Prepared for Freight Mobility Strategic Investment Board

STUDY OF ROAD-RAIL CONFLICTS

PHASE 2 - DEVELOPMENT OF PROJECT PRIORITIES

August 2018

Prepared by:
transpogroup
WHAT TRANSPORTATION CAN BE.

Development of Project Priorities

STUDY OF ROAD-RAIL CONFLICTS - PHASE 2

Prepared for:
Freight Mobility Strategic Investment Board (FMSIB)

August 2018

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Chapter 1. Introduction

In 2016, the Legislature directed the Joint Transportation Committee to conduct a study evaluating the impacts of prominent road-rail conflicts and to develop a corridor-based prioritization process for addressing the impacts on a statewide level (Second Engrossed Substitute House Bill 1299 (2015), Section 204(3)). The study was delivered to the Legislature during the 2017 session, with a series of findings and recommendations.

One of the recommendations from the 2016 study (Phase 1) was to "utilize a corridor-based prioritization strategy to assist in developing solutions and prioritizing investments." To better understand the project needs throughout the state, the Legislature in 2017 directed the Freight Mobility Strategic Investment Board (FMSIB) to perform updates to the Joint Transportation Committee's Study of Road-Rail Conflicts in Cities. The following updates were identified:

- Update the Road-Rail Conflicts Database
- Develop a Corridor-Based Project Prioritization Process
- Identify and Recommend a Statewide List of Projects

This study utilized data and information from the Phase 1 study, along with additional project data from Regional Transportation Planning Organizations (RTPOs) and Metropolitan Planning Organization (MPOs) throughout the State, to prepare a prioritized list of railroad crossing improvement projects utilizing a corridor-based process.

Specific Legislative Language

The specific Legislative direction that has guided this effort is contained in Engrossed Substitute Senate Bill SB 5096 (2017), Section 206. It states the following:

The appropriation in this section is subject to the following conditions and limitations: $60,000 of the motor vehicle account—state appropriation is provided solely for the board, from amounts set aside out of statewide fuel taxes distributed to cities according to RCW 46.68.110(2), to manage and update the road-rail conflicts database produced as a result of the joint transportation committee's "Study of Road-rail Conflicts in Cities (2016)." The board shall update the database using data from the most recent versions of the Washington state freight and goods transportation system update, marine cargo forecast, and other relevant sources. The database must continue to identify prominent road-rail conflicts that will help to inform strategic state investment for freight mobility statewide. The board shall form a committee including, but not limited to, representatives from local governments, the department of transportation, the utilities and transportation commission, and relevant stakeholders ***to identify and recommend a statewide list of projects using a corridor-based approach****. The board shall provide the list to the transportation committees of the legislature and the office of financial management by September 1, 2018.*

Background on the Subject

At-grade railroad crossings, where roads cross railroad tracks at the same level, can typically function adequately while population and traffic levels remain low. As both rail and road traffic increases, and trains get longer, at-grade crossings become more problematic, impacting communities in a variety of ways. The phrase "road-rail conflict" is used to describe potentially problematic at-grade crossings. Examples of potential conflicts include the following:

- Long and unpredictable travel delays for both the general public and freight users
- Collisions between trains and vehicles or pedestrians

- Temporary increase of emergency response times

With the growth of the state's population and increasing road and rail traffic, communities throughout the state are concerned about the reliable and safe movement of rail and truck freight, general traffic, and emergency vehicles across more than 2,180 public, active at-grade railroad crossings.

The Phase 1 study identified a series of findings and recommendations, but stopped short of identifying and evaluating projects to improve the top road-rail conflicts throughout the state.

Study Approach

The Phase 2 study built off the work completed in Phase 1 to begin the identification and evaluation of projects to address road-rail conflicts throughout the State. The effort continued to utilize data developed through the Phase 1 effort given the short timeline and limited resources directed towards the Phase 2 study.

The study started with a request for projects and updated crossing data from the RTPOs/MPOs. Projects were discussed and confirmed individually with each RTPO/MPO and categorized into a series of different tiers based on their overall project readiness. The projects were then evaluated utilizing crossing data and evaluation criteria developed as part of the Phase 1 efforts. Finally, a prioritization methodology was prepared to list the projects in a ranked order.

The work was guided by an Advisory Group made up of largely the same representatives from the prior Phase 1 study effort. The group included representatives from agencies and organizations across the state. The Advisory Group met four times throughout the study – in October, January, April and June – and provided valuable feedback on the evaluation criteria and methodology to determine project priorities.

Additional support and direction was provided by members of the RTPO/MPO Coordinating Committee. The Committee members worked with their respective organizations to assist in compiling a list of railroad crossing projects throughout the state, and also provided input and feedback on the project prioritization criteria and methodology.

Chapter 2. Project Identification

To assess project needs and priorities throughout the State, and provide a credible recommendation to the Legislature, a request for projects and updated crossing data was sent out to the RTPO/MPOs. In addition, the project team attended the RTPOs/MPOs Coordinating Committee meetings to explain the needs of the study and request that each region provide a list of railroad crossing projects in their respective region. After receipt of the project lists, the project team also met one-on-one with each region to review the project lists in detail to better understand the scope and cost of each project.

Description of Project Tiers

The study team assumed that the legislative intent for funding a Phase 2 study was to generate a project list that might then receive legislative appropriation. The study team further assumed that road-rail conflict projects are in various stages of development throughout the state. The project categories primarily fit within one of three levels of project development. They include:

Tier 1 – Projects that are in design and awaiting full construction funding.

Tier 2 – Projects that are planned and/or scoped but have not proceeded to engineering or design of any substantial kind.

Tier 3 – A Road-Rail conflict ranked in the Top 302 crossings from the Phase 1 Study, but for which no project has been studied, scoped, or identified in the regional plan for that location.

RTPO's and MPO's were asked to review railroad crossing projects at each of the top crossings in their region and categorize them according to the three project Tiers. A summary of the project information received from the RTPO/MPOs is included in subsequent sections.

Responses Received from RTPO/MPOs

A variety of responses were received from a majority of the RTPO/MPOs located throughout the state. Some responses contained detailed lists of projects or problematic crossings, where others contained a limited amount of information about projects, either because little information exists or the local agency was not able to respond to the request. Three RTPOs had few crossings in their jurisdiction, and therefore did not submit any projects. Table 1 lists the RTPO/MPOs that participated in the request for project data.

Table 1. RTPO/MPO Responses Received

RTPO/MPO	Abbreviation	Response Received?
Benton-Franklin Council of Governments	BFCOG	Yes
Chelan - Douglas Transportation Council	CDTC	Yes
Cowlitz-Wahkiakum Council of Governments	CWCOG	Yes
Palouse RTPO	PRTPO	No
Peninsula RTPO	PRTPO	No
Puget Sound Regional Council	PSRC	Yes
Quad-County RTPO	QRTPO	No
Skagit Council of Governments	SCOG	Yes
Southwest Washington Regional Transportation Council	SWTRO	Yes
Spokane Regional Transportation Council	SRTC	Yes
Thurston Regional Planning Council	TRPC	Yes
Whatcom Council of Governments	WCOG	Yes
Yakima Valley Conference of Governments	YVCOG	Yes

Summary of Projects By Tier

The projects or crossings submitted were categorized into the three Project Tiers. In general, almost half the projects were Tier 2 where a solution has been identified, but no design has been completed. Approximately 26 crossings were submitted for Tier 3, which means a local agency has identified the crossing as a problem, but no solution has been confirmed or identified. A total of 16 Tier 1 projects were submitted, which represent projects that are designed and are awaiting full construction funding. However, 10 of the 16 Tier 1 projects are fully funded and are proceeding towards construction. Figure 1 illustrates the split between the three tiers and Figure 2 shows the location of the project or crossing by Tier.

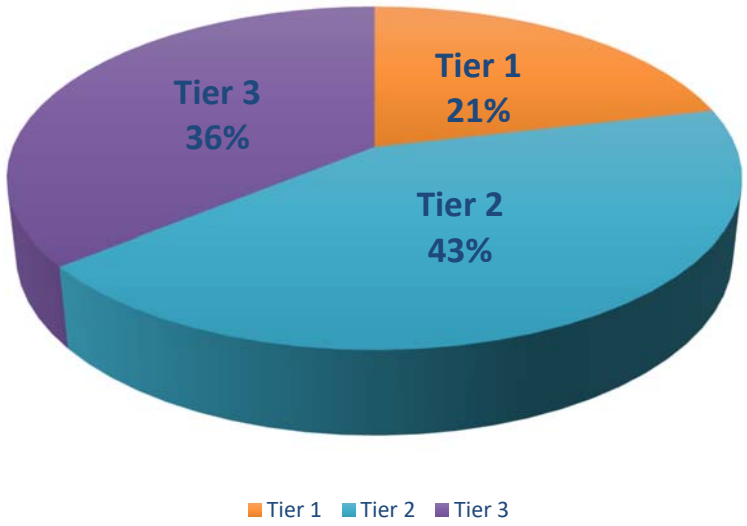


Figure 1. Project/Crossing Summarized by Tier

Tier 1 Projects

A total of 16 Tier 1 projects were submitted as listed in Table 2. Many of the projects appear to be grade separation solutions or contain some type of grade separated structure. The total estimated cost has been noted for each project, along with the amount of funding that has already been secured. A total of 10 projects have been fully funded and could likely be removed at some time from the Tier 1 list.

