

Clackamas County

DRIVE TO ZERO SAFETY ACTION PLAN



March 2019



Clackamas County

DRIVE TO ZERO SAFETY ACTION PLAN

Prepared For:

Clackamas County

Prepared By:

Kittelson & Associates, Inc.

851 SW 6th Avenue, Suite 600

Portland, Oregon 97204

Adopted by Board of County Commissioners March 28, 2019.



Acknowledgements

Clackamas County

Joseph Marek, PE, PTOE, Project Manager

Rob Sadowsky

Christian Snuffin, PE, PTOE

Ellen Rogalin

Drive to Zero Advisory Board

Janelle Lawrence, Oregon Impact - Chair

Laurel Bentley Moses, Clackamas County

Jim Bernard, Clackamas County Board Chair

Mike Bezner, Clackamas County

Brian Burke, Traffic Safety Commission

Mary Jo Cartasegna, Clackamas County

Lucie Drum, American Medical Response (AMR)

Walt McAllister, Oregon Department of Transportation

Brian McCrady, Clackamas County

Kari Shanklin, Clackamas County Fire District #1

Jeff Smith, Clackamas County Sheriff's Office

Jamie Zentner, Clackamas County

Consultant Team

Kittelson & Associates, Inc.

Nick Foster, AICP, RSP

Bryan Graveline

Brian Ray, PE

Ralph Bentley

Hilary Louth

Legacy Emanuel Medical Center

Gerianne Bartz, RN, BSN

Montana State University

Jay Otto

Contents

INTRODUCTION	1
Drive to Zero Safety Action Plan	1
The Problem	3
Recent Progress in Transportation Safety	4
Plan Development Process	5
PART 1 DATA TRENDS AND EMPHASIS AREAS.	7
Data Trends and Emphasis Areas	7
Rural vs. Urban	10
Inexperienced Drivers	11
Roadway Departures.	11
Aggressive Driving	11
Causes of Crashes	12
Other Plans	19
What is Safety Culture?	24
Safety Management Includes	27
PART 2 LOCAL ROAD SAFETY PLAN.	35
Local Road Safety Plan	35
Overview	36
About this Plan	37
Local Road Safety Plan	38
Project Evaluation And Tracking	53
Next Steps	64
IMPLEMENTATION.	65
Drive to Zero Safety Action Plan	65
Performance Measures	67

Part 1 Appendix A

Literature and Initial Data Review Summary

Part 1 Appendix B

Action Items Spreadsheet

Part 1 Appendix C

Acronyms

Part 2 Appendix A

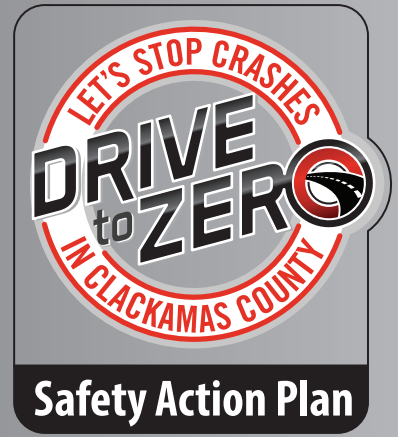
Top 50 SPIS Sites Analysis

Part 2 Appendix B

Project Lists and Maps
Projects Programmed for Construction

Part 2 Appendix C

Preliminary Systemic Safety Analysis



Introduction

Drive to Zero Safety Action Plan

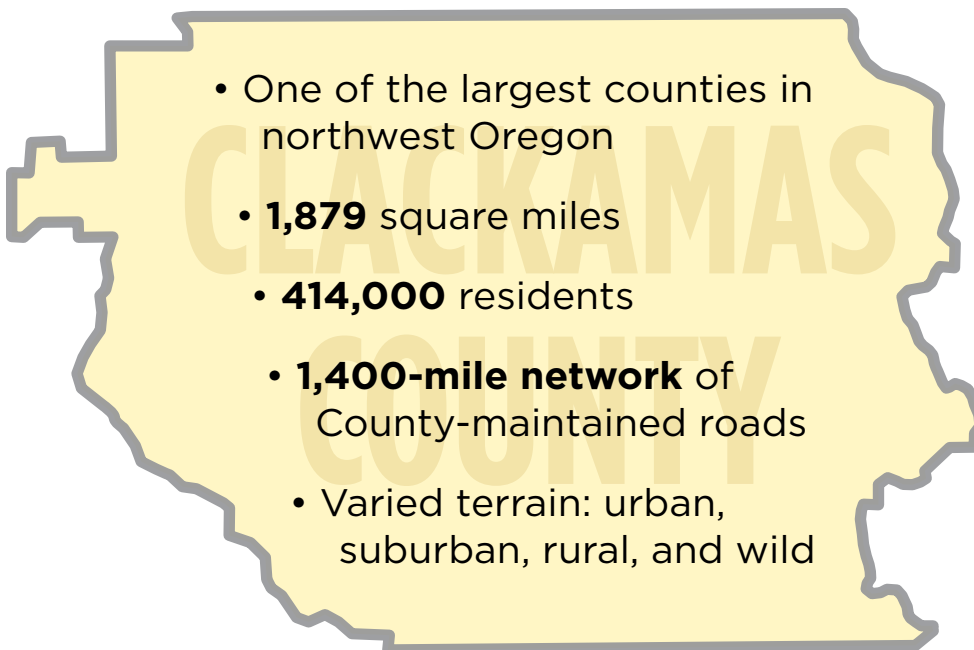




Introduction

The Problem

From 2009 to 2015, 183 people were killed in traffic crashes in Clackamas County. Another 795 people suffered serious, potentially life-altering injuries. In addition to the tragedy of this loss of life and quality of life, the economic impact of these and other less severe crashes was greater than \$100 million per year during this period. A survey of residents found that most believe that the only acceptable number of fatal and serious injury crashes in Clackamas County is zero. Given this belief, **the county has set a goal to eliminate fatal and serious injury crashes by 2035.** This plan is the roadmap to achieve this goal.



How to use this plan

County departments:

- Follow through on action items in Part 1
- Implement the Local Road Safety Plan in Part 2

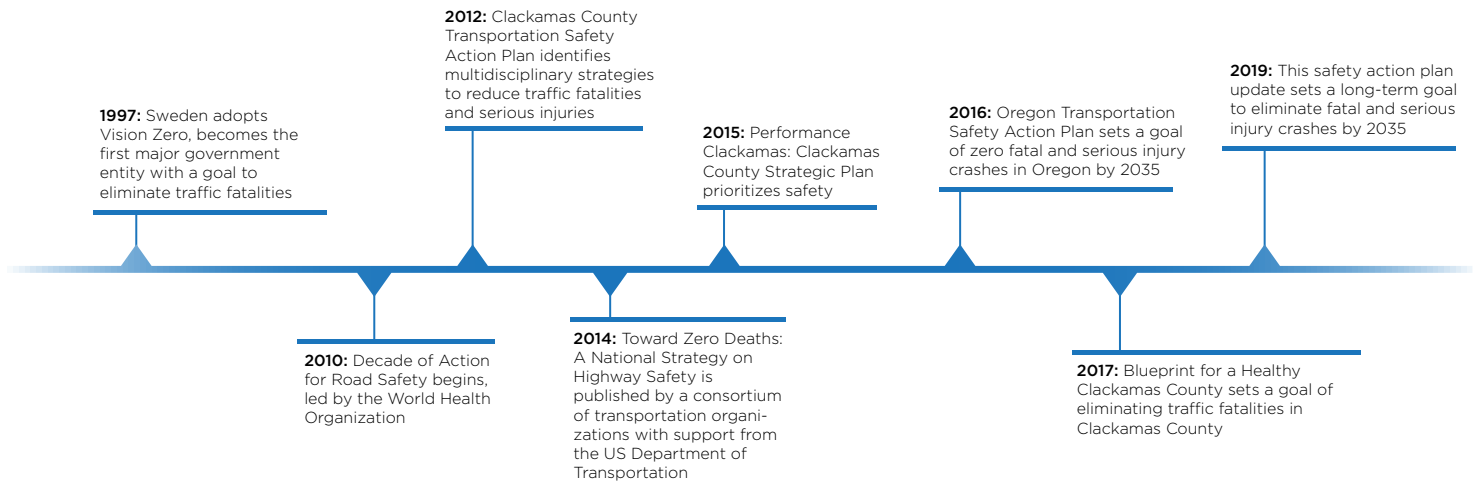
Other organizations:

- Follow through on action items in Part 1
- Review data presented in Part 1 to use in advocacy and outreach efforts

General public

- Demonstrate safe driving
- Let your elected officials know that zero is the only acceptable number of traffic fatalities

Figure 1-Recent Advancements in Transportation Safety Planning in Clackamas County and Beyond



Recent Progress in Transportation Safety

Viewpoints on roadway safety have evolved over the last twenty years, both in ceasing to accept severe crashes as inevitable and in becoming more multidisciplinary, as shown in Figure 1. This figure also shows that Clackamas County’s goal of eliminating fatal and serious injury crashes is aligned with international, national, state, and local organizations. The first document setting a goal in Clackamas County to eliminate traffic fatalities was published in the *Blueprint for a Healthy Clackamas County* in 2017. **Appendix A** describes these plans in further detail.

Plan Outreach Efforts

- Meetings with Drive to Zero Advisory Group
- Interviews with stakeholders including:
 - County staff from multiple departments
 - Private organizations
- Public involvement opportunities using an online virtual open house advertised on County website, e-mail lists and social media

Plan Development Process

This plan is an update to the 2012 Clackamas County Transportation Safety Action Plan (TSAP). That plan, which was the first of its kind in Oregon for a local agency, outlined actions to reduce traffic fatalities and severe injuries by 50% over the following ten years through a multidisciplinary focus on engineering, education, enforcement, emergency medical services, and evaluation activities.

