



Transportation Operations

2019–2021 Low Cost Enhancement Program

FINAL REPORT



DECEMBER, 2021

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DEFINITIONS

Category	Definition
Intersection	Project addresses crash trends, contributing factors, or mobility issues at an intersection.
Lane Departure	Project addresses engineering countermeasures associated with a vehicle leaving the lane. These may include high friction surface treatment (HFST), rumble strips, guardrails, and other treatments particular to a location.
Pedestrian/Bicycle	Project addresses identified crash risks or mobility issues for bicyclists or pedestrians.
Mobility	Project addresses mobility on the system; can include Intelligent Transportation System (ITS) projects.
Signs	Projects to implement Guide, Warning, Regulatory, or Low Clearance signs.
Pavement Markings	Project involves striping.
ITS spending	ITS-related projects.
Traffic Studies	Any research or traffic studies.
Project Design	Labor to design and scope projects.
Miscellaneous	Activities that don't fit in another category. Examples include: WSP aerial markings, Test sites, Tort claim investigations, illumination.
Low Cost Actions	Bundle of many small cost safety and mobility projects – usually \$5,000 or less – under one job number.

PROGRAM OVERVIEW

Low Cost Enhancement (LCE) projects are small, low cost – usually less than \$100,000 – projects that can be quickly implemented to reduce crashes, reduce the potential for crashes, or improve mobility. LCEs quickly address emerging crash trends and mobility issues. These projects bring near-term relief to operational deficiencies, and are often the first step in implementing incremental, long-term corridor strategies.

Because of their low cost and quick implementation, LCE projects are often very practical solutions to emerging needs. LCE projects may often postpone or lessen the need for larger capital projects.

LCE projects generally come in three sizes:

1. **Small.** Under \$5,000. When projects are under \$5,000, they are often bundled together under “Low Cost Actions,” but they can also stand alone.
2. **Medium.** \$5,000 – \$50,000.
3. **Large.** Over \$50,000.

LCE projects often originate when concerned citizens, elected officials, local agencies, or region staff identify a safety or mobility concern along a state highway. Region Transportation Office staff analyze the concern and decide to create an LCE project to address the concern. Additionally, the Transportation Operations’ Field Assessment Program identifies larger-scale opportunities for LCE through a systematic screening process.

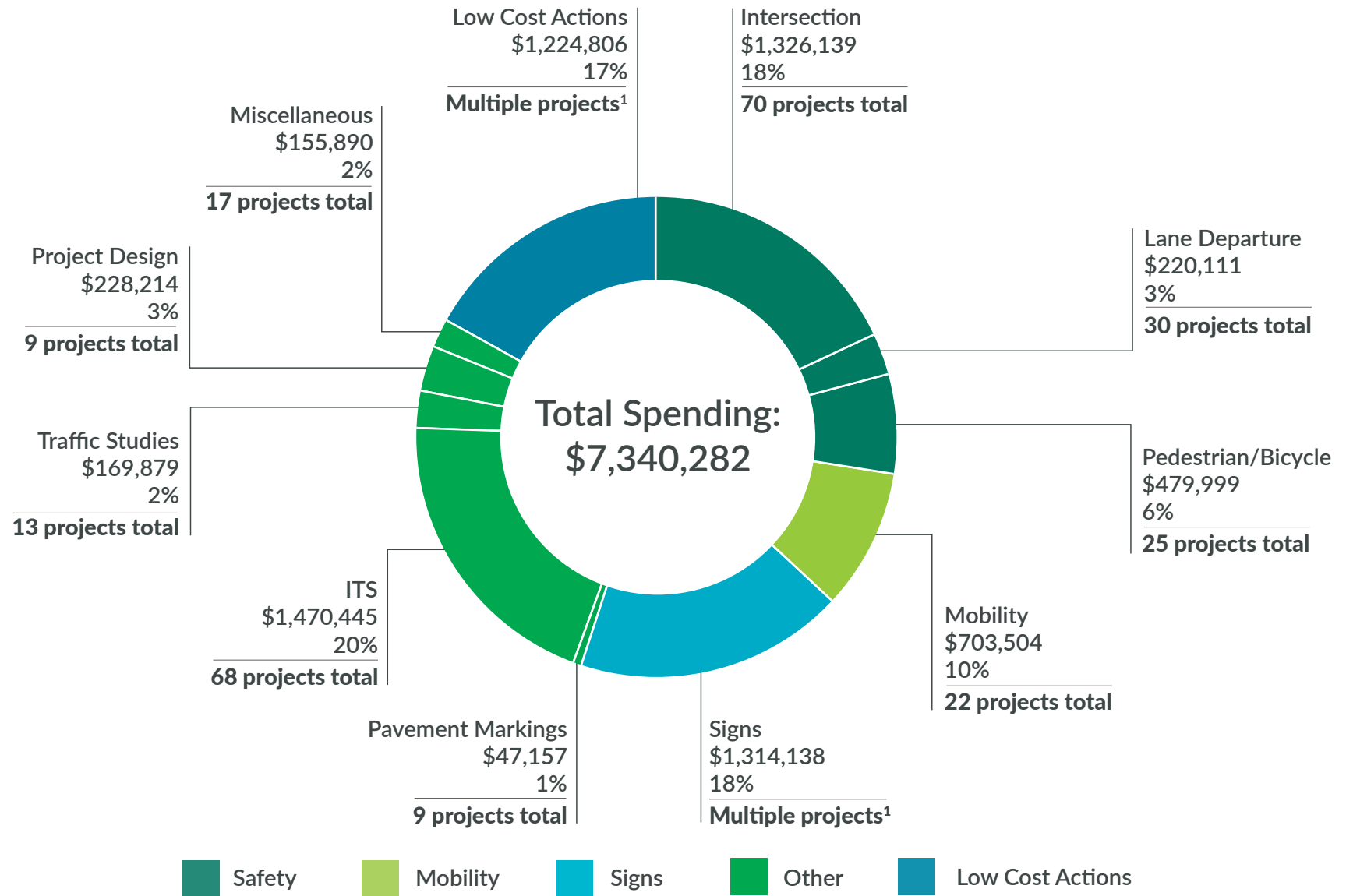
The 2019-2021 Low Cost Enhancement Program

In 2019-21, The Transportation Operations Division delivered \$7.3 million in low-cost enhancement projects. This included over 258 projects, plus numerous low-cost actions and bundled signing projects. Of the \$7.3 million, \$6.9 million went directly to implement on-the-ground projects. An additional \$170,000 went to traffic studies, and \$228,000 went to staff time to design projects.

This report fulfills the requirements in SSB 5165, Section 216 (1):

\$6,000,000 of the motor vehicle account—state appropriation is provided solely for low-cost enhancements. The department shall give priority to low-cost enhancement projects that improve safety or provide congestion relief. By December 15th of each odd-numbered year, the department shall provide a report to the legislature listing all low-cost enhancement projects completed in the prior fiscal biennium.