In addition to the details noted in Table 2, other crossings were identified that may be impacted by the Tier 1 project, such as those crossings nearby that could either see reduced or increased conflicts. The affected crossings have been noted in the project database consistent with the intent of a corridor prioritization effort.

Table 2. Tier 1 List of Projects (Not Prioritized)

Project ID	Project Name	Project Description	Street Name or Location	Crossing Number	Total Cost (Amount Funded) – in millions	RTPO
T1-1	**Connell Rail Interchange Project**, Connell	Relocates, reconfigures and improves a rail interchange where the Columbia Basin Railway (CBRW) intersects the BNSF mainline. In addition to adding capacity and improving freight movement, this investment will relocate the rail switch yard away from residential areas, school traffic patterns and emergency response routes.	N/A	Railroad	$24.1 ($10.0)	BFCG
T1-2	**McKittrick Street Grade Separation**, Wenatchee	Following the 2015 Sleepy Hollow wildfire that destroyed 70+ acres of industrial property in the area, the city completed a redevelopment plan that relocates access across BNSF from Hawley Street south one block to McKittrick Street. The project provides for grade separated access to the industrial uses along the river.	Hawley St	065840P	$25.0 ($0.0)	CDTC
T1-3	**South 228th Union Pacific Grade Separation,** Kent	Construct a grade separation of the Union Pacific Railroad mainline tracks at South 228th Street. The project will include the construction of a bridge; four-lane vehicle crossing; full-width paving; concrete curbs, gutters and sidewalks; bicycle facilities; street lighting; utilities and appurtenances. Expected to be completed in 2019.	S 228th St	396576X	$40.1 ($21.9)	PSRC
T1-4	**I-5 @ SR 529 Interchange Improvements**, Marysville	Complete the current half interchange by constructing a new I-5 NB off-ramp to SR 529 and new SB on-ramp from SR 529 to I-5. Provides another route to avoid the downtown rail crossing at 4th Avenue. Expected completion date in 2019. ***Fully funded.***	I-5 & SR 529	084640G	$84.4 ($84.4)	PSRC
T1-5	**Canyon Road Freight Corridor Improvements**, Pioneer Way E to 52nd St E / 62nd Ave E, Pierce County	Extends the major arterial/NHS roadway to connect with the planned completion of SR-167, crossing over the BNSF railroad, Clarks Creek and the Puyallup River. The roadway will link the planned employment center in Frederickson with the Port of Tacoma and destinations northward (e.g. Seattle).	Puyallup Area	New	$62.7 ($22.4)	PSRC

T1-6	**South Lander St Grade Separation**, Seattle	Develop a grade separation of the roadway and the Burlington Northern mainline railroad tracks between 1st Ave S and 4th Ave S. Grade separation to accommodate bicycle, pedestrian, and transit users as well as general freight use. Expected completion in 2020. ***Fully funded.***	S Lander St	085584F	$123.0 (123.0)	PSRC
T1-7	**I-5/Mounts Rd to Thorne Ln Corridor Improvements**, Lakewood and Dupont	Construct grade separation at the interchanges with Thorne Lane, Berkeley Street, and DuPont-Steilacoom Rd as part of the I-5 JBLM corridor improvements funded through Connecting Washington. Expected to be completed by 2023. ***The projects are fully funded.***	Lakewood, JBLM, DuPont	Multiple	$482.4 ($482.4)	PSRC
T1-8	**River S Bridge Replacement**, Ridgefield	Replace the bridge accessing the River 'S' Unit of the Ridgefield National Wildlife Refuge with a new two-lane bridge that will grade separate the crossing of the BNSF mainline. ***Fully funded.***	Wildlife Refuge Rd	092425R	$8.6 ($8.6)	RTC
T1-9	**Pioneer St Rail Overpass,** Port of Ridgefield	Extend Pioneer Street with an overpass providing a grade-separated crossing of the BNSF mainline and eliminating at-grade crossings at Division Street and Mill Street. ***Fully funded.***	Port of Ridgefield	092428L	$14.9 ($14.9)	RTC
T1-10	**SR 14/Bingen Point Access Improvements,** Port of Klickitat	The project supports economic development and improves safety by providing a new grade separated crossing of BNSF's tracks between SR 14 and Bingen Point. ***Fully funded.***	Maple St	090169V	$22.9 ($22.9)	RTC
T1-11	**Riverside Dr / 4th St N Safety Improvements,** Mount Vernon	Install new pedestrian gates, advanced warning devices, concrete railroad crossing systems, upgrade sidewalks, including realignment to reduce skew, and improve vertical curve of the roadway. ***Fully funded.***	Riverside Dr	084758W	$1.4 ($1.4)	SCOG
T1-12	**Barker Rd Overpass**, Spokane Valley	New grade separation over BNSF rail line. Replaces an existing at-grade crossing and provides a roundabout at the intersection of Barker Road and Trent Avenue (SR 290). Completion of this project anticipates the closure of Flora Road. ***Fully funded.***	Barker Rd	066244T	$18.7 ($25.0)	SRTC
T1-13	**Pines Road / BNSF Grade Separation (SR27/SR290),** Spokane Valley	Replaces an existing at-grade crossing with an underpass of BNSF's railroad tracks and provides a roundabout at the intersection of Pines Road and Trent Avenue (SR 290). Completion of this project anticipates the closure of University Road.	Pines Road-SR27	066367E	$22.9 ($2.0)	SRTC
T1-14	**Birch Bay Lynden/Portal Way Signalization Project,** Whatcom County	Safety improvements including advanced detection; new bungalow; new RR signal standards, lights and gate arms; advanced RR warning lights and standard warning lights; crossing upgrades involving 110 LF of new track, ties and ballast; signal inter-connect; and pavement markings & signage. ***Fully funded.***	Birch Bay – Lynden Road	084845A	$3.9 ($3.9)	WCOG

T1-15	**F Street,** Bellingham	Install quad gates for quiet zone implementation. ***Fully funded.***	F Street	077846P	$0.7 ($0.7)	WCOG
T1-16	**Regional Beltway Phase II**, Union Gap	New grade separation over BNSF rail line as part of the WSDOT Connecting WA funded South Union Gap Interchange Project. Connects to future Beltway project that is 30% designed and has recently received funding to purchase ROW. Expected construction in mid-2020's.	New Crossing	N/A	$17.9 ($0.4)	YVCOG

Tier 2 Projects

A total of 34 Tier 2 projects were submitted and are listed in Table 3. While the projects include many grade separation projects, other solutions include signals, ITS, railroad switchyard relocation, pedestrian crossings, and at-grade crossing improvements. Most of the projects have little or no secured funding for construction or design.

Table 3. Tier 2 List of Projects (Not Prioritized)

Project ID	Project Name	Project Description	Street Name / Location	Crossing Number	Total Cost (Amount Funded) – in millions	RTPO
T2-1	**Division Street Crossing Safety & ADA Improvements**, Cashmere	Construct ADA compliant railroad pedestrian/bike crossing surfaces, install a four-quadrant gate signal system with pedestrian gates, and update signs and markings.	Division St	084464L	$1.5 ($0.0)	CDTC
T2-2	**Miller St Grade Separation**, Wenatchee	One component of constructing a bypass corridor for SR 285, to connect downtown Wenatchee and the North Wenatchee waterfront district directly to the Olds Station industrial area and US 2.	N Miller St	065839V	$30.0 ($0.0)	CDTC
T2-3	**BNSF Wenatchee Switchyard Relocation**, Wenatchee	Relocating BNSF switchyards and operations outside city limits. Project is a substitute for two grade separations. Includes new railroad siding and train control and a maintenance and operations building.	Orondo St	065831R	$32.0 ($0.0)	CDTC
T2-4	**Bridge Street Non-Motorized Grade Separation**, Wenatchee	New pedestrian extension west from the existing Columbia River pedestrian bridge to connect with Wenatchee Avenue in the vicinity of Bridge Street.	Bridge St	New	$4.0 ($0.0)	CDTC
T2-5	**Edmonds Street Waterfront Connector**, Edmonds	One-lane roadway bridge spanning the railroad tracks to connect the police and fire stations directly to the waterfront, providing immediate access for emergency responders and emergency ferry off-load and on-load. Also provides multimodal pedestrian and bicycle access between downtown Edmonds and the waterfront area.	Edmonds Waterfront	New	$29.9 ($0.0)	PSRC
T2-6	**70th Avenue E Railroad Crossing**, Fife	Grade separated (4-lane) crossing of the Union Pacific Railroad tracks. Segments of 70th Avenue E, north and south of the railroad crossing have been improved to a 5-lane roadway.	70th Ave E	Multiple	$26.2 ($0.0)	PSRC