Since the completion of the 2012 TSAP, the county has made strides in advancing its vision of traffic safety through multidisciplinary efforts. These achievements include:

- A joint road safety audit/health impact assessment on SE McLoughlin Boulevard
- A pilot project to enhance Safety Culture in Molalla with experts from Montana State University
- Joint outreach efforts between the Health, Housing, and Human Services Department and the Department of Transportation and Development (DTD)
- Creating the Transportation Safety Program Manager position
- Integrating the Safe Communities Program into the Department of Transportation and Development

This plan builds on the 2012 effort. It has been developed through a collaborative process involving county staff from multiple departments, Oregon Department of Transportation (ODOT) staff, the general public and private organizations involved in transportation safety. This plan continues many actions identified in the 2012 plan, while introducing new actions based on best practices, data analyses, and input from the groups involved in developing this plan.



Blueprint for a Healthy Clackamas County

The county's Community Health Improvement Plan, *Blueprint for a Healthy Clackamas County*, sets goals related to access to care, a culture of health, and healthy behaviors. In addition to setting a goal to eliminate crash fatalities, the Blueprint sets goals to improve adverse health outcomes so residents can live and age well in healthy communities. Transportation related factors include commute time, poor air quality, and improving the built environment and transportation network.

PLAN OUTLINE

Reaching zero fatal and serious injury crashes will require a focused multidisciplinary effort and coordination between public and private organizations. As such, this plan contains a range of action items to be completed by several different organizations.

This plan is broken into two parts:

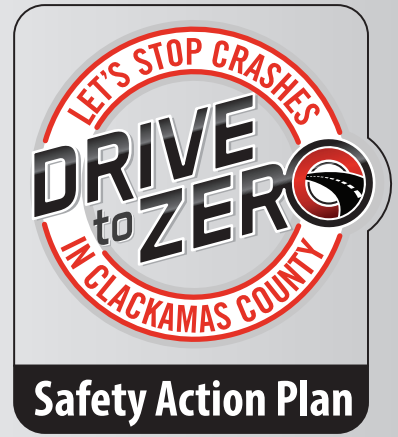
Part 1: The broad areas on which the county, its partner organizations and its residents must focus to achieve the goal of zero fatal and serious injury crashes by 2035. The plan's emphasis areas align with the *Toward Zero Deaths* national strategy, which include:

- Safe Drivers and Passengers
- Safe Infrastructure
- Safe Vehicles
- Safe Vulnerable Users
- Enhanced Emergency Medical Services
- Safety Culture
- Safety Management

The plan contains specific action items for each emphasis area, with responsible and supporting agencies and timelines for each item.

Successful implementation of this plan depends on everyone.

Part 2 (Local Road Safety Plan): This is a data-driven plan for county-owned roadways, which includes projects to reduce fatal and serious injury crashes on roadway segments and intersections based on crash and roadway analyses. Projects include countermeasures targeted at high crash locations, as well as treatments that can be deployed systemically throughout the county at locations with contributing factors to fatal and serious injury crashes. The plan prioritizes the projects and describes when the county will further investigate and implement them.



Part 1

Data Trends and Emphasis Areas

Drive to Zero Safety Action Plan

Part 1 Introduction

Clackamas County has a goal to eliminate fatal and serious injury crashes on its roads by 2035. Part 1 of Clackamas County's **Drive to Zero Safety Action Plan** describes the broad areas on which the county, its partner organizations, and its residents must focus to achieve this goal. These emphasis areas represent an evidence-based approach to reducing fatal and serious injury

crashes. They are based on a review of crash data in Clackamas County and best practices from local, national, and international sources. Notably the emphasis areas align with those of *Toward Zero Deaths: A National Strategy on Highway Safety*¹, of which the county is a proud partner, and the *Oregon Transportation Safety Action Plan, 2016*².

DRIVE TO ZERO

Achieving the goal of zero traffic fatalities will involve everyone.



1 Toward Zero Deaths Steering Committee. *Toward Zero Deaths: A National Strategy on Highway Safety*. June 2014. www.towardzerodeaths.org/.

2 Oregon Department of Transportation. *Oregon Transportation Safety Action Plan, 2016*. 2016. www.oregon.gov/ODOT/Safety/Documents/TSAP_2016.pdf.



Thousands of people are involved in traffic crashes in Clackamas County each year, and dozens of families are faced with the tragedy of severe crashes that cause potentially life-threatening injuries or even death. We are committed, as a county, to tackle the challenge of eliminating severe crashes by collaborating among our agencies and partnering with community stakeholders and nonprofit associations. This collective multi-pronged approach will advance our shared goal of eliminating traffic fatalities and serious injuries on Clackamas County roads by 2035. This Transportation Safety Action Plan (TSAP) is a starting point and a dynamic framework for moving forward.

Preventable serious injuries and deaths from traffic crashes pose a public health concern to all who live, work, play, and travel through Clackamas County. This TSAP builds on data-driven strategies to increase health outcomes by improving the built environment and engaging county residents to help build a community that supports a healthy culture of safety.

Everyone in Clackamas County has a vital role in preventing crashes. **We ask you to embrace the affirmation that TRAFFIC SAFETY STARTS WITH ME!** Throughout this plan you'll find opportunities to take action and help us in our Drive to Zero.

Part 1 is organized into the following sections:

- Crash Data Trends
- Safe Drivers and Passengers
- Safe Infrastructure
- Safe Vehicles
- Safe Vulnerable Users
- Enhanced Emergency Medical Services
- Safety Culture
- Safety Management

The Safe System

The Safe System approach prioritizes safety first when designing infrastructure. The principles of this approach include:

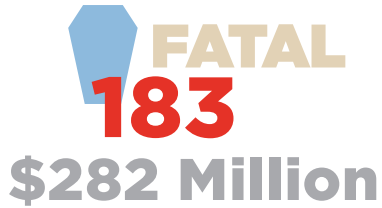
- People will make mistakes, but these mistakes should not lead to death or serious injury.
- Speeds have a direct relationship to the severity of crashes.
- Safety is everyone's responsibility, especially the designers of the system.
- Safety must be considered at all levels to provide redundancy when one part fails.

Source: Towards Zero Deaths Foundation. www.towardszerofoundation.org/thesafesystem/#principles

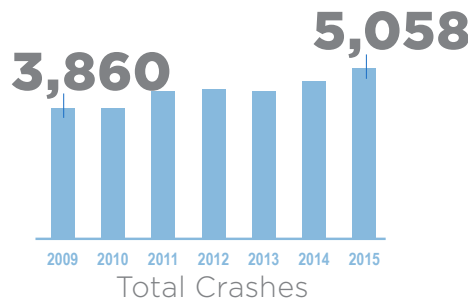
Crash Data Trends

From 2009 to 2015, **183** people were killed in traffic crashes in Clackamas County. Another **795** people suffered serious, potentially life-altering injuries.

The economic impact of these and other less severe crashes was **\$787.5 million**, or about **\$112.5 million per year**. Economic costs during this time are shown by crash type below.

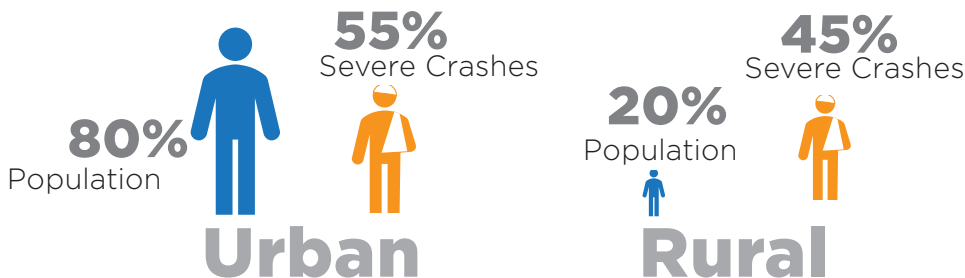


Over the past seven years, reported total crashes (30%), and reported fatal and serious injury crashes (25%) have generally increased in Clackamas County. This increase has outpaced the county's population growth of 4% over the same time.



Rural vs. Urban

People drive further in rural areas to reach destinations and emergency response times can be longer than in urban areas. Speeds are also higher than in urban areas and there are fewer transportation options. As a result, rural areas are more susceptible to severe crashes than urban areas. As shown below, 45% of reported severe crashes occurred in rural areas, while 20% of the population lives in rural areas.*



*Urban areas, as defined by the Federal Highway Administration, include any areas defined by the Census as being urbanized (either urbanized areas or urban clusters) with a population of 5,000 or greater. By this definition, for example, Molalla is considered urban and Estacada is not.

The Real Cost of Crashes

More difficult to calculate than the economic costs of crashes are the quality of life costs. So many of us know someone who was impacted by a crash, and those impacts reverberate throughout entire communities.

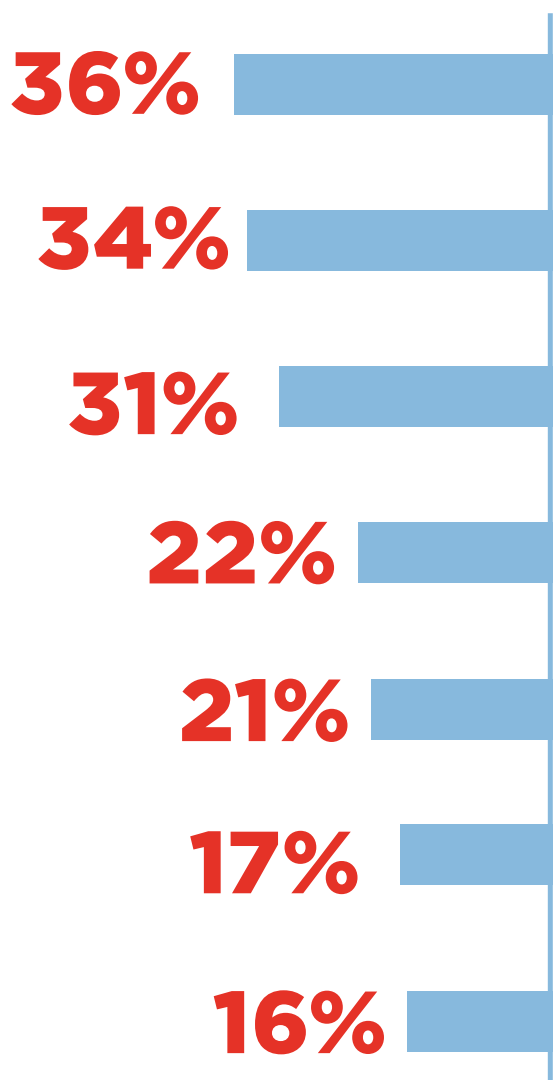
One such tragic event involved 6-year-old Derick Bedwell, who was killed in a drunk-driving crash in rural Molalla in June 2018. Because of the remote location, the victims had to flag a passing vehicle and travel 13 miles to reach cell service. By the time medical personnel arrived, it was too late. Derick's death impacted his family, his friends and his entire community.

