.638
Object Position:	1749+55.00	18.000	2544.083
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+50.00	18.000	2548.418
Object Position:	1749+05.00	18.000	2543.707
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+00.00	18.000	2548.198
Object Position:	1748+55.00	18.000	2543.288
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+50.00	18.000	2547.978
Object Position:	1748+05.00	18.000	2542.827
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+00.00	18.000	2547.758
Object Position:	1747+55.00	18.000	2542.323

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+50.00	18.000	2547.538
Object Position:	1747+05.00	18.000	2541.777
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+00.00	18.000	2547.318
Object Position:	1746+55.00	18.000	2541.189
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+50.00	18.000	2547.098
Object Position:	1746+05.00	18.000	2540.558
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+00.00	18.000	2546.878
Object Position:	1745+55.00	18.000	2539.885
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+50.00	18.000	2546.658
Object Position:	1745+05.00	18.000	2539.170
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+00.00	18.000	2546.436
Object Position:	1744+55.00	18.000	2538.411
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+50.00	18.000	2546.182
Object Position:	1744+05.00	18.000	2537.611
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+00.00	18.000	2545.886
Object Position:	1743+55.00	18.000	2536.768
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+50.00	18.000	2545.548
Object Position:	1743+05.00	18.000	2535.884
Obstruction:	No Obstruction		
Sight Distance:	1162.054		

	Station	Offset	Elevation
Eye Position:	1749+00.00	18.000	2545.167
Object Position:	1742+55.00	18.000	2534.956
Obstruction:	No Obstruction		
Sight Distance:	1111.628		
Eye Position:	1748+50.00	18.000	2544.744
Object Position:	1742+05.00	18.000	2533.986
Obstruction:	No Obstruction		
Sight Distance:	1061.234		
Eye Position:	1748+00.00	18.000	2544.279
Object Position:	1741+55.00	18.000	2533.088
Obstruction:	No Obstruction		
Sight Distance:	1011.004		
Eye Position:	1747+50.00	18.000	2543.771
Object Position:	1741+05.00	18.000	2532.245
Obstruction:	No Obstruction		
Sight Distance:	960.902		
Eye Position:	1747+00.00	18.000	2543.220
Object Position:	1740+55.00	18.000	2531.361
Obstruction:	No Obstruction		
Sight Distance:	910.808		
Eye Position:	1746+50.00	18.000	2542.628
Object Position:	1740+05.24	18.000	2530.425
Obstruction:	No Obstruction		
Sight Distance:	862.202		
Eye Position:	1746+00.00	18.000	2541.993
Object Position:	1739+55.75	18.000	2529.467
Obstruction:	No Obstruction		
Sight Distance:	824.599		
Eye Position:	1745+50.00	18.000	2541.315
Object Position:	1739+06.20	18.000	2528.388
Obstruction:	No Obstruction		
Sight Distance:	797.077		
Eye Position:	1745+00.00	18.000	2540.596
Object Position:	1738+56.58	18.000	2527.132
Obstruction:	No Obstruction		
Sight Distance:	776.922		
Eye Position:	1744+50.00	18.000	2539.833

	Station	Offset	Elevation
	1738+06.88	18.000	2525.833
Obstruction:	No Obstruction		
Sight Distance:	762.071		
Eye Position:	1744+00.00	18.000	2539.029
Object Position:	1737+57.08	18.000	2524.489
Obstruction:	No Obstruction		
Sight Distance:	750.999		
Eye Position:	1743+50.00	18.000	2538.182
Object Position:	1737+07.20	18.000	2523.100
Obstruction:	No Obstruction		
Sight Distance:	742.691		
Eye Position:	1743+00.00	18.000	2537.293
Object Position:	1736+57.25	18.000	2521.668
Obstruction:	No Obstruction		
Sight Distance:	736.448		
Eye Position:	1742+50.00	18.000	2536.361
Object Position:	1736+07.26	18.000	2520.191
Obstruction:	No Obstruction		
Sight Distance:	730.654		
Eye Position:	1742+00.00	18.000	2535.387
Object Position:	1735+57.26	18.000	2518.673
Obstruction:	No Obstruction		
Sight Distance:	727.135		
Eye Position:	1741+50.00	18.000	2534.499
Object Position:	1735+07.30	18.000	2517.113
Obstruction:	No Obstruction		
Sight Distance:	724.020		
Eye Position:	1741+00.00	18.000	2533.652
Object Position:	1734+57.44	18.000	2515.517
Obstruction:	No Obstruction		
Sight Distance:	723.094		
Eye Position:	1740+50.00	18.000	2532.763
Object Position:	1734+07.74	18.000	2513.885
Obstruction:	No Obstruction		
Sight Distance:	721.811		
Eye Position:	1740+00.00	18.000	2531.832
Object Position:	1733+57.95	18.000	2512.198
Obstruction:	No Obstruction		

Station	Offset	Elevation
721.717		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:08am

Surface(s): LW 3

Alignment Name: LW
Start Station: 1744+00.00
Stop Station: 1722+50.00
Interval: 50.000

Sight Distance: 694.000
Relaxed Distance: 694.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1744+00.00	18.000	2539.029
Object Position:	1737+08.15	18.000	2523.127
Obstruction:	No Obstruction		
Sight Distance:	790.230		
Eye Position:	1743+50.00	18.000	2538.182
Object Position:	1736+58.16	18.000	2521.694
Obstruction:	No Obstruction		
Sight Distance:	783.642		
Eye Position:	1743+00.00	18.000	2537.293
Object Position:	1736+08.11	18.000	2520.217
Obstruction:	No Obstruction		
Sight Distance:	777.537		
Eye Position:	1742+50.00	18.000	2536.361
Object Position:	1735+58.02	18.000	2518.696
Obstruction:	No Obstruction		
Sight Distance:	773.589		
Eye Position:	1742+00.00	18.000	2535.387
Object Position:	1735+07.95	18.000	2517.133
Obstruction:	No Obstruction		
Sight Distance:	770.232		
Eye Position:	1741+50.00	18.000	2534.499
Object Position:	1734+57.93	18.000	2515.533
Obstruction:	No Obstruction		
Sight Distance:	768.728		

	Station	Offset	Elevation
Eye Position:	1741+00.00	18.000	2533.652
Object Position:	1734+08.03	18.000	2513.894
Obstruction:	No Obstruction		
Sight Distance:	767.068		
Eye Position:	1740+50.00	18.000	2532.763
Object Position:	1733+58.31	18.000	2512.211
Obstruction:	No Obstruction		
Sight Distance:	766.479		
Eye Position:	1740+00.00	18.000	2531.832
Object Position:	1733+08.51	18.000	2510.492
Obstruction:	No Obstruction		
Sight Distance:	766.681		
Eye Position:	1739+50.00	18.000	2530.859
Object Position:	1732+58.51	18.000	2508.722
Obstruction:	No Obstruction		
Sight Distance:	766.802		
Eye Position:	1739+00.00	18.000	2529.733
Object Position:	1732+08.51	18.000	2506.904
Obstruction:	No Obstruction		
Sight Distance:	766.787		
Eye Position:	1738+50.00	18.000	2528.462
Object Position:	1731+58.51	18.000	2505.045
Obstruction:	No Obstruction		
Sight Distance:	766.365		
Eye Position:	1738+00.00	18.000	2527.149
Object Position:	1731+08.51	18.000	2503.151
Obstruction:	No Obstruction		
Sight Distance:	766.671		
Eye Position:	1737+50.00	18.000	2525.794
Object Position:	1730+58.51	18.000	2501.238
Obstruction:	No Obstruction		
Sight Distance:	766.878		
Eye Position:	1737+00.00	18.000	2524.396
Object Position:	1730+08.51	18.000	2499.258
Obstruction:	No Obstruction		
Sight Distance:	767.139		
Eye Position:	1736+50.00	18.000	2522.956
Object Position:	1729+58.51	18.000	2497.138

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	768.962		
Eye Position:	1736+00.00	18.000	2521.474
Object Position:	1729+08.37	18.000	2495.153
Obstruction:	No Obstruction		
Sight Distance:	778.271		
Eye Position:	1735+50.00	18.000	2519.949
Object Position:	1728+58.05	18.000	2493.232
Obstruction:	No Obstruction		
Sight Distance:	791.889		
Eye Position:	1735+00.00	18.000	2518.381
Object Position:	1728+07.93	18.000	2491.466
Obstruction:	No Obstruction		
Sight Distance:	808.435		
Eye Position:	1734+50.00	18.000	2516.772
Object Position:	1727+57.94	18.000	2489.842
Obstruction:	No Obstruction		
Sight Distance:	830.276		
Eye Position:	1734+00.00	18.000	2515.120
Object Position:	1727+08.01	18.000	2488.502
Obstruction:	No Obstruction		
Sight Distance:	859.830		
Eye Position:	1733+50.00	18.000	2513.425
Object Position:	1726+58.10	18.000	2487.209
Obstruction:	No Obstruction		
Sight Distance:	861.427		
Eye Position:	1733+00.00	18.000	2511.689
Object Position:	1726+08.15	18.000	2485.870
Obstruction:	No Obstruction		
Sight Distance:	848.229		
Eye Position:	1732+50.00	18.000	2509.909
Object Position:	1725+58.15	18.000	2484.645
Obstruction:	No Obstruction		
Sight Distance:	835.885		
Eye Position:	1732+00.00	18.000	2508.088
Object Position:	1725+08.07	18.000	2483.518
Obstruction:	No Obstruction		
Sight Distance:	825.275		

	Station	Offset	Elevation
Eye Position:	1731+50.00	18.000	2506.224
Object Position:	1724+57.89	18.000	2482.485
Obstruction:	No Obstruction		
Sight Distance:	814.367		
Eye Position:	1731+00.00	18.000	2504.320
Object Position:	1724+07.61	18.000	2481.584
Obstruction:	No Obstruction		
Sight Distance:	804.408		
Eye Position:	1730+50.00	18.000	2502.405
Object Position:	1723+57.06	18.000	2480.779
Obstruction:	No Obstruction		
Sight Distance:	787.547		
Eye Position:	1730+00.00	18.000	2500.384
Object Position:	1723+06.18	18.000	2480.079
Obstruction:	No Obstruction		
Sight Distance:	773.170		
Eye Position:	1729+50.00	18.000	2498.295
Object Position:	1722+55.21	18.000	2479.658
Obstruction:	No Obstruction		
Sight Distance:	767.543		
Eye Position:	1729+00.00	18.000	2496.314
Object Position:	1722+04.43	18.000	2479.408
Obstruction:	No Obstruction		
Sight Distance:	765.007		
Eye Position:	1728+50.00	18.000	2494.443
Object Position:	1721+53.87	18.000	2479.272
Obstruction:	No Obstruction		
Sight Distance:	762.601		
Eye Position:	1728+00.00	18.000	2492.681
Object Position:	1721+03.24	18.000	2479.247
Obstruction:	No Obstruction		
Sight Distance:	761.064		
Eye Position:	1727+50.00	18.000	2491.119
Object Position:	1720+52.56	18.000	2479.340
Obstruction:	No Obstruction		
Sight Distance:	760.059		
Eye Position:	1727+00.00	18.000	2489.789

	Station	Offset	Elevation
	1720+01.83	18.000	2479.539
Obstruction:	No Obstruction		
Sight Distance:	760.595		
Eye Position:	1726+50.00	18.000	2488.491
Object Position:	1719+51.05	18.000	2479.814
Obstruction:	No Obstruction		
Sight Distance:	762.425		
Eye Position:	1726+00.00	18.000	2487.165
Object Position:	1719+00.26	18.000	2480.187
Obstruction:	No Obstruction		
Sight Distance:	767.579		
Eye Position:	1725+50.00	18.000	2485.949
Object Position:	1718+49.47	18.000	2480.686
Obstruction:	No Obstruction		
Sight Distance:	783.747		
Eye Position:	1725+00.00	18.000	2484.842
Object Position:	1717+99.05	18.000	2481.177
Obstruction:	No Obstruction		
Sight Distance:	814.181		
Eye Position:	1724+50.00	18.000	2483.844
Object Position:	1717+48.97	18.000	2481.671
Obstruction:	No Obstruction		
Sight Distance:	869.409		
Eye Position:	1724+00.00	18.000	2482.957
Object Position:	1716+99.11	18.000	2482.156
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+50.00	18.000	2482.179
Object Position:	1716+49.67	18.000	2482.642
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+00.00	18.000	2481.510
Object Position:	1716+00.45	18.000	2483.125
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+50.00	18.000	2481.126
Object Position:	1715+51.23	18.000	2483.608
Obstruction:	No Obstruction		

Station	Offset	Elevation
Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:06am

Surface(s): LE 3

Alignment Name: LW
Start Station: 1726+50.00
Stop Station: 1686+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1726+50.00	18.000	2476.380
Object Position:	1720+00.87	18.000	2451.294
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1726+00.00	18.000	2474.082
Object Position:	1719+50.13	18.000	2450.970
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1725+50.00	18.000	2471.785
Object Position:	1718+99.39	18.000	2450.621
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1725+00.00	18.000	2469.488
Object Position:	1718+48.68	18.000	2450.247
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1724+50.00	18.000	2467.190
Object Position:	1717+98.36	18.000	2449.857
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1724+00.00	18.000	2464.893
Object Position:	1717+48.39	18.000	2449.467
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1723+50.00	18.000	2462.547
Object Position:	1716+98.87	18.000	2449.080
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+00.00	18.000	2459.688
Object Position:	1716+49.58	18.000	2448.695
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+50.00	18.000	2457.606
Object Position:	1716+00.31	18.000	2448.311
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+00.00	18.000	2455.944
Object Position:	1715+51.03	18.000	2447.926
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1721+50.00	18.000	2455.015
Object Position:	1715+01.73	18.000	2447.541
Obstruction:	No Obstruction		
Sight Distance:	1715.984		
Eye Position:	1721+00.00	18.000	2453.356
Object Position:	1714+52.38	18.000	2447.156
Obstruction:	No Obstruction		
Sight Distance:	1658.457		
Eye Position:	1720+50.00	18.000	2453.085
Object Position:	1714+02.97	18.000	2446.771
Obstruction:	No Obstruction		
Sight Distance:	1582.629		
Eye Position:	1720+00.00	18.000	2452.789
Object Position:	1713+53.51	18.000	2446.384
Obstruction:	No Obstruction		
Sight Distance:	1514.828		
Eye Position:	1719+50.00	18.000	2452.469
Object Position:	1713+04.01	18.000	2445.744
Obstruction:	No Obstruction		
Sight Distance:	1447.316		
Eye Position:	1719+00.00	18.000	2452.125
Object Position:	1712+54.85	18.000	2444.148

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1366.772		
Eye Position:	1718+50.00	18.000	2451.757
Object Position:	1712+05.65	18.000	2442.955
Obstruction:	No Obstruction		
Sight Distance:	1307.761		
Eye Position:	1718+00.00	18.000	2451.369
Object Position:	1711+56.12	18.000	2442.272
Obstruction:	No Obstruction		
Sight Distance:	1268.247		
Eye Position:	1717+50.00	18.000	2450.979
Object Position:	1711+06.41	18.000	2441.757
Obstruction:	No Obstruction		
Sight Distance:	2632.073		
Eye Position:	1717+00.00	18.000	2450.589
Object Position:	1710+56.65	18.000	2441.403
Obstruction:	No Obstruction		
Sight Distance:	2432.372		
Eye Position:	1716+50.00	18.000	2450.199
Object Position:	1710+06.84	18.000	2441.209
Obstruction:	No Obstruction		
Sight Distance:	1760.214		
Eye Position:	1716+00.00	18.000	2449.808
Object Position:	1709+56.98	18.000	2441.176
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1715+50.00	18.000	2449.418
Object Position:	1709+07.09	18.000	2441.305
Obstruction:	No Obstruction		
Sight Distance:	1201.681		
Eye Position:	1715+00.00	18.000	2449.028
Object Position:	1708+57.18	18.000	2441.631
Obstruction:	No Obstruction		
Sight Distance:	1224.456		
Eye Position:	1714+50.00	18.000	2448.638
Object Position:	1708+07.28	18.000	2442.460
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1714+00.00	18.000	2448.247
Object Position:	1707+57.23	18.000	2443.162
Obstruction:	No Obstruction		
Sight Distance:	1309.867		
Eye Position:	1713+50.00	18.000	2447.857
Object Position:	1707+07.19	18.000	2443.026
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1713+00.00	18.000	2447.081
Object Position:	1706+57.33	18.000	2442.892
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1712+50.00	18.000	2445.512
Object Position:	1706+07.21	18.000	2442.756
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1712+00.00	18.000	2444.358
Object Position:	1705+57.12	18.000	2442.621
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1711+50.00	18.000	2443.700
Object Position:	1705+07.02	18.000	2442.485
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1711+00.00	18.000	2443.202
Object Position:	1704+56.89	18.000	2442.350
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1710+50.00	18.000	2442.867
Object Position:	1704+06.72	18.000	2442.214
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1710+00.00	18.000	2442.695
Object Position:	1703+56.50	18.000	2442.078
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1709+50.00	18.000	2442.684

	Station	Offset	Elevation
	1703+06.23	18.000	2441.942
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1709+00.00	18.000	2442.836
Object Position:	1702+55.84	18.000	2441.806
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1708+50.00	18.000	2443.222
Object Position:	1702+05.14	18.000	2441.656
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1708+00.00	18.000	2444.100
Object Position:	1701+54.39	18.000	2441.515
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1707+50.00	18.000	2444.642
Object Position:	1701+03.90	18.000	2442.671
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1707+00.00	18.000	2444.507
Object Position:	1700+53.50	18.000	2443.925
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1706+50.00	18.000	2444.372
Object Position:	1700+03.06	18.000	2444.928
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1706+00.00	18.000	2444.236
Object Position:	1699+52.59	18.000	2446.046
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1705+50.00	18.000	2444.101
Object Position:	1699+02.09	18.000	2447.315
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1705+00.00	18.000	2443.966
Object Position:	1698+51.57	18.000	2447.961
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1704+50.00	18.000	2443.831
Object Position:	1698+01.05	18.000	2448.634
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1704+00.00	18.000	2443.696
Object Position:	1697+50.53	18.000	2449.485
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1703+50.00	18.000	2443.560
Object Position:	1697+00.05	18.000	2450.587
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1703+00.00	18.000	2443.425
Object Position:	1696+49.62	18.000	2451.618
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1702+50.00	18.000	2443.290
Object Position:	1695+99.36	18.000	2452.770
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1702+00.00	18.000	2443.140
Object Position:	1695+49.48	18.000	2453.638
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1701+50.00	18.000	2443.118
Object Position:	1694+99.87	18.000	2454.327
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1701+00.00	18.000	2444.267
Object Position:	1694+50.33	18.000	2454.758
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1700+50.00	18.000	2445.514
Object Position:	1694+00.83	18.000	2455.030
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1700+00.00	18.000	2446.486
Object Position:	1693+51.35	18.000	2455.291
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1699+50.00	18.000	2447.611
Object Position:	1693+01.87	18.000	2455.299
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1699+00.00	18.000	2448.867
Object Position:	1692+52.37	18.000	2454.774
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1698+50.00	18.000	2449.483
Object Position:	1692+02.85	18.000	2455.542
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1698+00.00	18.000	2450.148
Object Position:	1691+53.30	18.000	2456.311
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1697+50.00	18.000	2450.996
Object Position:	1691+03.71	18.000	2457.080
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1697+00.00	18.000	2452.088
Object Position:	1690+54.10	18.000	2457.850
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1696+50.00	18.000	2453.109
Object Position:	1690+04.45	18.000	2458.620
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1696+00.00	18.000	2454.257
Object Position:	1689+54.78	18.000	2459.391
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1695+50.00	18.000	2455.130
Object Position:	1689+05.00	18.000	2460.163

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1695+00.00	18.000	2455.826
Object Position:	1688+55.00	18.000	2460.939
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1694+50.00	18.000	2456.260
Object Position:	1688+05.00	18.000	2461.714
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1694+00.00	18.000	2456.535
Object Position:	1687+55.00	18.000	2462.490
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+50.00	18.000	2456.798
Object Position:	1687+05.00	18.000	2463.193
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+00.00	18.000	2456.777
Object Position:	1686+55.00	18.000	2463.185
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1692+50.00	18.000	2456.310
Object Position:	1686+05.00	18.000	2463.095
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1692+00.00	18.000	2457.086
Object Position:	1685+55.00	18.000	2462.922
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1691+50.00	18.000	2457.862
Object Position:	1685+05.00	18.000	2462.672
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1691+00.00	18.000	2458.638
Object Position:	1684+55.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1690+50.00	18.000	2459.413
Object Position:	1684+05.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1690+00.00	18.000	2460.189
Object Position:	1683+55.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+50.00	18.000	2460.965
Object Position:	1683+05.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+00.00	18.000	2461.741
Object Position:	1682+55.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+50.00	18.000	2462.516
Object Position:	1682+05.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+00.00	18.000	2463.292
Object Position:	1681+55.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+50.00	18.000	2464.068
Object Position:	1681+05.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+00.00	18.000	2464.693
Object Position:	1680+55.00	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1686+50.00	18.000	2464.678
Object Position:	1680+04.80	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1686+00.00	18.000	2464.578

	Station	Offset	Elevation
	1679+54.56	18.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

LE - Sight Distance via InRoads Roadway Visibility Tool

Median lane

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:31am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1683+41.00
Stop Station: 1715+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1683+41.00	-18.000	2463.245
Object Position:	1689+86.00	-18.000	2458.845
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1683+91.00	-18.000	2463.499
Object Position:	1690+36.00	-18.000	2458.151
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1684+41.00	-18.000	2463.677
Object Position:	1690+86.00	-18.000	2457.455
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1684+91.00	-18.000	2463.775
Object Position:	1691+36.00	-18.000	2456.871
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1685+41.00	-18.000	2463.789
Object Position:	1691+86.00	-18.000	2456.350
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1685+91.00	-18.000	2463.722
Object Position:	1692+36.00	-18.000	2455.889
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1686+41.00	-18.000	2463.573
Object Position:	1692+85.60	-18.000	2455.441
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1686+91.00	-18.000	2463.343
Object Position:	1693+35.22	-18.000	2454.895
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+41.00	-18.000	2463.031
Object Position:	1693+84.88	-18.000	2454.210
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+91.00	-18.000	2462.637
Object Position:	1694+34.59	-18.000	2453.519
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+41.00	-18.000	2462.161
Object Position:	1694+84.35	-18.000	2452.829
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+91.00	-18.000	2461.609
Object Position:	1695+34.16	-18.000	2452.152
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+41.00	-18.000	2460.969
Object Position:	1695+84.02	-18.000	2451.493
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+91.00	-18.000	2460.276
Object Position:	1696+33.91	-18.000	2450.841
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1690+41.00	-18.000	2459.581
Object Position:	1696+83.82	-18.000	2450.218
Obstruction:	No Obstruction		
Sight Distance:	749.185		
Eye Position:	1690+91.00	-18.000	2458.886
Object Position:	1697+33.72	-18.000	2449.613

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	746.234		
Eye Position:	1691+41.00	-18.000	2458.316
Object Position:	1697+83.57	-18.000	2448.952
Obstruction:	No Obstruction		
Sight Distance:	745.251		
Eye Position:	1691+91.00	-18.000	2457.809
Object Position:	1698+33.35	-18.000	2448.182
Obstruction:	No Obstruction		
Sight Distance:	751.615		
Eye Position:	1692+41.00	-18.000	2457.348
Object Position:	1698+83.25	-18.000	2447.429
Obstruction:	No Obstruction		
Sight Distance:	768.870		
Eye Position:	1692+91.00	-18.000	2456.879
Object Position:	1699+33.51	-18.000	2446.660
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+41.00	-18.000	2456.314
Object Position:	1699+83.68	-18.000	2445.967
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+91.00	-18.000	2455.622
Object Position:	1700+33.79	-18.000	2445.474
Obstruction:	No Obstruction		
Sight Distance:	2269.618		
Eye Position:	1694+41.00	-18.000	2454.927
Object Position:	1700+83.88	-18.000	2444.999
Obstruction:	No Obstruction		
Sight Distance:	1406.948		
Eye Position:	1694+91.00	-18.000	2454.235
Object Position:	1701+33.98	-18.000	2444.542
Obstruction:	No Obstruction		
Sight Distance:	1271.775		
Eye Position:	1695+41.00	-18.000	2453.557
Object Position:	1701+84.11	-18.000	2444.107
Obstruction:	No Obstruction		
Sight Distance:	1198.019		

	Station	Offset	Elevation
Eye Position:	1695+91.00	-18.000	2452.899
Object Position:	1702+34.28	-18.000	2443.679
Obstruction:	No Obstruction		
Sight Distance:	1148.127		
Eye Position:	1696+41.00	-18.000	2452.251
Object Position:	1702+84.51	-18.000	2443.038
Obstruction:	No Obstruction		
Sight Distance:	1077.801		
Eye Position:	1696+91.00	-18.000	2451.630
Object Position:	1703+34.79	-18.000	2442.443
Obstruction:	No Obstruction		
Sight Distance:	1020.530		
Eye Position:	1697+41.00	-18.000	2451.028
Object Position:	1703+85.12	-18.000	2441.870
Obstruction:	No Obstruction		
Sight Distance:	971.149		
Eye Position:	1697+91.00	-18.000	2450.325
Object Position:	1704+35.49	-18.000	2441.312
Obstruction:	No Obstruction		
Sight Distance:	930.610		
Eye Position:	1698+41.00	-18.000	2449.561
Object Position:	1704+85.89	-18.000	2440.796
Obstruction:	No Obstruction		
Sight Distance:	898.134		
Eye Position:	1698+91.00	-18.000	2448.809
Object Position:	1705+36.11	-18.000	2440.261
Obstruction:	No Obstruction		
Sight Distance:	863.155		
Eye Position:	1699+41.00	-18.000	2448.054
Object Position:	1705+86.50	-18.000	2439.726
Obstruction:	No Obstruction		
Sight Distance:	828.802		
Eye Position:	1699+91.00	-18.000	2447.394
Object Position:	1706+36.90	-18.000	2439.286
Obstruction:	No Obstruction		
Sight Distance:	803.554		
Eye Position:	1700+41.00	-18.000	2446.904

	Station	Offset	Elevation
	1706+87.35	-18.000	2438.964
Obstruction:	No Obstruction		
Sight Distance:	784.257		
Eye Position:	1700+91.00	-18.000	2446.433
Object Position:	1707+37.84	-18.000	2438.676
Obstruction:	No Obstruction		
Sight Distance:	767.837		
Eye Position:	1701+41.00	-18.000	2445.980
Object Position:	1707+88.38	-18.000	2438.467
Obstruction:	No Obstruction		
Sight Distance:	754.522		
Eye Position:	1701+91.00	-18.000	2445.547
Object Position:	1708+38.96	-18.000	2438.358
Obstruction:	No Obstruction		
Sight Distance:	744.418		
Eye Position:	1702+41.00	-18.000	2445.105
Object Position:	1708+89.59	-18.000	2438.336
Obstruction:	No Obstruction		
Sight Distance:	736.455		
Eye Position:	1702+91.00	-18.000	2444.469
Object Position:	1709+40.23	-18.000	2438.417
Obstruction:	No Obstruction		
Sight Distance:	731.752		
Eye Position:	1703+41.00	-18.000	2443.879
Object Position:	1709+90.88	-18.000	2438.595
Obstruction:	No Obstruction		
Sight Distance:	727.496		
Eye Position:	1703+91.00	-18.000	2443.312
Object Position:	1710+41.52	-18.000	2438.869
Obstruction:	No Obstruction		
Sight Distance:	723.348		
Eye Position:	1704+41.00	-18.000	2442.759
Object Position:	1710+92.11	-18.000	2439.241
Obstruction:	No Obstruction		
Sight Distance:	718.950		
Eye Position:	1704+91.00	-18.000	2442.234
Object Position:	1711+42.62	-18.000	2439.878
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	722.235		
Eye Position:	1705+41.00	-18.000	2441.701
Object Position:	1711+92.87	-18.000	2440.629
Obstruction:	No Obstruction		
Sight Distance:	729.231		
Eye Position:	1705+91.00	-18.000	2441.170
Object Position:	1712+42.43	-18.000	2441.475
Obstruction:	No Obstruction		
Sight Distance:	740.725		
Eye Position:	1706+41.00	-18.000	2440.758
Object Position:	1712+91.89	-18.000	2442.415
Obstruction:	No Obstruction		
Sight Distance:	748.715		
Eye Position:	1706+91.00	-18.000	2440.439
Object Position:	1713+41.29	-18.000	2443.445
Obstruction:	No Obstruction		
Sight Distance:	755.558		
Eye Position:	1707+41.00	-18.000	2440.158
Object Position:	1713+90.65	-18.000	2444.592
Obstruction:	No Obstruction		
Sight Distance:	766.507		
Eye Position:	1707+91.00	-18.000	2439.957
Object Position:	1714+40.01	-18.000	2445.805
Obstruction:	No Obstruction		
Sight Distance:	780.305		
Eye Position:	1708+41.00	-18.000	2439.854
Object Position:	1714+89.38	-18.000	2447.051
Obstruction:	No Obstruction		
Sight Distance:	790.007		
Eye Position:	1708+91.00	-18.000	2439.837
Object Position:	1715+38.77	-18.000	2448.240
Obstruction:	No Obstruction		
Sight Distance:	788.738		
Eye Position:	1709+41.00	-18.000	2439.919
Object Position:	1715+88.21	-18.000	2449.513
Obstruction:	No Obstruction		
Sight Distance:	787.345		

	Station	Offset	Elevation
	1709+91.00	-18.000	2440.096
Object Position:	1716+37.69	-18.000	2450.880
Obstruction:	No Obstruction		
Sight Distance:	780.170		
Eye Position:	1710+41.00	-18.000	2440.366
Object Position:	1716+87.22	-18.000	2452.339
Obstruction:	No Obstruction		
Sight Distance:	769.868		
Eye Position:	1710+91.00	-18.000	2440.733
Object Position:	1717+36.79	-18.000	2453.887
Obstruction:	No Obstruction		
Sight Distance:	757.939		
Eye Position:	1711+41.00	-18.000	2441.358
Object Position:	1717+86.39	-18.000	2455.687
Obstruction:	No Obstruction		
Sight Distance:	754.506		
Eye Position:	1711+91.00	-18.000	2442.101
Object Position:	1718+36.01	-18.000	2457.636
Obstruction:	No Obstruction		
Sight Distance:	752.283		
Eye Position:	1712+41.00	-18.000	2442.948
Object Position:	1718+85.85	-18.000	2459.691
Obstruction:	No Obstruction		
Sight Distance:	762.587		
Eye Position:	1712+91.00	-18.000	2443.897
Object Position:	1719+35.45	-18.000	2461.835
Obstruction:	No Obstruction		
Sight Distance:	781.104		
Eye Position:	1713+41.00	-18.000	2444.939
Object Position:	1719+85.08	-18.000	2463.796
Obstruction:	No Obstruction		
Sight Distance:	785.568		
Eye Position:	1713+91.00	-18.000	2446.100
Object Position:	1720+34.76	-18.000	2465.699
Obstruction:	No Obstruction		
Sight Distance:	786.396		
Eye Position:	1714+41.00	-18.000	2447.328
Object Position:	1720+84.49	-18.000	2467.605

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	2548.028		
Eye Position:	1714+91.00	-18.000	2448.589
Object Position:	1721+34.27	-18.000	2469.519
Obstruction:	No Obstruction		
Sight Distance:	2445.352		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:32am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1711+00.00
Stop Station: 1742+00.00
Interval: 50.000

Sight Distance: 604.000
Relaxed Distance: 604.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1711+00.00	-18.000	2440.796
Object Position:	1717+04.71	-18.000	2452.870
Obstruction:	No Obstruction		
Sight Distance:	728.667		
Eye Position:	1711+50.00	-18.000	2441.466
Object Position:	1717+54.32	-18.000	2454.487
Obstruction:	No Obstruction		
Sight Distance:	716.929		
Eye Position:	1712+00.00	-18.000	2442.244
Object Position:	1718+04.00	-18.000	2456.380
Obstruction:	No Obstruction		
Sight Distance:	715.960		
Eye Position:	1712+50.00	-18.000	2443.118
Object Position:	1718+54.00	-18.000	2458.388
Obstruction:	No Obstruction		
Sight Distance:	718.044		
Eye Position:	1713+00.00	-18.000	2444.084
Object Position:	1719+03.70	-18.000	2460.454
Obstruction:	No Obstruction		
Sight Distance:	731.367		
Eye Position:	1713+50.00	-18.000	2445.142
Object Position:	1719+53.31	-18.000	2462.569
Obstruction:	No Obstruction		
Sight Distance:	748.363		

	Station	Offset	Elevation
Eye Position:	1714+00.00	-18.000	2446.294
Object Position:	1720+02.96	-18.000	2464.481
Obstruction:	No Obstruction		
Sight Distance:	749.429		
Eye Position:	1714+50.00	-18.000	2447.540
Object Position:	1720+52.65	-18.000	2466.384
Obstruction:	No Obstruction		
Sight Distance:	749.752		
Eye Position:	1715+00.00	-18.000	2448.796
Object Position:	1721+02.39	-18.000	2468.290
Obstruction:	No Obstruction		
Sight Distance:	2461.435		
Eye Position:	1715+50.00	-18.000	2450.013
Object Position:	1721+52.18	-18.000	2470.195
Obstruction:	No Obstruction		
Sight Distance:	2199.521		
Eye Position:	1716+00.00	-18.000	2451.322
Object Position:	1722+02.02	-18.000	2472.105
Obstruction:	No Obstruction		
Sight Distance:	2048.550		
Eye Position:	1716+50.00	-18.000	2452.725
Object Position:	1722+51.88	-18.000	2474.014
Obstruction:	No Obstruction		
Sight Distance:	2133.464		
Eye Position:	1717+00.00	-18.000	2454.221
Object Position:	1723+01.75	-18.000	2475.868
Obstruction:	No Obstruction		
Sight Distance:	2024.059		
Eye Position:	1717+50.00	-18.000	2455.832
Object Position:	1723+51.59	-18.000	2477.564
Obstruction:	No Obstruction		
Sight Distance:	1909.271		
Eye Position:	1718+00.00	-18.000	2457.728
Object Position:	1724+01.57	-18.000	2479.266
Obstruction:	No Obstruction		
Sight Distance:	1763.870		
Eye Position:	1718+50.00	-18.000	2459.718
Object Position:	1724+51.56	-18.000	2480.972

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1597.115		
Eye Position:	1719+00.00	-18.000	2461.800
Object Position:	1725+01.62	-18.000	2482.676
Obstruction:	No Obstruction		
Sight Distance:	1432.159		
Eye Position:	1719+50.00	-18.000	2463.930
Object Position:	1725+51.77	-18.000	2484.379
Obstruction:	No Obstruction		
Sight Distance:	1281.514		
Eye Position:	1720+00.00	-18.000	2465.866
Object Position:	1726+01.90	-18.000	2486.086
Obstruction:	No Obstruction		
Sight Distance:	1163.091		
Eye Position:	1720+50.00	-18.000	2467.781
Object Position:	1726+52.04	-18.000	2487.793
Obstruction:	No Obstruction		
Sight Distance:	1061.751		
Eye Position:	1721+00.00	-18.000	2469.696
Object Position:	1727+02.22	-18.000	2489.501
Obstruction:	No Obstruction		
Sight Distance:	974.739		
Eye Position:	1721+50.00	-18.000	2471.611
Object Position:	1727+52.43	-18.000	2491.210
Obstruction:	No Obstruction		
Sight Distance:	901.625		
Eye Position:	1722+00.00	-18.000	2473.526
Object Position:	1728+02.70	-18.000	2492.922
Obstruction:	No Obstruction		
Sight Distance:	837.817		
Eye Position:	1722+50.00	-18.000	2475.441
Object Position:	1728+53.39	-18.000	2494.659
Obstruction:	No Obstruction		
Sight Distance:	785.964		
Eye Position:	1723+00.00	-18.000	2477.309
Object Position:	1729+04.39	-18.000	2496.395
Obstruction:	No Obstruction		
Sight Distance:	748.321		

	Station	Offset	Elevation
Eye Position:	1723+50.00	-18.000	2479.012
Object Position:	1729+55.51	-18.000	2498.270
Obstruction:	No Obstruction		
Sight Distance:	730.682		
Eye Position:	1724+00.00	-18.000	2480.715
Object Position:	1730+06.56	-18.000	2500.224
Obstruction:	No Obstruction		
Sight Distance:	725.187		
Eye Position:	1724+50.00	-18.000	2482.416
Object Position:	1730+57.49	-18.000	2502.156
Obstruction:	No Obstruction		
Sight Distance:	722.616		
Eye Position:	1725+00.00	-18.000	2484.119
Object Position:	1731+08.54	-18.000	2504.053
Obstruction:	No Obstruction		
Sight Distance:	721.501		
Eye Position:	1725+50.00	-18.000	2485.822
Object Position:	1731+59.69	-18.000	2505.910
Obstruction:	No Obstruction		
Sight Distance:	721.268		
Eye Position:	1726+00.00	-18.000	2487.524
Object Position:	1732+10.90	-18.000	2507.721
Obstruction:	No Obstruction		
Sight Distance:	721.131		
Eye Position:	1726+50.00	-18.000	2489.226
Object Position:	1732+62.14	-18.000	2509.494
Obstruction:	No Obstruction		
Sight Distance:	722.506		
Eye Position:	1727+00.00	-18.000	2490.929
Object Position:	1733+13.35	-18.000	2511.219
Obstruction:	No Obstruction		
Sight Distance:	725.456		
Eye Position:	1727+50.00	-18.000	2492.631
Object Position:	1733+64.44	-18.000	2512.894
Obstruction:	No Obstruction		
Sight Distance:	728.284		
Eye Position:	1728+00.00	-18.000	2494.333

	Station	Offset	Elevation
	1734+15.34	-18.000	2514.509
Obstruction:	No Obstruction		
Sight Distance:	731.433		
Eye Position:	1728+50.00	-18.000	2496.036
Object Position:	1734+65.65	-18.000	2516.071
Obstruction:	No Obstruction		
Sight Distance:	735.818		
Eye Position:	1729+00.00	-18.000	2497.738
Object Position:	1735+15.65	-18.000	2517.583
Obstruction:	No Obstruction		
Sight Distance:	739.911		
Eye Position:	1729+50.00	-18.000	2499.551
Object Position:	1735+65.65	-18.000	2519.051
Obstruction:	No Obstruction		
Sight Distance:	763.400		
Eye Position:	1730+00.00	-18.000	2501.466
Object Position:	1736+15.65	-18.000	2520.478
Obstruction:	No Obstruction		
Sight Distance:	802.901		
Eye Position:	1730+50.00	-18.000	2503.370
Object Position:	1736+65.65	-18.000	2521.918
Obstruction:	No Obstruction		
Sight Distance:	813.257		
Eye Position:	1731+00.00	-18.000	2505.234
Object Position:	1737+15.65	-18.000	2523.472
Obstruction:	No Obstruction		
Sight Distance:	834.295		
Eye Position:	1731+50.00	-18.000	2507.054
Object Position:	1737+65.52	-18.000	2524.980
Obstruction:	No Obstruction		
Sight Distance:	870.965		
Eye Position:	1732+00.00	-18.000	2508.833
Object Position:	1738+14.71	-18.000	2526.426
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1732+50.00	-18.000	2510.569
Object Position:	1738+63.69	-18.000	2527.824
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1733+00.00	-18.000	2512.263
Object Position:	1739+12.54	-18.000	2529.184
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1733+50.00	-18.000	2513.914
Object Position:	1739+61.33	-18.000	2530.500
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1734+00.00	-18.000	2515.523
Object Position:	1740+10.13	-18.000	2531.771
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1734+50.00	-18.000	2517.090
Object Position:	1740+58.97	-18.000	2532.980
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+00.00	-18.000	2518.614
Object Position:	1741+07.91	-18.000	2534.055
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+50.00	-18.000	2520.096
Object Position:	1741+56.94	-18.000	2535.005
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+00.00	-18.000	2521.536
Object Position:	1742+06.09	-18.000	2535.914
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+50.00	-18.000	2522.933
Object Position:	1742+55.34	-18.000	2536.786
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1737+00.00	-18.000	2524.483
Object Position:	1743+04.68	-18.000	2537.615
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1737+50.00	-18.000	2526.009
Object Position:	1743+54.07	-18.000	2538.406
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+00.00	-18.000	2527.492
Object Position:	1744+04.00	-18.000	2539.164
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+50.00	-18.000	2528.932
Object Position:	1744+54.00	-18.000	2539.879
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+00.00	-18.000	2530.330
Object Position:	1745+04.00	-18.000	2540.553
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+50.00	-18.000	2531.686
Object Position:	1745+54.00	-18.000	2541.183
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+00.00	-18.000	2532.999
Object Position:	1746+04.00	-18.000	2541.774
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+50.00	-18.000	2534.270
Object Position:	1746+54.00	-18.000	2542.319
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+00.00	-18.000	2535.401
Object Position:	1747+04.00	-18.000	2542.822
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+50.00	-18.000	2536.374
Object Position:	1747+54.00	-18.000	2543.284
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+00.00	-18.000	2537.305
Object Position:	1748+04.00	-18.000	2543.703

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:37am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1738+00.00
Stop Station: 1785+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1738+00.00	-18.000	2527.492
Object Position:	1744+45.00	-18.000	2539.753
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+50.00	-18.000	2528.932
Object Position:	1744+95.00	-18.000	2540.434
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+00.00	-18.000	2530.330
Object Position:	1745+45.00	-18.000	2541.073
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+50.00	-18.000	2531.686
Object Position:	1745+95.00	-18.000	2541.669
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+00.00	-18.000	2532.999
Object Position:	1746+45.00	-18.000	2542.223
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+50.00	-18.000	2534.270
Object Position:	1746+95.00	-18.000	2542.734
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1741+00.00	-18.000	2535.401
Object Position:	1747+45.00	-18.000	2543.203
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+50.00	-18.000	2536.374
Object Position:	1747+95.00	-18.000	2543.631
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+00.00	-18.000	2537.305
Object Position:	1748+45.00	-18.000	2544.015
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+50.00	-18.000	2538.194
Object Position:	1748+95.00	-18.000	2544.357
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1743+00.00	-18.000	2539.040
Object Position:	1749+45.00	-18.000	2544.656
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1743+50.00	-18.000	2539.844
Object Position:	1749+95.00	-18.000	2544.915
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1744+00.00	-18.000	2540.606
Object Position:	1750+45.00	-18.000	2545.139
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1744+50.00	-18.000	2541.325
Object Position:	1750+95.00	-18.000	2545.359
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1745+00.00	-18.000	2542.002
Object Position:	1751+45.00	-18.000	2545.579
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1745+50.00	-18.000	2542.636
Object Position:	1751+95.00	-18.000	2545.799

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1746+00.00	-18.000	2543.228
Object Position:	1752+45.00	-18.000	2546.019
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1746+50.00	-18.000	2543.778
Object Position:	1752+95.00	-18.000	2546.239
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1747+00.00	-18.000	2544.285
Object Position:	1753+45.00	-18.000	2546.459
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1747+50.00	-18.000	2544.750
Object Position:	1753+95.00	-18.000	2546.679
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1748+00.00	-18.000	2545.173
Object Position:	1754+45.00	-18.000	2546.899
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1748+50.00	-18.000	2545.553
Object Position:	1754+95.00	-18.000	2547.119
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+00.00	-18.000	2545.891
Object Position:	1755+45.00	-18.000	2547.339
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+50.00	-18.000	2546.186
Object Position:	1755+95.00	-18.000	2547.559
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+00.00	-18.000	2546.439
Object Position:	1756+45.00	-18.000	2547.779
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1750+50.00	-18.000	2546.661
Object Position:	1756+95.00	-18.000	2547.999
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+00.00	-18.000	2546.881
Object Position:	1757+45.00	-18.000	2548.219
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+50.00	-18.000	2547.101
Object Position:	1757+95.00	-18.000	2548.439
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+00.00	-18.000	2547.321
Object Position:	1758+45.00	-18.000	2548.659
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+50.00	-18.000	2547.541
Object Position:	1758+95.00	-18.000	2548.879
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+00.00	-18.000	2547.761
Object Position:	1759+45.00	-18.000	2549.099
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+50.00	-18.000	2547.981
Object Position:	1759+95.00	-18.000	2549.318
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+00.00	-18.000	2548.201
Object Position:	1760+45.00	-18.000	2549.516
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+50.00	-18.000	2548.421
Object Position:	1760+95.00	-18.000	2549.678
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+00.00	-18.000	2548.641

	Station	Offset	Elevation
	1761+45.00	-18.000	2549.804
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+50.00	-18.000	2548.861
Object Position:	1761+95.00	-18.000	2549.895
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+00.00	-18.000	2549.081
Object Position:	1762+45.00	-18.000	2549.949
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+50.00	-18.000	2549.301
Object Position:	1762+95.00	-18.000	2549.966
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+00.00	-18.000	2549.521
Object Position:	1763+45.00	-18.000	2549.949
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+50.00	-18.000	2549.741
Object Position:	1763+95.00	-18.000	2549.896
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1758+00.00	-18.000	2549.961
Object Position:	1764+45.00	-18.000	2549.807
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1758+50.00	-18.000	2550.181
Object Position:	1764+95.00	-18.000	2549.682
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+00.00	-18.000	2550.401
Object Position:	1765+45.00	-18.000	2549.522
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+50.00	-18.000	2550.621
Object Position:	1765+95.00	-18.000	2549.193
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1387.829		
Eye Position:	1760+00.00	-18.000	2550.840
Object Position:	1766+45.00	-18.000	2548.747
Obstruction:	No Obstruction		
Sight Distance:	1336.865		
Eye Position:	1760+50.00	-18.000	2551.034
Object Position:	1766+95.00	-18.000	2548.252
Obstruction:	No Obstruction		
Sight Distance:	1285.930		
Eye Position:	1761+00.00	-18.000	2551.192
Object Position:	1767+45.00	-18.000	2547.751
Obstruction:	No Obstruction		
Sight Distance:	1235.115		
Eye Position:	1761+50.00	-18.000	2551.315
Object Position:	1767+95.00	-18.000	2547.184
Obstruction:	No Obstruction		
Sight Distance:	1164.468		
Eye Position:	1762+00.00	-18.000	2551.402
Object Position:	1768+45.00	-18.000	2546.596
Obstruction:	No Obstruction		
Sight Distance:	1066.113		
Eye Position:	1762+50.00	-18.000	2551.453
Object Position:	1768+95.11	-18.000	2545.971
Obstruction:	No Obstruction		
Sight Distance:	973.403		
Eye Position:	1763+00.00	-18.000	2551.468
Object Position:	1769+45.58	-18.000	2545.328
Obstruction:	No Obstruction		
Sight Distance:	896.082		
Eye Position:	1763+50.00	-18.000	2551.447
Object Position:	1769+96.09	-18.000	2544.738
Obstruction:	No Obstruction		
Sight Distance:	841.797		
Eye Position:	1764+00.00	-18.000	2551.390
Object Position:	1770+46.66	-18.000	2544.308
Obstruction:	No Obstruction		
Sight Distance:	814.319		

	Station	Offset	Elevation
	1764+50.00	-18.000	2551.298
Object Position:	1770+97.30	-18.000	2543.877
Obstruction:	No Obstruction		
Sight Distance:	794.220		
Eye Position:	1765+00.00	-18.000	2551.169
Object Position:	1771+48.00	-18.000	2543.446
Obstruction:	No Obstruction		
Sight Distance:	779.379		
Eye Position:	1765+50.00	-18.000	2551.005
Object Position:	1771+98.78	-18.000	2543.015
Obstruction:	No Obstruction		
Sight Distance:	768.237		
Eye Position:	1766+00.00	-18.000	2550.644
Object Position:	1772+49.62	-18.000	2542.582
Obstruction:	No Obstruction		
Sight Distance:	761.284		
Eye Position:	1766+50.00	-18.000	2550.195
Object Position:	1773+00.49	-18.000	2542.150
Obstruction:	No Obstruction		
Sight Distance:	756.647		
Eye Position:	1767+00.00	-18.000	2549.711
Object Position:	1773+51.38	-18.000	2541.718
Obstruction:	No Obstruction		
Sight Distance:	753.446		
Eye Position:	1767+50.00	-18.000	2549.190
Object Position:	1774+02.24	-18.000	2541.285
Obstruction:	No Obstruction		
Sight Distance:	750.877		
Eye Position:	1768+00.00	-18.000	2548.635
Object Position:	1774+53.04	-18.000	2540.854
Obstruction:	No Obstruction		
Sight Distance:	747.068		
Eye Position:	1768+50.00	-18.000	2548.043
Object Position:	1775+03.71	-18.000	2540.433
Obstruction:	No Obstruction		
Sight Distance:	742.468		
Eye Position:	1769+00.00	-18.000	2547.415
Object Position:	1775+54.07	-18.000	2540.072

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	739.158		
Eye Position:	1769+50.00	-18.000	2546.778
Object Position:	1776+04.07	-18.000	2539.774
Obstruction:	No Obstruction		
Sight Distance:	736.678		
Eye Position:	1770+00.00	-18.000	2546.204
Object Position:	1776+54.07	-18.000	2539.535
Obstruction:	No Obstruction		
Sight Distance:	734.282		
Eye Position:	1770+50.00	-18.000	2545.779
Object Position:	1777+04.07	-18.000	2539.357
Obstruction:	No Obstruction		
Sight Distance:	731.511		
Eye Position:	1771+00.00	-18.000	2545.354
Object Position:	1777+54.07	-18.000	2539.239
Obstruction:	No Obstruction		
Sight Distance:	728.997		
Eye Position:	1771+50.00	-18.000	2544.929
Object Position:	1778+04.07	-18.000	2539.181
Obstruction:	No Obstruction		
Sight Distance:	725.508		
Eye Position:	1772+00.00	-18.000	2544.504
Object Position:	1778+54.07	-18.000	2539.309
Obstruction:	No Obstruction		
Sight Distance:	728.728		
Eye Position:	1772+50.00	-18.000	2544.079
Object Position:	1779+04.07	-18.000	2539.584
Obstruction:	No Obstruction		
Sight Distance:	740.445		
Eye Position:	1773+00.00	-18.000	2543.654
Object Position:	1779+53.76	-18.000	2539.928
Obstruction:	No Obstruction		
Sight Distance:	757.685		
Eye Position:	1773+50.00	-18.000	2543.229
Object Position:	1780+03.11	-18.000	2540.316
Obstruction:	No Obstruction		
Sight Distance:	776.535		

	Station	Offset	Elevation
Eye Position:	1774+00.00	-18.000	2542.804
Object Position:	1780+52.34	-18.000	2540.762
Obstruction:	No Obstruction		
Sight Distance:	796.779		
Eye Position:	1774+50.00	-18.000	2542.379
Object Position:	1781+01.49	-18.000	2541.159
Obstruction:	No Obstruction		
Sight Distance:	809.078		
Eye Position:	1775+00.00	-18.000	2541.962
Object Position:	1781+50.62	-18.000	2541.512
Obstruction:	No Obstruction		
Sight Distance:	813.229		
Eye Position:	1775+50.00	-18.000	2541.598
Object Position:	1781+99.76	-18.000	2541.923
Obstruction:	No Obstruction		
Sight Distance:	817.176		
Eye Position:	1776+00.00	-18.000	2541.295
Object Position:	1782+48.93	-18.000	2542.393
Obstruction:	No Obstruction		
Sight Distance:	820.859		
Eye Position:	1776+50.00	-18.000	2541.052
Object Position:	1782+98.15	-18.000	2542.922
Obstruction:	No Obstruction		
Sight Distance:	815.547		
Eye Position:	1777+00.00	-18.000	2540.868
Object Position:	1783+47.44	-18.000	2543.509
Obstruction:	No Obstruction		
Sight Distance:	807.423		
Eye Position:	1777+50.00	-18.000	2540.745
Object Position:	1783+96.80	-18.000	2544.156
Obstruction:	No Obstruction		
Sight Distance:	797.493		
Eye Position:	1778+00.00	-18.000	2540.683
Object Position:	1784+46.22	-18.000	2544.945
Obstruction:	No Obstruction		
Sight Distance:	792.335		
Eye Position:	1778+50.00	-18.000	2540.794

	Station	Offset	Elevation
	1784+95.71	-18.000	2545.887
Obstruction:	No Obstruction		
Sight Distance:	798.791		
Eye Position:	1779+00.00	-18.000	2541.065
Object Position:	1785+45.23	-18.000	2546.883
Obstruction:	No Obstruction		
Sight Distance:	811.475		
Eye Position:	1779+50.00	-18.000	2541.395
Object Position:	1785+95.00	-18.000	2547.963
Obstruction:	No Obstruction		
Sight Distance:	826.233		
Eye Position:	1780+00.00	-18.000	2541.785
Object Position:	1786+45.00	-18.000	2549.019
Obstruction:	No Obstruction		
Sight Distance:	831.800		
Eye Position:	1780+50.00	-18.000	2542.236
Object Position:	1786+95.00	-18.000	2550.033
Obstruction:	No Obstruction		
Sight Distance:	827.111		
Eye Position:	1781+00.00	-18.000	2542.649
Object Position:	1787+45.00	-18.000	2551.108
Obstruction:	No Obstruction		
Sight Distance:	824.710		
Eye Position:	1781+50.00	-18.000	2543.007
Object Position:	1787+95.00	-18.000	2552.241
Obstruction:	No Obstruction		
Sight Distance:	824.667		
Eye Position:	1782+00.00	-18.000	2543.425
Object Position:	1788+45.00	-18.000	2553.436
Obstruction:	No Obstruction		
Sight Distance:	824.729		
Eye Position:	1782+50.00	-18.000	2543.904
Object Position:	1788+95.00	-18.000	2554.691
Obstruction:	No Obstruction		
Sight Distance:	824.677		
Eye Position:	1783+00.00	-18.000	2544.443
Object Position:	1789+45.00	-18.000	2556.005
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	827.256		
Eye Position:	1783+50.00	-18.000	2545.041
Object Position:	1789+95.00	-18.000	2557.381
Obstruction:	No Obstruction		
Sight Distance:	835.956		
Eye Position:	1784+00.00	-18.000	2545.700
Object Position:	1790+45.00	-18.000	2558.816
Obstruction:	No Obstruction		
Sight Distance:	853.001		
Eye Position:	1784+50.00	-18.000	2546.510
Object Position:	1790+95.00	-18.000	2560.305
Obstruction:	No Obstruction		
Sight Distance:	896.668		
Eye Position:	1785+00.00	-18.000	2547.469
Object Position:	1791+45.00	-18.000	2561.805
Obstruction:	No Obstruction		
Sight Distance:	986.674		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:39am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1781+00.00
Stop Station: 1818+00.00
Interval: 50.000

Sight Distance: 612.000
Relaxed Distance: 612.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1781+00.00	-18.000	2542.649
Object Position:	1787+12.00	-18.000	2550.392
Obstruction:	No Obstruction		
Sight Distance:	796.268		
Eye Position:	1781+50.00	-18.000	2543.007
Object Position:	1787+62.00	-18.000	2551.486
Obstruction:	No Obstruction		
Sight Distance:	796.239		
Eye Position:	1782+00.00	-18.000	2543.425
Object Position:	1788+12.00	-18.000	2552.641
Obstruction:	No Obstruction		
Sight Distance:	796.207		
Eye Position:	1782+50.00	-18.000	2543.904
Object Position:	1788+62.00	-18.000	2553.856
Obstruction:	No Obstruction		
Sight Distance:	796.254		
Eye Position:	1783+00.00	-18.000	2544.443
Object Position:	1789+12.00	-18.000	2555.130
Obstruction:	No Obstruction		
Sight Distance:	796.686		
Eye Position:	1783+50.00	-18.000	2545.041
Object Position:	1789+62.00	-18.000	2556.466
Obstruction:	No Obstruction		
Sight Distance:	801.798		

	Station	Offset	Elevation
Eye Position:	1784+00.00	-18.000	2545.700
Object Position:	1790+12.00	-18.000	2557.861
Obstruction:	No Obstruction		
Sight Distance:	816.479		
Eye Position:	1784+50.00	-18.000	2546.510
Object Position:	1790+62.00	-18.000	2559.317
Obstruction:	No Obstruction		
Sight Distance:	832.601		
Eye Position:	1785+00.00	-18.000	2547.469
Object Position:	1791+12.00	-18.000	2560.815
Obstruction:	No Obstruction		
Sight Distance:	900.135		
Eye Position:	1785+50.00	-18.000	2548.488
Object Position:	1791+62.00	-18.000	2562.315
Obstruction:	No Obstruction		
Sight Distance:	979.227		
Eye Position:	1786+00.00	-18.000	2549.568
Object Position:	1792+12.00	-18.000	2563.402
Obstruction:	No Obstruction		
Sight Distance:	924.009		
Eye Position:	1786+50.00	-18.000	2550.618
Object Position:	1792+62.00	-18.000	2565.315
Obstruction:	No Obstruction		
Sight Distance:	1066.428		
Eye Position:	1787+00.00	-18.000	2551.638
Object Position:	1793+12.00	-18.000	2566.757
Obstruction:	No Obstruction		
Sight Distance:	1114.800		
Eye Position:	1787+50.00	-18.000	2552.718
Object Position:	1793+62.00	-18.000	2568.106
Obstruction:	No Obstruction		
Sight Distance:	1127.695		
Eye Position:	1788+00.00	-18.000	2553.858
Object Position:	1794+12.00	-18.000	2569.397
Obstruction:	No Obstruction		
Sight Distance:	1108.750		
Eye Position:	1788+50.00	-18.000	2555.059
Object Position:	1794+62.00	-18.000	2570.746

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1099.091		
Eye Position:	1789+00.00	-18.000	2556.319
Object Position:	1795+12.00	-18.000	2572.095
Obstruction:	No Obstruction		
Sight Distance:	1077.589		
Eye Position:	1789+50.00	-18.000	2557.640
Object Position:	1795+62.00	-18.000	2573.595
Obstruction:	No Obstruction		
Sight Distance:	1104.468		
Eye Position:	1790+00.00	-18.000	2559.021
Object Position:	1796+12.00	-18.000	2575.095
Obstruction:	No Obstruction		
Sight Distance:	1122.901		
Eye Position:	1790+50.00	-18.000	2560.462
Object Position:	1796+62.00	-18.000	2576.595
Obstruction:	No Obstruction		
Sight Distance:	1130.186		
Eye Position:	1791+00.00	-18.000	2561.955
Object Position:	1797+12.00	-18.000	2578.095
Obstruction:	No Obstruction		
Sight Distance:	1126.718		
Eye Position:	1791+50.00	-18.000	2563.455
Object Position:	1797+62.00	-18.000	2579.595
Obstruction:	No Obstruction		
Sight Distance:	1121.758		
Eye Position:	1792+00.00	-18.000	2564.955
Object Position:	1798+12.00	-18.000	2581.095
Obstruction:	No Obstruction		
Sight Distance:	1116.916		
Eye Position:	1792+50.00	-18.000	2566.455
Object Position:	1798+62.08	-18.000	2582.598
Obstruction:	No Obstruction		
Sight Distance:	1113.915		
Eye Position:	1793+00.00	-18.000	2567.955
Object Position:	1799+12.17	-18.000	2584.100
Obstruction:	No Obstruction		
Sight Distance:	1113.098		

	Station	Offset	Elevation
Eye Position:	1793+50.00	-18.000	2569.275
Object Position:	1799+62.26	-18.000	2585.603
Obstruction:	No Obstruction		
Sight Distance:	1154.836		
Eye Position:	1794+00.00	-18.000	2570.595
Object Position:	1800+12.36	-18.000	2587.105
Obstruction:	No Obstruction		
Sight Distance:	1207.058		
Eye Position:	1794+50.00	-18.000	2571.915
Object Position:	1800+62.38	-18.000	2588.606
Obstruction:	No Obstruction		
Sight Distance:	1271.599		
Eye Position:	1795+00.00	-18.000	2573.235
Object Position:	1801+12.38	-18.000	2590.106
Obstruction:	No Obstruction		
Sight Distance:	1351.226		
Eye Position:	1795+50.00	-18.000	2574.735
Object Position:	1801+62.39	-18.000	2591.607
Obstruction:	No Obstruction		
Sight Distance:	1363.150		
Eye Position:	1796+00.00	-18.000	2576.235
Object Position:	1802+12.39	-18.000	2593.107
Obstruction:	No Obstruction		
Sight Distance:	1782.570		
Eye Position:	1796+50.00	-18.000	2577.735
Object Position:	1802+62.39	-18.000	2594.607
Obstruction:	No Obstruction		
Sight Distance:	1785.634		
Eye Position:	1797+00.00	-18.000	2579.235
Object Position:	1803+12.38	-18.000	2596.107
Obstruction:	No Obstruction		
Sight Distance:	1781.502		
Eye Position:	1797+50.00	-18.000	2580.735
Object Position:	1803+62.38	-18.000	2597.606
Obstruction:	No Obstruction		
Sight Distance:	1769.734		
Eye Position:	1798+00.00	-18.000	2582.235

	Station	Offset	Elevation
	1804+12.38	-18.000	2599.106
Obstruction:	No Obstruction		
Sight Distance:	1754.971		
Eye Position:	1798+50.00	-18.000	2583.735
Object Position:	1804+62.31	-18.000	2600.604
Obstruction:	No Obstruction		
Sight Distance:	1734.339		
Eye Position:	1799+00.00	-18.000	2585.235
Object Position:	1805+12.22	-18.000	2602.102
Obstruction:	No Obstruction		
Sight Distance:	1690.755		
Eye Position:	1799+50.00	-18.000	2586.735
Object Position:	1805+62.13	-18.000	2603.599
Obstruction:	No Obstruction		
Sight Distance:	1644.812		
Eye Position:	1800+00.00	-18.000	2588.235
Object Position:	1806+12.04	-18.000	2605.096
Obstruction:	No Obstruction		
Sight Distance:	1596.735		
Eye Position:	1800+50.00	-18.000	2589.735
Object Position:	1806+62.00	-18.000	2606.595
Obstruction:	No Obstruction		
Sight Distance:	1547.035		
Eye Position:	1801+00.00	-18.000	2591.235
Object Position:	1807+12.00	-18.000	2608.095
Obstruction:	No Obstruction		
Sight Distance:	1497.154		
Eye Position:	1801+50.00	-18.000	2592.735
Object Position:	1807+62.00	-18.000	2609.595
Obstruction:	No Obstruction		
Sight Distance:	1447.273		
Eye Position:	1802+00.00	-18.000	2594.235
Object Position:	1808+12.00	-18.000	2611.095
Obstruction:	No Obstruction		
Sight Distance:	1397.392		
Eye Position:	1802+50.00	-18.000	2595.735
Object Position:	1808+62.00	-18.000	2612.595
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1347.511		
Eye Position:	1803+00.00	-18.000	2597.235
Object Position:	1809+12.00	-18.000	2614.088
Obstruction:	No Obstruction		
Sight Distance:	1297.614		
Eye Position:	1803+50.00	-18.000	2598.735
Object Position:	1809+62.00	-18.000	2615.548
Obstruction:	No Obstruction		
Sight Distance:	1247.654		
Eye Position:	1804+00.00	-18.000	2600.235
Object Position:	1810+12.00	-18.000	2616.886
Obstruction:	No Obstruction		
Sight Distance:	1197.471		
Eye Position:	1804+50.00	-18.000	2601.735
Object Position:	1810+62.00	-18.000	2618.042
Obstruction:	No Obstruction		
Sight Distance:	1146.981		
Eye Position:	1805+00.00	-18.000	2603.235
Object Position:	1811+12.00	-18.000	2619.195
Obstruction:	No Obstruction		
Sight Distance:	1096.542		
Eye Position:	1805+50.00	-18.000	2604.735
Object Position:	1811+62.15	-18.000	2620.291
Obstruction:	No Obstruction		
Sight Distance:	1006.733		
Eye Position:	1806+00.00	-18.000	2606.235
Object Position:	1812+12.63	-18.000	2621.359
Obstruction:	No Obstruction		
Sight Distance:	925.723		
Eye Position:	1806+50.00	-18.000	2607.735
Object Position:	1812+63.15	-18.000	2622.456
Obstruction:	No Obstruction		
Sight Distance:	869.505		
Eye Position:	1807+00.00	-18.000	2609.235
Object Position:	1813+13.72	-18.000	2623.667
Obstruction:	No Obstruction		
Sight Distance:	843.626		

	Station	Offset	Elevation
	1807+50.00	-18.000	2610.735
Object Position:	1813+64.35	-18.000	2624.832
Obstruction:	No Obstruction		
Sight Distance:	821.219		
Eye Position:	1808+00.00	-18.000	2612.235
Object Position:	1814+15.06	-18.000	2625.964
Obstruction:	No Obstruction		
Sight Distance:	805.173		
Eye Position:	1808+50.00	-18.000	2613.735
Object Position:	1814+65.83	-18.000	2627.057
Obstruction:	No Obstruction		
Sight Distance:	791.748		
Eye Position:	1809+00.00	-18.000	2615.233
Object Position:	1815+16.65	-18.000	2628.117
Obstruction:	No Obstruction		
Sight Distance:	781.548		
Eye Position:	1809+50.00	-18.000	2616.702
Object Position:	1815+67.49	-18.000	2629.133
Obstruction:	No Obstruction		
Sight Distance:	773.513		
Eye Position:	1810+00.00	-18.000	2618.102
Object Position:	1816+18.32	-18.000	2630.112
Obstruction:	No Obstruction		
Sight Distance:	768.255		
Eye Position:	1810+50.00	-18.000	2619.283
Object Position:	1816+69.12	-18.000	2631.044
Obstruction:	No Obstruction		
Sight Distance:	767.792		
Eye Position:	1811+00.00	-18.000	2620.424
Object Position:	1817+19.81	-18.000	2631.937
Obstruction:	No Obstruction		
Sight Distance:	768.284		
Eye Position:	1811+50.00	-18.000	2621.529
Object Position:	1817+70.31	-18.000	2632.795
Obstruction:	No Obstruction		
Sight Distance:	771.724		
Eye Position:	1812+00.00	-18.000	2622.594
Object Position:	1818+20.31	-18.000	2633.600

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	775.490		
Eye Position:	1812+50.00	-18.000	2623.635
Object Position:	1818+70.31	-18.000	2634.375
Obstruction:	No Obstruction		
Sight Distance:	779.670		
Eye Position:	1813+00.00	-18.000	2624.838
Object Position:	1819+20.31	-18.000	2635.106
Obstruction:	No Obstruction		
Sight Distance:	783.569		
Eye Position:	1813+50.00	-18.000	2626.003
Object Position:	1819+70.31	-18.000	2635.800
Obstruction:	No Obstruction		
Sight Distance:	817.554		
Eye Position:	1814+00.00	-18.000	2627.129
Object Position:	1820+20.31	-18.000	2636.455
Obstruction:	No Obstruction		
Sight Distance:	857.264		
Eye Position:	1814+50.00	-18.000	2628.218
Object Position:	1820+70.31	-18.000	2637.066
Obstruction:	No Obstruction		
Sight Distance:	870.354		
Eye Position:	1815+00.00	-18.000	2629.268
Object Position:	1821+20.31	-18.000	2637.796
Obstruction:	No Obstruction		
Sight Distance:	894.257		
Eye Position:	1815+50.00	-18.000	2630.281
Object Position:	1821+70.31	-18.000	2638.565
Obstruction:	No Obstruction		
Sight Distance:	933.887		
Eye Position:	1816+00.00	-18.000	2631.256
Object Position:	1822+19.89	-18.000	2639.302
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1816+50.00	-18.000	2632.192
Object Position:	1822+69.22	-18.000	2639.920
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1817+00.00	-18.000	2633.091
Object Position:	1823+18.46	-18.000	2640.553
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1817+50.00	-18.000	2633.952
Object Position:	1823+67.64	-18.000	2641.199
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1818+00.00	-18.000	2634.774
Object Position:	1824+16.81	-18.000	2641.718
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:41am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1814+00.00
Stop Station: 1847+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1814+00.00	-18.000	2627.129
Object Position:	1820+54.07	-18.000	2636.868
Obstruction:	No Obstruction		
Sight Distance:	888.831		
Eye Position:	1814+50.00	-18.000	2628.218
Object Position:	1821+04.07	-18.000	2637.562
Obstruction:	No Obstruction		
Sight Distance:	906.748		
Eye Position:	1815+00.00	-18.000	2629.268
Object Position:	1821+54.07	-18.000	2638.326
Obstruction:	No Obstruction		
Sight Distance:	937.275		
Eye Position:	1815+50.00	-18.000	2630.281
Object Position:	1822+03.84	-18.000	2639.058
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1816+00.00	-18.000	2631.256
Object Position:	1822+53.20	-18.000	2639.733
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1816+50.00	-18.000	2632.192
Object Position:	1823+02.44	-18.000	2640.378
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1817+00.00	-18.000	2633.091
Object Position:	1823+51.60	-18.000	2640.989
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1817+50.00	-18.000	2633.952
Object Position:	1824+00.73	-18.000	2641.557
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1818+00.00	-18.000	2634.774
Object Position:	1824+49.87	-18.000	2642.121
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1818+50.00	-18.000	2635.559
Object Position:	1824+99.03	-18.000	2642.683
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1819+00.00	-18.000	2636.305
Object Position:	1825+48.25	-18.000	2643.051
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1819+50.00	-18.000	2637.014
Object Position:	1825+97.53	-18.000	2643.406
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1820+00.00	-18.000	2637.685
Object Position:	1826+46.87	-18.000	2643.762
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1820+50.00	-18.000	2638.317
Object Position:	1826+96.29	-18.000	2644.117
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1821+00.00	-18.000	2639.002
Object Position:	1827+45.77	-18.000	2644.473
Obstruction:	No Obstruction		
Sight Distance:	1210.135		
Eye Position:	1821+50.00	-18.000	2639.770
Object Position:	1827+95.29	-18.000	2644.830

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1146.560		
Eye Position:	1822+00.00	-18.000	2640.502
Object Position:	1828+45.00	-18.000	2645.188
Obstruction:	No Obstruction		
Sight Distance:	1094.388		
Eye Position:	1822+50.00	-18.000	2641.195
Object Position:	1828+95.00	-18.000	2645.638
Obstruction:	No Obstruction		
Sight Distance:	1044.336		
Eye Position:	1823+00.00	-18.000	2641.851
Object Position:	1829+44.86	-18.000	2646.203
Obstruction:	No Obstruction		
Sight Distance:	997.038		
Eye Position:	1823+50.00	-18.000	2642.469
Object Position:	1829+94.66	-18.000	2646.626
Obstruction:	No Obstruction		
Sight Distance:	956.594		
Eye Position:	1824+00.00	-18.000	2643.049
Object Position:	1830+44.48	-18.000	2646.984
Obstruction:	No Obstruction		
Sight Distance:	925.439		
Eye Position:	1824+50.00	-18.000	2643.622
Object Position:	1830+94.30	-18.000	2647.343
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1825+00.00	-18.000	2644.195
Object Position:	1831+44.14	-18.000	2647.702
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1825+50.00	-18.000	2644.564
Object Position:	1831+93.99	-18.000	2648.061
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1826+00.00	-18.000	2644.924
Object Position:	1832+43.85	-18.000	2648.420
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1826+50.00	-18.000	2645.284
Object Position:	1832+93.72	-18.000	2648.779
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1827+00.00	-18.000	2645.644
Object Position:	1833+43.60	-18.000	2649.138
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1827+50.00	-18.000	2646.004
Object Position:	1833+93.47	-18.000	2649.498
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1828+00.00	-18.000	2646.364
Object Position:	1834+43.34	-18.000	2649.856
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1828+50.00	-18.000	2646.724
Object Position:	1834+93.19	-18.000	2650.214
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1829+00.00	-18.000	2647.188
Object Position:	1835+43.01	-18.000	2650.575
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1829+50.00	-18.000	2647.765
Object Position:	1835+92.98	-18.000	2650.935
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1830+00.00	-18.000	2648.164
Object Position:	1836+42.98	-18.000	2651.295
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1830+50.00	-18.000	2648.524
Object Position:	1836+92.98	-18.000	2651.654
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1831+00.00	-18.000	2648.884

	Station	Offset	Elevation
	1837+42.98	-18.000	2652.015
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1831+50.00	-18.000	2649.244
Object Position:	1837+92.98	-18.000	2652.375
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1832+00.00	-18.000	2649.604
Object Position:	1838+42.98	-18.000	2652.735
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1832+50.00	-18.000	2649.964
Object Position:	1838+92.98	-18.000	2653.095
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1833+00.00	-18.000	2650.324
Object Position:	1839+42.98	-18.000	2653.455
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1833+50.00	-18.000	2650.684
Object Position:	1839+92.98	-18.000	2653.815
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1834+00.00	-18.000	2651.044
Object Position:	1840+42.98	-18.000	2654.159
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1834+50.00	-18.000	2651.404
Object Position:	1840+92.98	-18.000	2654.399
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1835+00.00	-18.000	2651.764
Object Position:	1841+43.02	-18.000	2654.405
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1835+50.00	-18.000	2652.124
Object Position:	1841+93.20	-18.000	2654.449
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1836+00.00	-18.000	2652.484
Object Position:	1842+43.35	-18.000	2654.526
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1836+50.00	-18.000	2652.844
Object Position:	1842+93.48	-18.000	2654.537
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1837+00.00	-18.000	2653.204
Object Position:	1843+43.60	-18.000	2654.480
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1837+50.00	-18.000	2653.564
Object Position:	1843+93.73	-18.000	2654.355
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1838+00.00	-18.000	2653.924
Object Position:	1844+43.86	-18.000	2654.164
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1838+50.00	-18.000	2654.284
Object Position:	1844+94.00	-18.000	2653.902
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1839+00.00	-18.000	2654.644
Object Position:	1845+44.15	-18.000	2653.571
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1839+50.00	-18.000	2655.004
Object Position:	1845+94.31	-18.000	2653.170
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1840+00.00	-18.000	2655.364
Object Position:	1846+44.49	-18.000	2652.703
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1840+50.00	-18.000	2655.705
Object Position:	1846+94.68	-18.000	2652.166
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1841+00.00	-18.000	2655.901
Object Position:	1847+44.87	-18.000	2651.560
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1841+50.00	-18.000	2655.891
Object Position:	1847+95.00	-18.000	2650.887
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1842+00.00	-18.000	2655.965
Object Position:	1848+45.00	-18.000	2650.146
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1842+50.00	-18.000	2656.035
Object Position:	1848+95.00	-18.000	2649.390
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1843+00.00	-18.000	2656.037
Object Position:	1849+45.00	-18.000	2648.701
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1843+50.00	-18.000	2655.972
Object Position:	1849+94.81	-18.000	2647.962
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+00.00	-18.000	2655.838
Object Position:	1850+44.60	-18.000	2647.054
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+50.00	-18.000	2655.636
Object Position:	1850+94.41	-18.000	2645.979
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+00.00	-18.000	2655.366
Object Position:	1851+44.22	-18.000	2644.834

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+50.00	-18.000	2655.028
Object Position:	1851+94.05	-18.000	2643.624
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1846+00.00	-18.000	2654.622
Object Position:	1852+43.90	-18.000	2642.345
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1846+50.00	-18.000	2654.147
Object Position:	1852+93.76	-18.000	2640.998
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1847+00.00	-18.000	2653.605
Object Position:	1853+43.63	-18.000	2639.580
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:56am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1843+00.00
Stop Station: 1899+00.00
Interval: 50.000

Sight Distance: 806.000
Relaxed Distance: 806.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1843+00.00	-18.000	2656.037
Object Position:	1851+05.37	-18.000	2645.732
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1843+50.00	-18.000	2655.972
Object Position:	1851+55.19	-18.000	2644.574
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+00.00	-18.000	2655.838
Object Position:	1852+05.03	-18.000	2643.349
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+50.00	-18.000	2655.636
Object Position:	1852+54.89	-18.000	2642.054
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+00.00	-18.000	2655.366
Object Position:	1853+04.76	-18.000	2640.690
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+50.00	-18.000	2655.028
Object Position:	1853+54.66	-18.000	2639.259
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1846+00.00	-18.000	2654.622
Object Position:	1854+04.57	-18.000	2637.760
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1846+50.00	-18.000	2654.147
Object Position:	1854+54.48	-18.000	2636.194
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1847+00.00	-18.000	2653.605
Object Position:	1855+04.40	-18.000	2634.558
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1847+50.00	-18.000	2652.994
Object Position:	1855+54.32	-18.000	2632.855
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1848+00.00	-18.000	2652.316
Object Position:	1856+04.23	-18.000	2631.084
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1848+50.00	-18.000	2651.569
Object Position:	1856+54.12	-18.000	2629.247
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1849+00.00	-18.000	2650.823
Object Position:	1857+03.97	-18.000	2627.342
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1849+50.00	-18.000	2650.140
Object Position:	1857+53.79	-18.000	2625.372
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1850+00.00	-18.000	2649.389
Object Position:	1858+03.79	-18.000	2623.326
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1850+50.00	-18.000	2648.441
Object Position:	1858+53.79	-18.000	2621.212

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1851+00.00	-18.000	2647.354
Object Position:	1859+03.79	-18.000	2619.030
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1851+50.00	-18.000	2646.199
Object Position:	1859+53.79	-18.000	2616.781
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1852+00.00	-18.000	2644.976
Object Position:	1860+03.79	-18.000	2614.462
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1852+50.00	-18.000	2643.684
Object Position:	1860+53.79	-18.000	2612.076
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1853+00.00	-18.000	2642.325
Object Position:	1861+03.79	-18.000	2609.623
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1853+50.00	-18.000	2640.897
Object Position:	1861+53.79	-18.000	2607.124
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1854+00.00	-18.000	2639.401
Object Position:	1862+03.79	-18.000	2604.624
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1854+50.00	-18.000	2637.838
Object Position:	1862+53.79	-18.000	2602.124
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1855+00.00	-18.000	2636.206
Object Position:	1863+03.79	-18.000	2599.624
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1855+50.00	-18.000	2634.506
Object Position:	1863+53.79	-18.000	2597.124
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1856+00.00	-18.000	2632.738
Object Position:	1864+03.79	-18.000	2594.527
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1856+50.00	-18.000	2630.901
Object Position:	1864+53.82	-18.000	2591.824
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1857+00.00	-18.000	2628.997
Object Position:	1865+04.00	-18.000	2589.104
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1857+50.00	-18.000	2627.025
Object Position:	1865+54.14	-18.000	2586.566
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1858+00.00	-18.000	2624.984
Object Position:	1866+04.25	-18.000	2584.061
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1858+50.00	-18.000	2622.876
Object Position:	1866+54.34	-18.000	2581.557
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1859+00.00	-18.000	2620.699
Object Position:	1867+04.42	-18.000	2579.053
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1859+50.00	-18.000	2618.454
Object Position:	1867+54.50	-18.000	2576.548
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1860+00.00	-18.000	2616.141

	Station	Offset	Elevation
	1868+04.58	-18.000	2574.044
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1860+50.00	-18.000	2613.760
Object Position:	1868+54.68	-18.000	2571.539
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1861+00.00	-18.000	2611.311
Object Position:	1869+04.78	-18.000	2569.034
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1861+50.00	-18.000	2608.813
Object Position:	1869+54.91	-18.000	2566.527
Obstruction:	No Obstruction		
Sight Distance:	1539.623		
Eye Position:	1862+00.00	-18.000	2606.313
Object Position:	1870+05.06	-18.000	2564.020
Obstruction:	No Obstruction		
Sight Distance:	1559.902		
Eye Position:	1862+50.00	-18.000	2603.813
Object Position:	1870+55.22	-18.000	2561.512
Obstruction:	No Obstruction		
Sight Distance:	1576.239		
Eye Position:	1863+00.00	-18.000	2601.313
Object Position:	1871+05.40	-18.000	2559.003
Obstruction:	No Obstruction		
Sight Distance:	1588.270		
Eye Position:	1863+50.00	-18.000	2598.813
Object Position:	1871+55.60	-18.000	2556.493
Obstruction:	No Obstruction		
Sight Distance:	1595.538		
Eye Position:	1864+00.00	-18.000	2596.226
Object Position:	1872+05.81	-18.000	2553.983
Obstruction:	No Obstruction		
Sight Distance:	1633.623		
Eye Position:	1864+50.00	-18.000	2593.525
Object Position:	1872+56.00	-18.000	2551.473
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1726.068		
Eye Position:	1865+00.00	-18.000	2590.825
Object Position:	1873+06.00	-18.000	2548.973
Obstruction:	No Obstruction		
Sight Distance:	1844.324		
Eye Position:	1865+50.00	-18.000	2588.273
Object Position:	1873+56.00	-18.000	2546.473
Obstruction:	No Obstruction		
Sight Distance:	1856.719		
Eye Position:	1866+00.00	-18.000	2585.773
Object Position:	1874+06.00	-18.000	2543.973
Obstruction:	No Obstruction		
Sight Distance:	1819.674		
Eye Position:	1866+50.00	-18.000	2583.273
Object Position:	1874+56.00	-18.000	2541.473
Obstruction:	No Obstruction		
Sight Distance:	1786.262		
Eye Position:	1867+00.00	-18.000	2580.773
Object Position:	1875+06.00	-18.000	2538.973
Obstruction:	No Obstruction		
Sight Distance:	1754.256		
Eye Position:	1867+50.00	-18.000	2578.273
Object Position:	1875+56.00	-18.000	2536.473
Obstruction:	No Obstruction		
Sight Distance:	1722.705		
Eye Position:	1868+00.00	-18.000	2575.773
Object Position:	1876+06.00	-18.000	2533.973
Obstruction:	No Obstruction		
Sight Distance:	1688.491		
Eye Position:	1868+50.00	-18.000	2573.273
Object Position:	1876+56.00	-18.000	2531.473
Obstruction:	No Obstruction		
Sight Distance:	1650.707		
Eye Position:	1869+00.00	-18.000	2570.773
Object Position:	1877+06.00	-18.000	2528.973
Obstruction:	No Obstruction		
Sight Distance:	1612.598		

	Station	Offset	Elevation
	1869+50.00	-18.000	2568.273
Object Position:	1877+56.00	-18.000	2526.473
Obstruction:	No Obstruction		
Sight Distance:	1578.334		
Eye Position:	1870+00.00	-18.000	2565.773
Object Position:	1878+06.00	-18.000	2523.973
Obstruction:	No Obstruction		
Sight Distance:	1557.134		
Eye Position:	1870+50.00	-18.000	2563.273
Object Position:	1878+56.00	-18.000	2521.473
Obstruction:	No Obstruction		
Sight Distance:	1536.254		
Eye Position:	1871+00.00	-18.000	2560.773
Object Position:	1879+06.00	-18.000	2518.973
Obstruction:	No Obstruction		
Sight Distance:	1513.596		
Eye Position:	1871+50.00	-18.000	2558.273
Object Position:	1879+56.00	-18.000	2516.473
Obstruction:	No Obstruction		
Sight Distance:	1488.577		
Eye Position:	1872+00.00	-18.000	2555.773
Object Position:	1880+06.00	-18.000	2513.973
Obstruction:	No Obstruction		
Sight Distance:	1462.633		
Eye Position:	1872+50.00	-18.000	2553.273
Object Position:	1880+56.00	-18.000	2511.473
Obstruction:	No Obstruction		
Sight Distance:	1434.638		
Eye Position:	1873+00.00	-18.000	2550.773
Object Position:	1881+06.00	-18.000	2508.973
Obstruction:	No Obstruction		
Sight Distance:	1405.982		
Eye Position:	1873+50.00	-18.000	2548.273
Object Position:	1881+56.00	-18.000	2506.473
Obstruction:	No Obstruction		
Sight Distance:	1375.779		
Eye Position:	1874+00.00	-18.000	2545.773
Object Position:	1882+06.00	-18.000	2503.973

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1344.818		
Eye Position:	1874+50.00	-18.000	2543.273
Object Position:	1882+56.00	-18.000	2501.473
Obstruction:	No Obstruction		
Sight Distance:	1312.981		
Eye Position:	1875+00.00	-18.000	2540.773
Object Position:	1883+06.00	-18.000	2498.973
Obstruction:	No Obstruction		
Sight Distance:	1280.730		
Eye Position:	1875+50.00	-18.000	2538.273
Object Position:	1883+56.00	-18.000	2496.473
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1876+00.00	-18.000	2535.773
Object Position:	1884+06.00	-18.000	2494.014
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1876+50.00	-18.000	2533.273
Object Position:	1884+56.00	-18.000	2491.718
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1877+00.00	-18.000	2530.773
Object Position:	1885+05.85	-18.000	2489.425
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1877+50.00	-18.000	2528.273
Object Position:	1885+55.68	-18.000	2487.031
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1878+00.00	-18.000	2525.773
Object Position:	1886+05.51	-18.000	2484.539
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1878+50.00	-18.000	2523.273
Object Position:	1886+55.35	-18.000	2482.046
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1879+00.00	-18.000	2520.773
Object Position:	1887+05.20	-18.000	2479.553
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1879+50.00	-18.000	2518.273
Object Position:	1887+55.07	-18.000	2477.060
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1880+00.00	-18.000	2515.773
Object Position:	1888+04.95	-18.000	2474.566
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1880+50.00	-18.000	2513.273
Object Position:	1888+54.85	-18.000	2472.072
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1881+00.00	-18.000	2510.773
Object Position:	1889+04.75	-18.000	2469.576
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1881+50.00	-18.000	2508.273
Object Position:	1889+54.66	-18.000	2467.081
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1882+00.00	-18.000	2505.773
Object Position:	1890+04.58	-18.000	2464.585
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1882+50.00	-18.000	2503.273
Object Position:	1890+54.49	-18.000	2462.090
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1883+00.00	-18.000	2500.773
Object Position:	1891+04.40	-18.000	2459.595
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1883+50.00	-18.000	2498.273

	Station	Offset	Elevation
	1891+54.30	-18.000	2457.111
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1884+00.00	-18.000	2495.785
Object Position:	1892+04.18	-18.000	2454.643
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1884+50.00	-18.000	2493.486
Object Position:	1892+54.02	-18.000	2452.194
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1885+00.00	-18.000	2491.186
Object Position:	1893+03.97	-18.000	2449.755
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1885+50.00	-18.000	2488.813
Object Position:	1893+53.97	-18.000	2447.330
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1886+00.00	-18.000	2486.313
Object Position:	1894+03.97	-18.000	2444.921
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1886+50.00	-18.000	2483.813
Object Position:	1894+53.97	-18.000	2442.528
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1887+00.00	-18.000	2481.313
Object Position:	1895+03.97	-18.000	2440.151
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1887+50.00	-18.000	2478.813
Object Position:	1895+53.97	-18.000	2437.788
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1888+00.00	-18.000	2476.313
Object Position:	1896+03.97	-18.000	2435.445
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1888+50.00	-18.000	2473.813
Object Position:	1896+53.97	-18.000	2433.116
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1889+00.00	-18.000	2471.313
Object Position:	1897+03.97	-18.000	2430.802
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1889+50.00	-18.000	2468.813
Object Position:	1897+53.97	-18.000	2428.506
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1890+00.00	-18.000	2466.313
Object Position:	1898+03.97	-18.000	2426.225
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1890+50.00	-18.000	2463.813
Object Position:	1898+53.97	-18.000	2423.960
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1891+00.00	-18.000	2461.313
Object Position:	1899+03.97	-18.000	2421.712
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1891+50.00	-18.000	2458.823
Object Position:	1899+53.97	-18.000	2419.479
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1892+00.00	-18.000	2456.348
Object Position:	1900+03.97	-18.000	2417.262
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1892+50.00	-18.000	2453.890
Object Position:	1900+53.97	-18.000	2415.063
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1893+00.00	-18.000	2451.447
Object Position:	1901+03.97	-18.000	2412.879
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1893+50.00	-18.000	2449.021
Object Position:	1901+53.97	-18.000	2410.709
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1894+00.00	-18.000	2446.611
Object Position:	1902+03.97	-18.000	2408.556
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1894+50.00	-18.000	2444.216
Object Position:	1902+53.97	-18.000	2406.251
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1895+00.00	-18.000	2441.838
Object Position:	1903+04.05	-18.000	2403.937
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1895+50.00	-18.000	2439.476
Object Position:	1903+54.20	-18.000	2401.634
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1896+00.00	-18.000	2437.130
Object Position:	1904+04.32	-18.000	2399.514
Obstruction:	No Obstruction		
Sight Distance:	3027.673		
Eye Position:	1896+50.00	-18.000	2434.799
Object Position:	1904+54.42	-18.000	2397.395
Obstruction:	No Obstruction		
Sight Distance:	2897.944		
Eye Position:	1897+00.00	-18.000	2432.485
Object Position:	1905+04.51	-18.000	2395.276
Obstruction:	No Obstruction		
Sight Distance:	2771.003		
Eye Position:	1897+50.00	-18.000	2430.187
Object Position:	1905+54.59	-18.000	2393.158

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	2649.299		
Eye Position:	1898+00.00	-18.000	2427.905
Object Position:	1906+04.68	-18.000	2391.039
Obstruction:	No Obstruction		
Sight Distance:	1427.129		
Eye Position:	1898+50.00	-18.000	2425.639
Object Position:	1906+54.77	-18.000	2388.920
Obstruction:	No Obstruction		
Sight Distance:	1376.020		
Eye Position:	1899+00.00	-18.000	2423.389
Object Position:	1907+04.87	-18.000	2386.801
Obstruction:	No Obstruction		
Sight Distance:	1390.041		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:58am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1895+00.00
Stop Station: 1955+00.00
Interval: 50.000

Sight Distance: 792.000
Relaxed Distance: 792.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1895+00.00	-18.000	2441.838
Object Position:	1902+90.01	-18.000	2404.569
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1895+50.00	-18.000	2439.476
Object Position:	1903+40.17	-18.000	2402.270
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1896+00.00	-18.000	2437.130
Object Position:	1903+90.30	-18.000	2400.107
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1896+50.00	-18.000	2434.799
Object Position:	1904+40.40	-18.000	2397.988
Obstruction:	No Obstruction		
Sight Distance:	2905.255		
Eye Position:	1897+00.00	-18.000	2432.485
Object Position:	1904+90.50	-18.000	2395.869
Obstruction:	No Obstruction		
Sight Distance:	2776.716		
Eye Position:	1897+50.00	-18.000	2430.187
Object Position:	1905+40.59	-18.000	2393.750
Obstruction:	No Obstruction		
Sight Distance:	2653.425		

	Station	Offset	Elevation
Eye Position:	1898+00.00	-18.000	2427.905
Object Position:	1905+90.67	-18.000	2391.632
Obstruction:	No Obstruction		
Sight Distance:	1429.156		
Eye Position:	1898+50.00	-18.000	2425.639
Object Position:	1906+40.77	-18.000	2389.513
Obstruction:	No Obstruction		
Sight Distance:	1356.475		
Eye Position:	1899+00.00	-18.000	2423.389
Object Position:	1906+90.86	-18.000	2387.393
Obstruction:	No Obstruction		
Sight Distance:	1365.794		
Eye Position:	1899+50.00	-18.000	2421.155
Object Position:	1907+40.98	-18.000	2385.274
Obstruction:	No Obstruction		
Sight Distance:	1400.560		
Eye Position:	1900+00.00	-18.000	2418.937
Object Position:	1907+91.10	-18.000	2383.154
Obstruction:	No Obstruction		
Sight Distance:	1440.670		
Eye Position:	1900+50.00	-18.000	2416.736
Object Position:	1908+41.23	-18.000	2381.033
Obstruction:	No Obstruction		
Sight Distance:	1477.914		
Eye Position:	1901+00.00	-18.000	2414.550
Object Position:	1908+91.38	-18.000	2378.912
Obstruction:	No Obstruction		
Sight Distance:	2043.292		
Eye Position:	1901+50.00	-18.000	2412.380
Object Position:	1909+41.54	-18.000	2376.790
Obstruction:	No Obstruction		
Sight Distance:	1992.443		
Eye Position:	1902+00.00	-18.000	2410.226
Object Position:	1909+91.71	-18.000	2374.668
Obstruction:	No Obstruction		
Sight Distance:	1946.764		
Eye Position:	1902+50.00	-18.000	2407.941
Object Position:	1910+41.89	-18.000	2372.545

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1926.316		
Eye Position:	1903+00.00	-18.000	2405.619
Object Position:	1910+92.00	-18.000	2370.425
Obstruction:	No Obstruction		
Sight Distance:	1912.582		
Eye Position:	1903+50.00	-18.000	2403.312
Object Position:	1911+42.00	-18.000	2368.310
Obstruction:	No Obstruction		
Sight Distance:	1895.745		
Eye Position:	1904+00.00	-18.000	2401.197
Object Position:	1911+92.00	-18.000	2366.195
Obstruction:	No Obstruction		
Sight Distance:	1853.773		
Eye Position:	1904+50.00	-18.000	2399.082
Object Position:	1912+42.00	-18.000	2364.081
Obstruction:	No Obstruction		
Sight Distance:	1811.585		
Eye Position:	1905+00.00	-18.000	2396.967
Object Position:	1912+92.00	-18.000	2361.965
Obstruction:	No Obstruction		
Sight Distance:	1769.123		
Eye Position:	1905+50.00	-18.000	2394.852
Object Position:	1913+42.00	-18.000	2359.851
Obstruction:	No Obstruction		
Sight Distance:	1726.796		
Eye Position:	1906+00.00	-18.000	2392.737
Object Position:	1913+92.00	-18.000	2357.736
Obstruction:	No Obstruction		
Sight Distance:	1684.318		
Eye Position:	1906+50.00	-18.000	2390.622
Object Position:	1914+42.00	-18.000	2355.621
Obstruction:	No Obstruction		
Sight Distance:	1641.841		
Eye Position:	1907+00.00	-18.000	2388.507
Object Position:	1914+92.00	-18.000	2353.506
Obstruction:	No Obstruction		
Sight Distance:	1599.369		

	Station	Offset	Elevation
Eye Position:	1907+50.00	-18.000	2386.392
Object Position:	1915+42.00	-18.000	2351.374
Obstruction:	No Obstruction		
Sight Distance:	1553.916		
Eye Position:	1908+00.00	-18.000	2384.277
Object Position:	1915+92.00	-18.000	2349.064
Obstruction:	No Obstruction		
Sight Distance:	1482.928		
Eye Position:	1908+50.00	-18.000	2382.162
Object Position:	1916+42.00	-18.000	2346.743
Obstruction:	No Obstruction		
Sight Distance:	1412.532		
Eye Position:	1909+00.00	-18.000	2380.047
Object Position:	1916+92.00	-18.000	2344.419
Obstruction:	No Obstruction		
Sight Distance:	1343.782		
Eye Position:	1909+50.00	-18.000	2377.932
Object Position:	1917+42.00	-18.000	2342.125
Obstruction:	No Obstruction		
Sight Distance:	1280.739		
Eye Position:	1910+00.00	-18.000	2375.817
Object Position:	1917+92.00	-18.000	2339.789
Obstruction:	No Obstruction		
Sight Distance:	1214.667		
Eye Position:	1910+50.00	-18.000	2373.702
Object Position:	1918+42.00	-18.000	2337.474
Obstruction:	No Obstruction		
Sight Distance:	1153.970		
Eye Position:	1911+00.00	-18.000	2371.587
Object Position:	1918+92.07	-18.000	2335.156
Obstruction:	No Obstruction		
Sight Distance:	1095.158		
Eye Position:	1911+50.00	-18.000	2369.472
Object Position:	1919+42.36	-18.000	2332.834
Obstruction:	No Obstruction		
Sight Distance:	1043.361		
Eye Position:	1912+00.00	-18.000	2367.357

	Station	Offset	Elevation
	1919+92.67	-18.000	2330.527
Obstruction:	No Obstruction		
Sight Distance:	1001.640		
Eye Position:	1912+50.00	-18.000	2365.242
Object Position:	1920+43.01	-18.000	2328.398
Obstruction:	No Obstruction		
Sight Distance:	983.262		
Eye Position:	1913+00.00	-18.000	2363.127
Object Position:	1920+93.37	-18.000	2326.269
Obstruction:	No Obstruction		
Sight Distance:	968.841		
Eye Position:	1913+50.00	-18.000	2361.012
Object Position:	1921+43.76	-18.000	2324.137
Obstruction:	No Obstruction		
Sight Distance:	957.128		
Eye Position:	1914+00.00	-18.000	2358.897
Object Position:	1921+94.19	-18.000	2322.004
Obstruction:	No Obstruction		
Sight Distance:	947.563		
Eye Position:	1914+50.00	-18.000	2356.782
Object Position:	1922+44.66	-18.000	2319.871
Obstruction:	No Obstruction		
Sight Distance:	939.438		
Eye Position:	1915+00.00	-18.000	2354.667
Object Position:	1922+95.15	-18.000	2317.735
Obstruction:	No Obstruction		
Sight Distance:	932.651		
Eye Position:	1915+50.00	-18.000	2352.504
Object Position:	1923+45.67	-18.000	2315.597
Obstruction:	No Obstruction		
Sight Distance:	927.552		
Eye Position:	1916+00.00	-18.000	2350.189
Object Position:	1923+96.20	-18.000	2313.460
Obstruction:	No Obstruction		
Sight Distance:	925.045		
Eye Position:	1916+50.00	-18.000	2347.874
Object Position:	1924+46.74	-18.000	2311.322
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	923.659		
Eye Position:	1917+00.00	-18.000	2345.559
Object Position:	1924+97.27	-18.000	2309.184
Obstruction:	No Obstruction		
Sight Distance:	922.510		
Eye Position:	1917+50.00	-18.000	2343.244
Object Position:	1925+47.77	-18.000	2307.048
Obstruction:	No Obstruction		
Sight Distance:	922.302		
Eye Position:	1918+00.00	-18.000	2340.929
Object Position:	1925+98.23	-18.000	2304.912
Obstruction:	No Obstruction		
Sight Distance:	922.483		
Eye Position:	1918+50.00	-18.000	2338.614
Object Position:	1926+48.62	-18.000	2302.781
Obstruction:	No Obstruction		
Sight Distance:	923.578		
Eye Position:	1919+00.00	-18.000	2336.299
Object Position:	1926+98.81	-18.000	2300.657
Obstruction:	No Obstruction		
Sight Distance:	925.228		
Eye Position:	1919+50.00	-18.000	2333.984
Object Position:	1927+48.81	-18.000	2298.543
Obstruction:	No Obstruction		
Sight Distance:	927.291		
Eye Position:	1920+00.00	-18.000	2331.717
Object Position:	1927+98.81	-18.000	2296.427
Obstruction:	No Obstruction		
Sight Distance:	928.739		
Eye Position:	1920+50.00	-18.000	2329.602
Object Position:	1928+48.81	-18.000	2294.313
Obstruction:	No Obstruction		
Sight Distance:	928.767		
Eye Position:	1921+00.00	-18.000	2327.487
Object Position:	1928+98.81	-18.000	2292.198
Obstruction:	No Obstruction		
Sight Distance:	928.915		

	Station	Offset	Elevation
	1921+50.00	-18.000	2325.372
Object Position:	1929+48.81	-18.000	2290.083
Obstruction:	No Obstruction		
Sight Distance:	928.885		
Eye Position:	1922+00.00	-18.000	2323.257
Object Position:	1929+98.81	-18.000	2287.968
Obstruction:	No Obstruction		
Sight Distance:	928.875		
Eye Position:	1922+50.00	-18.000	2321.142
Object Position:	1930+48.81	-18.000	2285.852
Obstruction:	No Obstruction		
Sight Distance:	928.833		
Eye Position:	1923+00.00	-18.000	2319.027
Object Position:	1930+98.81	-18.000	2283.738
Obstruction:	No Obstruction		
Sight Distance:	928.859		
Eye Position:	1923+50.00	-18.000	2316.912
Object Position:	1931+48.81	-18.000	2281.622
Obstruction:	No Obstruction		
Sight Distance:	928.716		
Eye Position:	1924+00.00	-18.000	2314.797
Object Position:	1931+98.81	-18.000	2279.508
Obstruction:	No Obstruction		
Sight Distance:	928.764		
Eye Position:	1924+50.00	-18.000	2312.682
Object Position:	1932+48.81	-18.000	2277.393
Obstruction:	No Obstruction		
Sight Distance:	928.439		
Eye Position:	1925+00.00	-18.000	2310.567
Object Position:	1932+98.81	-18.000	2275.278
Obstruction:	No Obstruction		
Sight Distance:	928.448		
Eye Position:	1925+50.00	-18.000	2308.452
Object Position:	1933+48.81	-18.000	2273.163
Obstruction:	No Obstruction		
Sight Distance:	928.440		
Eye Position:	1926+00.00	-18.000	2306.337
Object Position:	1933+98.81	-18.000	2271.048

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	928.572		
Eye Position:	1926+50.00	-18.000	2304.222
Object Position:	1934+48.81	-18.000	2268.933
Obstruction:	No Obstruction		
Sight Distance:	928.481		
Eye Position:	1927+00.00	-18.000	2302.107
Object Position:	1934+98.81	-18.000	2266.818
Obstruction:	No Obstruction		
Sight Distance:	928.588		
Eye Position:	1927+50.00	-18.000	2299.992
Object Position:	1935+48.81	-18.000	2264.703
Obstruction:	No Obstruction		
Sight Distance:	928.592		
Eye Position:	1928+00.00	-18.000	2297.877
Object Position:	1935+98.81	-18.000	2262.588
Obstruction:	No Obstruction		
Sight Distance:	929.664		
Eye Position:	1928+50.00	-18.000	2295.762
Object Position:	1936+48.81	-18.000	2260.473
Obstruction:	No Obstruction		
Sight Distance:	929.457		
Eye Position:	1929+00.00	-18.000	2293.647
Object Position:	1936+98.81	-18.000	2258.358
Obstruction:	No Obstruction		
Sight Distance:	934.804		
Eye Position:	1929+50.00	-18.000	2291.532
Object Position:	1937+48.81	-18.000	2256.332
Obstruction:	No Obstruction		
Sight Distance:	953.216		
Eye Position:	1930+00.00	-18.000	2289.417
Object Position:	1937+98.81	-18.000	2254.418
Obstruction:	No Obstruction		
Sight Distance:	1032.132		
Eye Position:	1930+50.00	-18.000	2287.302
Object Position:	1938+48.72	-18.000	2252.505
Obstruction:	No Obstruction		
Sight Distance:	1110.099		

	Station	Offset	Elevation
Eye Position:	1931+00.00	-18.000	2285.187
Object Position:	1938+98.36	-18.000	2250.604
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1931+50.00	-18.000	2283.072
Object Position:	1939+47.93	-18.000	2248.710
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1932+00.00	-18.000	2280.957
Object Position:	1939+97.44	-18.000	2246.805
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1932+50.00	-18.000	2278.842
Object Position:	1940+46.93	-18.000	2244.712
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1933+00.00	-18.000	2276.727
Object Position:	1940+96.40	-18.000	2242.619
Obstruction:	No Obstruction		
Sight Distance:	1443.100		
Eye Position:	1933+50.00	-18.000	2274.612
Object Position:	1941+45.86	-18.000	2240.527
Obstruction:	No Obstruction		
Sight Distance:	1421.550		
Eye Position:	1934+00.00	-18.000	2272.497
Object Position:	1941+95.35	-18.000	2238.434
Obstruction:	No Obstruction		
Sight Distance:	1395.837		
Eye Position:	1934+50.00	-18.000	2270.382
Object Position:	1942+44.85	-18.000	2236.340
Obstruction:	No Obstruction		
Sight Distance:	1364.262		
Eye Position:	1935+00.00	-18.000	2268.267
Object Position:	1942+94.37	-18.000	2234.245
Obstruction:	No Obstruction		
Sight Distance:	1330.050		
Eye Position:	1935+50.00	-18.000	2266.152