T2-7	**Willis St BNSF Grade Separation**, Kent	Construct grade separation at the BNSF Railway mainline tracks at Willis Street (SR 516). Provides a critical, grade-separated link through the commercial/industrial center of Kent. Links the valley warehouse/industrial center to SR 167 and I-5.	Willis St (SR 516)	085640K	$61.0 ($0.0)	PSRC
T2-8	**212th St BNSF RR Grade Separation**, Kent	Construct grade separation at the BNSF Railway mainline tracks at South 212th Street.	212th St	085625H	$66.0 ($0.0)	PSRC
T2-9	**SODO Rail Corridor Grade Separations**, Seattle	Develop a roadway grade separation over the Burlington Northern mainline to improve safety and accessibility within the SODO area. Candidate locations include current at-grade crossings between Royal Brougham Way to S Spokane St. Grade separation would accommodate multiple modes, including freight, bicycle, pedestrian, transit users.	South Downtown	New	$154.4 ($0.0)	PSRC
T2-10	**Lenora St/BNSF Rail Line Overcrossing**, Everett	This project will create a grade separated crossing and eliminate conflicts of vehicles and pedestrians. It will also improve a bottom out clearance on the vertical curve over the tracks.	Lenora St	084594H	$17.3 ($0.0)	PSRC
T2-11	**East Everett Avenue / BNSF Overcrossing**, Everett	Grade separation project.	Everett Area	084992 M	$17.2 ($0.0)	PSRC
T2-12	**Chestnut St / Eclipse Mill Road Improvements from Pacific to 36th**, Everett	Crossing improvements and/or possible grade separation.	Chestnut St	084605T	$4.3 ($0.0)	PSRC
T2-13	**Willis St (SR 516) Union Pacific Railroad Grade Separation**, Kent	Grade separation project.	Willis St	396581U	$26.5 ($0.0)	PSRC
T2-14	**S 212th St Union Pacific Railroad Grade Separation**, Kent	Grade separation project.	212th St	396575R	$33.0 ($0.0)	PSRC
T2-15	**Grove St RR Overcrossing**, Marysville	Construct new overcrossing that would span the BNDF tracks from State to Cedar Avenue. The tracks impede the east-west flow of traffic into and through the downtown core, serving to compound the lack of sufficient capacity between SR 9 and I-5. The project would alleviate congestion and increase overall east/west connectivity.	Grove St	084646X	$21.5 ($1.0)	PSRC
T2-16	**8th St at UPRR crossing and Butte Ave SE intersection Signal**, Sumner	Widen the Stewart Road corridor and UP crossing from 2 lanes to 4 lanes. The widened roadway will require the RR signal infrastructure to be reset/relocated and additional concrete panels to be placed.	8th St	396597R	$4.7 ($1.4)	PSRC
T2-17	**Zehnder Street BNSF Crossing at-grade improvements**, Sumner	Study, design, and construct at-grade railroad crossing improvements to improve safety at the complex intersection of Zehnder Street between Pease Ave to Wood Ave.	Zehnder St	085680H	$0.3 ($0.0)	PSRC

T2-18	**S. Holgate St. Rail Crossing Improvements**, Seattle	Develop a nonmotorized grade separation over the Burlington Northern mainline tracks, plus operational tracks supporting AMTRAK and BNSF SIG Yard. S Holgate St is the designated location for the final leg of the Region's Mountains to Sound Greenway; the current at-grade location is a subject of notable concern for bicycle and pedestrian safety.	S Holgate St	085583Y	$40.0 ($0.0)	PSRC
T2-19	**Railroad Crossing Delay Warning System**, Seattle	Install real-time railroad crossing warning system with adaptive signals/advisory information to inform emergency response and general-purpose traffic operations in the SODO area. May include a pilot project to test alternate equipment and information systems.	South Downtown Seattle Crossings	Multiple	$0.3 ($0.0)	PSRC
T2-20	**Pedestrian Overpass between Old Town Business District and Ruston Way**, Tacoma	Grade separated pedestrian link over the rail lines	Tacoma Waterfront	New	$40.0 ($0.0)	PSRC
T2-21	**S 56th and Washington St**, Tacoma	Vertical separation of RR crossing and roadway	S 56th St	085392N	$22.5 ($0.0)	PSRC
T2-22	**Pine St and S Tacoma Way**, Tacoma	Vertical separation of RR crossing and roadway	Pine St	085382H	$22.5 ($0.0)	PSRC
T2-23	**S 74th St and S Tacoma Way**, Tacoma	Vertical separation of RR crossing and roadway	S 74th St	085396R	$22.5 ($0.0)	PSRC
T2-24	**Steilacoom Ferry Lane Modification**, Pierce County	Improve the efficiency and capacity of the existing Steilacoom Ferry queuing lanes. Drivers waiting in the queuing lanes for the Ferry must cross the RR main line to drive down the ramp onto the Ferry. Improvements would include improved signage and possibly other improvements.	Union Ave	085755E	$0.7 ($0.0)	PSRC
T2-25	**Stewart Avenue East/66th Avenue East,** Pierce County	Install a traffic signal at the intersection of Stewart Ave E and 66TH Ave E to improve safety and efficiency of the intersection and crossing. Traffic currently backs up on Stewart Ave E across the rail tracks waiting at the intersection of 66th Ave E. The traffic signal will be interconnected with the rail crossing along with detection to allow for train priority while reducing conflicts with the travelling public.	66th Ave E	085703 M	$4.0 ($0.0)	PSRC
T2-26	**32nd Street/Russell,** Washougal	Washougal is currently working through an alternatives analysis for either an overpass at 27th Street or an underpass at 32nd Street. Once the alternatives analysis is completed, the actual project will be defined.	32nd St	090117D	$17.9 ($0.9)	RTC
T2-27	**College Way Railroad Grade Separation**, Mount Vernon	Grade-separated crossing over or under BNSF railroad line.	College Way-SR 538	084759D	$22.7 ($0.0)	SCOG

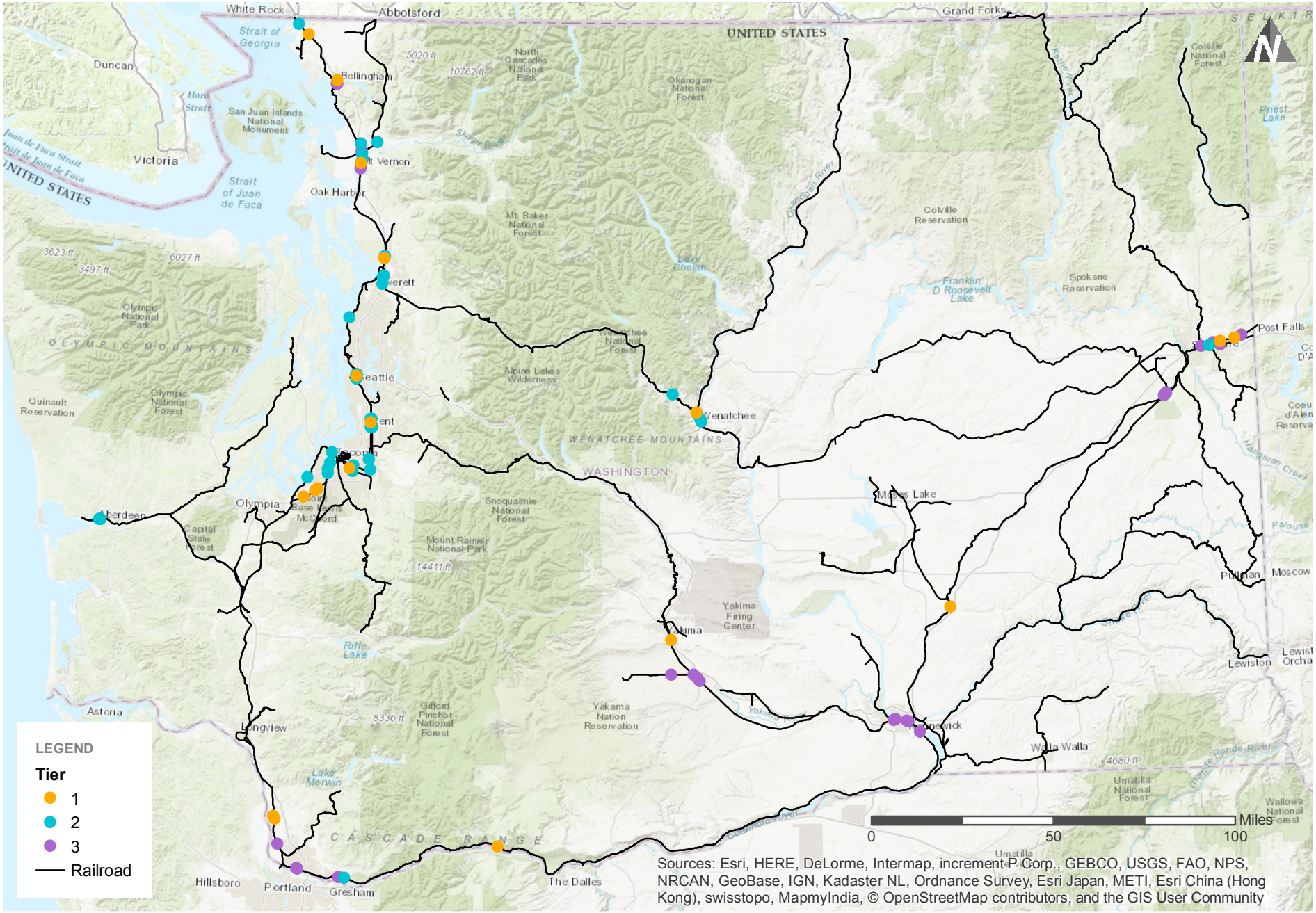
T2-28	**Cook Road Reconstruction**, Burlington	Grade-separated crossing over or under BNSF railroad line.	Cook Rd	084775 M	$15.5 ($0.0)	SCOG
T2-29	**Jones Road/John Liner Railroad Undercrossing**, Sedro-Woolley	New BNSF undercrossing and new arterial from E Jones Road to John Liner Road.	Jones Rd	New	$7.7 ($0.0)	SCOG
T2-30	**Railroad Overpass Project**, Burlington	Construct overcrossing over BNSF rail tracks to connect east/west sides of city.	Gilkey Rd	New	$17.0 ($0.0)	SCOG
T2-31	**BNSF Rail Bridge over Skagit River**, Burlington	BNSF Skagit River Bridge Replacement for Flood Risk Reductions. Project would add additional set of railroad tracks over the river.	E Whitmarsh Rd	Rail Bridge	$60.0 ($0.0)	SCOG
T2-32	**Park Road / BNSF Grade Separation,** Spokane Valley	Identified as a top priority for grade separation in the Bridging the Valley plan that was completed in 2003. The study included a 10% designed solution. While the design is certainly dated, this is an important project that could potentially address four crossings. Completion of this project could include the closure of Vista Road.	Park Rd	066377K	$23.0 ($0.0)	SRTC
T2-33	**Bell Rd-SR 548 Rail Grade Separation,** Blaine	Construct overcrossing over BNSF rail tracks as part of improvements to the I-5 Exit 274 interchange and SR 548.	SR 548	084853S	$13.4 ($0.0)	WCOG
T2-34	**East Aberdeen Mobility Improvements,** Aberdeen	Improvements to SR 12 to provide improved access to adjoining commercial properties. Could result in four of seven at-grade crossings being closed.	East Aberdeen	Various	$30.0 ($0.0)	GHCOG