In addition to tragic fatal crashes like this, crashes that don't end lives can still drastically affect them. Health issues stemming from serious crashes can lead to job and housing loss, financial trouble and mental health problems.

The most frequent contributing factors in reported crashes are:



Fatal and Serious Injury Crashes by Contributing Factor*



The most frequent contributing factors to fatal and serious injury crashes are:



Inexperienced Drivers: Crashes where the driver was 25 years of age or younger.



Roadway Departures: Crashes where the vehicle left the roadway or crossed over the center line.



Aggressive Driving: Crashes where the driver was driving too fast for conditions, following too closely, failing to avoid vehicle ahead, or exceeding the posted speed limit.



Motorcyclists: Crashes involving a motorcycle driver or passenger.



Alcohol/Drug: Crashes where the driver was under the influence of alcohol or drugs.



Senior Drivers: Crashes where the driver was 65 years old or older.



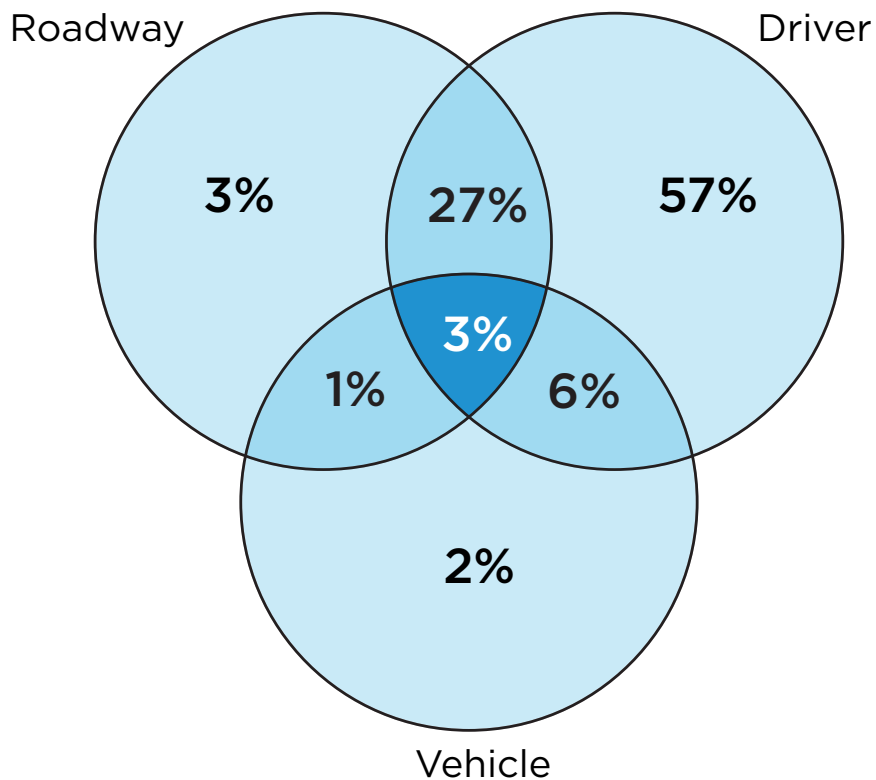
Pedestrians and Bicyclists: Crashes involving a person walking or bicycling.

* The percentages show when a factor was involved in a crash. Many crashes have more than one contributing factor.

Safe Drivers and Passengers

Causes of Crashes

The most common cause of crashes in Clackamas County, as well as throughout the country, is human error. As shown below, human error is a factor in 93% of crashes, while vehicle and infrastructure factors are present in 34% and 12% of crashes, respectively.¹ For the county to reach its goal of zero fatal and serious injury crashes, efforts across the entire social system must be accomplished. By changing attitudes, behavioral beliefs, and perceived norms, people using the transportation system can choose to make decisions to drive calmly, use seatbelts, drive sober, and use child passenger seats. Establishing values with safety as a primary core value will help people better understand when they should, and should not, be using the transportation system or choose to be a passenger.



Outreach should be tailored to the audience. One important way to do this is to provide information in multiple languages in locations with high non-English speaking populations.

¹ Treat, et al. Tri-Level Study of the Causes of Traffic Accidents. 1979

Attentive Driving

Data on distracted driving is difficult to collect, but in 2017 the Oregon Department of Transportation (ODOT) Distracted Driving Task Force Report² estimated crashes caused by distracted driving occur every three hours. Distracted driving can take many forms including eating, talking with passengers, and looking away from the road ahead. This topic has received increasing focus because of the rising use of cell phones, GPS devices, and other portable electronic devices while driving. Research from the AAA Foundation for Traffic Safety³ similarly reveals that in-vehicle technology like voice-based and touch screen features cause people to take their eyes and mental focus off the road and their hands off the wheel for potentially dangerous periods of time.

The Clackamas County Drive to Zero team offers the Posters & Coasters Safe Driving Media Contest to county high school students. The contest asks students to create artwork about safe driving for a chance to win prizes and share safe driving behavior with their local community. Nearly 100 high school students entered in 2018, with the winning poster shown here:



Artwork by: Kara Atiyeh, Junior, Sandy High School.

In response to findings and recommendations made by the ODOT Distracted Driving Task Force, House Bill 2597 took effect on October 1, 2017 making it illegal to drive in Oregon while holding or using any electronic device including cell phones, tablets, GPS or laptops.

However, new in-vehicle electronics and technologies are constantly entering the market. No matter what the newest distraction may be, all drivers need their focus to be on the road at all times.

Action Items-Attentive Driving

- Work with employers to institute distracted driving policies at their workplaces. The National Safety Council has a sample contract in its Distracted Driving toolkit.
- Educate youth and adults on the importance of paying attention when using the transportation system.
- Encourage businesses, institutions, and families to create policies related to driving safely, including attentive driving.

Attentive Driving - What Can You Do?

- Place electronic devices in a location you can't access before you start driving.
- Assign a designated texter.
- If you need to use an electronic device, pull over into a legal parking spot.
- Consume food or drink before or after driving
- Stay alert for wildlife crossing the roadway in rural areas.
- Program music or directions before you start driving.
- Take the Drive to Zero [Attentive Driving Pledge](http://www.clackamas.us/drivetozero/pledge.html).⁴

2 Reducing Distracted Driving in Oregon: An Interdisciplinary Approach to a Statewide Problem. Oregon Department of Transportation. February 2017.

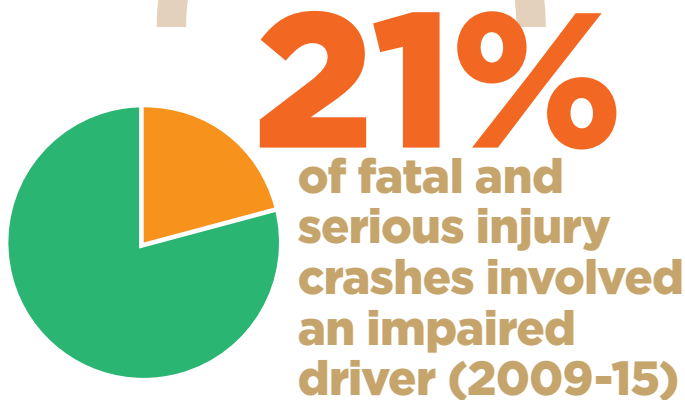
3 Visual and Cognitive Demands of Using In-Vehicle Infotainment Systems. AAA Foundation for Traffic Safety. October 2017.

4 www.clackamas.us/drivetozero/pledge.html

Safe Drivers and Passengers

Sober Driving

Over one-fifth of reported crash fatalities and serious injuries in Clackamas County involve alcohol- or drug-impairment. Additionally, fatigue, stress, and medications can lead to an impaired state that increases the risk of a crash.



Action Items-Sober Driving

- Work with alcohol and marijuana retailers/servers to encourage compliance checks to deter selling to, and reward those who do not sell to, underage individuals.
- Promote the Oregon Liquor Control Commission's Responsible Vendor Program.
- Provide educational posters, social media posts, and public service announcements to inform the public about the dangers of impaired driving.
- Work in schools to educate students on the consequences of impaired driving.
- Coordinate with enforcement agencies to gain support of legislation and penalties associated with impaired driving.

A substance use disorder is a treatable condition in which the use of alcohol or other substances leads to a clinically significant impairment or distress.

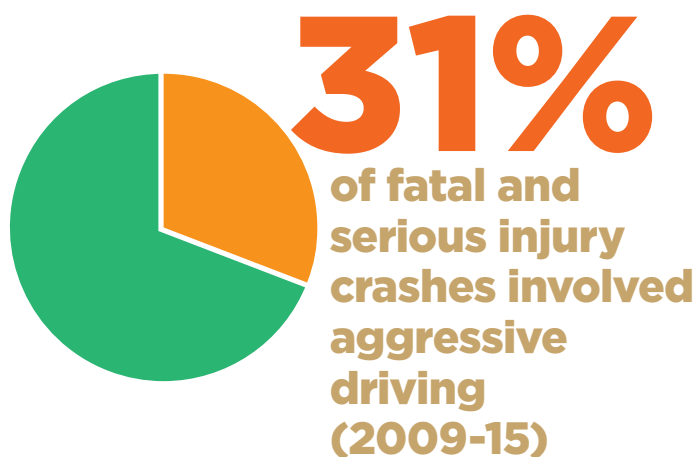
- Provide Drug Recognition Expert (DRE) training for all county law enforcement officers.
- Increase Driving Under the Influence of Intoxicants (DUII) and impaired driving enforcement.
 - » Data-driven saturation patrols.
 - » Drug recognition training (DRE & K9), standardized field sobriety tests training, and wet labs.
 - » Assign a dedicated DUII enforcement unit.
- Develop repeat DUII driver offender programs focused on treating the causes of DUII.
- Grow partnerships and support existing efforts to reduce underage drinking, underage marijuana use, and drug use through funding, educational outreach, and coalition membership.
 - » Partner with substance abuse treatment programs.