Statewide Low Cost Enhancement Spending by Type of Project 2019-2021

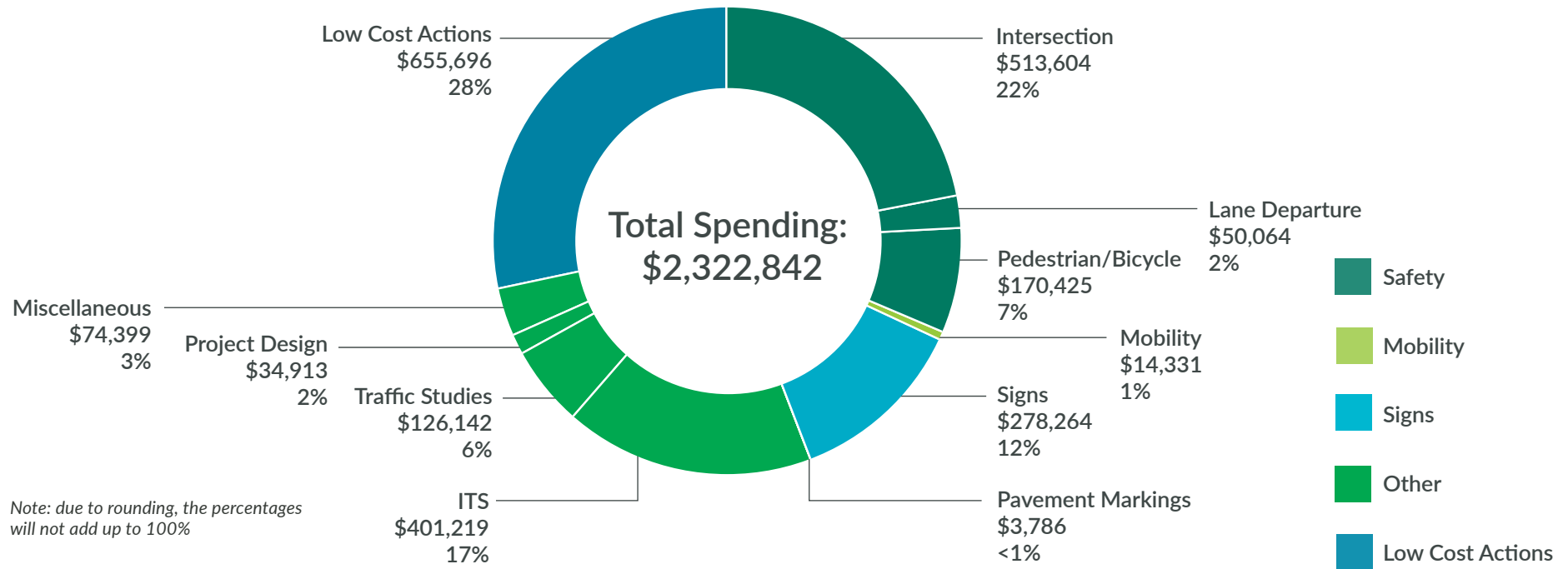


Note: 26 projects have more than one category assigned to them and are counted more than once in the graph.

¹ Sign and Low Cost Action projects have many low-cost projects that do not get counted individually.

NORTHWEST REGION

NWR: Low Cost Enhancement Spending by Type of Project – 2019-2021



All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
King Area Low Cost Actions	\$255,560	Low Cost Actions		
Mount Baker Low Cost Actions	\$205,596	Low Cost Actions		
Snohomish Area Low Cost Actions	\$194,539	Low Cost Actions		
NWR Curve Warning Signs	\$122,767	Lane Departure	Signs	
Maxtime Cards, License, and Renewal	\$111,916	Intersection		
I-90 On-Ramp at Rainier – Ramp Meter Restripe & Pedestrian Enhancements	\$86,547	Pedestrian/Bicycle	Mobility	ITS spending
SR 203 in Sammamish - Signal Cameras and Central Signal System Connections	\$79,177	Intersection	ITS spending	



NORTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
Fast Act Weight Limit Signs	\$67,101	Signs		
I-90, I-405 and SR 522 Ramp Meter Enhancement and ITS	\$65,780	ITS spending		
SR 526 at MP 1.06 - Relocate Impact Attenuator	\$56,593	Miscellaneous		
SR 96 at Penny Creek School - Flashing Beacons Grant Match	\$54,685	Pedestrian/Bicycle		
SR 527 Bothell to Mill Creek - Overhead Fibers	\$50,954	ITS spending		
HOV/Managed Urban Lane (MUL) Pooled Fund Study	\$50,000	Traffic Studies		
SR 527 -10 Fiber Splices	\$35,154	ITS spending		
US 2 at Eagle Falls - No Parking Signs and Pavement Marking on Shoulder	\$31,948	Pedestrian/Bicycle		
SR 520 at 52st EB & WB - Signal Cabinet Upgrade	\$28,732	Intersection		
Replace Controllers - Eight Locations Regionwide	\$28,314	ITS spending		
TMC Pooled Fund Study	\$25,000	Traffic Studies		
SR 527 & SR 96 - Loop Work For Adaptive Signal Controller	\$24,734	Intersection		
SR 522 at NE 195th - Offramp Fiber & Camera	\$24,686	ITS spending		
I-5 at Bakerview NB & SB - Uninterruptable Power Supply	\$24,074	Intersection		
SR 900 Corridor Study	\$22,216	Traffic Studies		
I-5 at Interurban - Improve Pedestrian Crossing	\$20,856	Pedestrian/Bicycle		
SR 20 at Coronet Bay - Flashing Yellow Arrow & Back Plates	\$18,291	Intersection		
SR 202 Sammamish to Fall City - Corridor Study	\$18,178	Traffic Studies		
SR 92 at Machias - Active Warning Signs	\$17,527	Intersection		
I-5 at Main In Ferndale - Cabinet Replacement	\$17,247	Intersection		
I-405 at SR 527 NB - Signal Head Relocation	\$16,788	Intersection		
Replace 3 Cameras	\$16,251	ITS spending		
SR 20 Spur at 22nd St - Signal Cabinet Upgrade	\$16,105	Intersection		
Environmental Investigation	\$15,404	Project Design		

NORTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
Bridge Clearance Signing	\$15,059	Signs		
Snohomish County Adaptive Signals - Phase 2	\$14,408	ITS spending		
I-5 at 220th in Mountlake Terrace - Signals	\$14,343	Intersection		
I-5 at Lynnwood - Guide Sign	\$14,225	Signs		
I-5 from Ebey Slough Bridge to SR 531- Ramp meter.	\$13,879	ITS spending		
I-5 Express Lanes - Slippery When Wet Signs	\$13,739	Signs		
SR 531 at 67th Ave NB & SB - Flashing Yellow Arrow	\$13,114	Intersection		
SR 9 at 60th - Left Lane Restriction	\$12,640	Intersection		
SR 203 at Tolt Rd - Sign & Striping	\$12,600	Intersection		
SR 531 at I-5 - Pedestrian Signs, Crosswalk Markings, and Detectable Warning Surfaces	\$12,437	Pedestrian/Bicycle		
SR 20 at March Pt/Christianson - Signal Cabinet Upgrade	\$12,118	Intersection		
I-5 at Main in Ferndale - Flashing Yellow Arrow	\$11,833	Intersection		
SR 20 at Sharpes Corner - Striping And Signing	\$11,534	Intersection		
SR 530 at Arlington Heights Rd - Flashing Yellow Arrow	\$11,446	Intersection		
Radar Speed Signs	\$11,017	ITS spending		
SR 9 at MP 51.40-51.90 - Curve Signing	\$10,678	Lane Departure		
SR 527 at Dumas - Flashing Yellow Arrow	\$10,615	Intersection		
Material Lab Investigation	\$10,386	Project Design		
I-5 SB to Union - Signing/Delineation	\$9,714	Lane Departure		
US 2 from I-5 to Bickford - Tow Zone Signs	\$9,671	Signs		
Regionwide HOV Violation Signs	\$9,389	Signs		
SR 900 at S 129th St - Traffic Signal and Pavement Marking Enhancements	\$9,386	Pedestrian/Bicycle		
SR 164 at 244th - Flashing Yellow Arrows	\$9,329	Intersection		
SR 99 at S154th - Flashing Yellow Arrow Right Turn Overlap	\$9,224	Intersection		

NORTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 9 at SR 531 - Roundabout Striping Modification	\$9,188	Intersection		
SR 20 at E Whidbey Ave EB - Flashing Yellow Arrows	\$8,989	Intersection		
NWR Staffing Costs	\$8,730	Miscellaneous		
SR 99 at 154th - Audible Pedestrian System	\$8,664	Intersection		
SR 203 at Snoqualmie Valley - Trail Crossing Pavement Markings and Speed Limit Change	\$8,601	Pedestrian/Bicycle		
Spokane S/6th Ave S to I-5 SB - Curve Warning Signs	\$8,515	Lane Departure		
SR 526 - Signing	\$8,447	Signs		
SR 525 at Harbour Pt Shopping Center - Flashing Yellow Arrows	\$8,021	Intersection		
Signal Maintenance Investigation	\$8,016	Project Design		
SR 410 at 284th - Flashing Yellow Arrows	\$7,942	Intersection		
Black Cat Speed Data Collection Units	\$7,919	Traffic Studies		
SR 202 at North Bend Way - Flashing Yellow Arrows	\$7,701	Intersection		
SR 169 at Witte - Flashing Yellow Arrows	\$7,196	Intersection		
SR 202 from SR 203 to Fish Hatchery - No Parking Signs on Shoulder	\$6,874	Pedestrian/Bicycle		
SR 516 at 172 - Flashing Yellow Arrows	\$6,528	Intersection		
320th EB Ramp to I-5 NB - Curve Warning	\$6,490	Lane Departure		
Generator Relocation - Dayton to Marysville	\$6,459	ITS spending		
SR 525 at SR 526 (84th St SW) - Flashing Yellow Arrows	\$6,007	Intersection		
SR 20 Wrong Way Improvements - Phase 1	\$5,814	Signs		
Advanced Traffic Controller Cabinets	\$5,609	ITS spending		
SR 202 at Sahalee - Camera Replacement	\$5,458	ITS spending		
Tort Claim Investigation	\$5,402	Miscellaneous		
SR 20 at MP 126.4 - Curve Warning Signs	\$5,395	Lane Departure		

NORTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 410 at Garrett - Flashing Yellow Arrows	\$5,295	Intersection		
SR 539 at Kok Rd - Flashing Yellow Arrows	\$4,995	Intersection		
SR 532 at 82nd Ave NW (Pioneer Hwy) - Flashing Yellow Arrows	\$4,659	Intersection		
I-5 Offramp to Boeing Access Rd - No Parking Signs	\$4,333	Signs		
SR 9 at MP 33.33 - Flashing Beacon	\$4,276	Lane Departure		
I-5 NB Marysville Vicinity - Connect Loops To Cabinet	\$4,147	ITS spending		
SR 520 at 92nd - Pedestrian Signing and Markings at the Roundabout	\$4,025	Pedestrian/Bicycle		
I-90 at W Mercer Way - Remove HOV Marks	\$3,786	Pavement Markings		
SR 525 at E Bush Point/S Honeymoon Bay - Restripe	\$3,723	Intersection		
SR 531 at 51st Ave NE - Flashing Yellow Arrows	\$3,367	Intersection		
SR 18 WB at I-5 - Overhead Sign Update	\$3,203	Signs		
Regionwide Bridge Clearance Signing	\$2,717	Signs		
SR 20 Memorial Highway Signs	\$2,634	Signs		
I-405 at NE 70th - Bike Box	\$2,487	Pedestrian/Bicycle		
SR 410 at 241st Ave SE - One Way Sign	\$2,106	Signs		
SR 900 Open House	\$2,100	Traffic Studies		
Regionwide Unstable Slopes Signing	\$2,056	Signs		
SR 104 near 47th Ave NE - Utility Pole Removal	\$1,939	Miscellaneous		
SR 522 at MP 6.33 - Remove Left Turn into Private Driveway	\$1,735	Miscellaneous		
SR 509 at Cloverdale St/1st Ave S - Signal Upgrade	\$1,591	Intersection		
SR 526 at Broadway - Wrong Way Improvements	\$1,199	Intersection		
SR 96 I-5 to SR 9 - Paving for NB On-Ramp meter	\$1,163	ITS spending		
Utility Investigation	\$1,108	Project Design		
SR 169 Maple Valley Open House	\$728	Traffic Studies		

NORTHWEST REGION

2019-2021 Project Highlights

I-90 ON-RAMP AT RAINIER – RAMP METER RESTRIPE & PEDESTRIAN ENHANCEMENTS

\$86,547

The ramp meter on the ramp from northbound Rainier Ave S to eastbound I-90 manages demand entering I-90, which is regularly congested during peak periods. In the previous configuration, the on-ramp had a single general-purpose lane with an adjacent HOV bypass. Due to heavy mainline congestion and limited ramp storage capacity, queues from the single general-purpose lane would extend onto northbound Rainier Ave S.

The queues in the single general-purpose lane affected traffic on northbound Rainier Ave S, impacting transit progression northbound toward downtown Seattle. Additionally, pedestrians attempting to cross the ramp during peak periods had to navigate through a lane of queued vehicles, while also observing approaching free flow traffic in the HOV lane. To mitigate these issues, Northwest Region re-channelized the entrance to the ramp, reducing the option-drop configuration to a single, exit-only lane configuration. The region converted the HOV bypass to a general-purpose metered lane, and the right lane to a metered shoulder for additional storage.

This configuration improves the experience for both pedestrians and transit. Pedestrians now only cross one lane of traffic, reducing crossing distance as well as eliminating the possibility of a single lane of stopped traffic blocking pedestrians' views of approaching traffic in the next lane. The metered shoulder created 800 extra feet of storage space, which allows for greater flexibility

during metered conditions and facilitates transit progression by shifting queues from northbound Rainier Ave S to the on-ramp.

This project also provides a future benefit: it will improve pedestrian safety crossing the ramp for users of the upcoming LINK light rail station, as well as northbound transit mobility heading to the LINK station and downtown Seattle.



Before: aerial of ramp with two full-time lanes, a general-purpose lane, and an HOV bypass



After: ramp reduced to a single-lane entrance with a metered shoulder downstream of the striping

NORTHWEST REGION

2019-2021 Project Highlights

SR 9 AT 60TH - LEFT TURN RESTRICTION

\$12,640

The 60th St. intersection is near the Marysville east city limits and is part of unincorporated Snohomish County. The intersection primarily provides access for rural low-density residential housing. Over the past five years, there have been several crashes at this intersection; 85% involved southbound vehicles turning left at the intersection from SR 9 to 60th and experiencing a rear-end crash. There were two serious crashes in 2018: one overturn and one rear end.

Northwest Region installed new pavement markings, pylons, and signing to prohibit all left turns and enhance traffic safety at the intersection. Motorists are able to travel to and from SR 9 through the 42nd Street Northeast intersection.

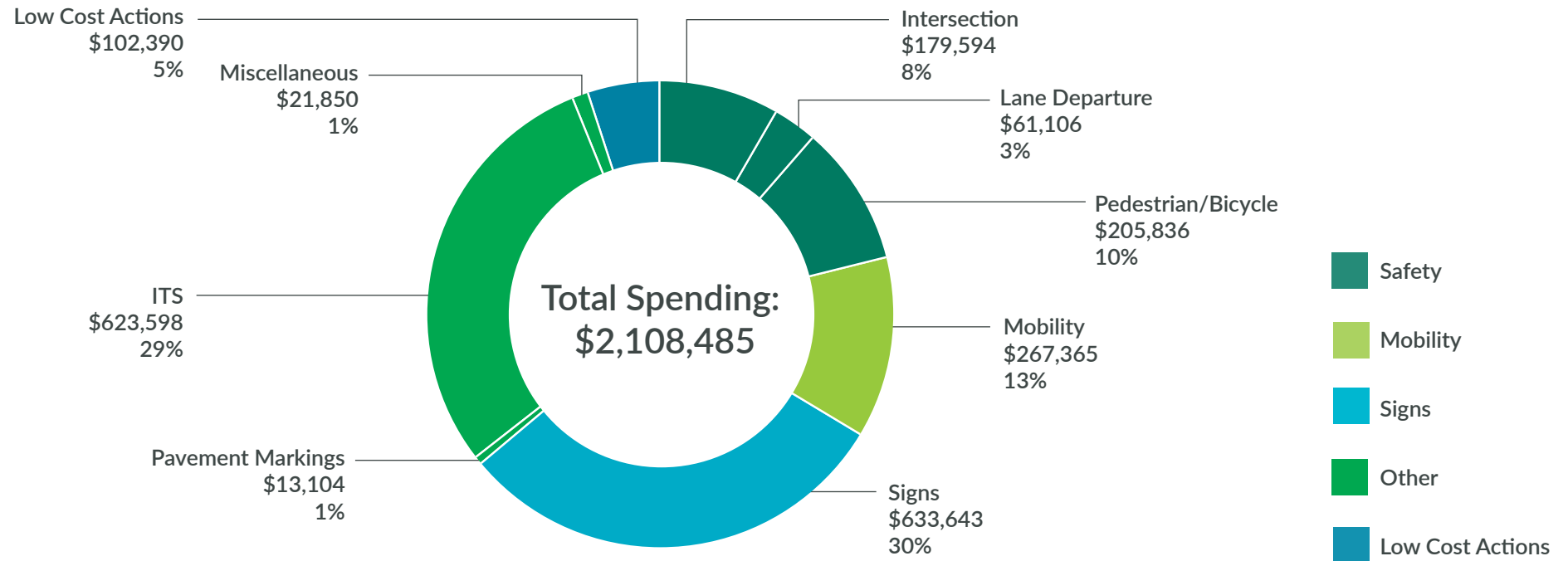
NWR monitored and revisited the project site to increase density and length of the pylon application along the centerline. This was intended to achieve compliance with the turn restriction.