	Station	Offset	Elevation
	1943+43.93	-18.000	2232.149
Obstruction:	No Obstruction		
Sight Distance:	1293.398		
Eye Position:	1936+00.00	-18.000	2264.037
Object Position:	1943+93.53	-18.000	2230.051
Obstruction:	No Obstruction		
Sight Distance:	1253.674		
Eye Position:	1936+50.00	-18.000	2261.922
Object Position:	1944+43.16	-18.000	2227.952
Obstruction:	No Obstruction		
Sight Distance:	1211.520		
Eye Position:	1937+00.00	-18.000	2259.807
Object Position:	1944+92.81	-18.000	2225.851
Obstruction:	No Obstruction		
Sight Distance:	1167.791		
Eye Position:	1937+50.00	-18.000	2257.788
Object Position:	1945+42.50	-18.000	2223.753
Obstruction:	No Obstruction		
Sight Distance:	1119.641		
Eye Position:	1938+00.00	-18.000	2255.873
Object Position:	1945+92.20	-18.000	2221.703
Obstruction:	No Obstruction		
Sight Distance:	1073.969		
Eye Position:	1938+50.00	-18.000	2253.958
Object Position:	1946+42.00	-18.000	2219.723
Obstruction:	No Obstruction		
Sight Distance:	1037.295		
Eye Position:	1939+00.00	-18.000	2252.043
Object Position:	1946+92.00	-18.000	2217.817
Obstruction:	No Obstruction		
Sight Distance:	1008.418		
Eye Position:	1939+50.00	-18.000	2250.128
Object Position:	1947+42.00	-18.000	2215.992
Obstruction:	No Obstruction		
Sight Distance:	985.721		
Eye Position:	1940+00.00	-18.000	2248.197
Object Position:	1947+92.00	-18.000	2214.237
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	967.479		
Eye Position:	1940+50.00	-18.000	2246.082
Object Position:	1948+42.00	-18.000	2212.567
Obstruction:	No Obstruction		
Sight Distance:	956.236		
Eye Position:	1941+00.00	-18.000	2243.967
Object Position:	1948+92.00	-18.000	2210.971
Obstruction:	No Obstruction		
Sight Distance:	946.784		
Eye Position:	1941+50.00	-18.000	2241.852
Object Position:	1949+42.00	-18.000	2209.453
Obstruction:	No Obstruction		
Sight Distance:	938.879		
Eye Position:	1942+00.00	-18.000	2239.737
Object Position:	1949+92.00	-18.000	2208.013
Obstruction:	No Obstruction		
Sight Distance:	932.236		
Eye Position:	1942+50.00	-18.000	2237.622
Object Position:	1950+42.00	-18.000	2206.652
Obstruction:	No Obstruction		
Sight Distance:	927.758		
Eye Position:	1943+00.00	-18.000	2235.507
Object Position:	1950+92.00	-18.000	2205.366
Obstruction:	No Obstruction		
Sight Distance:	923.566		
Eye Position:	1943+50.00	-18.000	2233.392
Object Position:	1951+42.00	-18.000	2204.163
Obstruction:	No Obstruction		
Sight Distance:	920.601		
Eye Position:	1944+00.00	-18.000	2231.277
Object Position:	1951+92.00	-18.000	2203.030
Obstruction:	No Obstruction		
Sight Distance:	918.102		
Eye Position:	1944+50.00	-18.000	2229.162
Object Position:	1952+42.00	-18.000	2201.981
Obstruction:	No Obstruction		
Sight Distance:	916.666		

	Station	Offset	Elevation
	1945+00.00	-18.000	2227.047
Object Position:	1952+92.00	-18.000	2201.009
Obstruction:	No Obstruction		
Sight Distance:	915.791		
Eye Position:	1945+50.00	-18.000	2224.936
Object Position:	1953+42.00	-18.000	2200.118
Obstruction:	No Obstruction		
Sight Distance:	915.821		
Eye Position:	1946+00.00	-18.000	2222.885
Object Position:	1953+92.00	-18.000	2199.299
Obstruction:	No Obstruction		
Sight Distance:	915.660		
Eye Position:	1946+50.00	-18.000	2220.912
Object Position:	1954+42.00	-18.000	2198.561
Obstruction:	No Obstruction		
Sight Distance:	915.587		
Eye Position:	1947+00.00	-18.000	2219.018
Object Position:	1954+92.00	-18.000	2197.901
Obstruction:	No Obstruction		
Sight Distance:	915.261		
Eye Position:	1947+50.00	-18.000	2217.201
Object Position:	1955+42.00	-18.000	2197.321
Obstruction:	No Obstruction		
Sight Distance:	915.787		
Eye Position:	1948+00.00	-18.000	2215.462
Object Position:	1955+92.00	-18.000	2196.815
Obstruction:	No Obstruction		
Sight Distance:	910.754		
Eye Position:	1948+50.00	-18.000	2213.801
Object Position:	1956+42.00	-18.000	2196.390
Obstruction:	No Obstruction		
Sight Distance:	902.745		
Eye Position:	1949+00.00	-18.000	2212.218
Object Position:	1956+92.00	-18.000	2196.042
Obstruction:	No Obstruction		
Sight Distance:	893.662		
Eye Position:	1949+50.00	-18.000	2210.712
Object Position:	1957+42.00	-18.000	2195.979

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	895.067		
Eye Position:	1950+00.00	-18.000	2209.285
Object Position:	1957+92.00	-18.000	2195.963
Obstruction:	No Obstruction		
Sight Distance:	894.997		
Eye Position:	1950+50.00	-18.000	2207.936
Object Position:	1958+42.00	-18.000	2196.052
Obstruction:	No Obstruction		
Sight Distance:	895.866		
Eye Position:	1951+00.00	-18.000	2206.665
Object Position:	1958+92.00	-18.000	2196.216
Obstruction:	No Obstruction		
Sight Distance:	897.283		
Eye Position:	1951+50.00	-18.000	2205.472
Object Position:	1959+42.00	-18.000	2196.479
Obstruction:	No Obstruction		
Sight Distance:	898.946		
Eye Position:	1952+00.00	-18.000	2204.357
Object Position:	1959+92.00	-18.000	2196.798
Obstruction:	No Obstruction		
Sight Distance:	895.727		
Eye Position:	1952+50.00	-18.000	2203.319
Object Position:	1960+41.75	-18.000	2197.197
Obstruction:	No Obstruction		
Sight Distance:	900.685		
Eye Position:	1953+00.00	-18.000	2202.360
Object Position:	1960+91.42	-18.000	2197.669
Obstruction:	No Obstruction		
Sight Distance:	908.964		
Eye Position:	1953+50.00	-18.000	2201.479
Object Position:	1961+41.11	-18.000	2198.035
Obstruction:	No Obstruction		
Sight Distance:	911.066		
Eye Position:	1954+00.00	-18.000	2200.675
Object Position:	1961+90.84	-18.000	2198.413
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1954+50.00	-18.000	2199.950
Object Position:	1962+40.62	-18.000	2198.791
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1955+00.00	-18.000	2199.303
Object Position:	1962+90.44	-18.000	2199.169
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:00am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1951+00.00
Stop Station: 1991+50.00
Interval: 50.000

Sight Distance: 730.000
Relaxed Distance: 730.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	1951+00.00	-18.000	2206.665
Object Position:	1958+30.00	-18.000	2196.012
Obstruction:	No Obstruction		
Sight Distance:	836.490		
Eye Position:	1951+50.00	-18.000	2205.472
Object Position:	1958+80.00	-18.000	2196.157
Obstruction:	No Obstruction		
Sight Distance:	838.115		
Eye Position:	1952+00.00	-18.000	2204.357
Object Position:	1959+30.00	-18.000	2196.434
Obstruction:	No Obstruction		
Sight Distance:	842.296		
Eye Position:	1952+50.00	-18.000	2203.319
Object Position:	1959+80.00	-18.000	2196.735
Obstruction:	No Obstruction		
Sight Distance:	839.621		
Eye Position:	1953+00.00	-18.000	2202.360
Object Position:	1960+29.83	-18.000	2197.117
Obstruction:	No Obstruction		
Sight Distance:	844.073		
Eye Position:	1953+50.00	-18.000	2201.479
Object Position:	1960+79.49	-18.000	2197.572
Obstruction:	No Obstruction		
Sight Distance:	852.428		

	Station	Offset	Elevation
Eye Position:	1954+00.00	-18.000	2200.675
Object Position:	1961+29.18	-18.000	2197.948
Obstruction:	No Obstruction		
Sight Distance:	855.546		
Eye Position:	1954+50.00	-18.000	2199.950
Object Position:	1961+78.90	-18.000	2198.325
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1955+00.00	-18.000	2199.303
Object Position:	1962+28.66	-18.000	2198.704
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1955+50.00	-18.000	2198.733
Object Position:	1962+78.47	-18.000	2199.081
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1956+00.00	-18.000	2198.242
Object Position:	1963+28.32	-18.000	2199.460
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1956+50.00	-18.000	2197.828
Object Position:	1963+78.21	-18.000	2199.840
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1957+00.00	-18.000	2197.517
Object Position:	1964+28.13	-18.000	2200.211
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1957+50.00	-18.000	2197.459
Object Position:	1964+78.07	-18.000	2200.592
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1958+00.00	-18.000	2197.480
Object Position:	1965+28.01	-18.000	2200.978
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1958+50.00	-18.000	2197.578
Object Position:	1965+77.94	-18.000	2201.352

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1959+00.00	-18.000	2197.755
Object Position:	1966+27.83	-18.000	2201.733
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1959+50.00	-18.000	2198.008
Object Position:	1966+77.65	-18.000	2202.108
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1960+00.00	-18.000	2198.341
Object Position:	1967+27.38	-18.000	2202.488
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1960+50.00	-18.000	2198.751
Object Position:	1967+77.35	-18.000	2202.874
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1961+00.00	-18.000	2199.235
Object Position:	1968+27.35	-18.000	2203.251
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1961+50.00	-18.000	2199.597
Object Position:	1968+77.35	-18.000	2203.628
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1962+00.00	-18.000	2199.977
Object Position:	1969+27.35	-18.000	2204.005
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1962+50.00	-18.000	2200.357
Object Position:	1969+77.35	-18.000	2204.387
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1963+00.00	-18.000	2200.737
Object Position:	1970+27.35	-18.000	2204.774
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1963+50.00	-18.000	2201.117
Object Position:	1970+77.35	-18.000	2205.154
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1964+00.00	-18.000	2201.497
Object Position:	1971+27.35	-18.000	2205.525
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1964+50.00	-18.000	2201.877
Object Position:	1971+77.35	-18.000	2205.914
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1965+00.00	-18.000	2202.257
Object Position:	1972+27.35	-18.000	2206.293
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1965+50.00	-18.000	2202.637
Object Position:	1972+77.35	-18.000	2206.666
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1966+00.00	-18.000	2203.017
Object Position:	1973+27.35	-18.000	2207.053
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1966+50.00	-18.000	2203.397
Object Position:	1973+77.35	-18.000	2207.433
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1967+00.00	-18.000	2203.777
Object Position:	1974+27.35	-18.000	2207.814
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1967+50.00	-18.000	2204.157
Object Position:	1974+77.35	-18.000	2208.194
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1968+00.00	-18.000	2204.537

	Station	Offset	Elevation
	1975+27.35	-18.000	2208.569
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1968+50.00	-18.000	2204.917
Object Position:	1975+77.35	-18.000	2208.946
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1969+00.00	-18.000	2205.297
Object Position:	1976+27.35	-18.000	2209.326
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1969+50.00	-18.000	2205.677
Object Position:	1976+77.35	-18.000	2209.706
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1970+00.00	-18.000	2206.057
Object Position:	1977+27.35	-18.000	2210.094
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1970+50.00	-18.000	2206.437
Object Position:	1977+77.35	-18.000	2210.473
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1971+00.00	-18.000	2206.817
Object Position:	1978+27.35	-18.000	2210.845
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1971+50.00	-18.000	2207.197
Object Position:	1978+77.35	-18.000	2211.227
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1972+00.00	-18.000	2207.577
Object Position:	1979+27.35	-18.000	2211.421
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1972+50.00	-18.000	2207.957
Object Position:	1979+77.36	-18.000	2211.606
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1973+00.00	-18.000	2208.337
Object Position:	1980+27.64	-18.000	2211.755
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1973+50.00	-18.000	2208.717
Object Position:	1980+77.82	-18.000	2211.936
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1974+00.00	-18.000	2209.097
Object Position:	1981+27.94	-18.000	2212.229
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1974+50.00	-18.000	2209.477
Object Position:	1981+78.01	-18.000	2212.598
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1975+00.00	-18.000	2209.857
Object Position:	1982+28.07	-18.000	2212.963
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1975+50.00	-18.000	2210.237
Object Position:	1982+78.12	-18.000	2213.333
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1976+00.00	-18.000	2210.617
Object Position:	1983+28.20	-18.000	2213.702
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1976+50.00	-18.000	2210.997
Object Position:	1983+78.31	-18.000	2214.074
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1977+00.00	-18.000	2211.377
Object Position:	1984+28.46	-18.000	2214.447
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1977+50.00	-18.000	2211.757
Object Position:	1984+78.65	-18.000	2214.825
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1978+00.00	-18.000	2212.137
Object Position:	1985+28.89	-18.000	2215.172
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1978+50.00	-18.000	2212.517
Object Position:	1985+79.17	-18.000	2215.476
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1979+00.00	-18.000	2212.825
Object Position:	1986+29.48	-18.000	2215.741
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1979+50.00	-18.000	2213.005
Object Position:	1986+79.82	-18.000	2216.023
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1980+00.00	-18.000	2213.185
Object Position:	1987+30.00	-18.000	2216.227
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1980+50.00	-18.000	2213.365
Object Position:	1987+80.00	-18.000	2216.417
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1981+00.00	-18.000	2213.545
Object Position:	1988+30.00	-18.000	2216.570
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1981+50.00	-18.000	2213.895
Object Position:	1988+80.00	-18.000	2216.678
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1982+00.00	-18.000	2214.257
Object Position:	1989+30.00	-18.000	2216.752

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1982+50.00	-18.000	2214.627
Object Position:	1989+80.00	-18.000	2216.787
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1983+00.00	-18.000	2214.995
Object Position:	1990+30.00	-18.000	2216.812
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1983+50.00	-18.000	2215.362
Object Position:	1990+80.00	-18.000	2216.804
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1984+00.00	-18.000	2215.730
Object Position:	1991+30.00	-18.000	2216.737
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1984+50.00	-18.000	2216.111
Object Position:	1991+80.00	-18.000	2216.636
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1985+00.00	-18.000	2216.478
Object Position:	1992+30.00	-18.000	2216.557
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1985+50.00	-18.000	2216.813
Object Position:	1992+80.00	-18.000	2216.436
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1986+00.00	-18.000	2217.092
Object Position:	1993+30.00	-18.000	2216.252
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1986+50.00	-18.000	2217.344
Object Position:	1993+80.00	-18.000	2216.043
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1987+00.00	-18.000	2217.616
Object Position:	1994+30.00	-18.000	2215.812
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1987+50.00	-18.000	2217.801
Object Position:	1994+80.00	-18.000	2215.547
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1988+00.00	-18.000	2217.994
Object Position:	1995+30.00	-18.000	2215.326
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1988+50.00	-18.000	2218.121
Object Position:	1995+80.00	-18.000	2214.987
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1989+00.00	-18.000	2218.216
Object Position:	1996+30.00	-18.000	2214.711
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1989+50.00	-18.000	2218.276
Object Position:	1996+80.00	-18.000	2214.441
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1990+00.00	-18.000	2218.294
Object Position:	1997+30.00	-18.000	2214.153
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1990+50.00	-18.000	2218.324
Object Position:	1997+80.00	-18.000	2213.871
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1991+00.00	-18.000	2218.290
Object Position:	1998+30.00	-18.000	2213.591
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1991+50.00	-18.000	2218.197

	Station	Offset	Elevation
	1998+80.00	-18.000	2213.273
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:03am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1991+50.00
Stop Station: 2000+00.00
Interval: 50.000

Sight Distance: 730.000
Relaxed Distance: 730.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	1991+50.00	-6.000	2217.957
Object Position:	1998+80.00	-6.000	2213.087
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1992+00.00	-6.000	2217.859
Object Position:	1999+30.00	-6.000	2212.849
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1992+50.00	-6.000	2217.790
Object Position:	1999+80.00	-6.000	2212.589
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

LW - Sight Distance via InRoads Roadway Visibility Tool

Outside lane and truck lane/end taper

Sight distance checked for direction of travel (looking back on station)

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 11:06am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1995+00.00
Stop Station: A 1946+00.00
Interval: 50.000

Sight Distance: 730.000
Relaxed Distance: 730.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	A 1994+50.00	-6.000	2215.593
Object Position:	A 1987+20.00	-6.000	2217.966
Obstruction:	No Obstruction		
Sight Distance:	2165.893		
Eye Position:	A 1994+00.00	-6.000	2215.866
Object Position:	A 1986+70.00	-6.000	2218.230
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1993+50.00	-6.000	2216.128
Object Position:	A 1986+20.00	-6.000	2218.501
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1993+00.00	-6.000	2216.362
Object Position:	A 1985+70.00	-6.000	2218.770
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1992+50.00	-6.000	2216.621
Object Position:	A 1985+20.00	-6.000	2219.051
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1992+00.00	-6.000	2216.897
Object Position:	A 1984+70.00	-6.000	2219.314
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	A 1991+50.00	-6.000	2217.160
Object Position:	A 1984+20.00	-6.000	2219.581
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1991+00.00	-6.000	2217.446
Object Position:	A 1983+70.00	-6.000	2219.847
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1990+50.00	-6.000	2217.737
Object Position:	A 1983+20.00	-6.000	2220.126
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1990+00.00	-6.000	2218.001
Object Position:	A 1982+70.00	-6.000	2220.386
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1989+50.00	-6.000	2218.250
Object Position:	A 1982+20.00	-6.000	2220.645
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1989+00.00	-6.000	2218.508
Object Position:	A 1981+70.00	-6.000	2220.916
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1988+50.00	-6.000	2218.768
Object Position:	A 1981+20.00	-6.000	2221.219
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1988+00.00	-6.000	2219.034
Object Position:	A 1980+70.00	-6.000	2221.582
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1987+50.00	-6.000	2219.337
Object Position:	A 1980+20.00	-6.000	2221.896
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1987+00.00	-6.000	2219.566
Object Position:	A 1979+70.00	-6.000	2222.207

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1986+50.00	-6.000	2219.837
Object Position:	A 1979+20.00	-6.000	2222.464
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1986+00.00	-6.000	2220.108
Object Position:	A 1978+70.00	-6.000	2222.694
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1985+50.00	-6.000	2220.380
Object Position:	A 1978+20.01	-6.000	2222.807
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1985+00.00	-6.000	2220.658
Object Position:	A 1977+70.16	-6.000	2222.862
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1984+50.00	-6.000	2220.921
Object Position:	A 1977+20.27	-6.000	2222.835
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1984+00.00	-6.000	2221.184
Object Position:	A 1976+70.33	-6.000	2222.687
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1983+50.00	-6.000	2221.465
Object Position:	A 1976+20.33	-6.000	2222.462
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1983+00.00	-6.000	2221.729
Object Position:	A 1975+70.25	-6.000	2222.162
Obstruction:	No Obstruction		
Sight Distance:	1136.130		
Eye Position:	A 1982+50.00	-6.000	2221.982
Object Position:	A 1975+20.10	-6.000	2221.799
Obstruction:	No Obstruction		
Sight Distance:	1099.715		

	Station	Offset	Elevation
Eye Position:	A 1982+00.00	-6.000	2222.254
Object Position:	A 1974+69.87	-6.000	2221.359
Obstruction:	No Obstruction		
Sight Distance:	1063.510		
Eye Position:	A 1981+50.00	-6.000	2222.543
Object Position:	A 1974+19.59	-6.000	2220.851
Obstruction:	No Obstruction		
Sight Distance:	1028.930		
Eye Position:	A 1981+00.00	-6.000	2222.880
Object Position:	A 1973+69.26	-6.000	2220.271
Obstruction:	No Obstruction		
Sight Distance:	997.636		
Eye Position:	A 1980+50.00	-6.000	2223.217
Object Position:	A 1973+18.91	-6.000	2219.620
Obstruction:	No Obstruction		
Sight Distance:	974.475		
Eye Position:	A 1980+00.00	-6.000	2223.556
Object Position:	A 1972+68.58	-6.000	2218.893
Obstruction:	No Obstruction		
Sight Distance:	965.815		
Eye Position:	A 1979+50.00	-6.000	2223.851
Object Position:	A 1972+18.29	-6.000	2218.101
Obstruction:	No Obstruction		
Sight Distance:	961.136		
Eye Position:	A 1979+00.00	-6.000	2224.082
Object Position:	A 1971+68.10	-6.000	2217.241
Obstruction:	No Obstruction		
Sight Distance:	957.516		
Eye Position:	A 1978+50.00	-6.000	2224.250
Object Position:	A 1971+18.06	-6.000	2216.313
Obstruction:	No Obstruction		
Sight Distance:	954.926		
Eye Position:	A 1978+00.00	-6.000	2224.334
Object Position:	A 1970+68.10	-6.000	2215.317
Obstruction:	No Obstruction		
Sight Distance:	953.170		
Eye Position:	A 1977+50.00	-6.000	2224.363

	Station	Offset	Elevation
	A 1970+18.10	-6.000	2214.253
Obstruction:	No Obstruction		
Sight Distance:	951.434		
Eye Position:	A 1977+00.00	-6.000	2224.287
Object Position:	A 1969+68.10	-6.000	2213.140
Obstruction:	No Obstruction		
Sight Distance:	949.100		
Eye Position:	A 1976+50.00	-6.000	2224.102
Object Position:	A 1969+18.10	-6.000	2212.015
Obstruction:	No Obstruction		
Sight Distance:	946.709		
Eye Position:	A 1976+00.00	-6.000	2223.847
Object Position:	A 1968+68.10	-6.000	2210.890
Obstruction:	No Obstruction		
Sight Distance:	945.082		
Eye Position:	A 1975+50.00	-6.000	2223.522
Object Position:	A 1968+18.10	-6.000	2209.754
Obstruction:	No Obstruction		
Sight Distance:	942.966		
Eye Position:	A 1975+00.00	-6.000	2223.129
Object Position:	A 1967+68.10	-6.000	2208.630
Obstruction:	No Obstruction		
Sight Distance:	941.355		
Eye Position:	A 1974+50.00	-6.000	2222.664
Object Position:	A 1967+18.10	-6.000	2207.518
Obstruction:	No Obstruction		
Sight Distance:	939.761		
Eye Position:	A 1974+00.00	-6.000	2222.130
Object Position:	A 1966+68.10	-6.000	2206.382
Obstruction:	No Obstruction		
Sight Distance:	937.407		
Eye Position:	A 1973+50.00	-6.000	2221.527
Object Position:	A 1966+18.10	-6.000	2205.268
Obstruction:	No Obstruction		
Sight Distance:	935.487		
Eye Position:	A 1973+00.00	-6.000	2220.853
Object Position:	A 1965+68.10	-6.000	2204.151
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	933.299		
Eye Position:	A 1972+50.00	-6.000	2220.109
Object Position:	A 1965+18.10	-6.000	2203.080
Obstruction:	No Obstruction		
Sight Distance:	932.048		
Eye Position:	A 1972+00.00	-6.000	2219.296
Object Position:	A 1964+68.10	-6.000	2202.093
Obstruction:	No Obstruction		
Sight Distance:	932.308		
Eye Position:	A 1971+50.00	-6.000	2218.413
Object Position:	A 1964+18.10	-6.000	2201.168
Obstruction:	No Obstruction		
Sight Distance:	937.226		
Eye Position:	A 1971+00.00	-6.000	2217.461
Object Position:	A 1963+68.10	-6.000	2200.326
Obstruction:	No Obstruction		
Sight Distance:	952.091		
Eye Position:	A 1970+50.00	-6.000	2216.439
Object Position:	A 1963+18.10	-6.000	2199.469
Obstruction:	No Obstruction		
Sight Distance:	977.396		
Eye Position:	A 1970+00.00	-6.000	2215.348
Object Position:	A 1962+68.05	-6.000	2198.785
Obstruction:	No Obstruction		
Sight Distance:	1046.876		
Eye Position:	A 1969+50.00	-6.000	2214.224
Object Position:	A 1962+18.15	-6.000	2198.089
Obstruction:	No Obstruction		
Sight Distance:	1059.758		
Eye Position:	A 1969+00.00	-6.000	2213.099
Object Position:	A 1961+68.37	-6.000	2197.533
Obstruction:	No Obstruction		
Sight Distance:	892.357		
Eye Position:	A 1968+50.00	-6.000	2211.974
Object Position:	A 1961+18.68	-6.000	2197.058
Obstruction:	No Obstruction		
Sight Distance:	889.456		

	Station	Offset	Elevation
	A 1968+00.00	-6.000	2210.848
Object Position:	A 1960+69.02	-6.000	2196.665
Obstruction:	No Obstruction		
Sight Distance:	876.337		
Eye Position:	A 1967+50.00	-6.000	2209.723
Object Position:	A 1960+19.36	-6.000	2196.366
Obstruction:	No Obstruction		
Sight Distance:	865.975		
Eye Position:	A 1967+00.00	-6.000	2208.600
Object Position:	A 1959+69.67	-6.000	2196.146
Obstruction:	No Obstruction		
Sight Distance:	858.016		
Eye Position:	A 1966+50.00	-6.000	2207.473
Object Position:	A 1959+19.94	-6.000	2196.059
Obstruction:	No Obstruction		
Sight Distance:	854.436		
Eye Position:	A 1966+00.00	-6.000	2206.350
Object Position:	A 1958+70.15	-6.000	2196.070
Obstruction:	No Obstruction		
Sight Distance:	852.910		
Eye Position:	A 1965+50.00	-6.000	2205.237
Object Position:	A 1958+20.28	-6.000	2196.145
Obstruction:	No Obstruction		
Sight Distance:	851.186		
Eye Position:	A 1965+00.00	-6.000	2204.192
Object Position:	A 1957+70.34	-6.000	2196.306
Obstruction:	No Obstruction		
Sight Distance:	850.000		
Eye Position:	A 1964+50.00	-6.000	2203.239
Object Position:	A 1957+20.32	-6.000	2196.554
Obstruction:	No Obstruction		
Sight Distance:	849.072		
Eye Position:	A 1964+00.00	-6.000	2202.342
Object Position:	A 1956+70.24	-6.000	2196.886
Obstruction:	No Obstruction		
Sight Distance:	848.806		
Eye Position:	A 1963+50.00	-6.000	2201.485
Object Position:	A 1956+20.12	-6.000	2197.310

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	849.759		
Eye Position:	A 1963+00.00	-6.000	2200.704
Object Position:	A 1955+70.00	-6.000	2197.803
Obstruction:	No Obstruction		
Sight Distance:	850.078		
Eye Position:	A 1962+50.00	-6.000	2200.012
Object Position:	A 1955+20.00	-6.000	2198.377
Obstruction:	No Obstruction		
Sight Distance:	850.255		
Eye Position:	A 1962+00.00	-6.000	2199.393
Object Position:	A 1954+70.00	-6.000	2199.037
Obstruction:	No Obstruction		
Sight Distance:	850.872		
Eye Position:	A 1961+50.00	-6.000	2198.865
Object Position:	A 1954+20.00	-6.000	2199.785
Obstruction:	No Obstruction		
Sight Distance:	851.703		
Eye Position:	A 1961+00.00	-6.000	2198.418
Object Position:	A 1953+70.00	-6.000	2200.613
Obstruction:	No Obstruction		
Sight Distance:	852.419		
Eye Position:	A 1960+50.00	-6.000	2198.054
Object Position:	A 1953+20.00	-6.000	2201.527
Obstruction:	No Obstruction		
Sight Distance:	853.353		
Eye Position:	A 1960+00.00	-6.000	2197.773
Object Position:	A 1952+70.00	-6.000	2202.519
Obstruction:	No Obstruction		
Sight Distance:	853.924		
Eye Position:	A 1959+50.00	-6.000	2197.599
Object Position:	A 1952+20.00	-6.000	2203.583
Obstruction:	No Obstruction		
Sight Distance:	853.661		
Eye Position:	A 1959+00.00	-6.000	2197.550
Object Position:	A 1951+70.00	-6.000	2204.751
Obstruction:	No Obstruction		
Sight Distance:	854.311		

	Station	Offset	Elevation
Eye Position:	A 1958+50.00	-6.000	2197.585
Object Position:	A 1951+20.00	-6.000	2205.991
Obstruction:	No Obstruction		
Sight Distance:	854.322		
Eye Position:	A 1958+00.00	-6.000	2197.699
Object Position:	A 1950+70.00	-6.000	2207.313
Obstruction:	No Obstruction		
Sight Distance:	854.344		
Eye Position:	A 1957+50.00	-6.000	2197.897
Object Position:	A 1950+20.00	-6.000	2208.718
Obstruction:	No Obstruction		
Sight Distance:	854.327		
Eye Position:	A 1957+00.00	-6.000	2198.179
Object Position:	A 1949+70.00	-6.000	2210.206
Obstruction:	No Obstruction		
Sight Distance:	854.325		
Eye Position:	A 1956+50.00	-6.000	2198.543
Object Position:	A 1949+20.00	-6.000	2211.776
Obstruction:	No Obstruction		
Sight Distance:	854.327		
Eye Position:	A 1956+00.00	-6.000	2198.991
Object Position:	A 1948+70.00	-6.000	2213.429
Obstruction:	No Obstruction		
Sight Distance:	854.287		
Eye Position:	A 1955+50.00	-6.000	2199.520
Object Position:	A 1948+20.00	-6.000	2215.165
Obstruction:	No Obstruction		
Sight Distance:	854.291		
Eye Position:	A 1955+00.00	-6.000	2200.131
Object Position:	A 1947+70.00	-6.000	2216.983
Obstruction:	No Obstruction		
Sight Distance:	854.377		
Eye Position:	A 1954+50.00	-6.000	2200.825
Object Position:	A 1947+20.00	-6.000	2218.884
Obstruction:	No Obstruction		
Sight Distance:	854.369		
Eye Position:	A 1954+00.00	-6.000	2201.603

	Station	Offset	Elevation
	A 1946+70.00	-6.000	2220.867
Obstruction:	No Obstruction		
Sight Distance:	855.269		
Eye Position:	A 1953+50.00	-6.000	2202.463
Object Position:	A 1946+20.00	-6.000	2222.927
Obstruction:	No Obstruction		
Sight Distance:	860.788		
Eye Position:	A 1953+00.00	-6.000	2203.406
Object Position:	A 1945+70.00	-6.000	2225.074
Obstruction:	No Obstruction		
Sight Distance:	873.933		
Eye Position:	A 1952+50.00	-6.000	2204.431
Object Position:	A 1945+20.00	-6.000	2227.251
Obstruction:	No Obstruction		
Sight Distance:	892.077		
Eye Position:	A 1952+00.00	-6.000	2205.537
Object Position:	A 1944+70.00	-6.000	2229.431
Obstruction:	No Obstruction		
Sight Distance:	914.028		
Eye Position:	A 1951+50.00	-6.000	2206.729
Object Position:	A 1944+20.00	-6.000	2231.611
Obstruction:	No Obstruction		
Sight Distance:	940.201		
Eye Position:	A 1951+00.00	-6.000	2208.002
Object Position:	A 1943+70.00	-6.000	2233.791
Obstruction:	No Obstruction		
Sight Distance:	971.778		
Eye Position:	A 1950+50.00	-6.000	2209.357
Object Position:	A 1943+20.00	-6.000	2235.971
Obstruction:	No Obstruction		
Sight Distance:	1010.006		
Eye Position:	A 1950+00.00	-6.000	2210.795
Object Position:	A 1942+70.00	-6.000	2238.151
Obstruction:	No Obstruction		
Sight Distance:	1077.983		
Eye Position:	A 1949+50.00	-6.000	2212.316
Object Position:	A 1942+20.00	-6.000	2240.331
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1152.930		
Eye Position:	A 1949+00.00	-6.000	2213.919
Object Position:	A 1941+70.00	-6.000	2242.511
Obstruction:	No Obstruction		
Sight Distance:	1185.386		
Eye Position:	A 1948+50.00	-6.000	2215.605
Object Position:	A 1941+20.00	-6.000	2244.691
Obstruction:	No Obstruction		
Sight Distance:	1198.228		
Eye Position:	A 1948+00.00	-6.000	2217.374
Object Position:	A 1940+70.00	-6.000	2246.871
Obstruction:	No Obstruction		
Sight Distance:	1197.816		
Eye Position:	A 1947+50.00	-6.000	2219.225
Object Position:	A 1940+20.00	-6.000	2249.051
Obstruction:	No Obstruction		
Sight Distance:	1186.423		
Eye Position:	A 1947+00.00	-6.000	2221.159
Object Position:	A 1939+70.00	-6.000	2251.166
Obstruction:	No Obstruction		
Sight Distance:	1154.700		
Eye Position:	A 1946+50.00	-6.000	2223.176
Object Position:	A 1939+20.00	-6.000	2253.279
Obstruction:	No Obstruction		
Sight Distance:	1116.117		
Eye Position:	A 1946+00.00	-6.000	2225.274
Object Position:	A 1938+70.00	-6.000	2255.417
Obstruction:	No Obstruction		
Sight Distance:	1075.804		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 7:57am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1950+00.00
Stop Station: A 1887+00.00
Interval: 50.000

Sight Distance: 675.000
Relaxed Distance: 675.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	A 1950+00.00	-6.000	2210.795
Object Position:	A 1943+25.00	-6.000	2235.753
Obstruction:	No Obstruction		
Sight Distance:	976.887		
Eye Position:	A 1949+50.00	-6.000	2212.316
Object Position:	A 1942+75.00	-6.000	2237.933
Obstruction:	No Obstruction		
Sight Distance:	1052.401		
Eye Position:	A 1949+00.00	-6.000	2213.919
Object Position:	A 1942+25.00	-6.000	2240.113
Obstruction:	No Obstruction		
Sight Distance:	1130.456		
Eye Position:	A 1948+50.00	-6.000	2215.605
Object Position:	A 1941+75.00	-6.000	2242.293
Obstruction:	No Obstruction		
Sight Distance:	1155.183		
Eye Position:	A 1948+00.00	-6.000	2217.374
Object Position:	A 1941+25.00	-6.000	2244.473
Obstruction:	No Obstruction		
Sight Distance:	1163.208		
Eye Position:	A 1947+50.00	-6.000	2219.225
Object Position:	A 1940+75.00	-6.000	2246.653
Obstruction:	No Obstruction		
Sight Distance:	1157.932		

	Station	Offset	Elevation
Eye Position:	A 1947+00.00	-6.000	2221.159
Object Position:	A 1940+25.00	-6.000	2248.833
Obstruction:	No Obstruction		
Sight Distance:	1141.921		
Eye Position:	A 1946+50.00	-6.000	2223.176
Object Position:	A 1939+75.00	-6.000	2250.947
Obstruction:	No Obstruction		
Sight Distance:	1105.122		
Eye Position:	A 1946+00.00	-6.000	2225.274
Object Position:	A 1939+25.00	-6.000	2253.061
Obstruction:	No Obstruction		
Sight Distance:	1061.974		
Eye Position:	A 1945+50.00	-6.000	2227.444
Object Position:	A 1938+75.00	-6.000	2255.199
Obstruction:	No Obstruction		
Sight Distance:	1018.578		
Eye Position:	A 1945+00.00	-6.000	2229.623
Object Position:	A 1938+24.91	-6.000	2257.331
Obstruction:	No Obstruction		
Sight Distance:	976.739		
Eye Position:	A 1944+50.00	-6.000	2231.803
Object Position:	A 1937+74.80	-6.000	2259.460
Obstruction:	No Obstruction		
Sight Distance:	941.856		
Eye Position:	A 1944+00.00	-6.000	2233.983
Object Position:	A 1937+24.67	-6.000	2261.633
Obstruction:	No Obstruction		
Sight Distance:	918.645		
Eye Position:	A 1943+50.00	-6.000	2236.163
Object Position:	A 1936+74.51	-6.000	2263.817
Obstruction:	No Obstruction		
Sight Distance:	901.258		
Eye Position:	A 1943+00.00	-6.000	2238.343
Object Position:	A 1936+24.32	-6.000	2266.002
Obstruction:	No Obstruction		
Sight Distance:	886.586		
Eye Position:	A 1942+50.00	-6.000	2240.523
Object Position:	A 1935+74.10	-6.000	2268.192

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	876.025		
Eye Position:	A 1942+00.00	-6.000	2242.703
Object Position:	A 1935+23.85	-6.000	2270.383
Obstruction:	No Obstruction		
Sight Distance:	866.984		
Eye Position:	A 1941+50.00	-6.000	2244.883
Object Position:	A 1934+73.58	-6.000	2272.575
Obstruction:	No Obstruction		
Sight Distance:	860.173		
Eye Position:	A 1941+00.00	-6.000	2247.063
Object Position:	A 1934+23.29	-6.000	2274.777
Obstruction:	No Obstruction		
Sight Distance:	855.691		
Eye Position:	A 1940+50.00	-6.000	2249.243
Object Position:	A 1933+73.00	-6.000	2276.960
Obstruction:	No Obstruction		
Sight Distance:	850.544		
Eye Position:	A 1940+00.00	-6.000	2251.423
Object Position:	A 1933+22.73	-6.000	2279.153
Obstruction:	No Obstruction		
Sight Distance:	847.578		
Eye Position:	A 1939+50.00	-6.000	2253.538
Object Position:	A 1932+72.48	-6.000	2281.342
Obstruction:	No Obstruction		
Sight Distance:	846.736		
Eye Position:	A 1939+00.00	-6.000	2255.651
Object Position:	A 1932+22.29	-6.000	2283.531
Obstruction:	No Obstruction		
Sight Distance:	846.915		
Eye Position:	A 1938+50.00	-6.000	2257.765
Object Position:	A 1931+72.20	-6.000	2285.715
Obstruction:	No Obstruction		
Sight Distance:	848.170		
Eye Position:	A 1938+00.00	-6.000	2259.892
Object Position:	A 1931+22.20	-6.000	2287.895
Obstruction:	No Obstruction		
Sight Distance:	849.163		

	Station	Offset	Elevation
Eye Position:	A 1937+50.00	-6.000	2262.024
Object Position:	A 1930+72.20	-6.000	2290.078
Obstruction:	No Obstruction		
Sight Distance:	850.414		
Eye Position:	A 1937+00.00	-6.000	2264.204
Object Position:	A 1930+22.20	-6.000	2292.256
Obstruction:	No Obstruction		
Sight Distance:	850.214		
Eye Position:	A 1936+50.00	-6.000	2266.384
Object Position:	A 1929+72.20	-6.000	2294.437
Obstruction:	No Obstruction		
Sight Distance:	850.325		
Eye Position:	A 1936+00.00	-6.000	2268.562
Object Position:	A 1929+22.20	-6.000	2296.617
Obstruction:	No Obstruction		
Sight Distance:	850.327		
Eye Position:	A 1935+50.00	-6.000	2270.742
Object Position:	A 1928+72.20	-6.000	2298.800
Obstruction:	No Obstruction		
Sight Distance:	850.638		
Eye Position:	A 1935+00.00	-6.000	2272.923
Object Position:	A 1928+22.20	-6.000	2300.984
Obstruction:	No Obstruction		
Sight Distance:	851.032		
Eye Position:	A 1934+50.00	-6.000	2275.103
Object Position:	A 1927+72.20	-6.000	2303.165
Obstruction:	No Obstruction		
Sight Distance:	851.056		
Eye Position:	A 1934+00.00	-6.000	2277.285
Object Position:	A 1927+22.20	-6.000	2305.345
Obstruction:	No Obstruction		
Sight Distance:	851.019		
Eye Position:	A 1933+50.00	-6.000	2279.464
Object Position:	A 1926+72.20	-6.000	2307.518
Obstruction:	No Obstruction		
Sight Distance:	850.373		
Eye Position:	A 1933+00.00	-6.000	2281.643

	Station	Offset	Elevation
	A 1926+22.20	-6.000	2309.700
Obstruction:	No Obstruction		
Sight Distance:	850.650		
Eye Position:	A 1932+50.00	-6.000	2283.824
Object Position:	A 1925+72.20	-6.000	2311.880
Obstruction:	No Obstruction		
Sight Distance:	850.604		
Eye Position:	A 1932+00.00	-6.000	2286.004
Object Position:	A 1925+22.20	-6.000	2314.060
Obstruction:	No Obstruction		
Sight Distance:	850.611		
Eye Position:	A 1931+50.00	-6.000	2288.183
Object Position:	A 1924+72.20	-6.000	2316.245
Obstruction:	No Obstruction		
Sight Distance:	851.136		
Eye Position:	A 1931+00.00	-6.000	2290.364
Object Position:	A 1924+22.20	-6.000	2318.420
Obstruction:	No Obstruction		
Sight Distance:	850.629		
Eye Position:	A 1930+50.00	-6.000	2292.544
Object Position:	A 1923+72.20	-6.000	2320.605
Obstruction:	No Obstruction		
Sight Distance:	851.032		
Eye Position:	A 1930+00.00	-6.000	2294.724
Object Position:	A 1923+22.20	-6.000	2322.775
Obstruction:	No Obstruction		
Sight Distance:	850.079		
Eye Position:	A 1929+50.00	-6.000	2296.904
Object Position:	A 1922+72.20	-6.000	2324.960
Obstruction:	No Obstruction		
Sight Distance:	850.623		
Eye Position:	A 1929+00.00	-6.000	2299.084
Object Position:	A 1922+22.20	-6.000	2327.140
Obstruction:	No Obstruction		
Sight Distance:	865.388		
Eye Position:	A 1928+50.00	-6.000	2301.264
Object Position:	A 1921+72.20	-6.000	2329.320
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	891.216		
Eye Position:	A 1928+00.00	-6.000	2303.445
Object Position:	A 1921+22.20	-6.000	2331.495
Obstruction:	No Obstruction		
Sight Distance:	910.104		
Eye Position:	A 1927+50.00	-6.000	2305.625
Object Position:	A 1920+72.20	-6.000	2333.675
Obstruction:	No Obstruction		
Sight Distance:	924.218		
Eye Position:	A 1927+00.00	-6.000	2307.805
Object Position:	A 1920+22.20	-6.000	2335.939
Obstruction:	No Obstruction		
Sight Distance:	948.066		
Eye Position:	A 1926+50.00	-6.000	2309.984
Object Position:	A 1919+72.22	-6.000	2338.170
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1926+00.00	-6.000	2312.164
Object Position:	A 1919+22.37	-6.000	2340.410
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1925+50.00	-6.000	2314.344
Object Position:	A 1918+72.59	-6.000	2342.647
Obstruction:	No Obstruction		
Sight Distance:	3500.524		
Eye Position:	A 1925+00.00	-6.000	2316.524
Object Position:	A 1918+22.85	-6.000	2344.847
Obstruction:	No Obstruction		
Sight Distance:	3257.226		
Eye Position:	A 1924+50.00	-6.000	2318.705
Object Position:	A 1917+73.14	-6.000	2347.014
Obstruction:	No Obstruction		
Sight Distance:	3007.000		
Eye Position:	A 1924+00.00	-6.000	2320.884
Object Position:	A 1917+23.42	-6.000	2349.182
Obstruction:	No Obstruction		
Sight Distance:	2756.831		

	Station	Offset	Elevation
	A 1923+50.00	-6.000	2323.065
Object Position:	A 1916+73.70	-6.000	2351.350
Obstruction:	No Obstruction		
Sight Distance:	1527.373		
Eye Position:	A 1923+00.00	-6.000	2325.243
Object Position:	A 1916+23.97	-6.000	2353.518
Obstruction:	No Obstruction		
Sight Distance:	1583.422		
Eye Position:	A 1922+50.00	-6.000	2327.424
Object Position:	A 1915+74.20	-6.000	2355.688
Obstruction:	No Obstruction		
Sight Distance:	2133.166		
Eye Position:	A 1922+00.00	-6.000	2329.604
Object Position:	A 1915+24.41	-6.000	2357.859
Obstruction:	No Obstruction		
Sight Distance:	1961.928		
Eye Position:	A 1921+50.00	-6.000	2331.784
Object Position:	A 1914+74.58	-6.000	2360.031
Obstruction:	No Obstruction		
Sight Distance:	1786.270		
Eye Position:	A 1921+00.00	-6.000	2333.963
Object Position:	A 1914+24.73	-6.000	2362.205
Obstruction:	No Obstruction		
Sight Distance:	1702.112		
Eye Position:	A 1920+50.00	-6.000	2336.165
Object Position:	A 1913+74.85	-6.000	2364.380
Obstruction:	No Obstruction		
Sight Distance:	1648.151		
Eye Position:	A 1920+00.00	-6.000	2338.427
Object Position:	A 1913+24.96	-6.000	2366.555
Obstruction:	No Obstruction		
Sight Distance:	1575.751		
Eye Position:	A 1919+50.00	-6.000	2340.666
Object Position:	A 1912+75.00	-6.000	2368.733
Obstruction:	No Obstruction		
Sight Distance:	1529.833		
Eye Position:	A 1919+00.00	-6.000	2342.919
Object Position:	A 1912+25.00	-6.000	2370.913

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1486.078		
Eye Position:	A 1918+50.00	-6.000	2345.163
Object Position:	A 1911+75.00	-6.000	2373.093
Obstruction:	No Obstruction		
Sight Distance:	1447.963		
Eye Position:	A 1918+00.00	-6.000	2347.343
Object Position:	A 1911+25.00	-6.000	2375.273
Obstruction:	No Obstruction		
Sight Distance:	1426.092		
Eye Position:	A 1917+50.00	-6.000	2349.523
Object Position:	A 1910+75.00	-6.000	2377.453
Obstruction:	No Obstruction		
Sight Distance:	1404.797		
Eye Position:	A 1917+00.00	-6.000	2351.703
Object Position:	A 1910+25.00	-6.000	2379.633
Obstruction:	No Obstruction		
Sight Distance:	1384.201		
Eye Position:	A 1916+50.00	-6.000	2353.883
Object Position:	A 1909+75.00	-6.000	2381.813
Obstruction:	No Obstruction		
Sight Distance:	1367.472		
Eye Position:	A 1916+00.00	-6.000	2356.063
Object Position:	A 1909+25.00	-6.000	2383.993
Obstruction:	No Obstruction		
Sight Distance:	1351.251		
Eye Position:	A 1915+50.00	-6.000	2358.243
Object Position:	A 1908+75.00	-6.000	2386.173
Obstruction:	No Obstruction		
Sight Distance:	1332.047		
Eye Position:	A 1915+00.00	-6.000	2360.423
Object Position:	A 1908+25.00	-6.000	2388.353
Obstruction:	No Obstruction		
Sight Distance:	1310.766		
Eye Position:	A 1914+50.00	-6.000	2362.603
Object Position:	A 1907+75.00	-6.000	2390.533
Obstruction:	No Obstruction		
Sight Distance:	1287.414		

	Station	Offset	Elevation
Eye Position:	A 1914+00.00	-6.000	2364.783
Object Position:	A 1907+25.00	-6.000	2392.713
Obstruction:	No Obstruction		
Sight Distance:	1263.673		
Eye Position:	A 1913+50.00	-6.000	2366.963
Object Position:	A 1906+75.00	-6.000	2394.893
Obstruction:	No Obstruction		
Sight Distance:	1238.031		
Eye Position:	A 1913+00.00	-6.000	2369.143
Object Position:	A 1906+25.00	-6.000	2397.073
Obstruction:	No Obstruction		
Sight Distance:	1210.839		
Eye Position:	A 1912+50.00	-6.000	2371.323
Object Position:	A 1905+75.00	-6.000	2399.361
Obstruction:	No Obstruction		
Sight Distance:	1220.277		
Eye Position:	A 1912+00.00	-6.000	2373.503
Object Position:	A 1905+25.00	-6.000	2401.541
Obstruction:	No Obstruction		
Sight Distance:	1189.959		
Eye Position:	A 1911+50.00	-6.000	2375.683
Object Position:	A 1904+75.00	-6.000	2403.788
Obstruction:	No Obstruction		
Sight Distance:	1179.420		
Eye Position:	A 1911+00.00	-6.000	2377.863
Object Position:	A 1904+25.00	-6.000	2406.054
Obstruction:	No Obstruction		
Sight Distance:	1171.984		
Eye Position:	A 1910+50.00	-6.000	2380.043
Object Position:	A 1903+75.00	-6.000	2408.304
Obstruction:	No Obstruction		
Sight Distance:	1157.760		
Eye Position:	A 1910+00.00	-6.000	2382.223
Object Position:	A 1903+25.06	-6.000	2410.527
Obstruction:	No Obstruction		
Sight Distance:	1136.917		
Eye Position:	A 1909+50.00	-6.000	2384.403

	Station	Offset	Elevation
	A 1902+75.11	-6.000	2412.748
Obstruction:	No Obstruction		
Sight Distance:	1120.217		
Eye Position:	A 1909+00.00	-6.000	2386.583
Object Position:	A 1902+25.16	-6.000	2414.928
Obstruction:	No Obstruction		
Sight Distance:	1324.596		
Eye Position:	A 1908+50.00	-6.000	2388.763
Object Position:	A 1901+75.20	-6.000	2417.109
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1908+00.00	-6.000	2390.943
Object Position:	A 1901+25.22	-6.000	2419.285
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1907+50.00	-6.000	2393.123
Object Position:	A 1900+75.24	-6.000	2421.467
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1907+00.00	-6.000	2395.303
Object Position:	A 1900+25.24	-6.000	2423.647
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1906+50.00	-6.000	2397.483
Object Position:	A 1899+75.24	-6.000	2425.824
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1906+00.00	-6.000	2399.691
Object Position:	A 1899+25.23	-6.000	2428.005
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1905+50.00	-6.000	2401.951
Object Position:	A 1898+75.23	-6.000	2430.185
Obstruction:	No Obstruction		
Sight Distance:	1197.365		
Eye Position:	A 1905+00.00	-6.000	2404.184
Object Position:	A 1898+25.23	-6.000	2432.365
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1190.087		
Eye Position:	A 1904+50.00	-6.000	2406.431
Object Position:	A 1897+75.24	-6.000	2434.544
Obstruction:	No Obstruction		
Sight Distance:	1185.140		
Eye Position:	A 1904+00.00	-6.000	2408.677
Object Position:	A 1897+25.28	-6.000	2436.725
Obstruction:	No Obstruction		
Sight Distance:	1182.313		
Eye Position:	A 1903+50.00	-6.000	2410.925
Object Position:	A 1896+75.30	-6.000	2438.904
Obstruction:	No Obstruction		
Sight Distance:	1181.014		
Eye Position:	A 1903+00.00	-6.000	2413.163
Object Position:	A 1896+25.30	-6.000	2441.082
Obstruction:	No Obstruction		
Sight Distance:	1179.731		
Eye Position:	A 1902+50.00	-6.000	2415.344
Object Position:	A 1895+75.30	-6.000	2443.261
Obstruction:	No Obstruction		
Sight Distance:	1178.861		
Eye Position:	A 1902+00.00	-6.000	2417.524
Object Position:	A 1895+25.30	-6.000	2445.444
Obstruction:	No Obstruction		
Sight Distance:	1177.853		
Eye Position:	A 1901+50.00	-6.000	2419.704
Object Position:	A 1894+75.30	-6.000	2447.622
Obstruction:	No Obstruction		
Sight Distance:	966.650		
Eye Position:	A 1901+00.00	-6.000	2421.884
Object Position:	A 1894+25.30	-6.000	2449.801
Obstruction:	No Obstruction		
Sight Distance:	960.359		
Eye Position:	A 1900+50.00	-6.000	2424.064
Object Position:	A 1893+75.30	-6.000	2451.980
Obstruction:	No Obstruction		
Sight Distance:	952.750		

	Station	Offset	Elevation
	A 1900+00.00	-6.000	2426.244
Object Position:	A 1893+25.30	-6.000	2454.167
Obstruction:	No Obstruction		
Sight Distance:	944.566		
Eye Position:	A 1899+50.00	-6.000	2428.424
Object Position:	A 1892+75.30	-6.000	2456.359
Obstruction:	No Obstruction		
Sight Distance:	936.001		
Eye Position:	A 1899+00.00	-6.000	2430.604
Object Position:	A 1892+25.30	-6.000	2458.564
Obstruction:	No Obstruction		
Sight Distance:	928.262		
Eye Position:	A 1898+50.00	-6.000	2432.784
Object Position:	A 1891+75.30	-6.000	2460.791
Obstruction:	No Obstruction		
Sight Distance:	922.259		
Eye Position:	A 1898+00.00	-6.000	2434.964
Object Position:	A 1891+25.30	-6.000	2463.031
Obstruction:	No Obstruction		
Sight Distance:	916.703		
Eye Position:	A 1897+50.00	-6.000	2437.144
Object Position:	A 1890+75.30	-6.000	2465.284
Obstruction:	No Obstruction		
Sight Distance:	911.455		
Eye Position:	A 1897+00.00	-6.000	2439.324
Object Position:	A 1890+25.30	-6.000	2467.556
Obstruction:	No Obstruction		
Sight Distance:	907.542		
Eye Position:	A 1896+50.00	-6.000	2441.504
Object Position:	A 1889+75.30	-6.000	2469.847
Obstruction:	No Obstruction		
Sight Distance:	904.353		
Eye Position:	A 1896+00.00	-6.000	2443.684
Object Position:	A 1889+25.30	-6.000	2472.150
Obstruction:	No Obstruction		
Sight Distance:	901.344		
Eye Position:	A 1895+50.00	-6.000	2445.864
Object Position:	A 1888+75.30	-6.000	2474.467

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	898.597		
Eye Position:	A 1895+00.00	-6.000	2448.044
Object Position:	A 1888+25.30	-6.000	2476.803
Obstruction:	No Obstruction		
Sight Distance:	896.741		
Eye Position:	A 1894+50.00	-6.000	2450.224
Object Position:	A 1887+75.30	-6.000	2479.152
Obstruction:	No Obstruction		
Sight Distance:	957.240		
Eye Position:	A 1894+00.00	-6.000	2452.403
Object Position:	A 1887+25.30	-6.000	2481.521
Obstruction:	No Obstruction		
Sight Distance:	1292.476		
Eye Position:	A 1893+50.00	-6.000	2454.583
Object Position:	A 1886+75.30	-6.000	2483.904
Obstruction:	No Obstruction		
Sight Distance:	1311.860		
Eye Position:	A 1893+00.00	-6.000	2456.769
Object Position:	A 1886+25.30	-6.000	2486.306
Obstruction:	No Obstruction		
Sight Distance:	1352.089		
Eye Position:	A 1892+50.00	-6.000	2458.969
Object Position:	A 1885+75.30	-6.000	2488.662
Obstruction:	No Obstruction		
Sight Distance:	1414.362		
Eye Position:	A 1892+00.00	-6.000	2461.185
Object Position:	A 1885+25.30	-6.000	2491.062
Obstruction:	No Obstruction		
Sight Distance:	1100.510		
Eye Position:	A 1891+50.00	-6.000	2463.418
Object Position:	A 1884+75.25	-6.000	2493.478
Obstruction:	No Obstruction		
Sight Distance:	1169.822		
Eye Position:	A 1891+00.00	-6.000	2465.666
Object Position:	A 1884+25.23	-6.000	2495.876
Obstruction:	No Obstruction		
Sight Distance:	1208.112		

	Station	Offset	Elevation
Eye Position:	A 1890+50.00	-6.000	2467.928
Object Position:	A 1883+75.23	-6.000	2498.290
Obstruction:	No Obstruction		
Sight Distance:	1193.307		
Eye Position:	A 1890+00.00	-6.000	2470.209
Object Position:	A 1883+25.23	-6.000	2500.650
Obstruction:	No Obstruction		
Sight Distance:	1155.200		
Eye Position:	A 1889+50.00	-6.000	2472.505
Object Position:	A 1882+75.24	-6.000	2503.123
Obstruction:	No Obstruction		
Sight Distance:	1163.079		
Eye Position:	A 1889+00.00	-6.000	2474.817
Object Position:	A 1882+25.24	-6.000	2505.623
Obstruction:	No Obstruction		
Sight Distance:	1182.313		
Eye Position:	A 1888+50.00	-6.000	2477.145
Object Position:	A 1881+75.24	-6.000	2508.123
Obstruction:	No Obstruction		
Sight Distance:	1202.250		
Eye Position:	A 1888+00.00	-6.000	2479.489
Object Position:	A 1881+25.23	-6.000	2510.624
Obstruction:	No Obstruction		
Sight Distance:	1222.849		
Eye Position:	A 1887+50.00	-6.000	2481.849
Object Position:	A 1880+75.21	-6.000	2513.125
Obstruction:	No Obstruction		
Sight Distance:	1243.717		
Eye Position:	A 1887+00.00	-6.000	2484.225
Object Position:	A 1880+25.17	-6.000	2515.626
Obstruction:	No Obstruction		
Sight Distance:	1264.780		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 11:16am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1943+00.00
Stop Station: A 1887+00.00
Interval: 50.000

Sight Distance: 675.000
Relaxed Distance: 675.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	A 1943+00.00	-18.000	2238.103
Object Position:	A 1936+23.35	-18.000	2265.204
Obstruction:	No Obstruction		
Sight Distance:	868.963		
Eye Position:	A 1942+50.00	-18.000	2240.283
Object Position:	A 1935+72.92	-18.000	2267.404
Obstruction:	No Obstruction		
Sight Distance:	859.991		
Eye Position:	A 1942+00.00	-18.000	2242.463
Object Position:	A 1935+22.47	-18.000	2269.603
Obstruction:	No Obstruction		
Sight Distance:	852.489		
Eye Position:	A 1941+50.00	-18.000	2244.643
Object Position:	A 1934+72.00	-18.000	2271.804
Obstruction:	No Obstruction		
Sight Distance:	846.498		
Eye Position:	A 1941+00.00	-18.000	2246.823
Object Position:	A 1934+21.51	-18.000	2274.015
Obstruction:	No Obstruction		
Sight Distance:	842.596		
Eye Position:	A 1940+50.00	-18.000	2249.003
Object Position:	A 1933+71.01	-18.000	2276.207
Obstruction:	No Obstruction		
Sight Distance:	838.256		

	Station	Offset	Elevation
Eye Position:	A 1940+00.00	-18.000	2251.183
Object Position:	A 1933+20.53	-18.000	2278.408
Obstruction:	No Obstruction		
Sight Distance:	835.798		
Eye Position:	A 1939+50.00	-18.000	2253.167
Object Position:	A 1932+70.08	-18.000	2280.607
Obstruction:	No Obstruction		
Sight Distance:	837.525		
Eye Position:	A 1939+00.00	-18.000	2255.147
Object Position:	A 1932+19.69	-18.000	2282.805
Obstruction:	No Obstruction		
Sight Distance:	840.220		
Eye Position:	A 1938+50.00	-18.000	2257.128
Object Position:	A 1931+69.46	-18.000	2284.994
Obstruction:	No Obstruction		
Sight Distance:	843.831		
Eye Position:	A 1938+00.00	-18.000	2259.121
Object Position:	A 1931+19.46	-18.000	2287.174
Obstruction:	No Obstruction		
Sight Distance:	847.409		
Eye Position:	A 1937+50.00	-18.000	2261.185
Object Position:	A 1930+69.46	-18.000	2289.357
Obstruction:	No Obstruction		
Sight Distance:	849.935		
Eye Position:	A 1937+00.00	-18.000	2263.365
Object Position:	A 1930+19.46	-18.000	2291.536
Obstruction:	No Obstruction		
Sight Distance:	849.866		
Eye Position:	A 1936+50.00	-18.000	2265.544
Object Position:	A 1929+69.46	-18.000	2293.716
Obstruction:	No Obstruction		
Sight Distance:	849.839		
Eye Position:	A 1936+00.00	-18.000	2267.723
Object Position:	A 1929+19.46	-18.000	2295.896
Obstruction:	No Obstruction		
Sight Distance:	849.842		
Eye Position:	A 1935+50.00	-18.000	2269.903
Object Position:	A 1928+69.46	-18.000	2298.080

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	850.265		
Eye Position:	A 1935+00.00	-18.000	2272.083
Object Position:	A 1928+19.46	-18.000	2300.264
Obstruction:	No Obstruction		
Sight Distance:	850.550		
Eye Position:	A 1934+50.00	-18.000	2274.263
Object Position:	A 1927+69.46	-18.000	2302.444
Obstruction:	No Obstruction		
Sight Distance:	850.601		
Eye Position:	A 1934+00.00	-18.000	2276.445
Object Position:	A 1927+19.46	-18.000	2304.624
Obstruction:	No Obstruction		
Sight Distance:	850.557		
Eye Position:	A 1933+50.00	-18.000	2278.624
Object Position:	A 1926+69.46	-18.000	2306.797
Obstruction:	No Obstruction		
Sight Distance:	849.933		
Eye Position:	A 1933+00.00	-18.000	2280.803
Object Position:	A 1926+19.46	-18.000	2308.980
Obstruction:	No Obstruction		
Sight Distance:	850.189		
Eye Position:	A 1932+50.00	-18.000	2282.985
Object Position:	A 1925+69.46	-18.000	2311.160
Obstruction:	No Obstruction		
Sight Distance:	850.164		
Eye Position:	A 1932+00.00	-18.000	2285.164
Object Position:	A 1925+19.46	-18.000	2313.340
Obstruction:	No Obstruction		
Sight Distance:	850.221		
Eye Position:	A 1931+50.00	-18.000	2287.343
Object Position:	A 1924+69.46	-18.000	2315.524
Obstruction:	No Obstruction		
Sight Distance:	850.631		
Eye Position:	A 1931+00.00	-18.000	2289.524
Object Position:	A 1924+19.46	-18.000	2317.700
Obstruction:	No Obstruction		
Sight Distance:	850.180		

	Station	Offset	Elevation
Eye Position:	A 1930+50.00	-18.000	2291.705
Object Position:	A 1923+69.46	-18.000	2319.884
Obstruction:	No Obstruction		
Sight Distance:	850.572		
Eye Position:	A 1930+00.00	-18.000	2293.884
Object Position:	A 1923+19.46	-18.000	2322.055
Obstruction:	No Obstruction		
Sight Distance:	849.722		
Eye Position:	A 1929+50.00	-18.000	2296.064
Object Position:	A 1922+69.46	-18.000	2324.240
Obstruction:	No Obstruction		
Sight Distance:	850.219		
Eye Position:	A 1929+00.00	-18.000	2298.244
Object Position:	A 1922+19.46	-18.000	2326.420
Obstruction:	No Obstruction		
Sight Distance:	854.235		
Eye Position:	A 1928+50.00	-18.000	2300.425
Object Position:	A 1921+69.46	-18.000	2328.600
Obstruction:	No Obstruction		
Sight Distance:	865.089		
Eye Position:	A 1928+00.00	-18.000	2302.605
Object Position:	A 1921+19.46	-18.000	2330.774
Obstruction:	No Obstruction		
Sight Distance:	888.513		
Eye Position:	A 1927+50.00	-18.000	2304.785
Object Position:	A 1920+69.46	-18.000	2332.954
Obstruction:	No Obstruction		
Sight Distance:	932.551		
Eye Position:	A 1927+00.00	-18.000	2306.965
Object Position:	A 1920+19.46	-18.000	2335.364
Obstruction:	No Obstruction		
Sight Distance:	1032.454		
Eye Position:	A 1926+50.00	-18.000	2309.144
Object Position:	A 1919+69.53	-18.000	2337.728
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1926+00.00	-18.000	2311.325

	Station	Offset	Elevation
	A 1919+19.89	-18.000	2340.090
Obstruction:	No Obstruction		
Sight Distance:	3736.879		
Eye Position:	A 1925+50.00	-18.000	2313.505
Object Position:	A 1918+70.31	-18.000	2342.457
Obstruction:	No Obstruction		
Sight Distance:	3512.544		
Eye Position:	A 1925+00.00	-18.000	2315.685
Object Position:	A 1918+20.77	-18.000	2344.698
Obstruction:	No Obstruction		
Sight Distance:	3343.200		
Eye Position:	A 1924+50.00	-18.000	2317.865
Object Position:	A 1917+71.25	-18.000	2346.856
Obstruction:	No Obstruction		
Sight Distance:	3129.726		
Eye Position:	A 1924+00.00	-18.000	2320.045
Object Position:	A 1917+21.74	-18.000	2349.015
Obstruction:	No Obstruction		
Sight Distance:	2912.561		
Eye Position:	A 1923+50.00	-18.000	2322.225
Object Position:	A 1916+72.22	-18.000	2351.174
Obstruction:	No Obstruction		
Sight Distance:	2702.961		
Eye Position:	A 1923+00.00	-18.000	2324.403
Object Position:	A 1916+22.69	-18.000	2353.334
Obstruction:	No Obstruction		
Sight Distance:	2503.485		
Eye Position:	A 1922+50.00	-18.000	2326.584
Object Position:	A 1915+73.12	-18.000	2355.495
Obstruction:	No Obstruction		
Sight Distance:	2310.912		
Eye Position:	A 1922+00.00	-18.000	2328.765
Object Position:	A 1915+23.53	-18.000	2357.657
Obstruction:	No Obstruction		
Sight Distance:	2126.424		
Eye Position:	A 1921+50.00	-18.000	2330.945
Object Position:	A 1914+73.90	-18.000	2359.821
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1952.290		
Eye Position:	A 1921+00.00	-18.000	2333.124
Object Position:	A 1914+24.25	-18.000	2361.986
Obstruction:	No Obstruction		
Sight Distance:	1784.327		
Eye Position:	A 1920+50.00	-18.000	2335.398
Object Position:	A 1913+74.57	-18.000	2364.152
Obstruction:	No Obstruction		
Sight Distance:	1686.293		
Eye Position:	A 1920+00.00	-18.000	2337.792
Object Position:	A 1913+24.88	-18.000	2366.318
Obstruction:	No Obstruction		
Sight Distance:	1573.007		
Eye Position:	A 1919+50.00	-18.000	2340.157
Object Position:	A 1912+75.00	-18.000	2368.493
Obstruction:	No Obstruction		
Sight Distance:	1493.354		
Eye Position:	A 1919+00.00	-18.000	2342.544
Object Position:	A 1912+25.00	-18.000	2370.673
Obstruction:	No Obstruction		
Sight Distance:	1422.073		
Eye Position:	A 1918+50.00	-18.000	2344.923
Object Position:	A 1911+75.00	-18.000	2372.853
Obstruction:	No Obstruction		
Sight Distance:	1348.821		
Eye Position:	A 1918+00.00	-18.000	2347.103
Object Position:	A 1911+25.00	-18.000	2375.033
Obstruction:	No Obstruction		
Sight Distance:	1322.269		
Eye Position:	A 1917+50.00	-18.000	2349.283
Object Position:	A 1910+75.00	-18.000	2377.213
Obstruction:	No Obstruction		
Sight Distance:	1286.962		
Eye Position:	A 1917+00.00	-18.000	2351.463
Object Position:	A 1910+25.00	-18.000	2379.393
Obstruction:	No Obstruction		
Sight Distance:	1251.658		

	Station	Offset	Elevation
	A 1916+50.00	-18.000	2353.643
Object Position:	A 1909+75.00	-18.000	2381.573
Obstruction:	No Obstruction		
Sight Distance:	1220.835		
Eye Position:	A 1916+00.00	-18.000	2355.823
Object Position:	A 1909+25.00	-18.000	2383.753
Obstruction:	No Obstruction		
Sight Distance:	1189.909		
Eye Position:	A 1915+50.00	-18.000	2358.003
Object Position:	A 1908+75.00	-18.000	2385.933
Obstruction:	No Obstruction		
Sight Distance:	1157.552		
Eye Position:	A 1915+00.00	-18.000	2360.183
Object Position:	A 1908+25.00	-18.000	2388.113
Obstruction:	No Obstruction		
Sight Distance:	1127.984		
Eye Position:	A 1914+50.00	-18.000	2362.363
Object Position:	A 1907+75.00	-18.000	2390.293
Obstruction:	No Obstruction		
Sight Distance:	1092.929		
Eye Position:	A 1914+00.00	-18.000	2364.543
Object Position:	A 1907+25.00	-18.000	2392.473
Obstruction:	No Obstruction		
Sight Distance:	1063.021		
Eye Position:	A 1913+50.00	-18.000	2366.723
Object Position:	A 1906+75.00	-18.000	2394.653
Obstruction:	No Obstruction		
Sight Distance:	1027.227		
Eye Position:	A 1913+00.00	-18.000	2368.903
Object Position:	A 1906+25.00	-18.000	2396.833
Obstruction:	No Obstruction		
Sight Distance:	999.535		
Eye Position:	A 1912+50.00	-18.000	2371.083
Object Position:	A 1905+75.00	-18.000	2399.257
Obstruction:	No Obstruction		
Sight Distance:	1092.876		
Eye Position:	A 1912+00.00	-18.000	2373.263
Object Position:	A 1905+25.00	-18.000	2401.570

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1118.539		
Eye Position:	A 1911+50.00	-18.000	2375.443
Object Position:	A 1904+75.00	-18.000	2403.950
Obstruction:	No Obstruction		
Sight Distance:	1160.207		
Eye Position:	A 1911+00.00	-18.000	2377.623
Object Position:	A 1904+25.00	-18.000	2406.363
Obstruction:	No Obstruction		
Sight Distance:	1417.163		
Eye Position:	A 1910+50.00	-18.000	2379.803
Object Position:	A 1903+75.02	-18.000	2408.725
Obstruction:	No Obstruction		
Sight Distance:	1373.301		
Eye Position:	A 1910+00.00	-18.000	2381.983
Object Position:	A 1903+25.19	-18.000	2411.103
Obstruction:	No Obstruction		
Sight Distance:	1333.706		
Eye Position:	A 1909+50.00	-18.000	2384.163
Object Position:	A 1902+75.36	-18.000	2413.337
Obstruction:	No Obstruction		
Sight Distance:	1296.187		
Eye Position:	A 1909+00.00	-18.000	2386.343
Object Position:	A 1902+25.52	-18.000	2415.512
Obstruction:	No Obstruction		
Sight Distance:	1262.746		
Eye Position:	A 1908+50.00	-18.000	2388.523
Object Position:	A 1901+75.68	-18.000	2417.688
Obstruction:	No Obstruction		
Sight Distance:	1233.727		
Eye Position:	A 1908+00.00	-18.000	2390.703
Object Position:	A 1901+25.82	-18.000	2419.859
Obstruction:	No Obstruction		
Sight Distance:	1209.677		
Eye Position:	A 1907+50.00	-18.000	2392.883
Object Position:	A 1900+75.95	-18.000	2422.036
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	A 1907+00.00	-18.000	2395.063
Object Position:	A 1900+26.07	-18.000	2424.211
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1906+50.00	-18.000	2397.243
Object Position:	A 1899+76.19	-18.000	2426.383
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1906+00.00	-18.000	2399.533
Object Position:	A 1899+26.30	-18.000	2428.558
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1905+50.00	-18.000	2401.927
Object Position:	A 1898+76.41	-18.000	2430.734
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1905+00.00	-18.000	2404.293
Object Position:	A 1898+26.53	-18.000	2432.908
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1904+50.00	-18.000	2406.673
Object Position:	A 1897+76.66	-18.000	2435.083
Obstruction:	No Obstruction		
Sight Distance:	1121.259		
Eye Position:	A 1904+00.00	-18.000	2409.053
Object Position:	A 1897+26.81	-18.000	2437.259
Obstruction:	No Obstruction		
Sight Distance:	1117.675		
Eye Position:	A 1903+50.00	-18.000	2411.433
Object Position:	A 1896+76.88	-18.000	2439.436
Obstruction:	No Obstruction		
Sight Distance:	1115.546		
Eye Position:	A 1903+00.00	-18.000	2413.763
Object Position:	A 1896+26.88	-18.000	2441.613
Obstruction:	No Obstruction		
Sight Distance:	1113.778		
Eye Position:	A 1902+50.00	-18.000	2415.944

	Station	Offset	Elevation
	A 1895+76.88	-18.000	2443.792
Obstruction:	No Obstruction		
Sight Distance:	1113.073		
Eye Position:	A 1902+00.00	-18.000	2418.124
Object Position:	A 1895+26.88	-18.000	2445.976
Obstruction:	No Obstruction		
Sight Distance:	1112.282		
Eye Position:	A 1901+50.00	-18.000	2420.304
Object Position:	A 1894+76.88	-18.000	2448.153
Obstruction:	No Obstruction		
Sight Distance:	1111.167		
Eye Position:	A 1901+00.00	-18.000	2422.484
Object Position:	A 1894+26.88	-18.000	2450.331
Obstruction:	No Obstruction		
Sight Distance:	1109.832		
Eye Position:	A 1900+50.00	-18.000	2424.664
Object Position:	A 1893+76.88	-18.000	2452.511
Obstruction:	No Obstruction		
Sight Distance:	1108.288		
Eye Position:	A 1900+00.00	-18.000	2426.844
Object Position:	A 1893+26.88	-18.000	2454.698
Obstruction:	No Obstruction		
Sight Distance:	1106.675		
Eye Position:	A 1899+50.00	-18.000	2429.024
Object Position:	A 1892+76.88	-18.000	2456.889
Obstruction:	No Obstruction		
Sight Distance:	1105.017		
Eye Position:	A 1899+00.00	-18.000	2431.204
Object Position:	A 1892+26.88	-18.000	2459.094
Obstruction:	No Obstruction		
Sight Distance:	1103.434		
Eye Position:	A 1898+50.00	-18.000	2433.384
Object Position:	A 1891+76.88	-18.000	2461.320
Obstruction:	No Obstruction		
Sight Distance:	1100.675		
Eye Position:	A 1898+00.00	-18.000	2435.564
Object Position:	A 1891+26.88	-18.000	2463.560
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1079.307		
Eye Position:	A 1897+50.00	-18.000	2437.744
Object Position:	A 1890+76.88	-18.000	2465.812
Obstruction:	No Obstruction		
Sight Distance:	1064.615		
Eye Position:	A 1897+00.00	-18.000	2439.924
Object Position:	A 1890+26.88	-18.000	2468.084
Obstruction:	No Obstruction		
Sight Distance:	1036.981		
Eye Position:	A 1896+50.00	-18.000	2442.104
Object Position:	A 1889+76.88	-18.000	2470.374
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1896+00.00	-18.000	2444.284
Object Position:	A 1889+26.88	-18.000	2472.677
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1895+50.00	-18.000	2446.464
Object Position:	A 1888+76.88	-18.000	2474.994
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1895+00.00	-18.000	2448.644
Object Position:	A 1888+26.88	-18.000	2477.330
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1894+50.00	-18.000	2450.824
Object Position:	A 1887+76.88	-18.000	2479.678
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1894+00.00	-18.000	2453.003
Object Position:	A 1887+26.88	-18.000	2482.045
Obstruction:	No Obstruction		
Sight Distance:	1213.075		
Eye Position:	A 1893+50.00	-18.000	2455.183
Object Position:	A 1886+76.88	-18.000	2484.429
Obstruction:	No Obstruction		
Sight Distance:	1231.913		

	Station	Offset	Elevation
	A 1893+00.00	-18.000	2457.369
Object Position:	A 1886+26.88	-18.000	2486.830
Obstruction:	No Obstruction		
Sight Distance:	1260.747		
Eye Position:	A 1892+50.00	-18.000	2459.569
Object Position:	A 1885+76.88	-18.000	2489.164
Obstruction:	No Obstruction		
Sight Distance:	1295.420		
Eye Position:	A 1892+00.00	-18.000	2461.785
Object Position:	A 1885+26.88	-18.000	2491.404
Obstruction:	No Obstruction		
Sight Distance:	1346.108		
Eye Position:	A 1891+50.00	-18.000	2464.017
Object Position:	A 1884+76.72	-18.000	2493.709
Obstruction:	No Obstruction		
Sight Distance:	1444.598		
Eye Position:	A 1891+00.00	-18.000	2466.265
Object Position:	A 1884+26.59	-18.000	2495.979
Obstruction:	No Obstruction		
Sight Distance:	1011.973		
Eye Position:	A 1890+50.00	-18.000	2468.529
Object Position:	A 1883+76.46	-18.000	2498.264
Obstruction:	No Obstruction		
Sight Distance:	1075.915		
Eye Position:	A 1890+00.00	-18.000	2470.809
Object Position:	A 1883+26.35	-18.000	2500.495
Obstruction:	No Obstruction		
Sight Distance:	1081.180		
Eye Position:	A 1889+50.00	-18.000	2473.105
Object Position:	A 1882+76.24	-18.000	2502.834
Obstruction:	No Obstruction		
Sight Distance:	1044.393		
Eye Position:	A 1889+00.00	-18.000	2475.417
Object Position:	A 1882+26.12	-18.000	2505.339
Obstruction:	No Obstruction		
Sight Distance:	1055.911		
Eye Position:	A 1888+50.00	-18.000	2477.745
Object Position:	A 1881+76.00	-18.000	2507.845

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1067.675		
Eye Position:	A 1888+00.00	-18.000	2480.089
Object Position:	A 1881+25.87	-18.000	2510.352
Obstruction:	No Obstruction		
Sight Distance:	1079.633		
Eye Position:	A 1887+50.00	-18.000	2482.448
Object Position:	A 1880+75.74	-18.000	2512.858
Obstruction:	No Obstruction		
Sight Distance:	1091.687		
Eye Position:	A 1887+00.00	-18.000	2484.825
Object Position:	A 1880+25.59	-18.000	2515.365
Obstruction:	No Obstruction		
Sight Distance:	1103.614		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 11:17am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1891+00.00
Stop Station: A 1843+00.00
Interval: 50.000

Sight Distance: 668.000
Relaxed Distance: 668.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	A 1891+00.00	-18.000	2466.265
Object Position:	A 1884+33.59	-18.000	2495.670
Obstruction:	No Obstruction		
Sight Distance:	1001.745		
Eye Position:	A 1890+50.00	-18.000	2468.529
Object Position:	A 1883+83.47	-18.000	2497.952
Obstruction:	No Obstruction		
Sight Distance:	1065.081		
Eye Position:	A 1890+00.00	-18.000	2470.809
Object Position:	A 1883+33.35	-18.000	2500.183
Obstruction:	No Obstruction		
Sight Distance:	1081.194		
Eye Position:	A 1889+50.00	-18.000	2473.105
Object Position:	A 1882+83.24	-18.000	2502.488
Obstruction:	No Obstruction		
Sight Distance:	1034.871		
Eye Position:	A 1889+00.00	-18.000	2475.417
Object Position:	A 1882+33.12	-18.000	2504.989
Obstruction:	No Obstruction		
Sight Distance:	1044.961		
Eye Position:	A 1888+50.00	-18.000	2477.745
Object Position:	A 1881+83.00	-18.000	2507.495
Obstruction:	No Obstruction		
Sight Distance:	1056.571		

	Station	Offset	Elevation
Eye Position:	A 1888+00.00	-18.000	2480.089
Object Position:	A 1881+32.87	-18.000	2510.002
Obstruction:	No Obstruction		
Sight Distance:	1068.438		
Eye Position:	A 1887+50.00	-18.000	2482.448
Object Position:	A 1880+82.74	-18.000	2512.508
Obstruction:	No Obstruction		
Sight Distance:	1080.394		
Eye Position:	A 1887+00.00	-18.000	2484.825
Object Position:	A 1880+32.59	-18.000	2515.015
Obstruction:	No Obstruction		
Sight Distance:	1092.174		
Eye Position:	A 1886+50.00	-18.000	2487.217
Object Position:	A 1879+82.43	-18.000	2517.524
Obstruction:	No Obstruction		
Sight Distance:	1104.341		
Eye Position:	A 1886+00.00	-18.000	2489.625
Object Position:	A 1879+32.26	-18.000	2520.032
Obstruction:	No Obstruction		
Sight Distance:	1116.028		
Eye Position:	A 1885+50.00	-18.000	2491.869
Object Position:	A 1878+82.09	-18.000	2522.541
Obstruction:	No Obstruction		
Sight Distance:	1157.894		
Eye Position:	A 1885+00.00	-18.000	2494.109
Object Position:	A 1878+32.00	-18.000	2525.045
Obstruction:	No Obstruction		
Sight Distance:	1210.310		
Eye Position:	A 1884+50.00	-18.000	2496.380
Object Position:	A 1877+82.00	-18.000	2527.546
Obstruction:	No Obstruction		
Sight Distance:	1265.850		
Eye Position:	A 1884+00.00	-18.000	2498.652
Object Position:	A 1877+32.00	-18.000	2530.046
Obstruction:	No Obstruction		
Sight Distance:	1333.893		
Eye Position:	A 1883+50.00	-18.000	2500.940
Object Position:	A 1876+82.00	-18.000	2532.546

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1412.583		
Eye Position:	A 1883+00.00	-18.000	2503.225
Object Position:	A 1876+32.00	-18.000	2535.046
Obstruction:	No Obstruction		
Sight Distance:	1513.820		
Eye Position:	A 1882+50.00	-18.000	2505.645
Object Position:	A 1875+82.00	-18.000	2537.545
Obstruction:	No Obstruction		
Sight Distance:	1515.995		
Eye Position:	A 1882+00.00	-18.000	2508.146
Object Position:	A 1875+32.00	-18.000	2540.045
Obstruction:	No Obstruction		
Sight Distance:	1480.925		
Eye Position:	A 1881+50.00	-18.000	2510.646
Object Position:	A 1874+82.00	-18.000	2542.545
Obstruction:	No Obstruction		
Sight Distance:	1454.994		
Eye Position:	A 1881+00.00	-18.000	2513.145
Object Position:	A 1874+32.00	-18.000	2545.045
Obstruction:	No Obstruction		
Sight Distance:	1428.125		
Eye Position:	A 1880+50.00	-18.000	2515.645
Object Position:	A 1873+82.00	-18.000	2547.545
Obstruction:	No Obstruction		
Sight Distance:	1393.023		
Eye Position:	A 1880+00.00	-18.000	2518.145
Object Position:	A 1873+32.00	-18.000	2550.045
Obstruction:	No Obstruction		
Sight Distance:	1357.830		
Eye Position:	A 1879+50.00	-18.000	2520.645
Object Position:	A 1872+82.00	-18.000	2552.545
Obstruction:	No Obstruction		
Sight Distance:	1323.824		
Eye Position:	A 1879+00.00	-18.000	2523.145
Object Position:	A 1872+32.00	-18.000	2555.045
Obstruction:	No Obstruction		
Sight Distance:	1293.815		

	Station	Offset	Elevation
Eye Position:	A 1878+50.00	-18.000	2525.645
Object Position:	A 1871+82.00	-18.000	2557.546
Obstruction:	No Obstruction		
Sight Distance:	1260.999		
Eye Position:	A 1878+00.00	-18.000	2528.146
Object Position:	A 1871+32.00	-18.000	2560.046
Obstruction:	No Obstruction		
Sight Distance:	1225.769		
Eye Position:	A 1877+50.00	-18.000	2530.646
Object Position:	A 1870+82.00	-18.000	2562.545
Obstruction:	No Obstruction		
Sight Distance:	1198.061		
Eye Position:	A 1877+00.00	-18.000	2533.146
Object Position:	A 1870+32.00	-18.000	2565.045
Obstruction:	No Obstruction		
Sight Distance:	1164.276		
Eye Position:	A 1876+50.00	-18.000	2535.646
Object Position:	A 1869+82.00	-18.000	2567.545
Obstruction:	No Obstruction		
Sight Distance:	1129.071		
Eye Position:	A 1876+00.00	-18.000	2538.145
Object Position:	A 1869+32.00	-18.000	2570.045
Obstruction:	No Obstruction		
Sight Distance:	1103.273		
Eye Position:	A 1875+50.00	-18.000	2540.645
Object Position:	A 1868+82.00	-18.000	2572.545
Obstruction:	No Obstruction		
Sight Distance:	1075.780		
Eye Position:	A 1875+00.00	-18.000	2543.145
Object Position:	A 1868+32.00	-18.000	2575.045
Obstruction:	No Obstruction		
Sight Distance:	1040.458		
Eye Position:	A 1874+50.00	-18.000	2545.645
Object Position:	A 1867+82.00	-18.000	2577.546
Obstruction:	No Obstruction		
Sight Distance:	1006.368		
Eye Position:	A 1874+00.00	-18.000	2548.145

	Station	Offset	Elevation
	A 1867+32.00	-18.000	2580.151
Obstruction:	No Obstruction		
Sight Distance:	1032.844		
Eye Position:	A 1873+50.00	-18.000	2550.645
Object Position:	A 1866+82.00	-18.000	2582.787
Obstruction:	No Obstruction		
Sight Distance:	1066.259		
Eye Position:	A 1873+00.00	-18.000	2553.146
Object Position:	A 1866+32.00	-18.000	2585.541
Obstruction:	No Obstruction		
Sight Distance:	1132.482		
Eye Position:	A 1872+50.00	-18.000	2555.645
Object Position:	A 1865+82.00	-18.000	2588.252
Obstruction:	No Obstruction		
Sight Distance:	1116.686		
Eye Position:	A 1872+00.00	-18.000	2558.145
Object Position:	A 1865+32.00	-18.000	2590.951
Obstruction:	No Obstruction		
Sight Distance:	1067.590		
Eye Position:	A 1871+50.00	-18.000	2560.645
Object Position:	A 1864+82.10	-18.000	2593.585
Obstruction:	No Obstruction		
Sight Distance:	1019.313		
Eye Position:	A 1871+00.00	-18.000	2563.146
Object Position:	A 1864+32.30	-18.000	2596.290
Obstruction:	No Obstruction		
Sight Distance:	979.385		
Eye Position:	A 1870+50.00	-18.000	2565.645
Object Position:	A 1863+82.50	-18.000	2598.786
Obstruction:	No Obstruction		
Sight Distance:	947.320		
Eye Position:	A 1870+00.00	-18.000	2568.145
Object Position:	A 1863+32.68	-18.000	2601.273
Obstruction:	No Obstruction		
Sight Distance:	921.214		
Eye Position:	A 1869+50.00	-18.000	2570.645
Object Position:	A 1862+82.85	-18.000	2603.768
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	901.146		
Eye Position:	A 1869+00.00	-18.000	2573.145
Object Position:	A 1862+33.01	-18.000	2606.260
Obstruction:	No Obstruction		
Sight Distance:	884.452		
Eye Position:	A 1868+50.00	-18.000	2575.645
Object Position:	A 1861+83.15	-18.000	2608.741
Obstruction:	No Obstruction		
Sight Distance:	871.754		
Eye Position:	A 1868+00.00	-18.000	2578.146
Object Position:	A 1861+33.28	-18.000	2611.177
Obstruction:	No Obstruction		
Sight Distance:	861.993		
Eye Position:	A 1867+50.00	-18.000	2580.655
Object Position:	A 1860+83.41	-18.000	2613.547
Obstruction:	No Obstruction		
Sight Distance:	854.325		
Eye Position:	A 1867+00.00	-18.000	2583.369
Object Position:	A 1860+33.53	-18.000	2615.857
Obstruction:	No Obstruction		
Sight Distance:	847.950		
Eye Position:	A 1866+50.00	-18.000	2586.055
Object Position:	A 1859+83.65	-18.000	2618.106
Obstruction:	No Obstruction		
Sight Distance:	843.362		
Eye Position:	A 1866+00.00	-18.000	2588.768
Object Position:	A 1859+33.79	-18.000	2620.284
Obstruction:	No Obstruction		
Sight Distance:	840.271		
Eye Position:	A 1865+50.00	-18.000	2591.465
Object Position:	A 1858+83.95	-18.000	2622.403
Obstruction:	No Obstruction		
Sight Distance:	838.570		
Eye Position:	A 1865+00.00	-18.000	2594.155
Object Position:	A 1858+34.11	-18.000	2624.454
Obstruction:	No Obstruction		
Sight Distance:	838.639		

	Station	Offset	Elevation
	A 1864+50.00	-18.000	2596.856
Object Position:	A 1857+84.11	-18.000	2626.452
Obstruction:	No Obstruction		
Sight Distance:	838.773		
Eye Position:	A 1864+00.00	-18.000	2599.406
Object Position:	A 1857+34.11	-18.000	2628.384
Obstruction:	No Obstruction		
Sight Distance:	838.895		
Eye Position:	A 1863+50.00	-18.000	2601.906
Object Position:	A 1856+84.11	-18.000	2630.254
Obstruction:	No Obstruction		
Sight Distance:	920.020		
Eye Position:	A 1863+00.00	-18.000	2604.406
Object Position:	A 1856+34.11	-18.000	2632.058
Obstruction:	No Obstruction		
Sight Distance:	906.266		
Eye Position:	A 1862+50.00	-18.000	2606.906
Object Position:	A 1855+84.11	-18.000	2633.797
Obstruction:	No Obstruction		
Sight Distance:	891.948		
Eye Position:	A 1862+00.00	-18.000	2609.405
Object Position:	A 1855+34.11	-18.000	2635.474
Obstruction:	No Obstruction		
Sight Distance:	877.743		
Eye Position:	A 1861+50.00	-18.000	2611.868
Object Position:	A 1854+84.11	-18.000	2637.083
Obstruction:	No Obstruction		
Sight Distance:	863.156		
Eye Position:	A 1861+00.00	-18.000	2614.269
Object Position:	A 1854+34.11	-18.000	2638.632
Obstruction:	No Obstruction		
Sight Distance:	848.310		
Eye Position:	A 1860+50.00	-18.000	2616.604
Object Position:	A 1853+84.11	-18.000	2640.119
Obstruction:	No Obstruction		
Sight Distance:	838.793		
Eye Position:	A 1860+00.00	-18.000	2618.877
Object Position:	A 1853+34.11	-18.000	2641.539

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	839.126		
Eye Position:	A 1859+50.00	-18.000	2621.086
Object Position:	A 1852+84.11	-18.000	2642.895
Obstruction:	No Obstruction		
Sight Distance:	839.122		
Eye Position:	A 1859+00.00	-18.000	2623.229
Object Position:	A 1852+34.11	-18.000	2644.187
Obstruction:	No Obstruction		
Sight Distance:	839.015		
Eye Position:	A 1858+50.00	-18.000	2625.310
Object Position:	A 1851+84.11	-18.000	2645.415
Obstruction:	No Obstruction		
Sight Distance:	839.419		
Eye Position:	A 1858+00.00	-18.000	2627.325
Object Position:	A 1851+34.11	-18.000	2646.580
Obstruction:	No Obstruction		
Sight Distance:	840.298		
Eye Position:	A 1857+50.00	-18.000	2629.278
Object Position:	A 1850+84.11	-18.000	2647.681
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1857+00.00	-18.000	2631.167
Object Position:	A 1850+34.11	-18.000	2648.691
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1856+50.00	-18.000	2632.992
Object Position:	A 1849+84.11	-18.000	2649.479
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1856+00.00	-18.000	2634.752
Object Position:	A 1849+33.97	-18.000	2650.176
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1855+50.00	-18.000	2636.448
Object Position:	A 1848+83.80	-18.000	2650.907
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	A 1855+00.00	-18.000	2638.082
Object Position:	A 1848+33.66	-18.000	2651.688
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1854+50.00	-18.000	2639.649
Object Position:	A 1847+83.54	-18.000	2652.405
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1854+00.00	-18.000	2641.154
Object Position:	A 1847+33.42	-18.000	2653.058
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1853+50.00	-18.000	2642.594
Object Position:	A 1846+83.30	-18.000	2653.649
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1853+00.00	-18.000	2643.971
Object Position:	A 1846+33.17	-18.000	2654.173
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1852+50.00	-18.000	2645.284
Object Position:	A 1845+83.02	-18.000	2654.632
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1852+00.00	-18.000	2646.532
Object Position:	A 1845+32.87	-18.000	2655.030
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1851+50.00	-18.000	2647.717
Object Position:	A 1844+82.70	-18.000	2655.361
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1851+00.00	-18.000	2648.838
Object Position:	A 1844+32.51	-18.000	2655.630
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1850+50.00	-18.000	2649.895

	Station	Offset	Elevation
	A 1843+82.32	-18.000	2655.833
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1850+00.00	-18.000	2650.729
Object Position:	A 1843+32.11	-18.000	2655.971
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1849+50.00	-18.000	2651.457
Object Position:	A 1842+82.00	-18.000	2656.045
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1849+00.00	-18.000	2652.141
Object Position:	A 1842+32.00	-18.000	2656.055
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1848+50.00	-18.000	2652.941
Object Position:	A 1841+82.00	-18.000	2656.027
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1848+00.00	-18.000	2653.678
Object Position:	A 1841+32.08	-18.000	2656.141
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1847+50.00	-18.000	2654.351
Object Position:	A 1840+82.27	-18.000	2656.064
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1847+00.00	-18.000	2654.960
Object Position:	A 1840+32.46	-18.000	2655.818
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1846+50.00	-18.000	2655.504
Object Position:	A 1839+82.63	-18.000	2655.516
Obstruction:	No Obstruction		
Sight Distance:	938.633		
Eye Position:	A 1846+00.00	-18.000	2655.985
Object Position:	A 1839+32.80	-18.000	2655.203
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	916.321		
Eye Position:	A 1845+50.00	-18.000	2656.402
Object Position:	A 1838+82.95	-18.000	2654.889
Obstruction:	No Obstruction		
Sight Distance:	898.254		
Eye Position:	A 1845+00.00	-18.000	2656.754
Object Position:	A 1838+33.08	-18.000	2654.574
Obstruction:	No Obstruction		
Sight Distance:	884.101		
Eye Position:	A 1844+50.00	-18.000	2657.044
Object Position:	A 1837+83.21	-18.000	2654.261
Obstruction:	No Obstruction		
Sight Distance:	872.801		
Eye Position:	A 1844+00.00	-18.000	2657.268
Object Position:	A 1837+33.33	-18.000	2653.946
Obstruction:	No Obstruction		
Sight Distance:	863.873		
Eye Position:	A 1843+50.00	-18.000	2657.431
Object Position:	A 1836+83.45	-18.000	2653.632
Obstruction:	No Obstruction		
Sight Distance:	857.119		
Eye Position:	A 1843+00.00	-18.000	2657.527
Object Position:	A 1836+33.57	-18.000	2653.318
Obstruction:	No Obstruction		
Sight Distance:	852.072		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:03am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1847+00.00
Stop Station: A 1829+30.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -18.000

	Station	Offset	Elevation
Eye Position:	A 1847+00.00	-18.000	2654.960
Object Position:	A 1840+55.37	-18.000	2655.939
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1846+50.00	-18.000	2655.504
Object Position:	A 1840+05.55	-18.000	2655.660
Obstruction:	No Obstruction		
Sight Distance:	928.067		
Eye Position:	A 1846+00.00	-18.000	2655.985
Object Position:	A 1839+55.72	-18.000	2655.348
Obstruction:	No Obstruction		
Sight Distance:	903.427		
Eye Position:	A 1845+50.00	-18.000	2656.402
Object Position:	A 1839+05.88	-18.000	2655.033
Obstruction:	No Obstruction		
Sight Distance:	883.775		
Eye Position:	A 1845+00.00	-18.000	2656.754
Object Position:	A 1838+56.02	-18.000	2654.719
Obstruction:	No Obstruction		
Sight Distance:	868.207		
Eye Position:	A 1844+50.00	-18.000	2657.044
Object Position:	A 1838+06.16	-18.000	2654.405
Obstruction:	No Obstruction		
Sight Distance:	855.997		

	Station	Offset	Elevation
Eye Position:	A 1844+00.00	-18.000	2657.268
Object Position:	A 1837+56.28	-18.000	2654.091
Obstruction:	No Obstruction		
Sight Distance:	846.318		
Eye Position:	A 1843+50.00	-18.000	2657.431
Object Position:	A 1837+06.41	-18.000	2653.777
Obstruction:	No Obstruction		
Sight Distance:	838.891		
Eye Position:	A 1843+00.00	-18.000	2657.527
Object Position:	A 1836+56.53	-18.000	2653.462
Obstruction:	No Obstruction		
Sight Distance:	833.561		
Eye Position:	A 1842+50.00	-18.000	2657.559
Object Position:	A 1836+06.67	-18.000	2653.148
Obstruction:	No Obstruction		
Sight Distance:	829.852		
Eye Position:	A 1842+00.00	-18.000	2657.529
Object Position:	A 1835+56.82	-18.000	2652.835
Obstruction:	No Obstruction		
Sight Distance:	827.682		
Eye Position:	A 1841+50.00	-18.000	2657.588
Object Position:	A 1835+06.98	-18.000	2652.520
Obstruction:	No Obstruction		
Sight Distance:	826.867		
Eye Position:	A 1841+00.00	-18.000	2657.635
Object Position:	A 1834+56.98	-18.000	2652.205
Obstruction:	No Obstruction		
Sight Distance:	828.310		
Eye Position:	A 1840+50.00	-18.000	2657.413
Object Position:	A 1834+06.98	-18.000	2651.891
Obstruction:	No Obstruction		
Sight Distance:	828.295		
Eye Position:	A 1840+00.00	-18.000	2657.126
Object Position:	A 1833+56.98	-18.000	2651.575
Obstruction:	No Obstruction		
Sight Distance:	828.287		
Eye Position:	A 1839+50.00	-18.000	2656.811
Object Position:	A 1833+06.98	-18.000	2651.260

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	828.286		
Eye Position:	A 1839+00.00	-18.000	2656.496
Object Position:	A 1832+56.98	-18.000	2650.945
Obstruction:	No Obstruction		
Sight Distance:	828.284		
Eye Position:	A 1838+50.00	-18.000	2656.181
Object Position:	A 1832+06.98	-18.000	2650.630
Obstruction:	No Obstruction		
Sight Distance:	828.288		
Eye Position:	A 1838+00.00	-18.000	2655.866
Object Position:	A 1831+56.98	-18.000	2650.315
Obstruction:	No Obstruction		
Sight Distance:	826.611		
Eye Position:	A 1837+50.00	-18.000	2655.551
Object Position:	A 1831+06.98	-18.000	2650.000
Obstruction:	No Obstruction		
Sight Distance:	826.929		
Eye Position:	A 1837+00.00	-18.000	2655.236
Object Position:	A 1830+56.98	-18.000	2649.685
Obstruction:	No Obstruction		
Sight Distance:	821.723		
Eye Position:	A 1836+50.00	-18.000	2654.921
Object Position:	A 1830+06.98	-18.000	2649.370
Obstruction:	No Obstruction		
Sight Distance:	819.917		
Eye Position:	A 1836+00.00	-18.000	2654.606
Object Position:	A 1829+56.98	-18.000	2649.055
Obstruction:	No Obstruction		
Sight Distance:	823.378		
Eye Position:	A 1835+50.00	-18.000	2654.291
Object Position:	A 1829+06.98	-18.000	2648.535
Obstruction:	No Obstruction		
Sight Distance:	833.423		
Eye Position:	A 1835+00.00	-18.000	2653.976
Object Position:	A 1828+56.82	-18.000	2648.000
Obstruction:	No Obstruction		
Sight Distance:	848.617		

	Station	Offset	Elevation
Eye Position:	A 1834+50.00	-18.000	2653.661
Object Position:	A 1828+06.67	-18.000	2647.463
Obstruction:	No Obstruction		
Sight Distance:	865.477		
Eye Position:	A 1834+00.00	-18.000	2653.346
Object Position:	A 1827+56.53	-18.000	2646.931
Obstruction:	No Obstruction		
Sight Distance:	884.505		
Eye Position:	A 1833+50.00	-18.000	2653.031
Object Position:	A 1827+06.41	-18.000	2646.402
Obstruction:	No Obstruction		
Sight Distance:	905.853		
Eye Position:	A 1833+00.00	-18.000	2652.716
Object Position:	A 1826+56.29	-18.000	2646.081
Obstruction:	No Obstruction		
Sight Distance:	931.731		
Eye Position:	A 1832+50.00	-18.000	2652.401
Object Position:	A 1826+06.16	-18.000	2645.765
Obstruction:	No Obstruction		
Sight Distance:	1452.774		
Eye Position:	A 1832+00.00	-18.000	2652.086
Object Position:	A 1825+56.02	-18.000	2645.449
Obstruction:	No Obstruction		
Sight Distance:	1382.439		
Eye Position:	A 1831+50.00	-18.000	2651.771
Object Position:	A 1825+05.88	-18.000	2645.133
Obstruction:	No Obstruction		
Sight Distance:	1322.794		
Eye Position:	A 1831+00.00	-18.000	2651.456
Object Position:	A 1824+55.72	-18.000	2644.817
Obstruction:	No Obstruction		
Sight Distance:	1271.792		
Eye Position:	A 1830+50.00	-18.000	2651.141
Object Position:	A 1824+05.55	-18.000	2644.501
Obstruction:	No Obstruction		
Sight Distance:	1227.613		
Eye Position:	A 1830+00.00	-18.000	2650.826

	Station	Offset	Elevation
	A 1823+55.37	-18.000	2644.020
Obstruction:	No Obstruction		
Sight Distance:	1156.727		
Eye Position:	A 1829+50.00	-18.000	2650.503
Object Position:	A 1823+05.18	-18.000	2643.462
Obstruction:	No Obstruction		
Sight Distance:	1080.851		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:04am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1847+00.00
Stop Station: A 1815+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	A 1847+00.00	-6.000	2654.720
Object Position:	A 1840+55.12	-6.000	2655.458
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1846+50.00	-6.000	2655.264
Object Position:	A 1840+05.17	-6.000	2655.178
Obstruction:	No Obstruction		
Sight Distance:	1045.520		
Eye Position:	A 1846+00.00	-6.000	2655.745
Object Position:	A 1839+55.21	-6.000	2654.864
Obstruction:	No Obstruction		
Sight Distance:	1018.035		
Eye Position:	A 1845+50.00	-6.000	2656.162
Object Position:	A 1839+05.23	-6.000	2654.549
Obstruction:	No Obstruction		
Sight Distance:	995.414		
Eye Position:	A 1845+00.00	-6.000	2656.514
Object Position:	A 1838+55.25	-6.000	2654.234
Obstruction:	No Obstruction		
Sight Distance:	977.087		
Eye Position:	A 1844+50.00	-6.000	2656.804
Object Position:	A 1838+05.25	-6.000	2653.919
Obstruction:	No Obstruction		
Sight Distance:	962.204		

	Station	Offset	Elevation
Eye Position:	A 1844+00.00	-6.000	2657.028
Object Position:	A 1837+55.25	-6.000	2653.604
Obstruction:	No Obstruction		
Sight Distance:	950.367		
Eye Position:	A 1843+50.00	-6.000	2657.191
Object Position:	A 1837+05.24	-6.000	2653.289
Obstruction:	No Obstruction		
Sight Distance:	941.034		
Eye Position:	A 1843+00.00	-6.000	2657.287
Object Position:	A 1836+55.24	-6.000	2652.974
Obstruction:	No Obstruction		
Sight Distance:	934.246		
Eye Position:	A 1842+50.00	-6.000	2657.319
Object Position:	A 1836+05.24	-6.000	2652.659
Obstruction:	No Obstruction		
Sight Distance:	929.509		
Eye Position:	A 1842+00.00	-6.000	2657.289
Object Position:	A 1835+55.26	-6.000	2652.345
Obstruction:	No Obstruction		
Sight Distance:	927.542		
Eye Position:	A 1841+50.00	-6.000	2657.242
Object Position:	A 1835+05.31	-6.000	2652.030
Obstruction:	No Obstruction		
Sight Distance:	926.371		
Eye Position:	A 1841+00.00	-6.000	2657.155
Object Position:	A 1834+55.31	-6.000	2651.715
Obstruction:	No Obstruction		
Sight Distance:	926.039		
Eye Position:	A 1840+50.00	-6.000	2656.933
Object Position:	A 1834+05.31	-6.000	2651.400
Obstruction:	No Obstruction		
Sight Distance:	922.867		
Eye Position:	A 1840+00.00	-6.000	2656.646
Object Position:	A 1833+55.31	-6.000	2651.085
Obstruction:	No Obstruction		
Sight Distance:	921.760		
Eye Position:	A 1839+50.00	-6.000	2656.331
Object Position:	A 1833+05.31	-6.000	2650.769

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	921.675		
Eye Position:	A 1839+00.00	-6.000	2656.016
Object Position:	A 1832+55.31	-6.000	2650.454
Obstruction:	No Obstruction		
Sight Distance:	925.488		
Eye Position:	A 1838+50.00	-6.000	2655.701
Object Position:	A 1832+05.31	-6.000	2650.139
Obstruction:	No Obstruction		
Sight Distance:	925.783		
Eye Position:	A 1838+00.00	-6.000	2655.386
Object Position:	A 1831+55.31	-6.000	2649.824
Obstruction:	No Obstruction		
Sight Distance:	921.364		
Eye Position:	A 1837+50.00	-6.000	2655.071
Object Position:	A 1831+05.31	-6.000	2649.509
Obstruction:	No Obstruction		
Sight Distance:	919.898		
Eye Position:	A 1837+00.00	-6.000	2654.756
Object Position:	A 1830+55.31	-6.000	2649.194
Obstruction:	No Obstruction		
Sight Distance:	922.797		
Eye Position:	A 1836+50.00	-6.000	2654.441
Object Position:	A 1830+05.31	-6.000	2648.879
Obstruction:	No Obstruction		
Sight Distance:	931.380		
Eye Position:	A 1836+00.00	-6.000	2654.126
Object Position:	A 1829+55.31	-6.000	2648.564
Obstruction:	No Obstruction		
Sight Distance:	946.738		
Eye Position:	A 1835+50.00	-6.000	2653.811
Object Position:	A 1829+05.31	-6.000	2648.178
Obstruction:	No Obstruction		
Sight Distance:	971.667		
Eye Position:	A 1835+00.00	-6.000	2653.496
Object Position:	A 1828+55.26	-6.000	2647.787
Obstruction:	No Obstruction		
Sight Distance:	1006.011		