Tier 3 Projects

A total of 26 Tier 3 projects were submitted and are listed in Table 4. A majority of the crossings were located on the eastern side of the mountains in Tri-Cities, Spokane, and Yakima regions. Other crossings are in Skagit, Whatcom, and Clark Counties. All the crossings identified were included in the top 302 crossings evaluated as part of the Phase 1 Study effort.

Table 4. Tier 3 List of Crossings to Study (Not Prioritized)

Project ID	Crossing Location (City/County)	Street Name / Location	Crossing Number	Rank from Phase 1	RTPO
T3-1	Kennewick	N Fruitland St	104572R	52	BFCOG
T3-2	Kennewick	N Edison St	104568B	81	BFCOG
T3-3	Kennewick	N Kellogg St	919073D	85	BFCOG
T3-4	Kennewick	N Washington St	104574E	132	BFCOG
T3-5	Benton County	Bowles Rd 9713	0900385S	197	BFCOG
T3-6	Vancouver	Beach Dr	090072Y	162	RTC
T3-7	Washougal	6th St	090112U	176	RTC
T3-8	Vancouver	NW 122nd St	092421N	210	RTC
T3-9	Vancouver	SE Chelsea Ave	090074M	221	RTC
T3-10	Mount Vernon	SR 536 - Kincaid	084744N	6	SCOG
T3-11	Burlington	SR 20 - Avon	084766N	23	SCOG
T3-12	Burlington	E Fairhaven Ave	084765G	34	SCOG
T3-13	Mount Vernon	Old 99/Blackburn	084739S	49	SCOG
T3-14	Spokane Valley	Pines Rd	662519S	38	SRTC
T3-15	Millwood	Argonne Rd	662514H	30	SRTC
T3-16	Spokane	Mission Ave	662503V	46	SRTC
T3-17	Spokane County	Harvard Rd	066240R	55	SRTC
T3-18	Cheney	F Street/Cheney-Spangle	065970L	22	SRTC
T3-19	Cheney	Pine St	066315M	64	SRTC
T3-20	Cheney	Cheney-Plaza Rd	065971T	82	SRTC
T3-21	Bellingham	Cornwall Ave	084806J	68	WCOG
T3-22	Bellingham	Wharf St	396920W	102	WCOG
T3-24	Toppenish	SR 22-Buena Way	099190G	79	YVCOG
T3-25	Toppenish	McDonald Rd E	099189M	191	YVCOG
T3-26	Toppenish	E Branch Rd	099186S	280	YVCOG
T3-27	Harrah	Lateral A Rd	099216G	302	YVCOG



Prioritized Projects by Tier

FIGURE **2**

Rail-Road Project Prioritization

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Chapter 3. Prioritization Process

To evaluate and prioritize the railroad crossing projects identified and submitted by the regions, a project prioritization process was developed. The prioritization process utilized data and built-off the evaluation criteria used to rank the railroad crossings in the Phase 1 study. This chapter outlines the specific details regarding the prioritization process used in the Phase 2 study effort.

Project Categories

Projects that were submitted by the regions generally fell into several categories. For purposes of consistently characterizing railroad crossing projects, the following project categories were developed for Tier 1 and 2 projects. Because Tier 3 projects are either studies or alternatives analysis, no project category was utilized in prioritizing Tier 3 projects.

Table 5. List of Project Categories by Improvement Type

	Category	Type of Improvement
1.	Grade Separation	Bridge or overpass
2.	Pedestrian-only Grade Separation	Pedestrian bridge (with or without emergency vehicle access)
3.	Safety Enhancements	Signs, gates, lights, Quiet Zones
4.	Mobility Solutions	ITS/Adaptive Signal Control, Dynamic Signage/Traveler Information, Signal interconnects, Pre-emption
5.	Railroad Enhancements	Reducing number of tracks, relocating tracks, operational changes
6.	Closure	Permanently closing an at-grade crossing to vehicle or pedestrian traffic

Categorizing projects by type of improvement is necessary to evaluate the overall benefit of the project. For example, a grade separation project will likely produce large benefits to safety and reductions in travel delay when compared to a project that only improves signage and railroad crossing gates. As such, the project categories assist in evaluating the benefits provided to one or more crossings.

Review of Phase 1 Study Evaluation Criteria

Due to the timeline to deliver a prioritized list of projects to the Legislature by September 1, 2018, the number of projects to evaluate, and the need to rely on existing data from the 302 high priority crossings evaluated in the Phase 1 study, the prioritization process needed to build from the evaluation criteria and data developed in Phase 1.

Many of the 19 criteria from Phase 1 were characteristics of a crossing location, such as the number of mainline tracks or surrounding population density at a crossing. To utilize any of the 19 criteria to determine the benefits of a project, each criterion was reviewed in more detail to determine whether it would change as a result of a project, and whether it would be a good indicator to measure project benefits. Table 6 summarizes each of the 19 criteria from Phase 1 and identifies their applicability to the project prioritization efforts.

Table 6. List of Phase 1 Evaluation Criteria

	Phase 1 Criteria[1]	Applicability to Phase 2
	Safety Group	
1.	Number of Alternative Grade Separations	A characteristic. While it would change with implementation of a grade-separated project, it would not impact the score of a crossing where a grade-separated project was to be evaluated.
2.	Number of Mainline tracks	A characteristic. It would not change due to a project.
3.	Proximity to Emergency Services	A characteristic. It would not change due to a project.
4.	***Incident History: Total***	***Projects that improve safety or mobility could reduce the occurrence of incidents.***
5.	***Incident History: Severity***	***Projects that improve safety or mobility could reduce the occurrence of severe incidents.***
6.	***Level of Protection***	***Projects could include facilities that improve level of protection.***
	Mobility Group	
7.	Roadway Freight Classification	A characteristic. It would not change due to a project.
8.	Existing Vehicle Volume	A characteristic. It would not change due to a project.
9.	Future Vehicle Volume	The number of future vehicle volumes could change due to a project, but the gate down time criterion would measure the actual performance benefits.
10.	Network Sensitivity	A characteristic. It would not change due to a project.
11.	Crossing Density	A characteristic. While it would change with implementation of a grade-separated project, it would not impact the score of a crossing where a grade-separated project was to be evaluated.
12.	***Gate Down Time***	***Projects that improve mobility could reduce the amount of gate down time or crossing delays for vehicles and pedestrians.***
	Community Group	
13.	Employment Density	A characteristic. It would not change due to a project.
14.	First/Last Mile Freight Facilities	A characteristic. It would not change due to a project.
15.	Population Density	A characteristic. It would not change due to a project.
16.	***Daily Emissions***	***Projects that improve mobility could reduce the amount of gate down time or crossing delays for vehicles, thus reducing emissions.***
17.	***Noise Quiet Zones***	***Projects could include facilities that allow for quiet zones.***
18.	Percent Minority	A characteristic. It would not change due to a project.
19.	Percent Low Income	A characteristic. It would not change due to a project.

Bold/italicized text = criteria used in Phase 2 efforts

1. See *Prioritization of Prominent Road-Rail Conflicts in Washington State*, January 2017, for a listing of the specific definitions of each criterion.

Project Scoring Methodology

Based on the review of the Phase 1 evaluation criteria, a total of six criteria were selected in which to measure and evaluate the benefits that may be created by implementation of a project. Below is a description of each of the 6 criteria identified for use in the Phase 2 project prioritization efforts.

The first criteria is “incident history: total” which reflects the total number of historical safety incidents. The second criteria, “incident history: severity,” adds weight to incident scoring based on the severity of the collision. For example, fatalities would be the most severe, followed by collisions resulting with an injury, then by collisions only involving property damage.

The crossing “gate down time” reflects the most basic barrier to mobility, the time vehicles must wait for a train to pass.

The “daily emissions” reflects vehicle pollution due to idling cars and trucks and is correlated to gate down time. “Noise quiet zones” reflects the amount of noise from crossings, and whether infrastructure is in place to implement a quiet zone.

The criteria utilized for the Phase 2 project prioritization efforts are listed in Table 7.