Pylons, striping, and signing to prevent left-hand turns from SR 9 to 60th.

OLYMPIC REGION

OR: Low Cost Enhancement Spending by Type of Project – 2019-2021



All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
Regionwide Signal Controller Improvements	\$220,212	Pedestrian/Bicycle	Mobility	ITS spending
SR 512 from I-5 to SR 7 EB - Congestion Management	\$183,703	Mobility	ITS spending	
Low Cost Actions - Regulatory Signs	\$171,791	Signs		
Regionwide Signing	\$161,069	Signs		
Low Cost Actions - Warning Signs	\$139,194	Signs		
Low Cost Actions - Intersections	\$138,013	Intersection		

OLYMPIC REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
I-5 & SR 16 - Cameras	\$137,438	ITS spending		
Low Cost Actions - Guide Signs	\$107,469	Signs		
Low Cost Actions - General	\$94,622	Low Cost Actions	Multiple	
US 101 and SR 104 Highway Advisory Radio Upgrade	\$78,199	ITS spending		
Low Cost Actions - Pedestrian/Bicyclist	\$50,188	Pedestrian/Bicycle		
SR 512 at Golden Given Road East - CCTV	\$42,518	ITS spending		
SR 512 at SR 161 - CCTV	\$35,555	ITS spending		
TMC Video Distribution Software Upgrade	\$34,927	ITS spending		
LCE Project Design and Support	\$34,885	ITS spending	Mobility	
SR 507 at East Gate Road - Wavetronix Signal Detection	\$34,704	ITS spending		
SR 7 from Roy Wye to Military Rd E - CCTV Camera Installation	\$25,895	ITS spending		
US 101 at Louella Rd - Left Turn Lane	\$24,970	Mobility	Intersection	
Tacoma Narrows Bridge Cameras	\$24,234	ITS spending		
Low Cost Actions - Lane Departure	\$24,044	Lane Departure		
SR 16 - Communications Upgrade for Six Ramp Meters	\$23,002	ITS spending		
US 101 to NB I-5 On Ramp - Warning Signs	\$22,436	Lane Departure	Signs	
SR 162 at Calistoga - ADA Accommodation	\$19,805	Pedestrian/Bicycle		
SR 160 South Worth - Ferry Holding Lane	\$19,679	Miscellaneous		
SR 99 54th to 59th - Signal Improvements	\$18,136	ITS spending		
US 101 in Hoodspport - Rectangular Rapid Flashing Beacons (RRFBs) and Radar Speed Feedback Signs	\$17,846	Pedestrian/Bicycle		
Traffic Management Center - Network Communication Improvements	\$17,078	ITS spending		
Signal Controller Conflict Tester Unit	\$13,188	ITS spending		
SR 115 at Damon Rd and Point Brown Ave - Warning Signs	\$12,517	Lane Departure	Signs	

OLYMPIC REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 507 at SR 702 - Traffic Cameras Installed	\$11,802	ITS spending		
SR 109 at Simpson Ave - Rectangular Rapid Flashing Beacon & Warning Signs at School Crosswalk	\$11,772	Pedestrian/Bicycle	Pavement Markings	
I-5 at Mounts Rd - All Way Stop	\$11,418	Intersection		
US 101 in Brinnon Area - Elk Crossing Warning Signs	\$11,403	Signs		
US 101 at Black Lake - Updated ADA Push Buttons	\$9,955	Pedestrian/Bicycle		
SR 16 at Center Street Off-Ramp - Warning Signs	\$9,159	Signs		
SR 16 in Gig Harbor - Interchange Guide Signs	\$9,134	Signs		
US 12 at Rochester Middle School - Rectangular Rapid Flashing Beacons	\$8,689	Pedestrian/Bicycle		
US 12 at Chehalis St - Left Turn Lane	\$8,023	Intersection		
I-5 Off-Ramp to SR 705 - City Center Warning Signs	\$7,788	Signs		
SR 305 at Bond Rd - Signal Improvements	\$7,132	Mobility		
SR 12 at Chehalis and Tyler Streets - Signal Improvements	\$6,451	Mobility	ITS spending	
SR 167 at 66th Ave E - Signal Improvements	\$5,873	ITS spending		
SR 105 East of SR 105 Spur to Edward P Smith Rd - Roadway Departure Delineation	\$5,650	Lane Departure		
US 12 at I-5 Grand Mound - Regulatory Signing & Median Crosshatching	\$5,555	Intersection		
US 101 at McDonald Cove - Warning Signs	\$5,386	Lane Departure		
SR 702 at Kinsman Rd - Intersection Warning Sign	\$5,224	Intersection		
I-5, 54th Interchange Left Turn Improvements	\$5,119	Intersection		
SR 16 at Wollochet Dr - Data Collection	\$4,272	ITS spending		
US 101 Rest-Awhile RV Park - Pedestrian Signs	\$4,204	Pedestrian/Bicycle		
I-5 at 41st Division Dr - Centerline Striping	\$3,910	Pavement Markings		
SR 117 at W Lauridsen Blvd - Install Intersection Warning Signs, and at 101 - Intersection Crosshatching	\$3,698	Pavement Markings		

OLYMPIC REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 167 at Stewart Rd - Guide Signs	\$3,450	Low Cost Actions		
SR 160 at Harrison Ave - Rectangular Rapid Flashing Beacon & Reflective Sign Post Cover	\$3,247	Signs		
SR 107 at Blue Slough Rd - Intersection Warning Signs	\$2,756	Low Cost Actions		
SR 116 at Hadlock Bay & Smith Road - Intersection Warning Signs	\$2,608	Lane Departure		
US 101 SB Merge at SR 8	\$2,495	Low Cost Actions		
SR 161 at Graham Hill - Evaluation of Shoulder Depth	\$2,140	Miscellaneous		
I-5, SR 16, SR 304 - HOV Lane Penalties Signs	\$1,740	Signs		
Camera Upgrade (Analog to Digital)	\$1,116	ITS spending		



OLYMPIC REGION

2019-2021 Project Highlights

US 101 AT LOUELLA RD - LEFT TURN LANE

\$24,970

This intersection had a history of rear-end crashes on northbound US 101 (towards Sequim) due to a lack of left-turn storage. The location was also a source of community concern.

WSDOT restriped US 101 to provide a left-turn lane within the existing roadway, allowing left-turning motorists to wait safely in their own lane without impeding through-traffic on US 101. Due to the limited roadway width and adjacent guardrail, the Olympic Region worked closely with local agencies and bicyclist groups to provide signed bicycle detour routes to help users avoid the narrowed shoulders of US 101.

Based on feedback from the bicyclist groups, another benefit is increased wayfinding signage for the parallel Olympic Discovery Trail.

Olympic Region collaborated with other WSDOT Offices and Port Angeles Maintenance to build the left turn lane. Low Cost Enhancement funds were \$24,970, and the total cost of the project was approximately \$54,000.



New left-turn lane on northbound US 101 at Louella Rd.

OLYMPIC REGION

2019-2021 Project Highlights

US 101 IN HOODSPORT - RECTANGULAR RAPID FLASHING BEACONS (RRFBs) AND RADAR SPEED FEEDBACK SIGNS

\$17,846

WSDOT partnered with Mason County to address a community request for enhanced pedestrian crossings and speed management throughout the community. The Olympic Region added RRFBs to three crosswalks, and installed radar speed feedback signs on each end of US 101 approaching Hoodsport.