	Station	Offset	Elevation
Eye Position:	A 1834+50.00	-6.000	2653.181
Object Position:	A 1828+05.24	-6.000	2647.395
Obstruction:	No Obstruction		
Sight Distance:	1046.210		
Eye Position:	A 1834+00.00	-6.000	2652.866
Object Position:	A 1827+55.24	-6.000	2647.016
Obstruction:	No Obstruction		
Sight Distance:	1095.490		
Eye Position:	A 1833+50.00	-6.000	2652.551
Object Position:	A 1827+05.24	-6.000	2646.629
Obstruction:	No Obstruction		
Sight Distance:	1649.951		
Eye Position:	A 1833+00.00	-6.000	2652.236
Object Position:	A 1826+55.25	-6.000	2646.314
Obstruction:	No Obstruction		
Sight Distance:	1562.241		
Eye Position:	A 1832+50.00	-6.000	2651.921
Object Position:	A 1826+05.25	-6.000	2645.999
Obstruction:	No Obstruction		
Sight Distance:	1480.971		
Eye Position:	A 1832+00.00	-6.000	2651.606
Object Position:	A 1825+55.25	-6.000	2645.684
Obstruction:	No Obstruction		
Sight Distance:	1405.557		
Eye Position:	A 1831+50.00	-6.000	2651.291
Object Position:	A 1825+05.23	-6.000	2645.369
Obstruction:	No Obstruction		
Sight Distance:	1335.684		
Eye Position:	A 1831+00.00	-6.000	2650.976
Object Position:	A 1824+55.21	-6.000	2645.054
Obstruction:	No Obstruction		
Sight Distance:	1270.855		
Eye Position:	A 1830+50.00	-6.000	2650.661
Object Position:	A 1824+05.17	-6.000	2644.738
Obstruction:	No Obstruction		
Sight Distance:	1210.715		
Eye Position:	A 1830+00.00	-6.000	2650.346

	Station	Offset	Elevation
	A 1823+55.12	-6.000	2644.357
Obstruction:	No Obstruction		
Sight Distance:	1154.262		
Eye Position:	A 1829+50.00	-6.000	2650.025
Object Position:	A 1823+05.06	-6.000	2643.948
Obstruction:	No Obstruction		
Sight Distance:	1100.816		
Eye Position:	A 1829+00.00	-6.000	2649.638
Object Position:	A 1822+54.95	-6.000	2643.482
Obstruction:	No Obstruction		
Sight Distance:	1050.286		
Eye Position:	A 1828+50.00	-6.000	2649.253
Object Position:	A 1822+04.81	-6.000	2642.979
Obstruction:	No Obstruction		
Sight Distance:	1007.761		
Eye Position:	A 1828+00.00	-6.000	2648.862
Object Position:	A 1821+54.63	-6.000	2642.483
Obstruction:	No Obstruction		
Sight Distance:	973.133		
Eye Position:	A 1827+50.00	-6.000	2648.475
Object Position:	A 1821+04.41	-6.000	2641.966
Obstruction:	No Obstruction		
Sight Distance:	945.344		
Eye Position:	A 1827+00.00	-6.000	2648.096
Object Position:	A 1820+54.14	-6.000	2641.404
Obstruction:	No Obstruction		
Sight Distance:	922.775		
Eye Position:	A 1826+50.00	-6.000	2647.781
Object Position:	A 1820+03.81	-6.000	2640.800
Obstruction:	No Obstruction		
Sight Distance:	904.763		
Eye Position:	A 1826+00.00	-6.000	2647.466
Object Position:	A 1819+53.43	-6.000	2640.151
Obstruction:	No Obstruction		
Sight Distance:	890.210		
Eye Position:	A 1825+50.00	-6.000	2647.151
Object Position:	A 1819+03.01	-6.000	2639.457
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	878.699		
Eye Position:	A 1825+00.00	-6.000	2646.836
Object Position:	A 1818+52.56	-6.000	2638.722
Obstruction:	No Obstruction		
Sight Distance:	869.572		
Eye Position:	A 1824+50.00	-6.000	2646.521
Object Position:	A 1818+02.10	-6.000	2637.941
Obstruction:	No Obstruction		
Sight Distance:	862.842		
Eye Position:	A 1824+00.00	-6.000	2646.206
Object Position:	A 1817+51.66	-6.000	2637.120
Obstruction:	No Obstruction		
Sight Distance:	857.825		
Eye Position:	A 1823+50.00	-6.000	2645.825
Object Position:	A 1817+01.27	-6.000	2636.255
Obstruction:	No Obstruction		
Sight Distance:	854.656		
Eye Position:	A 1823+00.00	-6.000	2645.404
Object Position:	A 1816+50.99	-6.000	2635.350
Obstruction:	No Obstruction		
Sight Distance:	852.995		
Eye Position:	A 1822+50.00	-6.000	2644.941
Object Position:	A 1816+00.88	-6.000	2634.403
Obstruction:	No Obstruction		
Sight Distance:	852.753		
Eye Position:	A 1822+00.00	-6.000	2644.435
Object Position:	A 1815+50.88	-6.000	2633.418
Obstruction:	No Obstruction		
Sight Distance:	852.779		
Eye Position:	A 1821+50.00	-6.000	2643.937
Object Position:	A 1815+00.88	-6.000	2632.389
Obstruction:	No Obstruction		
Sight Distance:	852.786		
Eye Position:	A 1821+00.00	-6.000	2643.418
Object Position:	A 1814+50.88	-6.000	2631.317
Obstruction:	No Obstruction		
Sight Distance:	852.779		

	Station	Offset	Elevation
	A 1820+50.00	-6.000	2642.855
Object Position:	A 1814+00.88	-6.000	2630.204
Obstruction:	No Obstruction		
Sight Distance:	852.777		
Eye Position:	A 1820+00.00	-6.000	2642.251
Object Position:	A 1813+50.88	-6.000	2629.047
Obstruction:	No Obstruction		
Sight Distance:	853.086		
Eye Position:	A 1819+50.00	-6.000	2641.605
Object Position:	A 1813+00.88	-6.000	2627.849
Obstruction:	No Obstruction		
Sight Distance:	853.480		
Eye Position:	A 1819+00.00	-6.000	2640.915
Object Position:	A 1812+50.88	-6.000	2626.608
Obstruction:	No Obstruction		
Sight Distance:	857.259		
Eye Position:	A 1818+50.00	-6.000	2640.183
Object Position:	A 1812+00.88	-6.000	2625.324
Obstruction:	No Obstruction		
Sight Distance:	868.081		
Eye Position:	A 1818+00.00	-6.000	2639.408
Object Position:	A 1811+50.88	-6.000	2624.058
Obstruction:	No Obstruction		
Sight Distance:	888.169		
Eye Position:	A 1817+50.00	-6.000	2638.592
Object Position:	A 1811+00.89	-6.000	2622.761
Obstruction:	No Obstruction		
Sight Distance:	922.491		
Eye Position:	A 1817+00.00	-6.000	2637.732
Object Position:	A 1810+51.10	-6.000	2621.422
Obstruction:	No Obstruction		
Sight Distance:	971.197		
Eye Position:	A 1816+50.00	-6.000	2636.831
Object Position:	A 1810+01.44	-6.000	2620.057
Obstruction:	No Obstruction		
Sight Distance:	1033.897		
Eye Position:	A 1816+00.00	-6.000	2635.886
Object Position:	A 1809+51.85	-6.000	2618.597

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1116.218		
Eye Position:	A 1815+50.00	-6.000	2634.900
Object Position:	A 1809+02.30	-6.000	2617.073
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1815+00.00	-6.000	2633.870
Object Position:	A 1808+52.75	-6.000	2615.510
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 7:49am

Surface(s): LW 3

Alignment Name: LW truck lane end taper
Start Station: 119+98.92
Stop Station: 100+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	119+48.92	6.000	2653.646
Object Position:	113+02.55	6.000	2647.418
Obstruction:	No Obstruction		
Sight Distance:	906.359		
Eye Position:	118+98.92	6.000	2653.332
Object Position:	112+52.65	6.000	2646.936
Obstruction:	No Obstruction		
Sight Distance:	953.714		
Eye Position:	118+48.92	6.000	2653.019
Object Position:	112+02.78	6.000	2646.452
Obstruction:	No Obstruction		
Sight Distance:	1017.160		
Eye Position:	117+98.92	6.000	2652.706
Object Position:	111+52.92	6.000	2646.154
Obstruction:	No Obstruction		
Sight Distance:	1469.005		
Eye Position:	117+48.92	6.000	2652.392
Object Position:	111+03.06	6.000	2645.855
Obstruction:	No Obstruction		
Sight Distance:	1379.523		
Eye Position:	116+98.92	6.000	2652.079
Object Position:	110+53.20	6.000	2645.556
Obstruction:	No Obstruction		
Sight Distance:	1303.884		

	Station	Offset	Elevation
Eye Position:	116+48.92	6.000	2651.766
Object Position:	110+03.34	6.000	2645.258
Obstruction:	No Obstruction		
Sight Distance:	1240.424		
Eye Position:	115+98.92	6.000	2651.452
Object Position:	109+53.46	6.000	2644.959
Obstruction:	No Obstruction		
Sight Distance:	1186.769		
Eye Position:	115+48.92	6.000	2651.139
Object Position:	109+03.57	6.000	2644.660
Obstruction:	No Obstruction		
Sight Distance:	1140.718		
Eye Position:	114+98.92	6.000	2650.826
Object Position:	108+53.67	6.000	2644.261
Obstruction:	No Obstruction		
Sight Distance:	1081.180		
Eye Position:	114+48.92	6.000	2650.506
Object Position:	108+03.76	6.000	2643.851
Obstruction:	No Obstruction		
Sight Distance:	1027.349		
Eye Position:	113+98.92	6.000	2649.965
Object Position:	107+53.96	6.000	2643.396
Obstruction:	No Obstruction		
Sight Distance:	986.999		
Eye Position:	113+48.92	6.000	2649.426
Object Position:	107+04.09	6.000	2642.925
Obstruction:	No Obstruction		
Sight Distance:	955.630		
Eye Position:	112+98.92	6.000	2648.894
Object Position:	106+54.19	6.000	2642.480
Obstruction:	No Obstruction		
Sight Distance:	938.705		
Eye Position:	112+48.92	6.000	2648.401
Object Position:	106+04.30	6.000	2641.972
Obstruction:	No Obstruction		
Sight Distance:	925.173		
Eye Position:	111+98.92	6.000	2647.929
Object Position:	105+54.25	6.000	2641.410

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	906.312		
Eye Position:	111+48.92	6.000	2647.630
Object Position:	105+04.14	6.000	2640.805
Obstruction:	No Obstruction		
Sight Distance:	891.010		
Eye Position:	110+98.92	6.000	2647.330
Object Position:	104+53.98	6.000	2640.156
Obstruction:	No Obstruction		
Sight Distance:	878.762		
Eye Position:	110+48.92	6.000	2647.031
Object Position:	104+03.78	6.000	2639.462
Obstruction:	No Obstruction		
Sight Distance:	869.087		
Eye Position:	109+98.92	6.000	2646.731
Object Position:	103+53.56	6.000	2638.726
Obstruction:	No Obstruction		
Sight Distance:	861.727		
Eye Position:	109+48.92	6.000	2646.432
Object Position:	103+03.35	6.000	2637.946
Obstruction:	No Obstruction		
Sight Distance:	856.374		
Eye Position:	108+98.92	6.000	2646.132
Object Position:	102+53.18	6.000	2637.124
Obstruction:	No Obstruction		
Sight Distance:	852.618		
Eye Position:	108+48.92	6.000	2645.733
Object Position:	102+03.08	6.000	2636.260
Obstruction:	No Obstruction		
Sight Distance:	850.454		
Eye Position:	107+98.92	6.000	2645.312
Object Position:	101+53.11	6.000	2635.356
Obstruction:	No Obstruction		
Sight Distance:	849.839		
Eye Position:	107+48.92	6.000	2644.859
Object Position:	101+03.23	6.000	2634.409
Obstruction:	No Obstruction		
Sight Distance:	850.618		

	Station	Offset	Elevation
Eye Position:	106+98.92	6.000	2644.383
Object Position:	100+53.32	6.000	2633.420
Obstruction:	No Obstruction		
Sight Distance:	851.694		
Eye Position:	106+48.92	6.000	2643.933
Object Position:	100+03.43	6.000	2632.387
Obstruction:	No Obstruction		
Sight Distance:	852.733		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:50am

Surface(s): LW 3

Alignment Name: LW
Start Station: A 1819+00.00
Stop Station: 1781+00.00
Interval: 50.000

Sight Distance: 685.000
Relaxed Distance: 685.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	A 1819+00.00	-6.000	2640.915
Object Position:	A 1812+10.30	-6.000	2625.569
Obstruction:	No Obstruction		
Sight Distance:	895.574		
Eye Position:	A 1818+50.00	-6.000	2640.183
Object Position:	A 1811+60.30	-6.000	2624.307
Obstruction:	No Obstruction		
Sight Distance:	911.592		
Eye Position:	A 1818+00.00	-6.000	2639.408
Object Position:	A 1811+10.30	-6.000	2622.996
Obstruction:	No Obstruction		
Sight Distance:	939.213		
Eye Position:	A 1817+50.00	-6.000	2638.592
Object Position:	A 1810+60.48	-6.000	2621.669
Obstruction:	No Obstruction		
Sight Distance:	980.134		
Eye Position:	A 1817+00.00	-6.000	2637.732
Object Position:	A 1810+10.81	-6.000	2620.329
Obstruction:	No Obstruction		
Sight Distance:	1031.953		
Eye Position:	A 1816+50.00	-6.000	2636.831
Object Position:	A 1809+61.23	-6.000	2618.880
Obstruction:	No Obstruction		
Sight Distance:	1098.366		

	Station	Offset	Elevation
Eye Position:	A 1816+00.00	-6.000	2635.886
Object Position:	A 1809+11.71	-6.000	2617.365
Obstruction:	No Obstruction		
Sight Distance:	1185.645		
Eye Position:	A 1815+50.00	-6.000	2634.900
Object Position:	A 1808+62.20	-6.000	2615.810
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1815+00.00	-6.000	2633.870
Object Position:	A 1808+12.70	-6.000	2614.236
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1814+50.00	-6.000	2632.798
Object Position:	A 1807+63.16	-6.000	2612.661
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1814+00.00	-6.000	2631.683
Object Position:	A 1807+13.58	-6.000	2611.085
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	A 1813+50.00	-6.000	2630.526
Object Position:	A 1806+63.94	-6.000	2609.506
Obstruction:	No Obstruction		
Sight Distance:	2671.528		
Eye Position:	A 1813+00.00	-6.000	2629.327
Object Position:	A 1806+14.25	-6.000	2607.926
Obstruction:	No Obstruction		
Sight Distance:	2577.427		
Eye Position:	A 1812+50.00	-6.000	2628.085
Object Position:	A 1805+64.50	-6.000	2606.344
Obstruction:	No Obstruction		
Sight Distance:	2457.757		
Eye Position:	A 1812+00.00	-6.000	2626.801
Object Position:	A 1805+14.70	-6.000	2604.760
Obstruction:	No Obstruction		
Sight Distance:	2340.486		
Eye Position:	A 1811+50.00	-6.000	2625.537
Object Position:	A 1804+64.86	-6.000	2603.175

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	2204.691		
Eye Position:	A 1811+00.00	-6.000	2624.239
Object Position:	A 1804+15.00	-6.000	2601.590
Obstruction:	No Obstruction		
Sight Distance:	2061.082		
Eye Position:	A 1810+50.00	-6.000	2622.891
Object Position:	A 1803+65.00	-6.000	2599.999
Obstruction:	No Obstruction		
Sight Distance:	1906.853		
Eye Position:	A 1810+00.00	-6.000	2621.515
Object Position:	A 1803+15.00	-6.000	2598.410
Obstruction:	No Obstruction		
Sight Distance:	1721.297		
Eye Position:	A 1809+50.00	-6.000	2620.041
Object Position:	A 1802+65.00	-6.000	2596.820
Obstruction:	No Obstruction		
Sight Distance:	1637.696		
Eye Position:	A 1809+00.00	-6.000	2618.502
Object Position:	A 1802+15.00	-6.000	2595.230
Obstruction:	No Obstruction		
Sight Distance:	1605.119		
Eye Position:	A 1808+50.00	-6.000	2616.923
Object Position:	A 1801+65.00	-6.000	2593.640
Obstruction:	No Obstruction		
Sight Distance:	1598.763		
Eye Position:	A 1808+00.00	-6.000	2615.333
Object Position:	A 1801+15.00	-6.000	2592.049
Obstruction:	No Obstruction		
Sight Distance:	1598.405		
Eye Position:	A 1807+50.00	-6.000	2613.743
Object Position:	A 1800+65.00	-6.000	2590.460
Obstruction:	No Obstruction		
Sight Distance:	1593.253		
Eye Position:	A 1807+00.00	-6.000	2612.153
Object Position:	A 1800+15.00	-6.000	2588.869
Obstruction:	No Obstruction		
Sight Distance:	1576.220		

	Station	Offset	Elevation
Eye Position:	A 1806+50.00	-6.000	2610.562
Object Position:	A 1799+65.00	-6.000	2587.280
Obstruction:	No Obstruction		
Sight Distance:	1553.907		
Eye Position:	A 1806+00.00	-6.000	2608.973
Object Position:	A 1799+15.00	-6.000	2585.690
Obstruction:	No Obstruction		
Sight Distance:	1527.457		
Eye Position:	A 1805+50.00	-6.000	2607.383
Object Position:	A 1798+65.00	-6.000	2584.100
Obstruction:	No Obstruction		
Sight Distance:	1498.676		
Eye Position:	A 1805+00.00	-6.000	2605.792
Object Position:	A 1798+15.00	-6.000	2582.510
Obstruction:	No Obstruction		
Sight Distance:	1468.176		
Eye Position:	A 1804+50.00	-6.000	2604.203
Object Position:	A 1797+65.00	-6.000	2580.919
Obstruction:	No Obstruction		
Sight Distance:	1436.024		
Eye Position:	A 1804+00.00	-6.000	2602.613
Object Position:	A 1797+15.00	-6.000	2579.330
Obstruction:	No Obstruction		
Sight Distance:	1402.911		
Eye Position:	A 1803+50.00	-6.000	2601.023
Object Position:	A 1796+65.00	-6.000	2577.740
Obstruction:	No Obstruction		
Sight Distance:	1368.780		
Eye Position:	A 1803+00.00	-6.000	2599.433
Object Position:	A 1796+15.00	-6.000	2576.150
Obstruction:	No Obstruction		
Sight Distance:	1333.996		
Eye Position:	A 1802+50.00	-6.000	2597.843
Object Position:	A 1795+65.00	-6.000	2574.560
Obstruction:	No Obstruction		
Sight Distance:	1298.291		
Eye Position:	A 1802+00.00	-6.000	2596.253

	Station	Offset	Elevation
	A 1795+15.00	-6.000	2572.970
Obstruction:	No Obstruction		
Sight Distance:	1262.087		
Eye Position:	A 1801+50.00	-6.000	2594.663
Object Position:	A 1794+65.00	-6.000	2571.379
Obstruction:	No Obstruction		
Sight Distance:	1225.337		
Eye Position:	A 1801+00.00	-6.000	2593.073
Object Position:	A 1794+15.00	-6.000	2569.790
Obstruction:	No Obstruction		
Sight Distance:	1188.153		
Eye Position:	A 1800+50.00	-6.000	2591.483
Object Position:	A 1793+65.00	-6.000	2568.199
Obstruction:	No Obstruction		
Sight Distance:	1150.334		
Eye Position:	A 1800+00.00	-6.000	2589.892
Object Position:	A 1793+15.00	-6.000	2566.609
Obstruction:	No Obstruction		
Sight Distance:	1112.486		
Eye Position:	A 1799+50.00	-6.000	2588.303
Object Position:	1792+65.00	-6.000	2565.019
Obstruction:	No Obstruction		
Sight Distance:	1073.997		
Eye Position:	A 1799+00.00	-6.000	2586.713
Object Position:	1792+15.00	-6.000	2563.429
Obstruction:	No Obstruction		
Sight Distance:	1035.325		
Eye Position:	A 1798+50.00	-6.000	2585.123
Object Position:	1791+65.00	-6.000	2561.845
Obstruction:	No Obstruction		
Sight Distance:	997.175		
Eye Position:	A 1798+00.00	-6.000	2583.533
Object Position:	1791+15.00	-6.000	2560.311
Obstruction:	No Obstruction		
Sight Distance:	965.364		
Eye Position:	A 1797+50.00	-6.000	2581.942
Object Position:	1790+65.00	-6.000	2558.836
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	939.825		
Eye Position:	A 1797+00.00	-6.000	2580.353
Object Position:	1790+15.00	-6.000	2557.421
Obstruction:	No Obstruction		
Sight Distance:	919.254		
Eye Position:	A 1796+50.00	-6.000	2578.763
Object Position:	1789+65.00	-6.000	2556.064
Obstruction:	No Obstruction		
Sight Distance:	902.686		
Eye Position:	A 1796+00.00	-6.000	2577.173
Object Position:	1789+15.00	-6.000	2554.768
Obstruction:	No Obstruction		
Sight Distance:	889.464		
Eye Position:	A 1795+50.00	-6.000	2575.583
Object Position:	1788+65.00	-6.000	2553.530
Obstruction:	No Obstruction		
Sight Distance:	878.659		
Eye Position:	A 1795+00.00	-6.000	2573.993
Object Position:	1788+15.00	-6.000	2552.352
Obstruction:	No Obstruction		
Sight Distance:	870.098		
Eye Position:	A 1794+50.00	-6.000	2572.403
Object Position:	1787+65.00	-6.000	2551.232
Obstruction:	No Obstruction		
Sight Distance:	863.161		
Eye Position:	A 1794+00.00	-6.000	2570.813
Object Position:	1787+15.00	-6.000	2550.172
Obstruction:	No Obstruction		
Sight Distance:	857.802		
Eye Position:	A 1793+50.00	-6.000	2569.222
Object Position:	1786+65.00	-6.000	2549.172
Obstruction:	No Obstruction		
Sight Distance:	853.795		
Eye Position:	A 1793+00.00	-6.000	2567.632
Object Position:	1786+15.00	-6.000	2548.230
Obstruction:	No Obstruction		
Sight Distance:	850.929		

	Station	Offset	Elevation
	1792+50.00	-6.000	2566.042
Object Position:	1785+65.00	-6.000	2547.348
Obstruction:	No Obstruction		
Sight Distance:	849.130		
Eye Position:	1792+00.00	-6.000	2564.452
Object Position:	1785+15.00	-6.000	2546.525
Obstruction:	No Obstruction		
Sight Distance:	848.387		
Eye Position:	1791+50.00	-6.000	2562.879
Object Position:	1784+65.00	-6.000	2545.761
Obstruction:	No Obstruction		
Sight Distance:	848.345		
Eye Position:	1791+00.00	-6.000	2561.362
Object Position:	1784+15.00	-6.000	2545.057
Obstruction:	No Obstruction		
Sight Distance:	852.351		
Eye Position:	1790+50.00	-6.000	2559.905
Object Position:	1783+65.00	-6.000	2544.412
Obstruction:	No Obstruction		
Sight Distance:	857.989		
Eye Position:	1790+00.00	-6.000	2558.507
Object Position:	1783+15.00	-6.000	2543.825
Obstruction:	No Obstruction		
Sight Distance:	862.974		
Eye Position:	1789+50.00	-6.000	2557.169
Object Position:	1782+65.00	-6.000	2543.273
Obstruction:	No Obstruction		
Sight Distance:	860.084		
Eye Position:	1789+00.00	-6.000	2555.890
Object Position:	1782+15.00	-6.000	2542.731
Obstruction:	No Obstruction		
Sight Distance:	847.685		
Eye Position:	1788+50.00	-6.000	2554.670
Object Position:	1781+65.00	-6.000	2542.250
Obstruction:	No Obstruction		
Sight Distance:	832.078		
Eye Position:	1788+00.00	-6.000	2553.509
Object Position:	1781+14.87	-6.000	2541.828

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	816.893		
Eye Position:	1787+50.00	-6.000	2552.408
Object Position:	1780+64.72	-6.000	2541.488
Obstruction:	No Obstruction		
Sight Distance:	805.297		
Eye Position:	1787+00.00	-6.000	2551.365
Object Position:	1780+14.54	-6.000	2541.256
Obstruction:	No Obstruction		
Sight Distance:	798.268		
Eye Position:	1786+50.00	-6.000	2550.382
Object Position:	1779+64.31	-6.000	2541.082
Obstruction:	No Obstruction		
Sight Distance:	792.134		
Eye Position:	1786+00.00	-6.000	2549.459
Object Position:	1779+14.03	-6.000	2540.971
Obstruction:	No Obstruction		
Sight Distance:	787.474		
Eye Position:	1785+50.00	-6.000	2548.594
Object Position:	1778+63.70	-6.000	2540.927
Obstruction:	No Obstruction		
Sight Distance:	783.462		
Eye Position:	1785+00.00	-6.000	2547.789
Object Position:	1778+13.33	-6.000	2540.932
Obstruction:	No Obstruction		
Sight Distance:	780.411		
Eye Position:	1784+50.00	-6.000	2547.043
Object Position:	1777+62.92	-6.000	2541.009
Obstruction:	No Obstruction		
Sight Distance:	777.805		
Eye Position:	1784+00.00	-6.000	2546.357
Object Position:	1777+12.49	-6.000	2541.132
Obstruction:	No Obstruction		
Sight Distance:	775.486		
Eye Position:	1783+50.00	-6.000	2545.729
Object Position:	1776+62.05	-6.000	2541.327
Obstruction:	No Obstruction		
Sight Distance:	774.473		

	Station	Offset	Elevation
Eye Position:	1783+00.00	-6.000	2545.161
Object Position:	1776+11.63	-6.000	2541.574
Obstruction:	No Obstruction		
Sight Distance:	773.297		
Eye Position:	1782+50.00	-6.000	2544.601
Object Position:	1775+61.27	-6.000	2541.881
Obstruction:	No Obstruction		
Sight Distance:	772.811		
Eye Position:	1782+00.00	-6.000	2544.080
Object Position:	1775+10.99	-6.000	2542.249
Obstruction:	No Obstruction		
Sight Distance:	774.713		
Eye Position:	1781+50.00	-6.000	2543.618
Object Position:	1774+60.86	-6.000	2542.664
Obstruction:	No Obstruction		
Sight Distance:	778.912		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:07am

Surface(s): LW 3

Alignment Name: LW
Start Station: 1785+00.00
Stop Station: 1740+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	1785+00.00	-6.000	2547.789
Object Position:	1778+53.65	-6.000	2540.919
Obstruction:	No Obstruction		
Sight Distance:	744.792		
Eye Position:	1784+50.00	-6.000	2547.043
Object Position:	1778+03.29	-6.000	2540.938
Obstruction:	No Obstruction		
Sight Distance:	741.787		
Eye Position:	1784+00.00	-6.000	2546.357
Object Position:	1777+52.89	-6.000	2541.021
Obstruction:	No Obstruction		
Sight Distance:	739.261		
Eye Position:	1783+50.00	-6.000	2545.729
Object Position:	1777+02.49	-6.000	2541.160
Obstruction:	No Obstruction		
Sight Distance:	737.416		
Eye Position:	1783+00.00	-6.000	2545.161
Object Position:	1776+52.10	-6.000	2541.362
Obstruction:	No Obstruction		
Sight Distance:	736.160		
Eye Position:	1782+50.00	-6.000	2544.601
Object Position:	1776+01.76	-6.000	2541.620
Obstruction:	No Obstruction		
Sight Distance:	735.510		

	Station	Offset	Elevation
Eye Position:	1782+00.00	-6.000	2544.080
Object Position:	1775+51.49	-6.000	2541.943
Obstruction:	No Obstruction		
Sight Distance:	736.088		
Eye Position:	1781+50.00	-6.000	2543.619
Object Position:	1775+01.36	-6.000	2542.322
Obstruction:	No Obstruction		
Sight Distance:	739.155		
Eye Position:	1781+00.00	-6.000	2543.216
Object Position:	1774+51.36	-6.000	2542.744
Obstruction:	No Obstruction		
Sight Distance:	744.600		
Eye Position:	1780+50.00	-6.000	2542.910
Object Position:	1774+01.36	-6.000	2543.169
Obstruction:	No Obstruction		
Sight Distance:	750.194		
Eye Position:	1780+00.00	-6.000	2542.697
Object Position:	1773+51.36	-6.000	2543.594
Obstruction:	No Obstruction		
Sight Distance:	755.616		
Eye Position:	1779+50.00	-6.000	2542.544
Object Position:	1773+01.36	-6.000	2544.019
Obstruction:	No Obstruction		
Sight Distance:	760.664		
Eye Position:	1779+00.00	-6.000	2542.450
Object Position:	1772+51.36	-6.000	2544.444
Obstruction:	No Obstruction		
Sight Distance:	765.965		
Eye Position:	1778+50.00	-6.000	2542.415
Object Position:	1772+01.36	-6.000	2544.869
Obstruction:	No Obstruction		
Sight Distance:	770.410		
Eye Position:	1778+00.00	-6.000	2542.440
Object Position:	1771+51.36	-6.000	2545.294
Obstruction:	No Obstruction		
Sight Distance:	775.451		
Eye Position:	1777+50.00	-6.000	2542.524
Object Position:	1771+01.36	-6.000	2545.719

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	779.549		
Eye Position:	1777+00.00	-6.000	2542.667
Object Position:	1770+51.36	-6.000	2546.144
Obstruction:	No Obstruction		
Sight Distance:	793.868		
Eye Position:	1776+50.00	-6.000	2542.869
Object Position:	1770+01.36	-6.000	2546.569
Obstruction:	No Obstruction		
Sight Distance:	870.029		
Eye Position:	1776+00.00	-6.000	2543.131
Object Position:	1769+51.36	-6.000	2546.984
Obstruction:	No Obstruction		
Sight Distance:	882.509		
Eye Position:	1775+50.00	-6.000	2543.452
Object Position:	1769+01.36	-6.000	2547.407
Obstruction:	No Obstruction		
Sight Distance:	902.051		
Eye Position:	1775+00.00	-6.000	2543.832
Object Position:	1768+51.36	-6.000	2547.826
Obstruction:	No Obstruction		
Sight Distance:	936.565		
Eye Position:	1774+50.00	-6.000	2544.255
Object Position:	1768+01.53	-6.000	2548.204
Obstruction:	No Obstruction		
Sight Distance:	987.277		
Eye Position:	1774+00.00	-6.000	2544.680
Object Position:	1767+51.81	-6.000	2548.547
Obstruction:	No Obstruction		
Sight Distance:	1052.881		
Eye Position:	1773+50.00	-6.000	2545.105
Object Position:	1767+02.16	-6.000	2548.819
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1773+00.00	-6.000	2545.530
Object Position:	1766+52.55	-6.000	2549.018
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1772+50.00	-6.000	2545.955
Object Position:	1766+02.95	-6.000	2549.182
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1772+00.00	-6.000	2546.380
Object Position:	1765+53.33	-6.000	2549.311
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1771+50.00	-6.000	2546.805
Object Position:	1765+03.70	-6.000	2549.404
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1771+00.00	-6.000	2547.230
Object Position:	1764+54.02	-6.000	2549.463
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1770+50.00	-6.000	2547.655
Object Position:	1764+04.29	-6.000	2549.486
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1770+00.00	-6.000	2548.080
Object Position:	1763+54.52	-6.000	2549.473
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1769+50.00	-6.000	2548.494
Object Position:	1763+04.71	-6.000	2549.426
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1769+00.00	-6.000	2548.921
Object Position:	1762+54.86	-6.000	2549.344
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1768+50.00	-6.000	2549.335
Object Position:	1762+04.99	-6.000	2549.223
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1768+00.00	-6.000	2549.714

	Station	Offset	Elevation
	1761+55.00	-6.000	2549.068
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1767+50.00	-6.000	2550.056
Object Position:	1761+05.00	-6.000	2548.877
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1767+00.00	-6.000	2550.329
Object Position:	1760+55.00	-6.000	2548.660
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1766+50.00	-6.000	2550.528
Object Position:	1760+05.00	-6.000	2548.440
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1766+00.00	-6.000	2550.692
Object Position:	1759+55.00	-6.000	2548.220
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1765+50.00	-6.000	2550.819
Object Position:	1759+05.00	-6.000	2548.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1765+00.00	-6.000	2550.911
Object Position:	1758+55.00	-6.000	2547.780
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1764+50.00	-6.000	2550.968
Object Position:	1758+05.00	-6.000	2547.560
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1764+00.00	-6.000	2550.988
Object Position:	1757+55.00	-6.000	2547.340
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1763+50.00	-6.000	2550.972
Object Position:	1757+05.00	-6.000	2547.120
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1763+00.00	-6.000	2550.921
Object Position:	1756+55.00	-6.000	2546.900
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1762+50.00	-6.000	2550.834
Object Position:	1756+05.00	-6.000	2546.680
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1762+00.00	-6.000	2550.711
Object Position:	1755+55.00	-6.000	2546.460
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1761+50.00	-6.000	2550.552
Object Position:	1755+05.00	-6.000	2546.240
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1761+00.00	-6.000	2550.357
Object Position:	1754+55.00	-6.000	2546.020
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1760+50.00	-6.000	2550.138
Object Position:	1754+05.00	-6.000	2545.800
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1760+00.00	-6.000	2549.918
Object Position:	1753+55.00	-6.000	2545.580
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+50.00	-6.000	2549.698
Object Position:	1753+05.00	-6.000	2545.360
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1759+00.00	-6.000	2549.478
Object Position:	1752+55.00	-6.000	2545.140
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1758+50.00	-6.000	2549.258
Object Position:	1752+05.00	-6.000	2544.920
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1758+00.00	-6.000	2549.038
Object Position:	1751+55.00	-6.000	2544.700
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+50.00	-6.000	2548.818
Object Position:	1751+05.00	-6.000	2544.479
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+00.00	-6.000	2548.598
Object Position:	1750+55.00	-6.000	2544.229
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+50.00	-6.000	2548.378
Object Position:	1750+05.00	-6.000	2543.938
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+00.00	-6.000	2548.158
Object Position:	1749+55.00	-6.000	2543.604
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+50.00	-6.000	2547.938
Object Position:	1749+05.00	-6.000	2543.227
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+00.00	-6.000	2547.718
Object Position:	1748+55.00	-6.000	2542.808
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+50.00	-6.000	2547.498
Object Position:	1748+05.00	-6.000	2542.347
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+00.00	-6.000	2547.278
Object Position:	1747+55.00	-6.000	2541.844

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+50.00	-6.000	2547.058
Object Position:	1747+05.00	-6.000	2541.297
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+00.00	-6.000	2546.838
Object Position:	1746+55.00	-6.000	2540.709
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+50.00	-6.000	2546.618
Object Position:	1746+05.00	-6.000	2540.078
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+00.00	-6.000	2546.398
Object Position:	1745+55.00	-6.000	2539.405
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+50.00	-6.000	2546.178
Object Position:	1745+05.00	-6.000	2538.690
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+00.00	-6.000	2545.956
Object Position:	1744+55.00	-6.000	2537.931
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+50.00	-6.000	2545.702
Object Position:	1744+05.00	-6.000	2537.131
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+00.00	-6.000	2545.406
Object Position:	1743+55.00	-6.000	2536.288
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+50.00	-6.000	2545.068
Object Position:	1743+05.00	-6.000	2535.403
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1749+00.00	-6.000	2544.687
Object Position:	1742+55.00	-6.000	2534.476
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1748+50.00	-6.000	2544.264
Object Position:	1742+05.00	-6.000	2533.506
Obstruction:	No Obstruction		
Sight Distance:	1195.443		
Eye Position:	1748+00.00	-6.000	2543.799
Object Position:	1741+55.00	-6.000	2532.466
Obstruction:	No Obstruction		
Sight Distance:	1145.137		
Eye Position:	1747+50.00	-6.000	2543.291
Object Position:	1741+05.00	-6.000	2531.341
Obstruction:	No Obstruction		
Sight Distance:	1094.819		
Eye Position:	1747+00.00	-6.000	2542.740
Object Position:	1740+55.00	-6.000	2530.173
Obstruction:	No Obstruction		
Sight Distance:	1044.525		
Eye Position:	1746+50.00	-6.000	2542.148
Object Position:	1740+04.92	-6.000	2528.961
Obstruction:	No Obstruction		
Sight Distance:	995.270		
Eye Position:	1746+00.00	-6.000	2541.513
Object Position:	1739+54.72	-6.000	2527.689
Obstruction:	No Obstruction		
Sight Distance:	953.478		
Eye Position:	1745+50.00	-6.000	2540.835
Object Position:	1739+04.47	-6.000	2526.425
Obstruction:	No Obstruction		
Sight Distance:	920.334		
Eye Position:	1745+00.00	-6.000	2540.116
Object Position:	1738+54.14	-6.000	2525.149
Obstruction:	No Obstruction		
Sight Distance:	880.306		
Eye Position:	1744+50.00	-6.000	2539.353

	Station	Offset	Elevation
	1738+03.73	-6.000	2523.828
Obstruction:	No Obstruction		
Sight Distance:	850.365		
Eye Position:	1744+00.00	-6.000	2538.549
Object Position:	1737+53.22	-6.000	2522.463
Obstruction:	No Obstruction		
Sight Distance:	828.092		
Eye Position:	1743+50.00	-6.000	2537.702
Object Position:	1737+02.62	-6.000	2521.051
Obstruction:	No Obstruction		
Sight Distance:	811.333		
Eye Position:	1743+00.00	-6.000	2536.813
Object Position:	1736+51.95	-6.000	2519.593
Obstruction:	No Obstruction		
Sight Distance:	798.706		
Eye Position:	1742+50.00	-6.000	2535.881
Object Position:	1736+01.23	-6.000	2518.091
Obstruction:	No Obstruction		
Sight Distance:	789.157		
Eye Position:	1742+00.00	-6.000	2534.907
Object Position:	1735+50.51	-6.000	2516.545
Obstruction:	No Obstruction		
Sight Distance:	781.757		
Eye Position:	1741+50.00	-6.000	2533.849
Object Position:	1734+99.83	-6.000	2514.956
Obstruction:	No Obstruction		
Sight Distance:	777.725		
Eye Position:	1741+00.00	-6.000	2532.718
Object Position:	1734+49.25	-6.000	2513.328
Obstruction:	No Obstruction		
Sight Distance:	774.866		
Eye Position:	1740+50.00	-6.000	2531.547
Object Position:	1733+98.84	-6.000	2511.662
Obstruction:	No Obstruction		
Sight Distance:	773.901		
Eye Position:	1740+00.00	-6.000	2530.332
Object Position:	1733+48.74	-6.000	2509.963
Obstruction:	No Obstruction		

Station	Offset	Elevation
774.725		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 8:08am

Surface(s): LW 3

Alignment Name: LW
Start Station: 1744+00.00
Stop Station: 1722+50.00
Interval: 50.000

Sight Distance: 694.000
Relaxed Distance: 694.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	1744+00.00	-6.000	2538.549
Object Position:	1737+03.58	-6.000	2521.078
Obstruction:	No Obstruction		
Sight Distance:	864.444		
Eye Position:	1743+50.00	-6.000	2537.702
Object Position:	1736+52.87	-6.000	2519.620
Obstruction:	No Obstruction		
Sight Distance:	850.309		
Eye Position:	1743+00.00	-6.000	2536.813
Object Position:	1736+02.09	-6.000	2518.117
Obstruction:	No Obstruction		
Sight Distance:	839.436		
Eye Position:	1742+50.00	-6.000	2535.881
Object Position:	1735+51.28	-6.000	2516.568
Obstruction:	No Obstruction		
Sight Distance:	830.858		
Eye Position:	1742+00.00	-6.000	2534.907
Object Position:	1735+00.47	-6.000	2514.976
Obstruction:	No Obstruction		
Sight Distance:	825.262		
Eye Position:	1741+50.00	-6.000	2533.849
Object Position:	1734+49.73	-6.000	2513.343
Obstruction:	No Obstruction		
Sight Distance:	820.870		

	Station	Offset	Elevation
Eye Position:	1741+00.00	-6.000	2532.718
Object Position:	1733+99.11	-6.000	2511.670
Obstruction:	No Obstruction		
Sight Distance:	818.685		
Eye Position:	1740+50.00	-6.000	2531.547
Object Position:	1733+48.68	-6.000	2509.961
Obstruction:	No Obstruction		
Sight Distance:	818.185		
Eye Position:	1740+00.00	-6.000	2530.332
Object Position:	1732+98.58	-6.000	2508.220
Obstruction:	No Obstruction		
Sight Distance:	818.730		
Eye Position:	1739+50.00	-6.000	2529.075
Object Position:	1732+48.58	-6.000	2506.439
Obstruction:	No Obstruction		
Sight Distance:	818.996		
Eye Position:	1739+00.00	-6.000	2527.813
Object Position:	1731+98.58	-6.000	2504.616
Obstruction:	No Obstruction		
Sight Distance:	817.771		
Eye Position:	1738+50.00	-6.000	2526.542
Object Position:	1731+48.58	-6.000	2502.751
Obstruction:	No Obstruction		
Sight Distance:	815.541		
Eye Position:	1738+00.00	-6.000	2525.229
Object Position:	1730+98.58	-6.000	2500.847
Obstruction:	No Obstruction		
Sight Distance:	826.505		
Eye Position:	1737+50.00	-6.000	2523.874
Object Position:	1730+48.58	-6.000	2498.931
Obstruction:	No Obstruction		
Sight Distance:	834.675		
Eye Position:	1737+00.00	-6.000	2522.476
Object Position:	1729+98.58	-6.000	2497.052
Obstruction:	No Obstruction		
Sight Distance:	849.722		
Eye Position:	1736+50.00	-6.000	2521.036
Object Position:	1729+48.58	-6.000	2495.249

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	869.912		
Eye Position:	1736+00.00	-6.000	2519.554
Object Position:	1728+98.70	-6.000	2493.561
Obstruction:	No Obstruction		
Sight Distance:	856.787		
Eye Position:	1735+50.00	-6.000	2518.029
Object Position:	1728+49.14	-6.000	2491.988
Obstruction:	No Obstruction		
Sight Distance:	845.875		
Eye Position:	1735+00.00	-6.000	2516.461
Object Position:	1727+99.76	-6.000	2490.530
Obstruction:	No Obstruction		
Sight Distance:	840.431		
Eye Position:	1734+50.00	-6.000	2514.852
Object Position:	1727+50.49	-6.000	2489.153
Obstruction:	No Obstruction		
Sight Distance:	838.268		
Eye Position:	1734+00.00	-6.000	2513.200
Object Position:	1727+01.29	-6.000	2487.843
Obstruction:	No Obstruction		
Sight Distance:	829.212		
Eye Position:	1733+50.00	-6.000	2511.505
Object Position:	1726+52.08	-6.000	2486.663
Obstruction:	No Obstruction		
Sight Distance:	822.475		
Eye Position:	1733+00.00	-6.000	2509.769
Object Position:	1726+02.85	-6.000	2485.630
Obstruction:	No Obstruction		
Sight Distance:	816.874		
Eye Position:	1732+50.00	-6.000	2507.989
Object Position:	1725+53.55	-6.000	2484.705
Obstruction:	No Obstruction		
Sight Distance:	812.135		
Eye Position:	1732+00.00	-6.000	2506.168
Object Position:	1725+04.17	-6.000	2483.889
Obstruction:	No Obstruction		
Sight Distance:	807.704		

	Station	Offset	Elevation
Eye Position:	1731+50.00	-6.000	2504.304
Object Position:	1724+54.70	-6.000	2483.183
Obstruction:	No Obstruction		
Sight Distance:	802.818		
Eye Position:	1731+00.00	-6.000	2502.400
Object Position:	1724+05.12	-6.000	2482.566
Obstruction:	No Obstruction		
Sight Distance:	795.445		
Eye Position:	1730+50.00	-6.000	2500.485
Object Position:	1723+55.52	-6.000	2482.065
Obstruction:	No Obstruction		
Sight Distance:	789.194		
Eye Position:	1730+00.00	-6.000	2498.605
Object Position:	1723+05.90	-6.000	2481.688
Obstruction:	No Obstruction		
Sight Distance:	785.900		
Eye Position:	1729+50.00	-6.000	2496.799
Object Position:	1722+56.19	-6.000	2481.343
Obstruction:	No Obstruction		
Sight Distance:	780.874		
Eye Position:	1729+00.00	-6.000	2495.102
Object Position:	1722+06.33	-6.000	2481.095
Obstruction:	No Obstruction		
Sight Distance:	776.610		
Eye Position:	1728+50.00	-6.000	2493.515
Object Position:	1721+56.32	-6.000	2480.957
Obstruction:	No Obstruction		
Sight Distance:	772.286		
Eye Position:	1728+00.00	-6.000	2492.037
Object Position:	1721+06.25	-6.000	2480.926
Obstruction:	No Obstruction		
Sight Distance:	769.395		
Eye Position:	1727+50.00	-6.000	2490.639
Object Position:	1720+56.13	-6.000	2481.016
Obstruction:	No Obstruction		
Sight Distance:	767.900		
Eye Position:	1727+00.00	-6.000	2489.309

	Station	Offset	Elevation
	1720+05.95	-6.000	2481.205
Obstruction:	No Obstruction		
Sight Distance:	768.687		
Eye Position:	1726+50.00	-6.000	2488.114
Object Position:	1719+55.74	-6.000	2481.468
Obstruction:	No Obstruction		
Sight Distance:	780.664		
Eye Position:	1726+00.00	-6.000	2487.075
Object Position:	1719+05.50	-6.000	2481.714
Obstruction:	No Obstruction		
Sight Distance:	954.591		
Eye Position:	1725+50.00	-6.000	2486.145
Object Position:	1718+55.28	-6.000	2481.921
Obstruction:	No Obstruction		
Sight Distance:	2430.522		
Eye Position:	1725+00.00	-6.000	2485.324
Object Position:	1718+05.04	-6.000	2482.137
Obstruction:	No Obstruction		
Sight Distance:	2023.474		
Eye Position:	1724+50.00	-6.000	2484.614
Object Position:	1717+54.94	-6.000	2482.341
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1724+00.00	-6.000	2484.012
Object Position:	1717+05.07	-6.000	2482.529
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+50.00	-6.000	2483.520
Object Position:	1716+55.31	-6.000	2482.746
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+00.00	-6.000	2483.138
Object Position:	1716+05.54	-6.000	2482.949
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+50.00	-6.000	2482.806
Object Position:	1715+55.77	-6.000	2483.152
Obstruction:	No Obstruction		

Station	Offset	Elevation
Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:05am

Surface(s): LE 3

Alignment Name: LW
Start Station: 1726+50.00
Stop Station: 1686+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	1726+50.00	-6.000	2475.756
Object Position:	1720+05.00	-6.000	2451.833
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1726+00.00	-6.000	2473.459
Object Position:	1719+54.82	-6.000	2451.511
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1725+50.00	-6.000	2471.161
Object Position:	1719+04.64	-6.000	2451.164
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1725+00.00	-6.000	2468.864
Object Position:	1718+54.49	-6.000	2450.794
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1724+50.00	-6.000	2466.567
Object Position:	1718+04.34	-6.000	2450.404
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1724+00.00	-6.000	2464.022
Object Position:	1717+54.36	-6.000	2450.014
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1723+50.00	-6.000	2461.114
Object Position:	1717+04.51	-6.000	2449.625
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1723+00.00	-6.000	2458.975
Object Position:	1716+54.67	-6.000	2449.236
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+50.00	-6.000	2456.870
Object Position:	1716+04.85	-6.000	2448.847
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1722+00.00	-6.000	2456.430
Object Position:	1715+55.03	-6.000	2448.458
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1721+50.00	-6.000	2454.618
Object Position:	1715+05.17	-6.000	2448.069
Obstruction:	No Obstruction		
Sight Distance:	1819.399		
Eye Position:	1721+00.00	-6.000	2453.876
Object Position:	1714+55.28	-6.000	2447.679
Obstruction:	No Obstruction		
Sight Distance:	1737.830		
Eye Position:	1720+50.00	-6.000	2453.601
Object Position:	1714+05.33	-6.000	2447.290
Obstruction:	No Obstruction		
Sight Distance:	1656.707		
Eye Position:	1720+00.00	-6.000	2453.302
Object Position:	1713+55.33	-6.000	2446.899
Obstruction:	No Obstruction		
Sight Distance:	1586.493		
Eye Position:	1719+50.00	-6.000	2452.979
Object Position:	1713+05.27	-6.000	2446.509
Obstruction:	No Obstruction		
Sight Distance:	1523.593		
Eye Position:	1719+00.00	-6.000	2452.631
Object Position:	1712+55.03	-6.000	2446.129

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1470.132		
Eye Position:	1718+50.00	-6.000	2452.259
Object Position:	1712+04.74	-6.000	2445.774
Obstruction:	No Obstruction		
Sight Distance:	1428.425		
Eye Position:	1718+00.00	-6.000	2451.870
Object Position:	1711+54.49	-6.000	2445.442
Obstruction:	No Obstruction		
Sight Distance:	1396.566		
Eye Position:	1717+50.00	-6.000	2451.480
Object Position:	1711+04.24	-6.000	2445.136
Obstruction:	No Obstruction		
Sight Distance:	1372.765		
Eye Position:	1717+00.00	-6.000	2451.090
Object Position:	1710+53.93	-6.000	2444.853
Obstruction:	No Obstruction		
Sight Distance:	1356.543		
Eye Position:	1716+50.00	-6.000	2450.699
Object Position:	1710+03.57	-6.000	2444.596
Obstruction:	No Obstruction		
Sight Distance:	1347.948		
Eye Position:	1716+00.00	-6.000	2450.309
Object Position:	1709+53.16	-6.000	2444.362
Obstruction:	No Obstruction		
Sight Distance:	1347.191		
Eye Position:	1715+50.00	-6.000	2449.919
Object Position:	1709+02.71	-6.000	2444.154
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1715+00.00	-6.000	2449.529
Object Position:	1708+52.25	-6.000	2443.972
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1714+50.00	-6.000	2449.138
Object Position:	1708+01.80	-6.000	2443.814
Obstruction:	No Obstruction		
Sight Distance:	1377.404		

	Station	Offset	Elevation
Eye Position:	1714+00.00	-6.000	2448.748
Object Position:	1707+51.52	-6.000	2443.677
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1713+50.00	-6.000	2448.358
Object Position:	1707+01.50	-6.000	2443.542
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1713+00.00	-6.000	2447.968
Object Position:	1706+51.70	-6.000	2443.407
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1712+50.00	-6.000	2447.593
Object Position:	1706+02.14	-6.000	2443.273
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1712+00.00	-6.000	2447.241
Object Position:	1705+52.59	-6.000	2443.139
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1711+50.00	-6.000	2446.914
Object Position:	1705+03.04	-6.000	2443.005
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1711+00.00	-6.000	2446.611
Object Position:	1704+53.46	-6.000	2442.871
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1710+50.00	-6.000	2446.332
Object Position:	1704+03.83	-6.000	2442.737
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1710+00.00	-6.000	2446.078
Object Position:	1703+54.16	-6.000	2442.602
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1709+50.00	-6.000	2445.849

	Station	Offset	Elevation
	1703+04.42	-6.000	2442.468
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1709+00.00	-6.000	2445.644
Object Position:	1702+54.66	-6.000	2442.333
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1708+50.00	-6.000	2445.464
Object Position:	1702+04.94	-6.000	2442.185
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1708+00.00	-6.000	2445.309
Object Position:	1701+55.17	-6.000	2442.707
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1707+50.00	-6.000	2445.173
Object Position:	1701+05.27	-6.000	2443.901
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1707+00.00	-6.000	2445.038
Object Position:	1700+55.30	-6.000	2445.170
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1706+50.00	-6.000	2444.902
Object Position:	1700+05.30	-6.000	2446.057
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1706+00.00	-6.000	2444.767
Object Position:	1699+55.26	-6.000	2447.361
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1705+50.00	-6.000	2444.632
Object Position:	1699+05.20	-6.000	2448.247
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1705+00.00	-6.000	2444.497
Object Position:	1698+55.11	-6.000	2448.962
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1704+50.00	-6.000	2444.362
Object Position:	1698+05.02	-6.000	2449.648
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1704+00.00	-6.000	2444.226
Object Position:	1697+54.94	-6.000	2450.700
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1703+50.00	-6.000	2444.091
Object Position:	1697+04.90	-6.000	2451.951
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1703+00.00	-6.000	2443.956
Object Position:	1696+54.90	-6.000	2452.935
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1702+50.00	-6.000	2443.820
Object Position:	1696+04.95	-6.000	2454.020
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1702+00.00	-6.000	2443.669
Object Position:	1695+54.93	-6.000	2454.726
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1701+50.00	-6.000	2444.265
Object Position:	1695+04.89	-6.000	2455.213
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1701+00.00	-6.000	2445.539
Object Position:	1694+54.92	-6.000	2455.546
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1700+50.00	-6.000	2446.693
Object Position:	1694+04.98	-6.000	2455.809
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1700+00.00	-6.000	2447.679
Object Position:	1693+55.07	-6.000	2456.013
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1699+50.00	-6.000	2448.983
Object Position:	1693+05.16	-6.000	2455.514
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1699+00.00	-6.000	2449.823
Object Position:	1692+55.23	-6.000	2455.097
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1698+50.00	-6.000	2450.533
Object Position:	1692+05.28	-6.000	2455.872
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1698+00.00	-6.000	2451.259
Object Position:	1691+55.30	-6.000	2456.647
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1697+50.00	-6.000	2452.326
Object Position:	1691+05.29	-6.000	2457.423
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1697+00.00	-6.000	2453.339
Object Position:	1690+55.24	-6.000	2458.200
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1696+50.00	-6.000	2454.555
Object Position:	1690+05.17	-6.000	2458.976
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1696+00.00	-6.000	2455.623
Object Position:	1689+55.07	-6.000	2459.754
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1695+50.00	-6.000	2456.305
Object Position:	1689+05.00	-6.000	2460.531

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1695+00.00	-6.000	2456.757
Object Position:	1688+55.00	-6.000	2461.306
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1694+50.00	-6.000	2457.072
Object Position:	1688+05.00	-6.000	2462.082
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1694+00.00	-6.000	2457.335
Object Position:	1687+55.00	-6.000	2462.858
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+50.00	-6.000	2457.491
Object Position:	1687+05.00	-6.000	2463.443
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1693+00.00	-6.000	2456.953
Object Position:	1686+55.00	-6.000	2463.424
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1692+50.00	-6.000	2456.678
Object Position:	1686+05.00	-6.000	2463.320
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1692+00.00	-6.000	2457.454
Object Position:	1685+55.00	-6.000	2463.135
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1691+50.00	-6.000	2458.229
Object Position:	1685+05.00	-6.000	2352.859
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1691+00.00	-6.000	2459.005
Object Position:	1684+55.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1690+50.00	-6.000	2459.781
Object Position:	1684+05.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1690+00.00	-6.000	2460.557
Object Position:	1683+55.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+50.00	-6.000	2461.332
Object Position:	1683+05.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1689+00.00	-6.000	2462.108
Object Position:	1682+55.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+50.00	-6.000	2462.884
Object Position:	1682+05.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1688+00.00	-6.000	2463.660
Object Position:	1681+55.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+50.00	-6.000	2464.435
Object Position:	1681+05.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1687+00.00	-6.000	2464.943
Object Position:	1680+55.00	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1686+50.00	-6.000	2464.916
Object Position:	1680+05.06	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1686+00.00	-6.000	2464.803

	Station	Offset	Elevation
	1679+55.13	-6.000	0.000
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

LE - Sight Distance via InRoads Roadway Visibility Tool

Outside lane and truck lane/end taper

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:30am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1683+41.00
Stop Station: 1715+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	1683+41.00	6.000	2462.765
Object Position:	1689+86.00	6.000	2458.365
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1683+91.00	6.000	2463.019
Object Position:	1690+36.00	6.000	2457.671
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1684+41.00	6.000	2463.197
Object Position:	1690+86.00	6.000	2456.975
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1684+91.00	6.000	2463.295
Object Position:	1691+36.00	6.000	2456.271
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1685+41.00	6.000	2463.309
Object Position:	1691+86.00	6.000	2455.504
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1685+91.00	6.000	2463.242
Object Position:	1692+36.00	6.000	2454.719
Obstruction:	No Obstruction		
Sight Distance:	1024.442		

	Station	Offset	Elevation
Eye Position:	1686+41.00	6.000	2463.093
Object Position:	1692+86.14	6.000	2453.977
Obstruction:	No Obstruction		
Sight Distance:	948.827		
Eye Position:	1686+91.00	6.000	2462.863
Object Position:	1693+36.30	6.000	2453.200
Obstruction:	No Obstruction		
Sight Distance:	889.340		
Eye Position:	1687+41.00	6.000	2462.551
Object Position:	1693+86.50	6.000	2452.506
Obstruction:	No Obstruction		
Sight Distance:	854.133		
Eye Position:	1687+91.00	6.000	2462.157
Object Position:	1694+36.76	6.000	2451.807
Obstruction:	No Obstruction		
Sight Distance:	827.818		
Eye Position:	1688+41.00	6.000	2461.681
Object Position:	1694+87.07	6.000	2451.111
Obstruction:	No Obstruction		
Sight Distance:	807.906		
Eye Position:	1688+91.00	6.000	2461.129
Object Position:	1695+37.43	6.000	2450.427
Obstruction:	No Obstruction		
Sight Distance:	793.224		
Eye Position:	1689+41.00	6.000	2460.489
Object Position:	1695+87.84	6.000	2449.761
Obstruction:	No Obstruction		
Sight Distance:	782.885		
Eye Position:	1689+91.00	6.000	2459.796
Object Position:	1696+38.29	6.000	2449.106
Obstruction:	No Obstruction		
Sight Distance:	774.951		
Eye Position:	1690+41.00	6.000	2459.101
Object Position:	1696+88.75	6.000	2448.477
Obstruction:	No Obstruction		
Sight Distance:	779.701		
Eye Position:	1690+91.00	6.000	2458.406
Object Position:	1697+39.20	6.000	2447.869

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	791.837		
Eye Position:	1691+41.00	6.000	2457.687
Object Position:	1697+89.60	6.000	2447.304
Obstruction:	No Obstruction		
Sight Distance:	835.382		
Eye Position:	1691+91.00	6.000	2456.920
Object Position:	1698+39.93	6.000	2446.810
Obstruction:	No Obstruction		
Sight Distance:	856.697		
Eye Position:	1692+41.00	6.000	2456.148
Object Position:	1698+89.98	6.000	2446.354
Obstruction:	No Obstruction		
Sight Distance:	880.683		
Eye Position:	1692+91.00	6.000	2455.393
Object Position:	1699+39.68	6.000	2445.885
Obstruction:	No Obstruction		
Sight Distance:	901.329		
Eye Position:	1693+41.00	6.000	2454.634
Object Position:	1699+89.29	6.000	2445.431
Obstruction:	No Obstruction		
Sight Distance:	1574.411		
Eye Position:	1693+91.00	6.000	2453.942
Object Position:	1700+38.85	6.000	2444.945
Obstruction:	No Obstruction		
Sight Distance:	1367.703		
Eye Position:	1694+41.00	6.000	2453.247
Object Position:	1700+88.39	6.000	2444.477
Obstruction:	No Obstruction		
Sight Distance:	1217.414		
Eye Position:	1694+91.00	6.000	2452.555
Object Position:	1701+37.94	6.000	2444.027
Obstruction:	No Obstruction		
Sight Distance:	1127.233		
Eye Position:	1695+41.00	6.000	2451.877
Object Position:	1701+87.53	6.000	2443.597
Obstruction:	No Obstruction		
Sight Distance:	1056.721		

	Station	Offset	Elevation
Eye Position:	1695+91.00	6.000	2451.218
Object Position:	1702+37.15	6.000	2443.182
Obstruction:	No Obstruction		
Sight Distance:	1006.127		
Eye Position:	1696+41.00	6.000	2450.571
Object Position:	1702+86.83	6.000	2442.885
Obstruction:	No Obstruction		
Sight Distance:	987.710		
Eye Position:	1696+91.00	6.000	2449.950
Object Position:	1703+36.57	6.000	2442.577
Obstruction:	No Obstruction		
Sight Distance:	967.535		
Eye Position:	1697+41.00	6.000	2449.348
Object Position:	1703+86.35	6.000	2442.281
Obstruction:	No Obstruction		
Sight Distance:	949.432		
Eye Position:	1697+91.00	6.000	2448.788
Object Position:	1704+36.18	6.000	2441.995
Obstruction:	No Obstruction		
Sight Distance:	928.921		
Eye Position:	1698+41.00	6.000	2448.301
Object Position:	1704+86.04	6.000	2441.730
Obstruction:	No Obstruction		
Sight Distance:	908.285		
Eye Position:	1698+91.00	6.000	2447.843
Object Position:	1705+35.96	6.000	2441.524
Obstruction:	No Obstruction		
Sight Distance:	887.975		
Eye Position:	1699+41.00	6.000	2447.374
Object Position:	1705+85.85	6.000	2441.281
Obstruction:	No Obstruction		
Sight Distance:	866.166		
Eye Position:	1699+91.00	6.000	2446.914
Object Position:	1706+35.75	6.000	2440.973
Obstruction:	No Obstruction		
Sight Distance:	836.780		
Eye Position:	1700+41.00	6.000	2446.424

	Station	Offset	Elevation
	1706+85.69	6.000	2440.655
Obstruction:	No Obstruction		
Sight Distance:	814.225		
Eye Position:	1700+91.00	6.000	2445.953
Object Position:	1707+35.68	6.000	2440.369
Obstruction:	No Obstruction		
Sight Distance:	792.597		
Eye Position:	1701+41.00	6.000	2445.500
Object Position:	1707+85.71	6.000	2440.157
Obstruction:	No Obstruction		
Sight Distance:	774.786		
Eye Position:	1701+91.00	6.000	2445.067
Object Position:	1708+35.79	6.000	2440.044
Obstruction:	No Obstruction		
Sight Distance:	762.161		
Eye Position:	1702+41.00	6.000	2444.651
Object Position:	1708+85.90	6.000	2440.013
Obstruction:	No Obstruction		
Sight Distance:	751.454		
Eye Position:	1702+91.00	6.000	2444.352
Object Position:	1709+36.03	6.000	2440.086
Obstruction:	No Obstruction		
Sight Distance:	743.174		
Eye Position:	1703+41.00	6.000	2444.044
Object Position:	1709+86.17	6.000	2440.256
Obstruction:	No Obstruction		
Sight Distance:	736.576		
Eye Position:	1703+91.00	6.000	2443.748
Object Position:	1710+36.30	6.000	2440.517
Obstruction:	No Obstruction		
Sight Distance:	736.672		
Eye Position:	1704+41.00	6.000	2443.476
Object Position:	1710+86.38	6.000	2440.880
Obstruction:	No Obstruction		
Sight Distance:	743.987		
Eye Position:	1704+91.00	6.000	2443.212
Object Position:	1711+36.39	6.000	2441.297
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	751.250		
Eye Position:	1705+41.00	6.000	2442.991
Object Position:	1711+86.33	6.000	2441.728
Obstruction:	No Obstruction		
Sight Distance:	759.716		
Eye Position:	1705+91.00	6.000	2442.746
Object Position:	1712+36.39	6.000	2442.282
Obstruction:	No Obstruction		
Sight Distance:	768.240		
Eye Position:	1706+41.00	6.000	2442.438
Object Position:	1712+86.37	6.000	2442.975
Obstruction:	No Obstruction		
Sight Distance:	777.424		
Eye Position:	1706+91.00	6.000	2442.119
Object Position:	1713+36.27	6.000	2443.720
Obstruction:	No Obstruction		
Sight Distance:	785.355		
Eye Position:	1707+41.00	6.000	2441.838
Object Position:	1713+86.14	6.000	2444.558
Obstruction:	No Obstruction		
Sight Distance:	779.024		
Eye Position:	1707+91.00	6.000	2441.637
Object Position:	1714+36.00	6.000	2445.489
Obstruction:	No Obstruction		
Sight Distance:	772.552		
Eye Position:	1708+41.00	6.000	2441.534
Object Position:	1714+85.86	6.000	2446.490
Obstruction:	No Obstruction		
Sight Distance:	765.207		
Eye Position:	1708+91.00	6.000	2441.517
Object Position:	1715+35.76	6.000	2447.686
Obstruction:	No Obstruction		
Sight Distance:	764.440		
Eye Position:	1709+41.00	6.000	2441.599
Object Position:	1715+85.70	6.000	2448.968
Obstruction:	No Obstruction		
Sight Distance:	763.326		

	Station	Offset	Elevation
	1709+91.00	6.000	2441.776
Object Position:	1716+35.68	6.000	2450.343
Obstruction:	No Obstruction		
Sight Distance:	762.929		
Eye Position:	1710+41.00	6.000	2442.046
Object Position:	1716+85.70	6.000	2451.813
Obstruction:	No Obstruction		
Sight Distance:	766.390		
Eye Position:	1710+91.00	6.000	2442.413
Object Position:	1717+35.77	6.000	2453.375
Obstruction:	No Obstruction		
Sight Distance:	769.687		
Eye Position:	1711+41.00	6.000	2442.826
Object Position:	1717+85.88	6.000	2454.993
Obstruction:	No Obstruction		
Sight Distance:	769.662		
Eye Position:	1711+91.00	6.000	2443.279
Object Position:	1718+36.00	6.000	2456.675
Obstruction:	No Obstruction		
Sight Distance:	766.551		
Eye Position:	1712+41.00	6.000	2443.843
Object Position:	1718+86.05	6.000	2458.451
Obstruction:	No Obstruction		
Sight Distance:	762.146		
Eye Position:	1712+91.00	6.000	2444.531
Object Position:	1719+36.20	6.000	2460.256
Obstruction:	No Obstruction		
Sight Distance:	758.114		
Eye Position:	1713+41.00	6.000	2445.287
Object Position:	1719+86.38	6.000	2462.166
Obstruction:	No Obstruction		
Sight Distance:	760.445		
Eye Position:	1713+91.00	6.000	2446.135
Object Position:	1720+36.60	6.000	2464.090
Obstruction:	No Obstruction		
Sight Distance:	763.650		
Eye Position:	1714+41.00	6.000	2447.078
Object Position:	1720+86.87	6.000	2466.015

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	766.628		
Eye Position:	1714+91.00	6.000	2448.109
Object Position:	1721+37.20	6.000	2467.947
Obstruction:	No Obstruction		
Sight Distance:	770.257		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:34am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1711+00.00
Stop Station: 1742+00.00
Interval: 50.000

Sight Distance: 604.000
Relaxed Distance: 604.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	1711+00.00	6.000	2442.476
Object Position:	1717+03.79	6.000	2452.361
Obstruction:	No Obstruction		
Sight Distance:	729.064		
Eye Position:	1711+50.00	6.000	2442.882
Object Position:	1717+53.90	6.000	2453.952
Obstruction:	No Obstruction		
Sight Distance:	731.839		
Eye Position:	1712+00.00	6.000	2443.374
Object Position:	1718+04.00	6.000	2455.573
Obstruction:	No Obstruction		
Sight Distance:	731.531		
Eye Position:	1712+50.00	6.000	2443.961
Object Position:	1718+54.00	6.000	2457.285
Obstruction:	No Obstruction		
Sight Distance:	726.574		
Eye Position:	1713+00.00	6.000	2444.641
Object Position:	1719+04.10	6.000	2459.081
Obstruction:	No Obstruction		
Sight Distance:	722.360		
Eye Position:	1713+50.00	6.000	2445.413
Object Position:	1719+54.26	6.000	2460.935
Obstruction:	No Obstruction		
Sight Distance:	721.519		

	Station	Offset	Elevation
Eye Position:	1714+00.00	6.000	2446.278
Object Position:	1720+04.45	6.000	2462.858
Obstruction:	No Obstruction		
Sight Distance:	724.597		
Eye Position:	1714+50.00	6.000	2447.238
Object Position:	1720+54.69	6.000	2464.782
Obstruction:	No Obstruction		
Sight Distance:	728.498		
Eye Position:	1715+00.00	6.000	2448.316
Object Position:	1721+04.98	6.000	2466.710
Obstruction:	No Obstruction		
Sight Distance:	731.451		
Eye Position:	1715+50.00	6.000	2449.533
Object Position:	1721+55.32	6.000	2468.635
Obstruction:	No Obstruction		
Sight Distance:	734.224		
Eye Position:	1716+00.00	6.000	2450.842
Object Position:	1722+05.70	6.000	2470.568
Obstruction:	No Obstruction		
Sight Distance:	749.794		
Eye Position:	1716+50.00	6.000	2452.245
Object Position:	1722+56.11	6.000	2472.498
Obstruction:	No Obstruction		
Sight Distance:	790.505		
Eye Position:	1717+00.00	6.000	2453.741
Object Position:	1723+06.53	6.000	2474.445
Obstruction:	No Obstruction		
Sight Distance:	1807.368		
Eye Position:	1717+50.00	6.000	2455.323
Object Position:	1723+56.93	6.000	2476.444
Obstruction:	No Obstruction		
Sight Distance:	1717.707		
Eye Position:	1718+00.00	6.000	2456.933
Object Position:	1724+07.17	6.000	2478.438
Obstruction:	No Obstruction		
Sight Distance:	1615.273		
Eye Position:	1718+50.00	6.000	2458.638
Object Position:	1724+57.14	6.000	2480.423

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1502.332		
Eye Position:	1719+00.00	6.000	2460.435
Object Position:	1725+06.83	6.000	2482.397
Obstruction:	No Obstruction		
Sight Distance:	1385.268		
Eye Position:	1719+50.00	6.000	2462.278
Object Position:	1725+56.43	6.000	2484.403
Obstruction:	No Obstruction		
Sight Distance:	1281.241		
Eye Position:	1720+00.00	6.000	2464.186
Object Position:	1726+06.01	6.000	2486.371
Obstruction:	No Obstruction		
Sight Distance:	1178.048		
Eye Position:	1720+50.00	6.000	2466.101
Object Position:	1726+55.61	6.000	2488.307
Obstruction:	No Obstruction		
Sight Distance:	1084.459		
Eye Position:	1721+00.00	6.000	2468.016
Object Position:	1727+05.23	6.000	2490.279
Obstruction:	No Obstruction		
Sight Distance:	1009.402		
Eye Position:	1721+50.00	6.000	2469.931
Object Position:	1727+54.91	6.000	2492.280
Obstruction:	No Obstruction		
Sight Distance:	949.585		
Eye Position:	1722+00.00	6.000	2471.846
Object Position:	1728+04.63	6.000	2494.228
Obstruction:	No Obstruction		
Sight Distance:	890.174		
Eye Position:	1722+50.00	6.000	2473.761
Object Position:	1728+54.28	6.000	2496.226
Obstruction:	No Obstruction		
Sight Distance:	847.359		
Eye Position:	1723+00.00	6.000	2475.692
Object Position:	1729+03.93	6.000	2498.175
Obstruction:	No Obstruction		
Sight Distance:	813.361		

	Station	Offset	Elevation
Eye Position:	1723+50.00	6.000	2477.678
Object Position:	1729+53.69	6.000	2500.117
Obstruction:	No Obstruction		
Sight Distance:	790.377		
Eye Position:	1724+00.00	6.000	2479.663
Object Position:	1730+03.62	6.000	2502.027
Obstruction:	No Obstruction		
Sight Distance:	773.991		
Eye Position:	1724+50.00	6.000	2481.649
Object Position:	1730+53.73	6.000	2503.934
Obstruction:	No Obstruction		
Sight Distance:	763.062		
Eye Position:	1725+00.00	6.000	2483.635
Object Position:	1731+03.95	6.000	2505.803
Obstruction:	No Obstruction		
Sight Distance:	750.961		
Eye Position:	1725+50.00	6.000	2485.621
Object Position:	1731+54.26	6.000	2507.632
Obstruction:	No Obstruction		
Sight Distance:	741.101		
Eye Position:	1726+00.00	6.000	2487.607
Object Position:	1732+04.65	6.000	2509.418
Obstruction:	No Obstruction		
Sight Distance:	733.855		
Eye Position:	1726+50.00	6.000	2489.593
Object Position:	1732+55.05	6.000	2511.164
Obstruction:	No Obstruction		
Sight Distance:	728.611		
Eye Position:	1727+00.00	6.000	2491.579
Object Position:	1733+05.42	6.000	2512.869
Obstruction:	No Obstruction		
Sight Distance:	725.711		
Eye Position:	1727+50.00	6.000	2493.564
Object Position:	1733+55.69	6.000	2514.525
Obstruction:	No Obstruction		
Sight Distance:	723.380		
Eye Position:	1728+00.00	6.000	2495.550

	Station	Offset	Elevation
	1734+05.76	6.000	2516.126
Obstruction:	No Obstruction		
Sight Distance:	722.258		
Eye Position:	1728+50.00	6.000	2497.536
Object Position:	1734+55.70	6.000	2517.687
Obstruction:	No Obstruction		
Sight Distance:	722.145		
Eye Position:	1729+00.00	6.000	2499.522
Object Position:	1735+05.70	6.000	2519.205
Obstruction:	No Obstruction		
Sight Distance:	722.146		
Eye Position:	1729+50.00	6.000	2501.471
Object Position:	1735+55.70	6.000	2520.683
Obstruction:	No Obstruction		
Sight Distance:	722.245		
Eye Position:	1730+00.00	6.000	2503.386
Object Position:	1736+05.70	6.000	2522.119
Obstruction:	No Obstruction		
Sight Distance:	722.565		
Eye Position:	1730+50.00	6.000	2505.290
Object Position:	1736+55.70	6.000	2523.501
Obstruction:	No Obstruction		
Sight Distance:	723.126		
Eye Position:	1731+00.00	6.000	2507.154
Object Position:	1737+05.70	6.000	2524.796
Obstruction:	No Obstruction		
Sight Distance:	729.230		
Eye Position:	1731+50.00	6.000	2508.974
Object Position:	1737+55.70	6.000	2526.023
Obstruction:	No Obstruction		
Sight Distance:	745.929		
Eye Position:	1732+00.00	6.000	2510.753
Object Position:	1738+05.75	6.000	2527.223
Obstruction:	No Obstruction		
Sight Distance:	773.115		
Eye Position:	1732+50.00	6.000	2512.489
Object Position:	1738+55.56	6.000	2528.369
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1733+00.00	6.000	2514.183
Object Position:	1739+05.23	6.000	2529.463
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1733+50.00	6.000	2515.834
Object Position:	1739+54.84	6.000	2530.533
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1734+00.00	6.000	2517.443
Object Position:	1740+04.44	6.000	2531.525
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1734+50.00	6.000	2519.010
Object Position:	1740+54.09	6.000	2532.527
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+00.00	6.000	2520.534
Object Position:	1741+03.82	6.000	2533.495
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+50.00	6.000	2522.016
Object Position:	1741+53.66	6.000	2534.463
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+00.00	6.000	2523.456
Object Position:	1742+03.60	6.000	2535.390
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+50.00	6.000	2524.853
Object Position:	1742+53.65	6.000	2536.277
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1737+00.00	6.000	2526.143
Object Position:	1743+03.79	6.000	2537.121
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1737+50.00	6.000	2527.384
Object Position:	1743+53.98	6.000	2537.925
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+00.00	6.000	2528.583
Object Position:	1744+04.00	6.000	2538.684
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+50.00	6.000	2529.740
Object Position:	1744+54.00	6.000	2539.399
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+00.00	6.000	2530.854
Object Position:	1745+04.00	6.000	2540.073
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+50.00	6.000	2531.926
Object Position:	1745+54.00	6.000	2540.703
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+00.00	6.000	2532.956
Object Position:	1746+04.00	6.000	2541.294
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+50.00	6.000	2533.943
Object Position:	1746+54.00	6.000	2541.839
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+00.00	6.000	2534.921
Object Position:	1747+04.00	6.000	2542.342
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+50.00	6.000	2535.894
Object Position:	1747+54.00	6.000	2542.804
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+00.00	6.000	2536.825
Object Position:	1748+04.00	6.000	2543.223

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:35am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1720+00.00
Stop Station: 1742+00.00
Interval: 50.000

Sight Distance: 604.000
Relaxed Distance: 604.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1720+00.00	18.000	2463.346
Object Position:	1726+08.06	18.000	2486.503
Obstruction:	No Obstruction		
Sight Distance:	1188.114		
Eye Position:	1720+50.00	18.000	2465.261
Object Position:	1726+57.39	18.000	2488.559
Obstruction:	No Obstruction		
Sight Distance:	1098.578		
Eye Position:	1721+00.00	18.000	2467.176
Object Position:	1727+06.74	18.000	2490.662
Obstruction:	No Obstruction		
Sight Distance:	1009.590		
Eye Position:	1721+50.00	18.000	2469.091
Object Position:	1727+56.14	18.000	2492.802
Obstruction:	No Obstruction		
Sight Distance:	930.606		
Eye Position:	1722+00.00	18.000	2471.006
Object Position:	1728+05.59	18.000	2494.873
Obstruction:	No Obstruction		
Sight Distance:	862.116		
Eye Position:	1722+50.00	18.000	2472.921
Object Position:	1728+54.71	18.000	2496.998
Obstruction:	No Obstruction		
Sight Distance:	804.934		

	Station	Offset	Elevation
Eye Position:	1723+00.00	18.000	2474.883
Object Position:	1729+03.70	18.000	2499.059
Obstruction:	No Obstruction		
Sight Distance:	764.296		
Eye Position:	1723+50.00	18.000	2477.010
Object Position:	1729+52.80	18.000	2501.043
Obstruction:	No Obstruction		
Sight Distance:	737.439		
Eye Position:	1724+00.00	18.000	2479.138
Object Position:	1730+02.18	18.000	2502.932
Obstruction:	No Obstruction		
Sight Distance:	719.600		
Eye Position:	1724+50.00	18.000	2481.266
Object Position:	1730+51.89	18.000	2504.824
Obstruction:	No Obstruction		
Sight Distance:	707.482		
Eye Position:	1725+00.00	18.000	2483.393
Object Position:	1731+01.71	18.000	2506.679
Obstruction:	No Obstruction		
Sight Distance:	697.660		
Eye Position:	1725+50.00	18.000	2485.521
Object Position:	1731+51.62	18.000	2508.494
Obstruction:	No Obstruction		
Sight Distance:	690.353		
Eye Position:	1726+00.00	18.000	2487.648
Object Position:	1732+01.59	18.000	2510.270
Obstruction:	No Obstruction		
Sight Distance:	685.095		
Eye Position:	1726+50.00	18.000	2489.776
Object Position:	1732+51.59	18.000	2512.005
Obstruction:	No Obstruction		
Sight Distance:	681.338		
Eye Position:	1727+00.00	18.000	2491.903
Object Position:	1733+01.55	18.000	2513.697
Obstruction:	No Obstruction		
Sight Distance:	678.765		
Eye Position:	1727+50.00	18.000	2494.031
Object Position:	1733+51.41	18.000	2515.342

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	677.982		
Eye Position:	1728+00.00	18.000	2496.159
Object Position:	1734+01.08	18.000	2516.938
Obstruction:	No Obstruction		
Sight Distance:	677.189		
Eye Position:	1728+50.00	18.000	2498.287
Object Position:	1734+50.85	18.000	2518.497
Obstruction:	No Obstruction		
Sight Distance:	677.101		
Eye Position:	1729+00.00	18.000	2500.414
Object Position:	1735+00.85	18.000	2520.020
Obstruction:	No Obstruction		
Sight Distance:	677.088		
Eye Position:	1729+50.00	18.000	2502.431
Object Position:	1735+50.85	18.000	2521.501
Obstruction:	No Obstruction		
Sight Distance:	677.082		
Eye Position:	1730+00.00	18.000	2504.346
Object Position:	1736+00.85	18.000	2522.940
Obstruction:	No Obstruction		
Sight Distance:	677.203		
Eye Position:	1730+50.00	18.000	2506.250
Object Position:	1736+50.85	18.000	2524.337
Obstruction:	No Obstruction		
Sight Distance:	677.551		
Eye Position:	1731+00.00	18.000	2508.114
Object Position:	1737+00.85	18.000	2525.495
Obstruction:	No Obstruction		
Sight Distance:	678.093		
Eye Position:	1731+50.00	18.000	2509.934
Object Position:	1737+50.85	18.000	2526.592
Obstruction:	No Obstruction		
Sight Distance:	685.285		
Eye Position:	1732+00.00	18.000	2511.713
Object Position:	1738+01.26	18.000	2527.653
Obstruction:	No Obstruction		
Sight Distance:	700.722		

	Station	Offset	Elevation
Eye Position:	1732+50.00	18.000	2513.449
Object Position:	1738+51.50	18.000	2528.680
Obstruction:	No Obstruction		
Sight Distance:	721.168		
Eye Position:	1733+00.00	18.000	2515.143
Object Position:	1739+01.58	18.000	2529.645
Obstruction:	No Obstruction		
Sight Distance:	748.876		
Eye Position:	1733+50.00	18.000	2516.794
Object Position:	1739+51.59	18.000	2530.582
Obstruction:	No Obstruction		
Sight Distance:	786.791		
Eye Position:	1734+00.00	18.000	2518.403
Object Position:	1740+01.60	18.000	2531.460
Obstruction:	No Obstruction		
Sight Distance:	841.154		
Eye Position:	1734+50.00	18.000	2519.970
Object Position:	1740+51.65	18.000	2532.314
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+00.00	18.000	2521.494
Object Position:	1741+01.78	18.000	2533.216
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1735+50.00	18.000	2522.976
Object Position:	1741+52.02	18.000	2534.192
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+00.00	18.000	2524.416
Object Position:	1742+02.36	18.000	2535.127
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1736+50.00	18.000	2525.813
Object Position:	1742+52.81	18.000	2536.022
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1737+00.00	18.000	2526.972

	Station	Offset	Elevation
	1743+03.34	18.000	2536.874
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1737+50.00	18.000	2528.072
Object Position:	1743+53.93	18.000	2537.684
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+00.00	18.000	2529.129
Object Position:	1744+04.00	18.000	2538.444
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+50.00	18.000	2530.144
Object Position:	1744+54.00	18.000	2539.159
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+00.00	18.000	2531.117
Object Position:	1745+04.00	18.000	2539.833
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+50.00	18.000	2532.047
Object Position:	1745+54.00	18.000	2540.463
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+00.00	18.000	2532.935
Object Position:	1746+04.00	18.000	2541.054
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+50.00	18.000	2533.780
Object Position:	1746+54.00	18.000	2541.599
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+00.00	18.000	2534.681
Object Position:	1747+04.00	18.000	2542.102
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+50.00	18.000	2535.654
Object Position:	1747+54.00	18.000	2542.564
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1742+00.00	18.000	2536.585
Object Position:	1748+04.00	18.000	2542.983
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:36am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1738+00.00
Stop Station: 1785+00.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1738+00.00	18.000	2529.129
Object Position:	1744+45.00	18.000	2539.033
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1738+50.00	18.000	2530.144
Object Position:	1744+95.00	18.000	2539.714
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+00.00	18.000	2531.117
Object Position:	1745+45.00	18.000	2540.353
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1739+50.00	18.000	2532.047
Object Position:	1745+95.00	18.000	2540.949
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+00.00	18.000	2532.935
Object Position:	1746+45.00	18.000	2541.503
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1740+50.00	18.000	2533.780
Object Position:	1746+95.00	18.000	2542.014
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1741+00.00	18.000	2534.681
Object Position:	1747+45.00	18.000	2542.483
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1741+50.00	18.000	2535.654
Object Position:	1747+95.00	18.000	2542.911
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+00.00	18.000	2536.585
Object Position:	1748+45.00	18.000	2543.295
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1742+50.00	18.000	2537.474
Object Position:	1748+95.00	18.000	2543.637
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1743+00.00	18.000	2538.320
Object Position:	1749+45.00	18.000	2543.937
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1743+50.00	18.000	2539.124
Object Position:	1749+95.00	18.000	2544.195
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1744+00.00	18.000	2539.886
Object Position:	1750+45.00	18.000	2544.419
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1744+50.00	18.000	2540.605
Object Position:	1750+95.00	18.000	2544.639
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1745+00.00	18.000	2541.282
Object Position:	1751+45.00	18.000	2544.859
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1745+50.00	18.000	2541.916
Object Position:	1751+95.00	18.000	2545.079

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1746+00.00	18.000	2542.508
Object Position:	1752+45.00	18.000	2545.299
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1746+50.00	18.000	2543.058
Object Position:	1752+95.00	18.000	2545.519
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1747+00.00	18.000	2543.565
Object Position:	1753+45.00	18.000	2545.739
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1747+50.00	18.000	2544.030
Object Position:	1753+95.00	18.000	2545.959
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1748+00.00	18.000	2544.453
Object Position:	1754+45.00	18.000	2546.179
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1748+50.00	18.000	2544.833
Object Position:	1754+95.00	18.000	2546.399
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+00.00	18.000	2545.171
Object Position:	1755+45.00	18.000	2546.619
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1749+50.00	18.000	2545.466
Object Position:	1755+95.00	18.000	2546.839
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1750+00.00	18.000	2545.719
Object Position:	1756+45.00	18.000	2547.059
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1750+50.00	18.000	2545.941
Object Position:	1756+95.00	18.000	2547.279
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+00.00	18.000	2546.161
Object Position:	1757+45.00	18.000	2547.499
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1751+50.00	18.000	2546.381
Object Position:	1757+95.00	18.000	2547.719
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+00.00	18.000	2546.601
Object Position:	1758+45.00	18.000	2547.939
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1752+50.00	18.000	2546.821
Object Position:	1758+95.00	18.000	2548.159
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+00.00	18.000	2547.041
Object Position:	1759+45.00	18.000	2548.379
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1753+50.00	18.000	2547.261
Object Position:	1759+95.00	18.000	2548.598
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+00.00	18.000	2547.481
Object Position:	1760+45.00	18.000	2548.796
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1754+50.00	18.000	2547.701
Object Position:	1760+95.00	18.000	2548.958
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+00.00	18.000	2547.921

	Station	Offset	Elevation
	1761+45.00	18.000	2549.084
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1755+50.00	18.000	2548.141
Object Position:	1761+95.00	18.000	2549.175
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+00.00	18.000	2548.361
Object Position:	1762+45.00	18.000	2549.229
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1756+50.00	18.000	2548.581
Object Position:	1762+95.00	18.000	2549.246
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+00.00	18.000	2548.801
Object Position:	1763+45.00	18.000	2549.229
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1757+50.00	18.000	2549.021
Object Position:	1763+95.00	18.000	2549.176
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1758+00.00	18.000	2549.241
Object Position:	1764+45.00	18.000	2549.087
Obstruction:	No Obstruction		
Sight Distance:	1340.049		
Eye Position:	1758+50.00	18.000	2549.461
Object Position:	1764+95.00	18.000	2548.962
Obstruction:	No Obstruction		
Sight Distance:	1289.293		
Eye Position:	1759+00.00	18.000	2549.681
Object Position:	1765+45.00	18.000	2548.802
Obstruction:	No Obstruction		
Sight Distance:	1238.512		
Eye Position:	1759+50.00	18.000	2549.901
Object Position:	1765+95.00	18.000	2548.768
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1188.215		
Eye Position:	1760+00.00	18.000	2550.120
Object Position:	1766+45.00	18.000	2548.719
Obstruction:	No Obstruction		
Sight Distance:	1137.944		
Eye Position:	1760+50.00	18.000	2550.314
Object Position:	1766+95.00	18.000	2548.692
Obstruction:	No Obstruction		
Sight Distance:	1087.829		
Eye Position:	1761+00.00	18.000	2550.472
Object Position:	1767+45.00	18.000	2548.588
Obstruction:	No Obstruction		
Sight Distance:	1037.602		
Eye Position:	1761+50.00	18.000	2550.595
Object Position:	1767+95.00	18.000	2548.461
Obstruction:	No Obstruction		
Sight Distance:	987.414		
Eye Position:	1762+00.00	18.000	2550.682
Object Position:	1768+45.00	18.000	2548.299
Obstruction:	No Obstruction		
Sight Distance:	937.233		
Eye Position:	1762+50.00	18.000	2550.733
Object Position:	1768+94.89	18.000	2548.101
Obstruction:	No Obstruction		
Sight Distance:	887.427		
Eye Position:	1763+00.00	18.000	2550.748
Object Position:	1769+44.45	18.000	2547.876
Obstruction:	No Obstruction		
Sight Distance:	846.617		
Eye Position:	1763+50.00	18.000	2550.727
Object Position:	1769+94.03	18.000	2547.635
Obstruction:	No Obstruction		
Sight Distance:	816.372		
Eye Position:	1764+00.00	18.000	2550.670
Object Position:	1770+43.67	18.000	2547.213
Obstruction:	No Obstruction		
Sight Distance:	793.764		

	Station	Offset	Elevation
	1764+50.00	18.000	2550.578
Object Position:	1770+93.37	18.000	2546.791
Obstruction:	No Obstruction		
Sight Distance:	776.922		
Eye Position:	1765+00.00	18.000	2550.449
Object Position:	1771+43.14	18.000	2546.368
Obstruction:	No Obstruction		
Sight Distance:	764.346		
Eye Position:	1765+50.00	18.000	2550.285
Object Position:	1771+92.98	18.000	2545.944
Obstruction:	No Obstruction		
Sight Distance:	754.822		
Eye Position:	1766+00.00	18.000	2550.247
Object Position:	1772+42.87	18.000	2545.520
Obstruction:	No Obstruction		
Sight Distance:	747.547		
Eye Position:	1766+50.00	18.000	2550.224
Object Position:	1772+92.80	18.000	2545.095
Obstruction:	No Obstruction		
Sight Distance:	742.071		
Eye Position:	1767+00.00	18.000	2550.165
Object Position:	1773+42.74	18.000	2544.671
Obstruction:	No Obstruction		
Sight Distance:	738.004		
Eye Position:	1767+50.00	18.000	2550.070
Object Position:	1773+92.66	18.000	2544.247
Obstruction:	No Obstruction		
Sight Distance:	735.129		
Eye Position:	1768+00.00	18.000	2549.940
Object Position:	1774+42.52	18.000	2543.823
Obstruction:	No Obstruction		
Sight Distance:	733.172		
Eye Position:	1768+50.00	18.000	2549.774
Object Position:	1774+92.26	18.000	2543.404
Obstruction:	No Obstruction		
Sight Distance:	732.067		
Eye Position:	1769+00.00	18.000	2549.572
Object Position:	1775+42.00	18.000	2543.033

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	731.757		
Eye Position:	1769+50.00	18.000	2549.360
Object Position:	1775+92.00	18.000	2542.720
Obstruction:	No Obstruction		
Sight Distance:	731.642		
Eye Position:	1770+00.00	18.000	2549.084
Object Position:	1776+42.00	18.000	2542.467
Obstruction:	No Obstruction		
Sight Distance:	731.542		
Eye Position:	1770+50.00	18.000	2548.659
Object Position:	1776+92.00	18.000	2542.274
Obstruction:	No Obstruction		
Sight Distance:	731.470		
Eye Position:	1771+00.00	18.000	2548.234
Object Position:	1777+42.00	18.000	2542.141
Obstruction:	No Obstruction		
Sight Distance:	731.459		
Eye Position:	1771+50.00	18.000	2547.809
Object Position:	1777+92.00	18.000	2542.069
Obstruction:	No Obstruction		
Sight Distance:	731.785		
Eye Position:	1772+00.00	18.000	2547.384
Object Position:	1778+42.00	18.000	2541.973
Obstruction:	No Obstruction		
Sight Distance:	732.089		
Eye Position:	1772+50.00	18.000	2546.959
Object Position:	1778+92.00	18.000	2541.813
Obstruction:	No Obstruction		
Sight Distance:	736.111		
Eye Position:	1773+00.00	18.000	2546.534
Object Position:	1779+42.14	18.000	2541.703
Obstruction:	No Obstruction		
Sight Distance:	749.195		
Eye Position:	1773+50.00	18.000	2546.109
Object Position:	1779+92.45	18.000	2541.658
Obstruction:	No Obstruction		
Sight Distance:	767.519		

	Station	Offset	Elevation
Eye Position:	1774+00.00	18.000	2545.684
Object Position:	1780+42.62	18.000	2541.689
Obstruction:	No Obstruction		
Sight Distance:	786.658		
Eye Position:	1774+50.00	18.000	2545.259
Object Position:	1780+92.72	18.000	2541.822
Obstruction:	No Obstruction		
Sight Distance:	777.697		
Eye Position:	1775+00.00	18.000	2544.842
Object Position:	1781+42.78	18.000	2542.172
Obstruction:	No Obstruction		
Sight Distance:	780.391		
Eye Position:	1775+50.00	18.000	2544.478
Object Position:	1781+92.85	18.000	2542.582
Obstruction:	No Obstruction		
Sight Distance:	782.926		
Eye Position:	1776+00.00	18.000	2544.175
Object Position:	1782+42.94	18.000	2543.052
Obstruction:	No Obstruction		
Sight Distance:	785.187		
Eye Position:	1776+50.00	18.000	2543.932
Object Position:	1782+93.09	18.000	2543.585
Obstruction:	No Obstruction		
Sight Distance:	791.363		
Eye Position:	1777+00.00	18.000	2543.748
Object Position:	1783+43.30	18.000	2544.178
Obstruction:	No Obstruction		
Sight Distance:	811.924		
Eye Position:	1777+50.00	18.000	2543.625
Object Position:	1783+93.58	18.000	2544.833
Obstruction:	No Obstruction		
Sight Distance:	829.762		
Eye Position:	1778+00.00	18.000	2543.563
Object Position:	1784+43.92	18.000	2545.477
Obstruction:	No Obstruction		
Sight Distance:	833.839		
Eye Position:	1778+50.00	18.000	2543.445

	Station	Offset	Elevation
	1784+94.33	18.000	2546.082
Obstruction:	No Obstruction		
Sight Distance:	821.259		
Eye Position:	1779+00.00	18.000	2543.290
Object Position:	1785+44.77	18.000	2546.731
Obstruction:	No Obstruction		
Sight Distance:	809.243		
Eye Position:	1779+50.00	18.000	2543.195
Object Position:	1785+95.00	18.000	2547.459
Obstruction:	No Obstruction		
Sight Distance:	799.102		
Eye Position:	1780+00.00	18.000	2543.160
Object Position:	1786+45.00	18.000	2548.299
Obstruction:	No Obstruction		
Sight Distance:	793.252		
Eye Position:	1780+50.00	18.000	2543.186
Object Position:	1786+95.00	18.000	2549.314
Obstruction:	No Obstruction		
Sight Distance:	796.471		
Eye Position:	1781+00.00	18.000	2543.369
Object Position:	1787+45.00	18.000	2550.388
Obstruction:	No Obstruction		
Sight Distance:	798.330		
Eye Position:	1781+50.00	18.000	2543.727
Object Position:	1787+95.00	18.000	2551.521
Obstruction:	No Obstruction		
Sight Distance:	798.285		
Eye Position:	1782+00.00	18.000	2544.145
Object Position:	1788+45.00	18.000	2552.716
Obstruction:	No Obstruction		
Sight Distance:	798.332		
Eye Position:	1782+50.00	18.000	2544.624
Object Position:	1788+95.00	18.000	2553.971
Obstruction:	No Obstruction		
Sight Distance:	798.283		
Eye Position:	1783+00.00	18.000	2545.163
Object Position:	1789+45.00	18.000	2555.286
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	798.814		
Eye Position:	1783+50.00	18.000	2545.761
Object Position:	1789+95.00	18.000	2556.661
Obstruction:	No Obstruction		
Sight Distance:	803.417		
Eye Position:	1784+00.00	18.000	2546.420
Object Position:	1790+45.00	18.000	2558.096
Obstruction:	No Obstruction		
Sight Distance:	813.950		
Eye Position:	1784+50.00	18.000	2547.050
Object Position:	1790+95.00	18.000	2559.585
Obstruction:	No Obstruction		
Sight Distance:	834.304		
Eye Position:	1785+00.00	18.000	2547.649
Object Position:	1791+45.00	18.000	2561.085
Obstruction:	No Obstruction		
Sight Distance:	845.373		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:40am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1781+00.00
Stop Station: 1818+00.00
Interval: 50.000

Sight Distance: 612.000
Relaxed Distance: 612.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1781+00.00	18.000	2543.369
Object Position:	1787+12.00	18.000	2549.672
Obstruction:	No Obstruction		
Sight Distance:	767.483		
Eye Position:	1781+50.00	18.000	2543.727
Object Position:	1787+62.00	18.000	2550.766
Obstruction:	No Obstruction		
Sight Distance:	767.518		
Eye Position:	1782+00.00	18.000	2544.145
Object Position:	1788+12.00	18.000	2551.921
Obstruction:	No Obstruction		
Sight Distance:	767.483		
Eye Position:	1782+50.00	18.000	2544.624
Object Position:	1788+62.00	18.000	2553.136
Obstruction:	No Obstruction		
Sight Distance:	767.518		
Eye Position:	1783+00.00	18.000	2545.163
Object Position:	1789+12.00	18.000	2554.410
Obstruction:	No Obstruction		
Sight Distance:	767.468		
Eye Position:	1783+50.00	18.000	2545.761
Object Position:	1789+62.00	18.000	2555.746
Obstruction:	No Obstruction		
Sight Distance:	769.165		

	Station	Offset	Elevation
Eye Position:	1784+00.00	18.000	2546.420
Object Position:	1790+12.00	18.000	2557.141
Obstruction:	No Obstruction		
Sight Distance:	775.937		
Eye Position:	1784+50.00	18.000	2547.050
Object Position:	1790+62.00	18.000	2558.597
Obstruction:	No Obstruction		
Sight Distance:	791.790		
Eye Position:	1785+00.00	18.000	2547.649
Object Position:	1791+12.00	18.000	2560.095
Obstruction:	No Obstruction		
Sight Distance:	816.486		
Eye Position:	1785+50.00	18.000	2548.308
Object Position:	1791+62.00	18.000	2561.595
Obstruction:	No Obstruction		
Sight Distance:	819.999		
Eye Position:	1786+00.00	18.000	2549.028
Object Position:	1792+12.00	18.000	2563.095
Obstruction:	No Obstruction		
Sight Distance:	829.748		
Eye Position:	1786+50.00	18.000	2549.898
Object Position:	1792+62.00	18.000	2564.595
Obstruction:	No Obstruction		
Sight Distance:	831.032		
Eye Position:	1787+00.00	18.000	2550.918
Object Position:	1793+12.00	18.000	2566.097
Obstruction:	No Obstruction		
Sight Distance:	858.782		
Eye Position:	1787+50.00	18.000	2551.998
Object Position:	1793+62.00	18.000	2567.833
Obstruction:	No Obstruction		
Sight Distance:	979.740		
Eye Position:	1788+00.00	18.000	2553.138
Object Position:	1794+12.00	18.000	2569.483
Obstruction:	No Obstruction		
Sight Distance:	1117.006		
Eye Position:	1788+50.00	18.000	2554.339
Object Position:	1794+62.00	18.000	2571.193

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1336.258		
Eye Position:	1789+00.00	18.000	2555.599
Object Position:	1795+12.00	18.000	2572.815
Obstruction:	No Obstruction		
Sight Distance:	1570.746		
Eye Position:	1789+50.00	18.000	2556.920
Object Position:	1795+62.00	18.000	2574.315
Obstruction:	No Obstruction		
Sight Distance:	1702.506		
Eye Position:	1790+00.00	18.000	2558.301
Object Position:	1796+12.00	18.000	2575.815
Obstruction:	No Obstruction		
Sight Distance:	1714.691		
Eye Position:	1790+50.00	18.000	2559.742
Object Position:	1796+62.00	18.000	2577.315
Obstruction:	No Obstruction		
Sight Distance:	1666.473		
Eye Position:	1791+00.00	18.000	2561.235
Object Position:	1797+12.00	18.000	2578.815
Obstruction:	No Obstruction		
Sight Distance:	1617.264		
Eye Position:	1791+50.00	18.000	2562.735
Object Position:	1797+62.00	18.000	2580.315
Obstruction:	No Obstruction		
Sight Distance:	1567.929		
Eye Position:	1792+00.00	18.000	2564.235
Object Position:	1798+12.00	18.000	2581.815
Obstruction:	No Obstruction		
Sight Distance:	1518.595		
Eye Position:	1792+50.00	18.000	2565.735
Object Position:	1798+61.92	18.000	2583.313
Obstruction:	No Obstruction		
Sight Distance:	1480.387		
Eye Position:	1793+00.00	18.000	2567.235
Object Position:	1799+11.83	18.000	2584.810
Obstruction:	No Obstruction		
Sight Distance:	1471.167		

	Station	Offset	Elevation
Eye Position:	1793+50.00	18.000	2568.915
Object Position:	1799+61.75	18.000	2586.307
Obstruction:	No Obstruction		
Sight Distance:	1490.160		
Eye Position:	1794+00.00	18.000	2570.595
Object Position:	1800+11.66	18.000	2587.805
Obstruction:	No Obstruction		
Sight Distance:	1518.662		
Eye Position:	1794+50.00	18.000	2572.275
Object Position:	1800+61.65	18.000	2589.305
Obstruction:	No Obstruction		
Sight Distance:	1418.545		
Eye Position:	1795+00.00	18.000	2573.955
Object Position:	1801+11.66	18.000	2590.805
Obstruction:	No Obstruction		
Sight Distance:	1341.549		
Eye Position:	1795+50.00	18.000	2575.455
Object Position:	1801+61.66	18.000	2592.305
Obstruction:	No Obstruction		
Sight Distance:	1351.159		
Eye Position:	1796+00.00	18.000	2576.955
Object Position:	1802+11.66	18.000	2593.805
Obstruction:	No Obstruction		
Sight Distance:	1393.066		
Eye Position:	1796+50.00	18.000	2578.455
Object Position:	1802+61.66	18.000	2595.305
Obstruction:	No Obstruction		
Sight Distance:	1366.864		
Eye Position:	1797+00.00	18.000	2579.955
Object Position:	1803+11.66	18.000	2596.805
Obstruction:	No Obstruction		
Sight Distance:	1345.046		
Eye Position:	1797+50.00	18.000	2581.455
Object Position:	1803+61.66	18.000	2598.305
Obstruction:	No Obstruction		
Sight Distance:	1329.933		
Eye Position:	1798+00.00	18.000	2582.955

	Station	Offset	Elevation
	1804+11.65	18.000	2599.804
Obstruction:	No Obstruction		
Sight Distance:	1318.771		
Eye Position:	1798+50.00	18.000	2584.455
Object Position:	1804+61.70	18.000	2601.306
Obstruction:	No Obstruction		
Sight Distance:	1322.839		
Eye Position:	1799+00.00	18.000	2585.955
Object Position:	1805+11.79	18.000	2602.809
Obstruction:	No Obstruction		
Sight Distance:	1322.566		
Eye Position:	1799+50.00	18.000	2587.455
Object Position:	1805+61.87	18.000	2604.311
Obstruction:	No Obstruction		
Sight Distance:	1326.563		
Eye Position:	1800+00.00	18.000	2588.955
Object Position:	1806+11.96	18.000	2605.814
Obstruction:	No Obstruction		
Sight Distance:	1338.655		
Eye Position:	1800+50.00	18.000	2590.455
Object Position:	1806+62.00	18.000	2607.315
Obstruction:	No Obstruction		
Sight Distance:	1327.545		
Eye Position:	1801+00.00	18.000	2591.955
Object Position:	1807+12.00	18.000	2608.815
Obstruction:	No Obstruction		
Sight Distance:	1307.157		
Eye Position:	1801+50.00	18.000	2593.455
Object Position:	1807+62.00	18.000	2610.315
Obstruction:	No Obstruction		
Sight Distance:	1291.309		
Eye Position:	1802+00.00	18.000	2594.955
Object Position:	1808+12.00	18.000	2611.815
Obstruction:	No Obstruction		
Sight Distance:	1241.440		
Eye Position:	1802+50.00	18.000	2596.455
Object Position:	1808+62.00	18.000	2613.315
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1191.571		
Eye Position:	1803+00.00	18.000	2597.955
Object Position:	1809+12.00	18.000	2614.808
Obstruction:	No Obstruction		
Sight Distance:	1141.688		
Eye Position:	1803+50.00	18.000	2599.455
Object Position:	1809+62.00	18.000	2616.268
Obstruction:	No Obstruction		
Sight Distance:	1091.744		
Eye Position:	1804+00.00	18.000	2600.955
Object Position:	1810+12.00	18.000	2617.773
Obstruction:	No Obstruction		
Sight Distance:	1041.890		
Eye Position:	1804+50.00	18.000	2602.455
Object Position:	1810+62.00	18.000	2619.383
Obstruction:	No Obstruction		
Sight Distance:	992.215		
Eye Position:	1805+00.00	18.000	2603.955
Object Position:	1811+12.00	18.000	2620.922
Obstruction:	No Obstruction		
Sight Distance:	942.405		
Eye Position:	1805+50.00	18.000	2605.455
Object Position:	1811+61.85	18.000	2622.440
Obstruction:	No Obstruction		
Sight Distance:	893.053		
Eye Position:	1806+00.00	18.000	2606.955
Object Position:	1812+11.40	18.000	2623.909
Obstruction:	No Obstruction		
Sight Distance:	850.400		
Eye Position:	1806+50.00	18.000	2608.455
Object Position:	1812+60.99	18.000	2625.283
Obstruction:	No Obstruction		
Sight Distance:	814.593		
Eye Position:	1807+00.00	18.000	2609.955
Object Position:	1813+10.63	18.000	2626.474
Obstruction:	No Obstruction		
Sight Distance:	785.698		