Table 7. Phase 2 Project Evaluation Criteria

Phase 1 Criteria	Description of How the Criteria was Considered in Phase 2
4. Incident History: Total	Projects that improve safety or mobility will receive points if they are likely to reduce the occurrence of incidents. The number of points is directly correlated to the points the crossing was assigned during Phase 1.
5 Incident History: Severity	Projects that improve safety or mobility will receive points if they are likely to reduce the occurrence of severe incidents. The number of points is directly correlated to the points the crossing was assigned during Phase 1.
7. Level of Protection	Projects that include facilities that improve level of protection would receive additional points based on the same scoring process in Phase 1.
12. Gate Down Time	Projects that improve mobility will receive points if they are likely to reduce gate down time or delays. The number of points is directly correlated to the points the crossing was assigned during Phase 1.
16. Daily Emissions	Projects that improve mobility will receive points if they are likely to reduce gate down time or delays, which impacts emissions. The number of points is directly correlated to the points the crossing was assigned during Phase 1.
17. Noise Quiet Zones	Projects that include facilities that allow for quiet zones would receive additional points.

The points assigned to the project or crossing were directly related to the type of project and the amount of benefit it provided. During the Phase 1 study effort, points were assigned to each crossing based on the 19 criteria in Table 6. Those points assigned to a Phase 1 crossing were the points that were eligible to be assigned to a Phase 2 project depending on the Project Category of the improvement. Figure 3 provides an overview of how points were assigned to the project.

<table>
<tr><th></th><th colspan="3">Scoring Methodology by Project Type</th></tr>
<tr><th>Phase 1 Criteria</th><th>Grade Separation or Closure Project</th><th>Safety Project</th><th>Mobility or Railroad Project</th></tr>
<tr><td>4. Incident History: Total
5. Incident History: Severity</td><td rowspan="3">Doubled Phase 1 points for a 100% increase</td><td>Increased Phase 1 points by 50%</td><td>No Change</td></tr>
<tr><td>6. Level of Protection</td><td rowspan="2">No Change</td><td rowspan="2">Increased Phase 1 points by 50%</td></tr>
<tr><td>12. Gate Down Time
16. Daily Emissions</td></tr>
<tr><td>17. Noise Quiet Zones</td><td>Full points</td><td>Full points if enabled a quiet zone</td><td>Full points if enabled a quiet zone</td></tr>
</table>

Figure 3. Scoring Methodology by Project Type

Points were also assigned to the project or crossing if it addressed or improved conditions at a nearby crossing in order to account for a "corridor approach." For example, a grade separation project could improve safety conditions at a nearby at-grade crossing, as it would attract more vehicles or pedestrians away from another problematic crossing. In other situations, a grade separation project might close two crossings, and therefore the project should receive credit for improving two crossings. Figure 4 highlights how points were assigned to the project given each type of improvement.

<table>
<tr><th></th><th colspan="3">Scoring Methodology by Project Type</th></tr>
<tr><th>Phase 1 Criteria</th><th>Grade Separation or Closure Project</th><th>Safety Project</th><th>Mobility or Railroad Project</th></tr>
<tr><td>4. Incident History: Total
5. Incident History: Severity</td><td rowspan="3">100% pts = closed crossing
50% pts = < 0.5 miles
25% pts = < 1 mile
0 pts = > 1 mile</td><td rowspan="2">No Change</td><td rowspan="2">No Change</td></tr>
<tr><td>6. Level of Protection</td></tr>
<tr><td>12. Gate Down Time</td><td rowspan="2">No Change</td><td rowspan="2">25% pts = < 0.5 miles
10% pts = < 1 mile
0 pts = > 1 mile</td></tr>
<tr><td>16. Daily Emissions</td><td></td><td></td></tr>
<tr><td>17. Noise Quiet Zones</td><td>Full points for closed crossing</td><td>Full points if enabled a quiet zone</td><td>Full points if enabled a quiet zone</td></tr>
</table>

Figure 4. Scoring Adjacent Crossings by Project Type

Measuring Project Cost/Benefits

Figure 5 illustrates how a crossing or project was scored using the methodology identified in Figures 3 and 4 and also identifies how the cost of a project was utilized to develop a cost-benefit ratio. The resulting cost-benefit number shown in purple was utilized to produce a ranked list of projects summarized by project Tier. The lower the number, the higher ranked the project was to reflect a lower cost per benefit point.

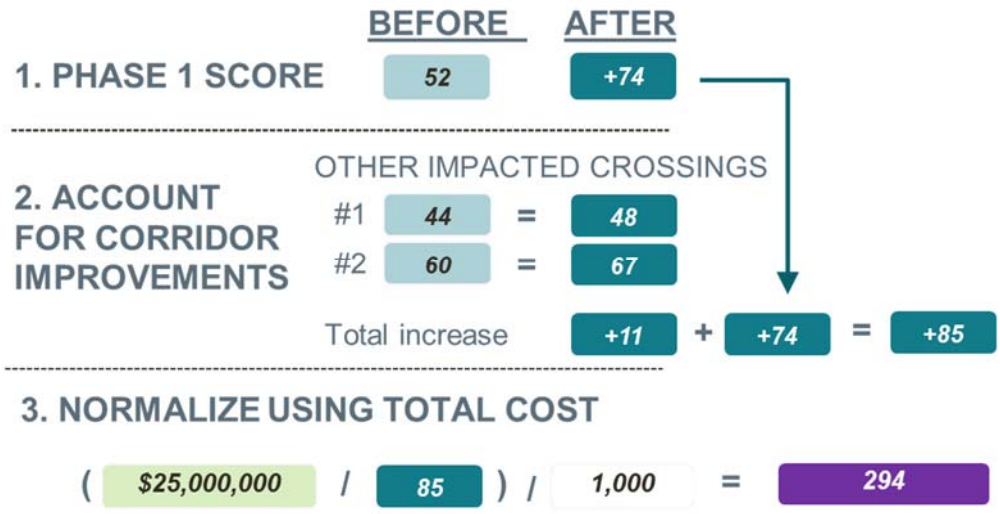

Figure 5. Measuring Project Cost/Benefits Example

A Phase 2 project score starts with the crossing score from the Phase 1 study to account for existing crossing characteristics such as whether the project is on a freight route, or whether it provides improved access to a nearby emergency provider. Then the project benefits points are assessed and added to the Phase 1 score. In the example in Figure 5, the project benefits were calculated at 22 additional points, which resulted in a total score of 74 points.

To account for a corridor-based approach and to recognize a project may also benefit or solve a problem as a nearby crossing, additional points are provided based on the scoring methodology illustrated in Figure 4. For the example shown in Figure 5, the project is assumed to benefit two nearby crossings which were within a mile or less of the project. In this example, the project received another 11 points, which were then added to the 74 points, for a total project score of 85 points.

The total project score was then divided by the total estimated cost of the projects to develop a cost-benefit score. A lower score suggests a higher cost-benefit, which means that benefits are received at a lower cost.

The scoring methodology was utilized only for projects in Tiers 1 and 2 since a specific solution had been identified. Crossings in Tier 3 were ranked based on the scores from the Phase 1 study, since a solution or project has not been identified.

However, to account for a corridor-based approach, crossings in Tier 3 could be combined into one study if an agency had a series of closely spaced crossings and they were committed to closing at least one crossing and improving another crossing. In such a situation, the crossing received the points of the crossing with the highest amount of points and then half the points of the other crossings to produce an overall total score. This situation occurred for three crossings in the City of Cheney, which resulted in the group of crossings being ranked number one in Tier 3.

Limitations of the Project Prioritization Effort

The prioritization effort relied primarily on data from the Phase 1 Study effort which was developed for the 302 high priority crossings across the State. This limited the ability to evaluate projects that were identified at crossings not on the original list, such as the rail crossing projects in the City of Aberdeen. Future prioritization efforts will need to rely on additional data and analysis beyond the information contained in the database from the Phase 1 Study effort.

In addition, there are specific grant programs administered by UTC and WSDOT that focus on funding crossing improvements. The programs can receive funding from federal sources and crossings need to be evaluated using established tools such as the *GradeDec.Net* developed by the Federal Railroad Administration (FRA) as an investment decision support tool for use by state and local authorities. It provides for a more complete evaluation of highway-rail grade crossing investments and serves to better measure the public returns for each dollar invested. *GradeDec.Net's* analysis of grade crossing improvements is both at the individual grade crossing and at the corridor or regional level.

Future efforts to prioritize projects and crossing investments should likely include the use of *GradeDec.Net* so projects can be eligible for federal funding.

Chapter 4. Project Priorities

The results of the project prioritization process are presented and summarized by project tier and listed in their ranked order. A detailed list of the projects is provided in Appendix A.

Tier 1 Results

A total of six projects which were not fully funded, were ranked in Tier 1 as shown in Table 8. Two projects tied for 5th place because the scope of the projects did not improve a problem crossing identified during the Phase 1 Study. The remaining projects in Table 8 are listed in no particular order and are currently fully funded and awaiting construction.