Sober Driving - What Can You Do?

- Drive sober and alert.
- Plan your ride home or assign a designated driver before you begin drinking or using marijuana.
- Prevent others from driving when they're intoxicated.
- Know the effects of any medication you're taking, prescription or over-the-counter.

Calm Driving

Aggressive driving was a factor in 46% of all reported crashes and 31% of reported fatal and serious injury crashes in Clackamas County from 2009 to 2015. Of these severe crashes, 85% involved speeding or driving too fast for conditions.



We take our personal lives with us wherever we go. If we're stressed or angry, that can carry through to our use of the transportation system and lead to erratic and dangerous driving. Efforts from the Clackamas County Public Health Division as described in **Blueprint for a Healthy Clackamas County** are critical to ensuring road users are in the right mental state to drive safely.

Action Items-Calm Driving

- Install speed feedback signs.
- Work with ODOT and individual cities to implement best practices in setting design speeds and speed limits, including risk-based speed limits.
- Implement automated enforcement of speeding and red-light running. (Based on current laws, this can only be used in cities, not in unincorporated communities of Clackamas County).

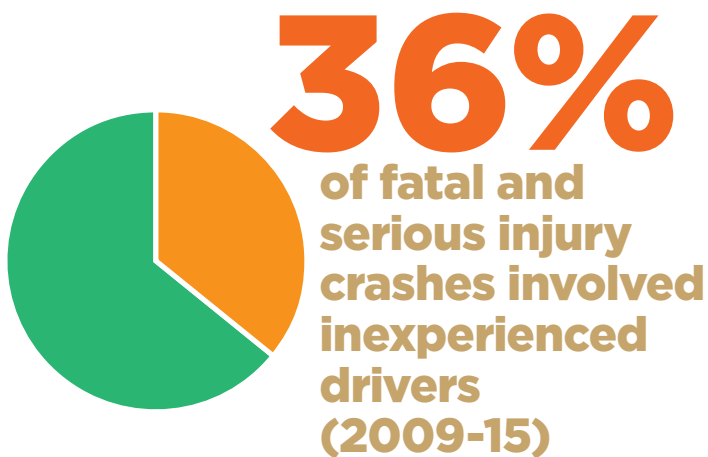
Calm Driving - What Can You Do?

- *Plan enough time to reach your destination so you don't need to speed to arrive on time.*
- *Drive the speed limit and leave ample following distance.*
- *Yield right-of-way to pedestrians and bicyclists at crosswalks and driveways.*
- *Calm yourself before driving if feeling stressed or angry.*

Safe Drivers and Passengers

Inexperienced Drivers

Inexperienced drivers are defined as drivers age 15 through 25. This demographic accounted for 40% of all reported crashes and 36% of reported severe crashes in Clackamas County from 2009 to 2015. Throughout the U.S., motor vehicle crashes are the leading cause of death for teenagers. These drivers' inexperience and their likelihood to overrate their driving abilities require special attention, according to *Toward Zero Deaths: A National Strategy on Highway Safety*.



According to ODOT, young drivers ages 15-20 without driver education, account for over 90% of all crashes involving drivers of this age.²

Action Items-Inexperienced Drivers

- Support driver education programs, especially in rural areas that may struggle for access to programs.
- Begin safety education before young people reach driving age, as early as preschool. Partner with groups such as **Safety Towns** and school districts.
- Support family-based driver education to leverage parental influence.
- Continue to support peer-based safe driving marketing efforts.
- Continue outreach programs in high schools county-wide to provide driver and non-motorized travel safety education.

Inexperienced Drivers - What Can You Do?

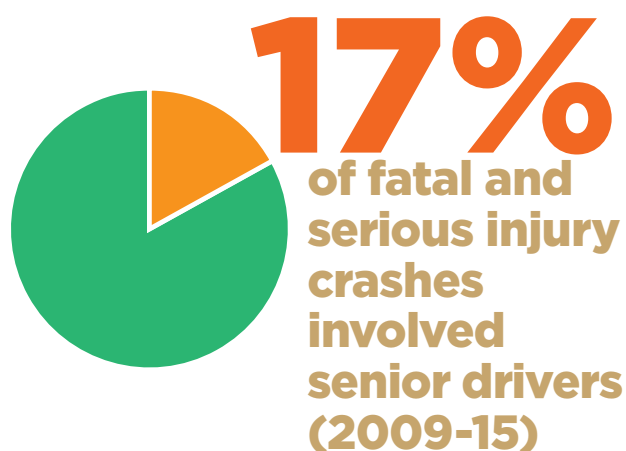
- *Work with young family members to impart safe driving principles before they reach driving age.*
- *Enroll teens approaching driving age in formal driver education courses.*
- *Sign a [Parent-Teen Driving Contract](#)¹ with young drivers in your family.*
- *Lead by example - always drive attentively, calmly and sober*

1 www.cdc.gov/MotorVehicleSafety/pdf/Driving_Contract-a.pdf

2 October 19, 2018 ODOT Press Release "Driver Education making all the difference in the world in Oregon."

Senior Drivers

Senior drivers are defined as age 65 or older. This demographic accounted for 18% of all reported crashes and 17% of reported severe crashes in Clackamas County from 2009 to 2015. Lower motor skill coordination at older ages, combined with a continued need to drive to medical care, shopping, and socialization creates special needs for this population. Several actions can be taken to improve senior driver safety.



Senior Drivers - What Can You Do?

- Take the online [AAA Roadwise Driver Course](http://www.aaadrivercourse.com)¹.
- Use transit options such as TriMet and Clackamas County Transportation Reaching People when possible.
- Ask your doctor or pharmacist to review medicines for side effects such as drowsiness that may affect safe driving.
- Have your vision checked annually.
- Drive during daylight hours when possible.

Seniors rely on transportation for socialization and medical needs. To enable them to access these critical needs without driving themselves, other transportation options are necessary. This is a particular challenge in rural areas, where transit options are often minimal and pedestrian infrastructure is often lacking.

Action Items-Senior Drivers

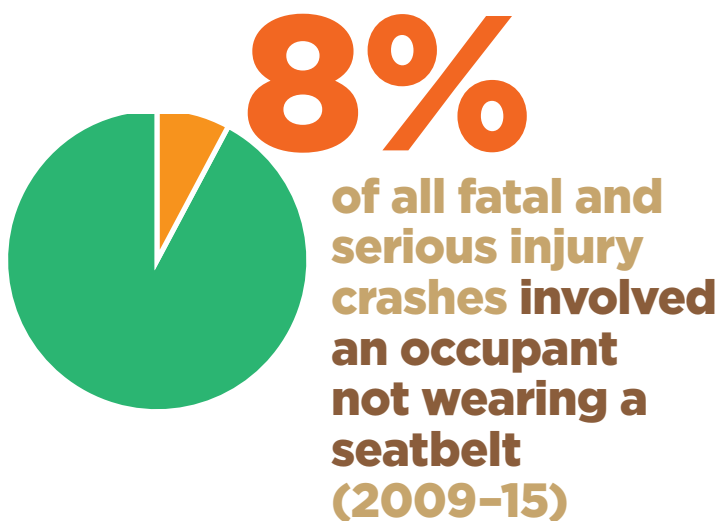
- Encourage conversations about safe driving between family members and the health care community through educational campaigns, pamphlets, and online resources.
- Since seniors are more likely to be taking medications, teach people about the impact of medicines on their ability to think clearly and react quickly.
- Support training sessions through organizations, such as AARP, AAA, and insurance companies, to help seniors maintain driving skills.
- Provide transportation options through infrastructure that allows for transit, walking, and other forms of transportation.
 - » Focus this effort in rural areas where maintaining mobility without driving is most difficult.
 - » Partner with transportation assistance programs to promote non-driving options.

¹ www.seniordriving.aaa.com/maintain-mobility-independence/driver-improvement-courses-seniors/take-online-defensive-driving-course/

Restraining Devices: Seatbelts, Child Passenger Seats, and Pet Harnessing

The state of Oregon boasts a seatbelt usage rate of 98%¹, among the highest in the country. In Clackamas County 8% of severe crashes involved a driver or passenger not wearing a seatbelt. Additionally, while just 2% of all occupants don't use seatbelts statewide, crashes involving impaired driving had an unbelted occupant 19% of the time.

Child passenger seats must be installed and used properly to achieve their full benefit. Additionally, pets need to be harnessed in vehicles to protect them, vehicle operators, and emergency responders.



Action Items—Restraining Devices

- Support Safe Kids Oregon, ODOT, and Oregon Impact in their education efforts on child passenger safety.
- Raise awareness of the frequency of incorrect car seat installation. Provide information on the safety outcomes of properly installed car seats, including types of seats, when they should be front or rear facing, when children should be seated in the front or back of vehicles, and other laws related to seatbelt use.
- Provide car seat installation assistance. If possible, offer reduced priced seats for sale to low-income families.
- Support education, marketing, and enforcement efforts to further increase seatbelt usage in Clackamas County.
- Complete gap analysis of child passenger safety in Clackamas County.
 - » Implement recommendations from gap analysis report.

Restraining Devices - What Can You Do?