	Station	Offset	Elevation
	1807+50.00	18.000	2611.455
Object Position:	1813+60.34	18.000	2627.620
Obstruction:	No Obstruction		
Sight Distance:	758.784		
Eye Position:	1808+00.00	18.000	2612.955
Object Position:	1814+10.11	18.000	2628.735
Obstruction:	No Obstruction		
Sight Distance:	736.444		
Eye Position:	1808+50.00	18.000	2614.455
Object Position:	1814+59.94	18.000	2629.811
Obstruction:	No Obstruction		
Sight Distance:	722.010		
Eye Position:	1809+00.00	18.000	2615.953
Object Position:	1815+09.81	18.000	2630.857
Obstruction:	No Obstruction		
Sight Distance:	715.494		
Eye Position:	1809+50.00	18.000	2617.422
Object Position:	1815+59.71	18.000	2631.860
Obstruction:	No Obstruction		
Sight Distance:	710.812		
Eye Position:	1810+00.00	18.000	2618.882
Object Position:	1816+09.61	18.000	2632.823
Obstruction:	No Obstruction		
Sight Distance:	707.411		
Eye Position:	1810+50.00	18.000	2620.487
Object Position:	1816+59.46	18.000	2633.748
Obstruction:	No Obstruction		
Sight Distance:	705.020		
Eye Position:	1811+00.00	18.000	2622.054
Object Position:	1817+09.22	18.000	2634.633
Obstruction:	No Obstruction		
Sight Distance:	703.533		
Eye Position:	1811+50.00	18.000	2623.584
Object Position:	1817+58.87	18.000	2635.480
Obstruction:	No Obstruction		
Sight Distance:	703.153		
Eye Position:	1812+00.00	18.000	2625.075
Object Position:	1818+08.87	18.000	2636.296

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	702.994		
Eye Position:	1812+50.00	18.000	2626.515
Object Position:	1818+58.87	18.000	2637.079
Obstruction:	No Obstruction		
Sight Distance:	702.959		
Eye Position:	1813+00.00	18.000	2627.718
Object Position:	1819+08.87	18.000	2637.820
Obstruction:	No Obstruction		
Sight Distance:	702.957		
Eye Position:	1813+50.00	18.000	2628.883
Object Position:	1819+58.87	18.000	2638.520
Obstruction:	No Obstruction		
Sight Distance:	702.957		
Eye Position:	1814+00.00	18.000	2630.009
Object Position:	1820+08.87	18.000	2639.184
Obstruction:	No Obstruction		
Sight Distance:	703.223		
Eye Position:	1814+50.00	18.000	2631.098
Object Position:	1820+58.87	18.000	2639.807
Obstruction:	No Obstruction		
Sight Distance:	703.574		
Eye Position:	1815+00.00	18.000	2632.148
Object Position:	1821+08.87	18.000	2640.258
Obstruction:	No Obstruction		
Sight Distance:	704.381		
Eye Position:	1815+50.00	18.000	2633.161
Object Position:	1821+58.87	18.000	2640.611
Obstruction:	No Obstruction		
Sight Distance:	711.375		
Eye Position:	1816+00.00	18.000	2634.136
Object Position:	1822+09.10	18.000	2640.921
Obstruction:	No Obstruction		
Sight Distance:	728.564		
Eye Position:	1816+50.00	18.000	2635.072
Object Position:	1822+59.39	18.000	2641.204
Obstruction:	No Obstruction		
Sight Distance:	752.169		

	Station	Offset	Elevation
Eye Position:	1817+00.00	18.000	2635.971
Object Position:	1823+09.56	18.000	2641.428
Obstruction:	No Obstruction		
Sight Distance:	783.584		
Eye Position:	1817+50.00	18.000	2636.832
Object Position:	1823+59.68	18.000	2641.559
Obstruction:	No Obstruction		
Sight Distance:	824.838		
Eye Position:	1818+00.00	18.000	2637.654
Object Position:	1824+09.78	18.000	2641.713
Obstruction:	No Obstruction		
Sight Distance:	882.458		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:55am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1814+00.00
Stop Station: 1833+50.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 18.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 18.000

	Station	Offset	Elevation
Eye Position:	1814+00.00	18.000	2630.009
Object Position:	1820+42.00	18.000	2639.602
Obstruction:	No Obstruction		
Sight Distance:	732.104		
Eye Position:	1814+50.00	18.000	2631.098
Object Position:	1820+92.00	18.000	2640.127
Obstruction:	No Obstruction		
Sight Distance:	733.166		
Eye Position:	1815+00.00	18.000	2632.148
Object Position:	1821+42.00	18.000	2640.462
Obstruction:	No Obstruction		
Sight Distance:	736.513		
Eye Position:	1815+50.00	18.000	2633.161
Object Position:	1821+92.09	18.000	2640.794
Obstruction:	No Obstruction		
Sight Distance:	749.041		
Eye Position:	1816+00.00	18.000	2634.136
Object Position:	1822+42.42	18.000	2641.071
Obstruction:	No Obstruction		
Sight Distance:	768.164		
Eye Position:	1816+50.00	18.000	2635.072
Object Position:	1822+92.61	18.000	2641.327
Obstruction:	No Obstruction		
Sight Distance:	793.096		

	Station	Offset	Elevation
Eye Position:	1817+00.00	18.000	2635.971
Object Position:	1823+42.71	18.000	2641.525
Obstruction:	No Obstruction		
Sight Distance:	825.827		
Eye Position:	1817+50.00	18.000	2636.832
Object Position:	1823+92.78	18.000	2641.645
Obstruction:	No Obstruction		
Sight Distance:	868.717		
Eye Position:	1818+00.00	18.000	2637.654
Object Position:	1824+42.84	18.000	2641.827
Obstruction:	No Obstruction		
Sight Distance:	929.380		
Eye Position:	1818+50.00	18.000	2638.439
Object Position:	1824+92.93	18.000	2641.975
Obstruction:	No Obstruction		
Sight Distance:	1018.324		
Eye Position:	1819+00.00	18.000	2639.185
Object Position:	1825+43.06	18.000	2642.294
Obstruction:	No Obstruction		
Sight Distance:	1555.961		
Eye Position:	1819+50.00	18.000	2639.894
Object Position:	1825+93.27	18.000	2642.656
Obstruction:	No Obstruction		
Sight Distance:	1388.154		
Eye Position:	1820+00.00	18.000	2640.565
Object Position:	1826+43.54	18.000	2643.018
Obstruction:	No Obstruction		
Sight Distance:	1266.704		
Eye Position:	1820+50.00	18.000	2641.197
Object Position:	1826+93.87	18.000	2643.380
Obstruction:	No Obstruction		
Sight Distance:	1180.460		
Eye Position:	1821+00.00	18.000	2641.703
Object Position:	1827+44.27	18.000	2643.742
Obstruction:	No Obstruction		
Sight Distance:	1128.507		
Eye Position:	1821+50.00	18.000	2642.047
Object Position:	1827+94.72	18.000	2644.106

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1103.055		
Eye Position:	1822+00.00	18.000	2642.352
Object Position:	1828+45.00	18.000	2644.468
Obstruction:	No Obstruction		
Sight Distance:	1085.216		
Eye Position:	1822+50.00	18.000	2642.621
Object Position:	1828+95.00	18.000	2644.731
Obstruction:	No Obstruction		
Sight Distance:	1048.370		
Eye Position:	1823+00.00	18.000	2642.850
Object Position:	1829+45.14	18.000	2644.892
Obstruction:	No Obstruction		
Sight Distance:	994.150		
Eye Position:	1823+50.00	18.000	2643.042
Object Position:	1829+95.35	18.000	2645.191
Obstruction:	No Obstruction		
Sight Distance:	975.097		
Eye Position:	1824+00.00	18.000	2643.198
Object Position:	1830+45.56	18.000	2645.552
Obstruction:	No Obstruction		
Sight Distance:	973.258		
Eye Position:	1824+50.00	18.000	2643.345
Object Position:	1830+95.79	18.000	2645.914
Obstruction:	No Obstruction		
Sight Distance:	973.167		
Eye Position:	1825+00.00	18.000	2643.492
Object Position:	1831+46.03	18.000	2646.275
Obstruction:	No Obstruction		
Sight Distance:	975.350		
Eye Position:	1825+50.00	18.000	2643.844
Object Position:	1831+96.28	18.000	2646.637
Obstruction:	No Obstruction		
Sight Distance:	964.462		
Eye Position:	1826+00.00	18.000	2644.204
Object Position:	1832+46.54	18.000	2646.999
Obstruction:	No Obstruction		
Sight Distance:	955.530		

	Station	Offset	Elevation
Eye Position:	1826+50.00	18.000	2644.564
Object Position:	1832+96.81	18.000	2647.361
Obstruction:	No Obstruction		
Sight Distance:	948.207		
Eye Position:	1827+00.00	18.000	2644.924
Object Position:	1833+47.09	18.000	2647.723
Obstruction:	No Obstruction		
Sight Distance:	942.213		
Eye Position:	1827+50.00	18.000	2645.284
Object Position:	1833+97.37	18.000	2648.085
Obstruction:	No Obstruction		
Sight Distance:	937.947		
Eye Position:	1828+00.00	18.000	2645.644
Object Position:	1834+47.64	18.000	2648.447
Obstruction:	No Obstruction		
Sight Distance:	934.616		
Eye Position:	1828+50.00	18.000	2646.004
Object Position:	1834+97.89	18.000	2648.808
Obstruction:	No Obstruction		
Sight Distance:	932.624		
Eye Position:	1829+00.00	18.000	2646.260
Object Position:	1835+48.11	18.000	2649.171
Obstruction:	No Obstruction		
Sight Distance:	937.863		
Eye Position:	1829+50.00	18.000	2646.403
Object Position:	1835+98.15	18.000	2649.531
Obstruction:	No Obstruction		
Sight Distance:	950.730		
Eye Position:	1830+00.00	18.000	2646.724
Object Position:	1836+48.15	18.000	2649.891
Obstruction:	No Obstruction		
Sight Distance:	953.078		
Eye Position:	1830+50.00	18.000	2647.084
Object Position:	1836+98.15	18.000	2650.250
Obstruction:	No Obstruction		
Sight Distance:	953.044		
Eye Position:	1831+00.00	18.000	2647.444

	Station	Offset	Elevation
	1837+48.15	18.000	2650.611
Obstruction:	No Obstruction		
Sight Distance:	956.825		
Eye Position:	1831+50.00	18.000	2647.804
Object Position:	1837+98.15	18.000	2650.971
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1832+00.00	18.000	2648.164
Object Position:	1838+48.15	18.000	2651.331
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1832+50.00	18.000	2648.524
Object Position:	1838+98.15	18.000	2651.690
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1833+00.00	18.000	2648.884
Object Position:	1839+48.15	18.000	2652.051
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1833+50.00	18.000	2649.244
Object Position:	1839+98.15	18.000	2652.411
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:53am

Surface(s): LE 3

Alignment Name: LE truck lane end taper
Start Station: 100+00.00
Stop Station: 114+95.00
Interval: 50.000

Sight Distance: 645.000
Relaxed Distance: 645.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: -6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: -6.000

	Station	Offset	Elevation
Eye Position:	100+00.00	-6.000	2646.724
Object Position:	106+44.64	-6.000	2650.038
Obstruction:	No Obstruction		
Sight Distance:	953.636		
Eye Position:	100+50.00	-6.000	2647.086
Object Position:	106+94.63	-6.000	2650.431
Obstruction:	No Obstruction		
Sight Distance:	953.745		
Eye Position:	101+00.00	-6.000	2647.448
Object Position:	107+44.63	-6.000	2650.825
Obstruction:	No Obstruction		
Sight Distance:	957.683		
Eye Position:	101+50.00	-6.000	2647.810
Object Position:	107+94.63	-6.000	2651.220
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	102+00.00	-6.000	2648.172
Object Position:	108+44.65	-6.000	2651.615
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	102+50.00	-6.000	2648.534
Object Position:	108+94.67	-6.000	2652.010
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	103+00.00	-6.000	2648.896
Object Position:	109+44.70	-6.000	2652.406
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	103+50.00	-6.000	2649.257
Object Position:	109+94.73	-6.000	2652.803
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	104+00.00	-6.000	2649.620
Object Position:	110+44.69	-6.000	2653.181
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	104+50.00	-6.000	2650.011
Object Position:	110+94.69	-6.000	2653.522
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	105+00.00	-6.000	2650.403
Object Position:	111+44.62	-6.000	2653.823
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	105+50.00	-6.000	2650.795
Object Position:	111+94.72	-6.000	2653.984
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	106+00.00	-6.000	2651.188
Object Position:	112+44.77	-6.000	2654.055
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	106+50.00	-6.000	2651.580
Object Position:	112+94.79	-6.000	2654.057
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	107+00.00	-6.000	2651.974
Object Position:	113+44.79	-6.000	2653.992
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	107+50.00	-6.000	2652.368
Object Position:	113+94.78	-6.000	2653.859

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	108+00.00	-6.000	2652.763
Object Position:	114+44.77	-6.000	2653.657
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:57am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1843+00.00
Stop Station: 1899+00.00
Interval: 50.000

Sight Distance: 806.000
Relaxed Distance: 806.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	1843+00.00	6.000	2655.557
Object Position:	1851+06.25	6.000	2644.511
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1843+50.00	6.000	2655.492
Object Position:	1851+56.36	6.000	2643.346
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+00.00	6.000	2655.358
Object Position:	1852+06.49	6.000	2642.112
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1844+50.00	6.000	2655.156
Object Position:	1852+56.63	6.000	2640.808
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+00.00	6.000	2654.886
Object Position:	1853+06.80	6.000	2639.433
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1845+50.00	6.000	2654.548
Object Position:	1853+56.98	6.000	2637.990
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1846+00.00	6.000	2654.142
Object Position:	1854+07.17	6.000	2636.479
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1846+50.00	6.000	2653.667
Object Position:	1854+57.38	6.000	2634.900
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1847+00.00	6.000	2653.125
Object Position:	1855+07.58	6.000	2633.250
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1847+50.00	6.000	2652.514
Object Position:	1855+57.79	6.000	2631.533
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1848+00.00	6.000	2651.836
Object Position:	1856+07.99	6.000	2629.746
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1848+50.00	6.000	2651.089
Object Position:	1856+58.16	6.000	2627.895
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1849+00.00	6.000	2650.252
Object Position:	1857+08.30	6.000	2625.972
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1849+50.00	6.000	2649.302
Object Position:	1857+58.40	6.000	2623.986
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1850+00.00	6.000	2648.285
Object Position:	1858+08.40	6.000	2621.933
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1850+50.00	6.000	2647.241
Object Position:	1858+58.40	6.000	2619.813

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1851+00.00	6.000	2646.154
Object Position:	1859+08.40	6.000	2617.624
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1851+50.00	6.000	2644.999
Object Position:	1859+58.40	6.000	2615.370
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1852+00.00	6.000	2643.776
Object Position:	1860+08.40	6.000	2613.043
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1852+50.00	6.000	2642.484
Object Position:	1860+58.40	6.000	2610.653
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1853+00.00	6.000	2641.125
Object Position:	1861+08.40	6.000	2608.193
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1853+50.00	6.000	2639.697
Object Position:	1861+58.40	6.000	2605.693
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1854+00.00	6.000	2638.201
Object Position:	1862+08.40	6.000	2603.193
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1854+50.00	6.000	2636.638
Object Position:	1862+58.40	6.000	2600.694
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1855+00.00	6.000	2635.006
Object Position:	1863+08.40	6.000	2598.193
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1855+50.00	6.000	2633.306
Object Position:	1863+58.40	6.000	2595.693
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1856+00.00	6.000	2631.538
Object Position:	1864+08.40	6.000	2593.246
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1856+50.00	6.000	2629.701
Object Position:	1864+58.38	6.000	2590.790
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1857+00.00	6.000	2627.797
Object Position:	1865+08.27	6.000	2588.380
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1857+50.00	6.000	2625.825
Object Position:	1865+58.12	6.000	2585.887
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1858+00.00	6.000	2623.784
Object Position:	1866+07.94	6.000	2583.396
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1858+50.00	6.000	2621.676
Object Position:	1866+57.74	6.000	2580.906
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1859+00.00	6.000	2619.499
Object Position:	1867+07.53	6.000	2578.417
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1859+50.00	6.000	2617.254
Object Position:	1867+57.33	6.000	2575.927
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1860+00.00	6.000	2614.941

	Station	Offset	Elevation
	1868+07.12	6.000	2573.437
Obstruction:	No Obstruction		
Sight Distance:	1758.474		
Eye Position:	1860+50.00	6.000	2612.560
Object Position:	1868+56.93	6.000	2570.946
Obstruction:	No Obstruction		
Sight Distance:	1756.683		
Eye Position:	1861+00.00	6.000	2610.111
Object Position:	1869+06.76	6.000	2568.455
Obstruction:	No Obstruction		
Sight Distance:	1785.682		
Eye Position:	1861+50.00	6.000	2607.613
Object Position:	1869+56.60	6.000	2565.963
Obstruction:	No Obstruction		
Sight Distance:	1839.016		
Eye Position:	1862+00.00	6.000	2605.113
Object Position:	1870+06.46	6.000	2563.470
Obstruction:	No Obstruction		
Sight Distance:	1889.692		
Eye Position:	1862+50.00	6.000	2602.613
Object Position:	1870+56.34	6.000	2560.976
Obstruction:	No Obstruction		
Sight Distance:	1934.770		
Eye Position:	1863+00.00	6.000	2600.113
Object Position:	1871+06.23	6.000	2558.481
Obstruction:	No Obstruction		
Sight Distance:	1972.491		
Eye Position:	1863+50.00	6.000	2597.613
Object Position:	1871+56.14	6.000	2555.986
Obstruction:	No Obstruction		
Sight Distance:	2001.116		
Eye Position:	1864+00.00	6.000	2595.142
Object Position:	1872+06.07	6.000	2553.490
Obstruction:	No Obstruction		
Sight Distance:	1993.376		
Eye Position:	1864+50.00	6.000	2592.709
Object Position:	1872+56.00	6.000	2550.993
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1944.413		
Eye Position:	1865+00.00	6.000	2590.276
Object Position:	1873+06.00	6.000	2548.493
Obstruction:	No Obstruction		
Sight Distance:	1893.016		
Eye Position:	1865+50.00	6.000	2587.793
Object Position:	1873+56.00	6.000	2545.993
Obstruction:	No Obstruction		
Sight Distance:	1927.604		
Eye Position:	1866+00.00	6.000	2585.293
Object Position:	1874+06.00	6.000	2543.493
Obstruction:	No Obstruction		
Sight Distance:	1956.293		
Eye Position:	1866+50.00	6.000	2582.793
Object Position:	1874+56.00	6.000	2540.993
Obstruction:	No Obstruction		
Sight Distance:	1937.829		
Eye Position:	1867+00.00	6.000	2580.293
Object Position:	1875+06.00	6.000	2538.493
Obstruction:	No Obstruction		
Sight Distance:	1916.666		
Eye Position:	1867+50.00	6.000	2577.793
Object Position:	1875+56.00	6.000	2535.993
Obstruction:	No Obstruction		
Sight Distance:	1893.531		
Eye Position:	1868+00.00	6.000	2575.293
Object Position:	1876+06.00	6.000	2533.493
Obstruction:	No Obstruction		
Sight Distance:	1868.523		
Eye Position:	1868+50.00	6.000	2572.793
Object Position:	1876+56.00	6.000	2530.993
Obstruction:	No Obstruction		
Sight Distance:	1841.267		
Eye Position:	1869+00.00	6.000	2570.293
Object Position:	1877+06.00	6.000	2528.493
Obstruction:	No Obstruction		
Sight Distance:	1813.177		

	Station	Offset	Elevation
	1869+50.00	6.000	2567.793
Object Position:	1877+56.00	6.000	2525.993
Obstruction:	No Obstruction		
Sight Distance:	1783.716		
Eye Position:	1870+00.00	6.000	2565.293
Object Position:	1878+06.00	6.000	2523.493
Obstruction:	No Obstruction		
Sight Distance:	1753.192		
Eye Position:	1870+50.00	6.000	2562.793
Object Position:	1878+56.00	6.000	2520.993
Obstruction:	No Obstruction		
Sight Distance:	1721.969		
Eye Position:	1871+00.00	6.000	2560.293
Object Position:	1879+06.00	6.000	2518.493
Obstruction:	No Obstruction		
Sight Distance:	1690.068		
Eye Position:	1871+50.00	6.000	2557.793
Object Position:	1879+56.00	6.000	2515.993
Obstruction:	No Obstruction		
Sight Distance:	1657.387		
Eye Position:	1872+00.00	6.000	2555.293
Object Position:	1880+06.00	6.000	2513.493
Obstruction:	No Obstruction		
Sight Distance:	1624.151		
Eye Position:	1872+50.00	6.000	2552.793
Object Position:	1880+56.00	6.000	2510.993
Obstruction:	No Obstruction		
Sight Distance:	1590.334		
Eye Position:	1873+00.00	6.000	2550.293
Object Position:	1881+06.00	6.000	2508.493
Obstruction:	No Obstruction		
Sight Distance:	1555.927		
Eye Position:	1873+50.00	6.000	2547.793
Object Position:	1881+56.00	6.000	2505.993
Obstruction:	No Obstruction		
Sight Distance:	1520.740		
Eye Position:	1874+00.00	6.000	2545.293
Object Position:	1882+06.00	6.000	2503.493

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1485.664		
Eye Position:	1874+50.00	6.000	2542.793
Object Position:	1882+56.00	6.000	2500.993
Obstruction:	No Obstruction		
Sight Distance:	1450.513		
Eye Position:	1875+00.00	6.000	2540.293
Object Position:	1883+06.00	6.000	2498.493
Obstruction:	No Obstruction		
Sight Distance:	1414.262		
Eye Position:	1875+50.00	6.000	2537.793
Object Position:	1883+56.00	6.000	2495.993
Obstruction:	No Obstruction		
Sight Distance:	1378.005		
Eye Position:	1876+00.00	6.000	2535.293
Object Position:	1884+06.00	6.000	2493.477
Obstruction:	No Obstruction		
Sight Distance:	1337.754		
Eye Position:	1876+50.00	6.000	2532.793
Object Position:	1884+56.00	6.000	2490.907
Obstruction:	No Obstruction		
Sight Distance:	1285.125		
Eye Position:	1877+00.00	6.000	2530.293
Object Position:	1885+06.05	6.000	2488.337
Obstruction:	No Obstruction		
Sight Distance:	1236.121		
Eye Position:	1877+50.00	6.000	2527.793
Object Position:	1885+56.12	6.000	2485.809
Obstruction:	No Obstruction		
Sight Distance:	1202.080		
Eye Position:	1878+00.00	6.000	2525.293
Object Position:	1886+06.19	6.000	2483.305
Obstruction:	No Obstruction		
Sight Distance:	1177.393		
Eye Position:	1878+50.00	6.000	2522.793
Object Position:	1886+56.27	6.000	2480.801
Obstruction:	No Obstruction		
Sight Distance:	1156.399		

	Station	Offset	Elevation
Eye Position:	1879+00.00	6.000	2520.293
Object Position:	1887+06.36	6.000	2478.295
Obstruction:	No Obstruction		
Sight Distance:	1138.181		
Eye Position:	1879+50.00	6.000	2517.793
Object Position:	1887+56.47	6.000	2475.790
Obstruction:	No Obstruction		
Sight Distance:	1123.071		
Eye Position:	1880+00.00	6.000	2515.293
Object Position:	1888+06.59	6.000	2473.284
Obstruction:	No Obstruction		
Sight Distance:	1110.071		
Eye Position:	1880+50.00	6.000	2512.793
Object Position:	1888+56.73	6.000	2470.778
Obstruction:	No Obstruction		
Sight Distance:	1098.425		
Eye Position:	1881+00.00	6.000	2510.293
Object Position:	1889+06.87	6.000	2468.270
Obstruction:	No Obstruction		
Sight Distance:	1086.873		
Eye Position:	1881+50.00	6.000	2507.793
Object Position:	1889+57.02	6.000	2465.763
Obstruction:	No Obstruction		
Sight Distance:	1075.938		
Eye Position:	1882+00.00	6.000	2505.293
Object Position:	1890+07.18	6.000	2463.255
Obstruction:	No Obstruction		
Sight Distance:	1065.439		
Eye Position:	1882+50.00	6.000	2502.793
Object Position:	1890+57.34	6.000	2460.748
Obstruction:	No Obstruction		
Sight Distance:	1055.331		
Eye Position:	1883+00.00	6.000	2500.293
Object Position:	1891+07.49	6.000	2458.242
Obstruction:	No Obstruction		
Sight Distance:	1045.114		
Eye Position:	1883+50.00	6.000	2497.793

	Station	Offset	Elevation
	1891+57.62	6.000	2455.747
Obstruction:	No Obstruction		
Sight Distance:	1035.869		
Eye Position:	1884+00.00	6.000	2495.289
Object Position:	1892+07.74	6.000	2453.269
Obstruction:	No Obstruction		
Sight Distance:	1028.586		
Eye Position:	1884+50.00	6.000	2492.723
Object Position:	1892+57.83	6.000	2450.809
Obstruction:	No Obstruction		
Sight Distance:	1024.324		
Eye Position:	1885+00.00	6.000	2490.156
Object Position:	1893+07.85	6.000	2448.367
Obstruction:	No Obstruction		
Sight Distance:	1021.065		
Eye Position:	1885+50.00	6.000	2487.613
Object Position:	1893+57.85	6.000	2445.944
Obstruction:	No Obstruction		
Sight Distance:	1018.098		
Eye Position:	1886+00.00	6.000	2485.113
Object Position:	1894+07.85	6.000	2443.536
Obstruction:	No Obstruction		
Sight Distance:	1014.172		
Eye Position:	1886+50.00	6.000	2482.613
Object Position:	1894+57.85	6.000	2441.144
Obstruction:	No Obstruction		
Sight Distance:	1010.900		
Eye Position:	1887+00.00	6.000	2480.113
Object Position:	1895+07.85	6.000	2438.769
Obstruction:	No Obstruction		
Sight Distance:	1008.274		
Eye Position:	1887+50.00	6.000	2477.613
Object Position:	1895+57.85	6.000	2436.406
Obstruction:	No Obstruction		
Sight Distance:	1005.446		
Eye Position:	1888+00.00	6.000	2475.113
Object Position:	1896+07.85	6.000	2434.065
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	1003.750		
Eye Position:	1888+50.00	6.000	2472.613
Object Position:	1896+57.85	6.000	2431.737
Obstruction:	No Obstruction		
Sight Distance:	1001.956		
Eye Position:	1889+00.00	6.000	2470.113
Object Position:	1897+07.85	6.000	2429.424
Obstruction:	No Obstruction		
Sight Distance:	1000.419		
Eye Position:	1889+50.00	6.000	2467.613
Object Position:	1897+57.85	6.000	2427.129
Obstruction:	No Obstruction		
Sight Distance:	999.511		
Eye Position:	1890+00.00	6.000	2465.113
Object Position:	1898+07.85	6.000	2424.849
Obstruction:	No Obstruction		
Sight Distance:	998.671		
Eye Position:	1890+50.00	6.000	2462.613
Object Position:	1898+57.85	6.000	2422.586
Obstruction:	No Obstruction		
Sight Distance:	998.280		
Eye Position:	1891+00.00	6.000	2460.113
Object Position:	1899+07.85	6.000	2420.339
Obstruction:	No Obstruction		
Sight Distance:	998.234		
Eye Position:	1891+50.00	6.000	2457.623
Object Position:	1899+57.85	6.000	2418.108
Obstruction:	No Obstruction		
Sight Distance:	998.293		
Eye Position:	1892+00.00	6.000	2455.148
Object Position:	1900+07.85	6.000	2415.892
Obstruction:	No Obstruction		
Sight Distance:	998.284		
Eye Position:	1892+50.00	6.000	2452.690
Object Position:	1900+57.85	6.000	2413.694
Obstruction:	No Obstruction		
Sight Distance:	1012.944		

	Station	Offset	Elevation
	1893+00.00	6.000	2450.247
Object Position:	1901+07.85	6.000	2411.511
Obstruction:	No Obstruction		
Sight Distance:	1044.616		
Eye Position:	1893+50.00	6.000	2447.821
Object Position:	1901+57.85	6.000	2409.344
Obstruction:	No Obstruction		
Sight Distance:	1053.014		
Eye Position:	1894+00.00	6.000	2445.411
Object Position:	1902+07.85	6.000	2407.190
Obstruction:	No Obstruction		
Sight Distance:	1063.614		
Eye Position:	1894+50.00	6.000	2443.016
Object Position:	1902+57.85	6.000	2405.126
Obstruction:	No Obstruction		
Sight Distance:	1094.961		
Eye Position:	1895+00.00	6.000	2440.638
Object Position:	1903+07.81	6.000	2403.074
Obstruction:	No Obstruction		
Sight Distance:	1135.778		
Eye Position:	1895+50.00	6.000	2438.276
Object Position:	1903+57.71	6.000	2401.006
Obstruction:	No Obstruction		
Sight Distance:	1179.488		
Eye Position:	1896+00.00	6.000	2435.930
Object Position:	1904+07.59	6.000	2398.896
Obstruction:	No Obstruction		
Sight Distance:	1217.094		
Eye Position:	1896+50.00	6.000	2433.599
Object Position:	1904+57.45	6.000	2396.787
Obstruction:	No Obstruction		
Sight Distance:	1259.606		
Eye Position:	1897+00.00	6.000	2431.285
Object Position:	1905+07.30	6.000	2394.678
Obstruction:	No Obstruction		
Sight Distance:	1307.317		
Eye Position:	1897+50.00	6.000	2428.987
Object Position:	1905+57.14	6.000	2392.570

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1360.675		
Eye Position:	1898+00.00	6.000	2426.705
Object Position:	1906+06.99	6.000	2390.461
Obstruction:	No Obstruction		
Sight Distance:	1419.972		
Eye Position:	1898+50.00	6.000	2424.439
Object Position:	1906+56.84	6.000	2388.353
Obstruction:	No Obstruction		
Sight Distance:	1485.562		
Eye Position:	1899+00.00	6.000	2422.189
Object Position:	1907+06.69	6.000	2386.244
Obstruction:	No Obstruction		
Sight Distance:	1557.160		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 9:57am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1895+00.00
Stop Station: 1955+00.00
Interval: 50.000

Sight Distance: 792.000
Relaxed Distance: 792.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	1895+00.00	6.000	2440.638
Object Position:	1902+93.77	6.000	2403.647
Obstruction:	No Obstruction		
Sight Distance:	1111.253		
Eye Position:	1895+50.00	6.000	2438.276
Object Position:	1903+43.68	6.000	2401.600
Obstruction:	No Obstruction		
Sight Distance:	1159.073		
Eye Position:	1896+00.00	6.000	2435.930
Object Position:	1903+93.57	6.000	2399.489
Obstruction:	No Obstruction		
Sight Distance:	1196.022		
Eye Position:	1896+50.00	6.000	2433.599
Object Position:	1904+43.43	6.000	2397.380
Obstruction:	No Obstruction		
Sight Distance:	1237.959		
Eye Position:	1897+00.00	6.000	2431.285
Object Position:	1904+93.29	6.000	2395.271
Obstruction:	No Obstruction		
Sight Distance:	1284.586		
Eye Position:	1897+50.00	6.000	2428.987
Object Position:	1905+43.13	6.000	2393.162
Obstruction:	No Obstruction		
Sight Distance:	1337.048		

	Station	Offset	Elevation
Eye Position:	1898+00.00	6.000	2426.705
Object Position:	1905+92.98	6.000	2391.054
Obstruction:	No Obstruction		
Sight Distance:	1395.483		
Eye Position:	1898+50.00	6.000	2424.439
Object Position:	1906+42.83	6.000	2388.945
Obstruction:	No Obstruction		
Sight Distance:	1459.723		
Eye Position:	1899+00.00	6.000	2422.189
Object Position:	1906+92.69	6.000	2386.836
Obstruction:	No Obstruction		
Sight Distance:	1529.969		
Eye Position:	1899+50.00	6.000	2419.955
Object Position:	1907+42.56	6.000	2384.727
Obstruction:	No Obstruction		
Sight Distance:	1623.138		
Eye Position:	1900+00.00	6.000	2417.737
Object Position:	1907+92.45	6.000	2382.617
Obstruction:	No Obstruction		
Sight Distance:	1758.534		
Eye Position:	1900+50.00	6.000	2415.536
Object Position:	1908+42.34	6.000	2380.506
Obstruction:	No Obstruction		
Sight Distance:	1777.987		
Eye Position:	1901+00.00	6.000	2413.350
Object Position:	1908+92.25	6.000	2378.395
Obstruction:	No Obstruction		
Sight Distance:	1762.237		
Eye Position:	1901+50.00	6.000	2411.180
Object Position:	1909+42.17	6.000	2376.283
Obstruction:	No Obstruction		
Sight Distance:	1730.853		
Eye Position:	1902+00.00	6.000	2409.026
Object Position:	1909+92.10	6.000	2374.171
Obstruction:	No Obstruction		
Sight Distance:	1701.116		
Eye Position:	1902+50.00	6.000	2406.938
Object Position:	1910+42.04	6.000	2372.059

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	1655.080		
Eye Position:	1903+00.00	6.000	2404.883
Object Position:	1910+92.00	6.000	2369.945
Obstruction:	No Obstruction		
Sight Distance:	1612.104		
Eye Position:	1903+50.00	6.000	2402.832
Object Position:	1911+42.00	6.000	2367.830
Obstruction:	No Obstruction		
Sight Distance:	1567.329		
Eye Position:	1904+00.00	6.000	2400.717
Object Position:	1911+92.00	6.000	2365.715
Obstruction:	No Obstruction		
Sight Distance:	1540.325		
Eye Position:	1904+50.00	6.000	2398.602
Object Position:	1912+42.00	6.000	2363.601
Obstruction:	No Obstruction		
Sight Distance:	1508.950		
Eye Position:	1905+00.00	6.000	2396.487
Object Position:	1912+92.00	6.000	2361.485
Obstruction:	No Obstruction		
Sight Distance:	1475.967		
Eye Position:	1905+50.00	6.000	2394.372
Object Position:	1913+42.00	6.000	2359.371
Obstruction:	No Obstruction		
Sight Distance:	1441.407		
Eye Position:	1906+00.00	6.000	2392.257
Object Position:	1913+92.00	6.000	2357.256
Obstruction:	No Obstruction		
Sight Distance:	1409.317		
Eye Position:	1906+50.00	6.000	2390.142
Object Position:	1914+42.00	6.000	2355.141
Obstruction:	No Obstruction		
Sight Distance:	1376.320		
Eye Position:	1907+00.00	6.000	2388.027
Object Position:	1914+92.00	6.000	2353.026
Obstruction:	No Obstruction		
Sight Distance:	1342.367		

	Station	Offset	Elevation
Eye Position:	1907+50.00	6.000	2385.912
Object Position:	1915+42.00	6.000	2350.916
Obstruction:	No Obstruction		
Sight Distance:	1307.965		
Eye Position:	1908+00.00	6.000	2383.797
Object Position:	1915+92.00	6.000	2348.872
Obstruction:	No Obstruction		
Sight Distance:	1287.839		
Eye Position:	1908+50.00	6.000	2381.682
Object Position:	1916+42.00	6.000	2346.818
Obstruction:	No Obstruction		
Sight Distance:	1261.978		
Eye Position:	1909+00.00	6.000	2379.567
Object Position:	1916+92.00	6.000	2344.781
Obstruction:	No Obstruction		
Sight Distance:	1237.103		
Eye Position:	1909+50.00	6.000	2377.452
Object Position:	1917+42.00	6.000	2342.712
Obstruction:	No Obstruction		
Sight Distance:	1204.230		
Eye Position:	1910+00.00	6.000	2375.337
Object Position:	1917+92.00	6.000	2340.663
Obstruction:	No Obstruction		
Sight Distance:	1173.418		
Eye Position:	1910+50.00	6.000	2373.222
Object Position:	1918+42.00	6.000	2338.636
Obstruction:	No Obstruction		
Sight Distance:	1143.916		
Eye Position:	1911+00.00	6.000	2371.107
Object Position:	1918+91.98	6.000	2336.591
Obstruction:	No Obstruction		
Sight Distance:	1096.542		
Eye Position:	1911+50.00	6.000	2368.992
Object Position:	1919+41.88	6.000	2334.537
Obstruction:	No Obstruction		
Sight Distance:	1054.456		
Eye Position:	1912+00.00	6.000	2366.877

	Station	Offset	Elevation
	1919+91.81	6.000	2332.484
Obstruction:	No Obstruction		
Sight Distance:	1020.603		
Eye Position:	1912+50.00	6.000	2364.762
Object Position:	1920+41.75	6.000	2330.371
Obstruction:	No Obstruction		
Sight Distance:	994.894		
Eye Position:	1913+00.00	6.000	2362.647
Object Position:	1920+91.72	6.000	2328.258
Obstruction:	No Obstruction		
Sight Distance:	973.892		
Eye Position:	1913+50.00	6.000	2360.532
Object Position:	1921+41.73	6.000	2326.145
Obstruction:	No Obstruction		
Sight Distance:	958.128		
Eye Position:	1914+00.00	6.000	2358.417
Object Position:	1921+91.77	6.000	2324.028
Obstruction:	No Obstruction		
Sight Distance:	945.232		
Eye Position:	1914+50.00	6.000	2356.302
Object Position:	1922+41.84	6.000	2321.912
Obstruction:	No Obstruction		
Sight Distance:	934.616		
Eye Position:	1915+00.00	6.000	2354.187
Object Position:	1922+91.94	6.000	2319.792
Obstruction:	No Obstruction		
Sight Distance:	926.327		
Eye Position:	1915+50.00	6.000	2352.088
Object Position:	1923+42.07	6.000	2317.673
Obstruction:	No Obstruction		
Sight Distance:	919.814		
Eye Position:	1916+00.00	6.000	2350.040
Object Position:	1923+92.21	6.000	2315.552
Obstruction:	No Obstruction		
Sight Distance:	914.688		
Eye Position:	1916+50.00	6.000	2347.992
Object Position:	1924+42.35	6.000	2313.430
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	911.080		
Eye Position:	1917+00.00	6.000	2345.943
Object Position:	1924+92.49	6.000	2311.308
Obstruction:	No Obstruction		
Sight Distance:	907.777		
Eye Position:	1917+50.00	6.000	2343.894
Object Position:	1925+42.59	6.000	2309.190
Obstruction:	No Obstruction		
Sight Distance:	905.671		
Eye Position:	1918+00.00	6.000	2341.847
Object Position:	1925+92.66	6.000	2307.070
Obstruction:	No Obstruction		
Sight Distance:	948.150		
Eye Position:	1918+50.00	6.000	2339.798
Object Position:	1926+42.66	6.000	2304.954
Obstruction:	No Obstruction		
Sight Distance:	938.001		
Eye Position:	1919+00.00	6.000	2337.750
Object Position:	1926+92.62	6.000	2302.840
Obstruction:	No Obstruction		
Sight Distance:	933.271		
Eye Position:	1919+50.00	6.000	2335.701
Object Position:	1927+42.62	6.000	2300.726
Obstruction:	No Obstruction		
Sight Distance:	930.986		
Eye Position:	1920+00.00	6.000	2333.637
Object Position:	1927+92.62	6.000	2298.609
Obstruction:	No Obstruction		
Sight Distance:	926.743		
Eye Position:	1920+50.00	6.000	2331.522
Object Position:	1928+42.62	6.000	2296.495
Obstruction:	No Obstruction		
Sight Distance:	913.144		
Eye Position:	1921+00.00	6.000	2329.407
Object Position:	1928+92.62	6.000	2294.381
Obstruction:	No Obstruction		
Sight Distance:	903.220		

	Station	Offset	Elevation
	1921+50.00	6.000	2327.292
Object Position:	1929+42.62	6.000	2292.266
Obstruction:	No Obstruction		
Sight Distance:	903.241		
Eye Position:	1922+00.00	6.000	2325.177
Object Position:	1929+92.62	6.000	2290.150
Obstruction:	No Obstruction		
Sight Distance:	903.243		
Eye Position:	1922+50.00	6.000	2323.062
Object Position:	1930+42.62	6.000	2288.035
Obstruction:	No Obstruction		
Sight Distance:	903.756		
Eye Position:	1923+00.00	6.000	2320.947
Object Position:	1930+92.62	6.000	2285.919
Obstruction:	No Obstruction		
Sight Distance:	903.224		
Eye Position:	1923+50.00	6.000	2318.832
Object Position:	1931+42.62	6.000	2283.804
Obstruction:	No Obstruction		
Sight Distance:	903.209		
Eye Position:	1924+00.00	6.000	2316.717
Object Position:	1931+92.62	6.000	2281.691
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1924+50.00	6.000	2314.602
Object Position:	1932+42.62	6.000	2279.574
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1925+00.00	6.000	2312.487
Object Position:	1932+92.62	6.000	2277.462
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1925+50.00	6.000	2310.372
Object Position:	1933+42.62	6.000	2275.346
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1926+00.00	6.000	2308.257
Object Position:	1933+92.62	6.000	2273.234

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1926+50.00	6.000	2306.142
Object Position:	1934+42.62	6.000	2271.119
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1927+00.00	6.000	2304.027
Object Position:	1934+92.62	6.000	2269.004
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1927+50.00	6.000	2301.912
Object Position:	1935+42.62	6.000	2266.888
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1928+00.00	6.000	2299.797
Object Position:	1935+92.62	6.000	2264.774
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1928+50.00	6.000	2297.682
Object Position:	1936+42.62	6.000	2262.658
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1929+00.00	6.000	2295.567
Object Position:	1936+92.62	6.000	2260.543
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1929+50.00	6.000	2293.452
Object Position:	1937+42.62	6.000	2258.394
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1930+00.00	6.000	2291.337
Object Position:	1937+92.62	6.000	2256.233
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1930+50.00	6.000	2289.222
Object Position:	1938+42.63	6.000	2254.028
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1931+00.00	6.000	2287.107
Object Position:	1938+92.67	6.000	2251.845
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1931+50.00	6.000	2284.992
Object Position:	1939+42.63	6.000	2249.685
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1932+00.00	6.000	2282.877
Object Position:	1939+92.54	6.000	2247.502
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1932+50.00	6.000	2280.762
Object Position:	1940+42.41	6.000	2245.383
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1933+00.00	6.000	2278.647
Object Position:	1940+92.27	6.000	2243.274
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1933+50.00	6.000	2276.532
Object Position:	1941+42.13	6.000	2241.165
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1934+00.00	6.000	2274.417
Object Position:	1941+91.99	6.000	2239.056
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1934+50.00	6.000	2272.302
Object Position:	1942+41.88	6.000	2236.945
Obstruction:	No Obstruction		
Sight Distance:	1274.073		
Eye Position:	1935+00.00	6.000	2270.187
Object Position:	1942+91.80	6.000	2234.834
Obstruction:	No Obstruction		
Sight Distance:	1248.777		
Eye Position:	1935+50.00	6.000	2268.072

	Station	Offset	Elevation
	1943+41.74	6.000	2232.721
Obstruction:	No Obstruction		
Sight Distance:	1218.409		
Eye Position:	1936+00.00	6.000	2265.957
Object Position:	1943+91.72	6.000	2230.607
Obstruction:	No Obstruction		
Sight Distance:	1185.770		
Eye Position:	1936+50.00	6.000	2263.842
Object Position:	1944+41.73	6.000	2228.492
Obstruction:	No Obstruction		
Sight Distance:	1151.040		
Eye Position:	1937+00.00	6.000	2261.727
Object Position:	1944+91.78	6.000	2226.375
Obstruction:	No Obstruction		
Sight Distance:	1113.466		
Eye Position:	1937+50.00	6.000	2259.580
Object Position:	1945+41.85	6.000	2224.260
Obstruction:	No Obstruction		
Sight Distance:	1076.307		
Eye Position:	1938+00.00	6.000	2257.399
Object Position:	1945+91.93	6.000	2222.193
Obstruction:	No Obstruction		
Sight Distance:	1044.726		
Eye Position:	1938+50.00	6.000	2255.217
Object Position:	1946+42.00	6.000	2220.203
Obstruction:	No Obstruction		
Sight Distance:	1018.079		
Eye Position:	1939+00.00	6.000	2253.035
Object Position:	1946+92.00	6.000	2218.297
Obstruction:	No Obstruction		
Sight Distance:	998.012		
Eye Position:	1939+50.00	6.000	2250.854
Object Position:	1947+42.00	6.000	2216.472
Obstruction:	No Obstruction		
Sight Distance:	981.204		
Eye Position:	1940+00.00	6.000	2248.677
Object Position:	1947+92.00	6.000	2214.717
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	967.479		
Eye Position:	1940+50.00	6.000	2246.562
Object Position:	1948+42.00	6.000	2213.047
Obstruction:	No Obstruction		
Sight Distance:	956.235		
Eye Position:	1941+00.00	6.000	2244.447
Object Position:	1948+92.00	6.000	2211.451
Obstruction:	No Obstruction		
Sight Distance:	946.786		
Eye Position:	1941+50.00	6.000	2242.332
Object Position:	1949+42.00	6.000	2209.933
Obstruction:	No Obstruction		
Sight Distance:	938.879		
Eye Position:	1942+00.00	6.000	2240.217
Object Position:	1949+92.00	6.000	2208.493
Obstruction:	No Obstruction		
Sight Distance:	932.236		
Eye Position:	1942+50.00	6.000	2238.102
Object Position:	1950+42.00	6.000	2207.132
Obstruction:	No Obstruction		
Sight Distance:	927.759		
Eye Position:	1943+00.00	6.000	2235.987
Object Position:	1950+92.00	6.000	2205.846
Obstruction:	No Obstruction		
Sight Distance:	923.567		
Eye Position:	1943+50.00	6.000	2233.872
Object Position:	1951+42.00	6.000	2204.643
Obstruction:	No Obstruction		
Sight Distance:	920.603		
Eye Position:	1944+00.00	6.000	2231.757
Object Position:	1951+92.00	6.000	2203.510
Obstruction:	No Obstruction		
Sight Distance:	918.102		
Eye Position:	1944+50.00	6.000	2229.642
Object Position:	1952+42.00	6.000	2202.461
Obstruction:	No Obstruction		
Sight Distance:	916.665		

	Station	Offset	Elevation
	1945+00.00	6.000	2227.527
Object Position:	1952+92.00	6.000	2201.489
Obstruction:	No Obstruction		
Sight Distance:	915.790		
Eye Position:	1945+50.00	6.000	2225.416
Object Position:	1953+42.00	6.000	2200.598
Obstruction:	No Obstruction		
Sight Distance:	915.821		
Eye Position:	1946+00.00	6.000	2223.365
Object Position:	1953+92.00	6.000	2199.779
Obstruction:	No Obstruction		
Sight Distance:	915.659		
Eye Position:	1946+50.00	6.000	2221.392
Object Position:	1954+42.00	6.000	2199.041
Obstruction:	No Obstruction		
Sight Distance:	915.586		
Eye Position:	1947+00.00	6.000	2219.498
Object Position:	1954+92.00	6.000	2198.381
Obstruction:	No Obstruction		
Sight Distance:	915.260		
Eye Position:	1947+50.00	6.000	2217.681
Object Position:	1955+42.00	6.000	2197.801
Obstruction:	No Obstruction		
Sight Distance:	915.787		
Eye Position:	1948+00.00	6.000	2215.942
Object Position:	1955+92.00	6.000	2197.295
Obstruction:	No Obstruction		
Sight Distance:	918.257		
Eye Position:	1948+50.00	6.000	2214.281
Object Position:	1956+42.00	6.000	2196.870
Obstruction:	No Obstruction		
Sight Distance:	920.976		
Eye Position:	1949+00.00	6.000	2212.698
Object Position:	1956+92.00	6.000	2196.522
Obstruction:	No Obstruction		
Sight Distance:	926.525		
Eye Position:	1949+50.00	6.000	2211.192
Object Position:	1957+42.00	6.000	2196.182

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	922.138		
Eye Position:	1950+00.00	6.000	2209.765
Object Position:	1957+92.00	6.000	2195.920
Obstruction:	No Obstruction		
Sight Distance:	921.333		
Eye Position:	1950+50.00	6.000	2208.416
Object Position:	1958+42.00	6.000	2195.742
Obstruction:	No Obstruction		
Sight Distance:	924.440		
Eye Position:	1951+00.00	6.000	2207.145
Object Position:	1958+92.00	6.000	2195.661
Obstruction:	No Obstruction		
Sight Distance:	924.472		
Eye Position:	1951+50.00	6.000	2205.952
Object Position:	1959+42.00	6.000	2195.636
Obstruction:	No Obstruction		
Sight Distance:	921.001		
Eye Position:	1952+00.00	6.000	2204.837
Object Position:	1959+92.00	6.000	2195.668
Obstruction:	No Obstruction		
Sight Distance:	911.344		
Eye Position:	1952+50.00	6.000	2203.799
Object Position:	1960+42.09	6.000	2195.802
Obstruction:	No Obstruction		
Sight Distance:	901.349		
Eye Position:	1953+00.00	6.000	2202.840
Object Position:	1960+92.22	6.000	2196.014
Obstruction:	No Obstruction		
Sight Distance:	894.565		
Eye Position:	1953+50.00	6.000	2201.959
Object Position:	1961+42.37	6.000	2196.363
Obstruction:	No Obstruction		
Sight Distance:	895.068		
Eye Position:	1954+00.00	6.000	2201.155
Object Position:	1961+92.57	6.000	2196.745
Obstruction:	No Obstruction		
Sight Distance:	897.329		

	Station	Offset	Elevation
Eye Position:	1954+50.00	6.000	2200.430
Object Position:	1962+42.81	6.000	2197.126
Obstruction:	No Obstruction		
Sight Distance:	899.642		
Eye Position:	1955+00.00	6.000	2199.783
Object Position:	1962+93.09	6.000	2197.508
Obstruction:	No Obstruction		
Sight Distance:	901.859		

WSDOT Roadway Visibility Report

Report Created: 8/17/2021 10:01am

Surface(s): LE 3

Alignment Name: LE
Start Station: 1951+00.00
Stop Station: 2000+00.00
Interval: 50.000

Sight Distance: 730.000
Relaxed Distance: 730.000

Eye Position: From Alignment
Eye Height: 3.500
Eye Offset: 6.000

Object Position: From Alignment
Object Height: 2.000
Object Offset: 6.000

	Station	Offset	Elevation
Eye Position:	1951+00.00	6.000	2207.145
Object Position:	1958+30.00	6.000	2195.767
Obstruction:	No Obstruction		
Sight Distance:	867.532		
Eye Position:	1951+50.00	6.000	2205.952
Object Position:	1958+80.00	6.000	2195.698
Obstruction:	No Obstruction		
Sight Distance:	870.080		
Eye Position:	1952+00.00	6.000	2204.837
Object Position:	1959+30.00	6.000	2195.655
Obstruction:	No Obstruction		
Sight Distance:	866.788		
Eye Position:	1952+50.00	6.000	2203.799
Object Position:	1959+80.00	6.000	2195.636
Obstruction:	No Obstruction		
Sight Distance:	855.609		
Eye Position:	1953+00.00	6.000	2202.840
Object Position:	1960+30.06	6.000	2195.753
Obstruction:	No Obstruction		
Sight Distance:	844.920		
Eye Position:	1953+50.00	6.000	2201.959
Object Position:	1960+80.18	6.000	2195.949
Obstruction:	No Obstruction		
Sight Distance:	837.077		

	Station	Offset	Elevation
Eye Position:	1954+00.00	6.000	2201.155
Object Position:	1961+30.33	6.000	2196.276
Obstruction:	No Obstruction		
Sight Distance:	836.503		
Eye Position:	1954+50.00	6.000	2200.430
Object Position:	1961+80.51	6.000	2196.657
Obstruction:	No Obstruction		
Sight Distance:	838.963		
Eye Position:	1955+00.00	6.000	2199.783
Object Position:	1962+30.74	6.000	2197.038
Obstruction:	No Obstruction		
Sight Distance:	841.539		
Eye Position:	1955+50.00	6.000	2199.213
Object Position:	1962+81.01	6.000	2197.420
Obstruction:	No Obstruction		
Sight Distance:	844.136		
Eye Position:	1956+00.00	6.000	2198.722
Object Position:	1963+31.32	6.000	2197.803
Obstruction:	No Obstruction		
Sight Distance:	846.831		
Eye Position:	1956+50.00	6.000	2198.308
Object Position:	1963+81.68	6.000	2198.185
Obstruction:	No Obstruction		
Sight Distance:	849.449		
Eye Position:	1957+00.00	6.000	2197.965
Object Position:	1964+32.06	6.000	2198.562
Obstruction:	No Obstruction		
Sight Distance:	851.628		
Eye Position:	1957+50.00	6.000	2197.641
Object Position:	1964+82.47	6.000	2198.944
Obstruction:	No Obstruction		
Sight Distance:	854.715		
Eye Position:	1958+00.00	6.000	2197.395
Object Position:	1965+32.88	6.000	2199.335
Obstruction:	No Obstruction		
Sight Distance:	858.499		
Eye Position:	1958+50.00	6.000	2197.226
Object Position:	1965+83.28	6.000	2199.710

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	861.307		
Eye Position:	1959+00.00	6.000	2197.135
Object Position:	1966+33.63	6.000	2200.096
Obstruction:	No Obstruction		
Sight Distance:	864.439		
Eye Position:	1959+50.00	6.000	2197.123
Object Position:	1966+83.92	6.000	2200.476
Obstruction:	No Obstruction		
Sight Distance:	867.726		
Eye Position:	1960+00.00	6.000	2197.189
Object Position:	1967+34.11	6.000	2200.860
Obstruction:	No Obstruction		
Sight Distance:	871.366		
Eye Position:	1960+50.00	6.000	2197.332
Object Position:	1967+84.12	6.000	2201.244
Obstruction:	No Obstruction		
Sight Distance:	874.747		
Eye Position:	1961+00.00	6.000	2197.555
Object Position:	1968+34.12	6.000	2201.623
Obstruction:	No Obstruction		
Sight Distance:	876.574		
Eye Position:	1961+50.00	6.000	2197.917
Object Position:	1968+84.12	6.000	2202.000
Obstruction:	No Obstruction		
Sight Distance:	876.212		
Eye Position:	1962+00.00	6.000	2198.297
Object Position:	1969+34.12	6.000	2202.378
Obstruction:	No Obstruction		
Sight Distance:	876.031		
Eye Position:	1962+50.00	6.000	2198.677
Object Position:	1969+84.12	6.000	2202.759
Obstruction:	No Obstruction		
Sight Distance:	876.663		
Eye Position:	1963+00.00	6.000	2199.057
Object Position:	1970+34.12	6.000	2203.144
Obstruction:	No Obstruction		
Sight Distance:	876.475		

	Station	Offset	Elevation
Eye Position:	1963+50.00	6.000	2199.437
Object Position:	1970+84.12	6.000	2203.523
Obstruction:	No Obstruction		
Sight Distance:	876.485		
Eye Position:	1964+00.00	6.000	2199.817
Object Position:	1971+34.12	6.000	2203.898
Obstruction:	No Obstruction		
Sight Distance:	876.502		
Eye Position:	1964+50.00	6.000	2200.197
Object Position:	1971+84.12	6.000	2204.284
Obstruction:	No Obstruction		
Sight Distance:	876.525		
Eye Position:	1965+00.00	6.000	2200.577
Object Position:	1972+34.12	6.000	2204.664
Obstruction:	No Obstruction		
Sight Distance:	876.526		
Eye Position:	1965+50.00	6.000	2200.957
Object Position:	1972+84.12	6.000	2205.039
Obstruction:	No Obstruction		
Sight Distance:	876.061		
Eye Position:	1966+00.00	6.000	2201.337
Object Position:	1973+34.12	6.000	2205.424
Obstruction:	No Obstruction		
Sight Distance:	876.479		
Eye Position:	1966+50.00	6.000	2201.717
Object Position:	1973+84.12	6.000	2205.803
Obstruction:	No Obstruction		
Sight Distance:	876.731		
Eye Position:	1967+00.00	6.000	2202.097
Object Position:	1974+34.12	6.000	2206.183
Obstruction:	No Obstruction		
Sight Distance:	876.907		
Eye Position:	1967+50.00	6.000	2202.477
Object Position:	1974+84.12	6.000	2206.563
Obstruction:	No Obstruction		
Sight Distance:	876.938		
Eye Position:	1968+00.00	6.000	2202.857

	Station	Offset	Elevation
	1975+34.12	6.000	2206.941
Obstruction:	No Obstruction		
Sight Distance:	876.692		
Eye Position:	1968+50.00	6.000	2203.237
Object Position:	1975+84.12	6.000	2207.318
Obstruction:	No Obstruction		
Sight Distance:	875.988		
Eye Position:	1969+00.00	6.000	2203.617
Object Position:	1976+34.12	6.000	2207.697
Obstruction:	No Obstruction		
Sight Distance:	876.005		
Eye Position:	1969+50.00	6.000	2203.997
Object Position:	1976+84.12	6.000	2208.079
Obstruction:	No Obstruction		
Sight Distance:	876.645		
Eye Position:	1970+00.00	6.000	2204.377
Object Position:	1977+34.12	6.000	2208.464
Obstruction:	No Obstruction		
Sight Distance:	876.909		
Eye Position:	1970+50.00	6.000	2204.757
Object Position:	1977+84.12	6.000	2208.843
Obstruction:	No Obstruction		
Sight Distance:	899.309		
Eye Position:	1971+00.00	6.000	2205.137
Object Position:	1978+34.12	6.000	2209.218
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1971+50.00	6.000	2205.517
Object Position:	1978+84.12	6.000	2209.597
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1972+00.00	6.000	2205.897
Object Position:	1979+34.12	6.000	2210.044
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1972+50.00	6.000	2206.277
Object Position:	1979+84.10	6.000	2210.503
Obstruction:	No Obstruction		

	Station	Offset	Elevation
	Unlimited		
Eye Position:	1973+00.00	6.000	2206.657
Object Position:	1980+33.91	6.000	2210.959
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1973+50.00	6.000	2207.037
Object Position:	1980+83.62	6.000	2211.403
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1974+00.00	6.000	2207.417
Object Position:	1981+33.26	6.000	2211.789
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1974+50.00	6.000	2207.797
Object Position:	1981+82.87	6.000	2212.151
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1975+00.00	6.000	2208.177
Object Position:	1982+32.46	6.000	2212.519
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1975+50.00	6.000	2208.557
Object Position:	1982+82.06	6.000	2212.881
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1976+00.00	6.000	2208.937
Object Position:	1983+31.67	6.000	2213.250
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1976+50.00	6.000	2209.317
Object Position:	1983+81.32	6.000	2213.624
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1977+00.00	6.000	2209.697
Object Position:	1984+31.01	6.000	2213.993
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
	1977+50.00	6.000	2210.077
Object Position:	1984+80.74	6.000	2214.364
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1978+00.00	6.000	2210.457
Object Position:	1985+30.52	6.000	2214.709
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1978+50.00	6.000	2210.837
Object Position:	1985+80.33	6.000	2215.017
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1979+00.00	6.000	2211.241
Object Position:	1986+30.19	6.000	2215.280
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1979+50.00	6.000	2211.688
Object Position:	1986+80.06	6.000	2215.543
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1980+00.00	6.000	2212.135
Object Position:	1987+30.00	6.000	2215.751
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1980+50.00	6.000	2212.581
Object Position:	1987+80.00	6.000	2215.946
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1981+00.00	6.000	2213.028
Object Position:	1988+30.00	6.000	2216.098
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1981+50.00	6.000	2213.412
Object Position:	1988+80.00	6.000	2216.201
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1982+00.00	6.000	2213.778
Object Position:	1989+30.00	6.000	2216.275

	Station	Offset	Elevation
	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1982+50.00	6.000	2214.145
Object Position:	1989+80.00	6.000	2216.311
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1983+00.00	6.000	2214.518
Object Position:	1990+30.00	6.000	2216.332
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1983+50.00	6.000	2214.884
Object Position:	1990+80.00	6.000	2216.319
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1984+00.00	6.000	2215.258
Object Position:	1991+30.00	6.000	2216.251
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1984+50.00	6.000	2215.638
Object Position:	1991+80.00	6.000	2216.156
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1985+00.00	6.000	2216.003
Object Position:	1992+30.00	6.000	2216.074
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1985+50.00	6.000	2216.343
Object Position:	1992+80.00	6.000	2215.950
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1986+00.00	6.000	2216.629
Object Position:	1993+30.00	6.000	2215.772
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1986+50.00	6.000	2216.879
Object Position:	1993+80.00	6.000	2215.564
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

	Station	Offset	Elevation
Eye Position:	1987+00.00	6.000	2217.132
Object Position:	1994+30.00	6.000	2215.332
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1987+50.00	6.000	2217.329
Object Position:	1994+80.00	6.000	2215.063
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1988+00.00	6.000	2217.525
Object Position:	1995+30.00	6.000	2214.829
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1988+50.00	6.000	2217.645
Object Position:	1995+80.00	6.000	2214.507
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1989+00.00	6.000	2217.737
Object Position:	1996+30.00	6.000	2214.239
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1989+50.00	6.000	2217.802
Object Position:	1996+80.00	6.000	2213.967
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1990+00.00	6.000	2217.818
Object Position:	1997+30.00	6.000	2213.681
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1990+50.00	6.000	2217.843
Object Position:	1997+80.00	6.000	2213.403
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1991+00.00	6.000	2217.804
Object Position:	1998+30.00	6.000	2213.137
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1991+50.00	6.000	2217.714

	Station	Offset	Elevation
	1998+80.00	6.000	2212.903
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1992+00.00	6.000	2217.619
Object Position:	1999+30.00	6.000	2212.656
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		
Eye Position:	1992+50.00	6.000	2217.541
Object Position:	1999+80.00	6.000	2212.460
Obstruction:	No Obstruction		
Sight Distance:	Unlimited		

Vertical Alignment Table 9.1

									Vertical Geometry		Stopping Sight Distance		
Design Speed, V (mph)	***Line***	***Begin Station***	***VPI Station***	***End Station***	***Grade In (%)***	***Grade Out (%)***	***Algebraic Grade Difference, A (%)***	***Type of Vertical Curve***	***Minimum Length Required (ft)***	***Proposed Curve Length, L (ft)***	***Required Minimum Sight Distance , S (ft)***	***Calculated Crest Curve Design Sight Distance (ft)***	***Calculated Sag Curve Design Sight Distance (ft)***
65	LW	1695+75	1700+00.00	1704+25	0.20	2.22	2.02	Sag	195	850	645		1579
65	LW	1704+50	1709+00.00	1713+50	2.22	-0.55	2.77	Crest	195	900	645	837	
65	LW	1719+92	1724+92.13	1729+92	-0.55	3.83	4.38	Sag	195	1000	694		901
65	LW	1731+15	1741+14.70	1751+15	3.83	0.44	3.39	Crest	195	2000	694	1128	
65	LW	1760+90	1765+39.70	1769+90	0.44	-0.85	1.29	Crest	195	900	645	1227	
65	LW	1774+87	1783+37.17	1791+87	-0.85	3.18	4.03	Sag	195	1700	685		1583
65	LW	1808+68	1816+18.07	1823+68	3.18	0.63	2.55	Crest	195	1500	645	1127	
70	LW	1840+06	1851+05.64	1862+06	0.63	-5.00	5.63	Crest	210	2200	668	918	
70	LW	1883+41	1888+40.50	1893+41	-5.00	-4.36	0.64	Sag	210	1000	N/A		N/A
70	LW	1945+79	1955+78.67	1965+79	-4.36	2.25	6.61	Sag	210	2000	675		1163
70	LW	1970+04	1975+03.95	1980+04	2.25	-0.54	2.79	Crest	210	1000	730	879	
65	LE	1694+70	1699+70.00	1704+70	-1.39	-0.64	0.75	Sag	195	1000	N/A		N/A
65	LE	1707+00	1713+00.00	1719+00	-0.64	3.83	4.47	Sag	195	1200	604		1043
65	LE	1730+14	1740+14.00	1750+14	3.83	0.44	3.39	Crest	195	2000	604	1128	
65	LE	1759+89	1764+39.00	1769+89	0.44	-0.85	1.29	Crest	195	1000	645	1293	
65	LE	1774+74	1782+74.00	1790+74	-0.85	3.00	3.85	Sag	195	1600	612		1561
65	LE	1808+84	1816+33.72	1823+84	3.00	0.72	2.28	Crest	195	1500	645	1192	
70	LE	1840+12	1850+62.40	1861+12	0.72	-5.00	5.72	Crest	210	2100	806	890	
70	LE	1890+96	1896+95.52	1902+96	-5.00	-4.23	0.77	Sag	210	1200	N/A		N/A
70	LE	1945+34	1953+33.86	1961+34	-4.23	0.76	4.99	Sag	210	1600	792		1227
70	LE	1984+49	1989+49.46	1994+49	0.76	-0.54	1.30	Crest	210	1000	645	1288	

Comments: Per DM 1220.02(2), Minimum Required Length must be greater 3*V.

Required Sight Distance (grade <3%) per DM Exhibit 1260-1. Required Sight Distance (grade>3%) per DM Exhibit 1260-3.

Crest Vertical Curve Sight Distance calculated per DM Exhibit 1260-5. Sag Vertical Curve Sight Distance calculated per DM Exhibit 1260-7.

N/A = Values of "A" less than 1.75 are within the 1 degree diverge of the headlight beam and therefore do not need to be evaluated for SSD on sag curves per DM Exhibit 1260-7.

```
            Project Name: XL5479_Mainline - final
             Description: Mainline algs for LE and LW
Horizontal Alignment Name: LW
             Description: westbound I-90 Phase 3 alignment MP 64 to MP 70
                   Style: AL HW_CLinePSENew
  Vertical Alignment Name: Vert
             Description: Vert for WB I-90 Phase 3
                   Style: AL_HW_CLinePSENew
                                      STATION         ELEVATION

Element: Parabola
                    P.V.C.        1683+20.00          2458.315
                   V.P.I.         1687+20.00          2462.315
                   P.V.T.         1691+20.00          2463.115
                  Length:            800.000
   Stopping Sight Distance:         1748.938
           Entrance Grade:            1.0000
               Exit Grade:            0.2000
      r = ( g2 - g1 ) / L:           -0.1000
      K = l / ( g2 - g1 ):         1000.0000
          Middle Ordinate:            -0.800

Element: Linear
                   P.V.T.         1691+20.00          2463.115
                    P.V.C.        1695+75.00          2464.025
            Tangent Grade:            0.2000
           Tangent Length:           455.000

Element: Parabola
                    P.V.C.        1695+75.00          2464.025
                   V.P.I.         1700+00.00          2464.875
                   P.V.T.         1704+25.00          2474.310
                  Length:            850.000
  Headlight Sight Distance:         3920.370
           Entrance Grade:            0.2000
               Exit Grade:            2.2200
      r = ( g2 - g1 ) / L:            0.2376
      K = l / ( g2 - g1 ):          420.7921
          Middle Ordinate:             2.146

Element: Linear
                   P.V.T.         1704+25.00          2474.310
                    P.V.C.        1704+50.00          2474.865
            Tangent Grade:            2.2200
           Tangent Length:            25.000

Element: Parabola
                    P.V.C.        1704+50.00          2474.865
                   V.P.I.         1709+00.00          2484.855
                   P.V.T.         1713+50.00          2482.380
                    VHIGH         1711+71.30          2482.871
                  Length:            900.000
   Stopping Sight Distance:          837.408
           Entrance Grade:            2.2200
               Exit Grade:           -0.5500
      r = ( g2 - g1 ) / L:           -0.3078
      K = l / ( g2 - g1 ):          324.9097
          Middle Ordinate:            -3.116

Element: Linear
                   P.V.T.         1713+50.00          2482.380
                    P.V.C.        1719+92.13          2478.848
            Tangent Grade:           -0.5500
           Tangent Length:           642.133

Element: Parabola
                    P.V.C.        1719+92.13          2478.848
                   V.P.I.         1724+92.13          2476.098
                   P.V.T.         1729+92.13          2495.248
                     VLOW         1721+17.70          2478.503
                  Length:           1000.000
  Headlight Sight Distance:          900.502
           Entrance Grade:           -0.5500
               Exit Grade:            3.8300
      r = ( g2 - g1 ) / L:            0.4380
      K = l / ( g2 - g1 ):          228.3105
          Middle Ordinate:             5.475

Element: Linear
```

Phase 3 LW roadway built from 1686+39 to 1995+00

Vertical curve at beginning of Project includes future Phase 4 Vertical curve.

LW 1983+20 to 1995+00 profile matches existing.

See Contract Plans for final details.

```
                    P.V.T.        1729+92.13          2495.248
                     P.V.C.       1731+14.70          2499.943
            Tangent Grade:            3.8300
           Tangent Length:           122.567

Element: Parabola
                     P.V.C.       1731+14.70          2499.943
                    V.P.I.        1741+14.70          2538.243
                    P.V.T.        1751+14.70          2542.643
                   Length:          2000.000
   Stopping Sight Distance:         1128.421
           Entrance Grade:            3.8300
               Exit Grade:            0.4400
      r = ( g2 - g1 ) / L:           -0.1695
      K = l / ( g2 - g1 ):          589.9705
          Middle Ordinate:            -8.475

Element: Linear
                    P.V.T.        1751+14.70          2542.643
                     P.V.C.       1760+89.70          2546.933
            Tangent Grade:            0.4400
           Tangent Length:           975.000

Element: Parabola
                     P.V.C.       1760+89.70          2546.933
                    V.P.I.        1765+39.70          2548.913
                    P.V.T.        1769+89.70          2545.088
                     VHIGH        1763+96.68          2547.608
                   Length:           900.000
   Stopping Sight Distance:         1286.551
           Entrance Grade:            0.4400
               Exit Grade:           -0.8500
      r = ( g2 - g1 ) / L:           -0.1433
      K = l / ( g2 - g1 ):          697.6744
          Middle Ordinate:            -1.451

Element: Linear
                    P.V.T.        1769+89.70          2545.088
                     P.V.C.       1774+87.17          2540.859
            Tangent Grade:           -0.8500
           Tangent Length:           497.466

Element: Parabola
                     P.V.C.       1774+87.17          2540.859
                    V.P.I.        1783+37.17          2533.634
                    P.V.T.        1791+87.17          2560.664
                      VLOW        1778+45.73          2539.335
                   Length:          1700.000
  Headlight Sight Distance:         1583.017
           Entrance Grade:           -0.8500
               Exit Grade:            3.1800
      r = ( g2 - g1 ) / L:            0.2371
      K = l / ( g2 - g1 ):          421.8362
          Middle Ordinate:              8.564

Element: Linear
                    P.V.T.        1791+87.17          2560.664
                     P.V.C.      A 1808+68.07          2614.033
            Tangent Grade:            3.1800
           Tangent Length:          1678.275

Element: Parabola
                     P.V.C.      A 1808+68.07          2614.033
                    V.P.I.       A 1816+18.07          2637.883
                    P.V.T.       A 1823+68.07          2642.608
                   Length:          1500.000
   Stopping Sight Distance:         1126.760
           Entrance Grade:            3.1800
               Exit Grade:            0.6300
      r = ( g2 - g1 ) / L:           -0.1700
      K = l / ( g2 - g1 ):          588.2353
          Middle Ordinate:            -4.781

Element: Linear
                    P.V.T.       A 1823+68.07          2642.608
                     P.V.C.      A 1840+05.64          2652.925
            Tangent Grade:            0.6300
           Tangent Length:          1637.562
```

```
Element: Parabola
                     P.V.C.      A 1840+05.64          2652.925
                    V.P.I.       A 1851+05.64          2659.855
                    P.V.T.       A 1862+05.64          2604.855
                     VHIGH       A 1842+51.82          2653.700
                   Length:           2200.000
   Stopping Sight Distance:            918.360
            Entrance Grade:             0.6300
                Exit Grade:            -5.0000
       r = ( g2 - g1 ) / L:            -0.2559
       K = l / ( g2 - g1 ):           390.7638
           Middle Ordinate:            -15.483

Element: Linear
                    P.V.T.       A 1862+05.64          2604.855
                     P.V.C.      A 1883+40.50          2498.112
             Tangent Grade:            -5.0000
            Tangent Length:           2134.864

Element: Parabola
                     P.V.C.      A 1883+40.50          2498.112
                    V.P.I.       A 1888+40.50          2473.112
                    P.V.T.       A 1893+40.50          2451.312
                   Length:           1000.000
  Headlight Sight Distance:          5580.742
            Entrance Grade:            -5.0000
                Exit Grade:            -4.3600
       r = ( g2 - g1 ) / L:             0.0640
       K = l / ( g2 - g1 ):          1562.5000
           Middle Ordinate:              0.800

Element: Linear
                    P.V.T.       A 1893+40.50          2451.312
                     P.V.C.      A 1945+78.67          2222.928
             Tangent Grade:            -4.3600
            Tangent Length:           5238.169

Element: Parabola
                     P.V.C.      A 1945+78.67          2222.928
                    V.P.I.       A 1955+78.67          2179.328
                    P.V.T.       A 1965+78.67          2201.828
                      VLOW       A 1958+97.88          2194.169
                   Length:           2000.000
  Headlight Sight Distance:          1163.062
            Entrance Grade:            -4.3600
                Exit Grade:             2.2500
       r = ( g2 - g1 ) / L:             0.3305
       K = l / ( g2 - g1 ):           302.5719
           Middle Ordinate:             16.525

Element: Linear
                    P.V.T.       A 1965+78.67          2201.828
                     P.V.C.      A 1970+03.95          2211.396
             Tangent Grade:             2.2500
            Tangent Length:            425.280

Element: Parabola
                     P.V.C.      A 1970+03.95          2211.396
                    V.P.I.       A 1975+03.95          2222.646
                    P.V.T.       A 1980+03.95          2219.946
                     VHIGH       A 1978+10.40          2220.469
                   Length:           1000.000
   Stopping Sight Distance:            879.536
            Entrance Grade:             2.2500
                Exit Grade:            -0.5400
       r = ( g2 - g1 ) / L:            -0.2790
       K = l / ( g2 - g1 ):           358.4229
           Middle Ordinate:             -3.487

Element: Linear
                    P.V.T.       A 1980+03.95          2219.946
                    V.P.I.       A 1982+30.00          2218.726
             Tangent Grade:            -0.5400
            Tangent Length:            226.051

Element: Linear
                    V.P.I.       A 1982+30.00          2218.726
                    P.O.E.       A 1995+00.00          2211.947
             Tangent Grade:            -0.5337
```

Tangent Length: 1270.000

```
            Project Name: XL5479_Mainline - final
             Description: Mainline algs for LE and LW
Horizontal Alignment Name: LE
             Description: Eastbound I-90 Phase 3 alignment MP 64 to MP 70
                   Style: AL HW_CLinePSENew
  Vertical Alignment Name: Vert
             Description: Vert for eastbound I-90 Phase 3
                   Style: AL_HW_CLinePSENew
                                        STATION         ELEVATION

Element: Linear
                    P.O.B.         1676+00.00          2452.851
                     P.V.C.        1682+50.00          2458.701
            Tangent Grade:             0.9000
           Tangent Length:            650.000

Element: Parabola
                     P.V.C.        1682+50.00          2458.701
                    V.P.I.         1686+00.00          2461.851
                    P.V.T.         1689+50.00          2456.986
                     VHIGH         1685+25.11          2459.939
                   Length:            700.000
   Stopping Sight Distance:            821.245
           Entrance Grade:             0.9000
               Exit Grade:            -1.3900
      r = ( g2 - g1 ) / L:            -0.3271
      K = l / ( g2 - g1 ):           305.6769
          Middle Ordinate:             -2.004

Element: Linear
                    P.V.T.         1689+50.00          2456.986
                     P.V.C.        1694+70.00          2449.758
            Tangent Grade:            -1.3900
           Tangent Length:            520.000

Element: Parabola
                     P.V.C.        1694+70.00          2449.758
                    V.P.I.         1699+70.00          2442.808
                    P.V.T.         1704+70.00          2439.608
                   Length:           1000.000
  Headlight Sight Distance:          4778.283
           Entrance Grade:            -1.3900
               Exit Grade:            -0.6400
      r = ( g2 - g1 ) / L:             0.0750
      K = l / ( g2 - g1 ):          1333.3333
          Middle Ordinate:              0.937

Element: Linear
                    P.V.T.         1704+70.00          2439.608
                     P.V.C.        1707+00.00          2438.136
            Tangent Grade:            -0.6400
           Tangent Length:            230.000

Element: Parabola
                     P.V.C.        1707+00.00          2438.136
                    V.P.I.         1713+00.00          2434.296
                    P.V.T.         1719+00.00          2457.276
                      VLOW         1708+71.81          2437.586
                   Length:           1200.000
  Headlight Sight Distance:          1042.593
           Entrance Grade:            -0.6400
               Exit Grade:             3.8300
      r = ( g2 - g1 ) / L:             0.3725
      K = l / ( g2 - g1 ):           268.4564
          Middle Ordinate:              6.705

Element: Linear
                    P.V.T.         1719+00.00          2457.276
                     P.V.C.        1730+14.00          2499.942
            Tangent Grade:             3.8300
           Tangent Length:           1114.000

Element: Parabola
                     P.V.C.        1730+14.00          2499.942
                    V.P.I.         1740+14.00          2538.242
                    P.V.T.         1750+14.00          2542.642
                   Length:           2000.000
   Stopping Sight Distance:          1128.421
           Entrance Grade:             3.8300
```

Phase 3 LE roadway built from 1683+41 to 2000+00

LE 1981+07 to 2000+00 profile matches existing.

Section from 1676+00 to 1683+41 is future embankment for Phase 4.

```
                Exit Grade:            0.4400
      r = ( g2 - g1 ) / L:            -0.1695
      K = l / ( g2 - g1 ):           589.9705
          Middle Ordinate:             -8.475

Element: Linear
                     P.V.T.         1750+14.00          2542.642
                      P.V.C.        1759+89.00          2546.932
            Tangent Grade:             0.4400
           Tangent Length:            975.000

Element: Parabola
                      P.V.C.        1759+89.00          2546.932
                     V.P.I.         1764+39.00          2548.912
                     P.V.T.         1768+89.00          2545.087
                      VHIGH         1762+95.98          2547.608
                    Length:            900.000
   Stopping Sight Distance:           1286.551
           Entrance Grade:             0.4400
                Exit Grade:           -0.8500
      r = ( g2 - g1 ) / L:            -0.1433
      K = l / ( g2 - g1 ):           697.6744
          Middle Ordinate:             -1.451

Element: Linear
                     P.V.T.         1768+89.00          2545.087
                      P.V.C.        1774+74.00          2540.115
            Tangent Grade:            -0.8500
           Tangent Length:            585.000

Element: Parabola
                      P.V.C.        1774+74.00          2540.115
                     V.P.I.         1782+74.00          2533.315
                     P.V.T.         1790+74.00          2557.315
                       VLOW         1778+27.25          2538.614
                    Length:           1600.000
  Headlight Sight Distance:           1561.035
           Entrance Grade:            -0.8500
                Exit Grade:             3.0000
      r = ( g2 - g1 ) / L:              0.2406
      K = l / ( g2 - g1 ):           415.5844
          Middle Ordinate:               7.700

Element: Linear
                     P.V.T.         1790+74.00          2557.315
                      P.V.C.        1808+83.72          2611.607
            Tangent Grade:             3.0000
           Tangent Length:           1809.724

Element: Parabola
                      P.V.C.        1808+83.72          2611.607
                     V.P.I.         1816+33.72          2634.107
                     P.V.T.         1823+83.72          2639.507
                    Length:           1500.000
   Stopping Sight Distance:           1191.610
           Entrance Grade:             3.0000
                Exit Grade:             0.7200
      r = ( g2 - g1 ) / L:            -0.1520
      K = l / ( g2 - g1 ):           657.8947
          Middle Ordinate:             -4.275

Element: Linear
                     P.V.T.         1823+83.72          2639.507
                      P.V.C.        1840+12.40          2651.233
            Tangent Grade:             0.7200
           Tangent Length:           1628.681

Element: Parabola
                      P.V.C.        1840+12.40          2651.233
                     V.P.I.         1850+62.40          2658.793
                     P.V.T.         1861+12.40          2606.293
                      VHIGH         1842+76.74          2652.185
                    Length:           2100.000
   Stopping Sight Distance:            890.159
           Entrance Grade:             0.7200
                Exit Grade:            -5.0000
      r = ( g2 - g1 ) / L:            -0.2724
      K = l / ( g2 - g1 ):           367.1329
          Middle Ordinate:            -15.015
```

```
Element: Linear
                    P.V.T.         1861+12.40          2606.293
                     P.V.C.        1890+95.62          2457.133
            Tangent Grade:            -5.0000
           Tangent Length:           2983.212

Element: Parabola
                     P.V.C.        1890+95.62          2457.133
                    V.P.I.         1896+95.62          2427.133
                    P.V.T.         1902+95.62          2401.753
                   Length:           1200.000
  Headlight Sight Distance:          5566.532
           Entrance Grade:            -5.0000
               Exit Grade:            -4.2300
      r = ( g2 - g1 ) / L:             0.0642
      K = l / ( g2 - g1 ):          1558.4416
          Middle Ordinate:              1.155

Element: Linear
                    P.V.T.         1902+95.62          2401.753
                     P.V.C.        1945+33.86          2222.475
            Tangent Grade:            -4.2300
           Tangent Length:           4238.245

Element: Parabola
                     P.V.C.        1945+33.86          2222.475
                    V.P.I.         1953+33.86          2188.635
                    P.V.T.         1961+33.86          2194.715
                      VLOW         1958+90.17          2193.789
                   Length:           1600.000
  Headlight Sight Distance:          1226.791
           Entrance Grade:            -4.2300
               Exit Grade:             0.7600
      r = ( g2 - g1 ) / L:             0.3119
      K = l / ( g2 - g1 ):           320.6413
          Middle Ordinate:              9.980

Element: Linear
                    P.V.T.         1961+33.86          2194.715
                    V.P.I.         1981+07.00          2209.711
            Tangent Grade:             0.7600
           Tangent Length:           1973.139

Element: Linear
                    V.P.I.         1981+07.00          2209.711
                     P.V.C.        1984+60.17          2212.324
            Tangent Grade:             0.7400
           Tangent Length:            353.171

Element: Parabola
                     P.V.C.        1984+60.17          2212.324
                    V.P.I.         1989+60.17          2216.024
                    P.V.T.         1994+60.17          2213.298
                     VHIGH         1990+35.93          2214.454
                   Length:           1000.000
   Stopping Sight Distance:          1339.634
           Entrance Grade:             0.7400
               Exit Grade:            -0.5453
      r = ( g2 - g1 ) / L:            -0.1285
      K = l / ( g2 - g1 ):           778.0514
          Middle Ordinate:             -1.607

Element: Linear
                    P.V.T.         1994+60.17          2213.298
                    P.O.E.         2000+00.00          2210.354
            Tangent Grade:            -0.5453
           Tangent Length:            539.829
```

Length of Grade Table 9.2

Line	*Begin Upgrade Station*	*End Upgrade Station*	*Grade (%)*	*Maximum Length of Grade (ft)*	*Design Length of Grade (ft)*	*Comments*
LW	1683+20.00	1687+20.00	1.00	n/a	400	
LW	1687+20.00	1700+00.00	0.20	n/a	1280	
LW	1700+00.00	1709+00.00	2.22	n/a	900	
LW	1709+00.00	1724+92.13	-0.55	>3,000	1592	
LW	1724+92.13	1741+14.70	3.83	n/a	1623	
LW	1741+14.70	1765+39.70	0.44	n/a	2425	
LW	1765+39.70	1783+37.17	-0.85	>3,000	1797	
LW	1783+37.17	1816+18.07	3.18	n/a	3281	
LW	1816+18.07	1851+05.64	0.63	n/a	3488	
LW	1851+05.64	1888+40.50	-5.00	950	3735	climbing lane
LW	1888+40.50	1955+78.67	-4.36	1,150	6738	climbing lane
LW	1955+78.67	1975+03.95	2.25	n/a	1925	
LW	1975+03.95	1982+30.00	-0.54	>3,000	726	
LE	1682+50.00	1686+00.00	0.90	>3,000	350	
LE	1686+00.00	1699+70.00	-1.39	n/a	1370	
LE	1699+70.00	1713+00.00	-0.64	n/a	1330	
LE	1713+00.00	1740+14.00	3.83	1,300	2714	climbing lane
LE	1740+14.00	1764+39.00	0.44	>3,000	2425	*
LE	1764+39.00	1782+74.00	-0.85	n/a	1835	*
LE	1782+74.00	1816+33.72	3.00	1400	3360	climbing lane
LE	1816+33.72	1850+62.40	0.72	>3,000	3429	
LE	1850+62.40	1896+95.62	-5.00	n/a	4633	
LE	1896+95.62	1953+33.86	-4.23	n/a	5638	
LE	1953+33.86	1981+07.00	0.76	>3,000	2773	

Comments:

Design Length of Grade is measured from VPI to VPI.

Maximum length of grade calculated using DM Exhibit 1220-1.

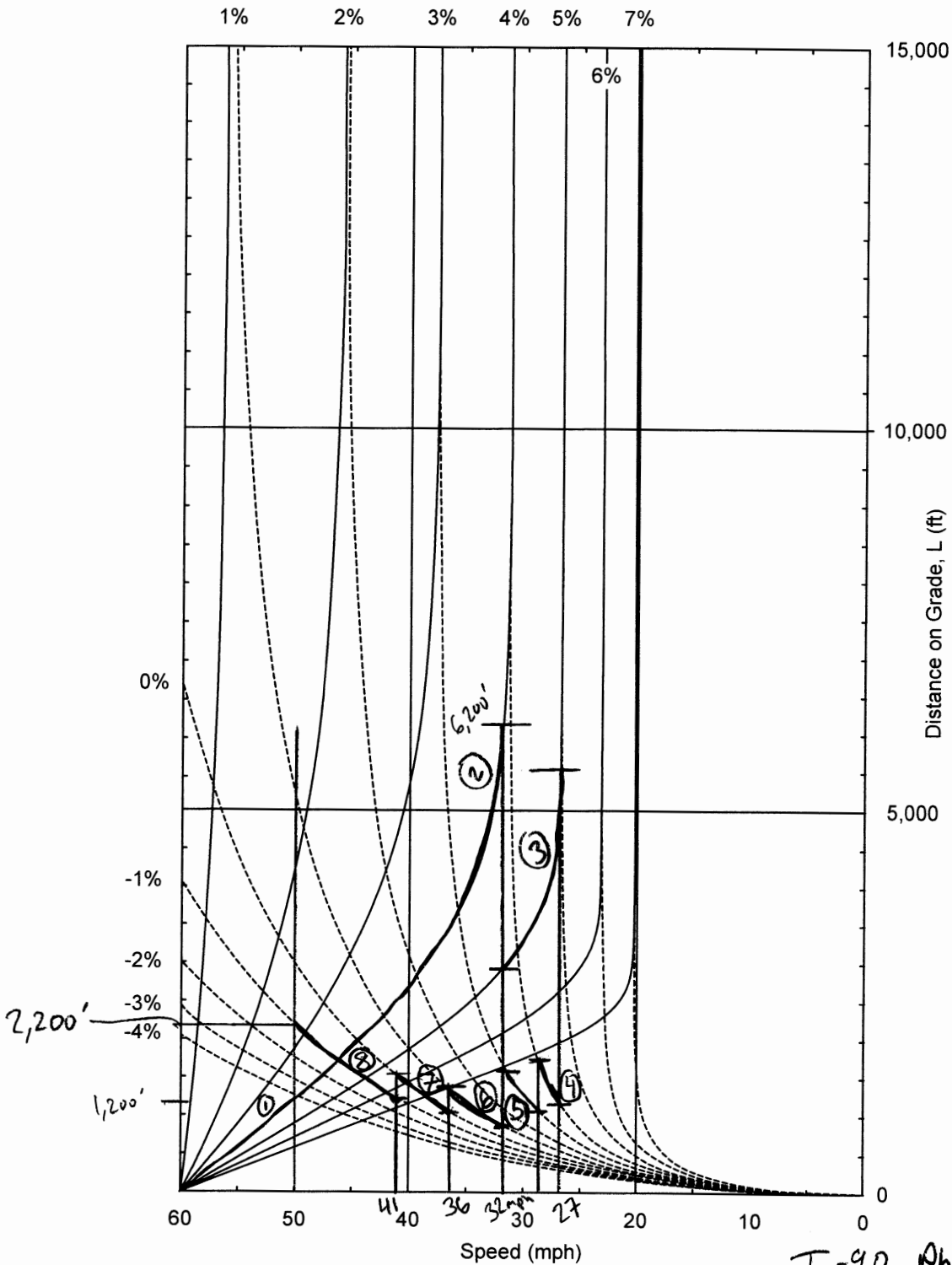
* Climbing lane continues between warranted grades.

Truck Climbing Lane Table 9.3

Line	*Step*	*Begin Upgrade Station (in direction of travel)*	*End Upgrade Station (in the direction of travel)*	*Actual Grade (%)*	*Length Along Grade (ft)*	*Begin Speed*	*End Speed*	*Length at End of Step (ft)*	*Comments*
Truck climbing Lane LW 1942+55 to LW 1829+30. Due to Bridge/approach slab, end of lane lengthed to LW 1829+30.									
LW	1	1950+78.00		4.36	6,238	60	50	1200	Start of lane adjusted to be within tanget and before super, LW 1942+50
LW	2		1888+40.50	4.36		50	32	5038	
LW	3	1888+40.50	1862+06.00	5.00	2,634	32	27	2634	
LW	4	1862+06.00	1856+56.00	4.30	550	27	29	550	Section of 2,200' vertical curve at top of grade
LW	5	1856+56.00	1851+06.00	2.87	550	29	32	550	Section of 2,200' vertical curve at top of grade
LW	6	1851+06.00	1845+56.00	1.48	550	32	36	550	Section of 2,200' vertical curve at top of grade
LW	7	1845+56.00	1840+06.00	0	550	36	41	550	Section of 2,200' vertical curve at top of grade
LW	8	1840+06.00	1823+68.00	-0.63	1638	41	50	1000	Truck lane warrant ends once 50 mph speed is met
See "I-90 Phase 3 LW Truck Climbing Lane" nomograph							Total:	10872	
Truck Climbing lane LE 1723+50 to 1834+00. For staging and beginning lane in tanget, start of lane at LE 1723+50. Due to Bridge/approach slab, end of lane lengthed to LE 1834+00									
LE	1	1716+00.00		3.83	2,414	60	50	1200	Start of grade 300' back from EVC
LE	2		1740+14.00	3.83		50	42	1214	
LE	3	1740+14.00	1764+39.00	0.44	2,425	42	54	2425	
LE	4	1764+39.00	1778+74.00	-0.85	1,435	54	60	1435	
LE	5	1778+74.00	1786+74.00	1.08	800	60	59	800	
LE	6	1786+74.00	1812+59.00	3	2,585	59	47	2585	Back to 60 mph before grade starts, Grade starts 400' past VPI. 375' at end is part of 1,500' vertical curve
LE	7	1812+59.00	1820+09.00	1.86	750	47	47	750	No speed gain. Center section to 1,500' vertical curve
LE	8	1820+09.00	1840+12.00	0.72	2003	47	50	1350	375' is part of 1,500' vertical curve
See "I-90 Phase 3 LE Truck Climbing Lane" nomograph							Total:	10559	

Comments: *All grades rounded to the nearest percentage and DM Exhibit 1270-2a used to determine length and speed of truck. Begin taper of 25:1 and end taper 65:1 (L=VT)*

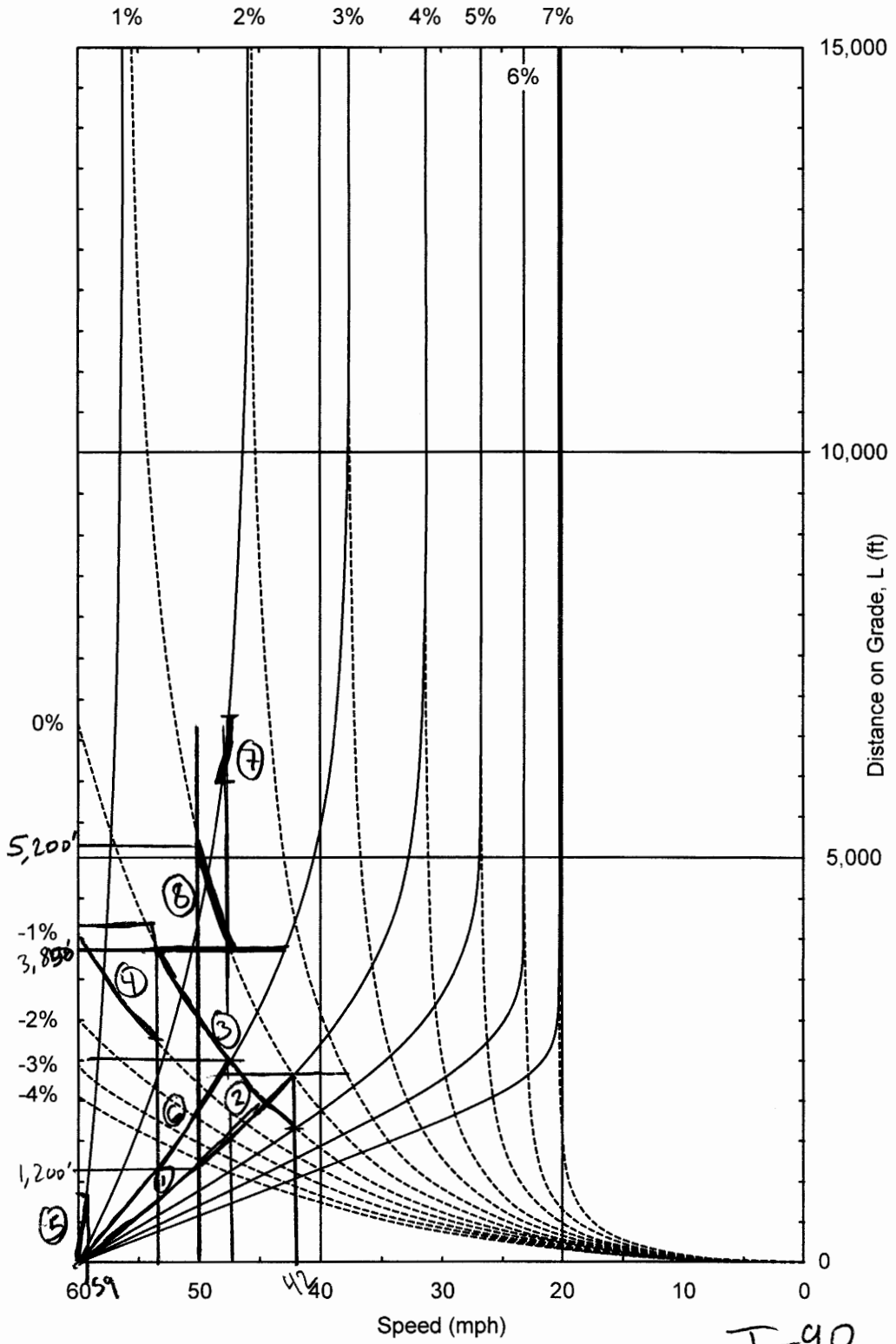
Exhibit 1270-2a Speed Reduction Warrant: Performance for Trucks



I-90 Phase 3

LW Truck Climbing Lane

Exhibit 1270-2a Speed Reduction Warrant: Performance for Trucks



I-90 Phase 3

LE Truck Climbing Lane

Superelevation Transition Table 10.1

Design Speed (mph)	*Line*	*PC Station*	*Curve PI Station*	*PT Station*	Super-elevation rate, e (%)	Normal Crown c (%)	Basic Runoff Length, LB (ft)	Runout Length, LR (ft)	LR*(c/e) (ft)	LR*((c+e)/e) (ft)	0.7*LR	0.3*LR	Curve Radius (ft)	Curve Direction	Design	Transition Begin Sta.	Full Super Begin Sta.	Full Super End Sta.	Transition End Sta.	Full Super Length (ft)
65	LW	1695+65.94	1699+16.86	1702+64.14	6	2	170	255	85.0	340.0	178.5	76.5	2800	Right	C2	1693+02.4	1696+42.4	1701+87.6	1705+27.6	545
65	LW	1707+84.80	1710+45.94	1713+04.64	7	2	195	293	83.7	376.7	205.1	87.9	2200	Left	C1	1706+63.4	1708+72.7	1712+16.7	1714+26.0	344
65	LW	1718+33.83	1721+07.68	1723+78.73	7	2	195	293	83.7	376.7	205.1	87.9	2200	Right	C2	1715+45.0	1719+21.7	1722+90.8	1726+67.5	369
65	LW	1729+23.77	1734.96.19	1740+28.06	8	2	225	338	84.5	422.5	236.6	101.4	1700	Left	C1	1727+71.7	1730+25.2	1739+26.7	1741+80.2	901
65	LW	1768+45.35	1775+22.19	1781+64.22	7	2	195	293	83.7	376.7	205.1	87.9	2380	Left	C1	1767+24.0	1769+33.3	1780+76.3	1782+85.6	1143
65	LW	1811+05.60	1817+03.80	1822+73.76	7	2	195	293	83.7	376.7	205.1	87.9	2200	Left	C1	1809+84.2	1811+93.5	1821+85.9	1823+95.1	992
65	LW	1829+04.63	1835+34.28		4	2	110	165	82.5	247.5	115.5	49.5	4608	Right	C2	1827+06.6	1829+54.1			1153
65			1835+34.28	1841+56.18											C1			1841+06.7	1841+89.2	
70	LW	1849+75.05	1857+49.97		5	2	150	225	90.0	315.0	157.5	67.5	4308	Left	C1	1849+07.6	1850+42.6			1398
70			1857+49.97	1865+08.49											C2			1864+41.0	1867+56.0	
70	LW	1885+27.34	1894+65.60	1903+83.18	5	2	150	225	90.0	315.0	157.5	67.5	5108	Right	C2	1882+79.8	1885+94.8	1903+15.7	1906+30.7	1721
70	LW	1919+82.46	1929+57.94	1938+68.72	7	2	210	315	90.0	405.0	220.5	94.5	3000	Left	C1	1918+52.0	1920+77.0	1937+74.2	1939+99.2	1697
70	LW	1963+11.21	1971+08.38	1978+28.34	8	2	240	360	90.0	450.0	252.0	108.0	2000	Right	C2	1959+69.2	1964+19.2	1977+20.3	1981+70.3	1301
65	LE	1692+36.49	1695+47.43	1698+54.28	7	2	195	293	83.7	376.7	205.1	87.9	2200	Right	C1	1691+15.1	1693+24.4	1697+66.4	1699+75.7	442
65	LE	1705+21.44	1708+59.07	1711+92.30	7	2	195	293	83.7	376.7	205.1	87.9	2400	Left	C2	1702+32.6	1706+09.3	1711+04.4	1714+81.1	495
65	LE	1718+66.99	1721+23.08	1723+76.87	7	2	195	293	83.7	376.7	205.1	87.9	2200	Right	C1	1717+45.6	1719+54.9	1722+89.0	RC	334
65	LE	1728+22.83	1733+04.88	1737+55.65	8	2	225	338	84.5	422.5	236.6	101.4	1500	Left	C2	RC	1729+24.2	1736+54.3	1740+76.8	730
65	LE	1768+83.36	1774+16.72	1779+24.62	8	2	225	338	84.5	422.5	236.6	101.4	1950	Left	C2	1765+62.3	1769+84.8	1778+23.2	1782+45.7	838
65	LE	1798+18.47	1799+19.31	1800+20.15	2	2	No transiton needed						10000	Left		CS	CS	CS	CS	
65	LE	1811+45.59	1816+75.81		8	2	225	338	84.5	422.5	236.6	101.4	2308	Right	C1	1809+93.5	1812+47.0			833
65			1816+75.81	1821+81.00											C2			1820+79.6	1825+02.1	
65	LE	1829+09.22	1835+24.11	1841+31.43	4	2	110	165	82.5	247.5	115.5	49.5	4500	Right	C1	1828+76.2	1829+58.7	1840+81.9	1841+64.4	1123
70	LE	1849+50.31	1857+05.80	1864+45.30	5	2	150	225	90.0	315.0	157.5	67.5	4200	Right	C1	1848+82.8	1850+17.8	1863+77.8	1865+12.8	1360
70	LE	1884+64.15	1893+82.58	1902+80.75	5	2	150	225	90.0	315.0	157.5	67.5	5000	Right	C1	1883+96.7	1885+31.7	1902+13.3	1903+48.3	1682
70	LE	1918+80.03	1928+90.63		8	2	240	360	90.0	450.0	252.0	108.0	3108	Left	C2	1915+38.0	1919+88.0			1738
70			1928+90.63	1938+34.20											C1			1937+26.2	1939+96.2	
70	LE	1960+04.86	1970+40.55		7	2	210	315	90.0	405.0	220.5	94.5	2600	Right	C2	1956+94.4	1960+99.4			1782
70			1970+40.55	1979+76.06											C1			1978+81.6	1981+06.6	

Comments: RC= Reverse Crown, CS = Crown Slope

Superelevation transitions per DM Exhibit 1250-6c.

LR and LB per DM Exhibit 1250-6a. Superelevation Rates 8% Max per DM 1250-4b.

Clear Zone Table 12.1 (Median)

This table shows locations that do not require clear zone mitigation.
See Barrier Table 13.1 for mitigated locations.

Design Speed, V (mph)	*Line*	*Begin Station*	*End Station*	*Fore-slope*	*Back-slope*	*Required Clear Zone*	*Available Clear Zone*	*Case*	*Cut/Fill*
70	LW	1835+83	1849+75	4:1	4:1	35	48+	case 1	cut
70	LW	1853+85	1916+59	6:1	6:1	42	42-57	case 1	cut/fill
70	LW	1935+84	1956+84	4:1	4:1	31-45	45-55	case 1	cut
70	LW	1960+34	1978+00	4:1	NA	54	54-105		fill
65	LE	1691+00	1696+72	4:1	2:1	32	32-43	case 1	cut
65	LE	1700+40	1734+20	4:1	2:1	29 - 50	29-63	case 1	cut/fill
65	LE	1792+14	1798+43	4:1	2:1	27 - 32	27-35	case 1	cut
65	LE	1803+33	1826+71	4:1	2:1	32	32+	case 1	cut
65	LE	1833+71	1846+24	4:1	4:1	42	42-50	case 1	cut/fill
70	LE	1850+56	1854+50	4:1	3:1	42	44-52	case 1	cut
70	LE	1854+50	1912+45	6:1	6:1	42	42-57	case 1	cut
70	LE	1919+27	1927+85	6:1	2:1	37	40-42	case 1	cut
70	LE	1932+25	1951+96	6:1	4:1	45	45+	case 1	cut
70	LE	1956+97	1978+00	4:1	4:1	32	32+	case 1	cut
70	LE	1991+00	1994+00	4:1	NA	54	54+		fill

Comments:

Required Clear Zone values per DM Exhibit 1600-2 and DM Exhibit 1600-5.
See DM 1600.02(3) for Case 1 - Case 3 criteria.

For ditch sections, the following criteria determine the Design Clear Zone:

(a) For ditch sections with foreslopes 4H:1V or flatter (see Exhibit 1600-5, Case 1, for an example), the Design Clear Zone distance is the greater of the following:

- The Design Clear Zone distance for a 10H:1V cut section based on speed and the average daily traffic (ADT); or
- A horizontal distance of 5 feet beyond the beginning of the backslope.

When a backslope steeper than 3H:1V continues for a horizontal distance of 5 feet beyond the beginning of the backslope, it is not necessary to use the 10H:1V cut slope criteria.

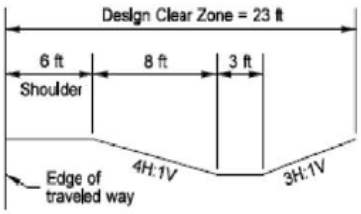
Cut section with ditch (foreslope 4H:1V or flatter)

Conditions: Speed – 55 mph
Traffic – 4,200 ADT
Slope – 4H:1V

Criteria: Greater of:

(1) Design Clear Zone for 10H:1V cut section, 23 feet
(2) 5 feet horizontal beyond beginning of backslope, 22 feet

Design Clear Zone = 23 feet



Case 1

Clear Zone Table 12.2 (Outside Shoulder)

This table shows locations that do not require clear zone mitigation.
See Barrier Table 13.2 for mitigated locations.