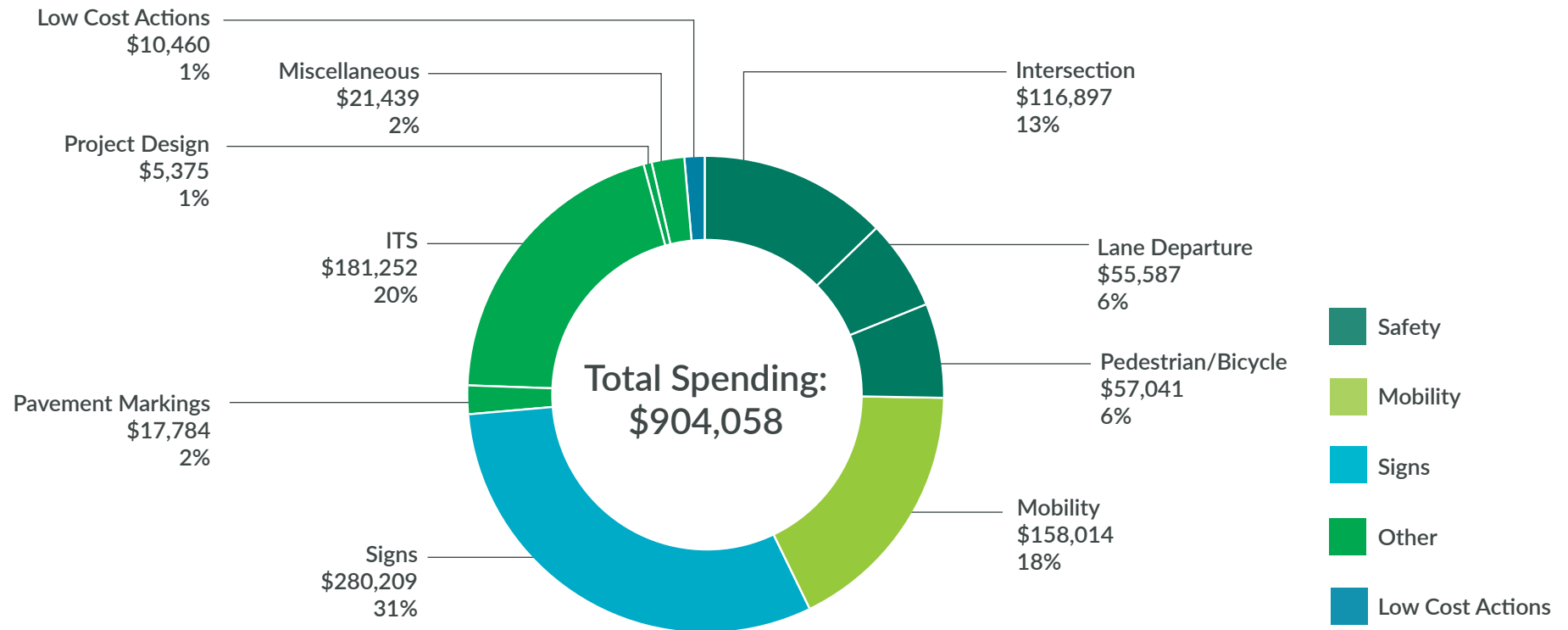
The project improved driver awareness of the low-speed context of US 101 through Hoodsport, and added several enhanced pedestrian crossings throughout the community.



New Rectangular Rapid Flashing Beacons on US 101 in Hoodsport.

NORTH CENTRAL REGION

NCR: Low Cost Enhancement Spending by Type of Project – 2019-2021



All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
US 2 in Leavenworth - Pedestrian and Signal Modifications	\$127,875	Pedestrian/Bicycle	Mobility	
Regionwide Camera Replacement	\$67,039	ITS spending		
US 97 at Ingalls Creek Rd - Two Way Left Turn Lane	\$49,442	Intersection		
Area 1 Signs	\$42,266	Signs		
Regionwide Signal Display And Detection Operations	\$41,839	Intersection	Mobility	Low Cost Actions

NORTH CENTRAL REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 28 at Eastmont Ave - Automated Traffic Signal Performance Measures & Travel Time Detection	\$41,305	ITS spending		
SR28/SR281 in Quincy - Signal Detection	\$34,545	Intersection	Mobility	
SR 17 in Moses Lake - Radio Network For Signals	\$29,892	ITS spending		
US 2 Near Cashmere - Travel Time Detection	\$26,971	Mobility		
Area 3 Signs	\$26,707	Signs		
Dodson Road Camera And Radio Upgrade	\$26,469	ITS spending		
I-90 Vantage Bridge to Median Crossing - Signing	\$24,449	Signs		
US 2 from Orondo to near Road A NW - Signing	\$23,346	Signs		
SR 243/RD 26 intersection channelization	\$22,527	Intersection		
US 2 from NCR boundary to Railroad Bridge - Signing and Linear Delineator System Markers	\$22,096	Lane Departure	Signs	
SR 155 Whole Route - Signing	\$18,581	Signs		
I90/SR171 in Moses Lake - Advanced Loop Detection	\$17,884	Intersection	Mobility	
I-90 from Vantage Bridge to the Adams County Line - Signing	\$17,156	Signs		
SR 28 Hydro Park to near Rock Island City - Signing	\$15,502	Signs		
US 17 from SR 260 to Kittelson Road - Signing	\$12,633	Signs		
US 2 in Leavenworth - Rectangular Rapid Flashing Beacons (RRFBs), Camera, And Radio	\$11,781	Pedestrian/Bicycle	ITS spending	
Area 4 Signs	\$11,508	Signs		
SR 28 in East Wenatchee - Shoulder Rumble Strip Fill In	\$11,305	Miscellaneous		
US 2, SR 17, SR 28, US 97 - Signing Projects	\$10,470	Signs		
SR 17 from SR 174 to SR 97 - Signing	\$9,956	Signs		
Regionwide Curve Warning Sign Replacement	\$8,911	Lane Departure		
SR 20 from Easy Pass Trailhead to Early Winters Cr - Signing	\$8,638	Signs		

NORTH CENTRAL REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
SR 28 in Ephrata - Cameras	\$8,426	Mobility	ITS spending	
Cart for Applying Durable Pavement Markings	\$7,915	Pavement Markings		
SR 971 near Lake Chelan State Park - Linear Delineator System	\$7,444	Lane Departure		
SR 172 Whole Route - Signing	\$7,347	Signs		
SR 28 in East Wenatchee - Installed Inlaid Plastics on Ramp for Striping Durability	\$6,999	Pavement Markings		
SR 262 Whole Route - Signing and Linear Delineator System Markers	\$6,716	Lane Departure	Signs	
SR 174 Whole Route - Signing	\$6,406	Signs		
SR 171 Whole Route - Signing	\$6,274	Signs		
US 2 near Jameson Lake Rd - Guardrail Length Changes at WSDOT Pit	\$6,222	Lane Departure		
SR 28 at 7th Avenue - Restripe	\$5,787	Intersection		
SR 26 at WSU - Safety Campaign	\$5,544	Miscellaneous		
SR 170 Whole Route - Signing	\$5,498	Signs		
SR 17 - Design Work For Restriping at M Rd, 2 SE, Coyan, Paradise, and Booker	\$5,375	Project Design		
Area 2 Signs	\$5,317	Signs		
SR 28 Flat Obstacle Hazard Markers for Gore Point at S7 Ramp & MP 4.8B	\$5,194	Lane Departure		
SR 243 near Mattawa - Signing	\$5,136	Signs		
US 2 at Dryden Ave. - Signal Install Camera	\$4,269	ITS spending		
SR 20 at Hanging Rock - Linear Delineator System	\$3,818	Lane Departure		
US 97A in Chelan, Apple Blossom Dr. - Flashing Yellow Left Turn Arrow	\$3,474	Intersection	Mobility	
US 20 at Hanging Rock - Signing Project	\$3,321	Lane Departure		
Regionwide Minor Striping Projects	\$2,870	Pavement Markings		
SR 971 Whole Route - Signing	\$2,506	Signs		

NORTH CENTRAL REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
US 97 at Blewett Pass - No Parking Signing	\$2,291	Signs		
I-90 near Vantage Bridge - Linear Delineator System Markers	\$2,271	Lane Departure		
SR 243 near Crab Creek - Linear Delineator System	\$2,207	Lane Departure		
US 2, SR 171, SR 172, and SR 173 - Durable Marker Changes	\$2,200	Miscellaneous		
US 2 at East Leavenworth Rd. - Camera	\$2,175	ITS spending		
SR 20 near Rainy Pass - Signing and Barrier	\$2,144	Lane Departure		
SR 97 North of Blewett Pass Summit - Signing Changes	\$2,143	Signs		
SR 28 at 9th Street - Signal Add Right Turn Overlap	\$1,964	Mobility		
SR 17 Moses Lake to Othello - Portable Signing for Safety Emphasis	\$1,199	Miscellaneous		
SR 24 at SR 243 - Crushed Surfacing Base Course (CSBC) For Pullouts	\$786	Miscellaneous		
SR 173 at Crane Orchard Rd - Signing	\$468	Signs		
Regionwide Minor WSP Requested Enhancements	\$405	Miscellaneous		
US 2 at Douglas - Linear Delineator System Markers	\$341	Lane Departure		
SR 28 from US 2 to Jct SR 285 - Signing Changes	\$336	Signs		
215 Whole Route - Signing	\$179	Signs		



NORTH CENTRAL REGION

2019-2021 Project Highlights

US 2 IN LEAVENWORTH - PEDESTRIAN AND SIGNAL MODIFICATIONS

\$127,875

In 2020, the City of Leavenworth installed two Hawk systems to help pedestrians cross US 2. Soon after installation, it became apparent that these systems were not working as expected due to their inability to coordinate with the nearby signal systems. In addition, drivers lacked familiarity with the Hawk system. This combination exacerbated the existing congestion problem in this location, instead of improving mobility and safety as intended.