- Use your seatbelt and encourage others in your vehicle to do the same.
- Learn how to properly use car seats, including when they should be front or rear facing, when children should be seated in the front or back of vehicles, how to properly use car seats while wearing a winter coat, and how to avoid unsafe after-market items and toys.
- Get a child seat checkup with [Oregon Impact](#)².
- Use new car seats.
- Check for child passenger seat recalls at www-odi.nhtsa.dot.gov/recalls/childseat.cfm

1 Oregon Department of Transportation. Oregon Transportation Safety Action Plan. 2016.

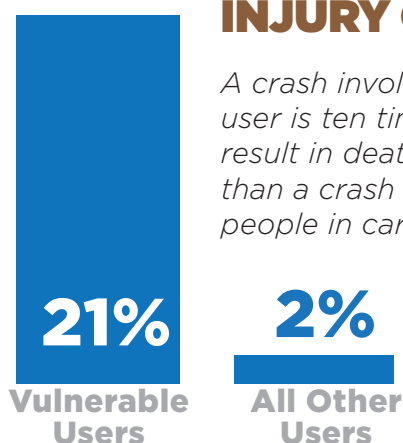
2 www.oregonimpact.org/car-seat-resources.htm

Safe Vulnerable Users

People walking, bicycling, or riding a motorcycle are considered **vulnerable users** because they do not have the same physical protection as people in a motor vehicle. It's no surprise that people walking, bicycling, or on motorcycles are involved in a disproportionately high number of fatal and serious injury crashes.

REPORTED CRASHES RESULTING IN SERIOUS INJURY OR DEATH

A crash involving a vulnerable user is ten times more likely to result in death or serious injury than a crash involving only people in cars or trucks.



Other Plans

The Oregon Department of Transportation **Safety Action Plan** lists improving vulnerable user safety as a near-term emphasis area. The Toward Zero Deaths national strategy lists safer vulnerable users as a key area. Lastly, the **Blueprint for a Healthy Clackamas County** and **Clackamas County Drive to Zero** program define a long-term goal of eliminating all pedestrian, bicycle, and motor vehicle traffic crash fatalities in Clackamas County.

A study from the US Department of Transportation shows that the faster a vehicle is traveling, the higher the likelihood is that a pedestrian crash will be fatal.



PEDESTRIAN DEATH DUE TO SPEED

U. S. DEPARTMENT OF TRANSPORTATION, LITERATURE REVIEWED ON VEHICLE TRAVEL SPEEDS AND PEDESTRIAN INJURIES. MARCH 2000.

Image created by the Portland Bureau of Transportation.

Safe Vulnerable Users



Action Items

Pedestrians

People walking face the most conflicts with motor vehicles. Action items to

mitigate pedestrian crashes include:

- **Work with partners** through safety fairs, school presentations, town halls, and community events to develop and provide safety education, including the following outreach for children.
 - » Safe crossing practices
 - » Not playing behind vehicles or near streets
 - » Importance of adult supervision

Pedestrians - What Can You Do?

- *Be attentive and put away electronic devices when walking or rolling.*
- *Cross the roadway at crosswalks and traffic lights.*
- *Wear high-visibility clothing.*

- **Adult pedestrian outreach**, such as safe crossing practices and new pedestrian infrastructure education.
- **Design roadways** integrating pedestrian safety considerations by providing pedestrian infrastructure, encouraging slower motor vehicle speeds, and minimizing conflict points between pedestrians and motorists (see Part II for more information).
 - » Sidewalks, pathways, and other walkways separating pedestrians from motor vehicles along roadways
 - » Enhanced roadway crossings, where appropriate
 - » Pedestrian-focused traffic signal timing, such as elimination of permissive right-turns on red and leading pedestrian intervals
- **Continue to support** the Clackamas County Safe Routes to School program.
- **Continue support** for County Bike and Pedestrian Program.

Motorists - What Can You Do?

- *Pay extra attention to look for people who may be crossing, or about to cross, the street at all intersections and other crossings.*
- *Give ample space between your vehicle and people bicycling when passing.*
- *Obey all traffic laws and drive predictably.*

Other vulnerable roadway users include construction workers, law enforcement agents, and Adopt-a-Road volunteers as well as skateboard, e-scooter, and hoverboard and other mobility device users.

Safe Vulnerable Users



Action Items

Bicyclists

Bicyclists face the most conflicts with motor vehicles. The following

action items can improve bicycle safety.

- **Education and awareness** campaigns centered on driver and bicyclist behavior, common crash types, and low-light visibility issues.
- **Roadway design** integrating bicycle safety considerations by providing appropriate bicycle infrastructure, encouraging slower motor vehicle speeds, and minimizing conflict points between bicyclists and people driving (see Part II for more information).

- » Shared lane markings, wayfinding, and where necessary, traffic calming for lower speed and volume roadways.
- » Increasing physical separation between people biking and motor vehicles as motor vehicle volumes and speeds increase, including physical barriers at higher speeds and volumes.

- **Continue to support** the Clackamas County Safe Routes to School programs.
- **Continue support** for County Bike and Pedestrian Program.
- **Support prevention agencies** such as Think First that provide training and education related to helmet use.

Bicyclists - What Can You Do?

- *Wear a helmet and use front and rear lights.*
- *Obey all traffic laws and ride predictably.*



Action Items

Motorcyclists

Motorcycles are motor vehicles, but motorcyclists have a lower level of protection and face

higher traffic injury and fatality risks. One of the best ways to improve motorcycle safety conditions is through education and outreach.

Ideally, motorcycle education efforts should leverage motorcycle culture and be led by fellow riders. This can include outreach on:

- Proper safety equipment
- Safe riding practices
- Motorcycle handling skills and maintenance

- ODOT and Team Oregon training and outreach work

Motorcyclists - What Can You Do?

- *Wear a helmet and protective clothing.*
- *Obey all traffic laws and ride predictably.*
- *Take a [Team Oregon motorcycle training course](http://team-oregon.org/training/)¹.*

¹ <http://team-oregon.org/training/>

Safe Infrastructure



The choices drivers make are influenced by the roadway infrastructure around them. For instance, people may feel comfortable driving faster than the posted speed limit on a roadway that is designed for faster speeds. Further, people will make mistakes when they drive. Whether these errors result in death or serious injury depends, in part, on infrastructure design.

Vehicle technology is rapidly changing toward a future with connected and autonomous vehicles. Infrastructure that is designed to communicate with vehicles will help prevent collisions in the future. Guiding principles and policies to support safety infrastructure include:

Safety should be a priority on every project

- Consider safety-based measures for a given design criteria to evaluate roadway performance.
- Develop policies and practices to incorporate safety assessments into project development, design, and construction.
- Convene a group to investigate how to incorporate increased safety analysis requirements into development review:
 - » Develop and implement crash frequency standards.
 - » Assess impact fees for trips through Safety Focus roadways and intersections.
- Integrate Road Safety Audits (RSAs) into the project development process. Encourage RSAs on existing roads and intersections.

Deploy safety countermeasures related to safety emphasis areas

- See Part 2 of the plan for more information on specific countermeasures and locations.

Design for all expected users

- Design appropriate infrastructure for people walking and biking.
- Educate and inform users of infrastructure changes.
- Enact roadway design standards that encourage vehicle speeds appropriate for the surrounding land use.

Performance Clackamas sets Pavement Condition Index (PCI) goals as follows:

- By 2022, maintain the average condition of paved county roads at 70 PCI or higher.
- By 2022, improve the average condition of urban local roads to a PCI of 70 or higher.

Prepare roadways, streetlights, signals, etc. for vehicle-to-infrastructure communication

- Monitor future trends to discern best options for pursuing this action item.

Safe Vehicles

Vehicle factors, such as brake failure, tire underinflation, and vehicle-related vision obstructions are the sole cause of about 3% of reported cases and contribute to about 12% of reported crashes in the United States¹. While vehicle-only contributing factors are rare, eliminating them provides opportunities to save more lives. Advances in vehicle technology will help reduce collisions and protect occupants. This section discusses Clackamas County's role in improving commercial fleet vehicle safety and passenger vehicle safety.

Action Items - Safe Vehicles

Clackamas County can help improve safety performance for commercial and personal vehicles:



Commercial Vehicles

- Increase Motor Carrier Safety inspections and outreach.
- Develop safety standards for County fleet vehicles.



Personal Vehicles

- Develop and implement education and outreach efforts to communicate safety benefits and limitations of new vehicle technologies.
- Analyze crashes involving vehicle malfunctions and use results to inform outreach, and possibly enforcement, efforts.

Safe Vehicles - What Can You Do?

- When purchasing a new or used vehicle, compare its [safety features](#)² with other vehicles.

Technology Advances and Safety

Newer vehicles and connected/automated vehicles can help drivers avoid crashes and improve safety in the following ways:

- **Perform some driving-related tasks**
- **Alert drivers to risk**
- **Assist drivers who are at risk of a crash**
- **Protect vehicle occupants during a crash**
- **Enable communication with other vehicles and the roadway**
- **Help vehicles continue to perform as designed**

Sources differ dramatically on when automated vehicles will hit the market and what levels of automation they'll possess. Some automation (such as cruise control) has been around for years, and vehicles that can drive themselves in specific situations and in good weather are on the streets now¹. However, fully automated vehicles may not saturate the market for some time. Carmakers across the country hope to put fully automated vehicles on the market by 2025², but many in the industry³ believe that obstacles such as crash ethics and cybersecurity could pose obstacles to widespread adoption.