Design Speed, V (mph)	*Line*	*Begin Station*	*End Station*	*Fore-slope*	*Back-slope*	*Required Clear Zone*	*Available Clear Zone*	*Case*	*Cut/Fill*
65	LW	1704+88	1722+04	6:1	2:1	38	40	case 1	cut
65	LW	1726+04	1736+50	4:1	1:1	39	40	case 1	cut
65	LW	1736+50	1744+70	6:1	2:1	37	38	case 1	cut
65	LW	1744+70	1749+50	4:1	1:1	38	40	case 1	cut
65	LW	1749+50	1750+69	6:1	1:1	38	39-44	case 1	cut
65	LW	1754+70	1771+46	6:1	2:1	38	38-41	case 1	cut
65	LW	1782+12	1788+00	6:1	2:1	38	40	case 1	cut
65	LW	1794+17	1801+13	6:1	10:1 or flatter	38	38+	case 1	cut
65	LW	1806+35	1818+50	4:1	1:1	37-42	37-42	case 1	cut
65	LW	1843+76	1846+85	4:1	4:1	39	40	case 1	cut
65	LW	1882+20	1887+50	6:1	NA	38	45-97		fill
65	LW	1887+50	1903+00	6:1	2:1	37-38	40	case 1	cut
65	LW	1903+00	1904+50	6:1	NA	38	125		fill
65	LW	1904+50	1914+44	6:1	2:1	37	40	case 1	cut
70	LW	1935+65	1941+50	4:1	NA	54	72+		fill
70	LW	1941+50	1944+50	4:1	2:1	30	32	case 1	cut
70	LW	1944+50	1954+33	6:1	NA	41	60+		fill
70	LW	1959+72	1997+50	6:1	2:1 - 4:1	37-38	38-40	case 1	cut
65	LE	1850+82	1860+59	4:1	2:1	32	32-34	case 1	cut
70	LE	1868+00	1882+00	4:1	2:1	35	35+	case 1	cut
70	LE	1882+00	1898+92	4:1	2:1	54	54+		fill
70	LE	1904+59	1911+93	4:1	4:1	54	54+		fill
70	LE	1956+72	1975+70	6:1	3:1	41	41-55+		fill
70	LE	1984+00	2004+40	4:1	10:1 - 2:1	32	32-35	case 1	cut

Comments:
Required Clear Zone values per DM Exhibit 1600-2 and DM Exhibit 1600-5.
See DM 1600.02(3) for Case 1 - Case 3 criteria.

Barrier Table 13.1 (Median)

Line	*Barrier/Guardrail*	*Barrier Type*	*Begin Station*	*End Station*	*Line*	*Barrier/Guardrail*	*Barrier Type*	*Begin Station*	*End Station*
TW	Barrier	Conc	100+00	103+56	TE	Barrier	Conc	106+90	117+70
LW	Barrier	Conc	1686+39	1834+84	LE	No barrier		1691+00	1696+72
LW	Bridge end	Grail	1834+84	1835+83	LE	Barrier	Grail	1696+72	1697+71
LW	No barrier		1835+83	1849+25	LE	Barrier	Conc	1697+71	1700+40
LW	Barrier	Conc	1849+25	1852+86	LE	No barrier		1700+40	1734+20
LW	Bridge end	Grail	1852+86	1853+85	LE	Barrier	Conc	1734+20	1737+56
LW	No barrier		1853+85	1916+59	LE	No barrier *		1737+56	1781+39
LW	Barrier	Conc	1916+59	1932+87	LE	Barrier	Conc	1781+39	1792+14
LW	Bridge end	Grail	1932+87	1935+84	LE	No barrier		1792+14	1798+43
LW	No barrier		1935+84	1956+84	LE	Bridge end	Grail	1798+43	1799+42
LW	Barrier	Conc	1956+84	1957+22	LE	Barrier	Conc	1799+42	1803+33
LW	Bridge end	Grail	1957+22	1960+34	LE	No barrier		1803+33	1826+71
LW	No barrier		1960+34	1978+00	LE	Bridge end	Grail	1826+71	1827+70
LW	Barrier	Grail	1978+00	1995+00	LE	Barrier	Conc	1827+70	1833+32
W	Barrier	Grail	300+00	307+38	LE	No barrier		1833+32	1846+24
					LE	Bridge end	Grail	1846+24	1847+23
					LE	Barrier	Conc	1847+23	1850+56
					LE	No barrier		1850+56	1912+45
					LE	Bridge end	Grail	1912+45	1913+44
					LE	Barrier	Conc	1913+44	1919+27
					LE	No barrier		1919+27	1927+85
					LE	Bridge end	Grail	1927+85	1928+84
					LE	Barrier	Conc	1928+84	1932+25
					LE	No barrier		1932+25	1951+96
					LE	Bridge end	Grail	1951+96	1954+58
					LE	Barrier	Conc	1954+58	1956+97
					LE	No barrier		1956+97	1994+00
					LE	Barrier	Grail	1994+00	1997+75
					LE	No barrier		1997+75	2000+00

Comments: All barrier is 42" in height with a minimum deflection distance of 2' which meets or exceeds minimum Design Manual standards.

****Median lane is adjacent to LW Line concrete barrier (shared median barrier).***

Barrier Table 13.2 (Outside Shoulder)

Line	Barrier/Guardrail	Barrier Type	Begin Station	End Station	Line	Barrier/Guardrail	Barrier Type	Begin Station	End Station
TW	Barrier	Conc	100+00	103+56	TE	Barrier	Conc	105+50	110+50
LW	Barrier	Conc	1686+39	1700+66	LE	Barrier	Conc	1683+41	1690+00
LW	Barrier		1700+46	1703+88	LE	Barrier	Conc	1669+82	1743+00
LW	Bridge end	Grail	1703+88	1704+88	LE	Barrier	Conc	1742+89	1760+87
LW	No barrier		1704+88	1722+04	LE	No barrier		1760+87	1760+87
LW	Barrier	Conc	1722+04	1725+05	LE	GR end	Grail	1761+45	1762+25
LW	Bridge end	Grail	1725+05	1726+04	LE	Barrier	Conc	1762+25	1785+26
LW	No barrier		1726+04	1750+69	LE	Barrier	Conc	1785+06	1812+81
LW	Barrier	Conc	1750+69	1753+71	LE	Barrier	Conc	1812+63	1845+41
LW	Bridge end	Grail	1753+71	1754+70	LE	Barrier	Conc	1845+23	1850+82
LW	No barrier		1754+70	1771+46	LE	No barrier		1850+82	1860+59
LW	Barrier	Conc	1771+46	1781+13	LE	GR end	Grail	1860+59	1861+58
LW	GR end	Grail	1781+13	1782+12	LE	Barrier	Conc	1861+58	1868+00
LW	No barrier		1782+12	1788+00	LE	No barrier		1868+00	1898+92
LW	Barrier	Conc	1788+00	1793+18	LE	GR end	Grail	1898+92	1899+91
LW	Bridge end	Grail	1793+18	1794+17	LE	Barrier	Conc	1899+91	1904+59
LW	No barrier		1794+17	1801+13	LE	No barrier		1904+59	1911+93
LW	Barrier	Conc	1801+13	1805+36	LE	Bridge end	Grail	1911+93	1912+93
LW	Bridge end	Grail	1805+36	1806+35	LE	Barrier	Conc	1912+93	1927+07
LW	No barrier		1806+35	1818+50	LE	Barrier	Conc	1926+88	1932+68
LW	Barrier	Conc	1818+50	1842+77	LE	Guardrail	Grail	1932+68	1954+58
LW	Bridge end	Grail	1842+77	1843+76	LE	Barrier	Conc	1954+58	1956+72
LW	No barrier		1843+48	1846+85	LE	No barrier		1956+72	1975+70
LW	Barrier	Conc	1846+85	1855+63	LE	Guardrail	Grail	1975+70	1983+73
LW	Barrier	Conc	1855+49	1881+21					
LW	GR end	Grail	1881+21	1882+20					
LW	No barrier		1882+20	1914+44					
LW	Barrier	Conc	1914+44	1932+89					
LW	Bridge end	Grail	1932+89	1935+65					
LW	No barrier		1935+65	1954+33					
LW	Barrier	Conc	1954+33	1958+11					
LW	Bridge end	Grail	1958+11	1959+72					
LW	No barrier		1959+72	1997+50					

Comments: All barrier is 42" in height with a minimum deflection distance of 2' which meets or exceeds minimum Design Manual standards.

South Central Region
Pavement Marking Material Policy

Roadway Classification	Marking Type				
	Center Lines	Lane Lines	Edge Lines	Wide Lines	Special Pavement Markings[1]
I-90 MP 33 – MP 69.5	N.A.	6" Grooved Plastic[2],[3] & RRPMs	6" Grooved Plastic[2],[4]	Grooved Plastic[2],[4]	Plastic
I-90 MP 69.5 – MP 138	N.A.	Grooved Plastic[4] & RRPMs	Paint	Grooved Plastic[4]	Plastic
I-82 I-182	N.A.	Grooved Plastic[4]	Paint	Grooved Plastic[4]	Plastic
Principal Arterial – U1/R1	Paint & RRPMs	Paint & RRPMs[3]	Paint	Grooved Plastic[4]	Plastic
Minor Arterial – U2/R2	Paint	Paint	Paint	Paint	Plastic
Collector – U3/R3	Paint	Paint	Paint	Paint	Plastic

Notes:

1. Special pavement markings include arrows, symbols, letters, crosswalks, stop bars, and channelizing lines. Special pavement markings when are encouraged to be Type B – Pre-Formed Fused Thermoplastic.
2. Grooves in this section shall have a depth of 300 mils.
3. Plastic in this section shall be Type C – Cold Applied Pre-Form Tape.
4. Plastic refers to methyl methacrylate (MMA), thermoplastic, or preformed tape.
5. Grooved Plastic is a line constructed by cutting a groove into the pavement surface and spraying, extruding, or gluing pavement marking material into the groove.
6. RRPMs refer to RPMs installed in a groove ground into the pavement. RRPMs are identified as "Recessed Pavement Markers" in the Standard Specifications and the Standard Plans.
7. RRPMs shall <u>not</u> be installed on bridges or structures.
8. RRPMs and/or plastic used in conjunction with centerline rumble strips shall be determined on a case-by-case basis.
9. Different marking materials may be considered on an individual basis based on a study that takes into account speed, volume, adverse weather conditions, and presence of roadway lighting. Modifications shall be approved by the ARA for Development.
10. When grooved installation is specified, bridge decks should have Grooved Plastic requested at same depth.
11. Special Provision will identify the type of plastic materials to be used.
12. Tape Grind width shall be per manufactures recommendations.
13. This policy applies to design projects.

Replaces Design Manual Exhibit 1030-1

Approved:

Todd V. Trepanier, SC Region Administrator

7-13-2018
Date

PDA.3.8

Cost Estimate

HIGHWAY : SR 090

PROJECT TITLE : I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/WILDLIFE BRIDGES

TYPE OF WORK :

FEDERAL AID PROJECT NO :

COUNTY(S) : KITTITAS

PROGRAM ITEM NUMBER(s) : 509093A

CONTROL SECTIONS : 190100, 190116

ESTIMATED COST DATA :

CONTRACT TOTAL	212,293,619.60	
WA SALES TAX: 8.00% OF $ 212,293,619.60 (GROUPS: 1,2,3)	16,983,489.57	
PROJECT SUBTOTAL	229,277,109.17	**
ENGINEERING 11.60%	26,596,144.66	
CONTINGENCIES 4.00%	9,171,084.37	
TOTAL COST OF PROJECT	**265,044,338.20**	***

HIGHWAY : SR 090

PROJECT TITLE : I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/WILDLIFE BRIDGES

TYPE OF WORK :

FEDERAL AID PROJECT NO :

COUNTY(S) : KITTITAS

PROGRAM ITEM NUMBER(s) : 509093A

CONTROL SECTIONS : 190100, 190116

ESTIMATED COST DATA :

CONTRACT TOTAL : BASE PLUS ALTERNATE A1	224,815,904.60	
WA SALES TAX: 8.00% OF $ 224,815,904.60 (GROUPS: 1,2,3)	17,985,272.37	
PROJECT SUBTOTAL	242,801,176.97	**
ENGINEERING 11.60%	28,164,936.53	
CONTINGENCIES 4.00%	9,712,047.08	
TOTAL COST OF PROJECT	**280,678,160.58**	***

HIGHWAY : SR 090

PROJECT TITLE : I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/WILDLIFE BRIDGES

TYPE OF WORK :

FEDERAL AID PROJECT NO :

COUNTY(S) : KITTITAS

PROGRAM ITEM NUMBER(s) : 509093A

CONTROL SECTIONS : 190100, 190116

ESTIMATED COST DATA :

CONTRACT TOTAL : BASE PLUS ALTERNATE A2	222,399,719.60	
WA SALES TAX: 8.00% OF $ 222,399,719.60 (GROUPS: 1,2,3)	17,791,977.57	
PROJECT SUBTOTAL	240,191,697.17	**
ENGINEERING 11.60%	27,862,236.87	
CONTINGENCIES 4.00%	9,607,667.89	
TOTAL COST OF PROJECT	**277,661,601.93**	***

PROJECT REMARKS:

ESTIMATE

I-90/Cabin Creek I/C to W Easton I/C Phase 3 - Add Lanes/Wildlife Bridges

MP 64.34 to 70.60 DIRECTION **Both** COUNTY **Kittitas** **PIN 509093A** **WIN E09093A**

PROJECT LENGTH **5.70** PAVING LENGTH **38.74** NHS Status **NHS** Functional Class **Rural-Interstate**

PROJECT TOTAL $311,200,000 DATE OF COSTS **8/20/2021** ESTIMATOR **Kenny King** CONSTRUCTION DURATION **5 yrs**

The I-90 Phase 3 Project addresses the project needs through several approaches. The complete reconstruction of the existing four lane freeway (two lanes in each direction) with a six lane freeway (three lanes in each direction) will add capacity, provide a smoother ride, and replace the rapidly deteriorating existing pavement. Eastbound and westbound lanes will be aligned to traverse the existing eastbound side of Easton Hill. Curves and cross slopes will be improved based on current design standards, this will increase safety and improve sight distance. In addition to the roadway expansion and reconstruction, several environmental improvements are included as part of this project. Aligning the eastbound and westbound lanes will allow for natural restoration of the existing westbound lanes. Proposed structures will improve habitat connectivity, enhance wetlands, and improve drainage in the HCZ (Hydraulic Connectivity Zones). These structures include a 150ft wide wildlife overcrossing at MP 67.5, bridges over Cedar Creek (MP 64.7), Telephone Creek (MP 65.6), Hudson Creek (MP 66.6), Unnamed Creek (MP 67.1), Wildlife Undercrossing at MP 68.8, Sparks Rd (MP 69.0), and Kachess River (MP 69.5).

QUANTITY	UNIT	ITEM NO.	ITEM	UNIT PRICE	AMOUNT
			BELOW THE LINE ITEMS		
1.0	L.S.		ARCHAEOLOGICAL/CULTURAL MONITORING AGREEMENT	$40,000	$40,000
1.0	L.S.		WSP MONITORING	$1,000,000	$1,000,000
1.0	L.S.		WSDOT IRT	$100,000	$100,000
2.0	L.S.		WSDOT Forces Emergent Striping	$50,000	$100,000
12.0	EACH		SERVICE AGREEMENTS WITH PSE	$12,500	$150,000
1.0	L.S.		WILDLIFE MONITORING	$119,000	$119,000
1.0	L.S.		STATE SUPPLIED ILLUMINATION & ITS EQUIPMENT	$464,000	$464,000
1.0	L.S.		GROWING AND ROADSIDE PLANTING CONTRACT (RST)	$6,206,738	$6,206,738
1.0	L.S.		PSE REIMBURSEMENT	($2,198,496)	($2,198,496)

PROJECT CHANGE TRACKING

Date	By	Comments
7/22/2020	GB	Transferred Information from previous BOE form to updated form
3/19/2021	KK	Adjusted qtys and revised some numbers
10/14/2021	ADB	Adjusted qtys revised unit bid prices and bridge costs.
12/21/2021	KK	Updated costs, added below the line service agreement, archaeological agreement, pse reimbursement and adjusted PE and CE

BID ITEM SUBTOTAL W/O MOBILIZATION		$0
MOBILIZATION	0%	$0
BID ITEM SUBTOTAL FROM EBASE		**$224,815,905**
DESIGN ALLOCATIONS	0.0%	$0
BID ITEM TOTAL		$224,815,905
SALES TAX	8.00%	$17,985,272
700 LEVEL NON-BID ITEMS		$0
PROJECT SUBTOTAL		$242,801,177
CONSTRUCTION ENGINEERING	11.6%	$28,164,936
CONTINGENCIES	4%	$9,712,047
800 LEVEL ITEMS		$0
860 LEVEL ITEMS		$5,981,242
CN ESTIMATE		**$286,700,000**
PE PHASE		**$24,500,000**
R/W ACQUISITION COSTS		
PROJECT TOTAL		**$311,200,000**

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		PREPARATION					
1	0001	MOBILIZATION	L.S.			20,500,000.00	A1
2	0025	CLEARING AND GRUBBING	ACRE	10,000.00	119.30	1,193,000.00	D6
3		SLOPE SCALING VEGETATION REMOVAL	L.S.			53,000.00	D6
4		LARGE WOODY MATERIAL SALVAGE - 30 IN. OR GREATER	EACH	500.00	530.00	265,000.00	
5		LARGE WOODY MATERIAL SALVAGE - 20-29.9 IN.	L.S.			500,000.00	
6	0038	ARCHAEOLOGICAL AND HISTORICAL SALVAGE	EST.			10,000.00	A1
7	0050	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L.S.			500,000.00	F8
8	0254	REMOVING SOLDIER PILE SHAFT OBSTRUCTIONS	EST.			39,000.00	T0
9	0256	REMOVING SHAFT OBSTRUCTIONS	EST.			176,000.00	T0
10	0258	REMOVING SIGN STRUCTURE SHAFT OBSTRUCTIONS	EST.			12,850.00	T0
11	0071	REMOVING EXISTING BRIDGE 90/117S SPARKS RD EB	L.S.			280,000.00	F8
12	0071	REMOVING EXISTING BRIDGE TEMPORARY SPARKS RD EB	L.S.			170,000.00	F8
13	0071	REMOVING EXISTING BRIDGE 90/118N KACHESS RIVER WB	L.S.			510,000.00	F8
14	0071	REMOVING EXISTING BRIDGE 90/118S KACHESS RIVER EB	L.S.			400,000.00	F8
15	0090	REMOVING CEMENT CONC. PAVEMENT	S.Y.	7.00	18,000.00	126,000.00	D6
16	0145	REMOVING CONC. BARRIER	L.F.	6.00	56,502.00	339,012.00	N0
17	0170	REMOVING GUARDRAIL	L.F.	5.00	17,200.00	86,000.00	K2
18	0182	REMOVING GUARDRAIL ANCHOR	EACH	300.00	28.00	8,400.00	K2
19	0187	REMOVING PAINT LINE	L.F.	0.65	163,950.00	106,567.50	Q2
20	0190	REMOVING PLASTIC LINE	L.F.	0.85	244,816.00	208,093.60	Q2
21		STOCKPILE SITE ACCESS	L.S.			100,000.00	
		GRADING					
22	0330	ROADWAY EXCAVATION INCL. HAUL - AREA A	C.Y.	10.00	687,560.00	6,875,600.00	J6
23	0330	ROADWAY EXCAVATION INCL. HAUL - AREA B	C.Y.	8.00	562,720.00	4,501,760.00	J6
24	0330	ROADWAY EXCAVATION INCL. HAUL - AREA C	C.Y.	10.00	261,110.00	2,611,100.00	J6
25	0330	ROADWAY EXCAVATION INCL. HAUL - AREA D	C.Y.	10.00	30,320.00	303,200.00	J6
26	0380	ROCK SLOPE SCALING	CRHR	600.00	230.00	138,000.00	X0

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		GRADING					
27	0390	ROCK SLOPE SCALING DEBRIS REMOVAL INCL. HAUL	C.Y.	40.00	660.00	26,400.00	K8
28	0470	EMBANKMENT COMPACTION	C.Y.	2.50	1,549,050.00	3,872,625.00	J6
		DRAINAGE					
29	1040	CHANNEL EXCAVATION INCL. HAUL	C.Y.	30.00	1,400.00	42,000.00	J6
30	1054	GRATE INLET TYPE 2	EACH	3,000.00	64.00	192,000.00	G2
31	1058	DROP INLET TYPE 1	EACH	5,000.00	49.00	245,000.00	G2
32	1059	DROP INLET TYPE 2	EACH	7,000.00	3.00	21,000.00	G2
33	1095	STREAMBED SEDIMENT	C.Y.	50.00	4,176.00	208,800.00	G2
34	0886	STREAMBED COBBLES 6 IN.	C.Y.	75.00	180.00	13,500.00	G2
35	0887	STREAMBED COBBLES 8 IN.	C.Y.	75.00	380.00	28,500.00	G2
36	0888	STREAMBED COBBLES 10 IN.	C.Y.	75.00	358.00	26,850.00	G2
37	0889	STREAMBED COBBLES 12 IN.	C.Y.	75.00	1,700.00	127,500.00	G2
38	0905	STREAMBED BOULDER ONE MAN	EACH	100.00	5,362.00	536,200.00	R0
39	0907	STREAMBED BOULDER TWO MAN	EACH	100.00	1,772.00	177,200.00	R0
40	0908	STREAMBED BOULDER THREE MAN	EACH	100.00	487.00	48,700.00	R0
41	0912	HABITAT BOULDER THREE MAN	EACH	100.00	61.00	6,100.00	R0
42	0914	HABITAT BOULDER FIVE MAN	EACH	150.00	13.00	1,950.00	R0
43	0922	ROCK FOR EROSION AND SCOUR PROTECTION CLASS A	C.Y.	150.00	573.00	85,950.00	R0
44	0924	ROCK FOR EROSION AND SCOUR PROTECTION CLASS B	C.Y.	110.00	110.00	12,100.00	R0
45	0926	ROCK FOR EROSION AND SCOUR PROTECTION CLASS C	C.Y.	110.00	720.00	79,200.00	R0
46	1085	QUARRY SPALLS	C.Y.	50.00	20,760.00	1,038,000.00	R0
47	1161	UNDERDRAIN PIPE 8 IN. DIAM.	L.F.	20.00	14,318.00	286,360.00	L4
48	1171	DRAIN PIPE 8 IN. DIAM.	L.F.	25.00	1,696.00	42,400.00	L4
49	1180	SCHEDULE A CULV. PIPE 12 IN. DIAM.	L.F.	50.00	290.00	14,500.00	G2
50	1182	SCHEDULE A CULV. PIPE 18 IN. DIAM.	L.F.	40.00	6,069.00	242,760.00	G2
51	1184	SCHEDULE A CULV. PIPE 24 IN. DIAM.	L.F.	85.00	3,331.00	283,135.00	G2
52	1186	SCHEDULE A CULV. PIPE 30 IN. DIAM.	L.F.	200.00	993.00	198,600.00	G2
53	1190	SCHEDULE B CULV. PIPE 18 IN. DIAM.	L.F.	125.00	337.00	42,125.00	G2

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		DRAINAGE					
54	1192	SCHEDULE B CULV. PIPE 24 IN. DIAM.	L.F.	150.00	90.00	13,500.00	G2
55	1206	SCHEDULE D CULV. PIPE 18 IN. DIAM.	L.F.	150.00	55.00	8,250.00	G2
56	3016	HIGH-DENSITY POLYETHYLENE (HDPE) PIPE 12 IN. DIAM.	L.F.	150.00	186.00	27,900.00	G2
57	3017	HIGH-DENSITY POLYETHYLENE (HDPE) PIPE 18 IN. DIAM.	L.F.	100.00	4,132.00	413,200.00	G2
58	3018	HIGH-DENSITY POLYETHYLENE (HDPE) PIPE 24 IN. DIAM.	L.F.	175.00	1,800.00	315,000.00	G2
59		TR. 1 ST. CULV. PIPE 0.138 IN. TH. 24 IN. DIAM.	L.F.	200.00	791.00	158,200.00	G2
60		TR. 1 ST. CULV. PIPE 0.138 IN. TH. 30 IN. DIAM.	L.F.	200.00	175.00	35,000.00	G2
61		PRECAST REINF. CONC. SPLIT BOX CULVERT (4' X 4')	L.F.	300.00	2,500.00	750,000.00	
62	3075	TEMPORARY STREAM DIVERSION	L.S.			800,000.00	J6
63		LARGE WOODY MATERIAL (LWM) - HABITAT	EACH	500.00	300.00	150,000.00	
64		LARGE WOODY MATERIAL (LWM) - MCND	L.F.	30.00	3,860.00	115,800.00	
65		LARGE WOODY MATERIAL (LWM) - STEEP SLOPE DISPERSION	L.F.	30.00	6,850.00	205,500.00	
66		LARGE WOODY MATERIAL (LWM) TYPE A	EACH	500.00	78.00	39,000.00	
67		LARGE WOODY MATERIAL (LWM) TYPE B	EACH	500.00	50.00	25,000.00	
68		LARGE WOODY MATERIAL (LWM) TYPE C	EACH	500.00	90.00	45,000.00	
69		LARGE WOODY MATERIAL (LWM) TYPE D	EACH	500.00	200.00	100,000.00	
		STORM SEWER					
70	3090	CATCH BASIN TYPE 1L	EACH	2,000.00	5.00	10,000.00	T8
71	3091	CATCH BASIN TYPE 1	EACH	2,000.00	2.00	4,000.00	T8
72	3105	CATCH BASIN TYPE 2 48 IN. DIAM.	EACH	3,000.00	2.00	6,000.00	T8
73	3109	CATCH BASIN TYPE 2 60 IN. DIAM.	EACH	5,000.00	43.00	215,000.00	T8
74	3541	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	L.F.	50.00	300.00	15,000.00	T8
		STRUCTURE					
75	4006	STRUCTURE EXCAVATION CLASS A INCL. HAUL	C.Y.	25.00	37,690.00	942,250.00	I2
76		STRUCTURE EXCAVATION CLASS A INCL. HAUL WALL 1-3	C.Y.	15.00	101,040.00	1,515,600.00	
77	4009	ROCK EXCAVATION FOR SHAFT INCLUDING HAUL	L.F.	1,000.00	3,369.00	3,369,000.00	T0
78	4013	SHORING OR EXTRA EXCAVATION CL. A	L.S.			1,020,000.00	I2
79	4013	SHORING OR EXTRA EXCAVATION CL. A WALL 1-3	L.S.			4,002,000.00	I2

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		STRUCTURE					
80	4084	CONSTRUCTING 4 FT. DIAM SHAFT	L.F.	1,400.00	303.00	424,200.00	T0
81	4087	CONSTRUCTING 6 FT. DIAM SHAFT	L.F.	1,500.00	561.00	841,500.00	T0
82	4088	CONSTRUCTING 7 FT. DIAM SHAFT	L.F.	1,600.00	1,041.00	1,665,600.00	T0
83	4049	SHAFT - 36 IN. DIAMETER	L.F.	200.00	6,149.00	1,229,800.00	T0
84	4053	FURNISHING SOLDIER PILE W 14 X 193	L.F.	160.00	2,742.00	438,720.00	T0
85	4053	FURNISHING SOLDIER PILE W 14 X 159	L.F.	130.00	2,018.00	262,340.00	T0
86	4053	FURNISHING SOLDIER PILE W 14 X 132	L.F.	110.00	6,607.00	726,770.00	T0
87	4149	ST. REINF. BAR FOR BRIDGE	LB.	1.50	1,180,420.00	1,770,630.00	U0
88	4150	ST. REINF. BAR FOR RETAINING WALL	LB.	1.50	251,728.00	377,592.00	U0
89	4151	ST. REINF. BAR FOR DIFFERENTIAL BARRIER	LB.	1.50	430,000.00	645,000.00	U0
90	4151	ST. REINF. BAR FOR PILASTER	LB.	2.50	24,400.00	61,000.00	U0
91	4151	ST. REINF. BAR FOR RAIL BASE	LB.	2.50	76,350.00	190,875.00	U0
92	4160	QA SHAFT TEST	EACH	900.00	53.00	47,700.00	T0
93	4166	LEAN CONCRETE	C.Y.	200.00	650.00	130,000.00	E0
94	4202	CONC. CLASS 4000 FOR DIFFERENTIAL BARRIER	C.Y.	900.00	2,150.00	1,935,000.00	E0
95	4202	CONC. CLASS 4000 FOR PILASTER	C.Y.	700.00	225.00	157,500.00	E0
96	4202	CONC. CLASS 4000 FOR RAIL BASE	C.Y.	700.00	810.00	567,000.00	E0
97	4322	CONC. CLASS 4000 FOR BRIDGE	C.Y.	800.00	6,324.00	5,059,200.00	B0
98	4139	CONC. CLASS 4000 FOR RETAINING WALL	C.Y.	900.00	784.00	705,600.00	B0
99	4269	PRESTRESSED CONC. GIRDER 12 INCH PCPS	L.F.	750.00	834.00	625,500.00	R8
100	4269	PRESTRESSED CONC. GIRDER 24 INCH PCPS	L.F.	750.00	1,680.00	1,260,000.00	R8
101	4269	PRESTRESSED CONC. GIRDER WF50G	L.F.	400.00	867.00	346,800.00	R8
102	4269	PRESTRESSED CONC. GIRDER WF58G	L.F.	450.00	2,911.00	1,309,950.00	R8
103	4269	PRESTRESSED CONC. GIRDER WF74G	L.F.	500.00	6,959.00	3,479,500.00	R8
104	4219	DEFICIENT STRENGTH CONC. PRICE ADJUSTMENT	CALC			9.00	B0
105		SAMPLE PANEL FOR PERMEON TREATMENT PROCESS	L.S.			7,000.00	
106	4196	PERMEON TREATMENT	S.Y.	30.00	21,073.00	632,190.00	B0

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		STRUCTURE					
107	4335	CONTRACTOR DESIGNED BURIED STRUCTURE NO. 1	L.S.			820,000.00	B0
108	4335	CONTRACTOR DESIGNED BURIED STRUCTURE NO. 2	L.S.			1,484,000.00	B0
109	4335	CONTRACTOR DESIGNED BURIED STRUCTURE NO. 3	L.S.			1,040,000.00	B0
110	4335	CONTRACTOR DESIGNED BURIED STRUCTURE NO. 4	L.S.			820,000.00	B0
111	4300	SUPERSTRUCTURE - CEDAR CREEK BRIDGE EB	L.S.			70,000.00	B0
112	4300	SUPERSTRUCTURE - CEDAR CREEK BRIDGE WB	L.S.			70,000.00	B0
113	4300	SUPERSTRUCTURE - TELEPHONE CREEK BRIDGE	L.S.			1,932,000.00	B0
114	4300	SUPERSTRUCTURE - HUDSON CREEK BRIDGE EB	L.S.			520,000.00	B0
115	4300	SUPERSTRUCTURE - HUDSON CREEK BRIDGE WB	L.S.			330,000.00	B0
116	4300	SUPERSTRUCTURE - UNNAMED CREEK (MP 67.1) BRIDGE EB	L.S.			1,400,000.00	B0
117	4300	SUPERSTRUCTURE - UNNAMED CREEK (MP 67.1) BRIDGE WB	L.S.			1,400,000.00	B0
118		WILDLIFE OVERCROSSING EB (CONTECH ARCH)	L.S.			4,050,000.00	
119		WILDLIFE OVERCROSSING WB (CONTECH ARCH)	L.S.			4,050,000.00	
120	4300	SUPERSTRUCTURE - WILDLIFE UNDERCROSSING MP 68.8 BRIDGE E	L.S.			800,000.00	B0
121	4300	SUPERSTRUCTURE - WILDLIFE UNDERCROSSING MP 68.8 BRIDGE W	L.S.			1,050,000.00	B0
122	4300	SUPERSTRUCTURE - SPARKS RD BRIDGE EB	L.S.			90,000.00	B0
123	4300	SUPERSTRUCTURE - SPARKS RD BRIDGE WB	L.S.			90,000.00	B0
124	4300	SUPERSTRUCTURE - KACHESS RIVER BRIDGE EB	L.S.			340,000.00	B0
125	4415	TRAFFIC BARRIER	L.F.	250.00	4,919.00	1,229,750.00	D0
126	4120	SEW PEDESTRIAN BARRIER	L.F.	400.00	186.00	74,400.00	D0
127		SEW TRAFFIC BARRIER - 42 IN.	L.F.	400.00	595.40	238,160.00	D0
128		WATERPROOFING MEMBRANE - WILDLIFE OVERCROSSING	S.Y.	80.00	3,056.00	244,480.00	X4
129	4474	CONCRETE FASCIA PANEL	S.F.	90.00	26,800.00	2,412,000.00	B0
130	4482	PREFABRICATED DRAINAGE MAT	S.Y.	25.00	840.00	21,000.00	G2
131	4483	PERMANENT GROUND ANCHOR	EACH	5,000.00	487.00	2,435,000.00	V7
132	4484	PERMANENT GROUND ANCHOR PERFORMANCE TEST	EACH	1,000.00	27.00	27,000.00	V7
133	4485	PERMANENT GROUND ANCHOR VERIFICATION TEST	L.S.			22,000.00	V7

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		STRUCTURE					
134	7169	STRUCTURAL EARTH WALL	S.F.	50.00	36,705.00	1,835,250.00	E0
135	5656	BRIDGE APPROACH SLAB	S.Y.	350.00	4,649.00	1,627,150.00	B0
		SURFACING					
136	5100	CRUSHED SURFACING BASE COURSE	TON	17.00	136,990.00	2,328,830.00	F6
		CEMENT CONCRETE PAVEMENT					
137	5625	CEMENT CONC. PAVEMENT	C.Y.	200.00	135,600.00	27,120,000.00	C0
138	5637	RIDE SMOOTHNESS COMPLIANCE ADJUSTMENT	CALC			976,320.00	C0
139	5638	CEMENT CONC. COMPLIANCE ADJUSTMENT	CALC			1,220,400.00	C0
140	5685	CORROSION RESISTANT DOWEL BAR	EACH	20.00	120,000.00	2,400,000.00	C0
		HOT MIX ASPHALT					
141	5711	PLANING BITUMINOUS PAVEMENT	S.Y.	5.00	35,121.00	175,605.00	A0
142	5738	HMA FOR PAVEMENT REPAIR CL. 3/8 IN. PG 64H-28	TON	100.00	7,462.00	746,200.00	A4
143	5766	HMA CL. 3/8 IN. PG 64H-28	TON	80.00	54,300.00	4,344,000.00	A4
144	5830	JOB MIX COMPLIANCE PRICE ADJUSTMENT	CALC			150,000.00	A4
145	5835	COMPACTION PRICE ADJUSTMENT	CALC			207,840.00	A4
146	5837	ASPHALT COST PRICE ADJUSTMENT	CALC			1,250,000.00	A4
147	6514	LONGITUDINAL JOINT SEAL	L.F.	3.00	75,000.00	225,000.00	A4
		EROSION CONTROL AND ROADSIDE PLANTING					
148	6463	CHECK DAM	L.F.	10.00	1,700.00	17,000.00	H0
149	6488	EROSION CONTROL AND WATER POLLUTION PREVENTION	L.S.			4,500,000.00	H0
150	6414	SEEDING, FERTILIZING, AND MULCHING	ACRE	3,500.00	24.80	86,800.00	T2
151		TOPSOIL TYPE A	C.Y.	20.00	110,000.00	2,200,000.00	
152		TALUS SLOPE DRESSING	S.Y.	8.00	30,250.00	242,000.00	
153	6546	PROJECT AREA WEED AND PEST CONTROL	EST.			100,000.00	M8
154	6630	HIGH VISIBILITY FENCE	L.F.	4.00	20,000.00	80,000.00	H0
155		SHREDDED WOOD MULCH	ACRE	7,000.00	62.50	437,500.00	
		TRAFFIC					
156	6645	AES. TR. BEAM GUARDRAIL TYPE 31	L.F.	35.00	6,355.00	222,425.00	J0

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		TRAFFIC					
157	6675	AES. TR. BEAM GUARDRAIL TYPE 31 9FT. LONG POST	L.F.	45.00	820.00	36,900.00	J0
158	6646	AES. TR. BEAM GUARDRAIL TRANSITION SECTION TYPE 21	EACH	5,000.00	27.00	135,000.00	J0
159	6650	AES. TR. BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL	EACH	6,000.00	28.00	168,000.00	J0
160	6776	PRECAST CONC. BARRIER TYPE 42 IN.	L.F.	110.00	45,875.00	5,046,250.00	N0
161		PRECAST CONC. BARRIER TRANSITION TYPE 42 IN.	EACH	3,500.00	27.00	94,500.00	D0
162		CONC. BARRIER TRANSITION TYPE 2 TO TYPE 42 IN. F SHAPE	L.F.	2,000.00			D0
163	6777	CAST-IN-PLACE CONC. BARRIER	L.F.	400.00	461.00	184,400.00	D0
164		CAST-IN-PLACE CONC. BARRIER TYPE 42 IN. TUNNEL BARRIER	L.F.	400.00	629.50	251,800.00	D0
165	6781	TEMPORARY BARRIER	L.F.	15.00	117,533.00	1,762,995.00	N0
166		BARRIER GAP - SINGLE SIDED	EACH	1,000.00	337.00	337,000.00	J0
167		BARRIER GAP - DOUBLE SIDED	EACH	1,500.00	1,033.00	1,549,500.00	J0
168	7440	TEMPORARY IMPACT ATTENUATOR	EACH	4,000.00	15.00	60,000.00	L6
169		RIGID GUIDE POST	EACH	50.00	200.00	10,000.00	K4
170		TEMPORARY RIGID GUIDE POST	EACH	50.00	602.00	30,100.00	K4
171		LDS BARRIER DELINEATOR	EACH	35.00	26,026.00	910,910.00	K4
172	6813	GROOVED PLASTIC LINE	L.F.	2.00	280,000.00	560,000.00	V6
173	6881	PLASTIC DRAINAGE MARKING	EACH	35.00	164.00	5,740.00	V6
174	6892	SHOULDER RUMBLE STRIP TYPE 1	MI.	5,000.00	23.70	118,500.00	E6
175	6889	RECESSED PAVEMENT MARKER	HUND	1,500.00	58.20	87,300.00	N2
176	6890	PERMANENT SIGNING	L.S.			100,000.00	U4
177	6896	TEMPORARY PAVEMENT MARKING-LONG DURATION	L.F.	0.75	466,506.00	349,879.50	N2
178	6898	CANTILEVER SIGN STRUCTURE NO. 1	L.S.			84,000.00	U8
179	6898	CANTILEVER SIGN STRUCTURE NO. 2	L.S.			83,000.00	U8
180	6898	CANTILEVER SIGN STRUCTURE NO. 3	L.S.			84,000.00	U8
181	6898	CANTILEVER SIGN STRUCTURE NO. 4	L.S.			85,000.00	U8
182	6898	CANTILEVER SIGN STRUCTURE NO. 5	L.S.			84,000.00	U8
183	6898	CANTILEVER SIGN STRUCTURE NO. 6	L.S.			98,000.00	U8

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		TRAFFIC					
184	6898	CANTILEVER SIGN STRUCTURE NO. 7	L.S.			98,000.00	U8
185	6898	CANTILEVER SIGN STRUCTURE NO. 8	L.S.			98,000.00	U8
186	6898	CANTILEVER SIGN STRUCTURE NO. 9	L.S.			101,000.00	U8
187	6904	ILLUMINATION SYSTEM	L.S.			40,000.00	H2
188	6914	ITS FIBER COMMUNICATION SYSTEM	L.S.			410,000.00	H4
189	6914	ITS CCTV 1	L.S.			6,400.00	H4
190	6914	ITS CCTV 2	L.S.			29,700.00	H4
191	6914	ITS CCTV 3	L.S.			29,700.00	H4
192	6914	ITS CCTV 4	L.S.			26,400.00	H4
193	6914	ITS CCTV 5	L.S.			29,700.00	H4
194	6914	ITS CCTV 6	L.S.			32,700.00	H4
195	6914	ITS CCTV 7	L.S.			37,600.00	H4
196	6914	ITS CCTV 8	L.S.			26,400.00	H4
197	6914	ITS CCTV 9	L.S.			6,400.00	H4
198	6914	ITS CCTV 10	L.S.			6,400.00	H4
199	6914	ITS CCTV 11	L.S.			32,700.00	H4
200	6914	ITS CCTV 12	L.S.			32,700.00	H4
201	6914	ITS CCTV 13	L.S.			6,400.00	H4
202	6914	ITS CCTV 14	L.S.			26,400.00	H4
203	6914	ITS CCTV 15	L.S.			32,700.00	H4
204	6914	ITS HUT 1	L.S.			70,000.00	H4
205	6914	ITS HUT 2	L.S.			70,000.00	H4
206	6914	ITS HUT 3	L.S.			70,000.00	H4
207	6914	ITS HUT 4	L.S.			70,000.00	H4
208	6914	ITS HUT 5	L.S.			80,000.00	H4
209	6914	ITS RADAR 1	L.S.			4,500.00	H4
210	6914	ITS RADAR 2	L.S.			4,500.00	H4

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		TRAFFIC					
211	6914	ITS RADAR 3	L.S.			4,500.00	H4
212	6914	ITS RADAR 4	L.S.			4,500.00	H4
213	6914	ITS RADAR 5	L.S.			4,500.00	H4
214	6914	ITS RADAR 6	L.S.			4,500.00	H4
215	6914	ITS RADAR 7	L.S.			4,500.00	H4
216	6914	ITS RADAR 8	L.S.			4,500.00	H4
217	6914	ITS RADAR 9	L.S.			4,500.00	H4
218	6914	ITS RADAR 10	L.S.			4,500.00	H4
219	6914	ITS RWIS	L.S.			9,000.00	H4
220	6914	ITS VMS 1	L.S.			93,020.00	H4
221	6914	ITS VMS 2	L.S.			93,020.00	H4
222	6914	ITS VMS 3	L.S.			93,020.00	H4
223	6914	ITS VMS 4	L.S.			93,020.00	H4
224	6914	ITS WILDLIFE CAMERA SYSTEM 1	L.S.			6,500.00	H4
225	6914	ITS WILDLIFE CAMERA SYSTEM 2	L.S.			6,500.00	H4
226	6914	ITS WILDLIFE CAMERA SYSTEM 3	L.S.			6,500.00	H4
227	6914	ITS WILDLIFE CAMERA SYSTEM 4	L.S.			6,500.00	H4
228	6914	ITS WILDLIFE CAMERA SYSTEM 5	L.S.			6,500.00	H4
229	6914	ITS WILDLIFE CAMERA SYSTEM 6	L.S.			6,500.00	H4
230	6914	ITS WILDLIFE CAMERA SYSTEM 7	L.S.			6,500.00	H4
231	6914	ITS WILDLIFE CAMERA SYSTEM 8A	L.S.			10,000.00	H4
232	6914	ITS WILDLIFE CAMERA SYSTEM 8B	L.S.			13,500.00	H4
233	6914	ITS WILDLIFE CAMERA SYSTEM 9A	L.S.			10,000.00	H4
234	6914	ITS WILDLIFE CAMERA SYSTEM 9B	L.S.			13,500.00	H4
235	6914	ITS WILDLIFE CAMERA SYSTEM 10A	L.S.			10,000.00	H4
236	6914	ITS WILDLIFE CAMERA SYSTEM 10B	L.S.			13,500.00	H4
237	6914	ITS WILDLIFE CAMERA SYSTEM 11A	L.S.			10,000.00	H4

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		TRAFFIC					
238	6914	ITS WILDLIFE CAMERA SYSTEM 11B	L.S.			13,500.00	H4
239		ITS - ELECTICAL VAULT 4848 INSTALL	EACH	550.00	12.00	6,600.00	H4
240		ITS - ELECTRICAL VAULT 5106 INSTALL	EACH	650.00	106.00	68,900.00	
241		ITS - ULITITY TRENCH	L.F.	57.00	34,700.00	1,977,900.00	
242	6945	CONDUIT PIPE 2 IN. DIAM.	L.F.	15.00	10,110.00	151,650.00	H2
243	6971	PROJECT TEMPORARY TRAFFIC CONTROL	L.S.			4,500,000.00	W3
		OTHER ITEMS					
244	9004	PROJECT PARTNERING	CALC			1.00	A1
245	7004	TYPE C PROGRESS SCHEDULE	L.S.			150,000.00	A1
246	7000	SCHEDULE UPDATE	EACH	5,000.00	30.00	150,000.00	A1
247	7006	STRUCTURE EXCAVATION CLASS B INCL. HAUL	C.Y.	15.00	34,200.00	513,000.00	I2
248	7007	SHORING OR EXTRA EXCAVATION TRENCH	S.F.	1.00	69,400.00	69,400.00	I2
249	7008	SHORING OR EXTRA EXCAVATION CLASS B	S.F.	2.50	195,972.00	489,930.00	I2
250	7017	GRAVEL BACKFILL FOR PIPE ZONE BEDDING	C.Y.	25.00	6,659.00	166,475.00	F6
251	7014	GRAVEL BACKFILL FOR DRAIN	C.Y.	50.00	1,274.00	63,700.00	F6
252	7029	PLUGGING EXISTING PIPE	EACH	500.00	60.00	30,000.00	G2
253	7037	STRUCTURE SURVEYING	L.S.			850,000.00	V3
254	7038	ROADWAY SURVEYING	L.S.			550,000.00	V3
255	7074	WIRE MESH SLOPE PROTECTION ANCHOR	EACH	100.00	80.00	8,000.00	X0
256	7078	CABLE NET SLOPE PROTECTION TYPE 1	S.F.	6.00	158,000.00	948,000.00	X0
257	7080	CABLE FENCE	L.F.	150.00	6,882.00	1,032,300.00	I6
258	7110	WIRE FENCE TYPE 1	L.F.	15.00	4,437.00	66,555.00	I6
259	7137	TEMPORARY BARRIER GLARE SCREEN	L.F.	10.00	55,139.00	551,390.00	I6
260		SNOW POLE	EACH	30.00	2,435.00	73,050.00	
261	7360	MANHOLE 48 IN. DIAM. TYPE 1	EACH	4,000.00	27.00	108,000.00	T8
262	7360	MANHOLE 48 IN. DIAM. TYPE 3	EACH	4,000.00	2.00	8,000.00	T8
263	7365	MANHOLE 72 IN. DIAM. TYPE 1	EACH	10,000.00	1.00	10,000.00	T8
264	7715	FORCE ACCOUNT CONTOUR GRADING	EST.			200,000.00	A1

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		OTHER ITEMS					
265	7715	FORCE ACCOUNT FENCE ADJUSTMENT	EST.			20,000.00	A1
266	7480	ROADSIDE CLEANUP	EST.			400,000.00	A1
267	7725	REIMBURSEMENT FOR THIRD PARTY DAMAGE	EST.			5.00	A1
268	7728	MINOR CHANGE	CALC			-1.00	A1
269	7730	FUEL COST ADJUSTMENT	CALC			1,916,000.00	A1
270	7731	STEEL COST ADJUSTMENT	CALC			100,000.00	A1
271	7732	AGGREGATE COMPLIANCE PRICE ADJUSTMENT	CALC			-1.00	A1
272	7736	SPCC PLAN	L.S.			5,000.00	A1
273	7530	CONSTRUCTION GEOTEXTILE FOR SEPARATION	S.Y.	5.00	3,600.00	18,000.00	G2
274	7554	CONSTRUCTION GEOTEXTILE FOR PERMANENT EROSION CONTROL	S.Y.	3.00	43,799.00	131,397.00	G2
275	7567	GRAVEL BORROW FOR STRUCTURAL EARTH WALL INCL. HAUL	C.Y.	30.00	307,805.00	9,234,150.00	I2
276	7561	SHOTCRETE FACING	S.F.	40.00	31,358.00	1,254,320.00	E4
277		INSTRUMENTATION FOR MSE AND SOLIDER PILE WALLS	L.S.			500,000.00	
278	7071	ROCK DOWEL TYPE 1	L.F.	160.00	660.00	105,600.00	S2
279	7073	FORCE ACCOUNT ROCK BOLT & ROCK DOWEL GROUT EXCEEDANCE	EST.			2,000.00	A1
280	7405	JUST IN TIME TRAINING	L.S.			10,000.00	A1
281	7077	WIRE MESH SLOPE PROTECTION	S.F.	5.00	90,000.00	450,000.00	X0
282		MODIFIED SINGLE GATE - 8FT	EACH	1,500.00	18.00	27,000.00	
283		MODIFIED DOUBLE GATE - 14 FT	EACH	4,500.00	3.00	13,500.00	
284		WILDLIFE EXLUSION FENCE - 12 FT SPACING	L.F.	100.00	40,093.00	4,009,300.00	
285		WILDLIFE EXCLUSION FENCE - STEEL POST	L.F.	60.00	4,442.00	266,520.00	
286		WILDLIFE SIGNS	L.S.			75,000.00	
					BASE TOTAL :	212,293,619.60	
		ALTERNATE A1					
287	7559	GEOSYNTHETIC RETAINING WALL	S.F.	25.00	196,581.00	4,914,525.00	G2

ITEM NO.	STD. NO.	ITEM DESCRIPTION	UNIT MEAS	UNIT PRICE	QUANTITY	AMOUNT	PRE-QUAL
		ALTERNATE A1					
288	7561	SHOTCRETE FACING	S.F.	40.00	190,194.00	7,607,760.00	E4
					ALTERNATE A1 TOTAL :	12,522,285.00	
		ALTERNATE A2					
289	7169	STRUCTURAL EARTH WALL	S.F.	50.00	202,122.00	10,106,100.00	E0
					ALTERNATE A2 TOTAL :	10,106,100.00	

BASE PLUS ALT A1 TOTAL : $ 224,815,904.60

BASE PLUS ALT A2 TOTAL : $ 222,399,719.60

Executive TEIS - Capital Projects System
Project Detail With Fund Types

I-90/Cabin Cr I/C to W Easton I/C Phase 3 - Add Lanes/Wildlife Bridges

ProjectID(PIN): 509093A **Contracting Method:** Design Bid Build **Percent Complete:** 6% **Revenue Package:** 2015 CW Pkg

Description: Construct six lanes and wildlife bridges on new alignment **Bond Eligible:** N

Book Description: The original concrete pavement on this section of I-90 east of Snoqualmie Pass is severely deteriorated and needs to be replaced. Unstable slopes result in rock and debris falling onto the highway. Drivers also experience stop-and-go traffic conditions due to increasing traffic volumes and collisions, including collisions with wildlife. This project will reconstruct I-90 on a new alignment and add a third lane in each direction to add capacity, improve sight distance, provide a smoother ride, and replace rapidly deteriorating pavement. The project will also address unstable slopes to reduce rock fall and construct new wildlife crossings to improve habitat connectivity and reduce collisions with wildlife.

Route:	Interstate 90 **Mile Posts:** 64.34 - 70.60	**DOT Region:**	South Central
Program/Sub-Program:	Improvement / Economic Initiatives	**County:**	Kittitas
Sub-Category:	Freight and Goods	**Congressional District(s):**	08
Improvement Types:	Rural/Urban Mobility - General Purpose	**Legislative Districts(s):**	13
Major Corridor:	I-90, Snoqualmie Pass - Corridor Improvements	**Urban Area:**	Unassigned
Project Origin:	Unassigned	**Location:**	West of Easton

PROJECT STATUS

Phase	Start Date	End Date	Phase Status
Preliminary Engineering	07/10/2017	07/29/2022	Active Delivery Project
Construction	03/21/2022	04/30/2029	Active Delivery Project

Milestone	Date	Actl
D - Project Definition Complete	06/19/2017	✓
B - Begin Preliminary Engineering	07/10/2017	✓
E - Environmental Doc Complete	03/27/2018	✓
A - Advertisement Date	01/18/2022	
O - Operationally Complete	10/15/2027	

PROJECT COSTS

Phase/Fund Type	Prior	19 - 21	21 - 23	23 - 25	25 - 27	27 - 29	29 - 31	31 - 33	33 - 35	35 - 37	Future	Total
Preliminary Engineering	6,877,660	12,715,461	3,306,878	0	0	0	0	0	0	0	0	22,900,000
State - CWA	6,877,660	12,715,461	3,306,878	0	0	0	0	0	0	0	0	22,900,000
Construction	0	0	63,000,000	119,600,000	112,300,000	20,641,000	0	0	0	0	0	315,541,000
State - CWA	0	0	63,000,000	119,600,000	112,300,000	20,641,000	0	0	0	0	0	315,541,000
Project Totals	6,877,660	12,715,461	66,306,878	119,600,000	112,300,000	20,641,000	0	0	0	0	0	338,441,000
State - CWA	6,877,660	12,715,461	66,306,878	119,600,000	112,300,000	20,641,000	0	0	0	0	0	338,441,000

PDA.4.2

NEPA Re-evaluation Approval for the I-90 Snoqualmie Pass East Project Phases 3, 4 and 5

March 27, 2018

William Sauriol, WSDOT SCR Region Environmental Manager

Liana Liu, FHWA WSDOT Area Engineer

I-90 Snoqualmie Pass East Project Final EIS Signature page

July 31, 2008

Megan White, WSDOT Environmental Services Director

Daniel M. Mathis, PE, FHWA Division Administrator

ECS Minor Report I-90 MP 70.3 to MP 70.6

September 20, 2021

William Sauriol, WSDOT SCR Region Environmental Manager

Liana Liu, FHWA WSDOT Area Engineer

Washington State
Department of Transportation

Intra-Departmental Communication

DATE: May 1, 2018

FROM: William Sauriol
SCR Environmental

SUBJECT: Approved NEPA Re-evaluation for the Interstate 90 Snoqualmie Pass East Project Phases 3, 4 and 5
MP 62 to MP 70.3; XL 5479
WIN E09017A

TO: Andrew Byrd, P.E.
SCR Project Development

This transmittal letter provides documentation for the approved I-90 Snoqualmie Pass East Project NEPA Reevaluation for Phases 3, 4 and 5 between MP 62 and MP 70.3. This documentation is to be included and retained in the project's official design file.

Project Environmental Classification/Clearances

The attached approved NEPA Re-evaluation summary includes the design updates from your office to the last 8 miles of this 15-mile corridor project since the publication of the 2008 Final Environmental Impact Statement (EIS), titled I-90 Snoqualmie Pass East Project, and tied to the October 6, 2008 FHWA Record of Decision (ROD) FHWA-WA-EIS-05-01-F.

After detailed review and analysis of the environmental disciplines found in the 2008 Final EIS, both FHWA and WSDOT determined that policy and design updates since the Final EIS did not individually or cumulatively constitute new impacts, mitigation measures or commitments outside those disclosed in the original Final EIS and did not involve unusual circumstances as defined in 23 CFR 71.117 (b), such that it would require the preparation of a supplemental EIS. WSDOT also reviewed the project under the State Environmental Policy Act (SEPA) and found the project was consistent with the SEPA analysis included in the Final EIS and SEPA Notice of Action Taken (NAT) issued on December 12, 2008 for this 15-mile corridor project.

Under the Endangered Species Act (ESA), a Biological Assessment (BA) was completed for the I-90 Snoqualmie Pass East Project in January 2008. The BA determined that the project **may affect, but is not likely to adversely affect** bull trout, **may affect, but is not likely to affect** spotted owl, and **may effect, but is not likely to adversely affect** marbled murrelet. The USFWS concurred in a Biological Opinion dated September 3, 2008 and NMFS concurred on April 7, 2008. Both the USFWS and NMFS conditioned their concurrence on WSDOT re-initiating ESA consultation for each subsequent phase of the project as funding and construction contracts were made available. WSDOT has completed ESA re-initiation for Phase 1 and 2 and expects to complete re-initiation for the next phase of the project by July 2019.

Section 106 consultation with the State Historic Preservation Office (SHPO), the US Forest Service and interested Tribes was completed as part of the Final EIS in 2008. During the NEPA reevaluation two areas near the project limits were added to the Area of Potential Effect (APE) and consulted on with SHPO, interested tribes and the US Forest Service to ensure compliance with Section 106 objectives. One prehistoric site near eastbound MP 69.4 that was already disclosed in the 2008 Final EIS has be re-identified near the existing highway that will need to be avoided and protected during construction. As with previous phases of the project, a phase specific unanticipated discovery plan (UDP) will be developed and included in all future construction phases of the project.

As part of the NEPA Re-evaluation, streams, jurisdictional waters and wetlands were updated to current regulation. As per the objectives of this project, new stream crossings for the project are expected to improve overall stream and hydrological conditions within the highway corridor. Combined, Phases 3, 4 and 5 are estimated to impact the following jurisdictional water features that will require permits and compensatory mitigation under the Clean Water Act, sections 401 and 404:

- Permanent Stream Impacts ~ 0.79 acres
- Temporary Steam Impacts ~ 1.07 acres
- Permanent Wetland Impacts ~ 4.75 acres
- Temporary Wetland Impacts ~ 2.63 acres
- Permanent Buffer Impacts ~ 12.63 acres
- Temporary Buffer Impacts ~ 3.53 acres

Project Commitments

The I-90 Snoqualmie Pass East Project has maintained a Commitment Tracking System (CTS) since 2008. NEPA level commitments for Phases 3, 4 and 5 are currently in CTS and permits conditions will be added to CTS as they are received. Due to the location of this project on US Forest Service lands this project also includes a number of long term commitments related to stormwater, mitigation, monitoring, HCZs/CEAs, maintenance, and wildlife fencing that are found in CTS. Attached is a list of specific commitments that were updated during this NEPA Re-evaluation process but is not the entire list of project commitments found in the Final EIS. For the complete list of project related commitments please request a copy of the current project CTS.

Project Permits and Approvals

The following environmental permits or approvals are expected for the remainder of the project.

- Letter of Consent (USFS with USBR concurrence)
- Special Use Permit(s) (USFS)
- Federal Timber Approval (USFS)
- Detour or Haul Road Approval (USFS)
- Section 401 Water Quality Certification (Ecology)
- Section 402 NPDES Stormwater (Ecology)
- Section 404 Individual (US Army Corps of Engineers)
- Hydraulic Project Approval (WDFW)
- Critical Areas Ordinance Compliance (Kittitas County)
- Flood Plain Development Permit (Kittitas County)
- Shoreline Management Compliance (Kittitas County)
- Noise Variance (Kittitas County)
- Water Use approval (Ecology)
- Forest Practice Permit (DNR)

Material Source Environmental Classification/Clearances

At this point of design, the remainder of the project is expected to be material balanced but may need specialize materials for specific elements of the project. If specialized materials are needed for the project they will come from approved private sources. Depending on the exact limits of each remaining phase, materials from one phase may be stored or moved to other locations of the project as needed for construction. No state-owned material source is expected to be needed but several material sources have been identified in the 2008 Final EIS for use as needed.

Design Transmittal Memo: I-90 Snoqualmie Pass East Project
Phases 3, 4 and 5 NEPA Re-evaluation
WIN E09017A

WS:mr

Attachments:
Signed NEPA Re-evaluation Summary
Encl: NEPA Re-evaluation Package (Design Office Project File)
Phases 3, 4 and 5 NEPA Re-evaluation updated Commitment List

cc: SCR Project Development (Brian White), cover letter & Re-evaluation Summary
SCR Program Management (Jeff Davis), cover letter & NEPA Re-evaluation Summary
SCR Program Management (Lori Van Horn-Harris), cover letter & NEPA Re-evaluation Summary
SCR Program Management (Tanya Harper), cover letter & NEPA Re-evaluation Summary
SCR Review (Greg Elder), cover letter & NEPA Re-evaluation Summary

I-90 Snoqualmie Pass East Phases 3, 4, & 5
Clarifications and Updates to NEPA Level Commitments through the 2018 Phases 3, 4 and 5 NEPA Reevaluation

Other I-90 Project 2008 Final EIS commitments found in Project CTS

Stampede Pass Stockpile: Stampede Pass Stockpile site shall be restored to native topography and with native plants before closing out the I-90 project. Final site conditions to the parking area outside the official stockpile site will be negotiated with the USFS during contract development of that phase of construction.

Cultural Sites: Site 45KT2196 is a National Register Eligible Historic Property and will be avoided and protected. This site will be marked and protected before any construction or ground disturbing activities occur. A cultural monitoring plan and Unanticipated Discovery Plan (UDP) shall be included in all construction contracts and the site monitored by a professional archaeologist.

Cabin Creek Sno-Park: WSDOT made the following commitments at Cabin Creek sno-park:

- During construction WSDOT will maintain egress and access through the sno-park and local Forest Service roads
- During construction WSDOT will maintain an equal area of parking during the winter season between October 1 and April 15
- WSDOT will restore the parking area of the finished project in a equal to or better conditions then it is currently
- WSDOT will widen the existing Cabin Creek overpass by 4 to 8 feet to improve public pedestrian safety over the interchange
- When construction is complete, there will be no net decrease of the easement area for the sno-park boundary

Visual: The project's Architectural Design Guidelines and Roadside Master Plan will be incorporated into the designs and construction contracts of the project.

Visual: During design and construction, minimize tree removal and vegetation clearing and grubbing within the project limits to the degree possible. This will lower water quality risks, potentially lower erosion control costs and improve negative visual impacts of the project.

Visual: Protect native understory species outside the project limits.

Visual: To the degree possible, construct and maintain a vegetative buffer along the on-ramp of Cabin Creek Interchange to provide visual screening between I-90 and Cabin Creek sno-park.

Visual: Incorporate and construct vegetative buffers along the outside lanes of the three largest curves of Amabilis Grade that are at least 10-feet wide to minimize driver views of existing BPA high voltage towers. Choose native plant species that will not cause damage to the roadway or structures of the interstate.

Federal Lands / Visual: Work with the Forest Service to incorporate restoration plans on new fill slopes using native vegetation that meet Forest Plan consistency, particularly around Amabilis Mountain.

Visual Mitigation: Develop designs and specifications for new Forest Service entry and exit signs for WSDOT and FHWA approval.

Easton Stockpile Site: Design and construct a vegetated berm between I-90 and the Easton Stockpile Site (MP 68.8-69.0) to reduce travelers views into the stockpile site.

Easton Stockpile Site: Minimize tree removal within the 100-foot forested buffer between the site and the interstate and plant additional native understory species between the stockpile site and the interstate to minimize views of the stockpile site.

Wildlife Objectives: Continue collaborating with the Forest Service on pre and post construction wildlife monitoring (plans, maintenance and long-term management) to design and document the project wide objectives of wildlife connectivity structures.

NEPA Commitments: Designs and construction of the project will incorporate the Ecological Connectivity Performance Standards and Mitigation Performance Standards of the Mitigation Development Team Report (FEIS Appendix D).

Project Approval: As part of providing approved easements for the remainder of the project, update Phase1 and 2 easement as part of the process. WSDOT's objective is to perfect the Phase 1 and 2 easement to those lands required for operation and maintenance of the Interstate but also add areas that were missed or under Special Use Permit that should be within the easement (stormwater facilities, avalanche fence, wildlife fencing, etc). Ensure all areas of Phases 3, 4 and 5 that are no longer required for highway purposes are reclaimed and revegetated, including the westbound lanes between MP 67.6 and MP 69.4.

Wildlife Fence: Construct all wildlife fence as close to the Interstate and within the WSDOT/FHWA easement as possible.

Minimize Impacts: WSDOT will continue to minimize environmental impacts to mature forest, wetlands, and vegetation, particularly around Amabilis Mountain.
Project Approval: WSDOT will provide the technical assistance and GIS support needed by the Forest Service to prepare the Forest Plan Consistency Analysis and update the FEIS Appendix W.
Project Approval: The Forest Service will provide WSDOT the draft Consistency Analysis Report prior to approving the Phase 3, 4, and 5 construction contracts. This report will address the compliance with laws and regulations that apply to the National Forest System Land and Forest Plan standards for scenery, species populations, forested habitat, riparian habitat, water quality and the Aquatic Conservation Strategy objectives.
Project Approval: The Forest Service will seek a Corridor Level Letter of Consent for the remainder of the 1-90 project to help streamline construction approvals. After construction all easements will be reduced to only the area necessary for the maintenance and operation of the Interstate. Forest Service easement approval requires review and approval of 30%, 60%, 90% PS&E and Final Contracts.

Washington State
Department of Transportation

Interstate 90
Snoqualmie Pass East Project
Phases 3, 4 and 5
NEPA Reevaluation

Introduction

The Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) reevaluate[1] National Environmental Policy Act (NEPA) documentation for Environmental Impacts Statements (EIS) when there have been substantial changes, or when major steps to advance a project have not occurred with three years of the Record of Decision (ROD).

In 2008, WSDOT completed the Final EIS and Section 4(f) Evaluation and FHWA issued ROD FHWA-WA-EIS-05-01-F for the Interstate 90 Snoqualmie Pass East Project[2] (I-90 project), a 15-mile corridor project on I-90 between Milepost (MP) 51 and MP 70.3 in Kittitas County, WA. FHWA and WSDOT are the lead agencies for the I-90 project under NEPA and the State Environmental Policy Act (SEPA). The Federal government is the primary land owner within the project area and the United States Forest Service (USFS) and United States Bureau of Reclamation (USBR) manage these lands and are NEPA cooperating agencies for the I-90 project.

In 2009, WSDOT started construction of the Select Alternative in phases as funding allowed. To date, WSDOT has completed Phases 1A and 1B. Phases 1C and 2A are currently under construction with an anticipated completion date of 2019. This will conclude the first seven miles of the 15-mile corridor project, from Hyak MP 55.1 to Price Creek vicinity MP 62.

In 2015, the Washington State Legislature passed the Connecting Washington Account that funded the remainder of the project from MP 62 to MP 70.3. WSDOT has been gathering additional geotechnical and survey data as well as updating project designs. Design changes since the 2008 EIS are included in this NEPA reevaluation.

WSDOT has divided the remainder of the project into three construction phases that take into account public safety, construction efficiency, material flow and funding constraints. Each phase is anticipated to occur sequentially as shown below and in ***Attachment A***.

Phase 3 – starts at approximately MP 67.4 and extends to the eastern end of the I-90 Project corridor at MP 70.3. This phase is described as Easton Hill vicinity to Easton, and construction is expected to begin in the spring of 2021.

Phase 4 – extends from the eastern limits of the Phase 2A project from MP 62 to approximately MP 64.5. This phase is described as Price Creek vicinity to Cabin Creek Interchange, and construction is expected to begin in the spring of 2022.

[1] WSDOT Environmental Procedure 400.06(1)
[2] Additional information on the I-90 project can be found in the 2008 Final EIS

Phase 5 – Phase 5 is located between Phase 3 and Phase 4 and extends from approximately MP 64.5 to MP 67.4. This phase is described as Cabin Creek Interchange to Easton Hill vicinity, and construction is expected to begin in the spring of 2026.

What has Changed Since the 2008 EIS?

Design changes since the 2008 EIS have been coordinated with and endorsed by the I-90 Interdisciplinary Team (IDT) made up of state and federal resource and permit agencies who have jurisdiction on the project.

Design modifications are graphically represented in ***Attachment B*** and include:

- The current westbound lanes near Easton Hill between MP 67.5 and MP 69.4 will be abandoned, reclaimed and restored to natural native conditions. The new westbound lanes will be constructed adjacent to the current eastbound lanes. WSDOT and the IDT expect that by combining the west and east bound lanes between MP 67.5 and MP 69.4, the overall duration of construction of the project can be reduced by at least one season. This change is also expected to reduce construction and long-term costs for wildlife exclusion fencing and improve wildlife connectivity.
- Stream crossings and hydrologic connectivity zones (HCZs) were updated after consulting with the US Forest Service on their Aquatic Conservation Strategy and the Washington State Department of Fish and Wildlife (WDFW) on current fish passage criteria. The design assumptions for these features had not been reviewed since the 2008 EIS.
- Bridge and wildlife crossing locations and lengths have been updated to meet design constraints while maintaining wildlife connectivity objectives. WSDOT and the I-90 IDT worked together to ensure that the design changes continued to meet or exceed wildlife connectivity objectives found in the EIS.

Connectivity Emphases Area (CEA)	Milepost	2008 EIS Design	2017 Design	Appendix B Page #
Bonnie Creek	62.3	600' Bridges	600' Bridges	1
Swamp Creek	62.5	120' Bridges	200' Bridges	1
	62.7	120' Bridges	80' Bridges	2
	63.2	120' Bridges	No large structure	2
Toll Creek	63.7	120' Bridges	200' Bridges	3
Hudson Creek (South Branch)	67.1	230' Bridges	230' Bridges	8
Easton Hill	67.6	Two 120' Bridges	One 150' Overcrossing	9
Kachess River	67.6 to 69.4	Split alignment	Combined alignment	9, 10
	68.6 vicinity	Two 150' Overcrossings	One 150' Overcrossing	9, 10
	69.5	100' Bridges	100' Bridges	11
Total Structure Length: measured as openness under or over the highway for wildlife		**1680'**	**1710'**	

Key design features of the remainder of the project are:

- Reconstruct I-90, adding a new lane in both directions from two to three
- Replace auxiliary lanes where warranted
- Reconstruct two existing interchanges, Stampede Pass and Cabin Creek
- Treat all impervious surface stormwater and bring the highway to current Highway Runoff Manual standards
- Improve cross highway stream and creek drainage
- Construct low mobility wildlife structures to improve safety and provide wildlife connectivity
- Construct seven pairs of new bridges (approximate lengths provided):
    - 600 feet MP 62.3 (Bonnie Creek)
    - 200 feet MP 62.5 (Unnamed Creek/Wildlife connectivity)
    - 80 feet MP 62.7 (Swamp Creek)
    - 200 feet MP 63.7 (Unnamed Creek)
    - 230 feet MP 67.1 (Unnamed/Hudson Creek)
    - 60 feet +/- MP 69.1 (Sparks Road)
    - 120 feet MP 69.5 (Kachess River)
- Construct two 150-foot-wide Wildlife Overcrossings at approximately MP 67.5 and MP 68.6
- Stabilize several rock slope areas
- Abandon and reclaim the westbound lanes near Easton Hill between MP 67.5 and MP 69.4 and add the new westbound lanes adjacent to the current eastbound lanes to meet wildlife connectivity commitments
- Construct several Hydrologic Connectivity Zones (HCZ's)
- Widen I-90 through a geotechnically challenging area around Amabilis Mountain, including placement of embankment and / or retaining structures

How did WSDOT Coordinate the Design Changes with Cooperating Agencies and the I-90 IDT?

WSDOT continues to regularly coordinate with the I-90 IDT to ensure design modifications and project progress are consistent with the environmental commitments found in the 2008 EIS. Since 2016, WSDOT has been consulting with the IDT on the design changes and sharing the geotechnical and construction constraints behind the project modifications found in this reevaluation. The IDT worked with WSDOT to ensure that the design modifications were consistent with the environmental commitments of the 2008 EIS, as well as help reduce the overall construction duration and improve wildlife connectivity expectations. IDT recommendations on the design modifications have been incorporated in the NEPA Reevaluation. Documentation on the IDT process, as well as IDT recommendations, are available upon request.

I-90 IDT members include:

- Federal Highway Administration (FHWA)
- U.S. Forest Service (USFS)
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- U.S. Bureau of Reclamation (USBR)
- National Marine Fisheries Service (NMFS)
- Washington State Department of Fish and Wildlife (WDFW)
- Washington State Department of Ecology (Ecology)
- Washington State Department of Parks and Recreation (State Parks)
- Kittitas County
- Washington State Department of Transportation (WSDOT)

How did WSDOT Coordinate the Design Changes with Tribes and the Public?

WSDOT provides ongoing outreach to interested tribes and the public through agency updates and media notifications. Annually, WSDOT specifically reaches out to the Colville, Snoqualmie, Muckleshoot, Tulalip, Wanapum and Yakama Tribal governments to provide project progress, news and solicit input. WSDOT's cultural program also communicates with tribal governments on project-related cultural findings and documentation. Public inquiries on the I-90 project have focused on minimizing construction and traffic related impacts. In 2016, WSDOT organized a public meeting for this project in Easton, Washington and 8 local citizens attended. Comments received at this public meeting focused on management of Snoqualmie Pass closures during construction and winter events, emergency service access during construction, as well as completing the project in a safe and timely manner. WSDOT will continue to reach out to the public and interested tribal governments about the I-90 project as phases are designed and constructed.

How were the Design Changes Analyzed for the Reevaluation?

WSDOT completed this reevaluation in accordance with 23 CFR §771.129 and 23 CFR §771.130, the WSDOT Environmental Manual (M 31-11.17, WSDOT 2017) and WSDOT guidance for NEPA reevaluations (WSDOT 2012). WSDOT reviewed and analyzed the environmental disciplines, mitigation measures, commitments and best management practices (BMPs) outlined in the 2008 Final EIS.

The NEPA reevaluation for Phases 3, 4 and 5 compares the design modifications and policy changes that have occurred since the 2008 FEIS and ROD. ***Appendix B*** provides a graphic comparison between the 2008 EIS and current design footprints.

Comparisons of Effects

Will the design modifications change effects from what was identified in the 2008 FEIS?

The 2008 FEIS identified expected impacts to natural, socio-economic and manmade resources from the project. As a part of this reevaluation the affected environments and consequences found in the 2008 EIS were reviewed, updated and analyzed as needed to determine if changes in project designs or regulatory policy lead to additional environmental impacts.

What are the results of the updated NEPA analysis?

The analysis in this NEPA reevaluation conclude that Phases 3, 4 and 5 remain consistent with the commitments, mitigation strategy and findings found in the 2008 FEIS and ROD. The summary for each environmental discipline is found below. Documentation supporting the findings below are found in ***Appendices C through H*** or available upon request.

No Change Disciplines:

After review, no changes in impacts were found for the following disciplines identified in the 2008 FEIS:

- Air Quality
- Energy
- Geology and Soils
- Hazardous Materials
- Social and Economic

Fish, Wildlife and Habitats – Endangered Species Act (ESA). WSDOT completed formal consultation with USFWS and NMFS for the entire 15-mile project and committed to reinitiate as additional phases of the project were designed. To date there have been eight (8) reinitiations since the 2008 FEIS on design phases and construction related modifications. WSDOT also communicates with USFWS and NMFS as designs progress to minimize project risks to fish, wildlife and habitats, including Designated Critical Habitat (DCH) under the ESA.

The overarching improvements that the project provides are expected to improve baseline conditions for fish and wildlife species found in the project area. Wildlife and ESA commitments, compensatory mitigation measures and Best Management Practices (BMPs) found in the 2008 FEIS continue to be the key ESA protection methods for the remainder of the project.

WSDOT continues to consult with the Services to update changes in ESA listings and project designs that may result in effects to the following species in a manner, or to an extent, not covered by the original consultation (2008 FEIS): Carnivores (gray wolf, grizzly bear, Canada lynx, and wolverine), marbled murrelet, northern spotted owl, northern spotted owl DCH, bull trout, bull trout DCH, MCR DPS steelhead, and MCR DPS steelhead DCH.

The design modifications in this reevaluation have been shared with USFWS, NMFS and the USFS who support the design modifications as an improvement to the original designs found in the 2008 FEIS.

Historic, Cultural and Archaeological Resources. No additional cultural or archeological resources were identified for the project. WSDOT reviewed the existing Area of Potential Effect (APE) and added two small areas to the APE to ensure no additional cultural risk to the project. Both DAHP and the US Forest Service were consulted and concurred with the revised APE and findings. WSDOT will continue to avoid and minimize risks to historic and cultural resources and update Unanticipated Discovery Plan for the project that will be incorporated in construction contracts for each phase of the project.

Land Use. The project continues to be consistent with US Forest Service land management plans, as well as Kittitas County land use plans. Compared to the 2008 FEIS, the updated land acquisition estimate for the remainder of the project is within 1 and 3 acres of the 2008 FEIS estimate.

Noise. The 2008 FEIS found that a noise wall at Lake Easton State Park would be both feasible and reasonable and WSDOT committed to update the noise study when funding for that phase of the project was available. In 2017, WSDOT completed an updated noise study. The updated report found that the traffic growth rate changed from 2.1% to 1.0% and changes to FHWA noise reasonableness criteria concluded that a noise wall at Easton State Park was still feasible, but not reasonable. Therefore, noise walls are not justified. WSDOT also used this opportunity to identify and update all sensitive receptors for the remainder of the project. The noise study found that no sensitive receptors qualified for noise abatement. The report did find that the design modification of combining the east and westbound lanes reduced projected noise levels for a sensitive residential development north of Easton near MP 69.1. WSDOT is working with Lake Easton State Park to determine if there are less formal noise mitigation measures that may reduce the perception of noise impacts at campsites closest to I-90.

Public Services and Utilities. No new utilities were identified beyond those found in the 2008 FEIS. This analysis focused on identifying and managing potential risks to Bonneville Power Administration's (BPAs) high voltage transmission lines and towers, as well as reviewing existing access breaks on I-90 with BPA and other utilities. The analysis concluded that the project will not impact existing high voltage power lines or towers and that WSDOT will continue to coordinate with BPA and other utilities on existing access breaks along I-90.

Section 4(f) Recreation Resources. The 2008 FEIS identified the Cabin Creek Sno-Park (MP 64) as the only Section 4(f) recreational resource in the remaining portion of the project. As discussed in the 2008 FEIS, the project will result in a temporary occupancy of the Cabin Creek Sno-Park. Since 2008, WSDOT has maintained a Special Use Permit (SUP) with the US Forest Service for temporary use of this sno-park during the non-winter recreational season of October 1 to April 15.

Phase 4 will replace the Cabin Creek Interchange (MP 64). To ensure access to and through the sno-park during construction, WSDOT will build the new Cabin Creek Interchange bridge adjacent to the existing interchange bridge, allowing vehicle and pedestrian access to and through the sno-park, as well as local roads, during construction. The new interchange bridge will be 4 to 6 feet wider, improving pedestrian safety. The new interchange will be slightly higher to accommodate taller vehicles under the interchange. New interchange on/off ramps, as well as the sno-park parking area will be elevated accordingly. WSDOT is committed to a no net loss of parking or easement area at the sno-park as a result of the project and the site will be returned in the same or better conditions then it is currently.

Transportation. In 2008 WSDOT estimated the annual traffic growth rate at 2.1 percent using a combination of data sources. In 2016 WSDOT updated the estimated annual traffic growth rate to 1.0 percent using a permanent automatic traffic counter located near Cabin Creek (MP 63.98).

The primary reasons for the Annual Average Daily Traffic volumes for both the 2008 and 2016 traffic analysis are compared in the following table:

Analysis Year	Base Year	Design Year	Growth Rate	Base Year AADT	Design Year AADT
2008	2010	2030	2.1%	29,800	41,200
2016	2016	2041	1.0%	30,482	39,300

Visual Quality. The 2008 FEIS remains the guiding document for visual commitments and mitigation measures for the project. I-90 is a designated State and National Scenic Byway and an updated Visual Report was developed to incorporate visual expectations early in the design process and update specific

areas of the project where visual mitigation was best suited. During the visual update WSDOT worked with the USFS Landscape Architect to help ensure consistency on the scope and analysis for the report.

As found in the 2008 FEIS Visual Report, the most challenging area for visual quality is between MP 64.5 and MP 67.4, within the steep geotechnically challenging slopes of Amabilis Mountain. This area will require fill materials and retaining walls and will expose more of the Bonneville Power Administration (BPA) high voltage power corridor south of I-90. In 2017, WSDOT worked to minimize fill and tree impacts in large sections of this area as compared to the 2008 FEIS. As designs progress, WSDOT will continue to look for opportunities to reduce visual impacts by avoiding existing trees, incorporating visual screening (vegetative buffers, 42 inch barrier, berms) and providing extensive post construction revegetation.

The project's *Architectural Design Guidelines* and *Roadside Master Plan* continue to be the key visual mitigation commitment for the project. In accordance with the *Architectural Design Guidelines,* WSDOT will apply a consistent Cascadian theme to all bridges and structures within the project. The *Architectural Design Guidelines* were collaboratively developed with the US Forest Service and the Mountains to Sound Greenway due to the project's location on National Forest lands and a State and National Scenic Byway.

Water Resources. No changes were identified or anticipated for water resources.

The project will provide stormwater treatment where little to no stormwater treatment exists today. Baseline conditions for streams, flood plains and shallow ground water are expected to be improved by constructing larger culverts, bridges, Hydrological Connectivity Zones (HCZs) and extensive post construction habitat restoration. WSDOT will continue to work with US Forest Service and WDFW to meet current state and federal guidelines as well as the Mitigation Development Team (MDT) Recommendation Package referenced in the 2008 FEIS.

Wetlands and other Jurisdictional Waters. Wetlands delineations were updated from the original 2004 delineations using Ecology's 2014 revised Washington State Wetland Rating Systems for Washington and updated other regulatory changes for indirect permanent impacts. Changes in wetland impacts since the 2008 FEIS are due to both wetland policy changes and project design modifications. As designs progress wetland impacts will continue to minimized to the degree possible. The results of policy and project modifications are provided below:

Permanent and Temporary Wetland Impact Comparison (Acres)

	2008 FEIS Footprint (R03)		Current Design Footprint (R11)		Difference due to Wetland Update[1]		Difference due to Design Update[2]		Total Difference	
Phase	**Perm.**	**Temp.**	**Perm.**	**Temp.**	**Perm.**	**Temp.**	**Perm.**	**Temp.**	**Perm.**	**Temp.**
3	*0.76*	*0.52*	*0.60*	*0.25*	*0.02*	*0.02*	*-0.19*	*-0.29*	*-0.17*	*-0.27*
4	*0.52*	*1.54*	*1.69*	*2.30*	*0.58*	*-0.06*	*0.59*	*0.83*	*1.17*	*0.76*
5	*2.16*	*1.24*	*2.46*	*0.07*	*-0.30*	*-0.85*	*0.60*	*-0.33*	*0.30*	*-1.17*
TOTAL	***3.45***	***3.31***	***4.75***	***2.63***	***0.31***	***-0.89***	***0.99***	***0.21***	***1.30***	***-0.68***

1 – Wetland impact difference between FEIS and 2017-updated wetland boundaries using Footprint R03.
2 – Wetland impact difference between Footprint R11 and Footprint R03 using FEIS wetland boundaries.

The comparison of Wetland Categories between the 2008 FEIS and the current designs are shown in the following table:

Wetland Category Wetland Impact Comparison (Acres)					
Wetland Category	2008 FEIS Footprint R03	Current Design Footprint R11	Difference due to Wetland Update[1]	Difference due to Design Update[2]	Total Difference
I	*0.19*	*0.59*	*0.02*	*0.38*	*0.40*
II	*0.68*	*2.34*	*1.37*	*0.29*	*1.66*
III	*2.10*	*1.20*	*-1.13*	*0.23*	*-0.90*
IV	*0.48*	*0.62*	*0.04*	*0.10*	*0.14*
TOTAL	***3.45***	***4.75***	***0.31***	***0.99***	***1.30***

1 – Wetland impact difference between FEIS and 2017-updated wetlands boundaries and ratings using Footprint R03.
2 – Wetland impact difference between Footprint R11 and Footprint R03 using 2017-updated wetland boundaries and ratings.

Mitigation

Will the design modifications in Phases 3, 4, & 5 require additional mitigation?

No new mitigation measures were identified as part of this reevaluation. Project commitments and mitigation strategies found in the 2008 FEIS and ROD will continued to be employed in the remainder of the project. Mitigation measures will continue to focus on avoidance and minimization of natural resource impacts; increasing fish and wildlife passage through bridges and culverts designed with *Ecological Connectivity* and wildlife migration; improving stream morphology, floodplain function, and aquatic life passage; 100% stormwater treatment; wetland and stream restoration; pre and post construction wildlife monitoring; and incorporation of Cascadian Style architecture designs into bridges and structures.

Cumulative Effects

The design modifications of the project do not change the cumulative effects in the area. In 2014, the Bureau of Reclamation released a draft EIS that would construct a large underground irrigation tunnel between Keechelus Lake and Kachess Lake that would pass under I-90. WSDOT provided written comments and requested additional information to help ensure the tunnel would not physically impact I-90, including long term wildlife or wetland mitigation commitments. Communication in early 2018 with the Bureau indicated that the tunnel project is still being considered but was not a priority project, had not been advanced and was not funded at this time.

The I-90 project remains consistent with local and regional land use plans, economic and transportation plans, fish and wildlife protection and connectivity plans, stream and floodway protection plans, as well as stormwater treatment plans.

Finding and Conclusion

Based on the information contained in this NEPA reevaluation we find that:

1. The project remains consistent with applicable federal, state and local regulations, including the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA).
2. The design modifications to the project since the 2008 Final EIS and Record of Decision FHWA-WA-EIS-05-01-F do not pose new or unmitigated impacts that were not disclosed in the 2008 Final EIS.
3. The environmental commitments and compensatory mitigation measures found in the 2008 Final EIS and ROD remain applicable and consistent with this reevaluation and the project.
4. That a Supplemental EIS is not required and no further environmental evaluation is required.

William M. Sauriol

WSDOT Regional Office

Date: 3/27/18

FHWA Official Liana Liu

Date: 3/27/2018

FHWA-WA-EIS-05-01-F

Interstate 90 Snoqualmie Pass East
Kittitas County, Washington
Final Environmental Impact Statement
Submitted Pursuant to 42 USC 4332(2) (c) (and where applicable 49 USC 303)
by the
US Department of Transportation
Federal Highway Administration
and
Washington State Department of Transportation
Cooperating Agencies include: United States Forest Service
and
United States Bureau of Reclamation

7/31/08
Date of Approval

Megan White
Environmental Services Director
Washington State Department of Transportation

07/31/08
Date of Approval

Daniel M. Mathis, PE
Division Administrator
Federal Highway Administration

The following persons may be contacted for additional information concerning this document:

Liana Liu, Area Engineer
Federal Highway Administration
Washington Division
711 South Capitol Way, Suite 501
Olympia, WA 98501
Telephone (360) 753-9553

Jason Smith, Environmental Manager
Washington State Department of Transportation
1710 South 24th Avenue, Suite 100
Yakima, WA 98902
Telephone (509) 577-1921

In accordance with the National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA), the Interstate 90 (I-90) Snoqualmie Pass East Final Environmental Impact Statement (EIS) evaluates environmental conditions within a 15-mile corridor of I-90 in Kittitas County, Washington. The project corridor begins on the eastern side of Snoqualmie Pass at milepost (MP) 55.1 east of the Hyak interchange and ends at MP 70.3 near Easton. The Washington State Department of Transportation (WSDOT) proposes to improve the corridor to meet project needs (avalanches, unstable slopes, structural deficiencies, traffic volume, and ecological connectivity). After considering various route alternatives, WSDOT has identified a Preferred Alternative. A limited number of hard copies or CDs of this document are available free of charge by contacting Jason Smith at the above address.

Washington State Department of Transportation

ECS Minor Report

WIN/Title: W100031 - I-90 IT camera modification MP 70.3 to MP 70.6 **ECS Id:** W100031-1

WSDOT Approval

Region Environmental Contact	Phone
Mark Reynolds	509-577-1929

Approval

Sauriol, William

9/20/2021

Federal Highway Administration — Date

Region Environmental Manager — Date

Electronically signed through a secure system.

Part 1 - Project Description

PIN(S):

Federal Aid Number:	
Description of Work:	As part of the I-90 SPE Phase 3 contract an existing IT traffic camera will be updated and moved to accommodate the larger project. The traffic camera modification is just outside the official Final EIS limits that end at MP 70.3. The existing camera for this ECS is located between MP 70.3 and 0.6 and this ECS is to ensure environmental approvals for the work outside the official Phase 3 limits.
Needs & Purpose:	The traffic monitoring equipment at this location is outdated and needs to be brought up to current specifications and will be added to the contract for I-90 SPE Phase 3 PIN 509093A.
Statement of purpose:	The purpose of this project is to replace obsolete CCTV cameras and equipment to improve the visual quality for monitoring highway conditions.

Project Location

SR: 90 Begin MP: 70.3 End MP: 70.6

WSDOT Region: South Central

County/Counties: Kittitas

Right of Way

Will ROW be needed for this project? No

ROW Notes:

WIN/Title: W100031 - I-90 IT camera modification MP 70.3 to MP 70.6 **ECS Id:** W100031-1

Section, Township, Range: Section 11, Township 20N, Range 13E

Statewide Transportation Improvement Program (STIP) Confirmation

Are all phases of the project included in the STIP? Yes

list the STIP/STIP Addendum: 509093A19

Part 2 - Project Environmental Documentation

NEPA Classification: FHWA Categorical Exclusion (CE) 23 CFR 771.117

NEPA Subsection: C22: Project within the existing operational ROW

SEPA Classification: Categorical Exemption

SEPA Subsection: WAC 197-11-800(23) Installation, relocation, maintenance and operation of utilities

Federal Agency Concurrence is required: ☐

Endangered Species Act

USFWS Consultation:	Formal	Determination:	May affect likely to adversely affect	Date:	8/13/2019
NOAA Consultation:	Informal	Determination:	May affect not likely to adversely affect	Date:	10/15/2019

National Historic Preservation Act: Section 106

Has a Cultural Resources Specialist review this project? *Yes*

Is the project on tribal lands? *No*

Is the project on Forest Service or other Federal land? No

Are there any National Register-eligible historic bridges within the project limits? No

Is the project exempt from further review under the 2018 Programmatic Agreement with FTA, FHWA and SHPO? Yes

Exemption(s): A-2 Installation, replacement, or repair of maintenance equipment, safety appurtenances, and traffic control devices, including but not limited to guardrails, barriers, glare screens, snow and ice detectors, energy attenuators, cameras, lighting, signs, signals, and informational signage/kiosks, provided the activity is in-kind replacement or does not include ground disturbance or is within the demonstrated vertical and horizontal limits of previous construction or disturbance.

Will a cultural resources survey be required?

Determination of effect:

Date of SHPO concurrence with determination:

If Adverse Effect, date of execution of Memorandum of Agreement:

Notes:

WIN/Title: W100031 - I-90 IT camera modification MP 70.3 to MP 70.6 **ECS Id:** W100031-1

Part 3 - Permits & Approvals

Federal:

- ☐ US Army Corps of Engineers
  - ☐ Section 404 ☐ Section 10
  - ☐ Nationwide Type:
  - ☐ Individual
- ☐ US Coast Guard
  - ☐ General Bridge Act

  Contact Date:
  - ☐ Private Aids to Navigation (non-bridge project)

Local:

- ☐ Critical Areas Ordinance Compliance (CAO)

  Issuing Agency:

  List of CAO permits in notes section.
- ☐ Jurisdictional Stormwater Manual

  Issuing Municipality:
- ☐ Noise Variance (e.g. nighttime construction or maint.)

  Issuing Agency: kittitas county
- ☐ Flood Plain Development Permit

  Issuing Agency:
- ☐ Shoreline Management Program

  Issuing Agency:

  Permit Type:

Other Plans/Approvals:

- ☐ MBTA Permit Required
- ☐ BE Permit Required or Bird Management Plan Required
- ☐ Incidental Harassment Authorization
- ☐ Other

State:

- ☐ Hydraulic Project Approval (HPA)
- ☐ General Hydraulic Project

  Type:
- ☐ Section 401 Water Quality Certification

  Certifying Entity:

  Certification Type:
- ☐ Aquatic Use Authorization (WDNR)
- ☐ Coastal Zone Management Certification (CZM)

  County: Unassigned
- ☐ Forest Practice Approval

  Agency Name:
- ☐ NPDES Construction Stormwater Permit
  - ☐ General
  - ☐ Individual
- ☐ Temporary Erosion Sediment Control Plan (TESC)
- ☐ GEO 21-02

Tribal:

Tribe Name:

List of permits and approval in the Notes section below.

Notes:

WIN/Title: W100031 - I-90 IT camera modification MP 70.3 to MP 70.6 **ECS Id:** W100031-1

Part 4 - Environmental Context

4a) Air Quality

1. Is the project located in a maintenance or nonattainment area? *No*
2. Is the project likely to have > 140,000 AADT? *No*

4b) Critical Areas/Resource Lands

1. Will the project affect fish, wildlife or habitat? *No*
2. Are there fish barriers present within the project Area? No

   Is the project within the Injunction Case Area Boundary?
3. Is there the potential to impact MBTA? No

   Was an MBTA survey conducted?
4. Is the project located in a Sole Source Aquifer? *No*
5. Will the project impact a geologically hazardous area? *No*
6. Will the project require work in water or below the estimated OHWM? *No*
7. Is the project located in a 100-year Floodway? *No*

   Is the project located in a 100-year Floodplain?
8. Will other resource land (i.e. forest lands, mineral resource lands) be impacted? *No*

4c) Hazardous Materials

1. Does the project require excavation below the existing ground surface? *Yes*
   a. Is the project located within 1/2 mile radius of any Ecology listed sites that have the potential of impacting the project during construction?
2. Does the project require excavation below the existing roadway prism? Yes
   a. Will groundwater be encountered in an area of known contamination? *No*
3. Will any properties be acquired as part of this project? *No*
4. Does the project anticipate conducting modifications(renovation or demolition) to any WSDOT structures?(Ex.bridges or WSDOT buildings) No

   If "No', Please contact your Hazardous Materials Specialist.
6. Based on the information above and the project specific activities, is there a potential for the project to acquire any known or potentially contaminated properties, or encounter contaminated soils, groundwater or surface water? *No*

   Therefore, based on the proposed project description and construction activities, WSDOT is unlikely to assume liability for cleanup of contaminated soil or groundwater as part of this project, and it is concluded that no significant, unavoidable adverse impacts that cannot be mitigated for are expected for the following reasons: 1) No known or suspected contaminated properties are being acquired; 2) Soil disturbance is anticipated to be less than 1 foot below ground surface with no known or suspected contamination; 3) Contaminated groundwater will not be encountered as part of this project. No further investigation is warranted at this time.

4d) Noise

1. Is this project a Type 1 noise project? *No*
2. Do previous noise mitigation commitments exist within or adjacent to the project limits? No
3. Is a noise study required?

4e) Land Use

1. Are there any Section 4(f) resources (parks, recreation areas, wildlife refuges, historic properties)impacted/used within the project limits? No
5. Are there any properties within the project limits that used funds from the Land & Water Conservation Fund Act or any other RCO grant funds? No
6. Is there a Wild and Scenic River (state or federally designated, "study river", or on the National Rivers Inventory) in or near the project area? No
7. Is the project located on a Scenic Byway? *Yes*
   Name: Mountains to Sound Greenway
8. Is the project located on a State Scenic & Recreational Highway? *Yes*
   Scenic classification : Mountain to Sound Greenway / BX
   (per Utilities Accommodation Policy Manual M 22-86).
9. Will farmland be converted for the project? No

4f) Title VI/Environmental Justice

1. Will the project require detailed EJ analysis? *No*
   Exemption number and description:

4g) Water Quality/Stormwater

1. Will the project increase runoff? *No*
2. Will water quality treatment be required per the HRM or a more stringent manual local stormwater management manual? *No*
3. Does a TMDL waterbody have the potential to receive a discharge? *No*
4. Does a 303d waterbody have the potential to receive a discharge? *No*

4h) Visual Quality/Roadside Policy Manual/Aesthetics

1. Will the project disturb the roadside? (e.g. Cuts, fills, new lighting, clearing & grading, realignment, structures) *No*
2. Will the project disturb Resource Conservation Areas? (See Roadside Poicy Manual M 3110) *No*

WIN/Title: W100031 - I-90 IT camera modification MP 70.3 to MP 70.6 **ECS Id:** W100031-1

Attached Files
ESA Review for I-90 Phase 3 - Utility pole at MP 70_6.msg
Sec 106 Review for I-90 SPE Phase 3_MP 70_3 to MP 70_6 Utility Modification.msg
USFWS I-90 SPE BO Aug 2019.pdf
NOAA I-90 SPE BO Oct 2019.pdf

From: Norman, Mark
To: Reynolds, Mark
Subject: I-90 Phase 3 - Utility pole at MP 70.6
Date: Tuesday, August 31, 2021 10:17:18 AM

Mark,

I have reviewed the addition of a utility pole at MP 70.6 as it relates to ESA consultation on the I-90 Snoqualmie Pass East Project. This work is located within the action area previously analyzed and effects to listed species will remain consistent with the existing consultation.

Please let me know if you need anything else.

Regards,
Mark

Mark Norman
SCR Biology and Mitigation Lead
Cell: (509) 969-9005

From:	Williams, Scott
To:	Reynolds, Mark
Cc:	Sauriol, William; Bower, Doc
Subject:	RE: I-90 SPE Phase 3, MP 70.3 to MP 70.6 Utility Modification
Date:	Wednesday, September 1, 2021 2:13:37 PM

Mark,

This can be exempted under A-2 of the Statewide Programmatic Agreement.

Thanks,

Scott S. Williams
Cultural Resources Program Manager, WSDOT
Ph: 360-810-0891

From: Reynolds, Mark <ReynoMR@wsdot.wa.gov>
Sent: Wednesday, September 1, 2021 8:54 AM
To: Williams, Scott <WilliaS@wsdot.wa.gov>
Cc: Sauriol, William <SaurioW@wsdot.wa.gov>; Bower, Doc <BowerD@wsdot.wa.gov>
Subject: I-90 SPE Phase 3, MP 70.3 to MP 70.6 Utility Modification
Importance: High

Scott, thanks for discussing I-90 Phase 3 details with us last week. This is a follow up email regarding the IT Traffic Camera modifications needed to be added to the Phase 3 contract. This utility modification is outside the official Final EIS end MP limits of MP 70.3. You thought that you could provide us a quick Cultural Resource exemption on this.

I have attached the specific plan sheets for the IT camera work and photos of the area. As well, a draft memo describing the work is attached. Worst case scenario is the relocation will be up to 200 east but the Traffic Office believes it will be less but the highway work will determine it's final relocation.

Generally, the work will move an existing IT traffic camera cabinet and pole east; run new underground conduit from the existing location to the new; and add a new camera and microwave dish. The work site appears completely worked from previous highway improvements and is within the existing ROW.

Please let me know if you have any questions on this so I can provide you the information quickly. We are hoping to get your concurrence within this week if possible.

Mark Reynolds
SCR Environmental Coordinator
Cell 509.895.4199
Video conferencing available through MS Teams

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
Central Washington Field Office
215 Melody Lane, Suite 103
Wenatchee, WA 98801-8122

In Reply Refer To:
13260-2008-F-0119-R001
X-Ref: 01EWFW00-2008-F-0070, R001, R002, 13260-2008-I-0119
01EWFW00-2014-I-0745, 01EWFW00-2014-I-0796, 13260-2008-B-0013

Daniel Mathis
U.S. Department of Transportation
Federal Highway Administration
711 Capital Way South, Suite 501
Olympia, Washington 98501-1284

Dear Mr. Mathis:

This letter responds to your request for reinitiation of formal consultation on the I-90 Snoqualmie Pass East Project for Phase 3 and 4 (Project). Reinitiation of consultation in accordance with section 7(a)(2) of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*) was prompted by new information that revealed effects of your agency's action that may affect critical habitat of a listed species in a manner or to an extent not considered in the U.S. Fish and Wildlife Service's (Service) previous project-wide informal consultation (Service Reference 13260-2008-I-0119) completed in August 2008.

The Service received a biological assessment (BA) along with a letter requesting reinitiation of consultation from the Washington State Department of Transportation (WSDOT, the official non-Federal designee of the Federal Highway Administration) on April 9, 2019, and it was received by our office on April 11, 2019. The consultation concerns the possible effects of re-aligning, widening, and meeting other Project needs along an 8.3-mile portion of Interstate Highway 90 (I-90) between the towns of Hyak and Easton in Kittitas County, Washington. You requested formal reinitiation of a previously informal consultation regarding the Project and its effects on the revised designated critical habitat (critical habitat) for the northern spotted owl (*Strix occidentalis caurina*; spotted owl). After reviewing the new information, we concur that it does not indicate a need to change our previous analysis of effects to any other listed species or designated critical habitat.

The enclosed Biological Opinion (Opinion) is based on information provided in the BA, field investigations, meetings, electronic correspondence, and other sources of information cited in the Opinion. A complete record of this consultation is on file at the Central Washington Field Office

in Wenatchee, Washington. An electronic copy of this Opinion will be available to the public approximately 14 days after it is finalized and signed. A list of Opinions completed by the Service since October 1, 2017, can be found on the Service's Environmental Conservation Online System (ECOS) website at http://ecos.fws.gov/ecp/report/biological-opinion.html.

Before consultation under the Act began on the I-90 Snoqualmie Pass East Project, the Federal Highway Administration (FHWA), WSDOT, and the Service agreed that the large scale and long implementation schedule of this Project would require frequent reinitiation of consultation. We all anticipated that ongoing refinement of designs, analysis of data from new field surveys, and regulatory changes would lead to changes in Project effects relative to those covered in the original consultations (formal and informal). Considering reinitiation of consultation as a normal part of Project development has fostered open discussion between WSDOT, the Service and other regulatory agencies (both state and federal). We believe this collaborative approach to consultation has been an effective way to find the best solutions for minimizing construction impacts to listed species and has provided your agency with an efficient mechanism for complying with the Act and other environmental regulations.

The Service appreciates your efforts to protect listed species and the habitats on which they depend while meeting your land management needs. If you have any questions regarding this biological opinion or our shared responsibilities under the Act, please contact Tara Callaway at the Central Washington Field Office in Wenatchee at (509) 665-3508, extension 2004 (e-mail: Tara_Callaway@fws.gov) or Sierra Franks at (509) 665-3508, extension 1880 (e-mail Sierra_Franks@fws.gov).

Sincerely,

FOR

Brad Thompson, Acting State Supervisor
Washington Fish and Wildlife Office

Enclosure(s)

cc:
FHWA, Olympia, WA (L. Liu)
WSDOT, Union Gap, WA (M. Norman)
USFS, Cle Elum, WA (P. Garvey-Darda)
WSDOT, Union Gap, WA (A. Byrd)

Endangered Species Act - Section 7 Consultation

BIOLOGICAL OPINION

U.S. Fish and Wildlife Service Reference:
01EWFW00-2019-F-0856

I-90 Snoqualmie Pass East Project

Kittitas County, Washington

Federal Action Agency:

Washington State Department of Transportation (official non-Federal designee of the Federal Highway Administration)

Consultation Conducted By:

U.S. Fish and Wildlife Service
Central Washington Field Office
Wenatchee, Washington

Brad Thompson, Acting State Supervisor
Washington Fish and Wildlife Office

8-13-2019
Date

TABLE OF CONTENTS

Appendices

FIGURES

ACRONYMS AND ABBREVIATIONS

AMA	Adaptive Management Area
BA	Biological Assessment
CFR	Code of Federal Regulations
Act	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)
Service	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
CHSU	Critical Habitat Subunit
CHU	Critical Habitat Unit
County	Kittitas County
dbh	diameter-at-breast-height
FHWA	Federal Highway Administration
FR	Federal Register
LWD	Large Woody Debris
MP	milepost
NWFP	Northwest Forest Plan
Opinion	Biological Opinion
PCE	Primary Constituent Element
Project	I-90 Snoqualmie Pass East Project
Services	U.S. Fish and Wildlife Service and National Marine Fisheries Service
spotted owl	northern spotted owl
tpa	trees per acre
WFWO	Washington Fish and Wildlife Office
WSDOT	Washington State Department of Transportation

1 INTRODUCTION

This document represents the U. S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the proposed I-90 Snoqualmie Pass East Project located in Kittitas County, Washington. The Opinion address effects to critical habitat for the northern spotted owl in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Your April 9, 2019, request for formal consultation was received on April 11, 2019.

This Opinion is based on information provided in the Biological Assessment (BA), telephone conversations, field investigations, and other sources of information as detailed below. A complete record of this consultation is on file at the Service's Central Washington Field Office in Wenatchee, Washington.

2 CONSULTATION HISTORY

The following is a summary of important events associated with this consultation:

1. April 11, 2019: The Service received a final BA and an official request for reinitiation of formal consultation on the I-90 Snoqualmie Pass East Project for northern spotted owl designated critical habitat.
2. June 26, 2019: The Service requested additional information from the WSDOT in order to allow completion of formal consultation.
3. June 26, 2019: WSDOT provided the Service with additional information. This supplemental information provides a sufficient basis for completing formal consultation.

3 BIOLOGICAL OPINION

4 DESCRIPTION OF THE PROPOSED ACTION

A federal action means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas (50 CFR 402.02).

Your Project BA included information about the modified Project footprint, and the permanent removal of mature forest in designated critical habitat for northern spotted owl which has increased due to the design changes and improved geospatial software. We completed the original consultations on the I-90 Snoqualmie Pass East Project, including the Phase 3 and 4 Project areas, in 2008 (USFWS Reference 13260-2008-F-0070 and USFWS Reference 13260-2008-I-0119). Critical habitat for northern spotted owl has been revised since the original consultations were completed and is now directly adjacent to I-90. Subsequently, the permanent removal of critical habitat has increased from zero acres to 61.6 acres for the proposed action.