Table 8. Tier 1 Project Priorities

Project ID	Crossing Number	Project Name	Street Name/ Location	RTPO	Total Cost	Project Cost/ Benefit	Project Ranking
T1-13	066367E	Pines Road / BNSF Grade Separation (SR27/SR290), Spokane Valley	Pines Rd-SR27	SRTC	$22,891,000	308	1
T1-2	065840P	McKittrick Street Grade Separation, Wenatchee	Hawley St	CDTC	$25,000,000	2,239	2
T1-3	396576X	South 228th Union Pacific Grade Separation, Kent	S 228th St	PSRC	$40,100,000	3,437	3
T1-5	New	Canyon Road Improvements, Pioneer Way E to 52nd St E / 62nd Ave E, Pierce County	Puyallup Area	PSRC	$62,720,190	3,600	4
T1-1	Railroad	Connell Rail Interchange Project, Connell	Hawley St	BFCOG	$24,100,000	0	5
T1-16	N/A	Regional Beltway Phase II, Union Gap	New Crossing	YVCOG	$17,950,000	0	5
T1-4	084640G	I-5 @ SR 529 Interchange Improvements, Marysville	I-5 & SR 529	PSRC	$84,400,000	0	Fully Funded
T1-6	085584F	South Lander Street Grade Separation, Seattle	S Lander St	PSRC	$123,000,000	0	Fully Funded
T1-7	Multiple	I-5/Mounts Rd to Thorne Ln Corridor Improvements, Lakewood and Dupont	Lakewood, JBLM, DuPont Area	PSRC	$482,430,000	0	Fully Funded
T1-8	092425R	River S Bridge Replacement, Ridgefield	Wildlife Refuge Rd	RTC	$8,759,600	0	Fully Funded
T1-9	092428L	Pioneer St Rail Overpass, Port of Ridgefield	Division St	RTC	$14,923,000	0	Fully Funded
T1-10	New	SR 14/Bingen Point Access Improvements, Port of Klickitat	Maple Street	RTC	$22,900,000	0	Fully Funded
T1-11	084758W	Riverside Dr / 4th St N Safety Improvements, Mount Vernon	Riverside Dr	SCOG	$1,449,000	0	Fully Funded
T1-12	066244T	Barker Road / BNSF Grade Separation, Spokane Valley	Barker Rd	SRTC	$18,738,000	0	Fully Funded
T1-14	084845A	Birch Bay Lynden/Portal Way Signalization Project	Birch Bay - Lynden Road	WCOG	$3,900,000	0	Fully Funded
T1-15	077846P	F Street, Bellingham	F Street	WCOG	$730,000	0	Fully Funded

Tier 2 Results

Approximately 29 of 34 projects in Tier 2 were ranked and are shown in Table 9. The five projects that were not scored did not improve a crossing identified during the Phase 1 study.

Table 9. Tier 2 Project Priorities

Project ID	Crossing Number	Project Name	Street Name/ Location	RTPO	Total Cost	Project Cost/ Benefit	Project Ranking
T2-17	085680H	Zehnder Street BNSF Crossing at-grade improvements, Sumner	Zehnder St	PSRC	$300,000	6	1
T2-19	Multiple	Railroad Crossing Delay Warning System, Seattle	South Downtown Seattle Crossings	PSRC	$250,000	7	2
T2-24	085755E	Steilacoom Ferry Lane Modification, Pierce County	Union Ave	PSRC	$650,000	12	3
T2-1	084464L	Division Street Crossing Safety & ADA Improvements, Cashmere	Division St	CDTC	$1,500,000	41	4
T2-25	085703M	Stewart Avenue East/66th Avenue East, Pierce County	66th Avenue	PSRC	$4,000,000	93	5
T2-16	396597R	8th St at UPRR crossing and Butte Ave SE intersection Signal, Sumner	8th St	PSRC	$4,704,000	157	6
T2-12	084605T	Chestnut St / Eclipse Mill Road Improvements from Pacific to 36th, Everett	Chestnut St	PSRC	$4,288,000	193	7
T2-32	066377K	Park Road / BNSF Grade Separation, Spokane Valley	Park Road	SRTC	$23,000,000	205	8
T2-13	396581U	Willis St (SR 516)/Union Pacific Railroad Grade Separation, Kent	Willis St	PSRC	$26,500,000	232	9
T2-26	090117D	32nd Street/Russell, Washougal	32nd St/Russell	RTC	$17,863,000	258	10
T2-28	084775M	Cook Road Reconstruction, Skagit County	Cook Rd	SCOG	$15,500,000	290	11
T2-33	084853S	Bell Road - SR 548, WSDOT	Bell Road - SR 548	WCOG	$13,400,000	298	12
T2-27	084759D	College Way Railroad Grade Separation, Mount Vernon	College Way-SR 538	SCOG	$22,700,000	327	13
T2-7	085640K	Willis St BNSF Grade Separation, Kent	Willis St (SR 516)	PSRC	$61,000,000	463	14
T2-15	084646X	Grove Street RR Overcrossing, Marysville	Grove St	PSRC	$21,540,000	467	15
T2-18	085583Y	S. Holgate St. Rail Crossing Improvements, Seattle	S Holgate St	PSRC	$40,000,000	542	16
T2-10	084594H	Lenora St/BNSF Rail Line Overcrossing, Everett	Lenora St	PSRC	$17,300,000	551	17
T2-14	396575R	S 212th St/Union Pacific Railroad Grade Separation, Kent	212th St	PSRC	$33,000,000	588	18

Project ID	Crossing Number	Project Name	Street Name/ Location	RTPO	Total Cost	Project Cost/ Benefit	Project Ranking
T2-11	084992M	East Everett Avenue / BNSF Overcrossing, Everett	Everett Area	PSRC	$17,152,000	767	19
T2-8	085625H	212th St BNSF RR Grade Separation, Kent	212th St	PSRC	$66,000,000	832	20
T2-2	065839V	Miller St Grade Separation, Wenatchee	N Miller St	CDTC	$30,000,000	945	21
T2-21	085392N	S 56th and Washington St, Tacoma	S 56th St	PSRC	$22,500,000	975	22
T2-3	065831R	BNSF Wenatchee Switchyard Relocation, Wenatchee	Orondo St	CDTC	$32,000,000	1,200	23
T2-23	085396R	S 74th St and S Tacoma Way, Tacoma	S 74th St	PSRC	$22,500,000	1,363	24
T2-22	085382H	Pine St and S Tacoma Way, Tacoma	Pine St	PSRC	$22,500,000	1,540	25
T2-5	New	Edmonds Street Waterfront Connector, Edmonds	Edmonds Waterfront	PSRC	$29,905,000	1,783	26
T2-30	New	Railroad Overpass Project, Burlington	Gilkey Road	SCOG	$17,000,000	3,050	27
T2-9	New	SODO Rail Corridor Grade Separations, Seattle	South Downtown	PSRC	$154,425,000	3,735	28
T2-20	New	Pedestrian Overpass between Old Town Business District and Ruston Way, Tacoma	Tacoma Waterfront	PSRC	$40,000,000	12,800	29
T2-4	New	Bridge Street Non-Motorized Grade Separation, Wenatchee	Bridge St	CDTC	$4,000,000	N/A[1]	N/A[1]
T2-6	New	70th Avenue E Railroad Crossing, Fife	70th Ave E	PSRC	$26,202,000	N/A[1]	N/A[1]
T2-29	New	Jones Road/John Liner Railroad Undercrossing, Sedro-Woolley	Jones Road	SCOG	$7,700,000	N/A[1]	N/A[1]
T2-31	Rail Bridge	BNSF Rail Bridge over Skagit River, Burlington	East Whitmarsh Rd	SCOG	$60,000,000	N/A[1]	N/A[1]
T2-34	Various	East Aberdeen Mobility Improvements, Aberdeen.	East Aberdeen	GHCOG	$30,000,000	N/A[2]	N/A[2]

1. Does not improve an existing at-grade crossing.
2. Not included in the original 302 crossings, therefore was not able to be scored.

Tier 3 Results

All 24 crossings identified in Tier 3 were ranked based on their scores from the Phase 1 Study effort and are shown in Table 10. The only exception was that three crossings in Cheney were combined into one project at the request of the MPO because the City would likely fund only one improvement to a crossing and the study would determine the best crossings to improve or close.

Table 10. Tier 3 Project Priorities

Project ID	Crossing Number	Project Name	Street Name/ Location	RTPO	Total Cost	Crossing Ranking
T3-18 T3-19 T3-20	065970L 066315M 065971T	Study of Three Crossings in Cheney	F St/Cheney-Spangle Pine St Cheney-Plaza Rd	SRTC	$0	1
T3-10	084744N	SR 536/Kincaid near S 3rd Street, Mount Vernon	SR 536 - Kincaid	SCOG	$0	2
T3-11	084766N	SR 20/Avon Ave near S Spruce St, Burlington	SR 20 - Avon	SCOG	$0	3
T3-15	662514H	Argonne Road, Millwood	Argonne Rd	SRTC	$0	4
T3-12	084765G	Fairhaven near Spruce St, Burlington	E Fairhaven Ave	SCOG	$0	5
T3-14	662519S	Pines Road at I-90, Spokane Valley	Pines Rd	SRTC	$0	6
T3-16	662503V	Mission Avenue, Spokane	Mission Ave	SRTC	$0	7
T3-13	084739S	Old 99/Blackburn Road near S 3rd Street, Mount Vernon	Old 99/Blackburn	SCOG	$0	8
T3-1	104572R	Fruitland Street, Kennewick	N Fruitland St	BFCOG	$0	9
T3-17	066240R	Harvard Road / BNSF Crossing, Spokane County	Harvard Rd	SRTC	$26,000,000	10
T3-21	084806J	Cornwall Ave, Bellingham	Cornwall Avenue	WCOG	$0	11
T3-24	099190G	SR 22-Buena Way, Toppenish	SR 22-Buena Way	YVCOG	$0	12
T3-2	104568B	Edison/BNSF Grade Separation, Kennewick	N Edison St	BFCOG	$0	13
T3-3	919073D	Kellogg Street, Kennewick	N Kellogg St	BFCOG	$0	14
T3-22	396920W	Wharf Street, Bellingham	Wharf Street	WCOG	$0	15
T3-4	104574E	Washington Street Corridor Improvements, Kennewick	N Washington St	BFCOG	$149,500	16
T3-6	090072Y	Beach Drive, Vancouver	Beach Drive	RTC	$0	17
T3-7	090112U	6th Street, Washougal	6th Street	RTC	$0	18
T3-25	099189M	BNSF/ E McDonald Rd, Track Circuitry, Toppenish	McDonald Rd E	YVCOG	$0	19
T3-5	0900385S	Bowles Road, Benton County	Bowles Rd 9713	BFCOG	$0	20
T3-8	092421N	NW 122nd Street, Vancouver	NW 122nd Street	RTC	$0	21
T3-9	090074M	SE Chelsea Avenue, Vancouver	SE Chelsea Avenue	RTC	$0	22
T3-26	099186S	Branch Road, Toppenish	E Branch Rd	YVCOG	$0	23
T3-27	099216G	White Swan Branch Line, Safety Upgrade, Harrah	Lateral A Rd	YVCOG	$0	24