- 1 www.businessinsider.com/lyft-deploying-self-driving-bmws-in-las-vegas-2018-5
- 2 www.edmunds.com/car-news/auto-industry/honda-plans-self-driving-cars-by-2025.html
- 3 www.technologyreview.com/s/602292/top-safety-official-doesnt-trust-automakers-to-teach-ethics-to-self-driving-cars/

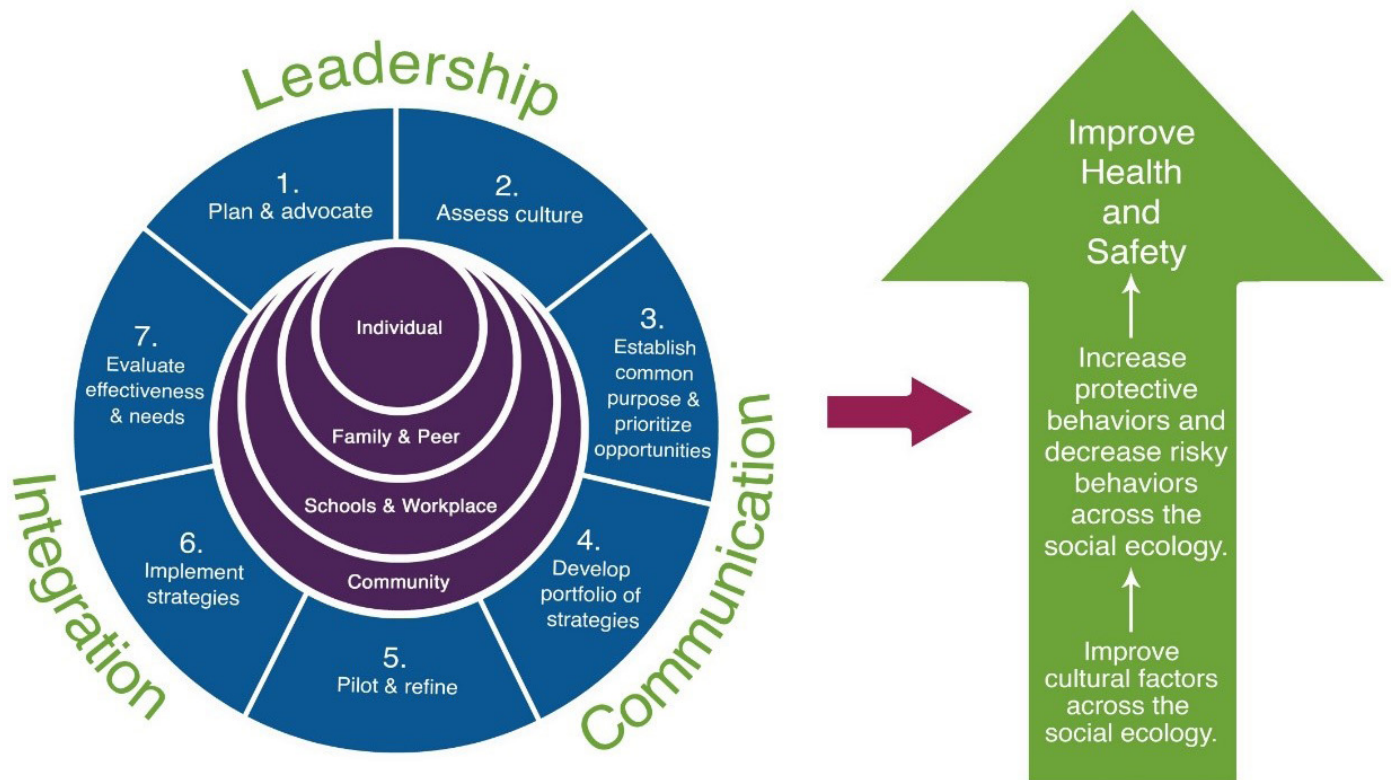
1 Treat, et al. Tri-Level Study of the Causes of Traffic Accidents. 1979.
 2 www.consumerreports.org/car-safety/cars-with-advanced-safety-systems/

Safety Culture

What is Safety Culture?

Safety Culture is the attitude, beliefs, perceptions, and values people share related to safety. It can be summed up by the phrase “the way we do things around here.” For Clackamas County, Safety Culture is the attitude residents share about safe driving and other forms of transportation. Clackamas County recognizes the need to grow a positive Safety Culture and to have everyone agree that serious injury or death from a vehicle crash is not acceptable. We must grow this Safety Culture across the county.

Positive Culture Framework from Montana University Center for Health and Safety Culture¹



¹ Graphic courtesy Montana State University

Safety Culture

In addition to the Molalla pilot project, the County's ongoing efforts to improve safety culture include:

- **Drive to Zero (DTZ)**, the Clackamas County initiative to eliminate fatal and serious injury crashes, focuses on safe driving and safe roadways. DTZ runs a number of programs, including youth-oriented education and outreach efforts, media campaigns, and the Molalla pilot project.
- **The Clackamas County Traffic Safety Commission** consists of 12 Clackamas County residents, including one or more high school students, that meets monthly to discuss a variety of safety-related topics and provide a community perspective on what is needed to improve safety in Clackamas County.
- Publishing the **Blueprint for a Healthy Clackamas County**, which establishes a long-term goal to eliminate traffic fatalities in Clackamas County.
- **The Clackamas County Safe Routes to School Program** focuses on increasing safety, walking and biking to local schools. Included in the program is extensive outreach and encouragement about safety for all users.

Molalla Safety Culture Project

In 2016, Clackamas County began a pilot project to build a rural community traffic safety program incorporating the **Positive Culture Framework (PCF)**. The Molalla rural area within the Molalla Rural Fire District boundary was selected due to their readiness including community-driven projects sponsored by the **Ford Family Foundation (FFF)** and the **Rural Development Initiatives (RDI)**. They were also chosen due to an overrepresentation of severe and fatal crashes.

Molalla Drive to Zero (M-DTZ) was formed under the umbrella of Molalla Communities that Care, a local non-profit. A fundamental component of the pilot was to establish a positive safety culture to encourage good choices and positive outcomes rather than traditional programs that focus on negative or traumatic methods of changing behavior.

The Center for Health and Safety Culture at Montana State University (MSU) provided consultation services including training and technical expertise on the PCF for the M-DTZ initiative. The PCF enhances efforts that grow a positive traffic safety culture. It is founded on the concept that there is positive in the community and it is worth growing. The outcome of the PCF framework was to support and enhance shared values and beliefs, in turn decreasing risky behaviors.

MSU conducted a survey within the Molalla Fire



Service boundary about community perceptions of traffic safety. Responses showed that community perception of traffic safety varied greatly. These surveys provided a lens through which stakeholders could better understand issues and perceptions within the community. The survey and local crash data also helped direct the program to select a focus area to work on, which was aggressive driving. As the program continued, other community projects were

chosen to work on including hosting child passenger safety education events, improving access to driver education for high school students, and creating safe driving policies for local businesses. While building capacity in the community for PCF takes time and effort, **there is deep interest in the community to grow a positive safety culture.**

M-DTZ stakeholders have provided outreach at safety fairs and community events. They have also reached out to school representatives, elected officials and law enforcement to discuss community-wide safety collaboration opportunities. These critical first steps are helpful for the community to lay the groundwork to grow a positive safety culture in the community.

Clackamas County will continue to work with the community and support their efforts. Staff will also reach out to other communities to continue local programs such as Molalla Drive to Zero.

National Resources and Efforts

- **The Road to Zero Coalition** is made up of 687 members ranging from advocacy organizations to government to public health experts. Its report on strategies to get to zero traffic deaths identifies creating a positive safety culture as one of the three key strategies. It provides several resources on its website covering a variety of topics.
- **The Toward Zero Deaths** national strategy details how to shift culture away from transportation risk acceptance. It brings together various state and local initiatives to pursue a highway system that is free of fatalities.
- Several cities, counties, and states around the country have adopted **Vision Zero** initiatives, including the City of Portland and the Oregon Department of Transportation (ODOT). The Vision Zero Network provides resources to help communities reach this goal.
- **The Transportation Research Board Safe Systems Committee** identifies research needs, explains research findings to the public, and creates partnerships between organizations focused on Safety Culture.

Emerging Technology and Safety Culture

Emerging technology may help drivers avoid crashes, but it also may introduce new distractions or cause people to rely too much on the technology. It will be important to monitor the effects of emerging technology on driver behavior and integrate it into efforts focused on building a safety culture.

Safety Culture – What Can You Do?

- *Contact the Department of Transportation and Development for your block club or neighborhood association to work with Clackamas County's safety team to build neighborhood traffic safety culture.*

Action Items – Safety Culture

- **Continue improving** safety culture within the county itself, starting with departments directly associated with transportation safety, including the Department of Transportation and Development and the Department of Health, Housing, and Human Services.
 - » This could include safe driving contracts that contain an agreement to drive sober, attentively, and calmly and providing educational materials, videos, and seminars.
- **Continue the Molalla Drive to Zero project.**
- **Build off the Molalla Drive to Zero project** and extend Positive Culture Framework applications to other communities in the county.
- **Reach out to media** to encourage positive reporting instead of negative or traumatic messaging.
- **Continue to support** the Clackamas County Safe Routes to School program, including education and encouragement efforts.

Safety Management

Safety management includes:

- Communication between safety partner organizations;
- Safety analysis capacity building; and,
- Data management.

Improved safety management will result in a coordinated and efficient effort to improve Clackamas County's transportation safety outcomes.



Communication between Safety Partners

Various organizations in Clackamas County are working to eliminate traffic fatalities and serious injuries. To most effectively accomplish this, the organizations, such as emergency medical service professionals, highway agencies, enforcement officers, transportation engineers, health officials, and private organizations should share data, understand the resources others can offer, and help each other with the challenges they are facing.

Action Items - Communication

- Continue DTZ Advisory Board and expand membership.
- Develop other forums and tools for cross-organization information sharing and communication.
- Collaborate with Clackamas County Public Health Division to work on active transportation, safe routes to school, health impact assessments, and rural access to health care.

- Include transportation safety in county public health education programming.
- Better incorporate safety into long-range planning and project development processes.
- Develop a formal method for sharing safety data with partners (such as a website or a recurring presentation).
- Collaborate with local law enforcement agencies to identify and evaluate top county crash locations.
- Continue to promote and support the Clackamas County Traffic Safety Commission.



Data Management

Data-driven approaches can help the county most effectively reduce severe crashes. Data can help the county determine where to focus its efforts to achieve the greatest reduction in severe crashes and then to determine the most effective treatments and/or programs to employ. To fully realize the potential of the data being collected, the county needs to share it across organizations and integrate it into systems where it can be effectively analyzed.

Action Items - Data Management

- Integrate Roadway Infrastructure Management Systems (RIMS), crash, and traffic databases.
- Manage assets efficiently.
- Improve data inventory elements including addition of curve data.

- Partner with Clackamas County Public Health Division and Center for Public Health Advancement to:
 - » Overlay substance abuse data with DUII data to identify locations to focus interventions.
 - » Overlay chronic disease impacts with transportation safety data to identify locations where interventions could be applied to reduce disease and traffic crashes (e.g., multimodal infrastructure improvements).
- Provide crash data recording training for law enforcement officers.