The Project includes design elements on I-90 at milepost (MP) 62.0 (Stampede Pass) to 70.3 (Easton) and construction is expected to begin in 2020. Phase 3 and 4 (MP 64.5 to 70.3 and MP 62.0 to 64.5, respectively) are expected to occur from 2020 to 2026 and 2025 to 2029, respectively. The larger Project footprint that differs from the original footprint will be a result of realigning westbound lanes from MP 67.5 to 69.5, straightening lanes, widening medians, and enlarging slope stabilization areas. The larger footprint will result in more forest removal, impervious surface and winter maintenance (e.g., traction sand and deicer). The forest impacts include the permanent removal of suitable habitat for northern spotted owl classified as mature coniferous (95.91 acres equal to or greater than 14 diameter at breast height (dbh)), young coniferous (15.35 acres of forest less than 14 dbh), and deciduous (16.19 acres). Removal of forested habitat is configured primarily as linear strips (average of approximately 43 feet wide) along the north and south side of the highway; however, the proposed action also includes several forested sections (ranging from zero to 300 feet) exceeding one acre in size (Norman pers. comm. 2019).

Major project activities for Phases 3 and 4 include: blasting rock, moving and processing large volumes of rock material, excavating and reconstructing the existing travel lanes, roadway surfacing and paving, overlay and widening existing and partial road alignments, permanent and temporary bridge construction, and roadway excavation and embankment. Phase 3 of the Project will also include the restoration of 48.47 acres of disturbed habitat (Norman pers. comm., 2019). All trees cleared from or located within the Project footprint will be incorporated into restoration activities as shredded wood mulch (less than 20 inch diameter trees at dbh), downed logs (20 to 39 inch diameter trees at dbh), standing snags (greater than 40 inch diameter trees at dbh), and slash. WSDOT has agreed to a request from the U.S. Forest Service (USFS) to increase the stocking density 10 percent for the Project from the stocking density of 630 linear feet per acre identified in the Snoqualmie Pass Adaptive Management Area Plan (USDA and USFWS 1997). For 40-foot logs, this results in 18 logs per acre with an additional six standing snags per acre for a total of 24 logs per acre.

4.1 Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The action area for this proposed federal action is based on the geographic extent of permanent removal of habitat, as depicted in Figure 1.

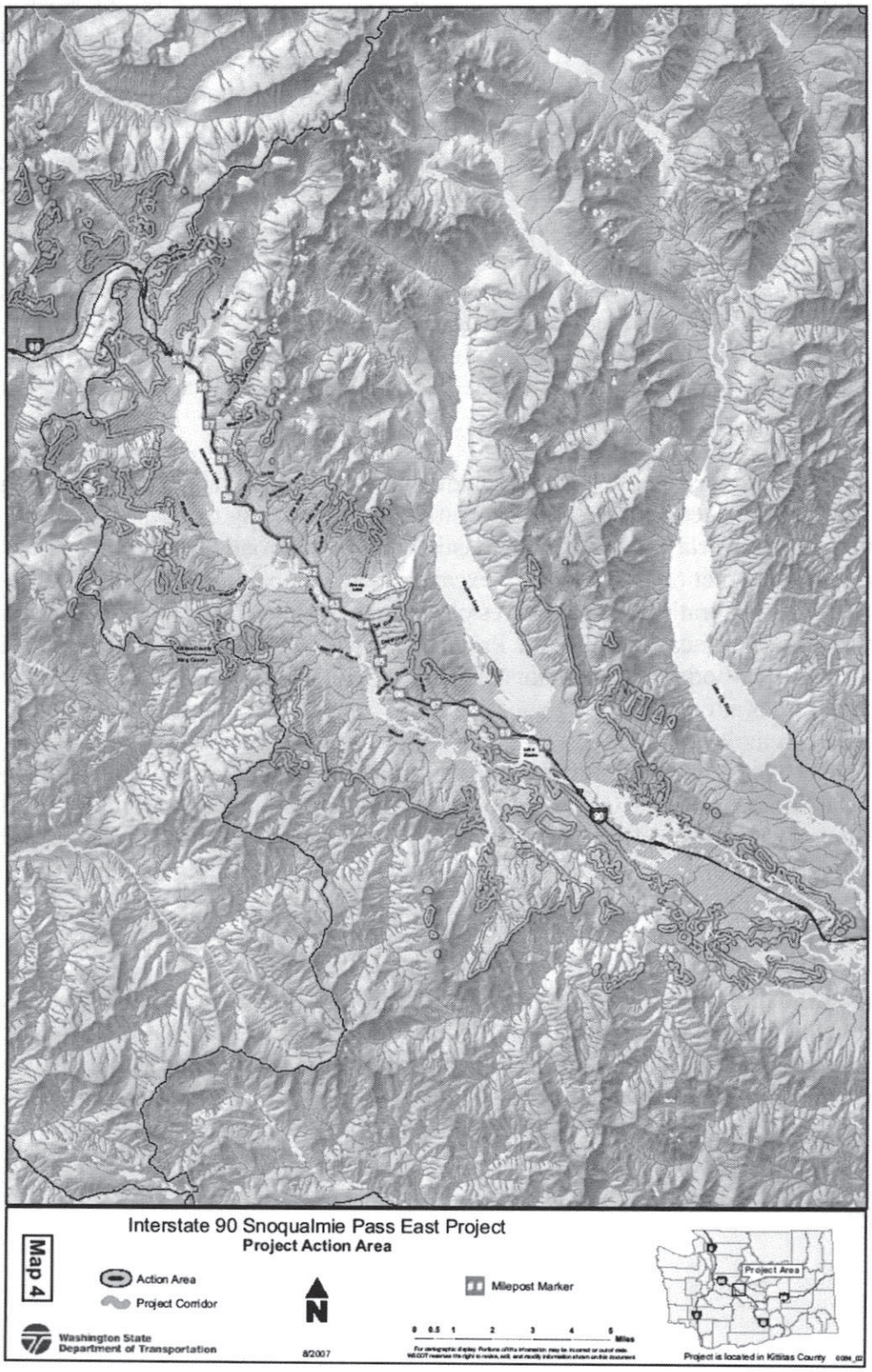


Figure 1. Terrestrial action area

4.2 Rationale for Adequacy of Existing Consultation

We agree with the analysis presented in the BA supporting the finding that proposed changes associated with Phase 3 and 4 will not result in effects to the gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx Canadensis*), and North American wolverine (*Gulo luscus*) that were not previously analyzed in our original project-wide informal consultation (Service Reference 13260-2008-I-0119). We also agree with the analysis presented in the BA supporting the finding that proposed changes associated with Phase 3 and 4 will not result in effects to the bull trout (*Salvenlinus confluentus*) that were not already analyzed in our original formal consultation (Service Reference 13260-2008-F-0070).

We agree that effects to the marbled murrelet (*Brachyramphus marmoratus*) will be similar to those analyzed in our original formal consultation (Service reference 13260-2008-F-0070), despite an increased area of removed mature forest. None of the additional forest removal is within any of the potentially suitable habitat identified during field surveys by Hamer Environmental. A majority of the forest that will be removed is configured as linear strips paralleling the highway. These forested edges, which are nearly 50 miles from salt water, also have high levels of disturbance from traffic noise and artificial light. We believe these areas are unlikely to provide habitat for the marbled murrelet. Consequently, proposed design changes are unlikely to result in new effects to this species.

5 ENVIRONMENTAL BASELINE: Designated Northern Spotted Owl Critical Habitat

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress.

5.1 Current Condition of Critical Habitat in the Action Area

The Project area overlaps Critical Habitat Unit 7, also known as East Cascades North (ECN), which contains 1,022,960 acres of northern spotted owl critical habitat and is divided into nine subunits (see Appendix A, Table 1). The action area is located in critical habitat subunit ECN-4, which encompasses approximately 222,818 acres in Kittitas County, Washington, and comprises lands managed by the USFS and the State of Washington. This subunit is expected to provide demographic support of the overall population as well as maintaining connectivity between populations, both north to south in the East Cascades North Unit and west to east between the West and East Cascades units (77 FR 71928). The final critical habitat rule suggests effects to dispersal habitat should be evaluated at a landscape scale (77 FR 71939).

For analysis and conservation planning purposes, the range of the spotted owl is divided into 12 physiographic provinces that reflect the physical, biological, and environmental factors that shape broad-scale landscape features and natural plant communities (Thomas et al. 1990, p. 61). In the revised recovery plan for the spotted owl, the physiographic provinces are identified as

individual recovery units that represent the current and historic distribution of spotted owl habitat and populations (USFWS 2011, p. III-1). In Washington, there are four physiographic provinces, including the Olympic Peninsula, the Washington western lowlands, the Washington Western Cascades, and the Washington Eastern Cascades.

The action area occurs within the Washington Eastern Cascades Province (WECP). Federal lands in this Province include approximately 779,662 acres of spotted owl nesting/roosting (suitable) habitat, which represents about 8.7 percent of all suitable habitat range-wide (Davis et al. 2016, p. 22). This zone is characterized by a continental climate (cold, snowy winters and dry summers) and a high frequency of natural disturbance due to fires and outbreaks of forest insects and pathogens. Flying squirrels are the dominant prey species, but the diet of northern spotted owls in this zone also includes relatively large proportions of bushy-tailed woodrats (*Neotoma cinerea*), snowshoe hare (*Lepus americanus*), pika (*Ochotona princeps*), and mice (*Microtus spp.*)(Forsman et al. 2001, pp. 144–145).

Relative to other portions of the northern spotted owls' range, nesting and roosting habitat in this zone includes relatively younger and smaller trees, likely reflecting the common usage of dwarf mistletoe (*Arceuthobium douglasii*) brooms (dense growths) as nesting platforms (especially in the north). Forest composition that includes high proportions of Douglas-fir is also associated with this nesting structure. Additional foraging habitat in this zone generally resembles nesting and roosting habitat, with reduced canopy cover and tree size, and reduced canopy layering. High prey diversity suggests relatively diverse foraging habitats are used.

Past effects to spotted owl habitat in the WECP resulted primarily from natural disturbance and forest management projects. The primary agents of natural disturbance in forested areas of the province are fires, insect outbreaks, and tree diseases. Preliminary data suggest that over 60,000 acres (about 7.7 percent of the provincial total) of suitable habitat for the spotted owl have been removed due to wildfire since 1994 (Appendix B). Information about effects to spotted owl habitat from insect and disease outbreaks is limited. The risk of these disturbances was assessed by the Okanogan-Wenatchee National Forest (OWNF) in their forest health assessment (USDA 2004). This assessment, however, did not estimate the extent of insect and disease disturbances to spotted owl habitat across the OWNF. The Service believes that removal of large patches of habitat, as well as small pockets (e.g., up to 5 to 10 acres) of tree mortality resulting from endemic levels of insect and disease activity have likely occurred. Patchy mortality is a natural process and can increase stand heterogeneity, which may benefit the spotted owl in some cases by producing the snags and large woody debris required by prey species (see Lehmkuhl et al. 2006a and b). Considering habitat effects of management activities since 1994, about 10,000 acres have been removed or downgraded due to management actions (about 5,000 acres from 1994 to April 2004, and about 5,000 acres from April 2004 through 2017; Service effects tracking data). Project-related removal of suitable habitat from the Northwest Forest Plan (NWFP) reserves in the WECP since 1994 was less than one percent of the starting habitat total and habitat removal across all land-use allocations was less than two percent of the starting habitat total.

At the scale of the WECP, wildfire has removed more than 60,000 acres of suitable spotted owl habitat or about six times as much as has been removed by federal projects since 1994. This

habitat removal does not appear to have substantially changed the habitat capacity of NWFP reserves to support breeding spotted owls or for owls to disperse across the landscape. Nonetheless, population declines in the province have been steep, and large reserves expected to contribute to the persistence of spotted owls over the long term may no longer be fulfilling that expectation.

6 EFFECTS OF THE ACTION: Designated Northern Spotted Owl Critical Habitat

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The designation of critical habitat for the northern spotted owl uses the term primary constituent elements (PCEs) or essential features. PCEs are the physical and biological features of critical habitat essential to a species' conservation and thus its recovery. Revised critical habitat regulations (81 FR 7214) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified primary constituent elements, physical or biological features, or essential features. References to PCEs in this document should be viewed as synonymous with PBFs.

The PCEs identified in the revised spotted owl critical habitat rule include (1) forest types in early-, mid-, or late-seral stages that support the spotted owl across its geographic range; (2) nesting and roosting habitat; (3) foraging habitat; and (4) dispersal habitat (77 FR 72051-72052). When determining whether an action is likely to adversely affect critical habitat, the Service recommends evaluating the effects of a proposed action at a scale that is relevant to the spotted owl life-history functions supplied by the PCEs (77 FR 71939). We considered the following factors in our assessment of the impacts of the Project on designated northern spotted owl critical habitat: (1) the consideration of scale, quantity, and location of the proposed action in context of the action area and the critical habitat subunit; (2) the proposed action's effects to the intended conservation function or purpose of the critical habitat subunit and (3) the overall consistency of the action with the intent of the revised recovery plan for the northern spotted owl (Service 2011).

This reinitiation focuses only on the permanent removal of designated northern spotted owl critical habitat. Our original consultation (Service 2008b) on northern spotted owl critical habitat has already addressed noise effects from the Project. Because the revision of spotted owl critical habitat in January 2013 included adding critical habitat adjacent to I-90, critical habitat will now be permanently removed as a result of the Project. No other activities (e.g., noise effects) will affect northern spotted owl critical habitat in a manner, or to an extent, not already analyzed during any previous consultation for this Project.

The proposed action will lead to the permanent removal of 61.6 acres of northern spotted owl designated critical habitat that supports both young and mature forests. At best, the young stands

might provide some functionality as dispersal habitat, while the mature stands may support the dispersal and foraging habitat functions. The majority of affected critical habitat is configured as linear strips (average of approximately 43 feet wide) along the north and south side of the highway (Norman pers. comm. 2019). However, permanently impacted acreage perpendicular to I-90 can range from zero to 300 feet depending on the location in the Project, and there are several portions of critical habitat that will be permanently removed exceeding one acre of forest. Of the 222,818 acres in the critical habitat subunit ECN-4, 61.6 acres or 0.028 percent will be permanently removed. Given the size, function, and location of the Project in ECN-4, we do not anticipate the proposed action to affect the critical habitat subunit's intended function of demographic support and connectivity between local spotted owl populations and/or other subunits. Effects of the action are not expected to have a measurable effect on critical habitat function outside of the action area.

7 CUMULATIVE EFFECTS: Designated Northern Spotted Owl Critical Habitat

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Nature Conservancy recently purchased 47,982 acres of land in Kittitas County. Portions of these lands are directly adjacent to I-90 between Snoqualmie Pass and Cle Elum and will continue to be maintained as forest cover with similar management goals as the Forest Restoration Strategy. The Service is not aware of any other such future actions that are both reasonably certain to occur near the action area that would likely contribute to cumulative effects on the spotted owl.

8 INTEGRATION AND SYNTHESIS OF EFFECTS: Designated Northern Spotted Owl Critical Habitat

The Integration and Synthesis section is the final step in assessing the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action and the cumulative effects to the status of the species and critical habitat, and the environmental baseline, to formulate our biological opinion as to whether the proposed action is likely to: (1) appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated critical habitat for the conservation of the species.

The proposed I-90 Snoqualmie Pass East Project will result in the removal of 61.6 acres of northern spotted owl critical habitat. The I-90 corridor in the action area currently functions as dispersal habitat with isolated pockets of foraging habitat, which could support non-resident or dispersing spotted owls. We consider the resulting habitat loss from the Project to be an adverse effect by degrading PCE functionality and decreasing the capacity of the local landscape to provide dispersal and foraging support. However, the critical habitat removal includes a relatively small area adjacent to a highway where habitat use by spotted owls is probably constrained by noise disturbance and the limited current functionality of the existing habitat.

Furthermore, forested stands near affected areas currently provide and will continue to provide the primary constituent elements of dispersal and foraging habitat even with the proposed removal of critical habitat. These areas include the recently acquired properties by The Nature Conservancy that will be managed for conservation purposes such as healthy and resilient forests and wildlife populations. Although critical habitat will be permanently removed from the I-90 corridor, the value of critical habitat for northern spotted owl conservation at the range-wide, critical habitat unit, and subunit scales will be unaffected.

9 CONCLUSION: Designated Northern Spotted Owl Critical Habitat

After reviewing the current status of northern spotted owl critical habitat, the environmental baseline for the action area, the effects of the proposed action and cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to destroy or adversely modify designated critical habitat for the northern spotted owl.

10 REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if 1) they amount of extent of incidental take is exceeded, 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

11 LITERATURE CITED

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research 35(2):141-150.

Lehmkuhl, J.F., Kistler, K.D., Begley, J.S., and J. Boulanger. 2006a. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Lehmkuhl, J.F., Kistler, K.D., and J.S. Begley. 2006b. Bushy-tailed woodrat abundance in dry forests of eastern Washington. Journal of Mammalogy 87(2):371-379.

Norman, M. Assistant Environmental Manager. 2019. Washington Department of Transportation, South Central Region. Union Gap, Washington.

[USDA]. U.S. Department of Agriculture. 2004. Forest health assessment for the Okanogan and Wenatchee National Forests. Okanogan and Wenatchee National Forests. Pacific Northwest Region.

[USDA and USFWS] U.S. Department of Agriculture and U.S. Fish and Wildlife Service. 1997. Snoqualmie Pass Adaptive Management Area Plan FEIS. Cle Elum and North Bend Ranger District, Wenatchee and Mt. Baker-Snoqualmie National Forests. Pacific Northwest Region.

[USFWS] US Fish and Wildlife Service. 2008a. Biological Opinion for the I-90 Snoqualmie Pass East Project. USFWS Ref Number 13260-2008-F-0070.

[USFWS] US Fish and Wildlife Service. 2008b. Informal Consultation for the I-90 Snoqualmie Pass East Project. USFWS Ref Number 13260-2008-I-0119.

[USFWS] US Fish and Wildlife Service. 2011. Revised recovery plan for the northern spotted owl (*Strix occidentalis caurina*). Fish and Wildlife Service, Portland, Oregon. Xvi + 258 pp.

APPENDIX A

STATUS OF NORTHERN SPOTTED OWL CRITICAL HABITAT

Legal Status

The final rule designating revised critical habitat for the northern spotted owl (*Strix occidentalis caurina*) was published on December 4, 2012 (77 FR 71876-72068), and became effective on January 3, 2013. Critical habitat for the northern spotted owl now includes over 9.5 million acres in 11 units and 60 subunits in California, Oregon, and Washington.

Designation of critical habitat serves to identify those lands that are necessary for the recovery of the listed species. In this case, the Service's primary objective in designating critical habitat was to identify capable and existing essential northern spotted owl habitat and highlight specific areas where management of the northern spotted owl and its habitat should be given highest priority. The expectation of critical habitat is to ameliorate habitat-based threats. The recovery of the northern spotted owl requires habitat conservation in concert with the implementation of recovery actions that address other, non-habitat-based threats to the species, including the barred owl (77 FR 71879).

Conservation Role of Critical Habitat

Critical habitat contains those areas that are essential to the conservation of the species. The expectation of critical habitat is to ameliorate habitat-based threats. The recovery of the northern spotted owl requires habitat conservation in concert with the implementation of recovery actions that address other, non-habitat-based threats to the species, including the barred owl (77 FR 71879). The conservation role of northern spotted owl critical habitat is to "adequately support the life-history needs of the species to the extent that well-distributed and inter-connected northern spotted owl nesting populations are likely to persist within properly functioning ecosystems at the critical habitat unit and range-wide scales" (77 FR 71938).

Physical or Biological Features and Primary Constituent Elements

When designating critical habitat, the Service considers "the physical or biological features [PBFs] essential to the conservation of the species and which may require special management considerations or protection" (50 CFR §424.12; 77 FR 71897). "These include, but are not limited to: (1) space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species" (77 FR 71897). The final critical habitat rule states that "for the northern spotted owl, the physical or biological features essential to the conservation of the species are forested areas that are used or likely to be used for nesting, roosting, foraging, or dispersing" (77 FR 71897). The final critical habitat rule for the northern spotted owl provides

an in-depth discussion of the PBFs, which may be referenced for further detail (77 FR 71897-71906).

The designation of critical habitat for the northern spotted owl uses the term primary constituent elements or essential features. Primary constituent elements (PCEs) are the physical and biological features of critical habitat essential to a species' conservation and thus its recovery. Revised critical habitat regulations (81 FR 7214) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified primary constituent elements, physical or biological features, or essential features. References to PCEs in this document should be viewed as synonymous with PBFs.

Primary Constituent Elements of Northern Spotted Owl Critical Habitat

The PCEs are the specific elements of the PBFs that are essential to the conservation of the northern spotted owl and are those elements that make areas suitable as nesting, roosting, foraging, and dispersal habitat (77 FR 71904). The PCEs should be arranged spatially such that it is favorable to the persistence of populations, survival, and reproductive success of resident pairs, and survival of dispersing individuals until they are able to recruit into a breeding population (77 FR 71904). Within areas essential for the conservation and recovery of the northern spotted owl, the Service has determined that the PCEs are:

1) Forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographic range;

2) Habitat that provides for nesting and roosting;

3) Habitat that provides for foraging;

4) Habitat to support the transience and colonization phases of dispersal, which in all cases would optimally be composed of nesting, roosting, or foraging habitat (PCEs 2 or 3), but which may also be composed of other forest types that occur between larger blocks of nesting, roosting, or foraging habitat (77 FR 72051-72052).

Some critical habitat subunits may contain all of the above PCEs and support multiple life history requirements of the northern spotted owl, while some subunits may contain only those PCEs necessary to support the species particular use of that habitat. All of the areas designated as critical habitat, however, do contain PCE 1, forest type. Northern spotted owl critical habitat does not include meadows, grasslands, oak woodlands, aspen woodlands, or manmade structures and the land upon which they are located (77 FR 71918).

PCE 1: Forest Types

The primary forest types that support the northern spotted owl are: Sitka spruce, western hemlock, mixed conifer, mixed evergreen, grand fir, Pacific silver fir, Douglas-fir, white fir, Shasta red fir, redwood/Douglas-fir, and moister ponderosa pine (77 FR 72051).

PCE 2: Nesting and Roosting Habitat

Nesting and roosting habitat for northern spotted owl provides structural features for nesting, protection from adverse weather conditions, and cover to reduce predation risk for adults and young. In many cases, the same habitat may also provide for foraging. Nesting and roosting habitats must provide sufficient foraging habitat to meet the home range needs of territorial pairs of northern spotted owls throughout the year (77 FR 72051). Stands used for nesting and roosting that are generally characterized by:

Moderate to high canopy cover (60 to over 80 percent); multilayered, multispecies canopies with large (20 to 30 inches (51 to 76 centimeters (cm)) or greater diameter at breast height (dbh)) overstory trees; high basal area (greater than 240 ft^2/acre; 55 m^2/ha); high diversity of different diameters of trees; high incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags and large accumulations of fallen trees and other woody debris on the ground; and, sufficient open space below the canopy for northern spotted owls to fly (77 FR 72051). Nesting and roosting habitats will also function as foraging and dispersal habitat (77 FR 71884).

PCE 3: Foraging Habitat

Across the range of the northern spotted owl, nesting and roosting habitats also provide foraging opportunities; however, northern spotted owls may use other habitat types for foraging as well, and these habitats vary depending on broad ecological zones (Figure 1):

West Cascades/Coast Ranges of Oregon and Washington: Foraging habitat includes stands of nesting and roosting habitat; additionally, owls may use younger forests with some structural characteristics (legacy features) of old forests, hardwood forest patches, and edges between old forest and hardwoods. Foraging stands contain moderate to high canopy cover (60 to over 80 percent); a diversity of tree diameters and heights; increasing density of trees greater than or equal to 31 inches (80 cm) dbh increases foraging habitat quality (especially above 12 trees per acre (30 trees per ha)); increasing density of trees 20 to 31 inches (51 to 80 cm) dbh increases foraging habitat quality (especially above 24 trees per acre (60 trees per ha)); increasing snag basal area, snag volume (the product of snag diameter, height, estimated top diameter, and including a taper function), and density of snags greater than 20 inches (50 cm) dbh all contribute to increasing foraging habitat quality, especially above 10 snags/ha. Stands also include large accumulations of fallen trees and other woody debris on the ground, and sufficient open space below the canopy for northern spotted owls to fly (77 FR 72051).

East Cascades of Oregon and Washington: Foraging habitat includes stands of nesting and roosting habitat, as well as stands composed of Douglas-fir and white fir/Douglas-fir mix, with a mean tree size (quadratic mean diameter greater than 16.5 inches (42 cm)), increasing density of large trees (greater than 26 inches (66 cm)) and increasing basal area (the cross-sectional area of tree boles measured at breast height), which increases foraging habitat quality. Foraging stands also include large accumulations of fallen trees and other woody debris on the ground, and sufficient open space below the canopy for northern spotted owls to fly (77 FR 72051).

Klamath and Northern California Interior Coast Ranges: Foraging habitat includes stands of nesting and roosting habitat; in addition, other forest types with mature and old-forest characteristics. Presence of conifer species such as incense-cedar, sugar pine, Douglas-fir and hardwood species such as bigleaf maple, black oak, live oaks, and madrone, as well as shrubs. Forest patches within riparian zones of low-order streams and edges between conifer and hardwood forest stands. Brushy openings and dense young stands or low-density forest patches within a mosaic of mature and older forest habitat. High canopy cover (87 percent at frequently used sites) and multiple canopy layers. Mean stand diameter greater than 21 inches (52.5 cm), increasing mean stand diameter and densities of trees greater than 26 in (66 cm) increases foraging habitat quality. Foraging stands also include large accumulations of fallen trees and other woody debris on the ground and sufficient open space below the canopy for northern spotted owls to fly (77 FR 72051-72052)

Redwood Coast: Foraging habitat includes stands of nesting and roosting habitat; in addition, stands composed of hardwood tree species, particularly tanoak (*Lithocarpus densiflorus*). Early-seral habitats 6 to 20 years old with dense shrub and hardwood cover and abundant woody debris; these habitats produce prey, and must occur in conjunction with nesting, roosting, or foraging habitat. Increasing density of small-to- medium sized trees (10 to 22 in; 25 to 56 cm), which increases foraging habitat quality. Trees greater than 26 in (66 cm) in diameter or greater than 41 years of age. Sufficient open space below the canopy for northern spotted owls to fly (77 FR 72052).

PCE 4: Dispersal habitat

Northern spotted owl dispersal habitat is habitat that supports the transience and colonization phases of owl dispersal, and in all cases would optimally be composed of nesting, roosting, or foraging habitat (PCE 2 or 3), but which may also be composed of other forest types that occur between larger blocks of northern spotted owl nesting, roosting, or foraging habitat (77 FR 72052). In cases where nesting, roosting, or foraging habitats are insufficient to provide for dispersing or nonbreeding owls, the specific dispersal PCEs are:

A. Habitat supporting the transience phase of dispersal which includes stands with adequate tree size and canopy cover to provide protection from avian predators and minimal foraging opportunities. In general, this may include, but is not limited to, trees with at least 11 inches (28 cm) dbh and a minimum 40 percent canopy cover; and, younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, if such stands contain some roosting structures and foraging habitat to allow for temporary resting and feeding during the transience phase.

B. Habitat supporting the colonization phase of dispersal, which is generally equivalent to nesting, roosting and foraging habitat as described in PCEs 2 and 3, but may be smaller in area than that needed to support nesting pairs (77 FR 72052).

Zones of Habitat Associations used by Northern Spotted Owls

Differences in patterns of habitat associations used by the northern spotted owl across its range suggest four different broad zones of habitat use, which we characterize as the (1) West Cascades/Coast Ranges of Oregon and Washington, (2) East Cascades, (3) Klamath and Northern California Interior Coast Ranges, and (4) Redwood Coast (Figure 1). We configured these zones based on a qualitative assessment of similarity among ecological conditions and habitat associations within the 11 different regions analyzed during the critical habitat designation process (see USFWS 2012). These four zones capture the range in variation of some of the PBFs essential to the conservation of the northern spotted owl. Summarized below are the PBFs for each of these four zones, emphasizing zone-specific features that are distinctive within the context of general patterns that apply across the entire range of the northern spotted owl.

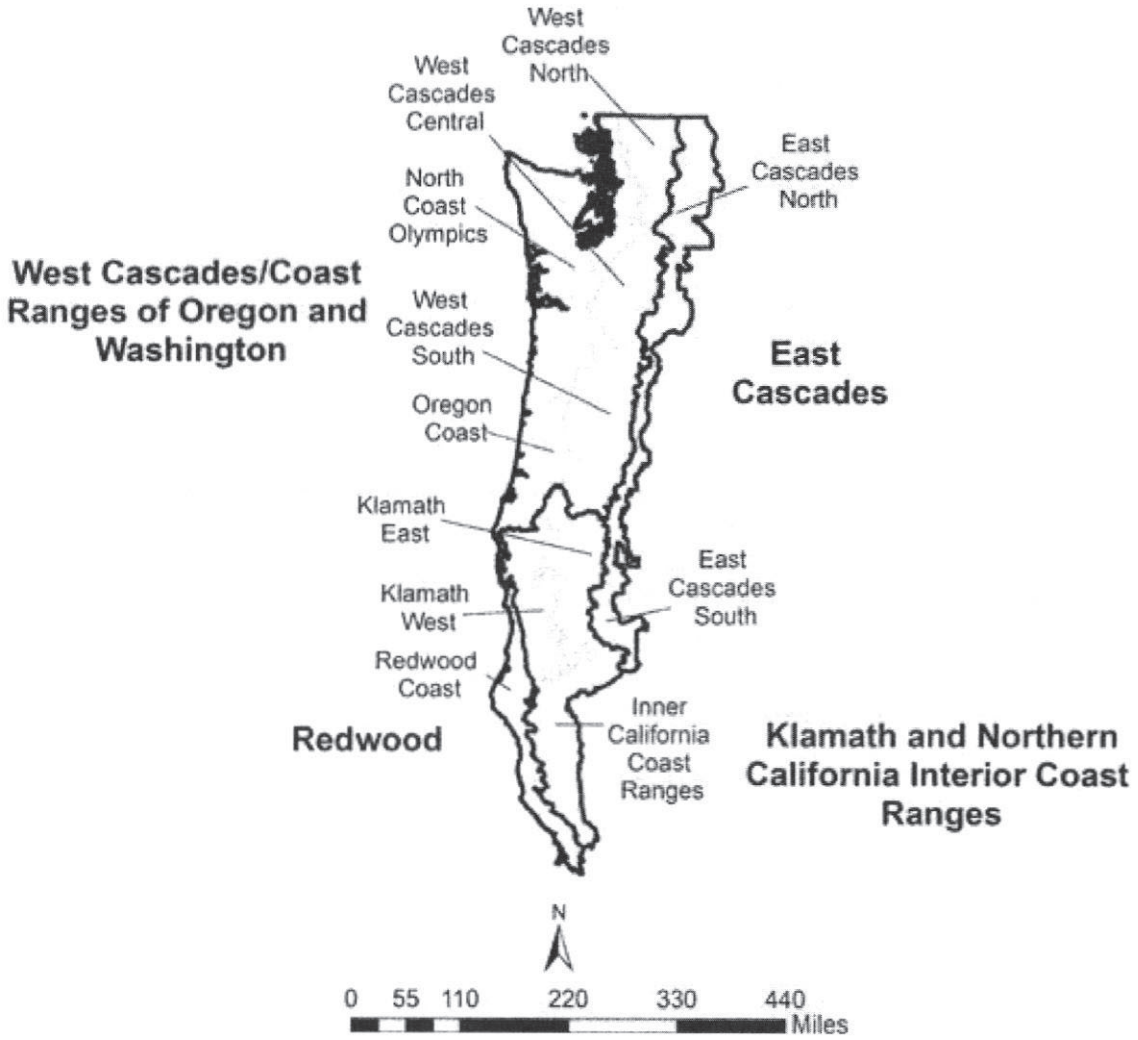


Figure 1. Eleven regions and four zones of habitat associations used by northern spotted owls in Washington, Oregon, and California (77 FR 71903).

West Cascade/Coast Ranges of Oregon and Washington

This zone includes five regions west of the Cascade crest in Washington and Oregon (Western Cascades North, Central and South; North Coast Ranges and Olympic Peninsula; and Oregon Coast Ranges; USFWS 2011, p. C–13). Climate in this zone is characterized by high rainfall and cool to moderate temperatures. Variation in elevation between valley bottoms and ridges is relatively low in the Coast Ranges, creating conditions favorable for development of contiguous forests. In contrast, the Olympic and Cascade ranges have greater topographic variation with many high-elevation areas supporting permanent snowfields and glaciers. Douglas-fir and western hemlock dominate forests used by northern spotted owls in this zone. Root diseases and wind-throw are important natural disturbance mechanisms that form gaps in forested areas. Flying squirrels (*Glaucomys sabrinus*) are the dominant prey, with voles and mice also representing important items in the northern spotted owl's diet (Forsman et al. 2001, p. 141).

Our habitat modeling indicates that vegetation structure has a dominant influence on owl population performance, with habitat pattern and topography also contributing. High canopy cover, high density of large trees, high numbers of sub-canopy vegetation layers, and low to moderate slope positions are all important features.

Nesting habitat in this zone is mostly limited to areas with large trees with defects such as mistletoe brooms, cavities, or broken tops. The subset of foraging habitat that is not nesting/roosting habitat generally had slightly lower values than nesting habitat for canopy cover, tree size and density, and canopy layering. Prey species (primarily the northern flying squirrel) in this zone are associated with mature to late-successional forests, resulting in small differences between nesting, roosting, and foraging habitats.

East Cascades

This zone includes the Eastern Cascades North and Eastern Cascades South regions (USFWS 2011, p. C–13). This zone is characterized by a continental climate (cold, snowy winters and dry summers) and a high frequency of natural disturbance due to fires and outbreaks of forest insects and pathogens. Flying squirrels are the dominant prey species, but the diet of northern spotted owls in this zone also includes relatively large proportions of bushy-tailed woodrats (*Neotoma cinerea*), snowshoe hare (*Lepus americanus*), pika (*Ochotona princeps*), and mice (*Microtus spp.*)(Forsman et al. 2001, pp. 144–145).

Our modeling indicates that habitat associations in this zone do not show a pattern of dominant influence by one or a few variables (USFWS 2011, Appendix C). Instead, habitat association models for this zone included a large number of variables, each making a relatively modest contribution (20 percent or less) to the predictive ability of the model. The features that were most useful in predicting northern spotted owl habitat quality were vegetation structure and composition, and topography, especially slope position in the north. Other efforts to model habitat associations in this zone have yielded similar results (e.g., Gaines et al. 2010, pp. 2048–2050; Loehle et al. 2011, pp. 25–28).

Relative to other portions of the northern spotted owls' range, nesting and roosting habitat in this zone includes relatively younger and smaller trees, likely reflecting the common usage of dwarf

mistletoe (*Arceuthobium douglasii*) brooms (dense growths) as nesting platforms (especially in the north). Forest composition that includes high proportions of Douglas-fir is also associated with this nesting structure. Additional foraging habitat in this zone generally resembles nesting and roosting habitat, with reduced canopy cover and tree size, and reduced canopy layering. High prey diversity suggests relatively diverse foraging habitats are used. Topographic position was an important variable, particularly in the north, possibly reflecting competition from barred owls (Singleton et al. 2010, pp. 289, 292). Barred owls, which have been present for over 30 years in the northern portions of this zone, preferentially occupy valley-bottom habitats, possibly compelling northern spotted owls to establish territories on less productive, mid-slope locations (Singleton et al. 2010, pp. 289, 292).

Klamath and Northern California Interior Coast Ranges

This zone includes the Klamath West, Klamath East, and Interior California Coast regions (USFWS 2011, p. C–13). This region in southwestern Oregon and northwestern California is characterized by very high climatic and vegetative diversity resulting from steep gradients of elevation, dissected topography, and large differences in moisture from west to east. Summer temperatures are high, and northern spotted owls occur at elevations up to 5,800 feet. The western portions of this zone support a diverse mix of mesic forest communities interspersed with drier forest types. Forests of mixed conifers and evergreen hardwoods are typical of the zone. The eastern portions of this zone have a Mediterranean climate with increased occurrence of the ponderosa pine. Douglas-fir/dwarf mistletoe is rarely used for nesting platforms in the western part of the northern spotted owl's range, but is commonly used in the east.

The prey base for northern spotted owls in this zone is correspondingly diverse, but dominated by dusky-footed woodrats, bushy-tailed woodrats, and flying squirrels. Northern spotted owls have been well studied in the western Klamath portion of this zone (Forsman et al. 2004, p. 217), but relatively little is known about northern spotted owl habitat use in the eastern portion and the California Interior Coast Range portion of the zone.

Our habitat association models for this zone suggest that vegetation structure and topographic features are nearly equally important in influencing owl population performance, particularly in the Klamath. High canopy cover, high levels of canopy layering, and the presence of very large dominant trees were all important features of nesting and roosting habitat. Compared to other zones, additional foraging habitat for this zone showed greater divergence from nesting habitat, with much lower canopy cover and tree size. Low to intermediate slope positions were strongly favored. In the eastern Klamath, the presence of Douglas-fir was an important compositional variable in our habitat model (USFWS 2011, Appendix C).

Redwood Zone

This zone is confined to the northern California coast, and is represented by the Redwood Coast region (USFWS 2011, p. C–13). It is characterized by a maritime climate with moderate temperatures and generally mesic conditions. Near the coast, frequent fog delivers consistent moisture during the summer. Terrain is typically low-lying (0 to 3,000 feet). Forest communities are dominated by redwood, Douglas-fir/tanoak forest, coast live oak (*Quercus*

agrifolia), and tanoak series. Dusky footed woodrats are the dominant prey items for northern spotted owls in this zone.

Habitat association models for this zone diverged strongly from models for other zones. Topographic variables (slope position and curvature) had a dominant influence with vegetation structure having a secondary role. Low position on slopes was strongly favored, along with concave landforms.

Several studies of northern spotted owl habitat relationships suggest that stump-sprouting and rapid growth of redwood trees, combined with high availability of woodrats in patchy, intensively managed forests, enables northern spotted owls to occupy a wide range of vegetation conditions within the redwood zone. Rapid growth rates enable young stands to develop structural characteristics typical of older stands in other regions. Thus, relatively small patches of large remnant trees can also provide nesting habitat structure in this zone.

Climate Change and Range-wide Spotted Owl Critical Habitat

There is growing evidence that recent climate change has impacted a wide range of ecological systems (Stenseth et al. 2002, entire; Walther et al. 2002, entire; Ådahl et al. 2006, entire; Moritz et al. 2012, entire; Westerling et al. 2011, p. S459; Marlon et al. 2012, p. E541). Climate change, combined with effects from past management practices, is exacerbating changes in forest ecosystem processes and dynamics to a greater degree than originally anticipated under the Northwest Forest Plan. Environmental variation affects all wildlife populations; however, climate change presents new challenges as systems may change beyond historical ranges of variability. In some areas, changes in weather and climate may result in major shifts in vegetation communities that can persist in particular regions.

Climate change will present unique challenges to the future of northern spotted owl populations and their habitats. Northern spotted owl distributions (Carroll 2010, entire) and population dynamics (Franklin et al. 2000, entire; Glenn et al. 2010, entire; Glenn et al. 2011a, entire; Glenn et al. 2011b, entire) may be directly influenced by changes in temperature and precipitation. In addition, changes in forest composition and structure as well as prey species distributions and abundance resulting from climate change may impact availability of habitat across the historical range of the subspecies. The *2011 Northern Spotted Owl Revised Recovery Plan* provides a detailed discussion of the possible environmental impacts to the habitat of the northern spotted owl from the projected effects of climate change (USFWS 2011, pp. III-5 to III-11).

Because both northern spotted owl population dynamics and forest conditions are likely to be influenced by large-scale changes in climate in the future, we have attempted to account for these influences in our designation of critical habitat by recognizing that forest composition may change beyond the range of historical variation, and that climate changes may have unpredictable consequences for both Pacific Northwest forests and northern spotted owls. Our critical habitat designation also recognizes that forest management practices that promote ecosystem health under changing climate conditions will be important for northern spotted owl conservation.

Special Management Considerations

The term critical habitat is defined in section 3(5)(A) of the Act, in part, as the specific areas within the geographical areas occupied by the species, at the time it is listed, on which are found those physical or biological features essential to the conservation of the species and "which may require special management considerations or protection." Accordingly, in identifying critical habitat, we determine whether the features essential to the conservation of the species on those areas may require any special management actions or protection (77 FR 71908). The types of management considerations or protections that may be required to preserve or enhance the essential physical or biological features for the northern spotted owl vary by forest types (moist forest vs. dry forest types) and ecological zones:

West Cascades/Coast Ranges of Oregon and Washington

To advance long-term northern spotted owl recovery and ecosystem restoration in moist forests in the face of climate change and past management practices, special management considerations or protections may be required that follow the principles as recommended in the 2011 Revised Recovery Plan (USFWS 2011, p. III–18):

1) Conserve older stands that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in Recovery Actions 10 and 32 (USFWS 2011, pp. III–43, III–67). On Federal land this recommendation applies to all land-use allocations.

2) Management emphasis needs to be placed on meeting northern spotted owl recovery goals and long-term ecosystem restoration and conservation. When there is a conflict between these goals, actions that would disturb or remove the essential physical or biological features of northern spotted owl critical habitat need to be minimized and reconciled with long-term ecosystem restoration goals.

3) Continue to manage for large, continuous blocks of late-successional forest.

4) In areas that are not currently late-seral forest or high-value habitat and where more traditional forest management might be conducted (e.g. matrix), these activities should consider applying ecological forestry prescriptions as described in the 2011 Revised Recovery Plan (USFWS 2011, pp. III–14, III–17 to III–19) (77 FR 71908).

East Cascades

In order to preserve the essential physical or biological features, these dynamic, disturbance prone forests should be managed in a way that promotes northern spotted owl conservation, responds to climate change, and restores dry forest ecological structure, composition and processes, including wildfire and other disturbances (USFWS 2011, p. III–20). The following restoration principles apply to the special management that may be required in this dry forest region (USFWS 2011, pp. III–34 to III–35) (77 FR 71910):

1) Conserve older stands that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in Recovery Actions 10 and 32 (USFWS 2011, pp. III–43, III–67). On Federal land this recommendation applies to all land-use allocations.

2) Emphasize vegetation management treatments outside of northern spotted owl territories or highly suitable habitat;

3) Design and implement restoration treatments at the landscape level;

4) Retain and restore key structural components, including large and old trees, large snags, and downed logs;

5) Retain and restore heterogeneity within stands;

6) Retain and restore heterogeneity among stands;

7) Manage roads to address fire risk; and

8) Consider vegetation management objectives when managing wildfires, where appropriate.

The above principles will result in treatments that have a variety of effects on northern spotted owl habitat in the short and long term. For example, some restoration treatments may have an immediate neutral or beneficial effect on existing northern spotted owl habitat (e.g., roads management, some prescribed fire prescriptions). Other treatments, however, may involve reductions in stand densities, canopy cover, or ladder fuels (understory vegetation that has the potential to carry up into a crown fire)—and thus affect the physical or biological features needed by the species. At the stand scale, this can result in a level of conflict between conserving existing northern spotted owl habitat and restoring dry-forest ecosystems. Resolution of such conflicts can be enhanced by considering the range of forest conditions that comprise suitable owl habitat and tailoring management accordingly (77 FR 71910).

Current Condition of Northern Spotted Owl Critical Habitat

The current condition of critical habitat incorporates the effects of all past human activities and natural events that led to the present-day status of the habitat (USDI and USDC 1998, pg. 4-19). With the revision of spotted owl critical habitat, the range-wide condition has been "reset" as of December 4, 2012.

Critical habitat for the northern spotted owl encompasses over 9.57 million acres in 11 units and 60 subunits in California, Oregon, and Washington. The critical habitat encompasses a broad range of forest types and seral conditions. Much of the suitable nesting and roosting habitat within the critical habitat exists in fragmented patches due to the effects of past timber harvest, wildfire, disease, and other disturbances. Based on the spotted owl habitat data developed for the Northwest Forest Plan 20-year monitoring report (Davis et al. 2016), we estimate that in 2012,

approximately 51 percent of the lands within CHUs contained suitable spotted owl nesting and roosting habitat (4.89 million acres) (Table 1, Appendix A).

Due to land management actions and natural disturbance events such as fire, windstorms, and insect damage, not all habitat capable lands in a CHU are likely to be high quality habitat at any one time. However, these lands retain the physical and biological features necessary to allow for the regrowth of the habitat characteristics required by spotted owls and are essential to achieving the area, quality, and configuration of habitat required for recovery of the owl (77 FR 71877).

Range-wide Critical Habitat Environmental Baseline

For tracking purposes, the Service maintains an online database of effects to spotted owl critical habitat, including both the effects of land management actions as well as losses due to natural disturbances documented through section 7 consultations. The Service updated the consultation database to reflect the 2012 habitat baseline developed for the Northwest Forest Plan 20-year monitoring report (Davis et al. 2016), and adjusted the habitat estimates to account for changes in land use allocations resulting from the 2016 revised Land and Resource Management Plans for Bureau of Land Management managed lands in western Oregon.

Using the spotted owl habitat model developed for the Northwest Forest Plan 20-year monitoring report, there was an estimated 4.89 million acres of nesting/roosting habitat within critical habitat in 2012 (51 percent) (Table 1, Appendix A). Since 2012, the Service has consulted on the removal or downgrading of 37,711 acres of nesting/roosting habitat within critical habitat range-wide, which represents a cumulative loss of about 0.39 percent of the available nesting/roosting habitat (Table 1, Appendix A). Most of these impacts originated in the Washington East Cascades, Oregon West Cascades and the Oregon and California Klamath Physiographic Provinces.

Range-wide, about 25,809 acres of habitat loss were associated with natural disturbances, and about 11,902 acres were associated with land management actions. Over half of the total losses (24,928 acres) occurred in Federal reserves that were intended to emphasize maintenance of spotted owl habitat values (i.e., Late-Successional Reserves).

The losses of nesting/roosting habitat in the Oregon and California Klamath Provinces represent about 48 percent of the range-wide losses, but these totals under-estimate the habitat losses that have occurred due to large wildfires. Habitat losses from wildfires that occurred from 2012 to 2017 within designated critical habitat have been estimated to be as high as 132,000 acres (2.7 percent) (Davis 2017, p. 28). The estimates provided by Davis (2017) were calculated as a cumulative range-wide total that was not analyzed at a level that allows us to account for these losses at the scale of individual provinces or land-use allocations. As reported in Davis et al. (2016, p. 42), wildfire is now the leading cause of habitat loss on Federal lands, far out-weighing habitat losses associated with land-management actions.

Table 1. Designated northern spotted owl critical habitat. Summary of northern spotted owl nesting/roosting[1] habitat (acres) removed or downgraded as documented through Endangered Species Act (ESA) section 7 consultations. Summary of effects by state, province, and land use function from 2012 to present (last updated on June 14, 2018).

Physiographic Province[2]		Evaluation Baseline		Nesting/Roosting Habitat Removed/Downgraded[5]							% Provincial Baseline Affected	% Range-wide Effects
				Land Management Effects			Habitat Loss from Natural Events			Total NR Acres Removed		
		Total Designated Critical Habitat Acres[3]	Nesting/Roosting Acres[4]	Reserves[6]	Non-Reserves[7]	Total	Reserves	Non-Reserves	Total			
WA	Eastern Cascades	1,022,960	467,221	1,206	27	1,233	3,895	0	3,895	5,128	1.10	13.60
	Olympic Peninsula	507,165	211,373	1	0	1	0	0	0	1	0.00	0.00
	Western Cascades	1,387,567	606,093	15	43	58	0	0	0	58	0.01	0.15
OR	Cascades East	529,652	187,798	893	1,321	2,214	1,003	195	1,198	3,412	1.82	9.05
	Cascades West	1,965,407	1,255,027	596	3,694	4,290	3,919	0	3,919	8,209	0.65	21.77
	Coast Range	1,151,874	483,846	96	705	801	0	0	0	801	0.17	2.12
	Klamath Mountains	911,681	542,119	1,385	1,152	2,537	6,485	1,535	8,020	10,557	1.95	27.99
CA	Cascades	243,205	97,248	0	114	114	0	0	0	114	0.12	0.30
	Coast	149,044	94,033	0	0	0	0	2,030	2,030	2,030	2.16	5.38
	Klamath	1,708,787	945,505	242	412	654	5,192	1,555	6,747	7,401	0.78	19.63
Total		**9,577,342**	**4,890,263**	**4,434**	**7,468**	**11,902**	**20,494**	**5,315**	**25,809**	**37,711**	**0.39%**	**100%**

Notes:

1. Northern spotted owl suitable habitat includes nesting/roosting habitat, and foraging-only habitat. Nesting/roosting habitat supports all life-history functions for spotted owls including foraging, and is sometimes referred to as nesting, roosting, and foraging habitat. Foraging-only habitat is a separate category that can include more open and fragmented forests, and does not provide structures for nesting/roosting. Habitat effects summarized in this table are all classified as impacts to nesting/roosting habitats. Impacts to foraging-only habitat are tracked separately.

2. Defined in the Revised Recovery Plan for the Northern Spotted Owl (USFWS 2011) as Recovery Units as depicted on page A-3.

3. Northern spotted owl critical habitat as designated December 4, 2012 (77 FR 71876). Total designated critical habitat acres listed here (9,577,342 acres) are derived from GIS data, and vary slightly from the total acres (9,577,969 acres) listed in the Federal Register (-627 acres).

4. Spotted owl nesting/roosting (NR) habitat based on GIS data developed for the Northwest Forest Plan 20-year monitoring report by Davis et al. 2016 (PNW-GTR-929). NR habitat acres are approximate values based on 2012 satellite imagery.

5. Estimated nesting/roosting habitat removed or downgraded from land management (e.g., timber sales) or natural events (e.g., wildfires) as documented through section 7 consultation or technical assistance. Effects reported here include acres removed or downgraded from 2012 to present.

6. Reserve land use allocations intended to provide spotted owl demographic support include Late-Successional Reserves identified in the Northwest Forest Plan on National Forests, designated Wilderness, and other Congressionally-reserved lands. Reserves on BLM lands in western Oregon managed under the 2016 revised Land and Resource Management Plans include Late-Successional Reserves, Congressionally-reserved lands, National Landscape Conservation System lands, and some District Designated Reserves (e.g., Areas of Critical Environmental Concern).

7. Non-reserve lands intended to provide spotted owl dispersal connectivity between reserves include USFS and BLM designations for timber production (matrix and harvest land base designations), Adaptive Management Areas, and other non-reserved land use designations.

Recently, the Service modified the consultation database input to account for effects to the habitats that could be used as foraging, but that lack the age or structural characteristics of habitats used for nesting and roosting. This distinction may not be made in all consultations. These data represent effects as reported in individual consultations and likely do not represent the entirety of impacts to foraging habitat within critical habitat since 2012. For many projects, affected foraging likely is captured within the nesting/roosting acres as foraging habitat was lumped into "nesting/roosting/foraging habitat" at the time of consultation. Trends to date mirror impacts reported by Davis et al. 2016, where habitat reductions are disproportionally affecting reserved lands and the Oregon and Klamath Province (Table 2).

During the first two decades of the Northwest Forest Plan (1993-2012), range-wide losses of nesting/roosting habitat on all Federal lands were estimated at 5.2 percent (474,300 ac) from wildfire; 1.3 percent (116,100 ac) from timber harvesting; and 0.7 percent (59,800 ac) from insects, disease, or other natural disturbances. This accounted for a total range-wide loss of 7.2 percent, but we estimated an overall net decrease of 1.5 percent, owing to new nesting/roosting habitat recruitment (Davis et al. 2016, p. 42). While currently only about half of the acres within critical habitat currently contain nesting/roosting habitat, many areas of younger forest are expected transition into suitable nesting/roosting habitat over the next few decades (Davis et al 2016, p. 37). Whether future habitat recruitment will keep pace with habitat losses from wildfires and other impacts is unknown.

Table 2: Designated northern spotted owl critical habitat. Summary of northern spotted owl foraging habitat[1] (acres) removed or downgraded as documented through ESA section 7 consultations. Summary of effects by state, province, and land use function from 2012 to present (last updated on June 14, 2018).

Physiographic Province[2]		Foraging Habitat Removed/Downgraded[4]							
		Total Designated Critical Habitat Acres[3]	Land Management Effects			Habitat Loss from Natural Events			Total Foraging Habitat removed/ downgraded
			Reserves[5]	Non-Reserves[6]	Total	Reserves[5]	Non-Reserves[6]	Total	
WA	Eastern Cascades	1,022,960	0	0	0	0	0	0	0
	Olympic Peninsula	507,165	0	0	0	0	0	0	0
	Western Cascades	1,387,567	0	0	0	0	0	0	0
OR	Cascades East	529,652	0	0	0	0	0	0	0
	Cascades West	1,965,407	263	687	950	0	0	0	950
	Coast Range	1,151,874	0	441	441	0	0	0	441
	Klamath Mountains	911,681	242	1,789	2,031	0	0	0	2,031
CA	Cascades	243,205	0	91	91	0	0	0	91
	Coast	149,044	0	1	1	0	885	885	886
	Klamath	1,708,787	1,449	272	1,721	5,996	297	6,293	8,014
Total		**9,577,342**	**1,954**	**3,281**	**5,235**	**5,996**	**1,182**	**7,178**	**12,413**

Notes:

1. Northern spotted owl suitable habitat includes nesting/roosting habitat, and foraging-only habitat. Nesting/roosting habitat supports all life-history functions for spotted owls including foraging, and is sometimes referred to as nesting, roosting, and foraging habitat. Foraging-only habitat is a separate category that can include more open and fragmented forests, and does not provide structures for nesting/roosting. Habitat effects summarized in this table are all classified as impacts to foraging-only habitat. Impacts to nesting/roosting habitat are tracked separately. Environmental baseline information for foraging habitat as a separate habitat category is not available at a provincial scale.

2. Defined in the Revised Recovery Plan for the Northern Spotted Owl (USFWS 2011) as Recovery Units as depicted on page A-3.

3. Northern spotted owl critical habitat as designated December 4, 2012 (77 FR 71876). Total designated critical habitat acres listed here (9,577,342 acres) are derived from GIS data, and vary slightly from the total acres (9,577,969 acres) listed in the Federal Register (-627 acres).

4. Estimated foraging-only habitat removed or downgraded from land management (e.g., timber sales) or natural events (e.g., wildfires) as documented through ESA section 7 consultations or technical assistance. Effects reported here include acres removed or downgraded from 2012 to present.

5. Reserve land use allocations intended to provide spotted owl demographic support include Late-Successional Reserves identified in the Northwest Forest Plan on National Forests, designated Wilderness, and other Congressionally-reserved lands. Reserves on BLM lands in western Oregon managed under the 2016 revised Land and Resource Management Plans include Late-Successional Reserves, Congressionally-reserved lands, National Landscape Conservation System lands, and some District Designated Reserves (e.g., Areas of Critical Environmental Concern).

6. Non-reserve lands intended to provide spotted owl dispersal connectivity between reserves include USFS and BLM designations for timber production (matrix and harvest land base designations), Adaptive Management Areas, and other non-reserved land use designations.

LITERATURE CITED

Adahl, E., P. Lundberg, and N. Jonzén. 2006. From climate change to population change: the need to consider annual life cycles. Global Change Biology 12:1627-1633.

Carroll, C. 2010. Role of climatic niche models in focal-species-based conservation planning: assessing potential effects of climate change on northern spotted owl in the Pacific Northwest, USA. Biological Conservation. 143:1432-1437.

Davis, R.J., Hollen, B., Hobson, J., Gower, J.E., and Keenum, David. 2016. Northwest Forest Plan—the first 20 years (1994–2013): status and trends of northern spotted owl habitats. Gen. Tech. Rep. PNW-GTR-929. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 54 p.

Davis, R. J. 2017. Wildfire frequency, extent, and severity in the [US] northern spotted owl range. Presentation made at the Northwest Forest Plan Tri-State meeting in Portland, OR, on November 7, 2017. Unpublished agency report. 32 pages.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research 35(2):141-150.

Forsman, E.D., R.G. Anthony, E.C. Meslow, and C.J. Zabel. 2004. Diets and foraging behavior of spotted owls in Oregon. Journal of Raptor Research 38(3):214-230.

Franklin, A.B., Anderson, D.R., Gutiérrez, R.J., and K.P. Burnham. 2000. Climate, habitat quality, and fitness in spotted owl populations in northwestern California. Ecological Monographs, 70(4):539-590.

Gaines, W.L., R.J. Harrod, J. Dickinson, A.L. Lyons and K. Halupka. 2010. Integration of Northern spotted owl habitat and fuels treatments in the eastern Cascades, Washington, USA. Forest Ecology and Management 260:2045–2052.

Glenn, E.M., R.G. Anthony, and E.D. Forsman. 2010. Population trends in northern spotted owls: associations with climate in the Pacific Northwest. Biological Conservation 143: 2543-2552.

Glenn, E.M., R.G. Anthony, E.D. Forsman, and G.S. Olson. 2011a. Local weather, regional climate, and annual survival of the northern spotted owl. Condor 113:159-176.

Glenn, E.M., R.G. Anthony, E.D. Forsman, and G.S. Olson. 2011b. Reproduction of northern spotted owls: the role of local weather and regional climate. Journal of Wildlife Management 75(6):1279-1294.

Loehle, C.L., L. Irwin, J. Beebe, and T. Fleming. 2011. Factors influencing the distribution of northern spotted owls in the eastern Cascades, Washington. Northwestern Naturalist, 92(1):19-36.

Marlon, J.R., Bartlein, P.J., Long, C., Gavin, D.G., Anderson, R.S., Briles, C. Brown, K.J., Colombaroli, D., Hallett, D.J., Power, M.J., Scharf, E.A., Walsh, M.K. A long-term perspective on wildfires in the western U.S. 2012. Proceedings of the National Academy of Sciences. Published online before print February 14, 2012, doi: 10.1073/pnas.1112839109.

Moritz, M. A., M.A. Parisien, E. Batllori, M. A. Krawchuk, J. Van Dorn, D. J. Ganz, and K. Hayhoe. 2012. Climate change and disruptions to global fire activity. Ecosphere 3(6):49. http://dx.doi.org/10.1890/ES11-00345.1

Singleton, P.H., J.F. Lehmkuhl, W.L. Gaines, and S.A. Graham. 2010. Barred owl space use and habitat selection in the eastern Cascades, Washington. Journal of Wildlife Management 74:285–294.

Stenseth, N.C., A. Mysterud, G. Ottersen, J. W. Hurrel, K-S Chan, and M. Lima. 2002. Ecological effects of climate fluctuations. Science 297:1292-1296.

[USDI and USDC] U.S. Department of the Interior and U.S. Department of Commerce. 1998. Endangered Species Consultation Handbook; Procedures for Conducting Section 7 Consultations and Conferences. USDI-FWS and USDC-NOAA-Fisheries, Washington, DC.

[USFWS] US Fish and Wildlife Service. 2011. Revised recovery plan for the northern spotted owl (*Strix occidentalis caurina*). Fish and Wildlife Service, Portland, Oregon. Xvi + 258 pp.

[USFWS] US Fish and Wildlife Service. 2012. Endangered and Threatened Wildlife and Plants; determination of critical habitat for the spotted owl. Fish and Wildlife Service. Fed. Reg. Vol. 77. 233:71876. December 4, 2012.

Walther, G. R., E. Post, P. Convoy, A. Menzel, C. Parmesan, T. J. C. Beebee, J. Fromentin, O. Hoegh-Guldberg, and F. Bairlein. 2002. Ecological responses to recent climate change. Nature 416: 389-395.

Westerling, A.L., M.G. Turner, E.A.H. Smithwick, W.H. Romme, and M. G. Ryan. 2011. Continued warming could transform Greater Yellowstone fire regimes by mid-21st century Proceedings of the National Academy of Science 108:13165-13170.

APPENDIX B: Summary of Estimated Wildfire Effects on Northern Spotted Owl Habitat in the Washington Eastern Cascades Physiographic Province, 1994 to Present

Year	#	Fire	Unit	Total Acres	NRF Rmvd	CHU Rmvd	CHU	AC Rmvd	READ	Comments
1994	1	Tyee	WNF	186800	9512	6080	6, 9, 11	17	0	jb analysis
1998	2	North 25	Chelan	8845	3500	1260	4	1	0	jb
			TOTAL	**195645**	**13012**	**7340**		**18**	**0**	
2001	3	Icicle Complex	Leav	7850	1569	41	10	0	1	jk
2001	4	Rex Creek	Chelan	56000	1873	0	n/a	0	1	cm
2001	5	Thirtymile	MRVD	9324	932	0	n/a	0	0	jk: assumed 10% of area is NRF
2001	6	South Libby	MVRD	3800	380	0	n/a	0	0	jk: assumed 10% of area is NRF
2001	7	Tommy Creek	Entiat	640	100	30	5	0	0	jk
2001	8	Rattlesnake	Naches	20	2	0	n/a	0	0	jk: assumed 10% of area is NRF
2001	9	Spruce-Dome	Naches	2600	260	130	17	0	0	jk: assumed 10% of area is NRF; about half in CHU
2001	10	Merritt Lake	Lake	20	2	0	n/a	0	0	jk: assumed 10% of area is NRF
2001	11	Dog Creek	Naches	450	45	0	n/a	0	0	jk: assumed 10% of area is NRF
			TOTAL	**80704**	**5163**	**201**		**0**	**2**	
2002	12	Deer Point	Chelan	43000	2098	0	n/a	0	1	cm
2002	13	Power Creek	Leav	10	0	0	n/a	0	0	jk
2002	14	Deer Mountain	Chelan	1500	0	0	n/a	0	0	jk
2002	15	Malcom	Cle Elum	10	2	2	13	0	0	jk: assumed 20% of area is NRF
2002	16	Cat Face	Lake	10	0	0	n/a	0	0	jk
			TOTAL	**44530**	**2100**	**2**		**0**	**1**	
2003	17	Crystal Creek	Leav	1284	195	0	n/a	0	1	jk
2003	18	Square Lake	Leav	1097	607	0	n/a	0	0	jk
2003	19	Farewell	MVRD	81400	1343	0	n/a	0	1	jk: about 1/3 of area is w/in NWFP; assumed 5% of area was NRF
2003	20	Needles	MVRD	21300	6500	2500	2	1	0	cm: much of home range of Driveway Butte STOC burned

Year	#	Fire	Unit	Total Acres	NRF Rmvd	CHU Rmvd	CHU	AC Rmvd	READ	Comments
2003	21	Maple	Lake	2409	1385	630	6	0	1	cm
			TOTAL	**107490**	**10030**	**3130**		**1**	**3**	
2004	22	Pot Peak Complex	Chelan	46000	4600	1150	4	1	1	jk: assumed 10% of area is NRF; about 1/2 of CHU was burned, much of 25-mile STOC home range burned
2004	23	Rattlesnake	Naches	600	30	0	n/a	0	0	jk: assumed 5% of area is NRF
2004	24	Icicle	Leav	778	416	355	10	0	1	jk
2004	25	Trinity	Lake	45	0	0	6	0	0	jk
2004	26	Dirtyface	Lake	295	50	0	n/a	0	0	jk
2004	27	Sunshine	MVRD	50	5	0	n/a	0	0	assumed 10% of area is NRF
2004	28	Reecer	Cle	100	18	0	n/a	0	0	jk
2004	29	Fisher	Leav	16500	1314	0	n/a	0	1	jk
			TOTAL	**64368**	**6433**	**1505**		**1**	**3**	
2005	30	Pearrygin Lake	MVRD	550		0	n/a	0	0	jk
2005	31	Dirtyface	Lake	1150	303	5	6	0	1	jk: BA coming over winter; weed issues
2005	32	Squaw Creek	MVRD	1200		0	n/a	0	0	
			TOTAL	**2900**	**303**	**5**		**0**	**1**	
2006	33	Tripod Complex	MVRD	175000	0	0	n/a	0	1	outside NWFP area
2006	34	Tatoosh Complex	MVRD	2550	0	0	n/a	0	0	wilderness
2006	35	Flick Creek	Chelan	5160	258	0	n/a	0	0	NPS/Chelan RD; assumed 5% NRF
2006	36	Tinpan	Entiat	5750	287	0	n/a	0	0	wilderness: assumed 5% was NRF
2006	37	Cedar Creek	MVRD	1661	10	0	n/a	0	0	jk: assumed 5% of area is NRF
2006	38	Polallie Ridge	Cle	500	50	0	n/a	0	0	jk: assumed 10% NRF
				190621	**605**	**0**		**0**	**1**	
2007	39	Tolo	NPS	300	15	0	n/a	0	0	jk: assumed 5% of area is NRF

Year	#	Fire	Unit	Total Acres	NRF Rmvd	CHU Rmvd	CHU	AC Rmvd	READ	Comments
2007	40	Easton Ridge	Cle	400	4	0	n/a	0	0	40 acres on USFS; assumed 10% was NRF
2007	41	Crow Creek	Naches	120	6	0	n/a	0	0	jk: assumed 5% of area is NRF
2007	42	Domke Lake Complex	Chelan	11500	1150	0	n/a	0	0	jk: assumed 10% NRF
				12320	**1175**	**0**		**0**	**0**	
2010	43	Rainbow Bridge	NPS	3710	371	0	n/a	0	0	jk: assumed 10% NRF
2010	44	Wenatchee River Complex	WRRD	2065	103	0	n/a	0	0	jk: assumed 5% of area is NRF
				5775	**474**	**0**		**0**	**0**	
										new ch rule in effect
2012	45	Wenatchee Complex	OWNF	59199	8312	10830	2, 3, 4	0	0	2014 USFS BA; NSO, BT, SIOR effects
2012	46	Okanogan Complex	OWNF	13547	232	1801	1	0	0	2014 USFS BA; incomplete
2012	47	Yakima Complex	OWNF	2376	797	868	5	0	0	Many small fires; PCF-style BA incomplete
2012	48	Table Mountain	Cle	42312	4231	4231	4	3	0	No BA; jk assumed 10% NRF
				117434	**13572**	**17730**		**3**	**0**	
2014	49	Mills Canyon	Entiat	22000	0	220	n/a	0	1	jk assumed 1% dispersal
2014	50	25-Mile	Chelan	240	12	36	2	0	0	jk assumed 5% NRF and 3x dispersal
2014	51	Carlton Complex	MVRD	256108	100	300	n/a	0	0	Only small % w/in NWFP; acres estimated
2014	52	Chiwaukum	WRRD	13895	1390	4170	3	3	0	jk assumed 10% NRF and 3x dispersal
2014	53	Duncan	Entiat	12659	127	381	3	1	0	jk assumed 10% NRF and 3x dispersal
2014	54	Kelly	Entiat	124	12	36	3	0	0	jk assumed 10% NRF and 3x dispersal
2014	55	Lone Mountain	NPS	2770	138		n/a	0	0	jk assumed 5% NRF

Year	#	Fire	Unit	Total Acres	NRF Rmvd	CHU Rmvd	CHU	AC Rmvd	READ	Comments
2014	56	Snag Canyon	Cle	12667	127	254	4	0	0	jk assumed 1% NRF and dispersal
2014	57	South Cle Elum Ridge	Cle	894	45	90	4	0	1	mixed ownership, jk assumed 5% NRF and D
2014	58	Hansel	WRRD	1016	102	306	3	0	0	jk assumed 10% NRF and 3x dispersal
2014	59	Little Bridge Creek	MVRD	4896	245	734	1	0	0	jk assumed 5% NRF and 3x dispersal
2014	60	Shoofly	WRRD	160	16	48	3	0	0	jk assumed 10% NRF and 3x dispersal
2014	61	Upper Falls	MVRD	8118	406	1217	1	0	0	jk assumed 5% NRF and 3x dispersal
				335,547	**2720**	**7792**		**4**	**2**	
2015	62	Wolverine	OWNF	65323	3266	6532	2, 3	1	1	jk assumed 5% NRF and dispersal
2015	63	First Creek	Chelan	7443	372	744	3	0	0	jk assumed 5% NRF and dispersal
2015	64	Black Canyon	MVRD	88974	250	750	n/a	0	0	mixed ownership, acres estimated
2015	65	Twisp	MVRD	11220	0	250	1	0	0	mixed ownership, acres estimated
				172,960	**3888**	**8276**		**1**	**1**	
2017	66	Diamond Peak	MVRD	128,272			1			May have entered north edge of CH
2017	67	Norse Peak	Naches	55,909			5			STOC habitat is along SR-410 corridor
2017	68	Jack Creek	WRRD	4,606			n/a			
2017	69	Jolly Mountain	Cle Elum	36,808			4			May have significant STOC and CH effects
2017	70	Uno Peak	Chelan	8,726			n/a			
				234,321	**0**	**0**				
		Grand Totals		**1,330,294**	**59475**	**45981**		**28**	**14**	

NRF and CHU removed is a combination of fire and fire-suppression effects
NRF and CHU acres overlap unless otherwise stated; CHU acres = NRF only
READ = Service resource advisors/BAER/monitoring (1=present, 0=absent)

Note: Fire information from 2012 to present are estimates, pending completion of emergency consultation.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

Refer to NMFS No.: WCRO-2019-00360

October 15, 2019

Daniel M. Mathis, P.E.
Division Administrator
Federal Highway Administration, WA Division
711 S. Capitol Way, Suite 501
Olympia, WA 98501-1284

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the I-90 Snoqualmie Pass East Project, Phase 3-4, Stampede Pass to Easton; (HUC 170300010304) Stampede Creek–Yakima River; (HUC 170300010306) Little Creek–Yakima River.

Dear Mr. Mathis:

Thank you for your letter of April 9, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the I-90 Snoqualmie Pass East Project, Phase 3 and 4 from Stampede Pass to Easton in Kittitas County, Washington.

In this biological opinion (opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of ESA-listed Middle Columbia River steelhead (*Oncorhynchus mykiss*) or result in the destruction or adverse modification of its designated critical habitat.

As required by section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPMs) NMFS considers necessary or appropriate to minimize incidental take associated with these actions. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the federal agency and any person who performs the action must comply with to carry out the RPMs. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

Our essential fish habitat (EFH) analysis includes one conservation recommendation to avoid, minimize, or otherwise offset potential adverse effects to EFH. If your response is inconsistent with the EFH conservation recommendation, the U.S. Army Corps of Engineers must explain

why, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly note if you accept the conservation recommendation.

Please contact Diane Driscoll of the Columbia Basin Branch at (509) 962-8911 x 809 or diane.driscoll@noaa.gov, if you have any questions concerning this section 7 consultation or require additional information.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Endangered Species Act (ESA) Section 7(a)(2)
Biological Opinion for the I-90 Snoqualmie Pass East Project, Phase 3-4, Stampede Pass to Easton; (HUCs 170300010304 Stampede Creek–Yakima River; 170300010306 Little Creek-Yakima River

NMFS Consultation Number: WCRO-2019-00360

Action Agency: U.S. Department of Transportation

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or critical habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify critical habitat?
Middle Columbia River steelhead	Threatened	Yes	No	No

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By:

for Michael P. Tehan
Assistant Regional Administrator

Date: 10/15/2019

TABLE OF CONTENTS

LIST OF TABLES

ACRONYM GLOSSARY

BA	Biological Assessment
BMP	Best Management Practice
CABS	Compost-Amended Biofiltration Swales
CEA	Connectivity Emphasis Area
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHART	Critical Habitat Analytical Review Team
CLC	Cascade Land Conservancy
CMA	calcium magnesium acetate
County	Kittitas County
CWU	Central Washington University
dbh	diameter at breast height
DPS	Distinct Population Segment
DQA	Data Quality Act
EB	Eastbound
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FHWA	Federal Highway Administration
FR	Federal Register
ft^2	square feet
gpm	gallons per minute
HCZ	Hydrologic Connectivity Zone
HPA	Hydraulic Project Approval
HUC	Hydrologic Unit Code
I-90 SPE	Interstate-90 Snoqualmie Pass East Project
ICTRT	Interior Columbia Basin Technical Recovery Team
IDT	Interdisciplinary Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LWD	Large Woody Debris
MCR	Middle Columbia River
MDT	Mitigation Development Team
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NLAA	Not Likely To Adversely Affect
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Unit
OHWM	Ordinary High Water Mark
opinion	Biological Opinion
OWNF	Okanogan–Wenatchee National Forest
PBF	Physical and Biological Feature

PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
Reclamation	Bureau of Reclamation
RM	River Mile
RPM	Reasonable and Prudent Measure
SPCC	Spill Prevention, Control and Countermeasures
SPE	Snoqualmie Pass East
SSSD	Steep-Slope Stormwater Dispersion
TESC	Temporary Erosion and Sediment Control
U.S.C.	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population
WB	Westbound
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WDOE	Washington State Department of Ecology
WSDOT	Washington State Department of Transportation
YN	Confederated Tribes and Bands of the Yakama Nation

1.0 INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), and its implementing regulations at 50 CFR 402.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file at the Columbia Basin Branch field office in Ellensburg, Washington.

Updates to the regulations governing interagency consultation (50 CFR part 402) will become effective on October 28, 2019 [84 FR 44976]. Because this consultation was pending and will be completed prior to that time, we are applying the previous regulations to the consultation. However, as the preamble to the final rule adopting the new regulations noted, "[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice." Thus, the updated regulations would not be expected to alter our analysis.

1.2 Consultation History

In 1999, the Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) formed an Interdisciplinary Team (IDT) to assist in developing design alternatives for the Interstate-90 Snoqualmie Pass East (I-90 SPE) project. The IDT has included NMFS, U.S. Fish and Wildlife (USFWS), the Okanogan–Wenatchee National Forest (OWNF), Washington State Parks, the Washington Departments of Fish and Wildlife (WDFW), Ecology (WDOE), Natural Resources (WDNR), the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers, Bureau of Reclamation (Reclamation), Kittitas County (County), Cascade Land Conservancy (CLC), and Central Washington University (CWU).

As part of that collaborative process, NMFS agreed to consult on the project in phases because the IDT presented an opportunity to consider the environmental consequences of the whole project even though designs for the entire 15 miles lacked sufficient detail to enable consultation on the entire project. The IDT met monthly for several years and now meets quarterly to discuss the ongoing project and the proposed designs for Phase 3-4 and provide technical assistance to FHWA regarding current construction and the development of a biological assessment (BA) for future actions.

Consistent with ESA collaborative consultation strategy approved by NMFS, FHWA and WSDOT have continued to reinitiate consultation with NMFS in response to design change and/or modification in ESA-listing status. The FHWA initiated consultation with NMFS for the effects of Phase 1 and 2 of the I-90 SPE project on listed species and designated critical habitats on January 11, 2008, and September 6, 2014, for Phase 3A. NMFS completed informal consultation for Phase 1 and 2 NWR-2008-134 on April 7, 2008, and Phase 3A WCR-2014-1508 on October 8, 2014, for effects to the Middle Columbia River (MCR) steelhead distinct population segment (DPS) and its designated critical habitat.

On April 4, 2019, FHWA submitted a BA and request for informal consultation on Phases 3 and 4 (Phase 3-4). Phase 3-4 incorporates construction activities from milepost (MP) 62 (Stampede Pass) to MP 70.3 (Easton) in Kittitas County, Washington. The FHWA determined that the proposed action was "not likely to adversely affect" (NLAA) MCR steelhead or its critical habitat. After reviewing the BA, NMFS informed FHWA on April 29, 2019, that we could not agree with an NLAA determination and that, with FHWA agreement, NMFS would initiate formal consultation. FHWA agreed with NMFS' determination. Consultation initiated on April 29, 2019.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). No interrelated actions or interdependent actions were identified for the proposed action.

The FHWA proposes partially funding WSDOT for Phase 3-4 of the I-90 SPE project. The project includes 8.3 miles of highway improvement including adding an additional lane in each direction, replacing the Kachess River Bridges at river mile (RM) 0.23 and 0.27, and the modification of stream crossings on eight tributaries to the Yakima River as shown in Table 1. The Kachess River is a tributary to the Yakima River entering at RM 203.5 upstream of the Easton Dam at RM 202.5. The left-bank tributaries included in this project (some of which are fish bearing) enter the Yakima River upstream of RM 205.

Of the eight tributary crossing structures that will be replaced (Table 1), five are on fish-bearing streams and the other three tributaries are non-fish-bearing. All of the tributary structures are located at least 530 yards away from the mainstem Yakima River and will be conducted in such a manner and at such time that NMFS does not anticipate any affects to the mainstem Yakima River. Therefore, this opinion will only discuss the five fish bearing tributaries and the Kachess River.

Table 1. Bridge and culvert designs for eight left bank tributaries of the Yakima River above Easton Dam and the Kachess River Bridges for Phase 3-4 of the Interstate-90 (I-90) Snoqualmie Pass East Project (FHWA 2019).

Tributary Name and Fish Presence	Existing Condition	Modified Phase 3-4 Design[1]
Toll Creek MP 64.1 Fish-bearing	4-ft concrete pipe. (980 ft^2 footprint). Not fish passable.	20-ft x 250-ft single box culvert. (5000 ft^2 footprint). Fish passable. Will remove the existing pipe and add fish passage.
Unnamed Creek MP 64.4 (NEW) Not fish-bearing	2-ft concrete pipe. (280 ft^2 footprint). Not fish passable.	8-ft x 205-ft single box culvert. (1,640 ft^2 footprint). Fish passable. Will replace existing pipe with a larger culvert incorporating an engineered channel.
Cedar Creek MP 64.6 Fish-bearing	4-ft box culvert. (620 ft^2 footprint). Not fish passable.	25-ft x 217-ft bridge. (5,425 ft^2 footprint). Fish passable. Replaces culvert with free-span bridge, thereby restoring channel to natural conditions.
Unnamed Creek MP 65.1 Fish-bearing	4-ft box culvert with metal insert. (580 ft^2 footprint). Not fish passable.	14-ft x 265-ft single box culvert. (3,710 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Telephone Creek MP 65.6 Fish-bearing	5-ft x 4-ft box culvert. (850 ft^2 footprint). Not fish passable.	20-ft x 130-ft bridge. (2,600 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Hudson Creek MP 66.6 Fish-bearing	4-ft box culvert. (660 ft^2 footprint). Not fish passable.	100-ft x 162-ft bridge. (16,200 ft^2 footprint). Replaces culvert with free-span bridge, thereby restoring channel to natural conditions.
Unnamed Creek MP 66.8 (NEW) Not fish-bearing	2-ft culvert. (290 ft^2 footprint). Not fish passable.	12-ft x 260-ft single box culvert. (3,120 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Unnamed Creek MP 67.8 (NEW) Not fish-bearing	2-ft culvert. (730 ft^2 footprint). Not fish passable.	13-ft x 200-ft single box culvert. (2,600 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Replacement of eastbound and westbound I-90 Kachess River Bridges	When complete, both bridges will clear-span the river, supported by spread footings installed above the 500-year flood elevation	

[1] All culvert replacements will include a full-width streambed mix, allowing for potential fish use across the entire culvert footprint.

The replacement of the Kachess River Bridges immediately north of the Easton Dam pool is the only action that will occur adjacent to the Yakima River. However, this work area will be above the normal pool elevation at the time of disturbance. The remaining bridge and culvert replacements will occur on the left-bank tributaries within 530 yards of the Yakima River at the closest point and in most areas over 1,000 yards from the Yakima River.

Worksite Isolation and Fish Removal/Exclusion

For all fish-bearing waters, work area isolation and fish capture and removal protocols shall follow those outlined in WSDOT's Fish Exclusion Protocols and Standards (2012). Implementation will be planned and directed by a WSDOT biologist, or qualified biologist under contract to WSDOT, possessing all necessary knowledge, training, and experience. Electrofishing will not be used. All individuals participating in fish capture and removal operations shall have the training, knowledge, skills, and ability to ensure safe handling of fish, and to ensure the safety of staff conducting the operations. The directing biologist will use his/her best professional judgment in deciding what sequence of activities is likely to minimize fish stress or injury (including stranding).

If pumps are used to temporarily bypass water or to dewater residual pools or cofferdams, pump intakes shall be screened to prevent aquatic life from entering the intake. Fish screens or guards shall comply with Washington State law (RCW 77.57.010 and 77.57.070), with guidelines prescribed by NMFS, and any more stringent requirements contained in the Hydraulic Project Approval (HPA) or General HPA issued by the WDFW.

Methods for safe capture and removal of fish from the isolated work area are described below. These methods are given in order of preference. At most locations, a combination of methods will be necessary.

1. Use only dip nets and seines composed of soft (non-abrasive) nylon material.
2. The operations shall confirm success of fish capture and removal before completely dewatering or commencing with other work within the isolated work area; the operations shall conduct a minimum of two complete passes without capture using electrofishing equipment.
3. Do not hold ESA-listed fish in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator.
4. Every attempt will be made to release ESA-listed specimens first.

Seining shall be the preferred method for fish capture. Other methods shall be used when seining is not possible, or when/after attempts at seining have proven ineffective. Seines, once pursed, should remain partially in the water while fish are removed with dip nets. Seines with a "bag" minimize handling stress and are preferred. Seines with a bag are also preferred where obstructions make access to the water (or deployment/retrieval of the seine) difficult.

Baited Minnow Traps are typically used before and in conjunction with seining. Traps may be left in the isolated work area overnight. Traps shall be inspected at least four times daily to

remove captured fish and thereby minimize predation within the trap. Traps will be checked more frequently if temperatures are in excess of 59°F.

Dip Nets shall be used in conjunction with seining. This method is particularly effective when employed during gradual dewatering or flow diversion. Once netted, fish shall remain partially in water until transferred to a bucket, cooler, or holding tank. Dip nets that retain a volume of water ("sanctuary nets") are preferred.

Connecting Rod Snakes may be used to flush fish out of stream crossing structures (i.e., culverts). Connecting rod snakes are composed of wood sections approximately 3 feet in length.

WSDOT will ensure that fish handling is the minimum necessary to remove fish from the isolated work area. WSDOT will conduct fish capture and removal operations in a manner that minimizes the amount and duration of handling. The operations shall maintain captured fish in water to the maximum extent possible during seining/netting, handling, and transfer for release. The directing biologist shall maintain accurate records of the operations, including: fish species, number, age/size class estimate, condition at release, and release location. Fish will not be sampled or anesthetized. The operations shall ensure that captured fish are held in water of suitable quality to ensure their safety. The directing biologist shall ensure that conditions in the holding containers are monitored frequently and operations adjusted appropriately to minimize fish stress. Fish shall not be held in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator; small coolers meeting this description are preferred over buckets.

Culvert Replacement and Installation

All existing stream crossings of fish-bearing streams will be upgraded to either a longer span bridge or an oversized bottomless culvert. All bottomless culverts will be built on small shafts or spread footings and will be designed in accordance the WDFW Water Crossing Design Guidelines (Barnard et al. 2013). The bottomless clear span designs will use natural substrate materials. Prior to the construction of culvert installations and replacements, road easements and construction limits will be marked, erosion and sediment controls will be installed, and fish will be removed from the affected portion of the creek when in-water construction is required. In areas where existing culverts will be replaced, an excavator or backhoe will be used to excavate current road fill to an elevation necessary to place the new culvert. If culverts are placed on new alignments, the culvert will be placed concurrently with constructing the roadbed.

All construction will take place in the dry either during the times when flow is absent, or by constructing a temporary diversion dam at the upstream limit of the work area and piping the flow past the culvert work. Once the fish have been removed, a small diversion is typically constructed upstream of the work site using a combination of ecology blocks, sandbags with heavy plastic sheeting, or aqua-barriers. A flexible pipe or hose can be incorporated into the dam and run through one of the culverts where it will terminate at a controlled splash area downstream of the work area. A temporary sediment fence may be installed downstream of the

hose outlet in order to retain turbid water and sediment that may be generated. The system will be designed for gravity flow and will be large enough to convey debris and flows expected during the construction period. If pumping is necessary, the pump will be fitted with mesh screens to prevent aquatic life from entering the intake hose.

The contractor will place new creek bed material prior to culvert placement. Using specifications from WDFW, this material is normally composed of washed, rounded, well-graded mix with gravels ranging in size from 0.25 inches to 5.0 inches sized for the slope and discharge and containing appropriate fine material to seal the streambed. After placing the culvert, the contractor will reintroduce the stream into the channel in a slow controlled fashion. The contractor will use a process known as "ramping" to prevent excessive erosion, siltation, or scour of the stream channel. A WSDOT engineer will observe and control the ramping process. After flow is fully restored to the channel, all material used in the temporary bypass will be removed from the site and the site restored to natural conditions.

Using the construction methods described above will substantially minimize disturbance to riparian areas. Disturbed banks will be seeded or planted with a diverse assemblage of native plants adapted to riparian areas. The contractor will restore any disturbed portions of creek beds beyond the immediate culvert replacement area to natural channel conditions.

The contractor will need to dewater and isolate approximately 6,144 square feet (ft^2) total of stream channel area in the five fish-bearing streams of the Yakima River tributaries and the Kachess River Bridge (site footprints range from 648 ft^2 to 1,060 ft^2). Qualified biologists in accordance with the 2012 WSDOT Fish Exclusion Protocols and Standards will conduct isolation of the work area, fish removal, and release of fish.

CEAs and HCZs

Separate from culverts and bridges for defined perennial streams in the action area, the I-90 SPE includes a number of specific ecologic connectivity features, named Connectivity Emphasis Areas (CEAs). Most of these relate to improving the hydrologic connectivity in streams and wetland areas crossed by the highway with a few emphasizing only wildlife. The Mitigation Development Team (MDT), a multi-agency team of biologists and hydrologists, identified the important CEAs and Hydrologic Connectivity Zones (HCZs) throughout the 8.3-mile project area. HCZs are geographic zones where connections between groundwater and surface water play an important role in maintaining natural flow paths that transmit water, sediment and nutrients in support of aquatic organisms and sustaining streamflow. The MDT then collaborated with design engineers to identify the locations and types of structures needed to meet the ecological goals unique to each CEA. The result is a project with six CEAs that include five HCZs identified within boundaries of the Phase 3-4 of I-90 SPE. The CEAs include the construction of several wildlife crossing structures, HCZs and over-sized bridges to increase the permeability of the corridor, connect important habitats, and promote terrestrial and aquatic ecological connectivity. WSDOT identified five HCZs in the Phase 3-4 project area where I-90 divides wetlands, alluvial fans, seepage zones and important aquifer recharge areas where either

small culverts or permeable road fill will be installed to improve groundwater flow under the highway.

In areas where new culverts or bridges will be installed, highway fill materials will be removed and habitat and hydrology will be restored beneath these structures. All connectivity structures will include natural substrates. The contractor will incorporate habitat elements, or "legacy structures," such as logs, root wads, and rocks within and around connectivity structures where practicable, and will use native vegetation in areas under bridge spans and on wildlife overcrossings.

Kachess River Bridges

The design for Phase 3-4 includes replacing and widening both the eastbound (EB) and westbound (WB) bridges, but relocating the WB bridge into the existing median, precluding the need for a temporary detour bridge. The existing EB bridge is 99 feet long and the WB bridge is 150 feet long. The new bridges will be lengthened to 240 feet long each and widened to add a third lane. Relocation of the WB bridge will require work below the OHWM in the Easton Dam pool to remove the four west side piers. Pier removal is scheduled during low pool elevation (October through March), when the piers are normally above the wetted edge of the pool and thus normally in a dewatered area of the pool. The contractor will remove four pier columns, each 4 feet in diameter, with a total disturbed area below the OHWM of approximately 50 ft^2. When complete, both bridges will clear-span the river, supported by spread footings installed above the 500-year flood elevation. By widening both bridges, there will be an increase in aquatic shading from 9,462 ft^2 (existing bridges) to 12,533 ft^2.

Riparian Vegetation Impacts

The Kachess River reach in which work will occur includes banks that are artificially straightened and armored with rock. Within the median, woody vegetation is limited to several shrubs less than 5 feet tall (hardhack–*Spiraea douglasii*) and one small conifer [less than 4-inch diameter at breast height (dbh)] rooted above the OHWM. Total woody cover within the median is estimated at 200 ft^2. The former WB alignment will be restored with native, riparian vegetation.

Impervious Surface

Construction of Phase 3-4 of the I-90 SPE corridor will result in a net impervious surface increase of approximately 34 acres over 8.3 miles, an increase of 35 percent. The increased impervious surface will require additional and corresponding winter operations and maintenance resources such as sand and chemical ant-icing/deicing compounds to manage the added impervious surface in the winter.

Traction Sand and Deicer

WSDOT currently uses chloride based FreezGard™ and IceSlicer™ as their anti-icer and deicer respectively. FreezGard™ is composed of a 30 percent liquid magnesium chloride solution and is applied at a rate of 20 to 25 gallons per lane mile. IceSlicer™ is a pelletized deicing product composed of sodium chloride, potassium chloride, magnesium chloride and trace minerals. WSDOT uses a 10-to-1 or 5-to-1 ratio of sand to IceSlicer™, with FreezGard™ added to help it spread more evenly over the roads.

Stormwater

WSDOT will include engineered stormwater treatment for all new and replaced impervious surfaces using stormwater treatment performance standards tied to state and federal permit requirements in treating 100 percent of stormwater runoff for the project, following the most current version of the WSDOT Highway Runoff Manual (2019). WSDOT will provide on-site treatment and off-site stormwater mitigation for any locations where on-site treatment is not possible due to physical constraints. Depending on location, WSDOT will use the following treatment methods: onsite stormwater treatment including natural or engineered dispersion areas, media filter drains, compost-amended biofiltration swales (CABS), continuous inflow CABS, or vegetated filter strips. Construction or installation of stormwater treatment will not require disturbance of any waterbody within the action area.

Water Withdrawal

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.06 cubic feet per second (cfs), or 27 gallons per minute (gpm). To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park or surface water withdrawn from the Yakima or Kachess Rivers.[1]

> ***Crystal Springs Sno-Park Well.*** This well is located on a terrace of alpine glacial drift on the south side of the Yakima River. The terrace lies approximately 30 to 40 feet above the floodplain.
>
> ***Kachess River.*** The contractor will withdraw water from the Kachess River at the I-90 Bridge with best management practices (BMPs) in place to avoid and minimize effects to fish. Reclamation controls flows in the Kachess River by releases from the Kachess Reservoir. Kachess River flows are lowest in May and June when the river drops to as low as 30 cfs. Flows increase in the early irrigation season (July–August) to 300 to 600 cfs, and up to 1,200 cfs and greater in September and October to continue meeting irrigation demands in the lower Yakima Basin when Keechelus Reservoir releases are reduced to protect spring-run Chinook salmon redds.

1 The assumption is that water will be withdrawn from only one source at a time, which is a worst-case scenario.

Yakima River. Water will be withdrawn from the Yakima River at the Stampede Pass Road Bridge with BMPs in place to minimize effects to fish. Flows in this reach of the Yakima River are driven by releases from the Keechelus Reservoir. The Yakima River flow below Crystal Springs is greatest during irrigation releases in July and August, ranging from 500 to 1,200 cfs. Keechelus Reservoir releases are reduced in September and October to 80 to 120 cfs to prevent spring-run Chinook salmon from spawning higher along channel margins where they would likely be left dry in the winter.

Due to the location of the project and necessary winter shut-downs, construction activities can only occur from April through October. For the purposes of this document, "construction season" refers to the 7-month window from April 1 to October 31. Work may start later and/or end earlier depending on weather conditions. It will be necessary for some work to occur 24 hours a day, seven days a week, due to the weather-shortened construction seasons. The in-water work window for fish-bearing streams in this location is generally July 16 through September 30.

Construction Sequencing

Phase 3 - (2020–2021)

- Construct WB Kachess River Bridge and minor roadway work near the Kachess River Bridge.

Phase 3 - (2021–2023)

- Construct permanent EB highway alignment and partial WB alignment, which includes:
    - EB portions of culverts at Cedar Creek, Telephone Creek, Hudson Creek, and Unnamed Creeks at MPs 65.1 and 67.8.
    - EB portion of the Hudson Creek CEA Bridge (Unnamed Creek 67.1).
- EB bridge over Kachess River.

Phase 3 - (2024–2025)

- Completion of the WB portion of HCZs (small culverts).
- Structure construction, including:
    - Completion of culverts at Cedar Creek, Telephone Creek, Hudson Creek, and Unnamed Creek 65.1.
    - Completion of the Hudson Creek CEA Bridge (Unnamed Creek 67.1).

Phase 4 - (2027–2028)

- Structure construction, including:
    - WB portion of the Toll Creek culvert.
    - WB Bonnie Creek Bridge.
    - WB Swamp Creek Bridge.
    - WB Wildlife Connectivity Bridge at MP 62.5.
    - WB Unnamed Creek 63.7 Bridge.
    - WB portion of Unnamed Creek 64.4 Culvert.

Phase 4 - Stage 3 (2028–2029)

- Structure construction, including:
  - Toll Creek Culvert (EB portion).
  - EB Bonnie Creek Bridge.
  - EB Swamp Creek Bridge.
  - EB Wildlife Connectivity Bridge at MP 62.5.
  - EB Unnamed Creek 63.7 Bridge.
  - EB Unnamed Creek 64.4 Culvert (EB portion).

Phase 4 - Stage 4 (2029)

- Minor traffic shifts to complete tie-ins.

Best Management Practices and Minimization Measures

The FHWA will ensure that the contractor complies will the following BMPs and minimization measures:

Minimization Measures

- A Temporary Erosion and Sediment Control (TESC) Plan will be developed and implemented. The BMPs in the plan will control sediments from all vegetation removal and ground-disturbing activities.
- FHWA will require inspections of all temporary and permanent erosion and sedimentation control measures on a regular basis, and maintenance and repair will occur to assure continued performance of their intended function.
- The contractor will inspect construction equipment daily to ensure there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products.
- For activities involving concrete, a concrete truck chute cleanout area shall be established to properly contain wash water. The cleanout area will be located in a WSDOT pre-approved location where infiltration of wash water will occur.
- No paving, chip sealing, or stripe painting will occur during periods of rain or wet weather.
- A Spill Prevention, Control and Countermeasures (SPCC) Plan will be approved and implemented. When practicable, all equipment fueling and maintenance will occur more than 300 feet from the nearest wetland, ditch, or flowing or standing water. (Fueling large cranes, pile drivers, and drill rigs over 300 feet away may not be practicable.)
- The contractor will not place crossovers for facilitating traffic movement in sensitive areas, such as wetlands.
- FHWA will ensure that the project and all stormwater BMPs, are designed and constructed in accordance with WSDOT's Highway Runoff Manual (WSDOT 2019) in order to minimize water quantity and quality impacts from freeway construction and operation. The selection of BMPs will meet or exceed water treatment requirements under Ecology standards and EPA Clean Water Act requirements.
- FHWA will ensure there is a stormwater construction plan to contain and treat stormwater generated during construction activities.

Access/Clearing and Grading/Cut and Fill

- FHWA will ensure that staging, processing, and stockpiling areas are not sited in environmentally sensitive aquatic resource areas.
- Any site selected by the contractor for staging, stockpiling, and materials processing, etc. will be subject to review and approval of FHWA.
- Boundaries of clearing limits associated with site access and construction will be clearly marked and fenced to prevent ground disturbance outside the limits.
- No tree removal will occur on U.S. Forest Service (USFS) lands without prior approval by the USFS.
- Vegetation will be grubbed only from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.
- FHWA will require restoration of all temporarily disturbed areas to pre-project conditions.
- The contractor will minimize removal of riparian vegetation to the greatest extent possible. Where possible, the contractor will mow or cut vegetation close to the ground without removing or disturbing root systems. Where clearing is unavoidable, the contractor will replant disturbed areas with appropriate native vegetation. Any revegetation will be coordinated with WSDOT biologists and landscape architects.
- Temporary storage of excavated materials will not occur within the 100-year floodplain between November 1 and May 1.
- Construction equipment will be equipped with adequate mufflers, intake silencers, and engine enclosures to meet current standards for noise reduction. Construction equipment will be equipped with spark arrestors and will meet current standards of the USFS Fire Management Office on USFS land.
- All stored material will be stabilized to prevent erosion or possible impacts to any aquatic area.
- FHWA will ensure that stormwater BMPs are sited in environmentally sensitive areas or where disturbance of mature vegetation is required to construct the BMP.

Bridges and Culverts

- FHWA will design clear-span bridges wherever possible to eliminate stream channel impacts and provide maximum habitat gain.
- All bottomless culverts will be built on small shafts or spread footings and will be designed in accordance with the WDFW Water Crossings Design Guidelines (Barnard et al. 2013). The bottomless clear-span designs will use natural substrate materials.
- Accumulations of bird feces, debris, road grit, and sand will be removed to the greatest extent possible prior to removing the existing bridges.
- FHWA will remove bridge footings in their entirety where possible. Where bridge footings are not removed, the piers will be cut off approximately 2 feet below ground surface and backfilled with clean native streambed material.
- FHWA will ensure that the contractor pumps sediment-laden water generated during construction of bridge piers or footings to an upland site to infiltrate prior to returning to

surface waters. If discharge to an upland site is not feasible, the contractor will pump the water to holding tanks and haul the water to an upland area for dispersion.

- Bridge construction will be conducted from the banks or temporary work platforms. Construction equipment will be kept out of aquatic resources as much as possible.
- Bridge abutments and piers will be built outside the OHWM, and will be designed to provide wildlife crossing opportunities.
- FHWA will approve all contractor demolition plans for all bridges. At no time will any material be allowed to enter the water during demolition.

In-water Work

- The WDFW will use the Hydraulic Project Approval process to determine seasonal restrictions (work windows) that the contractor will follow to avoid or minimize potential impacts to listed or proposed species. The site specific in-water work window will be agreed upon by the USFWS and NMFS.
- Any in-water work necessary at stream crossings will only occur during the appropriate work windows with BMPs in place to minimize impacts.
- During any in-water work at stream crossings, if necessary, the contractor will isolate the work area by diverting flows around the construction area. At no time will work inhibit the passage of any adult or juvenile salmonid species.
- If pumps are necessary to maintain flow and passage around work areas, inlets will be covered with screening that meets NMFS' criteria.
- Any equipment used over or in-water will use non-petroleum based lubricants, such as vegetable oil instead of hydraulic fluid, and will be "diapered" with absorbent pads.
- All concrete used in aquatic areas will either be poured in the dry or within confined waters not connected to surface waters, and will be allowed to cure 7 days before contact with surface water.
- Prior to starting in-water work on bridges and culverts, fish will be removed as per WSDOT guidance (2012) and the worksite isolated, if necessary, to prevent fish from re-entering during the construction activities. To avoid lethal effects, electrofishing will not occur, only seining and removal with sanctuary nets.
- Water will be reintroduced to isolated stream channels slowly and in a controlled fashion. The contractor will use a process known as "ramping" to prevent excessive erosion, siltation, or scour of the stream channel.
- If lights are used over or adjacent to any aquatic area they will be pointed away from the water and sighted so the least amount of light possible covers aquatic areas.

Conservation Measures

- As described before, conservation measures are specific measures or activities that promote the conservation of listed species. Several of these were identified as part of the IDT and MDT process.
- The project was designed with 14 CEAs identified throughout the 8.3-mile corridor. These CEAs include the construction of several wildlife crossing structures and nine HCZs, which increase the permeability of the corridor, connect important habitats, and promote normal ecological processes and hydrologic connectivity.

- Where possible, restoration adjacent to and below bridge structures will target local habitats and species to facilitate effective ecological connectivity.
- FHWA will ensure that all mitigation and restoration sites will be monitored for several years post-construction to ensure success and that regulatory requirements are being met.
- Disturbed stream banks will be seeded or planted with a diverse assemblage of native plants adapted to riparian areas. Any disturbed portions of the creek bed beyond the immediate culvert replacement area will be restored to natural channel conditions.
- If large trees, logs, or rootwads are removed, they will be retained where possible and placed in adjacent forested areas or incorporated into crossing structures.
- FHWA will ensure wildlife exclusion and guide fencing will be used to enhance the effectiveness of crossing structures. The contractor will use fencing with vertical retaining walls, natural topographic barriers, boulder fields, and other measures to form a continuous integrated system.
- FHWA will require a monitoring and adaptive management plan to ensure the success of the connectivity enhancements throughout the project.
- To provide crossings for smaller species, FHWA will place small and medium-sized culverts approximately every 600 feet throughout the project corridor.
- FHWA will require the use of WSDOT's Integrated Vegetation Management program to ensure practices minimize noxious weed occurrence consistent with USFS directives. Reducing or eliminating herbicide use at crossing structures will enhance use by smaller species.
- On bridges of 120-feet or less, the use of vertical retaining walls will maximize effectiveness as a crossing structure and maximize connected habitats.

2.0 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, federal agencies must ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitat. If incidental take is expected, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

This opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of a listed species," which is "to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50

CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. As described in the Federal Register (FR), such alterations may include, but are not limited to, those that alter the physical and biological features (PBFs) essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designation of critical habitat for MCR steelhead uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with PBFs. The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species, or destroy or adversely modify critical habitat:

- Identify the range-wide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2 Range-wide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up

the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

2.2.1 Status of the Species

The status of MCR steelhead is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The condition of critical habitat throughout the designated area is determined by the current function of the essential PBFs that help to form that conservation value.

The MCR steelhead DPS was listed as threatened on March 25, 1999 (64 FR 14517) and its threatened status was recently reaffirmed on May 26, 2016 (81 FR 33468). The DPS includes all naturally-spawning populations of steelhead using tributaries upstream and exclusive of the Wind River, Washington, and the Hood River, Oregon, excluding the Upper Columbia River and its tributaries (upstream of the Yakima River) and the Snake River. The Interior Columbia Technical Recovery Team (ICTRT 2007) identified 20 populations in four major population groups (Eastern Cascades, John Day River, the Umatilla River/Walla Walla drainages, and the Yakima River). Three of these populations are extinct: the White Salmon and Crooked River populations in the Eastern Cascades Major Population Group (MPG), and the Willow Creek population in the Umatilla River/Walla Walla MPG. Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs. Major watersheds within this DPS include the Klickitat, Fifteen Mile, Deschutes, John Day, Umatilla, Yakima, and Walla Walla River Basins. NMFS has defined the steelhead DPSs to include only the anadromous members of this species (70 FR 67130).

The ICTRT recommends having multiple viable populations to make a DPS less likely to become extinct from a single catastrophic event (ICTRT 2007; Spence et al. 1996). NMFS expresses the status of a DPS in terms of the status and extinction risk of its individual populations, relying on McElhaney et al.'s (2000) description of a viable salmonid population. The four parameters used to evaluate the viability of a salmonid population are abundance, productivity, spatial structure, and diversity. The recovery plan for MCR steelhead (NMFS 2009) describes these four parameters in detail, and the parameter values needed for persistence of individual populations and for recovery of the DPS. Only one MPG, the Yakima River MPG, and only one population within the Yakima River MPG, the Upper Yakima River, will be exposed to the effects of the proposed action.

Life History. Life history characteristics for MCR steelhead are similar to those of other inland steelhead DPSs. Most fish smolt at 2 years and spend 1 to 2 years in salt water before re-entering freshwater, where they may remain up to a year before spawning (Howell et al. 1985). All steelhead upstream of The Dalles Dam are summer-run fish that enter the Columbia River from June to August (Reisenbichler et al. 1992). Adult steelhead ascend mainstem rivers and their tributaries throughout the winter and spring, spawning in the late winter through spring. Fry emergence typically occurs between May and August dependent on water temperature.

Limiting Factors. The major factors limiting recovery of the MCR steelhead DPS include: (1) Mainstem Columbia River hydropower system mortality, (2) degraded tributary habitat, (3) reduced streamflow in tributaries, (4) impaired passage in tributaries, (5) hatchery-related effects, (6) predation/competition/disease, and (7) ocean conditions (Daly and Brodeur 2015; NMFS 2009; NWFSC 2015).

Abundance and Productivity. According to the most recent 5-year status review (2010 to 2014 data), 7 of 15 populations are currently above the minimum abundance thresholds identified by the ICTRT (NWFSC 2015). There are insufficient data to identify 5-year abundances for the Klickitat River and Rock Creek. Total escapement and natural-origin escapements for all five John Day populations increased relative to Ford's (Ford 2011) prior 5-year review. Total spawning escapements have increased in the most recent brood cycle for all three populations in the Umatilla–Walla Walla MPG as well. In the Eastern Cascades MPG, total escapement and natural-origin escapements for two of three populations have increased since the previous 5-year review.

The proposed action will take place within the Yakima River Basin MPG boundaries and will affect the Upper Yakima River population. The MCR Steelhead Recovery Plan (NMFS 2009) characterized five MCR steelhead populations as being at high risk of extinction in terms of abundance based on 1995 to 2004 spawner numbers. One of those high-risk populations is the Upper Yakima population. In the NWFSC 2015 Status Review, the abundance, productivity, and spatial structure risk was considered moderate while the genetic diversity risk remained high resulting in an overall high risk viability rating. Table 2 presents recent spawner abundance.

Table 2. Abundance and Abundance Thresholds for Yakima River Major Population Group populations of Middle Columbia River Steelhead (NWFSC 2015).