Chapter 5. Findings and Recommendations

During the course of the study, several findings were identified that are related to the need for road-rail solutions and funding for communities to implement the projects. Recommendations build from the findings to continue to explore ways to fund and implement railroad crossing projects across the State.

Findings

- The need for solutions to road-rail conflicts remains high and has been better quantified since the Phase 1 Study.
- Projects throughout the state are in various stages of project development and MPO/RTPO awareness of project status varies throughout the state.
- Planners and project sponsors are having a difficult time identifying, developing, and completing plans and projects to address road-rail conflicts because of the high costs and lack of available funding.
- Several state programs at WSDOT, UTC, FMSIB and other sources fund safety and mobility improvements at road-rail conflicts, but the need is still great.
- Besides the 2017 Update of the Freight and Goods Transportation System (FGTS), other data elements in the Phase 1 database have not substantially changed.

Recommendations

1. Implement ongoing efforts to continuously identify and recommend funding for road-rail conflict needs throughout the state.
2. Prioritize road-rail projects based substantially on the evaluation criteria developed through the Phases 1 and 2 study process.
3. Prior to providing design or construction funding to projects, ensure that the project sponsor has provided verifiable status of project development and committed funding.
4. Before providing funding to project sponsors, require that the project sponsor coordinate with other existing road-rail conflict funding programs.

Appendix A: Prioritized Project List

Road-Rail Project Priorities

Ranking based on Final Project Score (Total) versus Total Project Costs. Cost-Benefit Displayed in a Cost per Point (lower number is better).

Project ID	Crossing Number	Project Name	Street Name / Location	RTPO	Total Cost	Secured Funds	Original Crossing RANK	Original Crossing Total Score	Final Project Score (Total)	Final Project Score (Difference)	Project Cost / Benefit	PROJECT RANKING	Comments / Notes
TIER 1 Projects													
T1-13	066367E	Pines Road / BNSF Grade Separation (SR27/SR290), Spokane Valley	Pines Rd-SR27	SRTC	$22,891,000	$2,000,000	12	59.45	**133.68**	**74.23**	**171**	**1**	Improves two crossings
T1-2	065840P	McKittrick Street Grade Separation, Wenatchee	Hawley St	CDTC	$25,000,000	$0	172	11.84	**23.00**	**11.16**	**1,087**	**2**	
T1-3	396576X	South 228th Union Pacific Grade Separation, Kent	S 228th St	PSRC	$40,100,000	$21,932,897	84	24.13	**35.79**	**11.67**	**1,120**	**3**	
T1-5	New	Canyon Road Freight Corridor Improvements, Pioneer Way E to 52nd St E / 62nd Ave E, Pierce County	Puyallup Area	PSRC	$62,720,190	$22,368,125	0	0.00	**52.86**	**17.42**	**1,186**	**4**	Provides new grade separated crossing and closes the 52nd Street crossing
T1-1	Railroad	Connell Rail Interchange Project, Connell	Hawley St	BFCOG	$24,100,000	$10,000,000	0	0.00	**0.00**	**0.00**	**0**	**5**	Does not benefit an existing, nearby at-grade crossing
T1-16	N/A	Regional Beltway Phase II, Union Gap	New Crossing	YVCOG	$17,950,000	$400,000	0	0.00	**0.00**	**0.00**	**0**	**5**	Does not benefit an existing, nearby at-grade crossing
T1-4	084640G	I-5 @ SR 529 Interchange Improvements, Marysville	I-5 & SR 529	PSRC	$84,400,000	$84,400,000	18	47.31	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-6	085584F	South Lander Street Grade Separation, Seattle	S Lander St	PSRC	$123,000,000	$123,000,000	1	69.33	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-7	Multiple	I-5/Mounts Rd to Thorne Ln Corridor Improvements, Lakewood and Dupont	Lakewood, JBLM, DuPont Area	PSRC	$482,430,000	$482,430,000	249	20.09	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-8	092425R	River S Bridge Replacement, Ridgefield	Wildlife Refuge Rd	RTC	$8,759,600	$8,759,600	147	584.81	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-9	092428L	Pioneer St Rail Overpass, Port of Ridgefield	Division St	RTC	$14,923,000	$14,923,000	166	547.52	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-10	New	SR 14/Bingen Point Access Improvements, Port of Klickitat	Maple Street	RTC	$22,900,000	$22,900,000	0	0.00	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-11	084758W	Riverside Dr / 4th St N Safety Improvements, Mount Vernon	Riverside Dr	SCOG	$1,449,000	$1,449,000	21	53.03	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-12	066244T	Barker Road / BNSF Grade Separation, Spokane Valley	Barker Rd	SRTC	$18,738,000	$25,000,000	36	49.45	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-14	084845A	Birch Bay Lynden/Portal Way Signalization Project	Birch Bay - Lynden Road	WCOG	$3,900,000	$3,900,000	83	40.78	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
T1-15	077846P	F Street	F Street	WCOG	$730,000	$730,000	29	51.78	**0.00**	**0.00**	**0**	**N/A**	Fully Funded
		Total Costs (w/o fully funded projects)			**$192,761,190**	**$56,701,022**							
		Total Costs			**$953,990,790**	**$824,192,622**							
TIER 2 Projects													
T2-17	085680H	Zehnder Street BNSF Crossing at-grade improvements, Sumner	Zehnder St	PSRC	$300,000	$0	70	42.55	**52.39**	**9.84**	**6**	**1**	Low-cost safety upgrades
T2-19	Multiple	Railroad Crossing Delay Warning System, Seattle	South Downtown Seattle Crossings	PSRC	$250,000	$0	0	0.00	**37.05**	**37.05**	**7**	**2**	Low-cost ITS solution for several at-grade crossings
T2-24	085755E	Steilacoom Ferry Lane Modification, Pierce County	Union Ave	PSRC	$650,000	$0	40	49.08	**52.58**	**3.50**	**12**	**3**	Low-cost safety upgrades
T2-1	084464L	Division Street Crossing Safety & ADA Improvements, Cashmere	Division St	CDTC	$1,500,000	$0	129	34.24	**36.24**	**2.00**	**41**	**4**	Low-cost safety upgrades
T2-25	085703M	Stewart Avenue East/66th Avenue East, Pierce County	66th Avenue	PSRC	$4,000,000	$0	125	34.50	**43.20**	**8.70**	**93**	**5**	Low-cost safety upgrades
T2-16	396597R	8th St at UPRR crossing and Butte Ave SE intersection Signal, Sumner	8th St	PSRC	$4,704,000	$1,370,000	188	28.05	**29.95**	**1.90**	**157**	**6**	
T2-12	084605T	Chestnut St / Eclipse Mill Road Improvements from Pacific to 36th, Everett	Chestnut St	PSRC	$4,288,000	$0	238	22.19	**22.19**	**0.00**	**193**	**7**	Project is anticipated to provide little benefit based on the scoring methodology
T2-32	066377K	Park Road / BNSF Grade Separation, Spokane Valley	Park Road	SRTC	$23,000,000	$0	13	59.16	**112.41**	**53.25**	**205**	**8**	Addresses two problematic at-grade crossings

Road-Rail Project Priorities

Ranking based on Final Project Score (Total) versus Total Project Costs. Cost-Benefit Displayed in a Cost per Point (lower number is better).