Safety Analysis Capacity Building

As more data becomes available, Clackamas County has an opportunity to use this new data to improve traffic safety outcomes. To do so, however, the County will need to increase its analysis capacity by hiring additional staff with data analysis skills and/or by using trainings to improve existing staff analysis skills.

Action Items – Safety Analysis

- Pursue grants to provide additional training and/or software tools.
- Plan and execute data analysis training sessions.
- Add data analysis capabilities.
- Integrate the *Highway Safety Manual (HSM)* Predictive Method analyses into the roadway database for segments and intersections.
- Automate network screening using a custom or off-the-shelf tool.
- Support Data-Driven Approaches to Crime and Traffic Safety (DDACTS).

Safety Analysis – What Can You Do?

- Report all crashes.
- Report all road concerns.

Enhanced Emergency Medical Services

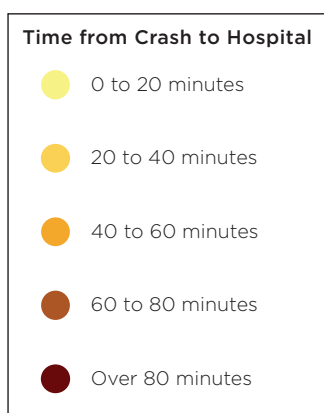
Emergency Medical Services (EMS) provide an opportunity to stabilize the life of a person injured in a crash. They are integral to Clackamas County reaching its goal of zero fatal or serious injury crashes. The effectiveness of EMS is tied closely to the time it takes for a person injured in a crash to receive prompt medical care. Research indicates that there is a “golden hour;” total pre-hospital time over 60 minutes is associated with a rise in patient mortality.¹

To receive prompt, high-quality medical attention, a victim with severe injuries needs to be quickly transported to a high-level trauma center. Clackamas County has no designated trauma centers and relies on trauma centers in the surrounding counties. For some rural parts of Clackamas County, prompt access to these facilities is not currently feasible. (See map on this page for the time elapsed between a crash and the victim’s arrival at the hospital for a selection of crashes in Clackamas County from 2012 to 2016).

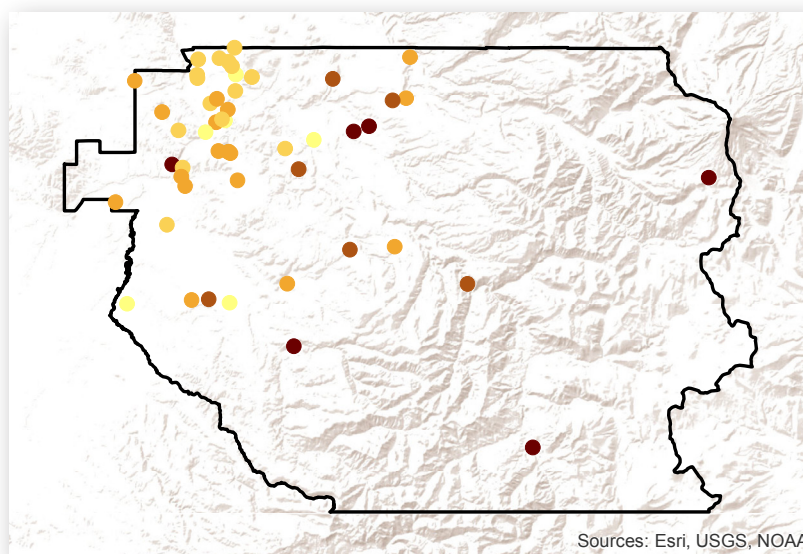
Areas with higher response times and lower availability of trauma centers may need to rely on bystander first aid. Evidence shows that bystander aid before EMS arrival can improve patient outcomes and decrease deaths.

Action Items - Emergency Medical Services

- **Partner with local hospitals or outreach groups** to help provide bystander training courses to the public (i.e., train members of the public to respond to emergencies since they are sometimes the first on the scene at a crash and may be the only one for some time in rural areas). Opportunities for this include:
 - » Partner with hospitals offering courses including Stop the Bleed, such as Legacy Health and Oregon Health Sciences University.
 - » Promote the Community Emergency Response Team (CERT) program, which trains community members in first responder skills.



Source: Fatality Analysis Reporting System (FARS). National Highway Traffic Safety Administration. 2012-2016.



¹ Samplais, et al. Impact of on-site care, prehospital time, and level of in-hospital care on survival in severely injured patients. 1993.

- » Work with local groups, such as fire departments, to be trainers themselves and then offer training more frequently in their local community.
- » Partner with Oregon Trauma Systems program and trauma centers since trauma centers are required to provide injury prevention programs.
- **Work with the Emergency Medical Services Council** and other stakeholders to:
 - » Maximize efficiency with urban and rural response times through evidence-based techniques.
 - » Optimize activation of Life Flight based on risk.
 - » Build advanced education EMS personnel capacity in rural areas.
 - » Identify reasons for delay in transport for both ground EMS and helicopter EMS (using registry data and EMS records).
 - » Consider process improvement initiatives to increase EMS documentation and data collection.
 - » Work with stakeholders to identify equipment upgrades, training, or enhancements that would improve patient outcomes.
 - » Identify barriers, if any, to rapid transfer of patients from lower-acuity hospitals in Clackamas County to nearby trauma centers.
 - » Explore accreditation of County dispatch centers.
- **Support the Oregon Area Trauma Advisory Board** in their efforts to:
 - » Review patient transport time data, identify barriers to rapid transport, and work with stakeholders to find solutions.
 - » Enhance quality assurance for delivery of emergency medical services and review improvement opportunities.
 - » Continue collaboration with EMS providers as part of Drive to Zero Advisory Board and expand to other groups as necessary.
- **Enhance collaboration** between the county and rural fire districts with emphasis on unique rural needs.
- **Work with the County 911 team** to:
 - » Involve them in appropriate project planning and design review to identify opportunities to improve EMS access and location identification.
 - » Involve them in enforcement and EMS grant opportunities.
 - » Develop and purchase a system that allows County 911 dispatchers to quickly input reported road issues and send the information to the appropriate agency (i.e., County, City, or ODOT Region).
- Consider a media campaign to inform/educate motorists how to help emergency vehicles move faster by slowing down and moving over.

Emergency Medical Services – What Can You Do?

- *Be aware of locations where cellular service may not exist.*
- *Be aware of your location so you can provide it to EMS providers if necessary.*
- *Program your phone with emergency contact information.*
- *Take a first-aid or CPR course.*



Part 1 Action Items Summary

The following table summarizes the action items in Part 1 of this plan. More detailed information on implementation timeframes and lead/supporting agencies for each item can be found in **Appendix B**.

Action #	Action Item
Safe Drivers and Passengers	
DP1	Work with employers to institute distracted driving policies at their workplaces.
DP2	Educate youth and adults on the importance of paying attention when using the transportation system.
DP3	Encourage businesses, institutions, and families to create policies related to driving safety, including attentive driving.
DP4	Work with alcohol and marijuana retailers/servers to encourage compliance checks to deter selling to, and reward those who do not sell to, underage customers.
DP5	Promote the Oregon Liquor Control Commission's Responsible Vendor program.
DP6	Provide educational posters, social media posts, and public service announcements to inform the dangers of impaired driving.
DP7	Work in schools to educate students on the consequences of impaired driving.
DP8	Coordinate with enforcement agencies to gain support for legislation and penalties associated with impaired driving.
DP9	Enhance Driving Under the Influence of Intoxicants (DUII) and impaired driving enforcement through data-driven saturation patrols; drug recognition and training (DRE & K9), standardized field sobriety tests training, and wet labs; and assigning a dedicated DUII enforcement unit.
DP10	Develop repeat DUII driver offender programs focused on treating the causes of DUII.
DP11	Provide Drug Recognition Expert (DRE) training for all county law enforcement officers.
DP12	Grow partnerships and support existing efforts to reduce underage drinking, underage marijuana use, and drug use through funding, educational outreach, and coalition membership.
DP13	Implement automated enforcement of speeding and red-light running. <i>This can only be used in cities, not in unincorporated communities of Clackamas County.</i>
DP14	Install speed feedback signs.
DP15	Work with ODOT and individual cities to implement best practices in setting design speeds and speed limits, including implementing risk-based speed limits.
DP16	Support driver education programs, especially in rural areas that may struggle with access to programs.
DP17	Begin safety education before young people reach driving age.
DP18	Support family-based safety education to leverage parental influence.
DP19	Continue to support peer-based marketing efforts.
DP20	Continue outreach program in high schools countywide to provide driver and non-motorized mode safety education.
DP21	Encourage conversations between family members and the health care community about safe driving through education campaigns and supporting materials, such as pamphlets and online resources.
DP22	Teach people about the impact of medicines on their ability to think clearly and react quickly.
DP23	Support training sessions through AARP and insurance companies to help seniors maintain driving skills.
DP24	Provide transportation options through multimodal infrastructure.
DP25	Support Safe Kids Oregon, ODOT, and Oregon Impact in their education efforts on child passenger safety.
DP26	Raise awareness of the frequency of incorrect car seat installation. Provide information on the safety outcomes of properly installed car seats, including types of seats, when they should be front or rear facing, when children should be seated in the front or back of vehicles, and other laws related to seat belt use.