Population	Interior Columbia Basin Technical Recovery Team Minimum Abundance Threshold	Natural Spawner Abundance 2005–2014
Satus Creek	1,000	1,127
Toppenish Creek	500	516
Naches River	1,500	1,244
Upper Yakima River	500	246

Spatial Structure and Diversity. The NWFSC (2015) reported no change in the integrated spatial structure and diversity risk for all 17 MCR steelhead populations relative to the previous status review by Ford (2011). Two populations are ranked at low risk, 14 at moderate risk, and one with a high risk of extinction based on spatial structure and diversity criteria, the Upper Yakima River. Within the Yakima River MPG, Satus and Toppenish Creeks, and the Naches River are at moderate risk of extinction, while the Yakima Upper Mainstem population is characterized as high risk.

Biological Risk Summary. The NWFSC (2015) reported that there have been improvements in the viability ratings for some of the component populations, but the MCR steelhead DPS is not currently meeting the viability criteria described in the Mid-Columbia Steelhead Recovery Plan.

Natural origin returns to the majority of populations in two of the four MPGs in this DPS increased modestly relative to the levels reported in the previous 5-year review. Abundance estimates for two of three populations with sufficient data in the remaining two MPGs (Eastside Cascades and Umatilla–Walla Walla) were marginally lower. Updated information indicates that stray levels into the John Day River populations have deceased in recent years. Out-of-basin hatchery stray proportions, although reduced, remain high in spawning reaches within the Deschutes River Basin populations. In general, the majority of population level viability ratings remained unchanged from prior reviews for each MPG within the DPS (NWFSC 2015). For the Yakima River MPG, the NWFSC (2015) gave overall viability ratings of Viable for the Satus and Toppenish Creek populations, Moderate for the Naches River population, and High Risk for the Upper Yakima River population.

Climate Change. Another factor affecting the range-wide status of MCR steelhead and aquatic habitat in the Columbia River Basin is climate change. Climate change has negative implications for salmon, steelhead, and their designated critical habitat in the Pacific Northwest (ISAB 2007; NWFSC 2015; Scheuerell and Williams 2005; Zabel et al. 2006). Average annual Northwest air temperatures have increased by approximately 1°C since 1900, or about 50 percent more than the global average over the same period (ISAB 2007). The latest climate models project a warming of 0.1°C to 0.6°C per decade over the next century.

Climate change affects salmonids and their habitat throughout the Interior Columbia Basin. Several studies have demonstrated that climate change has the potential to affect ecosystems in nearly all tributaries throughout the region (ISAB 2007). While the intensity of effects will vary by region, climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature) (Battin et al. 2007; ISAB 2007). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009), changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

The Independent Scientific Advisory Board (ISAB) identified a number of effects climate change would have on Columbia Basin salmon. A few of these include: (1) water temperature increases, and depletion of cold water habitat that could reduce the amount of suitable salmonid habitat by about 22 percent by the year 2090 in Washington State; (2) variations in precipitation that may alter the seasonal hydrograph and modify shallow mainstem rearing habitat; and (3) earlier snowmelt and higher spring flows with warmer temperatures that may cause spring Chinook salmon and steelhead yearlings to smolt and emigrate to the ocean earlier in the spring (Crozier et al. 2019; Crozier et al. 2010; ISAB 2007; O'Neal 2002). In addition, climate impacts in one life stage generally affect body size and timing in the next life stage and can be negative across multiple life stages (Healey 2011; Wade et al. 2013; Wainwright and Weitkamp 2013).

In summary, climate change is expected to make recovery targets for these salmon populations more difficult to achieve. However, habitat restoration action can act to reduce some of the

adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains, and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters; protecting and restoring riparian vegetation to ameliorate stream temperature increases; and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

2.2.2 Range-wide Status of Critical Habitat

Table 3 below, summarizes the critical habitat for MCR steelhead using information on the status of critical habitat for MCR steelhead described in the recovery plan for the species (NMFS 2009), incorporated by reference here. NMFS designated those habitats presently occupied by a particular species and containing PBFs that are essential to support one or more of the life stages of steelhead. The PBFs of freshwater migration, spawning and rearing sites include migratory access for adults and juveniles, water flow, water quality, temperature conditions, and suitable substrate for spawning and incubation, as well as cover, forage and floodplain connectivity for rearing. The current ability of these features to function properly varies across the landscape from poor in areas of high industrial or agricultural development to excellent in headwater wilderness areas (NMFS 2005; Spence et al. 1996; Wissmar et al. 1994).

Table 3. Critical habitat, designation date, Federal Register (FR) citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Middle Columbia River steelhead	9/02/05 (70 FR 52630)	Irrigation withdrawals, over-allocation of flows, removal of riparian vegetation, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and, to a limited extent, urbanization have reduced tributary stream flows, impaired passage in tributaries, increased sediment delivery to stream channels, altered stream morphology (i.e., channel modifications and diking), degraded water quality, and generally degraded critical habitat throughout much of the Interior Columbia Recovery Domain. Critical habitat in the action area is primarily affected by flow regulation from Kacheluss and Kachess dams, Interstate-90, and historic logging. The action area for this project is contained within the Upper Yakima River watershed, which provides 39.8 miles of freshwater spawning/rearing physical and biological features (PBFs), and 8.2 miles of migration/presence PBFs (NMFS 2005). The Critical Habitat Analytical Review Team (CHART) concluded the Upper Yakima River has a moderate-high conservation value because the PBFs in this watershed support one of four demographically independent populations in the Yakima River Major Population Group. CHART also noted that the additional areas upstream of Cle Elum, Kachess and Kacheluss dams may be essential for distinct population segment conservation.

The mainstem Yakima River and the Kachess River in the action area are both designated MCR steelhead critical habitat. At Easton Dam, either hydraulic or operational conditions or a combination of both affect the fish ladder and compromise access to both waterways during the

timing of MCR steelhead adult upstream migration. However, there is both spawning and rearing habitat upstream of Easton Dam for steelhead that are able to gain access.

The freshwater PBFs present in the action area relevant to this consultation are primarily for spawning and rearing with a lesser emphasis on migration, as listed below in Table 4.

Table 4. Critical habitat physical and biological features (PBFs) relevant to this consultation.

PBF Site	PBF Characteristics	Species Life Stage
Freshwater spawning	Water quality, water quantity, substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity, floodplain connectivity	Juvenile growth and mobility
	Water quality, forage	Juvenile development
	Natural cover	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, natural cover	Juvenile and adult mobility and survival

The physical and biological attributes of MCR steelhead critical habitat in the Columbia River Basin mainstem corridor are altered by the construction and operation of water storage and hydropower projects, including the run-of-river dams on the mainstem lower Snake and lower Columbia rivers. These alterations have affected juvenile migrants to a much larger extent than adult migrants. However, changing temperature patterns have created passage challenges for summer migrating adults in recent years, requiring new structural and operational solutions (i.e., cold-water pumps and exit "showers" for ladders at Lower Granite and Lower Monumental dams). Actions taken since 1995 that have reduced negative effects of the hydrosystem on juvenile and adult migrants include:

- Minimizing winter drafts (for flood risk management and power generation) to save water for augmenting spring flows during the peak juvenile passage period (water quantity).
- Releasing additional water from storage to augment flows for juvenile and adult summer migrants (water quantity).
- Releasing water from Dworshak Dam to reduce peak summer temperatures in the lower Snake River (water quality).
- Constructing juvenile bypass systems and "surface passage" structures, and providing spill at the run-of-river dams to divert smolts, steelhead kelts, and adult salmon falling back downstream away from turbine units (safe passage).
- Maintaining and improving the ladders used by adult salmon and steelhead (safe passage).

As discussed above, another factor affecting the range-wide status of MCR steelhead critical habitat in the Columbia River Basin is climate change. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin et al. 2007; ISAB 2007; Mote et al. 2014). While the intensity of effects will vary by region (ISAB 2007), most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation (Luce et al. 2013). Warmer air temperatures will lead to

more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing streamflow timing and increasing peak river flows, which may limit salmonid survival (Luce et al. 2013; Mantua et al. 2009). The largest driver of climate-induced decline in salmonid populations is likely to be the impact of increased winter peak flows, which scour the streambed and destroy salmonid eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows are all likely to decrease the function of MCR steelhead spawning and rearing PBF across the region. As harmful warm water temperatures become more widespread, juvenile salmonids may increasingly rely on confluences of colder tributaries or other areas of cold-water refugia (Mantua et al. 2009). Such changes are likely to make it more challenging to conserve diverse salmonid life histories, as the stream-type salmonid life history appears to be dependent on a diminishing habitat (Beechie et al. 2006).

2.3 Action Area

"Action area" means all areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02).

For purposes of this consultation, the action area includes the five named and unnamed left bank fish-bearing tributaries of the Yakima River upstream of Easton Dam at RM 202.5 (listed in Table 1) and approximately 0.27 miles of the lower Kachess River as it enters the Easton Dam pool. The I-90 SPE does not cross the Yakima River in the action area and work sites on the tributaries are at least 500 yards upstream from the Yakima River. In the Kachess River, the action area extends from the Easton Dam pool upstream approximately 0.27 miles to just upstream of the WB Kachess River Bridge. The action area on each of the tributaries includes the footprint of each crossing structure (see Table 1) plus the stream channel approximately 25 feet upstream and a maximum of 300 feet downstream for water quality effects. For each tributary the action area will also include the streambanks and riparian area 30 feet upstream and downstream of the new culvert or bridge and landward 20 feet on each bank from the OHWM, as well as any newly accessible stream areas upstream of the new stream crossings which will all be on United States Forest Service (USFS) land. Using the site-specific footprint for each crossing in Table 1 plus an estimated 2,400 ft^2 of area around each worksite NMFS conservatively estimates a total of approximately 18,144 ft^2 of area will be disturbed over five tributaries and the Kachess River Bridge abutment.

This is a very conservative estimate as most crossing sites will be accessed from the existing road bed and will not require disturbance of existing streambanks or riparian areas. The extent of the action area is based on the estimated extent of riparian, streambank and streambed disturbance from culvert removal, streambed stabilization, pier removal (Kachess River), and the extent of ground disturbance in riparian areas associated with access and construction in these areas.

2.4 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The Yakima and Kachess Rivers upstream of Easton Dam are both designated MCR steelhead critical habitat but the five fish-bearing tributaries to the Yakima River that are involved in the proposed action are not. However, all the fish-accessible streams in the action area have the potential to provide some level of rearing habitat for juveniles and if the habitat conditions are appropriate they could also provide adult spawning habitat. Within the action area, streams that are accessible to fish and provide appropriate habitat conditions could be used by adults for spawning and juvenile steelhead for rearing from the Yakima Upper Mainstem population.

Transportation routes typically occupy floodplain areas and shorelines that would otherwise be accessible and provide much needed steelhead rearing habitat. However, in this case the highway is far enough away from the Yakima River for most of the 8.3 miles of the proposed action that the potentially adverse effects to fish-bearing waters are passage (new culverts or bridges in fish-bearing streams), water quality (discharging pollution from developed sites), water quantity (water withdrawal during construction), altering both surface and groundwater exchange (hydrologic connectivity), and increased impervious surface.

In the action area, I-90 runs east to west across a landscape that slopes from north to south with the Yakima River on the south side of I-90 receiving all the drainage from the higher elevations on the north side of I-90. Although culverts were installed during the original construction of the highway for defined perennial streams, all the culverts are undersized and the highway blocked the movement of groundwater and some surface water (wetlands) down the slope from north to south. The MDT for the I-90 SPE also identified locations in the project corridor where wildlife movement patterns and areas for protecting aquatic habitat processes overlapped. An emphasis was placed on improving ecological connectivity in wetlands, riparian habitats, floodplains, streams, upland forests, unique habitats (such as talus), and old growth forests. The MDT called these areas CEAs. In addition, associated with the CEAs, the MDT identified HCZs, areas not necessarily located at stream crossings, where moving water under the roadway is important. They are typically located adjacent to wetlands, seeps, springs, or other visible signs of water that presently collect on the north side of the highway instead of continuing their natural movement downslope toward the Yakima River. Within each CEA, WSDOT has designed and targeted connectivity structures such as bridges and culverts in a variety of sizes and shapes to meet the specific objectives of that CEA. These connectivity structures range from small bottomless culverts to long bridges and wildlife overcrossings. With the exception of the wildlife overcrossings, all the connectivity structures will function to reconnect and restore hydrologic flows, nutrient cycling and water quality, all indirect benefits to fish habitat.

A large portion of the river and stream miles upstream of Easton Dam is within lands administered by the OWNF, WSDOT and WDNR. From Keechelus Dam to Easton Dam, the

Yakima River floodplain function is excellent, with a braided, meandering channel and numerous side channels (Haring 2001). The river has complex in-channel structure and an intact riparian corridor with little encroaching development. However, flow regulation, historic logging in the watersheds, and the existing I-90 freeway, including undersized culverts and bridges, have all affected the aquatic habitats upstream of Easton Dam. The Kachess River extends upstream of the Easton Dam pool approximately 1 mile before reaching the Kachess Dam. The Yakima River extends upstream of the Easton Dam pool approximately 12 miles before reaching the Keechelus Dam. There is approximately 20 miles of suitable MCR steelhead aquatic habitat in the mainstem and tributaries to the Yakima River upstream of Easton Dam pool and within the OWNF. Of the five fish-bearing tributaries to the Yakima River that will have passage structures modified, all five existing structures are currently fish passage barriers, the project will remove all five barriers and establish either an engineered channel or a natural channel to provide future passage.

Streamflow in the Yakima and Kachess Rivers is highly regulated to provide irrigation flows throughout the entire Yakima River Subbasin. Adequate flows are necessary for migrating adult steelhead to pass upstream to spawning areas, provide rearing habitat, and facilitate smolt emigration to marine environments. Flows also affect other habitat parameters like temperature, riparian vegetation, and food supply. In an unregulated condition, snowmelt-driven discharge peaks would dominate the flows in the Yakima Basin in May or June that then decline to ground-water-driven base flows in August and September. Late autumn rainfall and minor snowmelt would augment summer base flow, with Chinook winds or rain on snow events causing occasional winter high water flow episodes. Steelhead are adapted to these natural seasonal flow patterns, which maintained a variety of habitats and facilitated migratory behavior. Management of water storage and delivery systems in the Yakima Basin has significantly altered this flow pattern. Now winter and spring runoff from the upper Yakima, Kachess (both in the action area), Cle Elum, Tieton and Bumping rivers is captured in storage reservoirs and is used to meet summer irrigation needs in accordance with yearly entitlements. These operations result in stream flows across the basin that are often out of phase with the life-history requirements of native salmonids (Fast et al. 1991; Stanford et al. 2002) and riparian species such as cottonwoods (Jamieson and Braatne 2001). The most significant changes in flow regimes are the creation of: (1) unnaturally low flows, (2) unnaturally high flows, (3) rapidly changing flow levels, (4) return flows, and 5) altered sediment and wood transport.

There is some evidence that Easton dam hinders adult steelhead passage. Radio telemetry studies (Karp et al. 2009), have documented a few Upper Yakima steelhead approaching Easton Dam, and none passing the dam. However, these studies involved small numbers of fish over a few years. Furthermore, spring-run Chinook salmon regularly ascend the fish ladder at the dam; this indicates that under some conditions (possibly operational or hydraulic conditions that occur more often when spring-run Chinook salmon migrate), Easton Dam is passable to adult salmonids. Therefore, for the purposes of this analysis, NMFS will assume that steelhead pass the dam and thus further assume that Lake Easton, the Keechelus Reach of the Yakima River where the aforementioned tributaries enter, and the lower Kachess River are occupied by steelhead.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The I-90 SPE corridor is the main east-west transportation corridor across Washington State, and as such carries high volumes of interstate commerce. The proposed action is the final phase of a 15-mile-long, multi-year project designed to meet future traffic demands and improve public safety. The proposed action will not in and of itself increase traffic on the I-90 corridor. Because the surrounding landscape is primarily USFS, WSDOT, and WDNR with only small privately owned parcels, it is unlikely that there will be any development in or near the action area associated with the improved highway in the action area.

2.5.1 Effects on Species

As stated above, NMFS assumes that MCR steelhead occupy the lower Kachess River, the Yakima River and five of its tributaries upstream of Easton Dam where in-water work would occur. It is also possible that MCR steelhead would spawn in the action area but steelhead spawning and emergence take place prior to the in-water work window. All in-water work in fish-bearing streams will occur in the approved construction window, July 16 to September 30, which will avoid effects to adults or incubating embryos.

During the in-water work windows, steelhead juveniles of at least two age classes may be present and rearing in the action area. The use of BMPs to isolate and protect existing channels will prevent any material from entering a stream during removal of the existing or construction of new structures. The exception to this is the Kachess River Bridge where the contractor will isolate a limited area below the OHWM where the existing piers are located but removal will take place during low pool when the isolated area is already dewatered.

Worksite Isolation and Fish Removal

Worksite isolation and fish removal and exclusion actions during the in-water work window are intended to avoid and minimize effects of the in-water construction to salmonids. Fish handling, capture, collection and seining may injure fish and can include stress-related phenomena. Stress approaching or exceeding the physiological tolerance limits of individual fish impairs reproductive success, growth, and resistance to disease (Barton et al. 1986; Bonga 1997; Contreras-Sánchez et al. 1998; Schreck et al. 2001; Sigismondi and Weber 1988).

The total area expected to be dewatered and require fish salvage in the five fish-bearing streams is 6,144 ft^2. As discussed above, MCR steelhead access to the action area is limited but NMFS assumes juvenile MCR steelhead occupy the action area. To estimate the number of juvenile steelhead potentially exposed to work site isolation, we used average juvenile steelhead density values in average habitat from Mullan et al. (1992) of 12.3 per 1076.4 ft^2. Thus, NMFS would

expect up to 70 total juvenile MCR steelhead to be in the five fish-bearing streams that will require fish salvage. NMFS conservatively estimates that at least 50 percent of the juveniles encountered (35) will vacate the site of their own volition when herded with seines and at least 50 percent of the remaining 35 juveniles will be salvaged and relocated. WSDOT's previous salvage records during other phases of the I-90 SPE project indicate that the mortality rate for salvaged fish has been less than 1.5 percent. Assuming the salvaging techniques and protocols remain the same and the mortality rate of salvaged fish remains constant, NMFS does not expect more than one salvaged juvenile MCR steelhead to die as a result of salvage. The last 18 juveniles that fail to vacate the area or may hide among the substrate or undercut banks and will be injured or killed after the area is dewatered and actions within the channel begin. Thus, we estimate that as many as 19 juvenile MCR steelhead will die, the majority of which will be age zero fish.

Using life stage equivalents from Quinn (2005), the injury or death of up to 19 juvenile steelhead does not accrue to the loss of one adult steelhead, even if all the fish were from the same brood year.

Water Quality/Suspended Sediments

Construction activities related to the removal and replacement of bridges and culverts will disturb streambank and riverbed sediments, increasing the likelihood of temporary increases in suspended sediments in each of the five tributaries during or immediately after construction. Because the closest tributary worksite is approximately 530 yards upstream of the Yakima River, NMFS does not believe suspended sediments will affect the Yakima River itself. However, in the five fish-bearing tributaries, construction-related increases in sedimentation and siltation above the background level could potentially affect fish species and their habitat by reducing juvenile survival, interfering with feeding activities, and reducing primary and secondary productivity. The magnitude of potential effects on fish depends on the timing and extent of sediment loading and flow in the stream before, during, and immediately following construction.

Temporary increases in suspended sediment concentrations have highly variable effects on fish, ranging from behavioral effects including alarm reactions and avoidance responses to sublethal effects including reduced feeding and physiological stress (Newcombe and Jensen 1996). Juvenile salmonids often avoid streams that are chronically turbid (Lloyd 1987) or move laterally or downstream to avoid turbidity plumes (Sigler et al. 1984). Several studies have documented active avoidance of turbid areas by juvenile and adult salmonids (Lloyd et al. 1987; Servizi and Martens 1992; Sigler et al. 1984). The severity of effect of suspended sediment increases as a function of the sediment concentration and exposure time, or dose (Bash et al. 2001; Newcombe and Jensen 1996). Sigler et al. (1984) found that prolonged exposure to turbidities between 25 and 50 Nephelometric Turbidity Units (NTU) resulted in reduced growth and increased emigration rates of juvenile coho salmon and steelhead compared to controls. These findings are generally attributed to reductions in the ability of salmon to see and capture prey in turbid water (Waters 1995). Chronic exposure to high turbidity and suspended sediment may also affect growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress (Waters 1995). Berg and Northcote (1985)

observed changes in social and foraging behavior and increased gill flaring (an indicator of stress) in juvenile coho salmon at moderate turbidity (30–60 NTU). In this study, after turbidity was reduced to lower levels (0–20 NTU), behavior quickly returned to normal.

Although NMFS expects all fish in the area to be mobile enough to avoid the spatially and temporally-limited turbidity, elevated turbidity levels could result in conditions that will affect the behavior of some MCR steelhead. During periods of turbidity, fish in close proximity to the origination point are likely to display avoidance behaviors. If avoidance behavior displaces fish from preferred rearing habitat, it can result in greater expenditure of energy, greater exposure to predators, and greater competition for holding areas and suitable prey base. Individual fish that encounter increased turbidity or sediment concentrations will likely move away from affected areas into more suitable surrounding habitat. In-water work will only occur from July 16 to September 30 when flows in tributaries are lowest, but flows in the Yakima River are high. Thus if young fish were forced to flee as far downstream as the Yakima River they could experience very high flows. However, we expect the turbidity generated as flow returns to stream channels will not be sufficient to drive juveniles hundreds of yards downstream to the Yakima. NMFS does not expect turbidity to result in any injury or mortality or appreciably alter survival or fitness of any of those fish within the action area.

Stormwater

The 8.3 mile I-90 SPE footprint within the action area does not currently include any engineered stormwater treatment. Therefore, because construction of Phase 3-4 will treat all stormwater, NMFS expects an overall pollutant load reduction in the tributaries and the mainstem Yakima and Kachess Rivers. WSDOT will provide on-site treatment and off-site stormwater mitigation for locations where on-site treatment is not possible due to physical constraints. The proposed action will incorporate onsite stormwater treatment including natural or engineered dispersion areas, media filter drains, continuous inflow CABS, or vegetated filter strips depending on location. In addition, WSDOT is collaborating with the USFS to determine where federally-managed lands adjacent to the project footprint may serve as steep-slope stormwater dispersion (SSSD) areas. The use of SSSD will minimize impacts to forested areas or aquatic resources that would otherwise be converted to stormwater treatment facilities. NMFS believes that the overall improvement in engineered stormwater treatment, from no stormwater treatment to full treatment, will benefit all aquatic species and their habitats in the action area.

Traction Sand and Deicer

The primary deicers used today are sodium chloride (NaCl), calcium chloride ($CaCl_2$), magnesium chloride ($MgCl_2$), and calcium magnesium acetate (CMA). These compounds are sold under trade names such as IceBan™ ($CaCl_2$), IceSlicer™ (NaCl, KCl, $MgCl_2$), FreezGard™ ($MgCl_2$) and M-50™ ($MgCl_2$), and are being used in place of traditional salts (i.e., sodium chloride) to deice roads. The benefits of using alternatives to sodium chloride are less corrosion and less damage to plants, soil, and organisms. Alternative deicers also require less volume applied to be effective over the traditional sand and/or salt application.

The WSDOT Hyak Maintenance Facility (the relevant facility to this consultation) currently uses FreezGard™ and IceSlicer™ as their anti-icer and deicer, respectively. FreezGard™ is a liquid magnesium chloride solution (30%) with a corrosion inhibitor, and is applied to the roads at a rate of 20 to 25 gallons per lane mile before a freeze occurs. IceSlicer™ is a pelletized deicing product "composed of naturally occurring complex chlorides and 60+ trace minerals". It is mixed with liquid FreezGard™ to make a wet application; this also adds corrosion protection, as IceSlicer™ does not have corrosion inhibitors. When the roads become covered in snow and ice, the maintenance facilities apply a 10:1 or 5:1 ratio of sand to IceSlicer™, with FreezGard™ added to the mix to help it spread out more evenly over the roads. In summary, the primary anti-icers and deicers used in the project area are chloride-based substances ($CaCl_2$, NaCl, KCl, and $MgCl_2$).

A study of anti-icer and deicer products with similar chemical compositions (IceBan™ $CaCl_2$) was conducted in Peshastin Creek, Washington and Bear Creek, Oregon (National Academies of Sciences 2004). In Peshastin Creek, WSDOT determined that the chloride concentrations increased during the earliest stages of spring melt. However, the chloride concentrations measured were far less than the minimum chloride concentration considered toxic to aquatic biota. The study determined that the biochemical oxygen demand (BOD) in Bear Creek did not increase and there were no discernible increases in calcium concentrations in the creek due to the highway application of IceBan™ as an anti-icer. It is reasonable to conclude that the results in the action area will be similar.

In the aforementioned study, IceBan™ was applied at an average rate of 35 gallons per lane mile, whereas WSDOT will apply anti and deicing chemicals at rates of 20 to 25 gallons per lane mile. As noted earlier, the proposed action includes substantial infrastructure to handle and treat stormwater. The results of IceBan™ study, in the context of the robust stormwater treatment associated with the proposed action, suggests that MCR steelhead will not experience significant effects from the use of anti-icers and deicers.

Historically, WSDOT has used traction sand extensively along the project corridor. Traction sand can negatively affect receiving water bodies. Sand that is transported in stormwater runoff and snowmelt to nearby receiving water may smother important fish and invertebrate habitat. The addition of engineered stormwater treatment along the entire 8.3 miles will prevent almost all sand from being carried into receiving waters. The plow spray arising from the additional impervious surface would not be significant because the increase in impervious surface would be distributed along the 8.3-mile length of Phase 3-4, and with the exception of a few hundred feet of bridge surfaces the plow spray would not directly enter any waterbody. Overall, NMFS does not believe the use of anti-icer, deicer, or sand treatments on the existing or new impervious surface area will result in any measurable adverse effect to aquatic life in the action area.

Forage

The proposed actions in the five fish-bearing tributaries and the lower Kachess River will have a temporary negative effect on benthic macroinvertebrates by disturbing approximately 6,144 ft^2 of streambed over the five streams. The area to be disturbed in the Kachess River will be above the pool elevation at the time of disturbance and restored before the pool refills. Once the existing

structures, including the piers in the Kachess River are removed any newly available or newly constructed streambed area will, for at least a few weeks, provide fewer macroinvertebrate prey items than adjacent areas. However, forage species will begin to colonize the areas immediately after project completion via drift and migration (Fowler 2004; Herrmann et al. 2012). Given the size of the disturbed area, the amount of available local habitat, and the short-term nature of the action, NMFS expects short-term (from several days up to a few weeks) localized reduced productivity followed by a return to pre-project conditions such that effects to fish from reduced forage are not expected to be more than minimal.

Passage

Five of the tributaries to the Yakima River upstream of Easton Dam are fish-bearing and currently have undersized culverts that block passage. All new tributary structures will provide passage when construction is completed. NMFS does not expect the construction effects from the proposed action to appreciably reduce the suitability of the action area for migration because passage is not currently available, spawning, and rearing habitat will only be temporarily and minimally affected by construction with a full return of function post-project. NMFS expects an improvement in habitat availability post-construction when passage is available on all fish-bearing streams.

Water Withdrawal for Construction

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.12 cfs, or 54 gpm. To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park and surface water will be withdrawn from the Yakima and Kachess Rivers. The use of BMPs including appropriately sized pumps will avoid harm to instream fish or other aquatic organisms. NMFS does not believe the quantity of water withdrawn, up to 0.2 percent of the lowest flows, will have any effect on ESA-listed species in the rivers or streams in the action area.

Relevance of Effects on Individual Fish to Salmonid Population Viability

NMFS assesses the importance of habitat effects in the action area on individual fish and the population by examining the relevance of those effects to the characteristics of VSPs. The characteristics of VSPs are sufficient abundance, population growth rate (productivity), spatial structure, and diversity. While these characteristics are generally described as unique components of population dynamics, each characteristic exerts significant influence on the others. Declining abundance, for example, can reduce the spatial structure component of a population and, when habitats are less varied, then diversity among the population declines.

The 5-year geometric mean of natural spawners for the Upper Yakima River population has been estimated from 1992 through 2014 and has varied from a low of 53 when the fish were listed in 1999 (Ford et al. 2010), to a high of 246 for 2010 to 2014 (NWFSC 2015). The current NMFS threshold for viability for this population is 1,500 spawners. Reaching that objective is hindered primarily by actions and conditions that occur throughout the subbasin. NMFS does not expect

the proposed action to impede the attainment of viability goals, both in terms of the short-term construction disturbance and the long-term operation and maintenance of the upgraded transportation corridor. There will be long-term beneficial effects from installation of engineered stormwater treatment, the replacement of undersized culverts on fish-bearing streams and improvements in overall hydrologic connectivity that is currently absent.

The MCR steelhead juveniles that may rear in the action area, and adults that may be able to access the area for spawning are important for increasing abundance within the MPG and therefore the DPS. However, the death or injury of up to 18 juvenile *Oncorhynchus mykiss* from the Upper Yakima River will be small when considered at the population scale. Therefore, the proposed one-time action will have only minimal effect on the abundance within the Upper Yakima River population of MCR steelhead, and thus the effects to the MPG will be even smaller.

2.5.2 Effects on Critical Habitat

Critical habitat within the action area is only designated in the mainstem Yakima and Kachess Rivers, not in the tributaries where most of the proposed actions will occur. In addition, because all of the Yakima River tributary action sites are at least 530 yards from the mainstem, NMFS does not believe those tributary actions will affect critical habitat in the Yakima River. Therefore, the only critical habitat likely to be affected by the proposed action is the lower Kachess River. The Kachess River has an associated combination of physical and biological features essential for rearing and migrating steelhead. The critical habitat PBFs most likely to be affected by the proposed action are water quantity and riparian vegetation.

The PBFs of freshwater spawning and rearing sites and migration corridors include substrate, water quality and quantity for spawning, floodplain connectivity, water quality and quantity including temperature conditions supporting juvenile and adult mobility, abundant prey items supporting juvenile feeding, cover generally associated with complex habitat, and free passage (no obstructions) for adults and juveniles. These features are essential to conservation because they allow adult fish to reach upstream spawning areas and they allow juvenile fish to rear in and near natal streams for at least 1 to 2 years before proceeding downstream and to the ocean.

Designated critical habitat within the action area consists of good to very good quality freshwater spawning, rearing and migration PBFs in the lower Kachess River. Although there is a great deal of anthropomorphic disturbance in the watershed, the overall quantity and quality of critical habitat in the action area is very good in many areas. The essential elements of PBFs temporarily affected by the proposed action in the lower Kachess River are water quantity and riparian vegetation, both of which support adult and juvenile survival, growth, and mobility.

Water Quantity

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.12 cfs, or 54 gpm. To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park and surface water will be withdrawn from the Yakima and Kachess Rivers (only one source will be used at a time).

- ***Crystal Springs Sno-Park Well.*** This well is located on a terrace of alpine glacial drift on the south side of the Yakima River. The terrace lies approximately 30 to 40 feet above the floodplain.

- ***Kachess River.*** The contractor will withdraw water from the Kachess River at the I-90 Bridge with BMPs in place to avoid adverse effects to fish. Reclamation controls flows in the Kachess River by releases from the Kachess Reservoir. Kachess River flows are lowest in May and June when the river drops to as low as 30 cfs. Flows increase in the early irrigation season (July–August) to 300 to 600 cfs, and up to 1,200 cfs and greater in September and October to meet irrigation demands in the lower Yakima Basin when Keechelus Reservoir releases are reduced to protect salmon redds.

- ***Yakima River.*** The contractor will withdraw water from the Yakima River at the Stampede Pass Road Bridge with BMPs in place to avoid adverse effects to fish. Reclamation controls flows in the Yakima River by releases from the Keechelus Reservoir. The Yakima River flow below Crystal Springs is greatest during irrigation releases in July and August, ranging from 500 to 1,200 cfs. Keechelus Reservoir releases are reduced in September and October to 80 to 120 cfs to minimize scour of salmon redds in the Yakima River above Easton.

NMFS does not believe the withdrawal of up to 0.12 cfs from either the Crystal Springs Sno-Park Well, the Kachess River or the Yakima River even during their lowest flows of 30 to 80 cfs will result in any measurable affect to flows or habitat within the channel.

Riparian Vegetation Impacts

Relocation of the WB Kachess River Bridge will require disturbance of approximately 200 ft^2 of riparian vegetation within the existing median. Existing woody vegetation is limited to several shrubs less than 5 feet tall (hardhack–*Spiraea douglasii*) and one small conifer (less than 4-inch dbh). The former WB alignment will be restored with native, riparian vegetation, thereby improving the riparian cover baseline in the long term.

The replacement of three undersized culverts with large bridges will require revegetation with native trees, shrubs and grasses in the median and to the extent practicable beneath the bridges. Elements of a more natural habitat improve the functionality of these structures and open their use to a wider range of species. Vegetation and woody debris also supply organic matter to water

and soils, provide habitat for decomposer and soil organisms, and aid in moisture retention during dry periods.

Relevance of Effects on Physical or Biological Features to Conservation Value

As described above, the proposed actions in the lower Kachess River will have a short-term negative effect on riparian vegetation. NMFS does not expect these effects from the proposed action to result in any reduction in the suitability of the action area for spawning or rearing or as a migration corridor, as habitat conditions will be slightly improved over the long-term. In sum, the proposed action will not appreciably alter the conservation value of designated critical habitat for MCR steelhead.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The majority of the action area is on federal property (USFS) or is surrounded by federal and state property and is therefore subject to consultation for future actions. Some continuing non-federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline vs. cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat because of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6). NMFS takes into account the status of the species and critical habitat (Section 2.2), to formulate the agency's opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat for the conservation of the species.

The MCR steelhead DPS is unviable because only six populations are viable, seven are at moderate risk and four are at high risk of extinction. The DPS cannot achieve viability without significant improvements in abundance, productivity, and diversity for the moderate and high risk populations. The Yakima Upper Mainstem population of MCR steelhead are present in the action area. The Yakima Upper Mainstem is among those populations most at risk in the DPS. Despite increased abundance in recent years, the Yakima Upper Mainstem population is short of

recovery goals for both abundance and productivity. Outside the action area, urban development, logging, grazing, power generation, and agriculture have all resulted in the loss of important spawning and rearing habitat, and the loss or degradation of migration corridors. Within the action area, the regulation of flows by Reclamation from Keechelus and Kachess Reservoirs reduce habitat quality and the associated dams and undersized culverts in the freeway block access to spawning and rearing areas.

The proposed action will reduce abundance in the short term; specifically those juvenile fish killed or injured (resulting in death later) by in-water work. Based upon densities described above, NMFS estimates that up to 19 steelhead juveniles will be killed or injured during construction. All killed and injured fish would be from the Yakima Upper Mainstem population. Even assuming a very high juvenile-to-adult survival rate of 2 percent, 19 juvenile steelhead are expected to produce not more than one adult steelhead. In the context of the Yakima Upper Mainstem most recent mean abundance estimate of 246 spawners, the expected injury or death of these fish from direct construction impacts is not expected to meaningfully affect adult returns.

Direct effects include temporarily dewatering a total of 6,144 ft^2 of benthic habitat in fish-bearing streams (individual areas range from 648 ft^2 to 1040 ft^2 in the five fish-bearing streams), which will reduce food availability for juvenile salmonids in the immediate area and downstream for the three non-fish-bearing streams. However, the affected benthic area is small relative to the overall benthic area available for juvenile foraging in the tributaries and the mainstem Yakima River and recolonization in the tributaries will begin within a few days. Temporarily reducing food availability at this scale is not likely to reduce growth or survival, for juvenile steelhead.

The removal of fish passage barriers in five fish-bearing streams and the improved floodplain connectivity, groundwater-surface water interaction, movement of sediments and LWD will increase the amount of and improve the quality of available habitat. The proposed replanting of the former WB Kachess Bridge site will be an improvement over existing conditions. As plantings mature and restore at least some of the lost function over time in that location, every generation of steelhead into the foreseeable future will experience improved habitat at the site.

The limited effects to critical habitat include a temporary loss of 200 ft^2 of riparian habitat adjacent to the Kachess River that will be replaced as well as an improvement in hydrologic processes by removing the bridge pier from below the OHWM.

The proposed action will increase the impervious surface by approximately 34 acres over 8.3 miles, a 35 percent increase over the existing footprint of the freeway. The increase is primarily the result of:

- adding an additional lane in each direction.
- realigning WB lanes to parallel the existing EB lanes from MP 67.5 to 69.5.
- widening medians to improve safety, increase snow storage, and allow for improved stormwater capture and infiltration.
- enlarging slope stabilization areas.

Most of the action area is USFS land and road density and impervious surface on USFS land within the Upper Yakima Mainstem watersheds is high at 3.8 miles per square miles. The USFS is in the process of reducing road density on USFS land near the I-90 SPE project with more than 100 miles of road in the Upper Yakima currently in progress for closure. Overall, the increased impervious surface on non-federal land, along with the improvements in stormwater treatment, passage, stream and floodplain function are not likely to degrade or interfere with the functions of MCR steelhead critical habitat for migration, spawning or rearing.

In sum, the proposed action will improve groundwater–surface water interaction, stream and floodplain structure and function and increase access to high quality habitat immediately. Given the context of an action area that is somewhat degraded but still retains high levels of floodplain connectivity because of its location on USFS land, the adverse effects of the proposed action are not expected to appreciably diminish the likelihood that MCR steelhead will survive and recover.

Summary

For all the reasons described in the preceding paragraphs of this section, the proposed action will not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction or distribution nor will the proposed action reduce the value of designated critical habitat for the conservation of the species.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of MCR steelhead, or destroy or adversely modify their designated critical habitat.

2.9 Incidental Take Statement

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In the opinion, NMFS determined that incidental take of MCR steelhead is reasonably certain to occur due to exposure to mechanical injury and to reduced benthic productivity and riparian vegetation. Only the juvenile life stages will be adversely affected. We estimate that up to 19 juvenile steelhead will be injured or killed by construction activity.

Where possible, NMFS has estimated the number of fish that are likely to be in the action area that could be harmed by the proposed action. However, NMFS is not always able to precisely quantify and track the amount or number of individuals that are expected to be incidentally taken (injure, harm, kill, etc.) per species because of each mechanism of take. The difficulty is because of the variability and uncertainty associated with the response of listed species to the effects of the proposed action, the varying population size of each species, annual variations in the timing of spawning and migration, individual habitat use within the action area, and difficulty in observing injured or dead fish. However, it is possible to estimate the extent of incidental take by designating as ecological surrogates those elements of the project that are expected to result in incidental take, that are more predictable and/or measurable, with the ability to monitor those surrogates to determine the extent of take that is occurring. Ecological surrogates are project elements that are expected to result in take and are somewhat predictable and/or measurable. Ecological surrogates can be monitored to approximate the level of take that occurs. Ecological surrogates for construction effects are described below. In the opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

- Direct Effects

  Incidental take is expected to occur from construction-related effects in the form of injury or death of listed species. Worksite isolation and salvage for the removal of the existing culverts may injure or kill fish when salvaged or when the area is dewatered. The total area to be dewatered in the five fish-bearing streams is approximately 6,144 ft^2. Fish density estimates indicate that up to 19 total MCR steelhead juveniles may be affected by worksite isolation. If the FHWA exceeds the 19 juvenile steelhead captured, injured or killed when salvaging fish from the isolated streambeds, or exceeds the 6,144 ft^2 streambed footprint in the five fish-bearing streams, or 18,144 ft^2 total disturbed area over the five fish-bearing streams, the project will be considered to have exceeded anticipated take levels, thus requiring the WSDOT to cease operations and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

- Increased Sedimentation and Turbidity

  The analysis of the effects of the project anticipates that the mixing zone for turbidity levels produced by removal of undersized culverts and installation of new culverts and a bridge will not exceed WDOE state water quality standards and shall comply with the most restrictive combination of the following:

a. Not extend in a downstream direction for a distance from the discharge point(s) greater than 100 feet plus the depth of water over the discharge point(s), or extend upstream for a distance of over 100 feet.
b. Not affect greater than 25 percent of the flow.
c. Not occupy greater than 25 percent of the width of the water body.

If turbidity exceeds these standards, and construction activities fail to halt and adjust work to return to acceptable levels, the project will be considered to have exceeded anticipated take levels, thus requiring WSDOT to cease operations and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

- Alteration of Habitat

The ecological surrogate for incidental take associated with the action is the disturbance of approximately 6,144 ft^2 of streambed in the five tributaries and up to 200 ft^2 of riparian vegetation associated with the realignment of the WB Kachess River Bridge the effects of which have been analyzed in this opinion.

Anticipated incidental take will be exceeded if the numbers of individual fish or the ecological surrogates described in the sections above are not met, the project is not implemented as described in the BA, all minimization measures and BMPs are not implemented as described in the BA (including successful completion of monitoring and reporting criteria), or the project is not implemented in compliance with the terms and conditions of this ITS. If the number of fish harmed is exceeded or these ecological surrogates are not met and maintained, the proposed action will be considered to have exceeded anticipated take levels, thus requiring WSDOT to cease and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

2.9.2 Effect of the Take

In the opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species, or destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

The measures described below are non-discretionary, and the FHWA must ensure they are undertaken by WSDOT so that they become binding conditions of any contracts or permits, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this ITS. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require its contractor(s) to adhere to the terms and conditions

of the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA must report the progress of the action and its impact on the species to NMFS as specified in the ITS [50 CFR§402.14(i)(3)].

1) Measures shall be taken to minimize the mobilization of in-channel sediments, the introduction of sediments to streams, and turbidity plumes.
2) Measures shall be taken to revegetate temporarily impacted areas below and above the OHWM with native plants, shrubs and trees.
3) FHWA shall monitor and report on the amount or extent of incidental take.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and FHWA or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The FHWA or WSDOT has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1) The following terms and conditions implement RPM 1: Measures shall be taken to minimize the mobilization of in-channel sediments, the introduction of sediments to the streams or river and turbidity plumes.
   a. Minimization measures described in the BA and BMPs shall be implemented to prevent sediment incursion into the active channel and reduce the mobilization of sediments in the channel.
   b. Water discharged into the Yakima River tributaries, the Yakima River, the Kachess River or any associated wetland during construction will be filtered with a filter bag, diverted to a settling tank, upland, or infiltration area, and/or treated in a manner to ensure that discharges conform to the water quality requirements of the state water quality standards or waste discharge permit.
   c. Monitoring to ensure turbidity does not exceed the most restrictive combination of the following:
      i. Not extend in a downstream direction for a distance from the discharge point(s) greater than 100 feet plus the depth of water over the discharge point(s), or extend upstream for a distance of over 100 feet;
      ii. Not utilize greater than 25 percent of the flow; and
      iii. Not occupy greater than 25 percent of the width of the water body.

      If turbidity exceeds these standards, construction activities will need to halt and adjust work to return to acceptable levels.

      iv. Use an appropriate and regularly calibrated turbidity meter.
      v. Collect background turbidity levels at an undisturbed location approximately 100 feet upstream of point of disturbance prior to expected turbidity pulse.

vi. Turbidity samples will be taken every morning and mid-day approximately 50 or 100 feet (dependent on flow) downstream of disturbance point during expected periods of turbidity (during placement or removal). If the average exceeds state standards and is documented to exceed standards for more than 2 hours, work will cease until numbers decline to state standards. If necessary additional BMPs may be implemented to reduce turbidity levels as quickly as possible.

2) The following terms and conditions implement RPM 2: Measures shall be taken to revegetate impacted areas below and above the OHWM with native plants, shrubs and trees.

   a. Plants placed on-site shall be irrigated and maintained for 3 years.
   b. Where possible, revegetation will include trees to provide shade and inputs to the river in the future.
   c. The removal of existing riparian and native vegetation shall be minimized to the maximum extent practicable.

3) The following terms and conditions implement RPM 3: FHWA shall monitor and report on the amount or extent of incidental take.

   a. FHWA shall provide a report of Project activities to NMFS by December 31 of each construction year.
   b. The report shall include Project schedules, Project completions, and details regarding Project implementation for each given year.
   c. This report shall include a summary description of in-water constraint activities, avoidance and minimization measures taken (including sound attenuation), and any observed take incidents.
   d. FHWA shall visually monitor the river in the action area during operations for any affected fish, including, but not limited to, MCR steelhead. Observation of affected fish shall be reported to NMFS by telephone at (509) 962-8911, by FAX at (509) 962-8544, via email to the contact person identified in the transmittal letter for this opinion or at the address given below, within 24 hours of the incident. Operations shall be halted immediately until FHWA coordinates with NMFS to determine the cause of the incident and whether any additional protective measures are necessary to protect listed salmonids. Any protective measures that are determined necessary to protect listed salmonids shall be implemented as soon as practicable within hours of the incident.

      Affected fish are defined as:

      i. Dead or moribund fish at the water surface;
      ii. Showing signs of erratic swimming behavior or other obvious signs of distress;
      iii. Gasping at the water surface; or
      iv. Showing signs of other unusual behavior.

A follow-up written notification shall also be submitted to NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this opinion, or through the NMFS Columbia Basin Branch Office. Information provided should include the date, time, and location that the carcass or injured specimen was found, a color photograph, the cause of injury or death, if known, and the name and affiliation of the person who found the specimen. Any dead specimen(s) shall be placed in a cooler with ice and held for pickup by NMFS personnel or an individual designated by NMFS to do so.

Updates and reports required by these terms and conditions shall be submitted to NMFS Interior Columbia Basin Area Office, Columbia Basin Branch at:

Attention: Diane Driscoll (WCRO-2019-00360)
National Marine Fisheries Service
Columbia Basin Branch
304 South Water Street, Suite 201
Ellensburg, WA 98926

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

(1) FHWA and the WSDOT should work cooperatively with other state and federal agencies, the County, private landowners, governments, CWU, CLC, Confederated Tribes and Bands of the Yakama Nation (YN) and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects within the Yakima River Watershed.

2.11 Reinitiation of Consultation

This concludes formal consultation for Phase 3-4 of the I-90 SPE Project. Reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action (50 CFR 402.16).

3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect essential fish habitat (EFH). The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by in the BA and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plan developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area are described in the BA and this opinion. The project area includes habitat that has been designated as EFH for various life stages of Chinook salmon (*Oncorhynchus tshawytscha*), and coho salmon (*Oncorhynchus kisutch*).

3.2 Adverse Effects on Essential Fish Habitat

See Section 2.4 of the opinion for a description of the adverse effects on anadromous species habitat for Pacific salmon. The effects of the action on Pacific Coast salmon are similar to those described above in the ESA portion of the document.

NMFS concludes that the proposed action will have temporary adverse effects on EFH designated for Pacific Coast salmon in freshwater habitats where the proposed action occurs. Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document (Section 2.4), we conclude that the proposed action will have the following adverse effects on EFH for Pacific Coast salmon.

Sedimentation and Turbidity:

- degraded water quality
- reduction in aquatic macroinvertebrate production

Vegetation Removal:

- short-term loss of natural shade cover in one area of the project

3.3 Essential Fish Habitat Conservation Recommendations

The following are EFH conservation recommendations for the Project:

1) The FHWA should continue to work cooperatively with other state and federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid restoration projects within the Yakima River Basin. EFH would benefit from implementation of restoration projects that include (1) complex channels and floodplain habitats, (2) thermal refugia, and (3) functional riparian vegetation.

Fully implementing the EFH conservation recommendation above would protect EFH for Pacific coast salmon by avoiding or minimizing the adverse effects described in Section 3.2.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, FHWA must provide a detailed response in writing to NMFS within 30 days after receiving an EFH conservation recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH conservation recommendations, unless NMFS and the federal agency have agreed to use alternative timeframes for the federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations, the federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)]. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(l)].

4.0 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the FHWA, WSDOT, OWNF, Reclamation, YN, and the County. Other interested users could include landowners in Cle Elum and Roslyn, Washington, as well as people interested in the conservation of MCR steelhead. Individual copies of this opinion were provided to the FHWA and WSDOT. The format and naming adheres to conventional standards for style.

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion (and EFH consultation, if applicable) contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

5.0 REFERENCES

Barnard, R. J., and coauthors. 2013. Water Crossings Design Guidelines. WDFW (Washington Department of Fish and Wildlife), Olympia, Washington.

Barton, B. A., C. B. Schreck, and L. A. Sigismondi. 1986. Multiple Acute Disturbances Evoke Cumulative Physiological Stress Responses in Juvenile Chinook Salmon. Transactions of the American Fisheries Society 115:7.

Bash, J., C. Berman, and S. Bolton. 2001. Effects of turbidity and suspended solids on salmonids. University of Washington, Seattle.

Battin, J., and coauthors. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences 104(16):6.

Beechie, T., E. Buhle, M. Ruckelshaus, A. Fullerton, and L. Holsinger. 2006. Hydrologic regime and the conservation of salmon life history diversity. Biological Conservation 130(560-572).

Berg, L., and T. G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Bonga, S. E. W. 1997. The stress response in fish. PHYSIOLOGICAL REVIEWS 77(3):591-625.

Contreras-Sánchez, W. M., C. B. Schreck, M. S. Fitzpatrick, and C. B. Pereira. 1998. Effects of stress on the reproductive performance of rainbow trout (*Oncorhynchus mykiss*). Biology of Reproduction 58(2):439–447.

Crozier, L. G., and coauthors. 2019. Climate vulnerability assessment for Pacific salmon and steelhead in the California Current Large Marine Ecosystem. PLoS ONE 14(7):e0217711.

Crozier, L. G., R. W. Zabel, E. E. Hockersmith, and S. Achord. 2010. Interacting effects of density and temperature on body size in multiple populations of Chinook salmon. Journal of Animal Ecology 79(2):342–349.

Daly, E. A., and R. D. Brodeur. 2015. Warming Ocean Conditions Relate to Increased Trophic Requirements of Threatened and Endangered Salmon. PLoS ONE 10(12):e0144066.

Fast, D. E., J. D. Hubble, M. S. Kohn, and D. B. Watson. 1991. Yakima River spring Chinook enhancement study. Bonneville Power Administration, Final Report: Project No. 82-16, DOE/BP-39461-9, Portland, Oregon.

FHWA (U.S. Department of Transporation Federal Highway Administration), and WSDOT (Washington State Department of Transportation). 2019. I-90 Snoqualmie Pass East Phases 3 and 4 Stampede Pass to Easton Endangered Species Act Reinitiation of Consultation.

Ford, M., and coauthors. 2010. Draft Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. Draft U.S. Department of Commerce. Northwest Fisheries Science Center–Conservation Biology Division.

Ford, M. J., editor. 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113.

Fowler, R. T. 2004. The recovery of benthic invertebrate communiites following dewatering in two braided rivers. Hydrobiologia 523(1):17–28.

Haring, D. 2001. Yakima River Watershed Water Resource Inventory Areas 37–39 Final report. Washington State Conservation Commission.

Healey, M. 2011. The cumulative impacts of climate change on Fraser River sockeye salmon (*Oncorhynchus nerka*) and implications for management (vol 68, pg 718, 2011). Canadian Journal of Fisheries and Aquatic Sciences 68(5):953–953.

Herrmann, P. B., C. R. Townsend, and C. D. Matthaei. 2012. Individual and combined effects of fish predation and bed disturbance on stream benthic communities: a streamside channel experiment. Freshwater Biology 57(12):2487–2503.

Howell, P., and coauthors. 1985. Stock assessment of Columbia River anadromous salmonids Volume I: Chinook, coho, chum and sockeye salmon stock summaries. Bonneville Power Administration, Portland, Oregon.

ICTRT (Interior Columbia Technical Recovery Team). 2007. Viability criteria for application to Interior Columbia Basin salmonid ESU's. Northwest Fisheries Science Center.

ISAB (Independent Scientific Advisory Board). 2007. Climate change impacts on Columbia River Basin fish and wildlife, Portland, Oregon.

Jamieson, B., and J. H. Braatne. 2001. Riparian Cottonwood Ecosystems and Regulated Flows in Kootenai and Yakima Subbasins: Impacts of Flow Regulation on Riparian Cottonwood Forests of the Yakima River. 2000-2001 Technical Report, Project No. 200006800. BPA Report DOE/BP-00000005-3.

Karp, C., W. Larrick, M. Johnston, and T. Dick. 2009. Steelhead movements in the upper Yakima River Basin, fall 2002–spring 2006. United States Bureau of Reclamation, Denver, Colorado.

Lloyd, D. S., J. P. Koenings, and J. D. LaPerriere. 1987. Effects of turbidity in fresh waters of Alaska. North American Journal of Fisheries Management 7:18–33.

Luce, C. H., J. T. Abatzoglou, and Z. A. Holden. 2013. The Missing Mountain Water: Slower Westerlies Decrease Orographic Enhancement in the Pacific Northwest USA. Science 342(6164):1360–1364.

Mantua, N., I. Tohver, and A. Hamlet. 2009. Impacts of Climate Change on Key Aspects of Freshwater Salmon Habitat in Washington State. Washington Climate Change Impacts Assessment: Evaluating Washington's future in a changing climate. Climate Impacts Group, University of Washington, Seattle.

McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. NOAA Technical Memorandum NMFS-NWFSC–42, NOAA Technical Memorandum NMFS-NWFSC-42.

Mote, P., and coauthors. 2014. Climate Change Impacts in the United States: Chapter 21 Northwest. The Third National Climate Assessment U.S. Global Change Research Program, 487–513. doi:10.7930/J04Q7RWX.

Mote, P. W., and E. P. Salathé. 2009. Future climate in the Pacific Northwest. In: Washington Climate Change Impacts Assessment: Evaluating Washington's future in a changing climate. Climate Impacts Group, University of Washington, Seattle.

Mullan, J. W., K. R. Williams, G. Rhodus, T. Hillman, and J. D. McIntyre. 1992. Production and habitat of samonids in mid-Columbia River tributary streams, Monograph 1.

National Academies of Sciences, Engineering, and Medicine. 2004. Deicing Agent Impacts. Pages 130-131 *in* Identification of Research Needs Related to Highway Runoff Management. The National Academies Press, Washington, D.C.

Newcombe, C. P., and J. O. T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16:693–727.

NMFS (National Marine Fisheries Service). 2005. Final assessment of NOAA Fisheries' critical habitat analytical review teams for 12 evolutionarily significant units of West Coast Salmon and Steelhead. NOAA, Portland, Oregon.

NMFS (National Marine Fisheries Service). 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan.

NWFSC (Northwest Fisheries Science Center). 2015. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest.

O'Neal, K. 2002. Effects of Global Warming on Trout and Salmon in U.S. Streams. Defenders of Wildlife, Washington, D.C.

PFMC (Pacific Fishery Management Council). 2014. Pacific Coast Salmon Management Plan Appendix A: Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon, Portland, Oregon.

Quinn, T. P. 2005. The behavior and ecology of Pacific salmon and trout. American Fisheries Society, Bethesda, Maryland.

Reisenbichler, R. R., J. D. McIntyre, M. F. Solazzi, and S. W. Landino. 1992. Genetic variation in steelhead of Oregon and northern California. Transactions of the American Fisheries Society 121:158–169.

Scheuerell, M. D., and J. G. Williams. 2005. Forecasting climate-induced changes in the survival of Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*). Fisheries Oceanography 14(6):448–457.

Schreck, C. B., W. Contreras-Sanchez, and M. S. Fitzpatrick. 2001. Effects of stress on fish reproduction, gamete quality, and progeny. Aquaculture 197:3–24.

Servizi, J. A., and D. W. Martens. 1992. Sublethal responses of coho salmon (*Oncorhynchus kisutch*) to suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 49:1389–1395.

Sigismondi, L. A., and L. J. Weber. 1988. Changes in Avoidance Response Time of Juvenile Chinook Salmon Exposed to Multiple Acute Handling Stresses. Transactions of the American Fisheries Society 117(2):196–201.

Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of chronic turbidity on density and growth of steelheads and coho salmon. Transactions of the American Fisheries Society 113:142–150.

Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. ManTech Environmental Research Services Corporation, Corvallis, Oregon.

Stanford, J. A., and coauthors. 2002. The reaches project: Ecological and geomorphic studies supporting normative flows in the Yakima River Basin, Washington, Polson, MT.

Wade, A. A., and coauthors. 2013. Steelhead vulnerability to climate change in the Pacific Northwest. Journal of Applied Ecology 50(5):1093–1104.

Wainwright, T. C., and L. A. Weitkamp. 2013. Effects of Climate Change on Oregon Coast Coho Salmon: Habitat and Life-Cycle Interactions, volume 87. BIOONE.

Waters, T. F. 1995. Sediment in streams: Sources, biological effects, and control., Monograph 7 edition, volume Monograph 7. American Fisheries Society, Monograph 7, Bethesda, Maryland.

Wissmar, R., C., and coauthors. 1994. Ecological health of river basins in forested regions of Eastern Washington and Oregon. U.S. Department of Agriculture, Forest Service PNW-GTR-326.

WSDOT (Washington State Department of Transportation). 2012. Fish Exclusion Protocols and Standards.

WSDOT (Washington State Department of Transportation). 2019. Highway Runoff Manual, Olympia, Washington.

Zabel, R. W., M. D. Scheuerell, M. M. McClure, and J. G. Williams. 2006. The Interplay between Climate Variability and Density Dependence in the Population Viability of Chinook Salmon. Conservation Biology 20(1):11.

SD.5.4

Barrier Length of Need

Calculations

Barrier Length of Need

Location: **I-90 LW 1702+25 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope down to creek

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

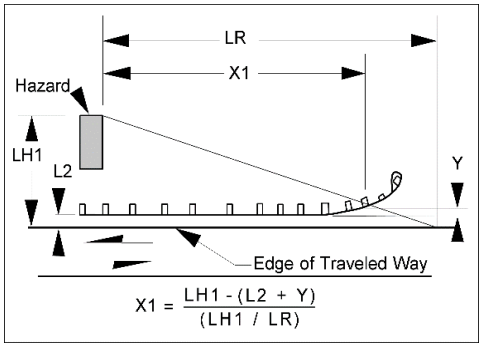
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1704+69	
Total Barrier Length* (ft)	263	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1704+69 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1704+32, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1723+45 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Box Culvert/Wing Wall drop off

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

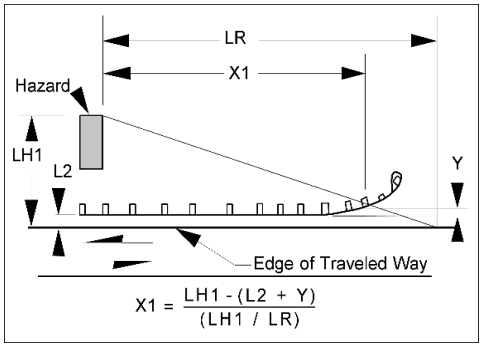
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1725+89	
Total Barrier Length* (ft)	400	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1725+89 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1725+52, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1752+05 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope down to creek

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

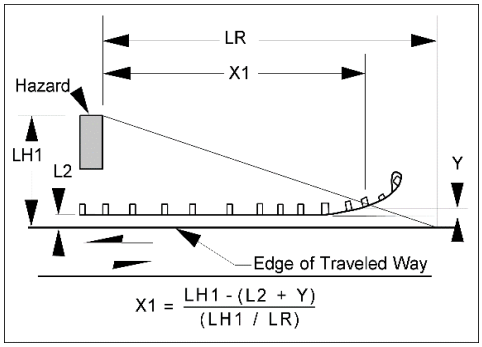
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1754+49	
Total Barrier Length* (ft)	263	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1754+49 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1754+12, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1791+50 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Rock catchment

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

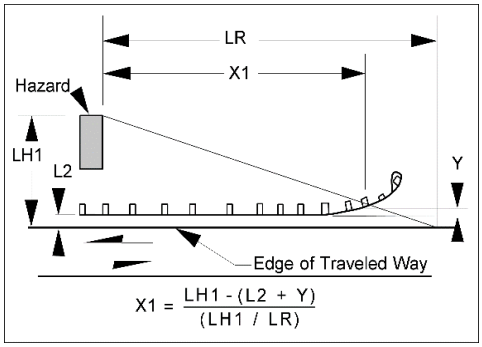
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1793+94	
Total Barrier Length* (ft)	615	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1793+94 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1793+57, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1779+50 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Rock catchment/side slope

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

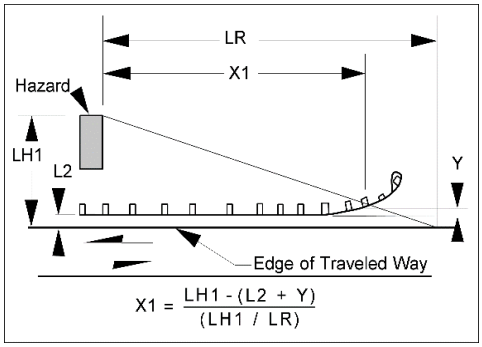
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1781+94	
Total Barrier Length* (ft)	1055	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1781+94 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1781+57, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1803+75 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope down to creek

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

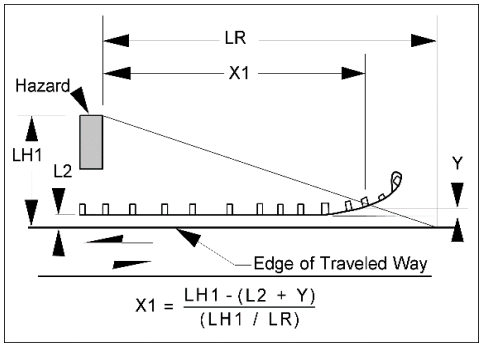
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	38-(10+) (38/330)
X1=	28 0.115151515
X1=	**243.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**243.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	256.0	distance to terminal grading
Min. Length of Need station	LW 1806+19	
Total Barrier Length* (ft)	296	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1806+19 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1805+82, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1841+63 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: New Sign Structure

LH1=	25	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

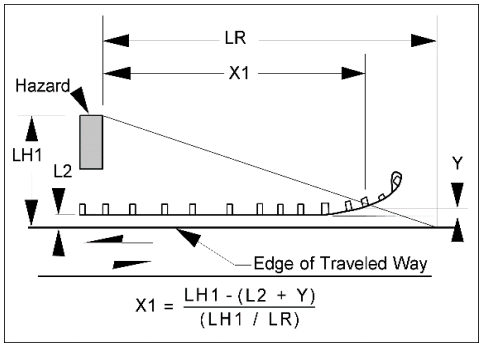
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	25-(10+) (25/330)
X1=	15 0.075757576
X1=	**198.00**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**198.00**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	211.0	distance to terminal grading
Min. Length of Need station	LW 1843+61	
Total Barrier Length* (ft)	1068	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1843+61 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1843+25, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1879+50 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Rock fall catchment/Hazard

LH1=	35	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

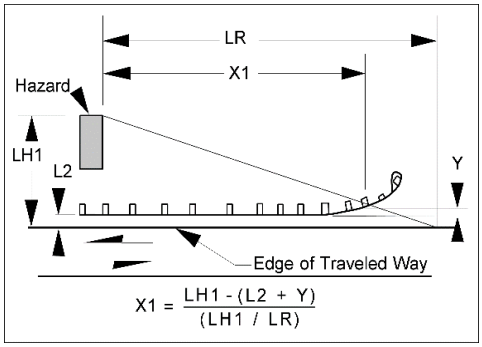
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	35-(10+) (35/360)
X1=	25 0.097222222
X1=	**257.14**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**257.14**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	270.0	distance to terminal grading
Min. Length of Need station	LW 1882+08	
Total Barrier Length* (ft)	2678	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1882+08 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1881+71, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1932+50 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope

LH1=	54	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

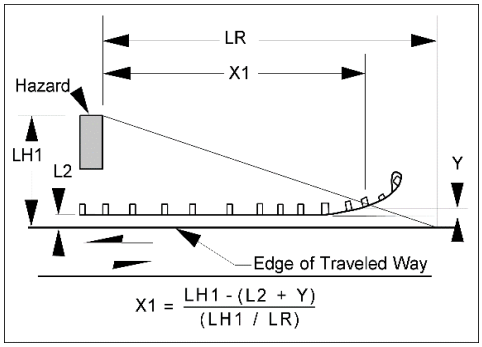
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	54-(10+) / (54/360)
X1=	44 / 0.15
X1=	**293.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**293.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	306.0	distance to terminal grading
Min. Length of Need station	LW 1935+44	
Total Barrier Length* (ft)	312	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1935+44 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1935+07, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1956+81 (LT) - OUTSIDE SHOULDER**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope to river

LH1=	41	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

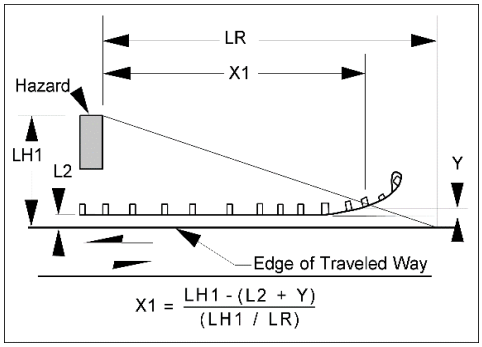
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	41-(10+) (41/360)
X1=	31 0.113888889
X1=	**272.20**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**272.20**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	285.0	distance to terminal grading
Min. Length of Need station	LW 1959+54	
Total Barrier Length* (ft)	287	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1959+54 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1959+17, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1833+25 (RT) - MEDIAN**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope to creek

LH1=	36	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

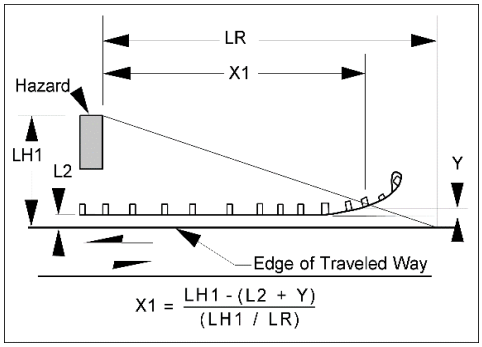
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	36-(10+) (36/330)
X1=	26 0.109090909
X1=	**238.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**238.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	251.0	distance to terminal grading
Min. Length of Need station	LW 1835+64	
Total Barrier Length* (ft)	268	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1835+64 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1835+27, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1850+83 (RT) - MEDIAN**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Overcrossing Median wall

LH1=	37	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	8.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

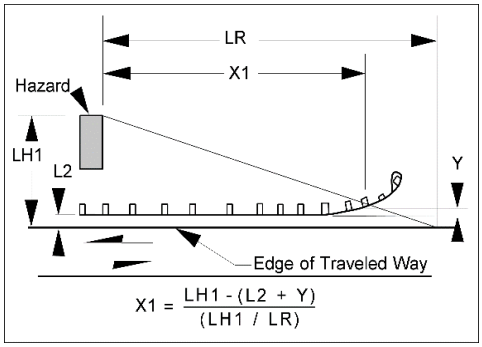
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	37-(8+) (37/360)
X1=	29 0.102777778
X1=	**282.16**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**282.16**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	295.0	distance to terminal grading
Min. Length of Need station	LW 1853+66	
Total Barrier Length* (ft)	457	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1853+66 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1853+29, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1932+35 (RT) - MEDIAN**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Median wall drop off

LH1=	54	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	4.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

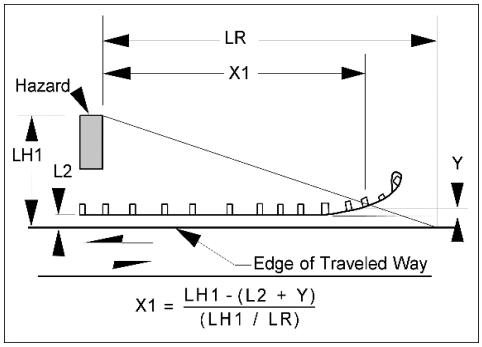
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	54-(4+) / (54/360)
X1=	50 / 0.15
X1=	**333.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**333.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	346.0	distance to terminal grading
Min. Length of Need station	LW 1935+69	
Total Barrier Length* (ft)	338	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1935+69 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1935+32, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LW 1956+81 (RT) - MEDIAN**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope to river

LH1=	54	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	4.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

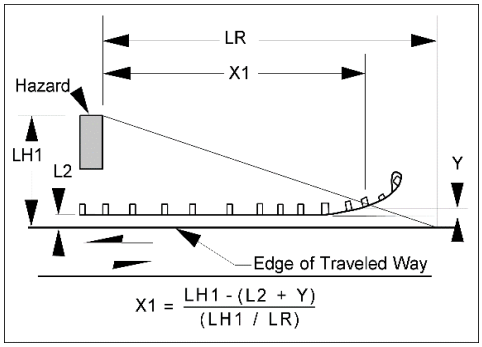
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	54-(4+) / (54/360)
X1=	50 / 0.15
X1=	**333.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**333.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	346.0	distance to terminal grading
Min. Length of Need station	LW 1960+15	
Total Barrier Length* (ft)	350	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LW 1960+15 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1959+78, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 W 303+91 (RT) - MEDIAN**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/slope to river

LH1=	54	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	4.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

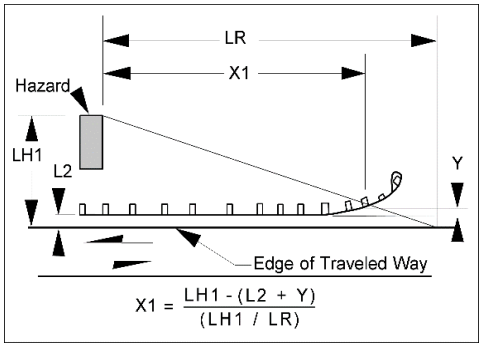
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	54-(4+) / (54/360)
X1=	50 / 0.15
X1=	**333.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**333.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	346.0	distance to terminal grading
Min. Length of Need station	W 307+25	
Total Barrier Length* (ft)	2436	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, W 307+25 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. W 306+88, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1862+50 (RT)**
OUTSIDE SHOULDER

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Utility vault

LH1=	26	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	13.5	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

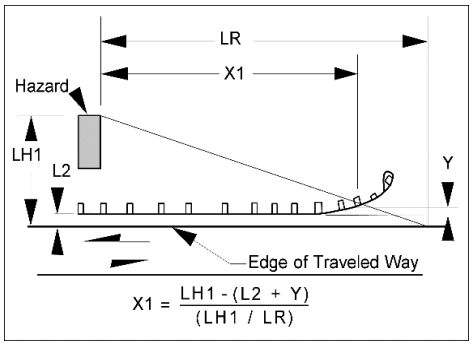
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	26-(13.5+) / (26/360)
X1=	12.5 / 0.072222222
X1=	**173.08**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**173.08**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	186.0	distance to terminal grading
Min. Length of Need station	LE 1860+76	
Total Barrier Length* (ft)	740	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1860+76 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1861+13 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1902+00 (RT)**
OUTSIDE SHOULDER

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Slope hazard/drop off

LH1=	54	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

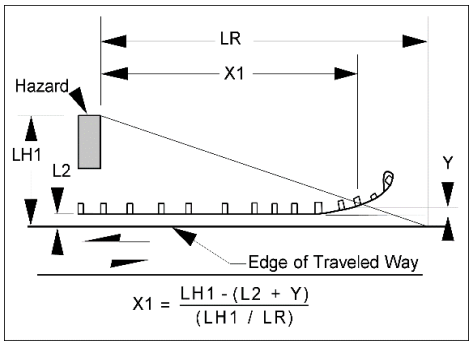
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	54-(10+) / (54/360)
X1=	44 / 0.15
X1=	**293.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**293.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	306.0	distance to terminal grading
Min. Length of Need station	LE 1899+06	
Total Barrier Length* (ft)	564	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1899+06 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1899+43 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1914+25 (RT)**
OUTSIDE SHOULDER

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Utility vault

LH1=	24	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

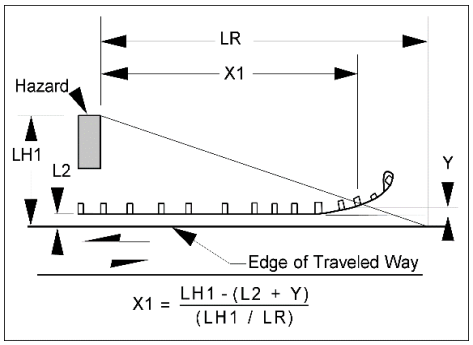
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	24-(10+) / (24/360)
X1=	14 / 0.066666667
X1=	**210.00**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**210.00**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	223.0	distance to terminal grading
Min. Length of Need station	LE 1912+15	
Total Barrier Length* (ft)	414	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1912+15 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1912+51 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1978+50 (RT)**
OUTSIDE SHOULDER

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Slope hazard/drop off

LH1=	38	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

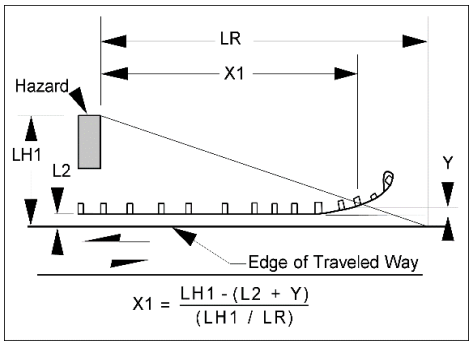
X1=	LH1 - (L2+Y)
	(LH1/LR)
X1=	38-(10+)
	(38/360)
X1=	28
	0.105555556
X1=	**265.26**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**265.26**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	278.0	distance to terminal grading
Min. Length of Need station	LE 1975+84	
Total Barrier Length* (ft)	800	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1975+84 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1976+21 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1699+50 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/2:1 slope down to creek

LH1=	49	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

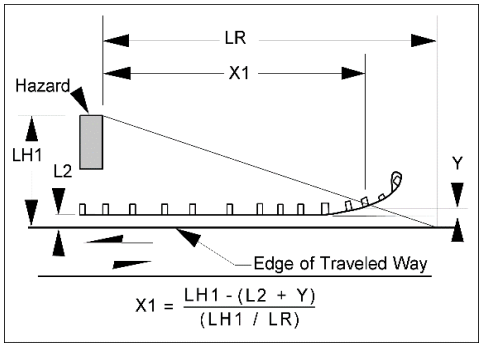
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	49-(10+) (49/330)
X1=	39 0.148484848
X1=	**262.65**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**262.65**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	276.0	distance to terminal grading
Min. Length of Need station	LE 1696+87	
Total Barrier Length* (ft)	276	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1696+87 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1697+23, see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1800+95 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/2:1 slope down to creek

LH1=	32	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

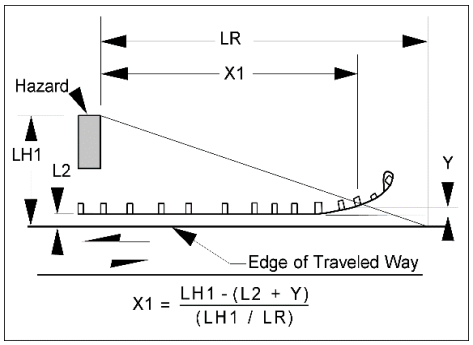
X1=	LH1 - (L2+Y)
	(LH1/LR)
X1=	32-(10+)
	(32/330)
X1=	22
	0.096969697
X1=	**226.88**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**226.88**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	240.0	distance to terminal grading
Min. Length of Need station	LE 1798+68	
Total Barrier Length* (ft)	250	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1798+68 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1799+04 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1829+34 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	65	Variable, max 65
LANE WIDTH (FT)	12	
NUMBER OF LANES	4	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge end/2:1 slope down to creek

LH1=	36	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	330
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

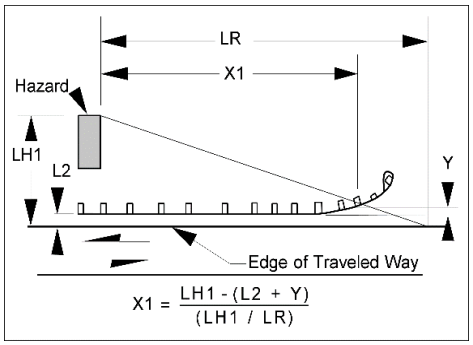
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	36-(10+) / (36/330)
X1=	26 / 0.109090909
X1=	**238.33**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**238.33**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	251.0	distance to terminal grading
Min. Length of Need station	LE 1826+95	
Total Barrier Length* (ft)	263	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1826+95 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1827+32 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1848+99 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Overcrossing Wall in median

LH1=	36	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

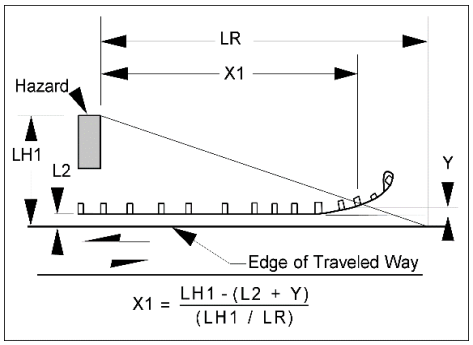
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	36-(10+) / (36/360)
X1=	26 / 0.1
X1=	**260.00**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**260.00**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	273.0	distance to terminal grading
Min. Length of Need station	LE 1846+39	
Total Barrier Length* (ft)	432	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1846+39 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1846+75 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1916+00 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Median wall drop off

LH1=	56	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	4.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

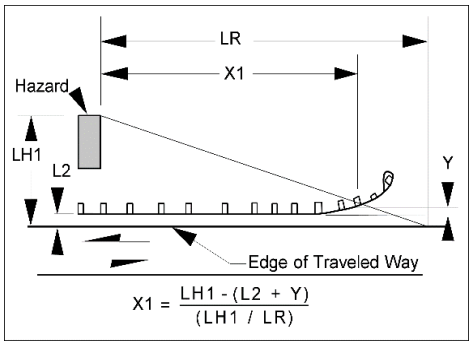
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	56-(4+) / (56/360)
X1=	52 / 0.155555556
X1=	**334.29**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**334.29**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	347.0	distance to terminal grading
Min. Length of Need station	LE 1912+65	
Total Barrier Length* (ft)	351	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1912+65 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1913+02 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1931+00 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Median wall drop off

LH1=	56	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	10.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

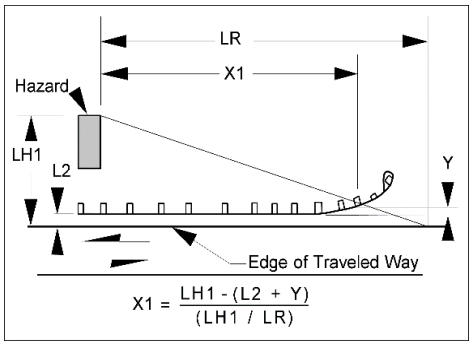
X1=	LH1 - (L2+Y)
	(LH1/LR)
X1=	56-(10+)
	(56/360)
X1=	46
	0.155555556
X1=	**295.71**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**295.71**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	309.0	distance to terminal grading
Min. Length of Need station	LE 1928+04	
Total Barrier Length* (ft)	300	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1928+04 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1928+40 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1955+00 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	Variable, max 70
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge/ slope to river

LH1=	41	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	8.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

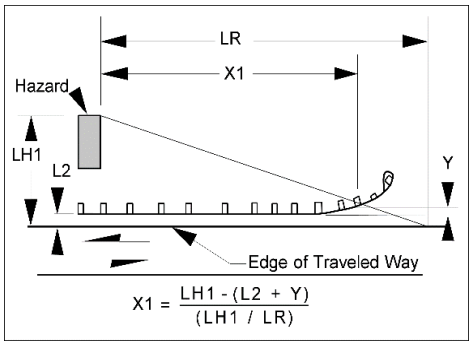
X1=	LH1 - (L2+Y) / (LH1/LR)
X1=	41-(8+) / (41/360)
X1=	33 / 0.113888889
X1=	**289.76**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**289.76**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	303.0	distance to terminal grading
Min. Length of Need station	LE 1952+10	
Total Barrier Length* (ft)	300	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1952+10 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1952+46 see final plans for actual limits.

Barrier Length of Need

Location: **I-90 LE 1997+38 (LT)** **Median**

I-90 Phase 3
XL5479 / WIN: E09093A / PIN: 509093A

Proposed Conditions:

EXISTING ADT	33,000	
POSTED SPEED (MPH)	70	
LANE WIDTH (FT)	12	
NUMBER OF LANES	3	taper to 2 lanes

ADT via WSDOT Traffic GeoPortal

HAZARD: Bridge Column

LH1=	36	**L5=**	
LH2=		**Y=**	
L1=		**LR*=**	360
L2=	4.0	**F=**	
L4=			

All values listed in feet
** DM Exhibit 1610-6*

Length of Need:

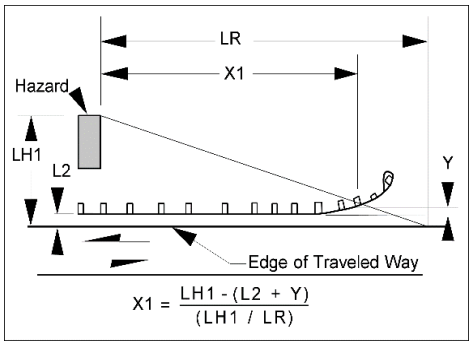
X1=	LH1 - (L2+Y) (LH1/LR)
X1=	36-(4+) (36/360)
X1=	32 0.1
X1=	**320.00**

Adjacent-Side Fixed Feature/Hazard
Barrier Parallel to Roadway

Data Table:

Length of Need = X1 (ft)	**320.00**	
Third post, add (ft)	12.5	to get to the end of terminal
Total length, roundedup (ft)	333.0	distance to terminal grading
Min. Length of Need station	LE 1994+18	
Total Barrier Length* (ft)	374	approx., see final plans

** Total barrier length includes any required terminal/transitions length*



Conclusion:

Barrier should be placed at a minumum to or past the Length of Need station, LE 1994+18 to meet requirements. Grading for the terminal pad shall follow Standard Plan C-22.40 and start station for terminal is approx.. LE 1994+54 see final plans for actual limits.

SD.5.5 Bridge Vertical Clearance Table

Line	*Begin Station*	*End Station*	*Bridge Number*	*CL Clearance*	*Left Fog Line Clearance*	*Right Fog Line Clearance*	*Roadway Width*	*Minimum Required Clearance (DM Exhibit 720-3)*	**Bridge Crossing**
LE	1699+77	1700+10	new				n/a		I-90 crossing over Cedar Creek
LW	1701+55	1701+87	new				n/a		I-90 crossing over Cedar Creek
LE	1750+30	1750+50	new				n/a		I-90 crossing over Creek
LW	1801+93	1803+14	new				n/a		I-90 crossing over Creek
LE	1801+30	1802+73	new				n/a		I-90 crossing over Creek
LW	1829+87	1832+82	new				n/a		I-90 crossing over Hudson Creek
LE	1829+68	1832+94	new				n/a		I-90 crossing over Hudson Creek
LW	1829+22	1850+78	new				n/a		Wildlife Overcrossing
LE	1848+97	1850+52	new				n/a		Wildlife Overcrossing
LW	1916+94	1919+61	new				n/a		Wildlife Undercrossing
LE	1916+22	1919+16	new				n/a		Wildlife Undercrossing
LW	1931+53	1932+18	new	>16.5	>16.5	>16.5	28 ft	16.5 ft	Sparks Rd crossing under I-90
LE	1931+13	1931+92	new	>16.5	>16.5	>16.5	28 ft	16.5 ft	Sparks Rd crossing under I-90
LW	1955+33	1956+57	new				n/a		Kachess River
LE	1954+95	1956+72	new				n/a		Kachess River
LW	1998+70	1998+97	090/119	16' 11'	17' 3"	16' 11"	existing	16+ ft	West Easton I/C crossing over I-90
LE	1997+19	1997+34	090/119	16' 9'	16' 4"	17' 1"	38	16+ ft	West Easton I/C crossing over I-90

Comments: Bridge vertical clearance was checked using InRoads 3D modeling and survey data.

SD.5.6 Fencing Table

Begin Sta	End Sta	Existing	R/W Fence	Wildlife Exclusion Fence	Length in Ft	Break in fencing reason
				LW Line		
1682+78	1687+10			X	432.00	Culvert w/slope jumpout
1687+40	1701+38			X	1398.00	Bridge
1701+87	1706+32			X	445.00	
1706+32	1715+00				868.00	Slope Stabilization
1715+00	1723+02			X	802.00	Box Culvert
1723+46	1726+02			X	256.00	
1726+02	1728+00				198.00	Slope Stabilization
1728+00	1751+47			X	2347.00	Bridge
1751+80	1771+16				1936.00	Slope Stabilization
1781+00	1788+26			X	726.00	
1788+26	1791+53				327.00	Slope Stabilization
1791+53	1801+93			X	1040.00	Bridge
1803+14	1805+43			X	229.00	
1805+43	1814+21				878.00	Slope Stabilization
1814+21	1818+63			X	442.00	Box Culvert
1819+08	1829+87			X	1079.00	Bridge
1832+82	1849+25			X	1643.00	Fill Slope
1850+75	1863+81			X	1306.00	Box Culvert
1864+11	1916+83			X	5272.00	Bridge
1919+77	1931+47			X	1170.00	Bridge
1932+10	1955+33			X	2323.00	Bridge
1956+53	1981+00	X	X		2447.00	
				LE Line		
1683+41	1685+47	X			206.00	Culvert w/slope jumpout
1685+72	1699+66			X	1394.00	Bridge
1700+18	1721+59			X	2141.00	Box Culvert
1721+89	1722+20			X	31.00	
1722+00	1739+00				1700.00	Wall
1738+66	1750+21			X	1155.00	Box Culvert
1751+08	1766+66			X	1558.00	
1766+37	1785+00				1863.00	Wall
1784+17	1801+15			X	1698.00	Bridge
1802+88	1812+00				912.00	Wall
1811+72	1818+36			X	664.00	Box Culvert
1818+74	1829+70			X	1096.00	Bridge
1832+95	1848+99			X	1604.00	Fill Slope
1850+53	1863+43			X	1290.00	Box Culvert
1863+92	1916+41			X	5249.00	Bridge
1919+31	1931+14			X	1183.00	Bridge
1931+74	1955+21			X	2347.00	Bridge
1956+47	1999+80	X	X		4333.00	

Comments: Fencing may or may not be placed above slope stabilization areas (still to be determined).

SD.5.7

Geotechnical Report

Attached separately due to size of document

August 20, 2021

Prepared by: Gabriel L. Taylor, L.E.G.

Assistant Chief Engineering Geologist

Reviewed by: Marc Fish, L.E.G.

Chief Engineering Geologist

Agency Approval Authority:

Tony M. Allen, P.E.

State Geotechnical Engineer

SD.5.8

Type A Hydraulics Report

Attached separately to due to size of document

Signed

September 22, 2021

Andrew Byrd, P.E

Development Branch Engineer

Hydraulics Report Approval Memo

September 23, 2021

Julie Heilman, WSDOT State Hydraulic Engineer

Katie Jones, WSDOT SC Region Hydraulic Engineer

Washington State Department of Transportation

Memorandum

September 23, 2021

TO: Andrew Byrd, Project Engineer
(509) 577-1760

FROM: Julie Heilman, State Hydraulic Engineer
(509) 577-1703
Katie Jones, Region Hydraulic Engineer K J
(509) 577-1769

SUBJECT: I-90/Cabin Creek I/C to W Easton I/C Phase 3 – Add Lanes/Wildlife Bridges
MP 64.34 to MP 70.60
Hydraulic Report Approval

I have reviewed the subject report and all comments have been addressed. This hydraulic report meets the requirements of the WSDOT Hydraulics Manual and Highway Runoff Manual and is approved.

If you have any questions, please feel free to contact me at (509) 577-1769 or Julie Heilman at (509) 577-1703.

KJ

CC: Project File, w/o attachment
HQ Hydraulics File, electronic attachment
SCR Hydraulics File, electronic attachment

SD.5.8.1

Hydrologic Connectivity Zones

Final Hydraulic Design Report

Attached separately to preserve
electronic signatures

Signed

September 16, 2021

Julie Heilman, WSDOT State Hydraulic Engineer

SD.5.8.1

Final Hydraulic Design Reports

For Creek Connectivity

FHD's attached separately to preserve electronic signatures

Julie Heilman, WSDOT State Hydraulic Engineer

FHD Report	Approval Date
I-90 MP 64.4 Unnamed Creek	November 29, 2021
I-90 MP 64.7 Cedar Creek	November 29, 2021
I-90 MP 65.1 Unnamed Creek	December 6, 2021
I-90 MP 65.6 Telephone Creek	December 20, 2021
I-90 MP 66.6 Hudson Creek	November 29, 2021
I-90 MP 66.8 Unnamed Creek	November 29, 2021
I-90 MP 67.1 Unnamed Creek	November 29, 2021
I-90 MP 67.8 Unnamed Creek	November 29, 2021

SD.5.11

ITS Systems Engineering Documentation

SCR Traffic Office

Washington State Department of Transportation

Intelligent Transportation Systems (ITS) Systems Engineering Analysis Worksheet

This worksheet, or a document with the same information, must be completed for all federal aid projects that include Intelligent Transportation Systems (ITS) elements. This worksheet must be completed prior to submitting a construction authorization request and must be kept in the project file for the entire document retention period of the project. If Concept of Operations, System Requirements, Verification Plan, and Validation Plan documents are required for the project, as determined by this worksheet, these documents must be submitted to the WSDOT Local Programs Engineer for review, who in turn will send them to the FHWA ITS/Operations Engineer for review, prior to submitting a construction authorization request. The documents must be kept in the project file for the entire document retention period of the project.

1. Project Name: I-90/Cabin Cr I/C to W Easton I/C Phase 3 – Add Lanes/Wildlife Bridges

2. Project Number (if known): XL5479

3. Total project cost (includes preliminary engineering/design, right of way, and construction phases):

   $322,896,600

4. Amount of total project cost for ITS elements: $4,000,000

5. Select which of the following items, if any, apply to this project:

   ☐ The project implements an existing adaptive signal control technology (ASCT) system for the first time. Or the project expands on an existing ASCT system involving jurisdictions the agency has not worked with previously. Please explain why you selected or did not select this item.

   There are no signalized intersectinos in this project.

   ☐ The project includes new and unproven hardware and/or communications technology that is considered "cutting edge" or not in common use. This could include custom developed or unproven commercial-off-the-shelf (COTS) technology that has not been used by the agency previously. Please explain why you selected or did not select this item.

   All devices have been in use for many years at WSDOT.

   ☐ The project will add new software that will be custom developed for this project or will make major modifications to existing custom developed software. Please explain why you selected or did not select this item.

   Project will use the current software in use.

   ☐ The project will add new interfaces to systems operated or maintained by other agencies. Please explain why you selected or did not select this item.

   WSDOT is the only agency operating and maintaining this project.

   ☐ The project will develop new system requirements or require revisions to existing system requirements that are not well understood within the agency and/or well documented at this time. These system requirements will be included in a request for proposal, or plans, specifications, and estimate bid document package. Therefore it will require significant stakeholder involvement and/or technical expertise to develop these items during the project delivery process. Please explain why you selected or did not select this item.

Project will use software and devices in use for many years at WSDOT.

☐ Multiple agencies will be responsible for one or more aspects of the project design, construction, deployment, and/or the ongoing operations and maintenance of the system. Please explain why you selected or did not select this item.

WSDOT is the only agency responsible for this project.

6. If you selected any of the items in question 5, FHWA and WSDOT consider the project to be high risk. Use this table for additional requirements:

Total project cost for high risk ITS projects		
Adaptive signal control technology (ASCT) projects	**Other types of ITS projects**	
	Greater than or equal to $1,000,000[2]	**Less than $1,000,000[2]**
Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan) [1] are required.	Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan) [1] are required.	Additional systems engineering documents (Concept of Operations, System Requirements, Verification Plan, and Validation Plan)[1] are recommended. This decision requires FHWA concurrence through the WSDOT Local Programs Engineer prior to submitting a construction authorization request.
Notes: 1. See definitions in Section 41.3. 2. Use the amount from question 4.		

7. What is the name of the regional ITS architecture and which portions of the architecture will be implemented? Is the project consistent with the architecture? Are revisions to the architecture required? Also, which user services, physical subsystem elements, information flows, and market/service packages will be completed, and how will these pieces be part of the architecture?

This ITS project is part of the Advanced Traveler Information Systems (ATIS) and Advanced Traffic Management Systems (ATMS) market packages described in the South Central Region Regional Intelligent Transportation System (ITS) Architecture (IBI Group, 2006). The project is consistent with the State architecture for Traveler Information, with a focus on providing information to help travelers make better decisions. This dissemination of the traveler information collected by the TMCs is one of WSDOT's key functions.

8. Identify the participating agencies, their roles and responsibilities, and the concept of operations. For the elements and market/service packages to be implemented, define the high-level operations of the system. This includes where the system will be used, its performance parameters, its life cycle, and which agency will operate and maintain it. Discuss the established requirements or agreements on information sharing and traffic device control responsibilities. The regional ITS architecture operational concept is a good starting point for discussion.

If this is a high risk project and a more extensive Concept of Operations document is being prepared for this project (see question 6), this answer can be a simple reference to that document.

WSDOT South Central Region will own and operate the system following construction.

9. Define the system requirements. Based on the concept of operations, define the "what" and not the "how" of the system. Define the detailed requirements for eventual detailed design. The applicable high-level functional requirements from the regional architecture are a good starting point for discussion. A review of the requirements by the project stakeholders is recommended.

If this is a high risk project and a more extensive System Requirements document is being prepared for this project (see question 6), this answer can be a simple reference to that document.

The South Central Region Regional Intelligent Transportation System (ITS) Architecture (IBI Group, 2006) evaluated existing project lists and provided prioritization of sub-projects, focusing on comprehensive VMS and camera coverage throughout the I-90 corridor. This work extends fiber optic lines to improve communication over Snoqualmie Pass. A portion of the I-90 ITS Infrastructure Deployments element will be constructed, with the remainder being scalable and constructed on subsequent funded projects.

10. Provide an analysis of alternative system configurations and technology options to meet requirements. This analysis should outline the strengths and weaknesses, technical feasibility, institutional compatibility, and life cycle costs of each alternative. The project stakeholders should have had input in choosing the preferred solution.

    Other communication options were considered for the project, and proved to provide insufficient communication bandwidth and reliability given project limitations.

11. Identify procurement/contracting options. Since there are different procurement methods for different types of projects, the decision regarding the best procurement option should consider the level of agency participation, compatibility with existing procurement methods, the role of the system integrator, and life cycle costs. Some options to consider include consultant design/low-bid contractor, systems manager, systems integrator, task order, and design/build.

    If the ITS portions of the project significantly meet the definition of construction, construction by low-bid contract would be used. Non-construction ITS portions of the project, such as services for software development, systems integration, systems deployment, systems management, or design, will be either engineering or service contracts. In these cases, a qualifications-based selection (QBS) or best value procurement may be more appropriate. For guidance on procurement options for ASCT systems, refer to Pages 15-20 of USDOT's *Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems*, FHWA-HOP-11-027, August 2012.

    A contractor, through a standard PS&E contract, will provide equipment as listed in the contract.

12. Identify the applicable ITS standards and testing procedures. Include documentation on which standards will be incorporated into the system design. Also include justification for any applicable standards not incorporated. The standards discussion in the regional architecture is a good starting point for discussion.

    Devices are reviewed for compatibility and compliance with the regions needs and are added to the proprietary approval list. Devices are then selected from the list. Testing procedures are then limited to continuity, line loss, connectivity, and a burn in period.

13. Outline the procedures and resources necessary for operations and management of the system. In addition to the concept of operations, document any internal policies or procedures necessary to recognize and incorporate the new system into the current operations and decision-making processes. Also, resources necessary to support continued operations, including staffing and training must be recognized early and be provided for. Such resources must also be provided to support necessary maintenance and upkeep to ensure continued system viability.

    The Central Washington Traffic Management Center (TMC) will be responsible for managing and operating the system

SD.5.12

Materials/Surfacing

Report

November 7, 2019

Jeff Uhlmeyer, P.E

WSDOT State Pavement Engineer

Washington State Department of Transportation

Memorandum

October 1, 2019

Region Materials Engineer's Stamp

TO: Jeff Uhlmeyer, P.E. / Mark Russell, P.E.
WSDOT State Pavement Engineer
State Materials Laboratory, MS: 47365

THRU: Troy Suing, P.E.
SCR Assistant Regional Administrator
Planning and Program Management

FROM: Robert Fleming, P.E.
SCR Materials Engineer
(509) 577-1791

SUBJECT: XL 5479, PIN#: 509093A, I-90, MP: 64.40 to MP: 70.10
"I-90/Cabin Creek Interchange to West Easton Interchange (Phase 3) – Add Lanes and Reconstruction"

PAVEMENT DESIGN REPORT

INTRODUCTION:

The following memorandum provides minimum pavement designs for the subject project.

This Pavement Design Report (PDR) is intended to be a stand-alone document detailing Phase 3 (and Phase 5) pavement design requirements. There have been numerous corridor PDRs, associated addenda, and electronic communication documents dating back to the original September 18, 2002 report that first described the general pavement sections to be employed along the Hyak to Easton corridor. These documents were required to accurately describe pavement design and project condition changes as the corridor pavement was progressively reconstructed but are now subject to either being misinterpreted or inappropriately utilized as conditions and pavement design policies have evolved during the near two decade time span that has elapsed since these projects were first conceptualized.

In addition, as a result of the Value Engineering (VE) study that was conducted in the summer of 2018, the beginning milepost limit of this project has been moved westerly to include the limits of the original I-90/Cabin Creek I/C to Easton Hill (Phase 5) reconstruction project (MP 64.48 to MP 67.36).

The scope of work on this project currently consists of, but may not be limited to, the complete reconstruction of the mainline roadway and shoulders between the subject MP limits. The new roadway will consist of a six lane (seven lane roadway along the Easton Hill grade between MP 67.3 vicinity and MP 69.3 vicinity) Cement Concrete Pavement (CCP) roadway with tied CCP shoulders as detailed herein. The existing roadway is not currently planned to be significantly incorporated into the new roadway structure, however newer portions of the recently reconstructed lanes near the east end of the project may be utilized in the new design.

This project is currently scheduled to be advertised for contractor bidding in October of 2020 with construction commencing in 2021.

MINIMUM PAVEMENT DESIGNS:

New Mainline Roadway:

1. Construct the new mainline traveled lanes by placing 1.05 ft. of CCP over 0.25 ft. of Hot Mix Asphalt (HMA) Class ⅜" PG 64H-28 over 0.25 ft. of Crushed Surfacing Base Course (CSBC).
2. Construct new mainline shoulders by placing 1.05 ft. of un-doweled CCP over 0.50 ft. of CSBC.
3. Construct new mainline shoulders east of the new Kachess River Bridge by placing 0.35 ft. of HMA Class ⅜" PG 64H-28 over 1.15 ft. of Crushed Surfacing Base Course.

Detour Lanes, West End Transitions, and Tie-Ins to Existing Roadway:

4. Construct roadway in accordance with details provided on Table 2 in the analysis section.

East End Transitions and Tie-Ins to Existing Roadway:

5. Utilize recommended (1) mainline roadway section.
6. Perpetuate all existing longitudinal underdrain structures and existing culverts across any new roadway.

Median Crossings:

7. Construct crossings by placing 0.50 ft. of HMA Class ⅜" PG 64H-28 over 1.00 ft. of CSBC.

Notes:

1. Construct CCP in accordance with Standard Plan A-40.10-03 unless otherwise specified.
2. Widen the outside lane (lane #1) to 14 ft. Stripe the lane the customary 12 ft. width.
3. In lanes #3 and #4 (if applicable) the dowel count may be reduced to a minimum of **4** in each wheelpath.

4. Vertical taper rates are to be no steeper than 500:1 (< 0.2%).
5. Use an ESAL level of 2,000,000 for HMA placed on this project.

GENERAL

Construction History:

The 1930's vintage US Route 10 (aka "The Sunset Highway") was the first improved roadway passing through the project area and consisted of a sinuous two-lane roadway that was replaced by four-lane facilities beginning in the late 1950's. There are few, if any, remnants of this roadway remaining as it has either been buried or removed during subsequent construction although traces of the original alignment are still visible at isolated locations along the corridor.

The portion of I-90 to be reconstructed on this project was constructed on three major projects. The EB and WB alignment between MP 64.40 and MP 67.31 was constructed on CT 5805 in 1959. The roadway section consisted of 0.75 ft. of PCCP over 0.58 ft. of untreated surfacing

The portion of the roadway east of MP 67.31 diverges into two distinct alignments with the WB roadway being shifted to the north. The EB alignment between MP 67.31 and MP 70.10 was constructed on CT 9806 in 1976 and consisted of 0.75 ft. of PCCP over 0.75 ft. of untreated surfacing.

The WB alignment between MP 67.31 and MP 70.10 was originally constructed as a two lane facility on CT 6045 in 1960 using 0.75 ft. of PCCP 0.58 ft. of untreated surfacing. A CCP truck climbing lane was added in 1976 at the same time as the LE alignment was constructed on CT 9806. Interestingly, the truck lane required replacement in 1990 due to deterioration. The truck lane roadway *and* shoulder were reconstructed using 0.83 ft. of CCP over an asphalt treated permeable base (ATPB). The ATPB was utilized in an attempt to improve the poor subsurface drainage.

Subsequent CCP rehabilitation along this corridor has been extensive and diverse in nature. Rehabilitation projects consisting of dowel bar retrofits, diamond profile grinding as well as HMA overlays commenced in the mid 1990's and have occurred at steadily increasing intervals as the climate along this corridor is exceedingly harsh on bituminous pavements.

The EB alignment between MP 64.40 and MP 67.31 received an HMA overlay in 1999 as the condition of the existing CCP surface was deemed unsuitable (due to the number of cracked panels) to perform a dowel bar retrofit. The section along these MP limits has required "mill and fill" HMA rehabilitation work 2001, 2007, 2014, and 2017 (partial). The remainder of the EB alignment east of MP 67.31 received a dowel bar retrofit and diamond profile grind in 1994. A small portion of lane #1 in the EB roadway east of MP 69.79 was replaced with a 0.95 ft. CCP section in 2013.

The most recent project along the EB alignment occurred in 2016 when the lanes and shoulders between MP 67.32 to MP 69.50 were overlaid with 0.50 ft. of HMA in response to deteriorating ride quality due to dowel bar retrofit failures and other distresses.

The rehabilitation history of the WB alignment between MP 64.40 and MP 67.31 is the same as the EB alignment. In reality little rehabilitation work has been performed along the WB alignment east of MP 67.31 with the exceptions being the previously mentioned reconstruction of the truck climbing lane in and panel replacements the occurred in 1990.

Miscellaneous projects along the current WB alignment included a 1997 dowel bar retrofit, diamond profile grind, and new shoulders between MP 69.52 and MP 70.10. This work was in turn replaced by the most recent work along this section of roadway which consisted of the replacement of lane #1 between MP 69.28 and the east MP limits of this project 2013.

Geology and Project Soil Description:

Surficial Soil Description:

A brief description of the project soil conditions is provided herein for the purposes of alerting the project designers to pavement design, embankment, and constructability issues that may be encountered and therefore require attention in the plans. Detailed soil and bedrock data is provided in the SML prepared geotechnical report for this project.

In general, surficial soils along the project consist of silty sandy gravels of varying gradations deposited by either glacial, alluvial (river), or other erosional processes with the vast majority of the soil being suitable for embankment construction. The soils along the majority of the project between the west MP limit to just before the point where the alignment moves out on to the Kachess River floodplain are glacial in origin whereas the remaining portion along the floodplain to the east project limits are the result of alluvial processes. Soil depth to bedrock is highly variable.

As the majority of the soils were deposited by glacial processes, or in a periglacial environment, the amounts of each size fraction of material can be highly variable as evidenced by small areas of "unsuitable" silt being noted in the 1970 Field Soils Report. Therefore, small areas of these materials may be encountered, particularly along the proposed new LW alignment. The chances of encountering these soil types when widening directly adjacent to the existing LW and LE pavement are much smaller but as experienced on similar projects in this area remain a possibility. If large amounts of these types of fine grained material are encountered during subsequent field investigations or during construction they will require removal and replacement with material meeting "Select Borrow" or similar specifications.

Another issue having a great impact on the constructability of the existing materials for embankment construction is water, as excessive water will render almost any soil type, including "granular" material is sufficient fines are present, un-compactable. The soil in this area is particularly susceptible to naturally being in an over-optimum condition for compaction as the precipitation in the form of both rainfall and snowfall is high and the period of "dry" season suitable for construction is relatively short.

Remediation for over-saturated materials consists of various methods including, aeration (spreading and drying the material), chemical drying (the use of lime or Portland cement), and careful blending of soil types and soils of varying moisture content to create a compactable

material. Further discussions on appropriate contract provisions may be required as the project design progresses.

Groundwater:

Detailed groundwater information will be provided in the SML geotechnical report for this project. However, for the purposes of roadway pavement design and to address potential constructability issues a description of the anticipated groundwater regime is included as the SML geotechnical report will be focused on the conditions near the proposed new structures.