To address this issue, North Central Region (NCR) replaced the Hawk system with a regular pedestrian crossing signal system that uses red, yellow, and green heads. The region also upgraded the signal detection systems in the corridor to adaptive systems so the crossing signals could coordinate with them. Additionally, NCR installed monitoring cameras and radio communications to the Rectangular Rapid Flashing Beacon (RRFB) system, to allow for remote control during high volume times like tree lighting. Finally, the region added battery backup for the signals.

The benefit of this work is a smoother operation of this multimodal facility, while at the same time enhancing safety of pedestrians crossing US 2. The ability to monitor and make operational changes

remotely and in real time with these systems provides important safety and mobility benefits during peak hours, seasonal traffic, and special events.



The new pedestrian crossing signal system on US 2 in Leavenworth

NORTH CENTRAL REGION

2019-2021 Project Highlights

US 97 AT INGALLS CREEK RD - TWO WAY LEFT TURN LANE

\$49,442

During their route review of this section of US 97, NCR's Field Assessment office identified operational issues in the vicinity of Ingalls Creek Rd. In the immediate area are several businesses, the Ingalls Creek Rd intersection, and WSDOT's shed access driveways. The region performed route reviews with WSP and WSDOT Maintenance personnel, and analyzed crash data at the location. This work revealed that this location would benefit from some form of channelization that would reduce through movement conflict points and address driver safety.

The region completed a low-cost safety enhancement project using Maintenance staff as well as private contractors. They removed stripes, widened US 97, installed guardrail, and restriped this section to provide a two-way left turn lane (TWLTL).

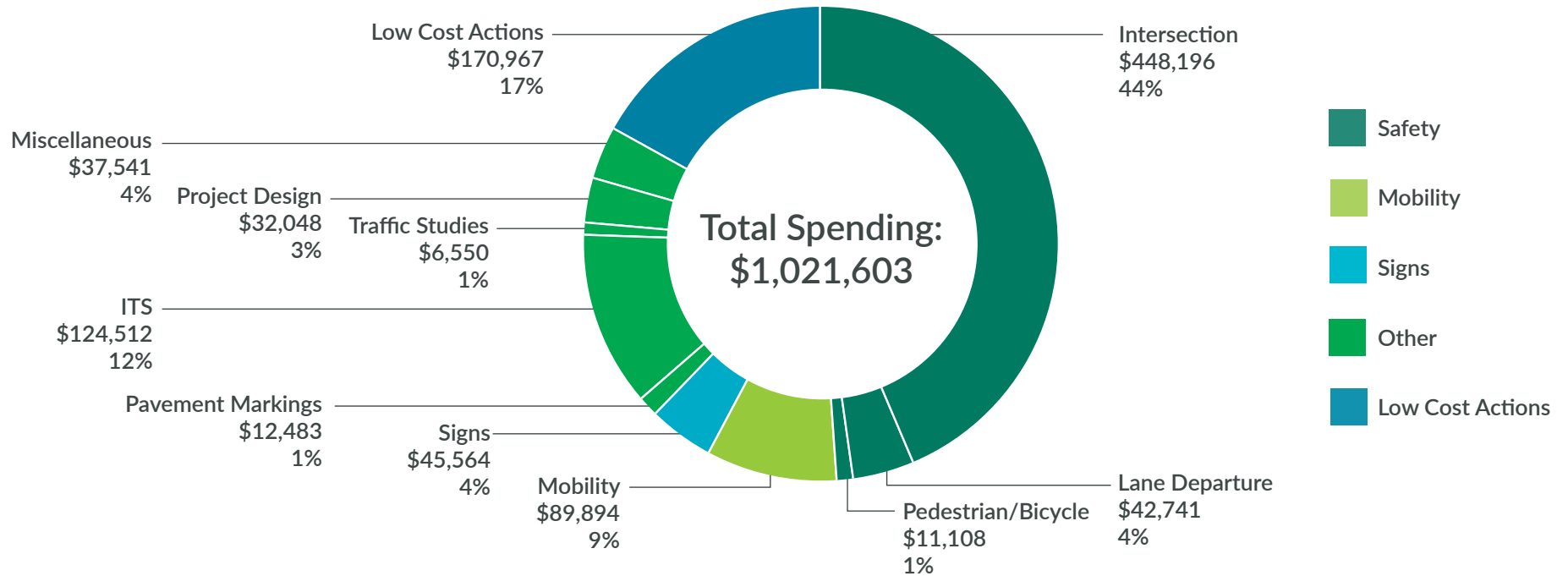
This project reduces the turning movement conflict points by removing traffic from the through movement. It also reduces enter-at-angle conflict points by providing a refuge area for turning vehicles entering the highway.



US 97 during installation of two-way left turn lane and restriping

SOUTHWEST REGION

SWR: Low Cost Enhancement Spending by Type of Project – 2019-2021



All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category
Low Cost Actions	\$170,967	Low Cost Actions	
Wavetronix Radar Signal Detection Units	\$130,157	Intersection	
SR 503 McBride/299th Intersection - Left Turn Lane Restripe	\$62,892	Intersection	
SR 500 SB Andresen/4th Plain - Right-Turn Lane Extension	\$60,000	Intersection	
I-5 Vicinity of Salmon Creek - 134th Corridor Adaptive Traffic Signals	\$58,400	Intersection	
Regionwide Flashing Yellow Arrow Signal Upgrades	\$40,843	Intersection	

SOUTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category
ITS Systems - Maintenance	\$37,735	ITS spending	
I-5 NB at Exit 3 - Off-Ramp Barrier	\$35,003	Lane Departure	
I-5 Active Traffic Management - System Enhancement	\$34,912	Mobility	
Project Definitions for 3 Projects in Clark County	\$32,048	Project Design	
SR 500/503 at 65th Street - Signal Optimization	\$30,642	Mobility	
WSP Radios For Incident Response Vehicles	\$26,790	Miscellaneous	
Regionwide 4G Modems	\$24,016	ITS spending	
SR 6 at Chilvers Road - Sight Distance Enhancements	\$22,614	Intersection	
TMC/EOC Expenditures	\$18,905	ITS spending	
I-5 NB Exit 11/SR 502 - Ramp Improvement	\$17,689	Intersection	Lane Departure
SR 503 in Woodland - Median Curb	\$16,382	Intersection	
I-5 in City of Vancouver - C Street Wrong Way Detection System	\$15,624	Intersection	
SR 14 EB Tunnels at White Salmon River - Radar Speed Signing Revision	\$14,921	Signs	
Portable "Your Speed Is" Signs	\$12,958	ITS spending	
I-5 in Woodland - Frontage Roads Channelization	\$12,483	Pavement Markings	
SR 503 Centralized Signal System Enhancement	\$12,178	Intersection	
SR 507 at Mt St Helens - Signing	\$12,141	Signs	
Stakeholder Engagement Agreement for Smart Community Assessment	\$11,000	ITS spending	
State Work Force	\$10,752	Miscellaneous	
I-5 at Exit 72 - Signing and Striping at frontage road	\$10,521	Mobility	
SR 500 SB at Andresen/4th - Turn Lane Extension	\$10,294	Intersection	
I-5 at SR 14 - Mill Plain & 4th Ramp Meter Revisions	\$9,722	Signs	
I-5 MP 0-7 - Weather Module Connection Integration	\$9,575	ITS spending	
ITS Firewall Replacement	\$8,540	ITS spending	