Project ID	Crossing Number	Project Name	Street Name / Location	RTPO	Total Cost	Secured Funds	Original Crossing RANK	Original Crossing Total Score	Final Project Score (Total)	Final Project Score (Difference)	Project Cost / Benefit	PROJECT RANKING	Comments / Notes
T2-13	396581U	Willis St (SR 516)/Union Pacific Railroad Grade Separation, Kent	Willis St	PSRC	$26,500,000	$0	24	53.67	**114.43**	**60.75**	**232**	**9**	Provides benefits to other nearby crossings
T2-26	090117D	32nd Street/Russell, Washougal	32nd St/Russell	RTC	$17,863,000	$863,000	51	46.77	**69.27**	**22.50**	**258**	**10**	
T2-28	084775M	Cook Road Reconstruction, Skagit County	Cook Rd	SCOG	$15,500,000	$0	80	41.09	**53.40**	**12.32**	**290**	**11**	
T2-33	084853S	Bell Road - SR 548, WSDOT	Bell Road - SR 548	WCOG	$13,400,000	$550,000	116	35.11	**45.02**	**9.91**	**298**	**12**	
T2-27	084759D	College Way Railroad Grade Separation, Mount Vernon	College Way-SR 538	SCOG	$22,700,000	$0	26	53.50	**69.49**	**15.99**	**327**	**13**	
T2-7	085640K	Willis St BNSF Grade Separation, Kent	Willis St (SR 516)	PSRC	$61,000,000	$0	8	60.99	**131.83**	**70.84**	**463**	**14**	
T2-15	084646X	Grove Street RR Overcrossing, Marysville	Grove St	PSRC	$21,540,000	$1,000,000	123	34.57	**46.17**	**11.60**	**467**	**15**	
T2-18	085583Y	S. Holgate St. Rail Crossing Improvements, Seattle	S Holgate St	PSRC	$40,000,000	$0	10	59.97	**73.80**	**13.83**	**542**	**16**	
T2-10	084594H	Lenora St/BNSF Rail Line Overcrossing, Everett	Lenora St	PSRC	$17,300,000	$0	203	25.82	**31.42**	**5.59**	**551**	**17**	
T2-14	396575R	S 212th St/Union Pacific Railroad Grade Separation, Kent	212th St	PSRC	$33,000,000	$0	69	42.63	**56.08**	**13.45**	**588**	**18**	
T2-11	084992M	East Everett Avenue / BNSF Overcrossing, Everett	Everett Area	PSRC	$17,152,000	$0	264	16.89	**22.36**	**5.47**	**767**	**19**	
T2-8	085625H	212th St BNSF RR Grade Separation, Kent	212th St	PSRC	$66,000,000	$0	11	59.67	**79.32**	**19.66**	**832**	**20**	
T2-2	065839V	Miller St Grade Separation, Wenatchee	N Miller St	CDTC	$30,000,000	$0	223	24.65	**31.73**	**7.08**	**945**	**21**	
T2-21	085392N	S 56th and Washington St, Tacoma	S 56th St	PSRC	$22,500,000	$0	245	20.71	**23.08**	**2.37**	**975**	**22**	
T2-3	065831R	BNSF Wenatchee Switchyard Relocation, Wenatchee	Orondo St	CDTC	$32,000,000	$0	225	24.55	**26.67**	**2.12**	**1,200**	**23**	
T2-23	085396R	S 74th St and S Tacoma Way, Tacoma	S 74th St	PSRC	$22,500,000	$0	283	14.19	**16.51**	**2.32**	**1,363**	**24**	
T2-22	085382H	Pine St and S Tacoma Way, Tacoma	Pine St	PSRC	$22,500,000	$0	291	11.04	**14.62**	**3.58**	**1,540**	**25**	
T2-5	New	Edmonds Street Waterfront Connector, Edmonds	Edmonds Waterfront	PSRC	$29,905,000	$0	0	0.00	**16.77**	**16.77**	**1,783**	**26**	
T2-30	New	Railroad Overpass Project, Burlington	Gilkey Road	SCOG	$17,000,000	$0	0	0.00	**5.57**	**5.57**	**3,050**	**27**	
T2-9	New	SODO Rail Corridor Grade Separations, Seattle	South Downtown	PSRC	$154,425,000	$0	0	0.00	**41.34**	**41.34**	**3,735**	**28**	Project cost is very high
T2-20	New	Pedestrian Overpass between Old Town Business District and Ruston Way, Tacoma	Tacoma Waterfront	PSRC	$40,000,000	$0	0	0.00	**3.13**	**3.13**	**12,800**	**29**	
T2-4	New	Bridge Street Non-Motorized Grade Separation, Wenatchee	Bridge St	CDTC	$4,000,000	$0	0	0.00	**0.00**	**0.00**	**N/A**	**N/A**	Does not improve an existing at-grade crossing
T2-6	New	70th Avenue E Railroad Crossing, Fife	70th Ave E	PSRC	$26,202,000	$0	0	0.00	**0.00**	**0.00**	**N/A**	**N/A**	Does not improve an existing at-grade crossing
T2-29	New	Jones Road/John Liner Railroad Undercrossing, Sedro-Woolley	Jones Road	SCOG	$7,700,000	$0	0	0.00	**0.00**	**0.00**	**N/A**	**N/A**	Does not improve an existing at-grade crossing
T2-31	Rail Bridge	BNSF Rail Bridge over Skagit River, Burlington	East Whitmarsh Rd	SCOG	$60,000,000	$0	0	0.00	**0.00**	**0.00**	**N/A**	**N/A**	Does not improve an existing at-grade crossing
T2-34	Various	East Aberdeen Mobility Improvements, Aberdeen	Various	GHCOG	$30,000,000	$0	0	0.00	**0.00**	**0.00**	**0**	**N/A**	Not included in the original 302 crossings, therefore was not able to be scored.
			Total Costs		**$889,379,000**	**$3,783,000**							
TIER 3 Projects													
T3-18	065970L	Cheney Crossings Study	F St/Cheney-Spangle	SRTC	$0	$0	22	54.44	**96.44**			**1**	
T3-19	066315M	Cheney Crossings Study	Pine St	SRTC	$0	$0	64	43.19				**1**	
T3-20	065971T	Cheney Crossings Study	Cheney-Plaza Rd	SRTC	$0	$0	82	40.81				**1**	
T3-10	084744N	SR 536/Kincaid near S 3rd Street, Mount Vernon	SR 536 - Kincaid	SCOG	$0	$0	6	61.70	**61.70**			**2**	

Road-Rail Project Priorities

Ranking based on Final Project Score (Total) versus Total Project Costs. Cost-Benefit Displayed in a Cost per Point (lower number is better).

Project ID	Crossing Number	Project Name	Street Name / Location	RTPO	Total Cost	Secured Funds	Original Crossing RANK	Original Crossing Total Score	Final Project Score (Total)	Final Project Score (Difference)	Project Cost / Benefit	PROJECT RANKING	Comments / Notes
T3-11	084766N	SR 20/Avon Ave near S Spruce St, Burlington	SR 20 - Avon	SCOG	$0	$0	23	54.43	**54.43**			**3**	
T3-15	662514H	Argonne Road, Millwood	Argonne Rd	SRTC	$0	$0	30	51.58	**51.58**			**4**	
T3-12	084765G	Fairhaven near Spruce St , Burlington	E Fairhaven Ave	SCOG	$0	$0	34	50.38	**50.38**			**5**	
T3-14	662519S	Pines Road at I-90, Spokane Valley	Pines Rd	SRTC	$0	$0	38	49.25	**49.25**			**6**	
T3-16	662503V	Mission Avenue, Spokane	Mission Ave	SRTC	$0	$0	46	47.56	**47.56**			**7**	
T3-13	084739S	Old 99/Blackburn Road near S 3rd Street, Mount Vernon	Old 99/Blackburn	SCOG	$0	$0	49	47.07	**47.07**			**8**	
T3-1	104572R	Fruitland Street, Kennewick	N Fruitland St	BFCOG	$0	$0	52	46.50	**46.50**			**9**	
T3-17	066240R	Harvard Road / BNSF Crossing, Spokane County	Harvard Rd	SRTC	$26,000,000	$0	55	45.96	**45.96**			**10**	
T3-21	084806J	Cornwall Ave, Bellingham	Cornwall Avenue	WCOG	$0	$0	68	42.82	**42.82**			**11**	
T3-24	099190G	SR 22-Buena Way, Toppenish	SR 22-Buena Way	YVCOG	$0	$0	79	41.19	**41.19**			**12**	
T3-2	104568B	Edison/BNSF Grade Separation, Kennewick	N Edison St	BFCOG	$0	$0	81	41.04	**41.04**			**13**	
T3-3	919073D	Kellogg Street, Kennewick	N Kellogg St	BFCOG	$0	$0	85	40.51	**40.51**			**14**	
T3-22	396920W	Wharf Street, Bellingham	Wharf Street	WCOG	$0	$0	102	37.40	**37.40**			**15**	
T3-4	104574E	Washington Street Corridor Improvements, Kennewick	N Washington St	BFCOG	$149,500	$0	132	33.74	**33.74**			**16**	
T3-6	090072Y	Beach Drive, Vancouver	Beach Drive	RTC	$0	$0	162	30.08	**30.08**			**17**	
T3-7	090112U	6th Street, Washougal	6th Street	RTC	$0	$0	176	29.03	**29.03**			**18**	
T3-25	099189M	BNSF/ E McDonald Rd, Track Circuitry, Toppenish	McDonald Rd E	YVCOG	$0	$0	191	27.42	**27.42**			**19**	
T3-5	0900385S	Bowles Road, Benton County	Bowles Rd 9713	BFCOG	$0	$0	197	27.08	**27.08**			**20**	
T3-8	092421N	NW 122nd Street, Vancouver	NW 122nd Street	RTC	$0	$0	210	25.43	**25.43**			**21**	
T3-9	090074M	SE Chelsea Avenue, Vancouver	SE Chelsea Avenue	RTC	$0	$0	221	24.85	**24.85**			**22**	
T3-26	099186S	Branch Road, Toppenish	E Branch Rd	YVCOG	$0	$0	280	14.37	**14.37**			**23**	
T3-27	099216G	White Swan Branch Line, Safety Upgrade, Harrah	Lateral A Rd	YVCOG	$0	$0	302	0.00	**0.00**			**24**	