It is anticipated that the groundwater conditions, particularly along the Easton Hill portion of the project, may have a significant impact upon design and construction. There is historic evidence of high water conditions, so much so, that a series of lateral drains were installed to remediate a pumping condition where water was emerging through the roadway along the WB roadway when the truck lane was reconstructed in 1990 and the EB roadway in 1994 when the shoulders were replaced on the DBR project. It is reported that water flows from the lateral drain system year round in many locations further substantiating a high groundwater environment.

Traffic Data:

The 2018 version of the WSPMS database (2017 Data) was utilized for traffic data and estimated design ESAL information. The results are tabulated below.

2017 AADT	Truck %	Design Period (Years)	Estimated Design Period ESAL (2022)	Notes
32,000	21%	3	4,600,000	Utilized for Short Term Detour and Tie-In Design ESALs
"	"	5	8,000,000	Intermediate Term Detour and Tie-In Design ESALs
"	"	10	17,500,000	Long Term Tie-In Design
"	"	50	225,000,000	Total Design ESALs (2025 Project Completion)
"	"	50	180,000,000	80%/20% Lane Distribution Factor

Table 1

ANALYSIS

Minimum Pavement Design Discussion:

As it is difficult to clearly describe every nuance that may be encountered when the roadway sections are being developed, several generalized minimum pavement sections are being detailed below. The project designers are allowed to use discretion and engineering judgement when developing "one-off" and/or temporary roadway sections that may include using portions of the existing roadway. The proposed roadway sections were developed using a combination of engineering judgement, previous CCP design experience garnered from earlier construction phases of the Snoqualmie Pass East Corridor, and WSDOT Pavement Policy guidelines.

New Alignment:

The current WSDOT Pavement Policy specifies a pavement section of 1.08 ft. (13 in.) of CCP over 0.35 ft. of HMA (base) over 0.35 ft. of CSBC for new construction at the projected ESAL level. Analysis of the standard section combined with experience from numerous CCP projects in the vicinity indicates that slightly thinner layers of CSBC, HMA base, and CCP are allowable in terms of constructability and risk to long term performance.

Therefore, it is recommended that all new pavement placed on new subgrade be constructed by placing 1.05 ft. of corrosion resistant doweled CCP (re. Standard Plan A-40.10-03) over 0.25 ft. of HMA Class ⅜" PG 64H-28 over 0.25 ft. of CSBC. Dowels may be reduced to four in each wheelpath in lanes 3 and 4, per Pavement Policy, as the ESAL loading is considerably lower. It is also recommended that lane 1 panel width be widened to 14 ft. (but still striped at the customary 12 foot width) to reduce stress at the panel joints and outside panel corners if HMA shoulders are utilized per Pavement Policy.

In addition, the WSDOT Pavement Policy specifies a minimum 0.35 ft. thick HMA shoulders for Interstate applications. However, utilizing HMA shoulders in mountainous environments has created demonstrable long term durability issues, particularly along the lane edge, on past projects and is a continually ongoing maintenance issue (distressed/eroding rumble strips, "drop-offs" along the lane edge, etc.) as programming a shoulder rehabilitation project alongside a CCP roadway is exceedingly difficult. The mountainous terrain that promotes vehicle off tracking in snowy conditions and environmental factors (freeze/thaw) are also particularly harsh on HMA pavements. As a result of these experiences, Region Management Staff and Region Design Staff are very reluctant to utilize HMA for shoulders in this location.

On the other hand, there are several recent design and construction strategies that, in theory, should improve the long term performance of HMA shoulders including; designing deeper shoulders than the "old" standard Interstate depth of 0.25 ft., utilizing widened CCP lanes (at least in lane 1) reducing off-tracking along the longitudinal joint, and paving with "richer" HMA mixes with compaction QA that are less permeable and therefore less prone to moisture damage. Nevertheless, there is no performance data to verify the long-term effectiveness of utilizing these processes in this mountainous area. A 0.50 ft. thick HMA section was utilized for chain-on widened areas on Phase 1B near Hyak but the performance has been unsatisfactory.

Therefore it is recommended that mainline shoulders for this project be constructed using by placing 1.05 ft. of un-doweled CCP over 0.50 ft. of CSBC west of Kachess River bridges, and placing 0.35 ft. of HMA Class ⅜" PG 64H-28 over 1.15 ft. of Crushed Surfacing Base Course east of Kachess River Bridges.

Exit 70 I/C Ramps/Tapers (If required):

If ramp modification is required construct new speed change lanes by first excavating the existing surfacing materials to a depth of 1.50 ft. then place 0.75 ft. of PCCP with corrosion resistant dowel bars over 0.25 ft. of HMA Class ⅜" PG 64H-28 over 0.50 ft. of CSBC. The designers are advised of the possibility of encountering remnants of the old 0.50 ft. thick

unfinished PCCP speed change lanes, primarily along the WB on-ramp, but also, albeit less likely as it was presumably removed on CT 7971, along the EB off-ramp. This is a low traffic volume interchange and as such the 0.75 ft. PCCP section is more than adequate for the design period. The remaining portions of the realigned ramps are to be (re)constructed by placing 0.75 ft. of HMA Class ⅜" PG 64H-28 over 0.75 ft. of CSBC. New ramp shoulders and gore areas are to be constructed to the same depths as the ramp traveled lanes per WSDOT pavement policy.

Temporary West End Tie-Ins:

As the current schedule for the re-construction of I-90 west of this project remains uncertain, the following table details the recommended roadway sections for various design periods.

Anticipated Design Period	HMA Depth	Surfacing Depth	Notes
1-3 Years	0.50 ft.	1.50 ft. CSBC	May incorporate the existing shoulders into the design. (Requires removal of rumble strips and 0.15 ft. "mill and fill" of shoulder.)
4-5 Years	0.65 ft.	1.35 ft. CSBC	May incorporate the existing shoulders into the design. (Requires removal of rumble strips and 0.15 ft. "mill and fill" of shoulder.)
6-10 Years	0.80 ft.	1.20 ft. CSBC	Excavate and remove 0.80 ft. of the existing HMA and a portion of the untreated surfacing from the existing shoulders.

Table 2

As is customary, re-using portions of the existing shoulder surfacing is recommended and encouraged if practicable. If this practice is not possible the tie-in lanes are to consist of the surfacing depths listed on Table 2. New temporary shoulders are to consist of a minimum of 0.25 ft. of HMA Class ⅜" PG 64H-28 over 1.75 ft. of CSBC.

East End Tie-Ins and Transitions:

Work here will consist of transitioning the new 1.05 ft. thick PCCP roadway and shoulders into the existing 0.95 ft. thick CCP lane #1 and/or the 0.70 ft. thick PCCP lane #2. Salvaging as much of the 0.95 ft. deep lane as practicable is allowable as it was constructed in 2013 while the older 0.70 ft. deep CCP lane will require excavation and replacement. It is also allowable to reduce the new CCP sections to 0.95 ft. of CCP over 0.25 ft. of HMA over 0.25 ft. of CSBC in areas where new passing lanes (i.e. lanes 2 and 3) are to be constructed directly adjacent to an existing 0.95 ft. thick lane #1 to avoid having the passing lanes actually being thicker than the driving lane.

Pavement Type Selection:

The existing Hyak to Easton Life Cycle Cost Analysis/Pavement Type Selection and corresponding Pavement Type Selection Analysis, dated March 1, 2007 and April 3, 2007 respectively, as well as the October 30, 2015 adoption of said documents for the entire corridor have been reviewed for adherence to current conditions.

HMA Pavement Design Discussion:

Section 8.2.1 of the 2018 WSDOT Pavement Policy specifies that HMA utilized as treated base material under the PCCP roadway as well as shoulders adjacent to PCCP roadway shall be 50 gyration mix designs to improve long term durability and resistance to moisture damage and stripping. This is definitely good practice for HMA used on the shoulders that are directly exposed to the environment but is likely less critical when the material is being utilized as a base underneath one or, or more, feet of doweled CCP where stripping is far less likely. Evidence of this can be found with the HMA base under the early 1970's vintage CCP on the west side of Snoqualmie Pass which is still in good condition. While the older HMA likely had a "better" quality neat asphalt binder it was also likely subject to less mix design verification (Hamburg tracker, etc.) and Q/A procedures and safeguards than a "modern" HMA.

Additionally, if strict adherence to Superpave design protocol were to be followed on this project there may be as many as three separate mix designs required for the various ESAL levels and applications likely to be encountered. As a practical matter, the Region Construction office has also always preferred to minimize the number of mix designs (if technically allowable with acceptable risk) to simplify contract administration.

For this project, as was at least partially the case with the project to the west (CT 8715 / Keechelus Dam to Stampede Pass – Phase 2A) where the 50 gyration HMA was eliminated, it is recommended that HMA Class ⅜" PG 64H-28, compacted to an N_{DESIGN} level of 75 gyrations, be utilized for all applications on this project. The only exception to this would pertain to any HMA that would be permanently exposed to traffic in a traveled lane, in which case, a 100 gyration HMA mix is required. There is the potential for some longer duration HMA transitions/detours but the risk involved with the 75 gyration mix for these applications is still considered minimal as the primary HMA failure mechanism in this area is raveling as opposed to rutting.

Contracting Agency Provided Materials Sources:

There are no Contracting Agency sources (existing sites) of construction materials recommended for this project. Any potential mineral aggregate sources derived from cut sections along the new alignment will be addressed in the SML Geotechnical report for this project, or, by subsequent investigation during the actual excavation of the material.

WSDOT STATE MATERIALS LABORATORY REVIEW AND CONCURRENCE BY:

Date: 11/7/19

JEFF UHLMEYER, P.E. / MARK RUSSELL, P.E.
WSDOT State Pavement Engineer

RDF:msh

Attachments:

Vicinity Maps
Pavement Type Determination
Value Engineering Study Findings

cc: SCR Assistant RA for Development (White)
SCR Construction (Smith)
SCR Design (Minnick)
Project Engineer (Byrd)
SCR Area 1 Maintenance Superintendent (Nelson)
SCR Program Management (Giles)
SCR Environmental Program Manager (Sauriol)

Documents reviewed for the preparation of this portion of this report include:

R.L. Washburn, P.E., 9/23/1969, L-3397 & L-3390, SR 90, "Hyak to Top of Easton Hill"
Field Soils Investigation

R.L. Washburn, P.E., 11/19/1970, L-3397, SR 90, "Top of Easton Hill to Easton"
Field Soils Investigation

B.S. Chen, Ph.D., P.E. & W. C. Adams, 5/9/2002, "Interstate 90 – Snoqualmie Pass East"
Geology and Soils Discipline Report
(Prepared for WSDOT by Hart Crowser, Inc.)

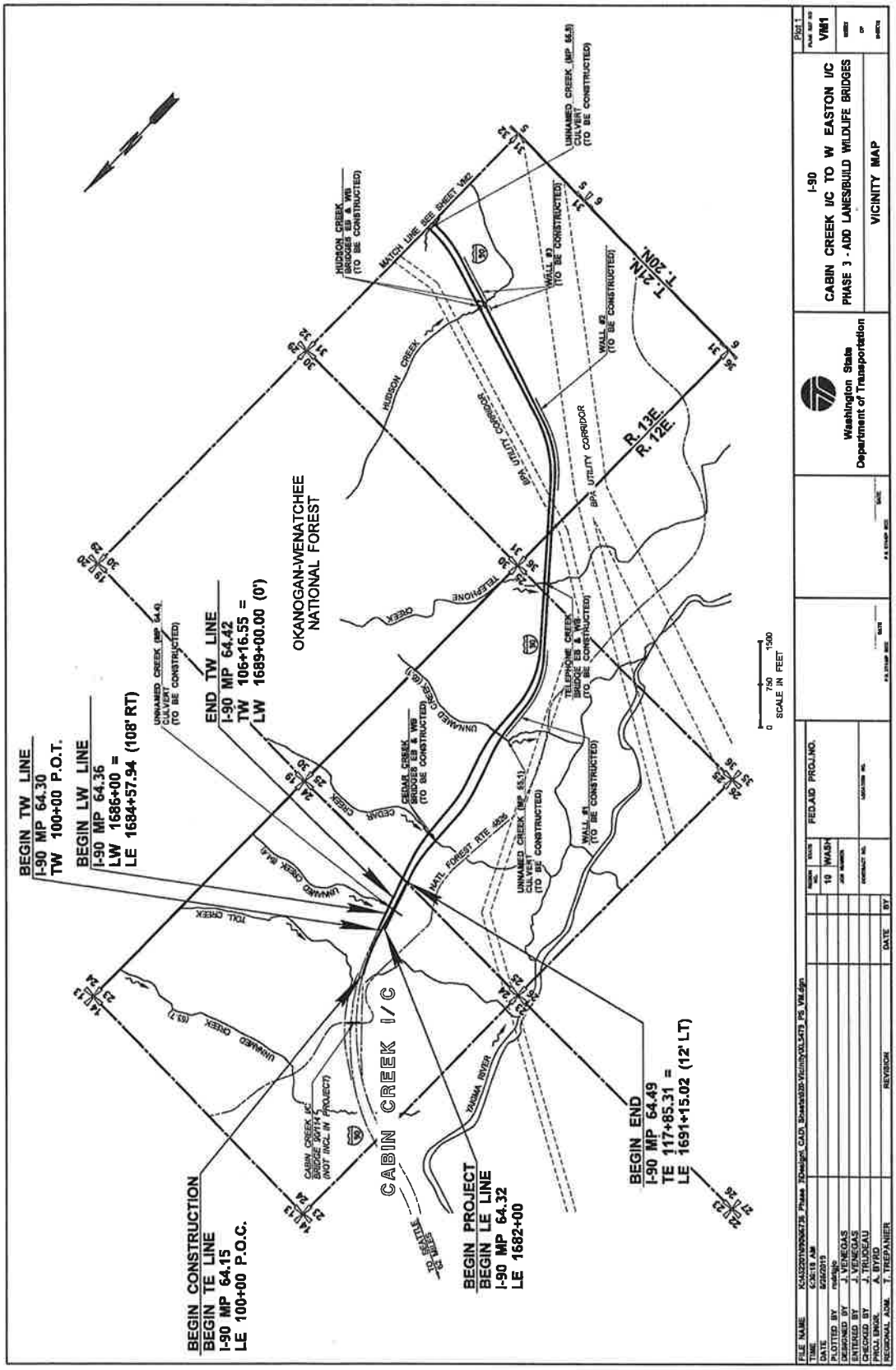
CT 5805, 1/22/1957, "Rustic Inn to Top [of] Easton Hill"
Contract Plans

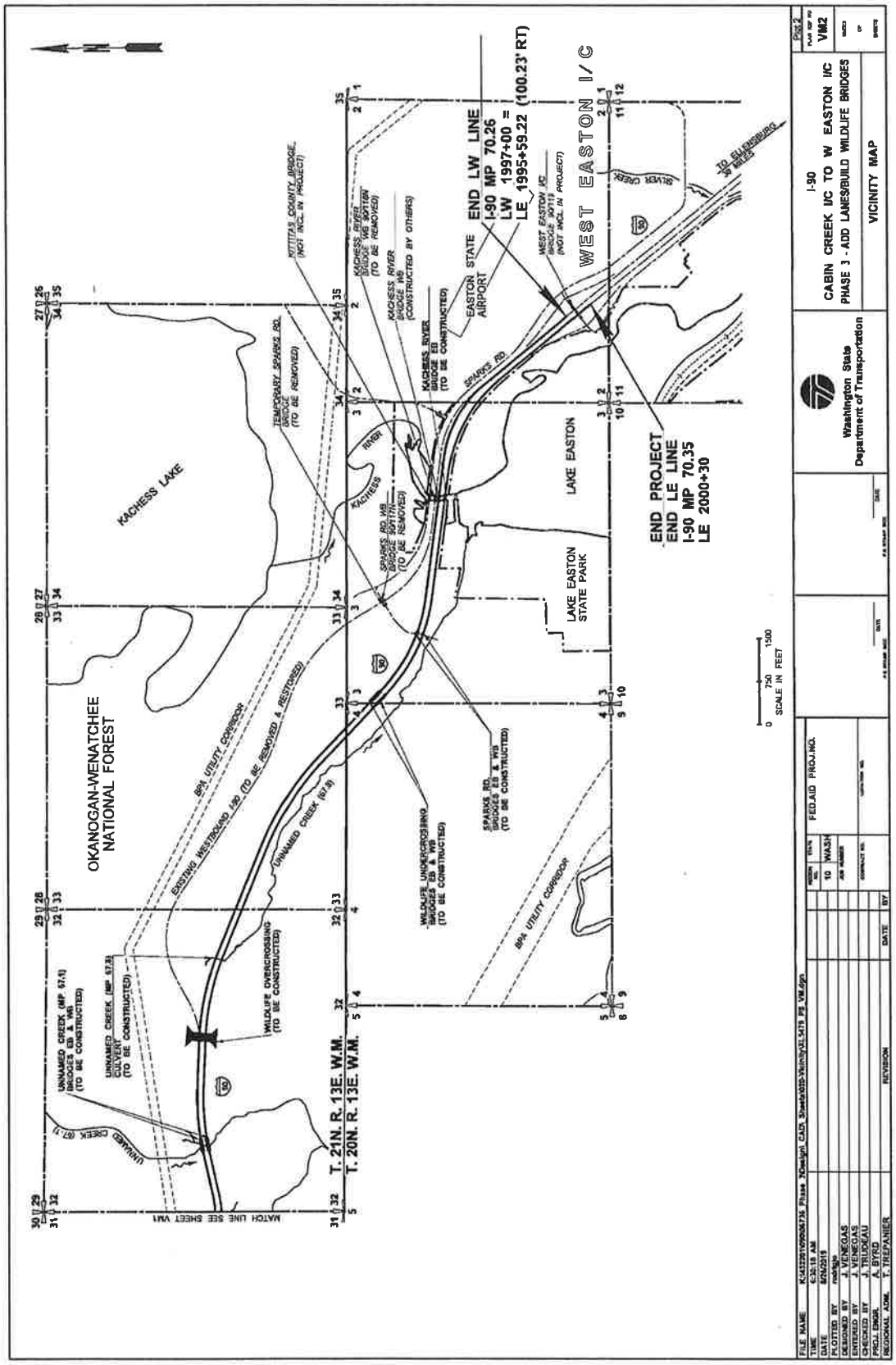
CT 6045, 9/12/1958, "Sunset Lodge Vicinity & Top of Easton Hill to Easton"
Contract Plans

CT 9806, 3/19/1974, "Easton Hill to Easton"
Contract Plans

9/1998, L-3097, Region Wide Pit & Quarry Investigation
Easton Hill Materials Source Exploration Boring Logs

WSDOT Pavement Policy


BEGIN TW LINE
I-90 MP 64.30
TW 100+00 P.O.T.
BEGIN LW LINE
I-90 MP 64.36
LW 1686+00 =
LE 1684+57.94 (108' RT)
END TW LINE
I-90 MP 64.42
TW 106+16.55 =
LW 1689+00.00 (0')
OKANOGAN-WENATCHEE
NATIONAL FOREST
BEGIN CONSTRUCTION
BEGIN TE LINE
I-90 MP 64.15
LE 100+00 P.O.C.
CABIN CREEK I/C
BEGIN PROJECT
BEGIN LE LINE
I-90 MP 64.32
LE 1682+00
BEGIN END
I-90 MP 64.49
TE 117+85.31 =
LE 1691+15.02 (12' LT)
R. 13E.
R. 12E.
T. 21N.
T. 20N.
SCALE IN FEET
Washington State
Department of Transportation
I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES
VICINITY MAP
VM1
FED.AID PROJ.NO.


KACHESS LAKE
OKANOGAN-WENATCHEE NATIONAL FOREST
BPA UTILITY CORRIDOR
EXISTING WESTBOUND I-90 (TO BE REMOVED & RESTORED)
UNNAMED CREEK (67.9)
UNNAMED CREEK (67.1)
UNNAMED CREEK (MP 67.1) BRIDGES EB & WB (TO BE CONSTRUCTED)
UNNAMED CREEK (MP 67.9) CULVERT (TO BE CONSTRUCTED)
WILDLIFE OVERCROSSING (TO BE CONSTRUCTED)
WILDLIFE UNDERCROSSING BRIDGES EB & WB (TO BE CONSTRUCTED)
SPARKS RD BRIDGES EB & WB (TO BE CONSTRUCTED)
SPARKS RD (BRIDGE WB SOUTH) (TO BE REMOVED)
TEMPORARY SPARKS RD BRIDGE (TO BE REMOVED)
KITTITAS COUNTY BRIDGE (NOT INCL IN PROJECT)
KACHESS RIVER BRIDGE WB SOUTH (TO BE REMOVED)
KACHESS RIVER BRIDGE WB (CONSTRUCTED BY OTHERS)
KACHESS RIVER BRIDGE EB (TO BE CONSTRUCTED)
EASTON STATE AIRPORT
SPARKS RD
END LW LINE
I-90 MP 70.26
LW 1997+00 =
LE 1995+59.22 (100.23' RT)
WEST EASTON I/C
WEST EASTON I/C BRIDGE SOUTH (NOT INCL IN PROJECT)
SILVER CREEK
TO SILVERDALE 35 MILES
LAKE EASTON
LAKE EASTON STATE PARK
END PROJECT
END LE LINE
I-90 MP 70.35
LE 2000+30
T. 21N. R. 13E. W.M.
T. 20N. R. 13E. W.M.
MATCH LINE SEE SHEET VM1
0 750 1500
SCALE IN FEET
Washington State Department of Transportation
I-90
CABIN CREEK I/C TO W EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES
VICINITY MAP
VM2
FEDAID PROJ.NO.
10 WASH
FILE NAME
TIME
DATE
PLOTTED BY
DESIGNED BY J. VENEGAS
ENTERED BY J. VENEGAS
CHECKED BY J. TRUDEAU
PROJ. ENGR. A. BYRD
REGIONAL ADM. T. TREPANIER
REVISION
DATE
BY

Washington State Department of Transportation

RECEIVED
NOV 13 2015

Memorandum

October 30, 2015

TO: Jeff Uhlmeyer, P.E. / Mark Russell, P.E.
WSDOT State Pavement Engineer

FROM: Andrew Byrd, P.E.
SCR Materials Engineer

ANDREW D. BYRD
STATE OF WASHINGTON
39833
REGISTERED
PROFESSIONAL ENGINEER
10/30/2015
Region Materials Engineer Stamp

SUBJECT: XLPEND, PIN#: 509017A, I-90, MP: 62.00 to 70.30
"I-90/Snoqualmie Pass East - Complete Corridor Improvements"
Pavement Type Determination

This memorandum documents the adoption of the approved "I-90 / Snoqualmie Pass East" Pavement Type Determination Report, dated March 3, 2007, for the remainder of the corridor. The approved report has been reviewed and all of the conclusions are still valid. Please consider the following justifications;

- All of the assumptions listed in the report remain valid today.
- Using current traffic data would not have an effect on the analysis as the nighttime rehab user costs were less than 1% of the total net present value of the HMA option.
- Reviewing the Unit Bid prices, both HMA and PCCP cost have increased about 40%.
- The 2007 RealCost LCCA was updated using current prices. The PCCP option is favored by 1.7% (assuming nighttime HMA rehabilitation) today vs. the HMA being favored by 2% in the previous report.
- The 8 year cycle for an HMA inlay rehabilitation cycles used this report is no different than what I would assume today for this location. As you know our history at this location would actually tend to suggest 5 or 6 years.
- HMA maintenance costs were not considered in this analysis. This would in all likely hood sways the analysis more towards the PCC option.
- All of the points discussed in the Engineering Analysis section are still valid.

11/17/15
State Pavement Division Concurrence

ADB:adb
cc: SCR Assistant RA for Construction
SCR Program Management
SCR Project Development Office

DOT Form 700-008 EF
Revised 5/99

Washington State Department of Transportation

Memorandum

PAVEMENT TYPE SELECTION

Snoqualmie Pass East Project

I-90, Hyak to Easton Vicinity

MP 55.10 to 70.30

The Pavement Type Selection Committee has completed its review of the pavement type selection for the Snoqualmie Pass East project.

This project begin on the eastern side of Snoqualmie Pass near Hyak at MP 55.1 and end near Easton at MP 70.3. The fifteen miles corridor improvement constructs six 12 ft. lanes, a 50 ft. rural median, 10 ft. inside and outside shoulders.

Following the procedure in the Pavement Type Selection, the analysis indicates the following:

I. **Pavement Design Analysis.** There are no pavement design issues. Both Hot Mix Asphalt (HMA) and Portland Cement Concrete (PCC) are viable alternatives.
II. **Life Cycle Cost Analysis.** HMA costs are 14 to 18 % more than PCC for daytime scheduled rehabilitation, and 2% less for nighttime scheduled rehabilitations.
III. **Engineering Analysis.** Engineering Analysis recommends PCC.

The Committee based on this analysis approves the use of PCC on this project.

The Pavement Type Selection Committee

Don Nelson
Director, Environmental and Engineering

Pasco Bakotich
State Design Engineer

John Conrad
Assistant Secretary
Engineering and Regional Operations

Keith Metcalf
Director of Project Control and Reporting

Tom Baker
State Materials Engineer

Don Whitehouse
South Central Region Administrator

JU:ck

Value Engineering Study Report – Final

Washington State Department of Transportation (WSDOT)

I-90 Snoqualmie Pass East

Stampede Pass to Easton

Yakima, WA

Corridor Agreement Y-12057/Task Y-1

Workshop Dates: March 26-30, 2018

Contact: Renee L. Hoekstra, CVS
(602) 493-1947

July 10, 2018

Guiding Teams – Building Success

July 12, 2018

Andrew D. Byrd, PE
Project Engineer
Development Branch
WSDOT – South Central Region
2809 Rudkin Road
Union Gap, WA 98903, 1648

RE: Value Engineering Study Report – Final
I-90 Snoqualmie Pass East
Stampede Pass to Easton
Yakima, WA

Dear Andrew:

Transmitted herewith is an electronic copy (PDF) of the draft Value Engineering Study Report for the above referenced project.

I appreciate your leadership and cooperation as well as that from the Value Engineering team and all other stakeholders. Should you have any questions, please contact me at (602) 493-1947.

Thank you for the opportunity to work with you and your team!

Sincerely,

RHA, LLC

Renee L. Hoekstra, CVS

cc: Mark Gabel, PE, AVS

6677 W Thunderbird Road, Suite K183, Glendale, Arizona 85306
(602) 493-1947 ■ (800) 480-1401 ■ (623) 275-2972 Fax
TeamRHA.com

Value Engineering Study

Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Contents

Executive Summary

Implementation

Summary Information

Value Engineering Workbooks

Contents (continued)

Support Data

EXECUTIVE SUMMARY

Value Engineering Study

Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Executive Summary

Background

A Value Engineering (VE) study was conducted on the design documents for the **I-90 Snoqualmie Pass East (Stampede Pass to Easton) Project** for the Washington State Department of Transportation (WSDOT) on March 26-30, 2018 for the project described below.

The WSDOT project manager, Andrew Byrd, presented the project during the kick-off meeting on March 26, 2018. A copy of his presentation is included in the Support Data section of this report.

The workshop objectives were reviewed at the start of the workshop as follows:

- Support WSDOT and its project partners in reviewing the design that will ensure they receive value
- Save $50M (construction)
- Review construction staging
- Validate phasing of Phases 3, 4 and 5
- Review pre-embankment approach (e.g., Phase 4 – 200 cubic yards short on fill)
- Review structures – type, size, location
    - Especially wildlife overcrossings
    - Hydraulic elements
- Review Hydraulic Connectivity Zones (HCZs)
- Review retaining walls in Phase 5
- Review the current approach to road abandonment and replacement

Additionally, the project's goals and objectives were identified as they relate to the success of the project:

- Increase capacity to a Level of Service "B"
- Reduce roadway closures due to rock fall events
- Support wildlife connectivity
- Improve the safety for sight distance, curves and design speed
- Maintenance of traffic and safety during construction
- Restore pavement – improve lifecycle cost
- Improve hydraulics
- Avoid rock stabilization

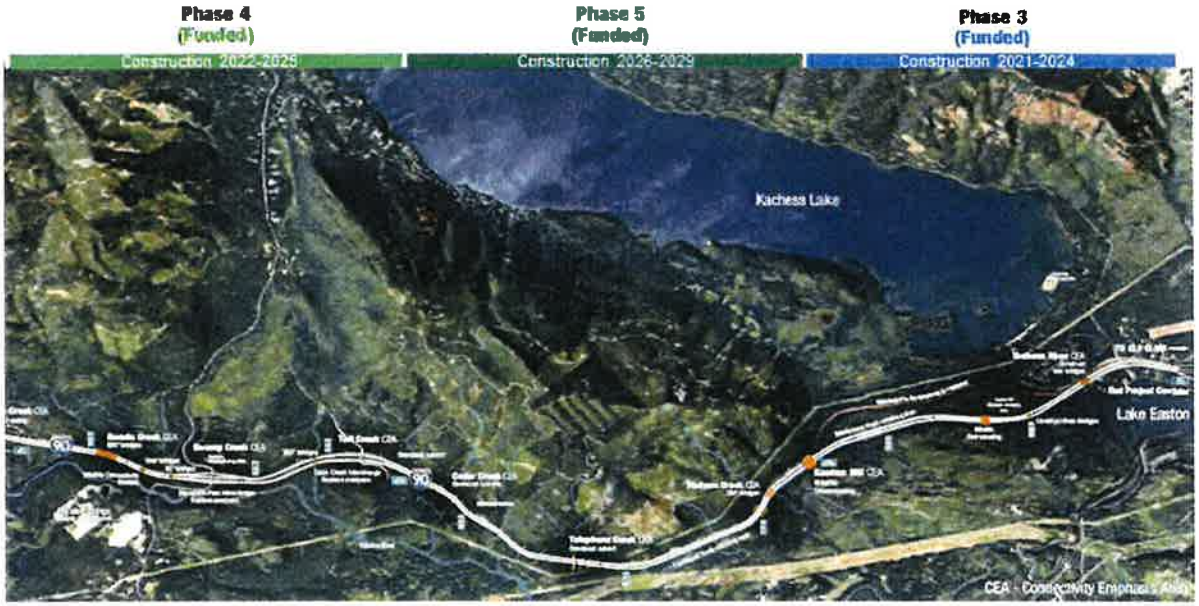
Value Engineering Study

Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Summary Project Description

The I-90 Snoqualmie Pass East (SPE) Project was established to reconstruct a 15-mile section of I-90 from Hyak (MP 55.10) to the West Easton Interchange (MP 70.30) to address several deficient areas. These include:

- Replacing the existing concrete pavement to create a better ride for the traveling public
- Increase capacity by creating an extra lane in each direction
- Reduce the risk of closures and delays due to avalanches by addressing slopes with avalanche mitigation measures
- Reduce the risk of rock fall by addressing unstable slopes
- Improve driver safety by increasing sight distance and addressing roadside safety elements
- Reduce wildlife/vehicle collisions by providing animal connectivity and installing wildlife fencing



This is a unique project which lies mostly within the Wenatchee National Forest, which is managed by the United States Forest Service (USFS). WSDOT has obtained and will be seeking additional easements from the USFS through a Letter of Consent (LOC) to construct the project. Unlike most projects, this project focuses on the safety of the traveling public with a balance of ecological connectivity. The environmental documentation was completed in 2008 with the finalization of the Environmental Impact Statement (EIS). Following the completion of this documentation, the project was split up into multiple phases to create smaller, more manageable contracts. The Value Engineering (VE) study focused on the following three phases:

	Phase 3	Phase 4	Phase 5
MP Limits	66.80 to 70.30	61.70 to 64.48	64.48 to 66.80
Budget	PE: $13,948,777 CN: $126,254,527	PE: $11,450,009 CN: $157,428,084	PE: $15,826,819 CN: $157,861,468
Project Timing	PE Start: 07-2017	PE Start: 06-2018	PE Start: 03-2022
	AD Date: 10-2020	AD Date: 10-2021	AD Date: 10-2025
	Operationally Complete: 10-2024	Operationally Complete: 10-2025	Operationally Complete: 10-2029

Phase 3 will reconstruct I-90 from the Easton Hill vicinity (MP 67.36) to W Easton Interchange (MP 70.10). This project will bundle the proposed westbound lanes along the existing eastbound, restore the existing westbound lanes, reconstruct the existing concrete pavement, increase capacity, construct two wildlife overcrossing structures, two structures at Sparks Road, and two structures at Kachess River. This project will also add various drainage structures. This project is currently in design and has an anticipated advertisement date of October 2020. Construction duration is anticipated to be four years.

Phase 4 will reconstruct I-90 from the Price Creek vicinity (MP 62.00) to Cabin Creek Interchange (MP 64.50). This project will reconstruct the existing concrete pavement, increase capacity, and reconstruct the Stampede Pass Interchange and the Cabin Creek Interchange. This project will also construct two 600' long bridges at Bonnie Creek, two 200' long wildlife bridges at MP 62.5, two 80' structures at Swamp Creek, and two 200' wildlife bridges at MP 63.7. The project will also install several drainage structures. This project is due to begin design in June 2018 and has an anticipated advertisement date of October 2021. Construction duration is anticipated to be four years.

Phase 5 will reconstruct I-90 from Cabin Creek Interchange (MP 64.50) to the Easton Hill vicinity (MP 67.36). This project will reconstruct the existing concrete pavement, increase the capacity, construct three large walls along Amabilis Grade (Approx. 50' in height), and construct two wildlife bridges at MP 67.1. The project will also install five large culverts, these are all anticipated to be on steep grades and will be required to be bottomless or have material placed in the bottom to simulate natural stream conditions. This project is anticipated to be design in March 2022 and has an Ad Date of October 2025. This project also has anticipated construction duration of four years.

There are potential staging areas at Stampede Pass Interchange, Cabin Creek Sno-Park (seasonal), abandoned westbound lanes in Phase 3, and the median at the base of Easton Hill stockpile site. These projects will also upgrade Intelligent Traffic Systems (ITS) as needed. The project is committed to restoring hydrologic connectivity as well by installing drainage systems within designated Hydrological Connectivity Zones (HCZs). All streams that flow through the I-90 corridor will be regraded to meet anticipated flows and the USFS Aquatic Conservation Strategy (ACS) objectives, which are part of the Northwest Forest Plan.

Performance Criteria

During the kick-off meeting on March 26, 2018, the decision makers helped the VE study team understand what defined project success for the I-90 Snoqualmie Pass East (Stampede Pass to Easton) project. Using a paired-comparison matrix, performance criteria were scored and ranked (see Support Data section of this report). These criteria were used later in the workshop by the VE study team for both evaluating and developing alternatives.

- **Constructability** – Maintenance of Traffic (MOT) during construction and seasonal impacts; delineation; ease of construction; speed and cost effective
- **Environmental** – Conform to 2008 Environmental Impact Statement (EIS)/Northwest Forest Plan; aesthetics, visual; Hydraulic Connectivity Zones (HCZs), Aquatic Conservation Strategies (ACS)
- **Maintainability** – Ease of access; safety for maintenance workers and the traveling public when maintenance operations are being performed; low maintenance/durability (50-year life)
- **Mainline Operations** – Long-term Level of Services (LOS)

Risk Identification

When brainstorming alternatives during the creative phase, the VE study team considered the following risks that were identified in the December 2015 Cost Estimate Validation Process (CEVP):

- Fire protection during construction
- Contractor availability
- Stream diversion approach (fish exclusion)
- Unsuitable soils (Phase 4)
- Schedule – expediting
- Uncertainty of costs – materials and resources

Summary Implementation Results

Summary implementation results are shown in the table below.

Workshop Outcome	Number	Section of Report / Result
Ideas Brainstormed	66	See Creative Idea List (Support Data section of this report)
Ideas Developed into VE Workbooks	17	See Value Engineering Workbooks section of this report
Value Engineering Proposals, costed	14	
Design Suggestions (DS), not costed	3	
Design Comments (DC), not developed	15	See Summary Information section of this report
VE Alternatives – Accepted • Costed – 2; PC-06, SC-05 • Not Costed – 1; PC-04	3	Potential Initial Cost: $2,016,000 Potential O&M Cost: - Potential Total: $2,016,000
VE Alternatives – Accepted with Modifications • Costed – 2; SS-05, AM-03	2	Potential Initial Cost: $13,096,000 Potential O&M Cost: - Potential Total: $13,096,000
VE Alternatives – Further Study • Costed – 4; PC-02, AM-08, SC-01, EC-05 • Not Costed – 2; SS-02, M-02	6	Potential Initial Cost: $9,664,000 Potential O&M Cost: - Potential Total: $9,664,000
VE Alternatives – Rejected • Costed – 6; SS-10, SS-13, SS-14, ME-02, AM-02, AM-04	6	Potential Initial Cost: $7,676,000 Potential O&M Cost: ($2,567,000) Potential Total: $5,109,000

The description and further discussion of these are included in the Value Engineering Workbooks section of this report. The VE proposals are categorized by Focus Areas—Phasing, Structures, Roadway, Staging and Construction.

The tables on the following pages summarize by disposition—Accepted, Accepted with Modifications, Further Study, or Rejected—the VE Alternatives, overall performance score (from performance criteria explained earlier and further detailed in Support Data Section of this report) and potential savings (or cost add) to the project. Details of the disposition of the VE Alternatives are shown in the Implementation section of this report.

"Accepted" VE Alternatives

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
PHASING					
PC-06	Combine Phases 3 and 5 into a single phase contract	3.75	$1,824,000		$1,824,000
PC-04	Identify other work that can be done during Phase 3 - combine work	***DESIGN SUGGESTION***			
STAGING					
SC-05	In Phase 5, eliminate bifurcation of lanes in Stages 1 and 3	1.67	$192,000		$192,000

"Accepted with Modifications" VE Alternatives

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
STRUCTURES					
SS-05	Use narrower bridge structure cross-sections to reduce shoulder width	0.83	$3,840,000		$3,840,000
ROADWAY					
AM-03	Use four-foot inside shoulders in lieu of ten-foot	1.25	$9,256,000		$9,256,000

"Further Study" VE Alternatives

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
PHASING					
PC-02	Haul Phase 3 excess excavation to Phase 4 off-road and pre-embank	-1.25	$512,000		$512,000
STRUCTURES					
SS-02	Optimize the length and depth of bridges	***DESIGN SUGGESTION***			
ROADWAY					
AM-08	Use composite concrete in lieu of standard Portland Cement Concrete	3.33	$6,932,000		$6,932,000

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
	Pavement (PCCP)				
M-02	Use performance specification for concrete roadway to improve longevity	***DESIGN SUGGESTION***			
STAGING					
SC-01	At truck climbing lanes eastbound, build full depth shoulders for truck usage to eliminate the truck climbing lane in Phase 5	2.08	$220,000		$220,000
CONSTRUCTION					
EC-05	Provide an opportunity to use recycled aggregates for Structural Earth Wall (SEW) backfill	-2.08	$2,000,000		$2,000,000

"Rejected" VE Alternatives

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
STRUCTURES					
SS-10	Use beveled ends at arches for wildlife in lieu of walls	1.25	($2,764,000)		($2,764,000)
SS-13	Use a Design-Build element within the Design-Bid-Build contract for the wildlife structures	0.83	$500,000		$500,000
SS-14	Use bridges in lieu of culverts where possible	0.83	($2,549,000)		($2,549,000)
ME-02	Reduce the height of walls 1 and 2 in Phase 5	3.75	$5,357,000		$5,357,000
ROADWAY					
AM-02	Use Hot Mix Asphalt (HMA) in lieu of concrete for shoulders	-2.08	$4,047,000	($2,567,000)	$1,480,000
AM-04	Use eight-foot outside shoulders in lieu of ten-foot	1.25	$3,085,000		$3,085,000

Value Engineering Study

Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Description of Study

The study was conducted in accordance with the SAVE International Value Methodology, found in the Support Data section of this report.

The Value Engineering Proposals, Design Suggestions and Design Comments are found in the Summary Information section of this report. This section lists by function and summarizes the ideas brainstormed and developed during the study indicating the areas of opportunity for improving the value, performance and functions of the project. A complete list of all of the ideas, the Creative idea List, is located in the Support Data section of this report.

Details of the Value Engineering proposals can be found in the Value Engineering Workbooks section of this report. A presentation of the VE study recommendations and findings was given to the decision makers on March 30, 2018; a copy is included in the Support Data section of this report.

Value Engineering Study Team

- Richard Schilling, WSDOT – Eastern Region SME
- Andrew Byrd, WSDOT – Design PE SME
- Mark Gabel, WSDOT – Design Analysis/Cost Risk SME
- Jeff Minnick, WSDOT – Construction SME
- Samih Shilbayeh, WSDOT – Design SME
- Ricky Bhalla, WSDOT – Design SME
- Liana Liu, FHWA – Design & Construction SME
- Forrest Dill, Ott-Sakai – Materials/Staging SME
- Mo Sheikhizadeh, David Evans – Structures/Construction SME
- Renee Hoekstra, RHA, LLC – CVS Team Leader
- Pat Miller, RHA, LLC – CVS Assistant Team Leader

IMPLEMENTATION

Implementation

Introduction

The VE Alternatives Initial Assessment/Comment form was completed on July 9, 2018 and is included on the following pages.

A summary of workshop outcomes and decisions made is shown below.

Workshop Outcome	Number	Section of Report / Result
Ideas Brainstormed	66	See Creative Idea List (Support Data section of this report)
Ideas Developed into VE Workbooks	17	See Value Engineering Workbooks section of this report
Value Engineering Proposals, costed	14	
Design Suggestions (DS), not costed	3	
Design Comments (DC), not developed	15	See Summary Information section of this report
VE Alternatives – Accepted • Costed – 2; PC-06, SC-05 • Not Costed – 1; PC-04	3	Potential Initial Cost: $2,016,000 Potential O&M Cost: - Potential Total: $2,016,000
VE Alternatives – Accepted with Modifications • Costed – 2; SS-05, AM-03	2	Potential Initial Cost: $13,096,000 Potential O&M Cost: - Potential Total: $13,096,000
VE Alternatives – Further Study • Costed – 4; PC-02, AM-08, SC-01, EC-05 • Not Costed – 2; SS-02, M-02	6	Potential Initial Cost: $9,664,000 Potential O&M Cost: - Potential Total: $9,664,000
VE Alternatives – Rejected • Costed – 6; SS-10, SS-13, SS-14, ME-02, AM-02, AM-04	6	Potential Initial Cost: $7,676,000 Potential O&M Cost: ($2,567,000) Potential Total: $5,109,000

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
PHASING							
PC-02	Haul Phase 3 excess excavation to Phase 4 off-road and pre-embank	-1.25	$512,000		$512,000	FS	Project team will continue to look for ways to temporarily stockpile material for Phase 4, closer to the project location.
PC-06	Combine Phases 3 and 5 into a single phase contract	3.75	$1,824,000		$1,824,000	A	Combining phases 3 and 5 works well with the timing of money and the phase 5 area staging works better than being a separate project. The acceptance of this will need to be ran through Regional management.
PC-04	Identify other work that can be done during Phase 3 - combine work	*DESIGN SUGGESTION*				A	This would be incorporated, especially for staging of Phase 5, if PC-06 is not accepted.
STRUCTURES							

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
SS-05	Use narrower bridge structure cross-sections to reduce shoulder width	0.83	$3,840,000		$3,840,000	AM	We would narrow bridges that would not be used for construction staging and did not have barrier within the proximity of the structure.
SS-10	Use beveled ends at arches for wildlife in lieu of walls	1.25	($2,764,000)		($2,764,000)	R	Idea results in an increase of cost.
SS-13	Use a Design-Build element within the Design-Bid-Build contract for the wildlife structures	0.83	$500,000		$500,000	R	The cost decrease does not justify the functional/performance improvement and the timing of a design-build component doesn't line up with anticipated beginning of construction of the overcrossing structures.
SS-14	Use bridges in lieu of culverts where possible	0.83	($2,549,000)		($2,549,000)	R	Not recommended by the VE team.

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
ME-02	Reduce the height of walls 1 and 2 in Phase 5	3.75	$5,357,000		$5,357,000	R	The option developed during the VE Study was determined to be a fatal flaw from our Geotechnical office's opinion. However, we will continue to seek an alternative to reduce the heights of MSE walls.
SS-02	Optimize the length and depth of bridges	*DESIGN SUGGESTION*				FS	We will continue to work with our Bridge and Structures office to maximize the design of these structures.
ROADWAY							
AM-02	Use Hot Mix Asphalt (HMA) in lieu of concrete for shoulders	-2.08	$4,047,000	($2,567,000)	$1,480,000	R	The cost savings of this idea does not exceed the benefit of not impacting the traveling public in the years

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
							proceeding construction.
AM-03	Use four-foot inside shoulders in lieu of ten-foot	1.25	$9,256,000		$9,256,000	AM	The project team will look into adopting this idea in areas that do not have concrete barrier and when these areas are not used for staging purposes.
AM-04	Use eight-foot outside shoulders in lieu of ten-foot	1.25	$3,085,000		$3,085,000	R	The location of this project and the percentages of trucks that use this facility do not lend its self to using 8' shoulders. There is a need to maintain a breakdown area, provide emergency vehicle access area, provide for snow removal activities, and to maintain route continuity .

13

SD.5.13

Median Crossover

Approval

Nov 19, 2020

LeRoy Patterson
WSDOT HQ Development Division
Highway Access Control & Hearings Manager

From:	Patterson, LeRoy
To:	King, Kenny
Cc:	Washabaugh, Robert; Byrd, Andrew; Roos, Matthew; Doolin, Jeanne
Subject:	RE: XL5479 - I-90 Phase 3 Median Crossover Request docs
Date:	Thursday, November 19, 2020 9:31:55 AM
Attachments:	ARA_Median Crossover Memo_Final.pdf XL5479_Median_Crossovers.pdf I90Ph3AccessRequestChecklist.xlsx

---

Kenny,

After reviewing the attached request to relocate the two exciting median crossovers on SR 90 at MP 67.60 and MP 69.30 to the proposed new location MP 67.30 and MP 69.30, I see no reason to notmove forward.

These relocations have been approved by the Region and WSP and will be reflexed on the WSDOTmedian crossover master plan as being relocated as requested above.

With the above information the region will not need FHWA approval or any further approval for thisrequest it being part of a highway project "I-90 Phase 3" that will improve safety and mobility.

Any questions please let me know

Thank you

LeRoy Patterson
WSDOT HQ Development Division
Highway Access Control & Hearings Manager
Olympia, WA 360-705-7266
Web Site: Access & Hearings

From: King, Kenny <KingK@wsdot.wa.gov>
Sent: Monday, October 19, 2020 11:52 AM
To: Patterson, LeRoy <PatterL@wsdot.wa.gov>; Roos, Matthew <RoosM@wsdot.wa.gov>; Doolin, Jeanne <DoolinJ@wsdot.wa.gov>
Cc: Washabaugh, Robert <WashabR@wsdot.wa.gov>; Byrd, Andrew <ByrdA@wsdot.wa.gov>
Subject: XL5479 - I-90 Phase 3 Median Crossover Request docsLeRoy,

Please find attached documents for the median crossovers request for the I-90/Cabin Creek I/C to W. Easton I/C Phase 3 – Add Lanes/Wildlife Bridges project (XL5479).

Please let us know if you have any further questions.Thanks

Kenny King, P.E.
I-90 Design Squad SupervisorTransportation
Engineer 3
SCR - Project Development BranchUnion
Gap, WA kingk@wsdot.wa.gov
(509)577-1729

Washington State
Department of Transportation

Memorandum

October 15, 2020

TO: Leroy Patterson
HQ Access & Hearings Manager

WBW

THRU: Brian White, P.E.
SCR Assistant Regional Administrator for Construction and Design

FROM: Andrew Byrd, P.E. / Robert Washabaugh, P.E. RW
Development Branch Project Engineer / Assistant Development Branch Project Engineer

SUBJECT: I-90/Cabin Creek I/C to W. Easton I/C
Phase 3 – Add Lanes/Wildlife Bridges
Median Crossover Location Justification

The subject project will reconstruct I-90 and relocate the westbound lanes on Easton Hill from MP 67.4 to MP 69.5 to the current eastbound side of the hill. There are two existing median crossovers within this area that will need to be relocated and reconstructed for the new I-90 roadway. This Memo is to request permission to replace the two existing median crossovers as described below. I-90 is established as a fully-controlled limited access highway and these median crossovers will not change the access control.

The existing median crossovers are located at MP 67.6 and MP 69.3 and cannot be utilized after the project is completed due to alignment changes and reconstruction of the roadway. SCR Maintenance has requested that new crossovers be located at the top and bottom of Easton Hill for ease of winter operations and detour needs in an emergency. The new median crossover locations are at MP 67.3 and MP 69.3, which is 1380 ft and 105 ft west of the existing median crossover locations respectively. Maintenance supports these locations as currently designed. The design speed thru this area will be 65 mph at the top of Easton Hill and 70 mph at the bottom.

The two new median crossovers will improve the conditions and safety for the traveling public and maintenance personnel by providing longer acceleration and deceleration lanes and improved sight distance. The new median crossovers will be designed and constructed using current WSDOT Design Manual guidance.

AB:jr
Attachment: I-90 Ph3 Access Request Checklist Spreadsheet

cc: Mike Krahenbuhl, Area 1 maintenance Superintendent
Project File

South Central Region/Project Development Branch Request

Complete

Access Description	SR I-90 - MP 67.3 and 69.3 - I-90/Cabin Cr I/C to W Easton I/C Phase 3 - Add Lanes/Wildlife Bridges - Maintenance Crossover

Instructions	In support of a revision to limited access request (break, inner corridor access, relocation, etc.), proceed through this worksheet. Supporting documents needed to fill out the following should be submitted in the request package. After you are satisfied with your responses, enter your contact information at the end of the sheet. This attests to the accuracy of the information, to the best of your knowledge, and region concurrence and support for the request.

Break/Revision Type	Maintenance Crossover
State Route	I-90
Milepost	67.3 and 69.3
Project Title	I-90/Cabin Cr I/C to W Easton I/C Phase 3 - Add Lanes/Wildlife Bridges
Customer	WSDOT

1. **What charge code should be used for this work?**

   XL 5497

2. **Identify access stations and offsets below or provide a plan display showing the locations.**

   I-90 Stations LE 1842+25 and LE 1945+93. See attached Vicinity Map.

3. **Describe the activities requiring an access break or inner corridor access.**

   Maintenance activities, snow plow turn around, u-turn route during extended pass closures, emergency vehicle turn around, state patrol access, etc.

4. **Why is this access break or inner corridor access the best alternative?**

   The two median crossover locations are at the top and bottom of Easton hill which is ideal for winter plowing activities and potential pass closures to enable traffic to detour from either direction. These locations are also in areas where there is adequate median width to store a full size commercial truck and are in relatively straight sections of the interstate.

5. **What types of impacts could the access break or inner corridor access create and how will they be mitigated?**

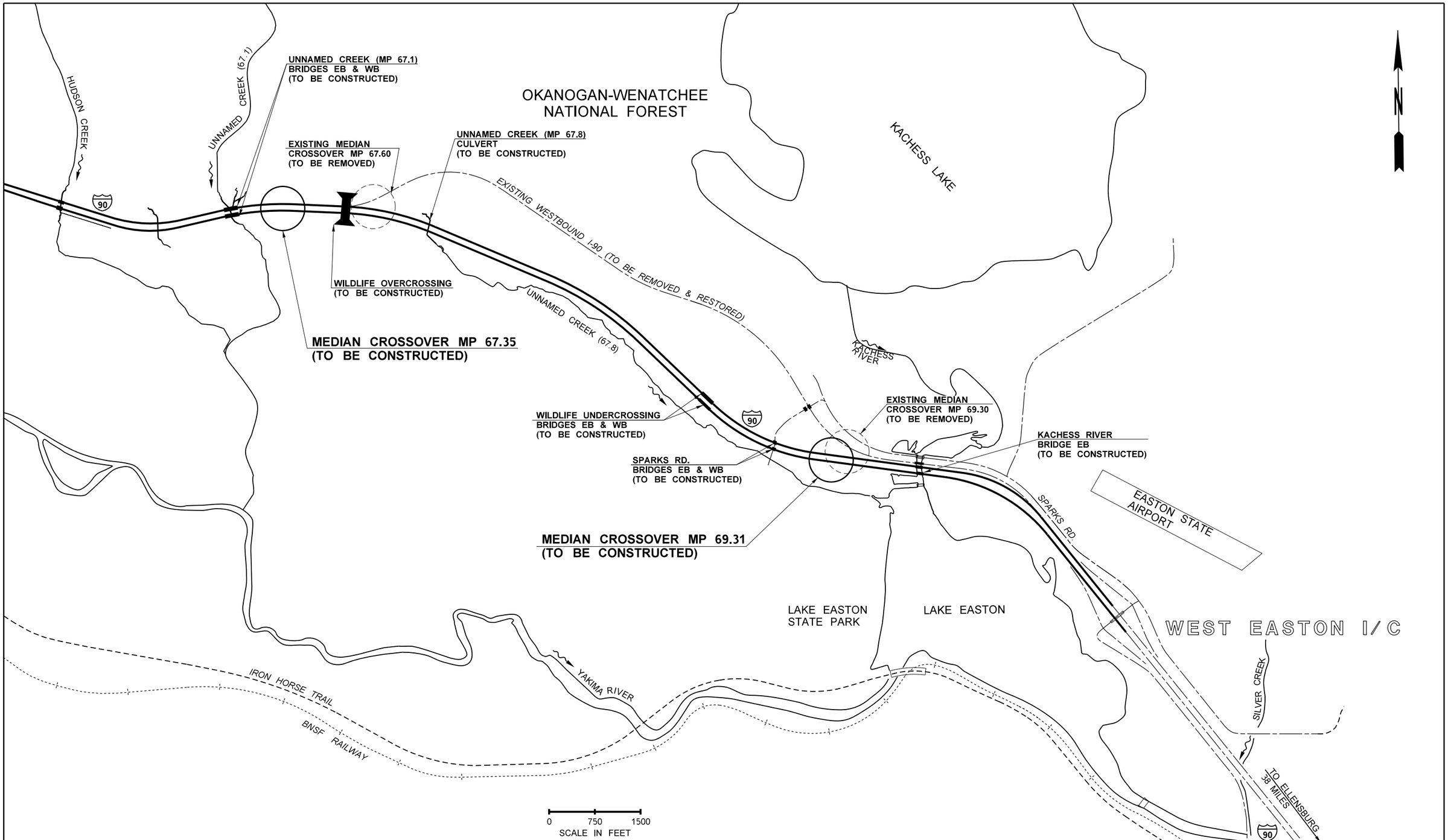
   Impacts to access will be no more than existing.

Access Questions
6. What is the anticipated start date and duration? During construction of the subject project and indefinitely thereafter as this is a permanent median crossover.
7. Will work activities cause equipment, material, or personnel to cross the limited access hachures? No
8. Will the work area be accessed directly from mainline or a ramp? (this does not including traffic control activities) Yes
9. Will any existing fencing be affected? No
10. Skip this question
11. Does this access request fall within interstate right of way? Yes
12. Does this request require Traffic Control Plans? Yes
13. Do approved Traffic Control Plans exist and are they included with this request package? Yes
14. Do traffic control activities reduce a lane on mainline or on a ramp? (this does not include rolling slowdowns) Yes
15. Are property rights (deeds) or value determination associated with this break request? No
16. Skip this question
17. Is this request associated with any of the following use and occupancies: permit, franchise, agreement or lease? No
18. Skip this question
19. Skip this question
20. Skip this question
21. Is this break request for a trail that is part of an approved comprehensive trail plan? No
22. What type of access is being requested? Permanent
23. Have right of way/limited access plan revisions (red and greens) been prepared and included as an attachment? Not Applicable
24. For activities within WSDOT right of way, does the design meet or exceed current applicable WSDOT standards? Yes
25. Is any construction involved with this request? Yes
26. Have you provided plan sheet(s) showing the nature and location of construction activities? Yes

	List attachments that have been provided for this request. Simple, meaningful document names are preferred.
1.	Vicinity Map
2.	Median Crossover Plan View
3.	Median Crossover Section View
4.	Traffic Control Plan Plan
5.	
6.	
7.	
8.	
9.	
10.	

The Environmental worksheet must be completed by your region's Environmental Manager (or designee) prior to this access request checklist being submitted to the Highway Access Control and Hearings Office.

WSDOT representative responsible for this request package. **This person has verified Region concurrence for this request.**	
Name	Andrew Byrd / Kenny King
Title	Project Engineer / I-90 Squad Supervisor
Region/Office	South Central Region/Project Development Branch
Date Completed	9/23/2020
E-mail	byrda@wsdot.wa.gov / kingk@wsdot.wa.gov
Phone	(509)577-1631 / (509)577-1729



FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\250-PavingPlan\Median Crossover\Vic_map.dgn						
TIME	1:02:05 PM			REGION NO. 10	STATE WASH	FED.AID PROJ.NO.	
DATE	9/23/2020						
PLOTTED BY	richajr			JOB NUMBER			
DESIGNED BY							
ENTERED BY							
CHECKED BY				CONTRACT NO.		LOCATION NO.	
PROJ. ENGR.							
REGIONAL ADM.		REVISION	DATE	BY			

P.E. STAMP BOX DATE

P.E. STAMP BOX DATE

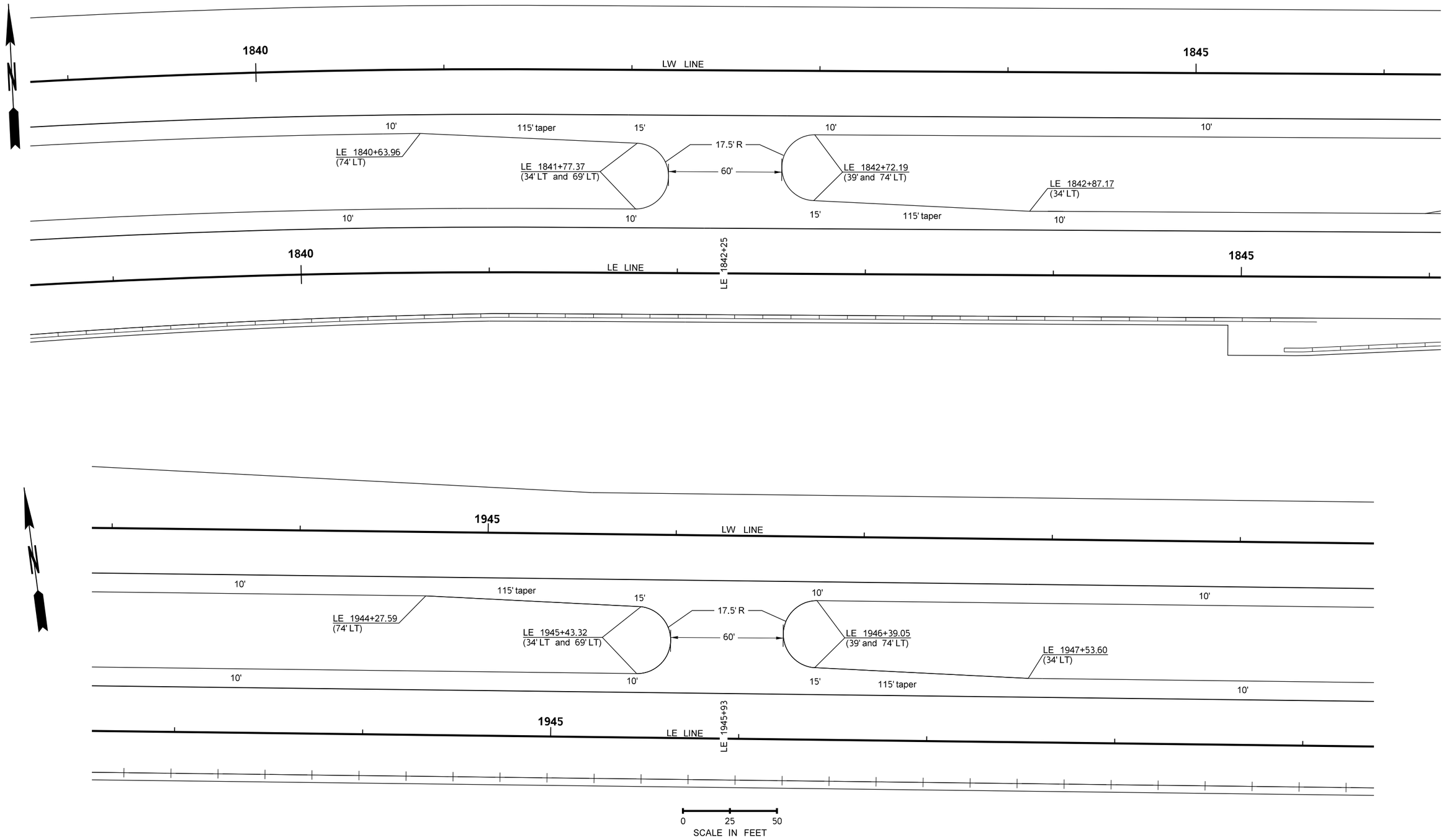
Washington State
Department of Transportation

I-90
CABIN CREEK I/C TO W. EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES

VICINITY MAP

Plot 1
PLAN REF NO

SHEET
OF
SHEETS



FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\250-PavingPlan\Median Crossover\Median Crossovers.dgn							
TIME	3:49:40 PM				REGION NO. 10	STATE WASH	FED.AID PROJ.NO.	
DATE	9/23/2020							
PLOTTED BY	Beckerl				JOB NUMBER			
DESIGNED BY								
ENTERED BY								
CHECKED BY					CONTRACT NO.		LOCATION NO.	
PROJ. ENGR.								
REGIONAL ADM.		REVISION	DATE	BY				

P.E. STAMP BOX DATE

P.E. STAMP BOX DATE

Washington State Department of Transportation

I-90

CABIN CREEK I/C TO W. EASTON I/C

PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES

MEDIAN CROSSOVER PLAN VIEW

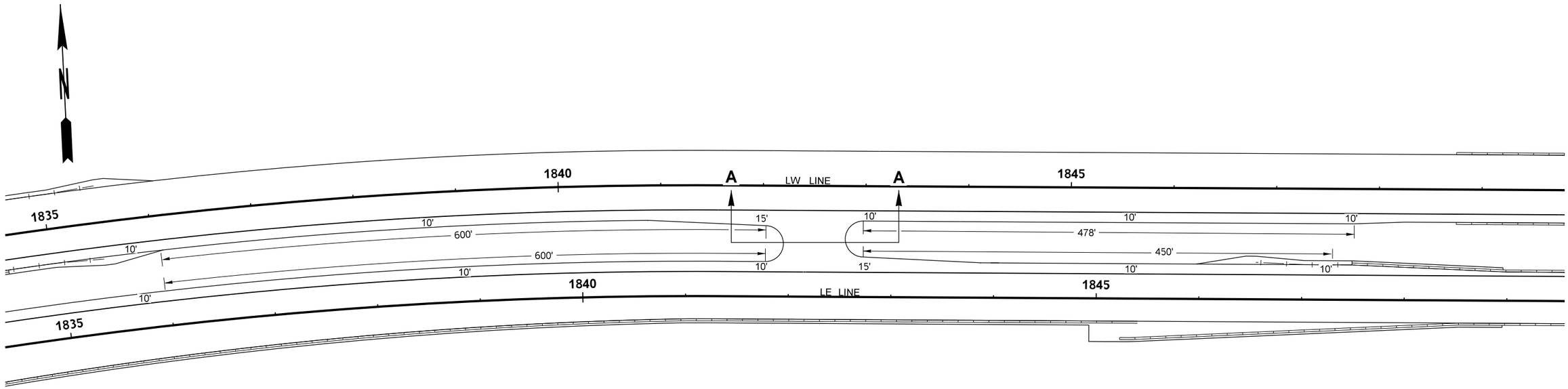
Plot 1

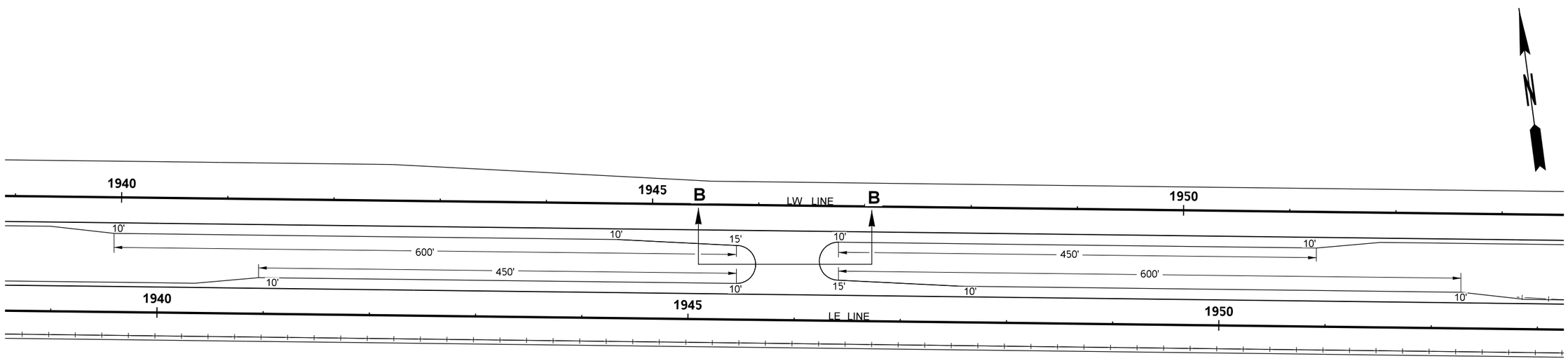
PLAN REF NO

SHEET

OF

SHEETS





0 50 100
SCALE IN FEET

FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\250-PavingPlan\Median Crossover\Median Crossovers.dgn					
TIME	2:04:47 PM			REGION NO. 10	STATE WASH	FED.AID PROJ.NO.
DATE	9/23/2020					
PLOTTED BY	Beckerl			JOB NUMBER		
DESIGNED BY						
ENTERED BY						
CHECKED BY				CONTRACT NO.		LOCATION NO.
PROJ. ENGR.						
REGIONAL ADM.		REVISION	DATE	BY		

P.E. STAMP BOX DATE

P.E. STAMP BOX DATE

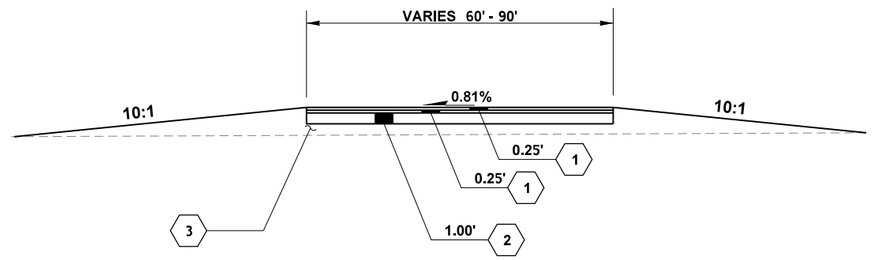
Washington State
Department of Transportation

I-90
CABIN CREEK I/C TO W. EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES

MEDIAN CROSSOVER PLAN VIEW

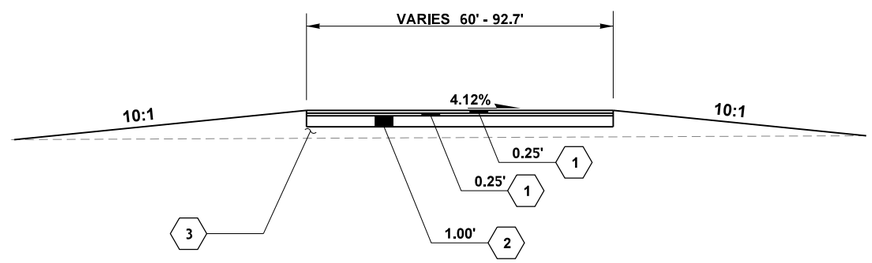
Plot 2
PLAN REF NO

SHEET
OF
SHEETS



SECTION A-A

(NOT TO SCALE)



SECTION B-B

(NOT TO SCALE)

LEGEND

1. HMA CL. 3/8 IN PG 64H-28
2. CRUSHED SURFACING BASE COURSE
3. EMBANKMENT COMPACTION

FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\250-PavingPlan\Median Crossover\Median Crossovers.dgn					
TIME	12:20:42 PM			REGION NO. 10	STATE WASH	FED.AID PROJ.NO.
DATE	9/23/2020					
PLOTTED BY	richajr			JOB NUMBER		
DESIGNED BY						
ENTERED BY						
CHECKED BY				CONTRACT NO.		LOCATION NO.
PROJ. ENGR.						
REGIONAL ADM.		REVISION	DATE	BY		

P.E. STAMP BOX DATE

P.E. STAMP BOX DATE

Washington State Department of Transportation

I-90
CABIN CREEK I/C TO W. EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES

MEDIAN CROSSOVER SECTION VIEW

Plot 3

PLAN REF NO

SHEET OF SHEETS

MINIMUM LANE CLOSURE TAPER LENGTH = L (feet)										
LANE WIDTH (feet)	Posted Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
10	105	150	205	270	450	500	550	-	-	-
11	115	165	225	295	495	550	605	660	-	-
12	125	180	245	320	540	600	660	720	780	840
MINIMUM SHOULDER TAPER LENGTH = L/3 (feet)										
SHOULDER WIDTH (feet)	Posted Speed (mph)									
	25	30	35	40	45	50	55	60	65	70
8'	40	40	60	90	120	130	150	160	170	190
10'	40	60	90	90	150	170	190	200	220	240
USE A MINIMUM 3 DEVICES TAPER FOR SHOULDER LESS THAN 8'.										

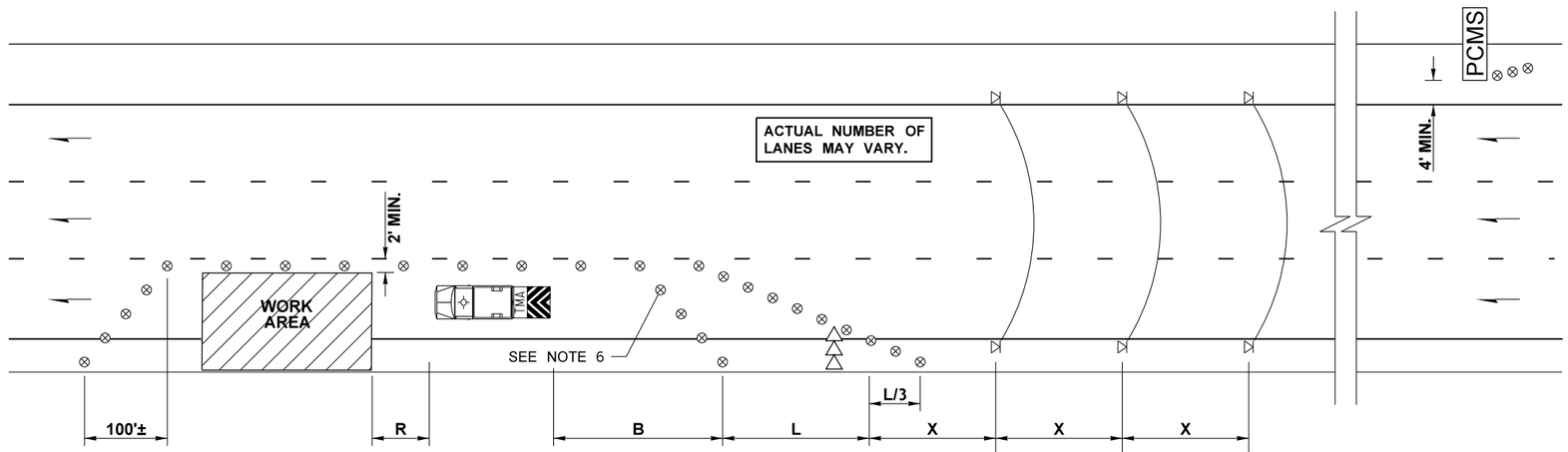
SIGN SPACING = X (1)		
FREEWAYS & EXPRESSWAYS	55 / 70 MPH	1500' ±
RURAL HIGHWAYS	60 / 65 MPH	800' ±
RURAL ROADS	45 / 55 MPH	500' ±
(1) ALL SPACING MAY BE ADJUSTED TO ACCOMMODATE INTERCHANGE RAMPS AT GRADE INTERSECTION AND DRIVEWAYS.		

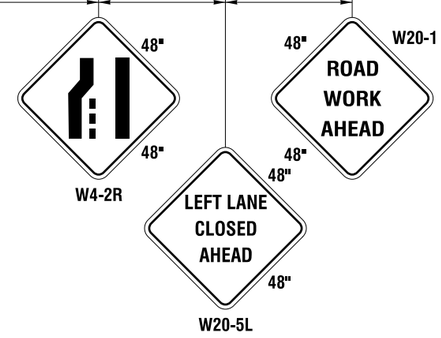
CHANNELIZATION DEVICE SPACING (feet)		
MPH	TAPER	TANGENT
50/70	40	80
35/45	30	60
25/30	20	40

BUFFER DATA										
LONGITUDINAL BUFFER SPACE = B										
SPEED (MPH)	25	30	35	40	45	50	55	60	65	70
LENGTH (feet)	155	200	250	305	360	425	495	570	645	730
TRANSPORTABLE ATTENUATOR ROLL AHEAD DISTANCE = R										
HOST VEHICLE WEIGHT 9,900 TO 22,000 lbs.			HOST VEHICLE WEIGHT > 22,000 lbs.							
< 45 MPH	45-55 MPH	> 55 MPH	< 45 MPH	45-55 MPH	> 55 MPH					
100'	123'	172'	74'	100'	150'					
PROTECTIVE VEHICLE (WORK VEHICLE) = R										
NO SPECIFIED DISTANCE REQUIRED										

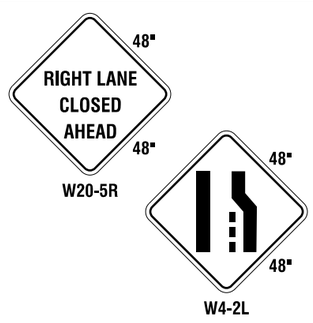
PCMS	
1	2
LEFT LANE CLOSURE	ONE MILE AHEAD
2.0 SEC	2.0 SEC

FIELD LOCATE 1 MILE (±) IN ADVANCE OF LANE CLOSURE





FOR USE DURING RIGHT LANE CLOSURE



PCMS	
1	2
RIGHT LANE CLOSURE	ONE MILE AHEAD
2.0 SEC	2.0 SEC

FIELD LOCATE 1 MILE (±) IN ADVANCE OF LANE CLOSURE

LEGEND

- TEMPORARY SIGN LOCATION
- TRAFFIC SAFETY DRUM
- SEQUENTIAL ARROW SIGN
- PCMS — PORTABLE CHANGEABLE MESSAGE SIGN
- TRANSPORTABLE ATTENUATOR

SINGLE-LANE CLOSURE FOR MULTI-LANE ROADWAYS

NOT TO SCALE

NOTES:

1. SEE SPECIAL PROVISIONS FOR WORK HOUR RESTRICTIONS.
2. ALL SIGNS SHALL BE BLACK ON ORANGE REFLECTIVE BACKGROUND UNLESS OTHERWISE NOTED.
3. ALL SIGNS ARE CLASS "B" UNLESS OTHERWISE NOTED.
4. NO FLAGGERS OR SPOTTERS.
5. DEVICES SHALL NOT ENCROACH INTO THE ADJACENT LANE. IF ENCROACHMENT IS NECESSARY, LANE SHALL BE CLOSED.
6. USE TRANSVERSE DEVICE IN CLOSED LANE EVERY 1,000' +/-.
7. EXTEND DEVICE TAPER AT L/3 ACROSS SHOULDER.
8. SIGNS SHALL BE GATED (MOUNT SIGN ON BARRIER WHEN PRESENT).
9. DEVICE SPACING FOR DOWNSTREAM TAPER SHALL BE 20'.

FILE NAME	K:\452201\090\06736_Phase 3\Design_CAD_Sheets\410-WZTCPlan\XL5479_PS_TC.dgn						
TIME	1:09:33 PM						
DATE	9/23/2020						
PLOTTED BY	richajr						
DESIGNED BY	B. SCHILPEROORT						
ENTERED BY	N. KOTLARZ						
CHECKED BY	K. KING						
PROJ. ENGR.	A. BYRD						
REGIONAL ADM.	T. TREPANIER	REVISION	DATE	BY			

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	
JOB NUMBER 19Y006		
CONTRACT NO.		LOCATION NO.

P.E. STAMP BOX — DATE

P.E. STAMP BOX — DATE

Washington State Department of Transportation

I-90
CABIN CREEK I/C TO W. EASTON I/C
PHASE 3 - ADD LANES/BUILD WILDLIFE BRIDGES

TRAFFIC CONTROL PLAN

Plot 2

PLAN REF NO TCP2

SHEET OF SHEETS

SD.5.21

Transportation Technical Update

NEPA Reevaluation for Phases 3, 4, and 5 of the I-90 Snoqualmie Pass East Project

February 22, 2018

Jared Doll/Todd Daley, P.E., SCR Traffic Office Manager

Washington State Department of Transportation

Transportation Technical Update

Subject:	Transportation Technical Update in support of the NEPA Reevaluation for Phases 3, 4 and 5 of the Interstate 90 Snoqualmie Pass East Project
Date:	February 22, 2018
Author:	Jared Doll, SCR Traffic Office
Approving Manager:	Todd Daley, P.E., SCR Traffic Office Manager

Introduction

This technical update supports the National Environmental Policy Act (NEPA) Reevaluation[1] for Phases 3, 4 and 5 of the Washington State Department of Transportation (WSDOT) Interstate 90 (I-90) Snoqualmie Pass East Project, (I-90 project)[2].

This Transportation Technical Update only updates the transportation elements that have changed since the Transportation Discipline Report was prepared for the Interstate 90 (I-90) Snoqualmie Pass East Project (I-90 project) 2008 Final Environmental Impact Statement (EIS). This analysis reviews the design modifications of Phases 3, 4 and 5 with current policies and conditions, compares the results with the 2008 FEIS, and determines what effects the design modifications have on the validity of the existing environmental documentation.

Project History

Following the 2008 Record of Decision (ROD) by FHWA and Final EIS concurrence from Cooperating agencies, WSDOT proceeded with construction of the Select Alternative for the 15-mile project in multiple phases. WSDOT has completed Phase 1B and is currently constructing Phases 1C and 2A consisting of the first seven miles, from Hyak (MP 55.1) to Price Creek vicinity (MP 62) with an anticipated completion date of fall 2018. This analysis focuses on the remaining eight 8.3 miles (Phases 3, 4 and 5) of the I-90 project (*Attachment A*).

The remainder of the project has been separated into the following phases:

Phase 3 – located between MP 67.4 to MP 70.3 with construction starting in 2021
Phase 4 – located between MP 62 to MP 64.5 with construction starting in 2022
Phase 5 – located between Phase 3 and Phase 4 with construction starting in 2026

[1] NEPA reevaluations are required under federal regulations 23 CFR §771.129.

[2] Additional information on the I-90 project can be found in the 2008 Final EIS.

Changes from the 2008 Transportation Disciple Report

Crash History for the Highway

Crashes data was updated for the period between July 1st, 2006 and July 1st, 2016. During that period, there were 1,421 reported crashes:

- 783 (55 percent) occurred during inclement weather
- 704 (50 percent) occurred where the highway was straight
- 707 (50 percent) occurred where the highway was curved
- 182 (13 percent) involved overturned vehicles
- 65 (5 percent) involved wildlife

Many of these crashes occurred for more than one reason, such as an overturned vehicle on a curve during inclement weather. The highest number of crashes occurred during inclement weather when the highway was wet or covered with slush, snow, or ice. The data on crashes where the highway is curved or straight is somewhat speculative, because loss of control may begin somewhere before the crash site.

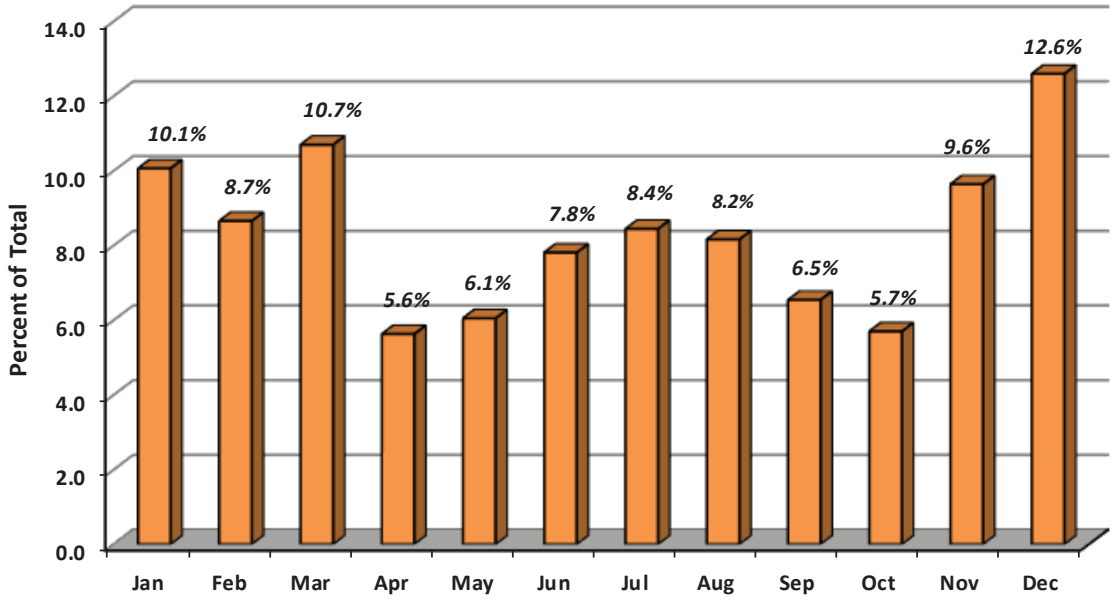
Other factors contributing to crashes include the time of day, day of the week, and month of year. Nearly 62 percent of the total reported crashes occurred between noon and midnight, approximately 30 percent between 6 am and noon, and 8 percent between midnight and 6 am. Roughly 48 percent occurred Monday through Thursday, and 52 percent Friday through Sunday. Approximately 18 percent occurred on a Friday. As shown in **Exhibit 1**, approximately 43 percent occurred during the summer (May through October), and 57 percent during the winter (November through April). Nearly 13 percent of the total crashes occurred during December.

Crash locations are fairly evenly distributed along the 15-mile project corridor; however, there are two general segments within Phases 3, 4 and 5 where crash numbers were slightly higher than the corridor average:

- ***Bonnie Creek to Swamp Creek (MP 61.5 to MP 63.0)*** is just west of the Stampede Pass interchange and has two lower design speed reverse curves
- ***Telephone Creek to Easton Hill (MP 66.0 to MP 70.0)*** is a relatively long segment characterized by fairly steep grades (four to five percent) and a mix of low and high design speed horizontal curves

Crash data involving wildlife is somewhat understated because wildlife crashes only include those crashes that were documented and reported by the Washington State Patrol, and/or had WSDOT involvement in road kill removal.

Exhibit 1: Crashes by Month



Traffic Volumes

Methods Used to Assess Traffic Volumes

Traffic volumes were updated by selecting 2016 as the base year and a design year of 2041. This section discusses the criteria used to evaluate traffic volumes.

Design Hour

The directional design hour volume (DDHV) is an estimate of the peak hour volume (PHV) in the peak direction on a given highway. The design hour volume (DHV) used for highway design should be in the range between the 30th and the 100th highest peak hour volumes. When selecting the DHV, a graph of the 200 highest hours should be developed. Using the graph of the 200th highest PHVs generated from automatic counters at the Cabin Creek Interchange in 2015, WSDOT chose the 30th highest PHV (3,900 vehicles per hour) as the DHV. WSDOT used the previously determined value for AADT and derived values K (proportion of AADT occurring in the peak hour) and DHV (proportion of AADT occurring in the peak direction), based on the relationship between the DHV and the AADT, to derive the DDHV used for capacity analyses. From the automatic traffic counts, WSDOT determined that 90 percent of the 200 highest hour volumes were on weekends or holidays.

Traffic Growth Rate

Traffic volumes on I-90 are currently estimated to increase at a rate of 1 percent per year.

During preparation of the Draft EIS in June 2005, WSDOT estimated annual average daily traffic (AADT) for the highway to be 28,100 vehicles. Traffic growth rates were estimated for the Draft EIS, using a base year of 2008 and a design year of 2028. At that time, WSDOT calculated the estimated AADT for the design year of 2028 to be 55,500, and annual traffic growth rate to be 3.5 percent. In February 2007, WSDOT revised traffic growth projections to 2.1 percent per year, using a base year of 2010 and a design year of 2030. In July 2016, WSDOT revised traffic growth projections to 1 percent per year, using 20 years of data from the automatic traffic counter at Cabin Creek (MP 63.98), to provide historical trends (**Exhibit 2A**).

Exhibit 2A: Annual Average Daily Traffic volumes

Analysis Year	Base Year	Design Year	Growth Rate	Base Year AADT	Design Year AADT
2005	2008	2028 (20 years)	3.5	28,100	55,500
2008	2010	2030 (20 years)	2.1	29,800	41,200
2016	2016	2041 (25 years)	1.0	30,482	39,300

Traffic volumes already exceed the highway's design capacity during peak travel periods. Traffic volume in the project area is higher during the daylight hours and on weekends, when volumes can reach 37,000 vehicles per day (**Exhibit 2B**) (WSDOT 2014b). Traffic volume is also much higher during the summer than during the winter (**Exhibit 3**). The worsening traffic situation may lead to an increase in travel times, the numbers of crashes, and adverse economic impacts.

Exhibit 2B: Daily Traffic Volumes – 2014 Yearly Average

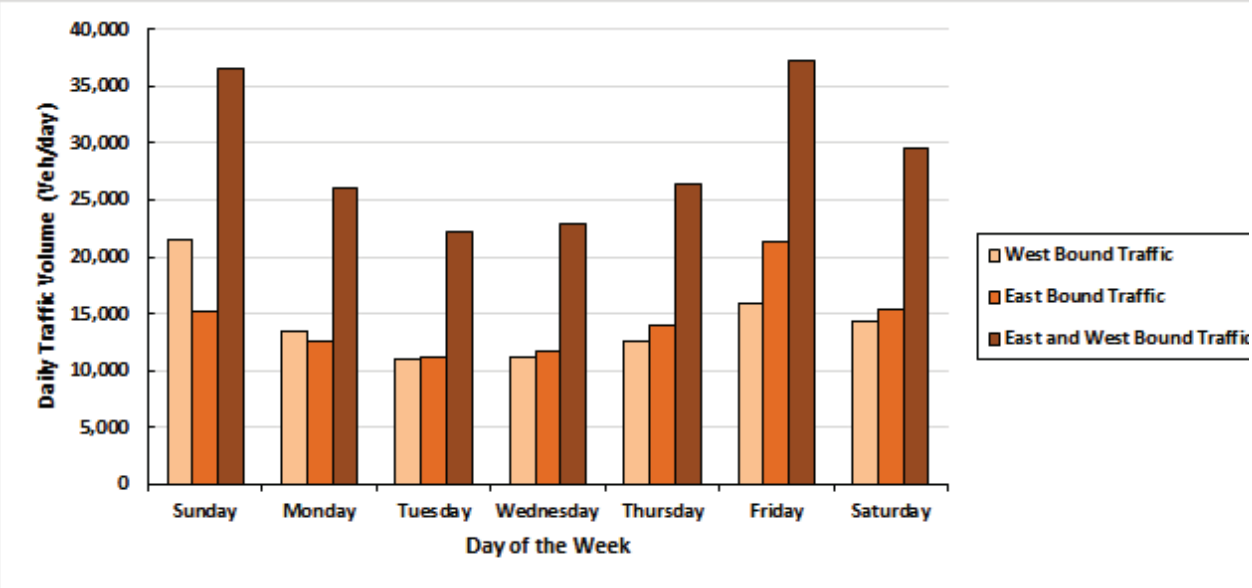
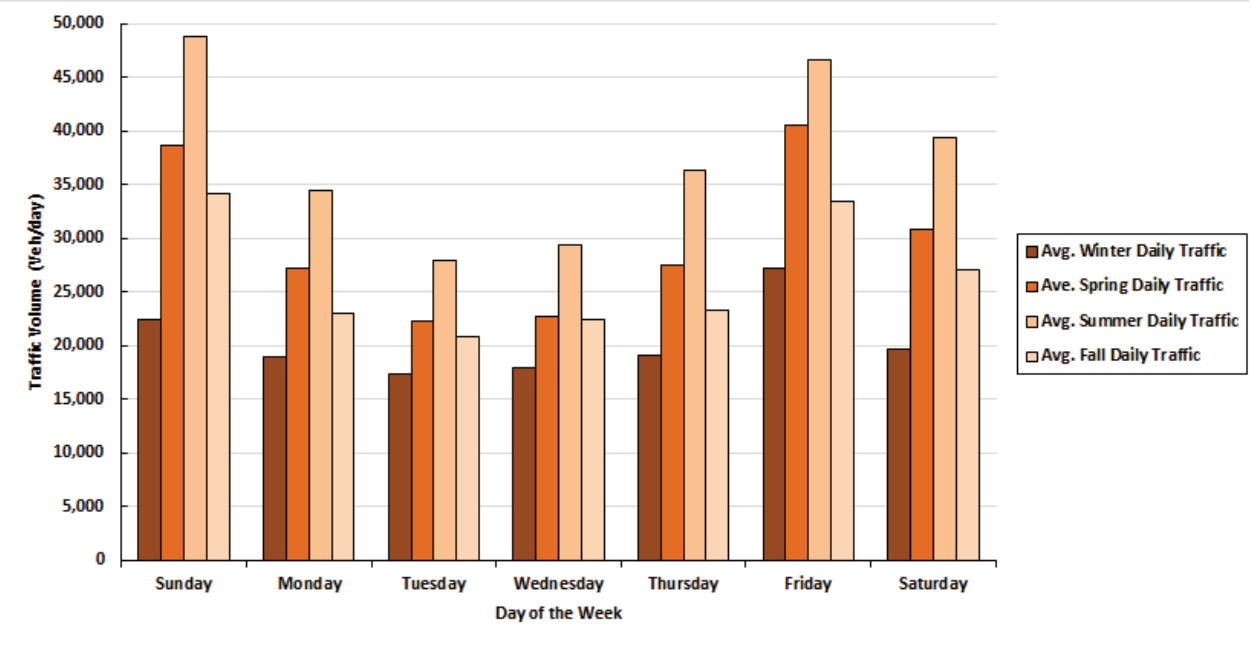


Exhibit 3 : Seasonal Traffic Variation – 2015 Weekly Average



Heavy Vehicle Factor

Freeway traffic volumes that include a mix of vehicle types must be adjusted to an equivalent flow rate expressed in passenger cars per hour per lane (pc/hr/ln). This adjustment is made using the heavy vehicle factor. Adjustments for heavy vehicles in the traffic stream account for three vehicle types: trucks, buses, and RVs. Trucks and buses are typically treated identically as there is no distinct difference in their performance (TRB 2000). Converting heavy vehicles to equivalent passenger cars is especially important when analyzing sections of highway with grades.

According to the 30th peak hour data collected from permanent traffic recorder S903 (Cabin Creek Interchange, MP 63.98), the average between 2010 and 2015 is approximately 10 percent heavy vehicles. Recreational vehicles, buses, and single unit trucks with 2 or more axles and 6 or more tires accounted for 4.4 percent of the 10 percent heavy traffic during peak hour.

Level of Service (LOS)

I-90 currently operates with two lanes in each direction in the project area except between MP 66.0 and MP 69.3, where there is a third truck climbing lane in the uphill (westbound) direction. On major holiday weekends, the existing highway can operate at or near capacity. Traffic analyses indicate that without improvements, the existing highway would generally operate at LOS (level of service) C or better in the base year 2015 (**Exhibit 4**).

The volume to capacity ratio for all two-lane segments is 0.70 or higher. A volume to capacity ratio of 1.0 means that the highway is at capacity, and generally indicates an LOS of E. Ratios of 0.60-0.90 are generally associated with LOS C or D and indicate acceptable service. The ratios for I-90 are within this range; however, these are average values, and I-90 experiences much higher than average volumes on weekends and holidays. During peak periods, the volume to capacity ratio is likely to be at or above 1.0.

Exhibit 4: Base Year 2015 Level of Service

Direction of Travel and Location (MP)	Assumed Free Flow Speed (mph)	Number of Lanes in each Direction	Terrain Type	Roadway Density (pc/mi/ln)[1]	LOS	Volume to Capacity Ratio
EB 62.00 to 66.20	70	2	Rolling	21.8	C	0.75
EB 66.20 to 67.00	70	3	Rolling	14.3	B	0.50
EB 67.00 to 67.50	70	2	Rolling	21.8	C	0.75
EB 67.50 to 69.50	70	2	Down Grade	20.0	C	0.70
EB 69.50 to 70.30	70	2	Level	20.0	C	0.70
WB 62.00 to 67.10	70	2	Rolling	21.8	C	0.75
WB 67.10 to 67.50	70	3	Rolling	14.3	B	0.50
WB 67.50 to 69.30	70	3	Up Grade	16.0	B	0.56
WB 69.30 to 70.30	70	2	Level	20.0	C	0.70

[1] *passenger cars per mile per lane*

No-Build LOS

The No-Build Alternative would not improve the capacity of the existing highway, which would continue to operate with two or three lanes in each direction and LOS would continue to degrade. Design year (2041) LOS under the No-Build Alternative is shown in **Exhibit 5**.

By 2030, without improvements, highway operations would degrade to LOS D, or close to capacity, and would continue to operate at that level until 2050. By 2065, highway operations would degrade to LOS F, when forecast demand exceeds capacity. Future year LOS degradation without improvements is based on analyses using a two-lane section in rolling terrain.

Exhibit 5: No Build Design Year 2041 LOS

Direction of Travel and Location (MP)	Assumed Free Flow Speed (mph)	Number of Lanes in each Direction	Terrain Type	Roadway Density (pc/mi/ln)[1]	LOS	Volume to Capacity Ratio
EB 62.00 to 66.20	70	2	Rolling	31.2	D	0.98
EB 66.20 to 67.00	70	3	Rolling	18.8	C	0.66
EB 67.00 to 67.50	70	2	Rolling	31.2	D	0.98
EB 67.50 to 69.50	70	2	Down Grade	27.6	D	0.91
EB 69.50 to 70.30	70	2	Level	27.6	D	0.91
WB 62.00 to 67.10	70	2	Rolling	31.2	D	0.98
WB 67.10 to 67.50	70	3	Rolling	18.8	C	0.66
WB 67.50 to 69.30	70	3	Up Grade	21.3	C	0.74
WB 69.30 to 70.30	70	2	Level	27.6	D	0.91

[1] *passenger cars per mile per lane*

Build LOS

If the project is built, the highway will operate with three lanes in each direction. Auxiliary truck climbing lanes will be constructed where warranted. Truck climbing lanes are proposed between MP 66.2 and MP 67.7 in the eastbound direction and between MP 66.6 and MP 69.3 in the westbound direction. Highway capacity will be increased, and the highway will operate at LOS C or better through the design year (2041) (**Exhibit 6**). Highway operations in 2015 assume widening throughout the project corridor.

Highway operations under the build scenario will maintain a LOS C or above until more than 30 years following the design year of 2041. Future year LOS degradation with improvements is based on analyses using a three-lane section in rolling terrain.

Exhibit 6: Build LOS by Year of Opening

Direction of Travel Location (MP)	Number of Lanes in each Direction	Terrain Type	Roadway Density (pc/mi/ln)[1]	LOS	Volume to Capacity Ratio
Estimated Year of Opening 2025					
EB 62.0 to 66.1	3	Rolling	16.1	B	0.56
EB 66.1 to 67.7	4	Rolling	12.1	B	0.42
EB 67.7 to 69.5	3	Down Grade	14.9	B	0.52
EB 69.5 to 70.3	3	Level	14.9	B	0.52
WB 62.0 to 66.6	3	Rolling	16.1	B	0.56
WB 66.6 to 67.5	4	Rolling	12.1	B	0.42
WB 67.5 to 69.5	4	Up Grade	13.5	B	0.47
WB 69.5 to 70.3	3	Level	14.9	B	0.52
Estimated Year of Opening 2030					
EB 62.0 to 66.1	3	Rolling	16.9	B	0.59
EB 66.1 to 67.7	4	Rolling	12.7	B	0.44
EB 67.7 to 69.5	3	Down Grade	15.7	B	0.55
EB 69.5 to 70.3	3	Level	15.7	B	0.55
WB 62.0 to 66.6	3	Rolling	16.9	B	0.59
WB 66.6 to 67.5	4	Rolling	12.7	B	0.44
WB 67.5 to 69.5	4	Up Grade	14.2	B	0.50
WB 69.5 to 70.3	3	Level	15.7	B	0.55
Estimated Year of Opening 2035					
EB 62.0 to 66.1	3	Rolling	17.7	B	0.62
EB 66.1 to 67.7	4	Rolling	13.3	B	0.47
EB 67.7 to 69.5	3	Down Grade	16.4	B	0.58
EB 69.5 to 70.3	3	Level	16.4	B	0.58
WB 62.0 to 66.6	3	Rolling	17.7	B	0.71
WB 66.6 to 67.5	4	Rolling	13.3	B	0.47
WB 67.5 to 69.5	4	Up Grade	14.9	B	0.52
WB 69.5 to 70.3	3	Level	16.4	B	0.58
Estimated Year of Opening 2041					
EB 62.0 to 66.1	3	Rolling	18.8	C	0.66
EB 66.1 to 67.7	4	Rolling	14.1	B	0.49
EB 67.7 to 69.5	3	Down Grade	17.4	B	0.61
EB 69.5 to 70.3	3	Level	17.4	B	0.61
WB 62.0 to 66.6	3	Rolling	18.8	C	0.66
WB 66.6 to 67.5	4	Rolling	14.1	B	0.49
WB 67.5 to 69.5	4	Up Grade	15.8	B	0.55
WB 69.5 to 70.3	3	Level	17.4	B	0.61

[1] *passenger cars per mile per lane*

Non-Motorized Facilities

No updates or changes were required since the 2008 Transportation Discipline Report.

Maintenance and Operations

No updates or changes were required since the 2008 Transportation Discipline Report.

Construction Impacts

No updates or changes were required since the 2008 Transportation Discipline Report.

Conclusion

Based on the information presented, Phases 3, 4 and 5 of the I-90 Project are consistent with the 2008 FEIS.

References

Transportation Research Board (TRB). 2000. *Highway Capacity Manual*.

Washington State Department of Transportation (WSDOT). 2014b. Unstable Slopes on I-90 Snoqualmie Pass, Re-assessment and Recommendations. A Report requested by the Governor of the State of Washington. January.

———. 2016. SCR Traffic Office, Traffic Growth Rate Memo.

SD.5.22

Value Engineering

Recommendation

Approval Form

July 9, 2018

Andrew Byrd, P.E

Project Development Branch

Project Engineer

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
PHASING							
PC-02	Haul Phase 3 excess excavation to Phase 4 off-road and pre-embank	-1.25	$512,000		$512,000	FS	Project team will continue to look for ways to temporarily stockpile material for Phase 4, closer to the project location.
PC-06	Combine Phases 3 and 5 into a single phase contract	3.75	$1,824,000		$1,824,000	A	Combining phases 3 and 5 works well with the timing of money and the phase 5 area staging works better than being a separate project. The acceptance of this will need to be ran through Regional management.
PC-04	Identify other work that can be done during Phase 3 - combine work	*DESIGN SUGGESTION*				A	This would be incorporated, especially for staging of Phase 5, if PC-06 is not accepted.
STRUCTURES							

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
SS-05	Use narrower bridge structure cross-sections to reduce shoulder width	0.83	$3,840,000		$3,840,000	AM	We would narrow bridges that would not be used for construction staging and did not have barrier within the proximity of the structure.
SS-10	Use beveled ends at arches for wildlife in lieu of walls	1.25	($2,764,000)		($2,764,000)	R	Idea results in an increase of cost.
SS-13	Use a Design-Build element within the Design-Bid-Build contract for the wildlife structures	0.83	$500,000		$500,000	R	The cost decrease does not justify the functional/performance improvement and the timing of a design-build component doesn't line up with anticipated beginning of construction of the overcrossing structures.
SS-14	Use bridges in lieu of culverts where possible	0.83	($2,549,000)		($2,549,000)	R	Not recommended by the VE team.

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
ME-02	Reduce the height of walls 1 and 2 in Phase 5	3.75	$5,357,000		$5,357,000	R	The option developed during the VE Study was determined to be a fatal flaw from our Geotechnical office's opinion. However, we will continue to seek an alternative to reduce the heights of MSE walls.
SS-02	Optimize the length and depth of bridges	*DESIGN SUGGESTION*				FS	We will continue to work with our Bridge and Structures office to maximize the design of these structures.
ROADWAY							
AM-02	Use Hot Mix Asphalt (HMA) in lieu of concrete for shoulders	-2.08	$4,047,000	($2,567,000)	$1,480,000	R	The cost savings of this idea does not exceed the benefit of not impacting the traveling public in the years

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
							proceeding construction.
AM-03	Use four-foot inside shoulders in lieu of ten-foot	1.25	$9,256,000		$9,256,000	AM	The project team will look into adopting this idea in areas that do not have concrete barrier and when these areas are not used for staging purposes.
AM-04	Use eight-foot outside shoulders in lieu of ten-foot	1.25	$3,085,000		$3,085,000	R	The location of this project and the percentages of trucks that use this facility do not lend its self to using 8' shoulders. There is a need to maintain a breakdown area, provide emergency vehicle access area, provide for snow removal activities, and to maintain route continuity .

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
AM-08	Use composite concrete in lieu of standard Portland Cement Concrete Pavement (PCCP)	3.33	$6,932,000		$6,932,000	FS	We will present idea to State Materials Engineer.
M-02	Use performance specification for concrete roadway to improve longevity	*DESIGN SUGGESTION*				FS	We will look into this further.
STAGING							
SC-01	At truck climbing lanes eastbound, build full depth shoulders for truck usage to eliminate the truck climbing lane in Phase 5	2.08	$220,000		$220,000	FS	We will look into ways to eliminate the 4th lane of travel for the EB direction. Not sure if it will be a hard running shoulder or not.
SC-05	In Phase 5, eliminate bifurcation of lanes in Stages 1 and 3	1.67	$192,000		$192,000	A	This has already been addressed and accepted.
CONSTRUCTION							
EC-05	Provide an opportunity to use recycled aggregates for Structural Earth Wall (SEW) backfill	-2.08	$2,000,000		$2,000,000	FS	This is currently not allowed per our standard specifications. The project office will

VE ALTERNATIVES INITIAL ASSESSMENT/COMMENT FORM
Washington State Department of Transportation (WSDOT)
I-90 Snoqualmie Pass East – Stampede Pass to Easton
Yakima, WA

Idea No.	Idea Title	Overall Performance Score	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost	Disposition of Alternative	
						A=Accept AM=Accept with Modifications FS=Further Study R=Reject	Comments
							work with the State Geotechnical Engineer to look into the feasibility of using this material.

Project Engineer Signature

7/9/2018
Date

SD.6.2.1

Barrier Selection Justification Memo

Approval

August 17, 2020

Jim Mahugh, P.E.
WSDOT Assistant State Design Engineer

Attached separately
to preserve
electronic signatures

SD.6.3

Design Decisions

Steel Guardrail Post Selection Memo

Washington State Department of Transportation

Memorandum

April 7, 2021

TO: File

THRU: Brian White, P.E. WBW
ARA for Construction and Development

FROM: Andrew Byrd, P.E. ARB
Development Branch Project Engineer

SUBJECT: I-90/Cabin Creek I/C to W. Easton I/C Phase 3
Add Lanes/Wildlife Bridges, MP 64.48 to MP 70.60
XL5479, PIN 509093A
Steel Guardrail Post Selection Justification

In WSDOT DM 1610.04 (dated September 2019) and Standard Plan C-1b, the design of semi-rigid barriers uses wood or steel posts, rail, and blockouts to support the rail away from the post. WSDOT allows the Contractor to use wood or steel posts for guardrail runs although steel posts are required for guardrail transition sections and terminals.

During discussions with Maintenance about the barrier design on this project, they brought up concerns about the use of wood posts for guardrail. They requested that the contract require steel posts be used on all guardrail runs within the project if possible.

There are several reasons that make sense for the contract to require the use of steel posts. This section of I-90 is in a mountainous region that is subject to frequent and severe inclement weather that causes guardrail to be struck often and wood posts to decompose over time. There is also the potential for forest fires. Steel posts are more durable and Maintenance can replace them more efficiently. This efficiency of installation improves the safety of maintenance personnel by reducing the duration of guardrail post repairs and replacements alongside live traffic. Steel posts can be reused more often than wood after being hit, which can also reduce time for repairs.

Given that region Maintenance currently replaces damaged wood posts with steel posts on this section of I-90, there is only approximately 6000 linear feet of guardrail on this project, and for reasons mentioned above, region Design will proceed with requiring the Contractor to install steel guardrail posts on this project.

AB:jr
Cc: Rick Keniston, ASDE