SOUTHWEST REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category
I-5/SR 503 in Woodland - Emergency Vehicle Preemption	\$7,576	Mobility	
US 101 Curve & Smith Rd - Signing Improvements	\$6,998	Signs	
Traffic Studies	\$6,550	Traffic Studies	
SR 100 Cape Disappointment State Park - Trail Crosswalk and Signing	\$6,542	Pedestrian/Bicycle	
I-5 at 134th St NB - Off Ramp Improvements	\$4,671	Intersection	
I-5 to Chamber Way - Crosswalk & Pedestrian Signing Improvements	\$4,566	Pedestrian/Bicycle	
SR 500 from St Johns to Andresen - Striping Revisions	\$4,246	Mobility	
I-5 at SR 432 - Guardrail/Pavement Improvement	\$4,192	Lane Departure	
SR 409 at Little Island Road - Curve Signing	\$3,565	ITS spending	Signs
SR 14 Bridge of the Gods Intersection - Reimbursement for Tolls	\$1,997	Mobility	

SOUTHWEST REGION

2019-2021 Project Highlights

SR 6 AT CHILVERS ROAD - SIGHT DISTANCE ENHANCEMENTS

\$22,614

This project was identified through the Field Assessment program. The SR 6 and Chilvers Rd. intersection is located southwest of Chehalis, WA. There is a history of high severity angle crashes between westbound through movements on SR 6 and left-turning movements from Chilvers Rd. This included one fatal, three evident injury, and eight possible injury crashes, all of which occurred under the same movement. The region determined that improved sight distance would address these issues.

Southwest Region used three approaches to improve the sight distance at the SR 6 & Chilvers Rd intersection. First, the region implemented a four-foot offset for westbound right turn movements by adding a sliver fill to maintain existing shoulder width but allow for a new channelized buffer area. They also moved the stop bar on Chilvers Rd closer to SR 6 by approximately 20 feet. Finally, they extended the left turn pocket for eastbound SR 6 drivers in order to add more storage capacity. The rumble strips in the vicinity of the intersection were ground out and filled in, in order to make room for the required offset.



Before sight distance enhancement



After sight distance enhancement

SOUTHWEST REGION

2019-2021 Project Highlights

I-5 TO CHAMBER WAY - CROSSWALK & PEDESTRIAN SIGNING IMPROVEMENTS

\$4,566

This intersection did not clearly identify the merge point and right of way for motorists entering the on-ramp. There was also an opportunity to enhance the crosswalk.

To address these needs, Southwest Region channelized the right turn to I-5 SB ramp to shorten pedestrian crossing. They also added and relocated signing to better signal the crosswalk. Finally, the region restriped the road to better help identify the yield lane and the crossing.

These changes increased road users' awareness of pedestrian activity and merging traffic.



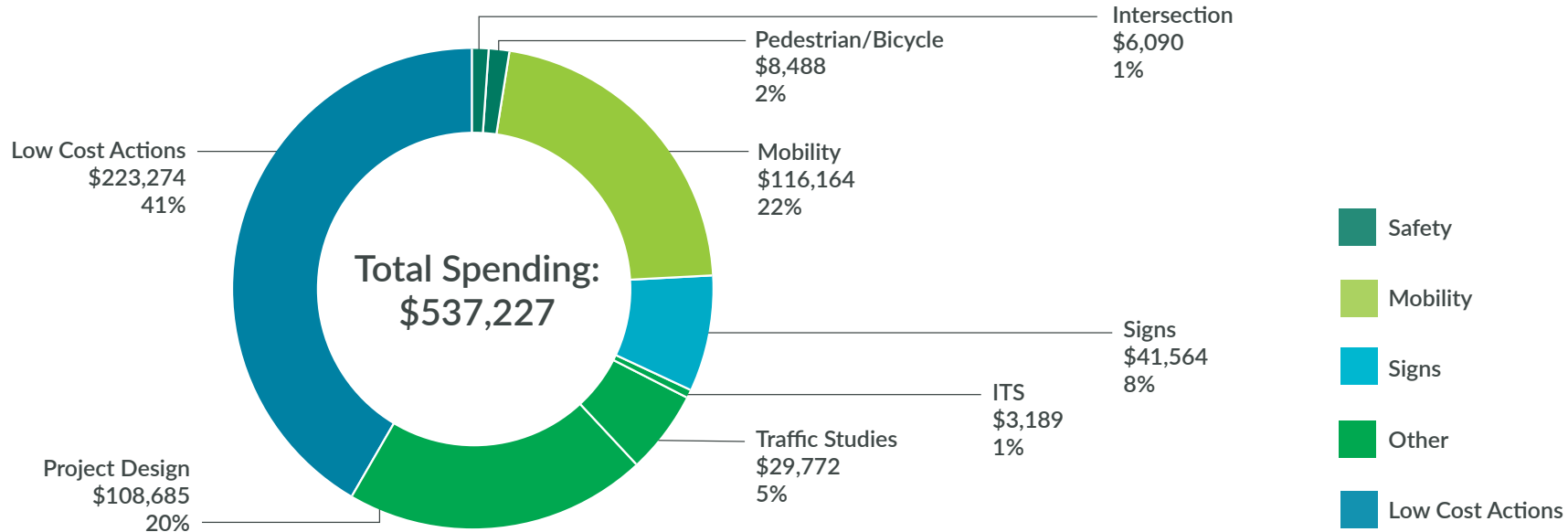
Before: Original configuration



After: New multimodal buffer area

EASTERN REGION

ER: Low Cost Enhancement Spending by Type of Project – 2019-2021



All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category
Regionwide Lost Cost Actions	\$179,661	Low Cost Actions
US 2 from Hazelwood Rd To Deer Heights Rd - Channelization	\$109,844	Mobility
I-90 at US 2 Garden Springs - Ramp Meter Design	\$108,685	Project Design
Field Assessment 2019-2021 Projects	\$43,613	Low Cost Actions
Area 2/Area 3 Curve Warning Signing Update	\$28,593	Signs
I-90 EB Freya and Custer On Ramps - Access Revision Report Analysis	\$20,092	Traffic Studies
SR 20 Curve Warning Signing	\$12,971	Signs
Eastern Region I-90 Operations Study-Project Rose Impact	\$9,680	Traffic Studies
Regionwide Crosswalk Updates	\$8,488	Pedestrian/Bicycle
SR 904 at Cheney-Spokane Rd - Signal Modifications	\$6,090	Intersection
SR 290 at I-90 - On-Ramp Signing & Barrier Revisions	\$4,104	Mobility
National Operations Center of Excellence (NOCOE) Signal Phase and Timing (SPaT) Challenge	\$3,189	ITS spending
US 2 Hayford Rd to Deer Heights Rd Channelization	\$2,215	Mobility



EASTERN REGION

2019-2021 Project Highlights

US 2 FROM HAZELWOOD RD TO DEER HEIGHTS RD - CHANNELIZATION

\$109,844

Eastern Region initially evaluated this location to address the entering-at-angle crash history at the CrossPointe Plaza driveways, as described in the 2017-19 LCE report. The region also wanted to manage left turns and access as development increases, to improve safety performance along the larger corridor. The region had previously constructed raised channelization from Hayford Road to just east of Hazelwood Road with available funds, taking into consideration that the Deer Heights intersection would be converted to a roundabout in a developer project. The roundabout was constructed as mitigation for a North 40 development that was constructed on the NE corner of US 2/Deer Heights.



This project channelized the median between the eastern end of the 17-19 project and the Deer Heights developer project. WSDOT provided \$110,000 in funding to the developer for this project, as part of the Deer Heights roundabout, after they completed the roundabout. The contractor used the project area for the traffic shifts.



Limiting left turns out of accesses reduces entering-at-angle crashes, as well as facilitates through movement. This is a strategy that will continue to be implemented on the corridor as funding becomes available.

EASTERN REGION

2019-2021 Project Highlights

REGIONWIDE CROSSWALK UPDATES

\$8,488

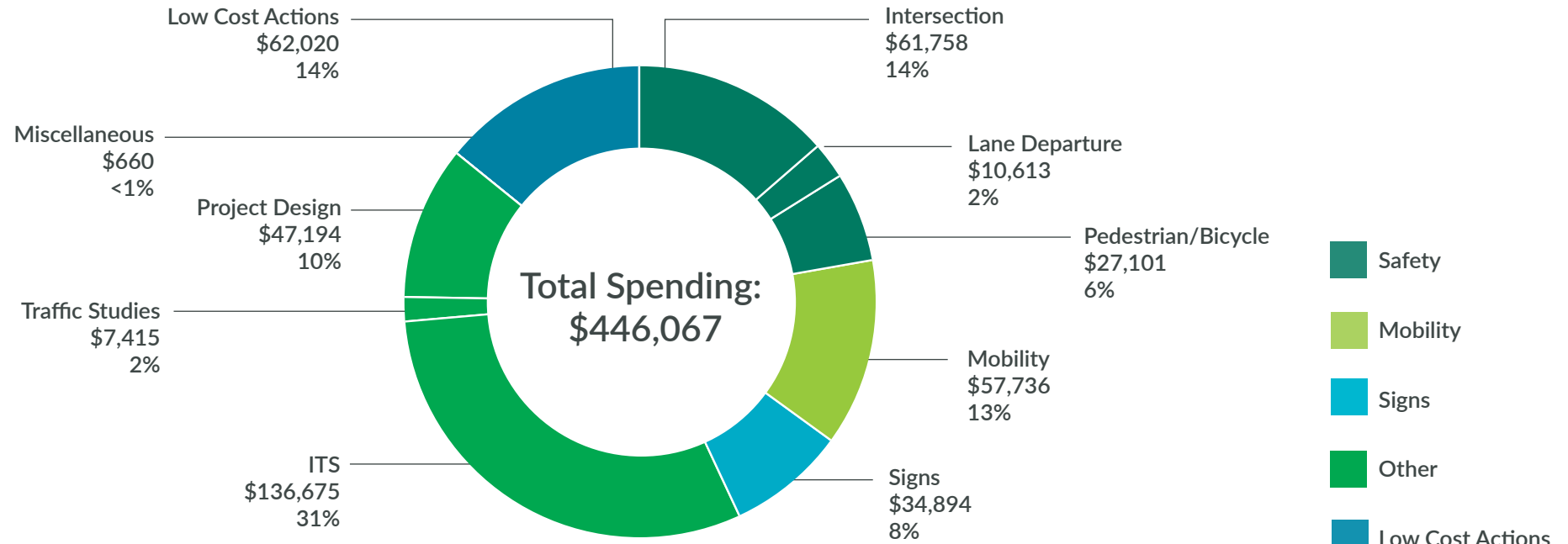
Eastern Region undertook a comprehensive study to identify priority locations for crosswalk enhancements. The region reviewed existing conditions and categorized each location per WSDOT guidance. This allowed the region to consistently apply guidance criteria when responding to requests regarding crosswalks. The region used the list to address high priority locations by updating signs and, in some instances, pavement markings as well.



At SR 902, the region added another crossing sign so that signs were present in both directions.

SOUTH CENTRAL REGION

SCR: Low Cost Enhancement Spending by Type of Project – 2019-2021



Note: due to rounding, the percentages will not add up to 100%

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
Design	\$45,194	Project Design		
US 395 at SR 240 - Drop Lane	\$42,562	Mobility		
Hyak Wifi/Wan	\$38,875	ITS spending		
US 12 in Alpowa - Curve Alignment	\$28,753	Low Cost Actions		
SR 240 in Steptoe at Match City St - Road Diet	\$21,674	Pedestrian/Bicycle	Mobility	
US 12 at Naches - Signal ADA Improvements	\$20,601	Pedestrian/Bicycle		

SOUTH CENTRAL REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
I-90 in Vantage Vicinity - Elk Warning Signs	\$19,337	Signs	ITS spending	
SR 14 at Plymouth Rd - Left Turn Pocket Lanes	\$18,563	Intersection		
Field Assessment Projects	\$17,329	Low Cost Actions		
Low Cost Actions	\$15,938	Low Cost Actions		
SR 240 in Hagen - Signal Modification	\$14,077	Intersection		
SR 129 at Rattlesnake Creek to near Park Rd and vicinity Asotin - Speed Limit Changes	\$11,381	Signs		
Regionwide Miovision Camera	\$11,111	ITS spending		
I-90 at Mt Si and Alpentel - Cameras	\$10,087	ITS spending		
I-90 Travel Time Data	\$10,000	ITS spending		
Minor Signing Modifications - Regionwide	\$9,660	Signs		
I-90 along Snoqualmie Pass - Portable Workzone Systems Enhancements	\$9,013	ITS spending		
I-182 at Queensgate Drive - Camera	\$8,940	ITS spending		
Lookout Tower in Yakima - Microwave Radio	\$8,552	ITS spending		
US 12 WB at A Street - Removal of Left Out	\$8,476	Intersection		
US 12 and SR 261 - Intersection Improvements	\$8,092	Intersection		
US 12 in Dixie - "Your Speed Is" Sign	\$7,109	ITS spending		
I-182 at 4th Ave - Improvements	\$6,830	Intersection		
SR 22 and I-82 to Yakima River Bridge - Delineation	\$6,717	Lane Departure		
SR 823 in Yakima - Speed Limit Change	\$6,265	Signs		
SR 182 at Queensgate Drive - Bicycle and Pedestrian Improvements	\$5,719	Intersection		
Low Cost Enhancements - Regional Administrator Requests	\$5,240	ITS spending	Traffic Studies	Project Design
SR 221 at Sellards Rd - Camera	\$5,043	ITS spending		

SOUTH CENTRAL REGION

All 2019-2021 Low Cost Enhancement Projects

Project	Cost	First Category	Second Category	Third Category
US 12 in Pomeroy - "Your Speed Is" Sign	\$4,905	ITS spending		
SR 240 and Columbia Park Drive - Steptoe Roundabout Monitoring	\$4,134	Traffic Studies		
SR 221 vicinity of Bert James Rd - Transverse Rumble Strips	\$3,896	Lane Departure		
Tri-Cities Cameras - US 395 in Yelm and SR 240/I-82 at Aaron	\$3,749	ITS spending		
I-90 in Cle Elum - "Your Speed Is" Sign	\$3,347	ITS spending		
Prosser Radio Network Update	\$2,367	ITS spending		
I-90 WB vicinity of Easton to Cle Elum - Threshold Evaluation	\$1,281	Traffic Studies		
Minor Low Cost Enhancement Adjustments	\$660	Miscellaneous		
US 12 at MP 392 - Rest Area Signing	\$587	Signs		

SOUTH CENTRAL REGION

2019-2021 Project Highlights

US 12 IN ALPOWA - CURVE ALIGNMENT

\$28,753

South Central Region's Field Assessment team reviewed this location as part of a roadway survey of US 12. US 12 intersects Ledgerwood Road within this curve in Alpowia. The project improved the curve by providing smoother and easier maneuvering at the posted speed limit, with the intention of reducing lane departures. The region made the centerline a continuous 700-foot radius and narrowed the uphill (eastbound) lane widths from 12 feet to 11 feet to best fit the existing pavement. The region also reduced the westbound suggested speed limit for this curve to 35 mph, as well as added a truck tipping sign.



The compound curve has been smoothed out, reducing the likelihood of lane departures.

SOUTH CENTRAL REGION

2019-2021 Project Highlights

SR 240 IN STEPTOE AT MATCH CITY ST - ROAD DIET

\$21,674

The City of Richland planned a road diet from the westbound ramp terminal of SR 240/Columbia Park Dr east into town. The city's project reduced the four-lane section to a three-lane section: one lane in each direction, with a two-way turn lane in the center. This allowed WSDOT the opportunity to better channelize the lanes between the ramp terminals. A high portion of the traffic

volume between the ramp terminals is bound for SR 240. South Central Region converted the right lane to a drop lane for westbound SR 240, and also provided a left-turn pocket at the signal into the transit station. Additionally, the region reduced the number of lanes leading up to the signal, which better aligned with the city project, and added a bike lane across the drop lane.



Before: SR 240 four-lane road at Match City Street



After: SR 240 with new left-turn pocket and drop lanes.

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**Washington State
Department of Transportation**