Part 1 Action Items Summary

Action #	Action Item
DP27	Provide child passenger seat installation assistance. If possible, offer reduced priced seats for low-income families.
DP28	Complete gap analysis of child passenger safety in Clackamas County.
DP29	Implement recommendations from gap analysis report (see item #DP27).
DP30	Support education, marketing, and enforcement efforts to further increase seat belt usage in Clackamas County.
Safe Vulnerable Users	
VU1	Work with partners through safety fairs, school presentations, town halls, and community events to develop and execute safety education, including outreach for children: safe crossing practices, not playing behind vehicles or near streets, and the importance of adult supervision.
VU2	Adult pedestrian outreach, such as safe crossing practices and new pedestrian infrastructure education.
VU3	Roadway design integrating pedestrian safety considerations by providing pedestrian infrastructure, encouraging slower motor vehicle speeds, and minimizing conflict points between people walking and people driving (see Part 2 for more information).
VU4	Continue to support the Clackamas County Safe Routes to School program.
VU5	Continue support for the County Bike and Pedestrian Program.
VU6	Education and awareness campaigns centered around driver and bicyclists behavior, common crash types, and low-light visibility issues.
VU7	Roadway design integrating bicycle safety considerations by providing appropriate bicycle infrastructure, encouraging slower motor vehicle speeds, and minimizing conflict points between bicyclists and people driving (see Part II for more information).
VU8	Support prevention agencies such as Think First, which provide training and education related to bike helmet use.
VU9	Consider outreach regarding proper motorcycle proper safety equipment.
VU10	Consider outreach regarding safe motorcycle riding practices.
VU11	Consider outreach regarding motorcycle handling skills and maintenance.
VU12	Support ODOT and Team Oregon training and outreach.
Safe Infrastructure	
I1	Consider safety-based measures for design criteria to evaluate roadway performance.
I2	Develop a policy and practice for incorporating safety assessments into project development, design, and construction.
I3	Convene a group to investigate incorporating increased safety analysis requirements into development review; develop and implement crash frequency standards, and assess impact fees for trips through Safety Focus roadways and intersections.
I4	Integrate Road Safety Audits (RSAs) into the project development process. Encourage RSAs on existing roads and intersections.
I5	Deploy safety countermeasures related to safety emphasis areas (see Part 2 of the plan for more information on specific countermeasures and locations).
I6	Design appropriate infrastructure for people walking and biking.
I7	Educate and inform users of infrastructure changes.
I8	Enact roadway design standards that encourage vehicle speeds appropriate for the surrounding land use.

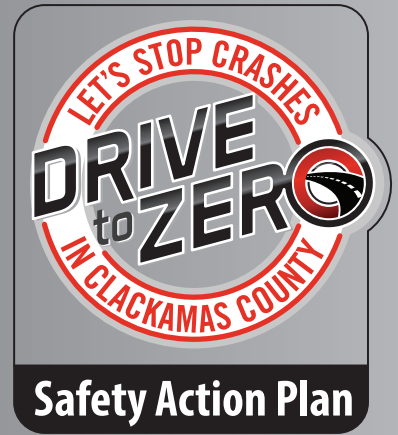


Part 1 Action Items Summary

Action #	Action Item
I9	By 2022, maintain the average condition of paved county roads at 70 PCI or higher.
I10	By 2022, maintain the average condition of urban local roads at 70 PCI or higher.
I11	Prepare roadways, streetlights, signals, etc. for vehicle to infrastructure communication. Monitor future trends to discern best way to pursue this action item.
Safe Vehicles	
VE1	Increase Motor Carrier Safety inspections and outreach.
VE2	Develop safety standards for County fleet vehicles.
VE3	Develop and implement education and outreach efforts to communicate safety benefits and limitations of new vehicle technologies.
VE4	Analyze crashes involving vehicle malfunctions and use results to inform outreach, and possibly enforcement, efforts.
Safety Culture	
C1	Continue improving safety culture within the County, starting with departments directly associated with transportation safety, including the Department of Transportation and Development and the Department of Health, Housing, and Human Services.
C2	Build off the Molalla Drive to Zero project and extend Positive Culture Framework applications to other communities in the County.
C3	Reach out to media to encourage positive reporting instead of negative or traumatic messaging.
C4	Continue to support the Clackamas County Safe Routes to School program, including education and encouragement efforts.
Safety Management	
M1	Integrate Roadway Infrastructure Management Systems (RIMS), crash, and traffic databases.
M2	Manage assets efficiently.
M3	Improve data inventory elements including addition of curve data.
M4	Partner with Public Health and the Center for Public Health Advancement to overlay substance abuse data with DUUI data and overlay chronic disease impacts with transportation safety data to identify locations where interventions could be applied to reduce disease and traffic crashes (e.g., multimodal infrastructure improvements) which may help fill gaps in reporting of non-injury crashes.
M5	Provide crash data recording training for law enforcement officers.
M6	Pursue grants to provide additional training and/or software tools.
M7	Plan and execute data analysis training sessions.
M8	Add data analysis capabilities.
M9	Integrate the <i>Highway Safety Manual (HSM)</i> Predictive Method analyses into the roadway database for segments and intersections.
M10	Automate network screening using a custom or off-the-shelf tool.
M11	Support data-driven approaches to crime and traffic safety (DDACTS).
M12	Continue DTZ Advisory Board and potentially expand membership.
M13	Develop other forums and tools for cross-organization information sharing and communication.

Part 1 Action Items Summary

Action #	Action Item
M14	Collaborate with Department of Public Health to work on active transportation, safe routes to school, health impact assessments, and rural access to health care.
M15	Include transportation safety in County public health education programming.
M16	Better incorporate safety into long-range planning and project development processes.
M17	Develop a formal method for sharing safety data with partners, such as a website or a recurring presentation.
M18	Collaborate with local law enforcement agencies to identify and evaluate top County crash locations.
M19	Continue to promote and support the Clackamas County Traffic Safety Commission.
Enhanced Emergency Medical Services	
EMS1	Partner with local hospitals and outreach groups to help provide bystander training courses to the public (i.e., train members of the public to respond to emergencies since they are sometimes the first on the scene at a crash and may be the only one for some time in rural areas).
EMS2	Maximize efficiency with urban and rural response times through evidence-based techniques.
EMS3	Optimize activation of Life Flight based on risk.
EMS4	Continue to build advanced education EMS personnel capacity in rural areas.
EMS5	Continue to identify reasons for delay in transport for both ground EMS (GEMS) and helicopter EMS (HEMS) using registry data and EMS records.
EMS6	Continue to consider process improvement initiatives to increase EMS documentation and data collection.
EMS7	Continue to work with stakeholders to identify equipment upgrades, training, or enhancements that would improve patient outcomes.
EMS8	Continue to identify barriers, if any, to rapid transfer of patients from lower-acuity hospitals in Clackamas County to trauma centers nearby.
EMS9	Continue to review patient transport time data, identify barriers to rapid transport, and work with stakeholders to find solutions.
EMS10	Explore accreditation of County dispatch centers.
EMS11	Continue to enhance quality assurance for delivery of emergency medical services and review improvement opportunities.
EMS12	Continue collaboration with EMS providers as part of the Drive to Zero Advisory Board and expand to other groups as necessary.
EMS13	Enhance collaboration between the County and rural fire districts with emphasis on unique rural needs.
EMS14	Involve County 911 in appropriate project planning and design review to identify opportunities to improve EMS access and location identification.
EMS15	Involve County 911 in enforcement and EMS grant opportunities.
EMS16	Develop/purchase a system that allows County 911 dispatchers to quickly input reported road issues and sent the information to the appropriate agency (i.e., County, City, or ODOT Region).
EMS17	Consider a media campaign to inform/educate the public on how to help emergency vehicles move faster by slowing down and moving over.



Part 2

Local Road Safety Plan

Drive to Zero Safety Action Plan

Overview

Part 2 builds on Part 1 to describe a data-driven Local Road Safety Plan for county-owned roadways. It includes projects to reduce fatal and severe injury crashes on road corridors and intersections. The Local Road Safety Plan is based on crash and roadway data analyses. The projects include countermeasures targeted at specific locations as well as treatments that can be deployed systemically throughout the county at locations with contributing factors to fatal and severe injury crashes. These projects are prioritized into a funding-constrained plan that describes when the county will further investigate and implement them.

About this Plan

The county’s safety-focused funds are divided between three overarching programs, as shown in **Figure 1** below. This Local Road Safety Plan addresses the two infrastructure programs: Location-Specific and Systemic. Non-infrastructure programs are covered in Part 1.

Figure 1. Programs Funded by County’s Safety Funds

Safety Funds*

Location-Specific Programs	Systemic Programs	Non-Infrastructure Programs
<ul style="list-style-type: none"> • Specific locations identified through Safety Priority Index System (SPIS) analysis, Road Safety Audits (RSAs), or other crash analyses 	<ul style="list-style-type: none"> • Intersections • Roadway Departure • Pedestrian and Bicycle • Other 	<ul style="list-style-type: none"> • Safe Routes to School Outreach • Clackamas County Sheriff’s Office (for enforcement coordination) • Drive to Zero Outreach • Other partner agencies and programs

***Other funding mechanisms include:**

Local Funds

- Tax Increment Financing
- Clackamas County Road Fund
- System Development Charges

Federal/State Funds (Administered by ODOT)

- Highway Safety Improvement Program (HSIP)
- Statewide Transportation Improvement Program (STIP)
- Surface Transportation Program (STP)
- All Roads Transportation Safety (ARTS) Grants
- Federal Lands Access Program
- Oregon Safe Routes to School Program

Regional Flexible Fund Allocation (Metro)

The Location-Specific and Systemic approaches represent two ways to identify locations and corresponding countermeasures to reduce crash frequency and severity. These approaches are consistent with the Oregon Department of Transportation's (ODOT's) All Roads Transportation Safety (ARTS) program.

Part 2 is organized in the following sections:

- Local Road Safety Plan
 - » Location-Specific Safety Treatments
 - » Systemic Safety Treatments
 - » Funding-Constrained Plan
- Project Evaluation and Tracking
- Next Steps

LOCAL ROAD SAFETY PLAN

The county's Local Road Safety Plan includes a five-year list of programs and projects based on projected funding. Projects include both location-specific and systemic work. This plan was informed by analyzing the county's top 50 high-crash sites based on Safety Priority Index System (SPIS) score, crash analyses conducted for the Transportation System Plan (TSP), road safety audits (RSAs) and other previous safety studies, and by conducting a systemic screening analysis to identify roadway and environmental factors that potentially contribute to severe crashes. This two-pronged approach addresses existing locations with poor safety performance (based on crash frequency, rate, and severity history) and identifies locations where systemic safety treatments and countermeasures may prevent future severe crashes.

Location-Specific vs. Systemic

The Location-Specific and Systemic approaches each have their strengths and complement each other. Eliminating fatal and serious injury crashes will require using both approaches.

Location-Specific

The Location-Specific approach addresses specific locations with a history of crashes. The county typically uses SPIS scores to identify sites for this program. This approach usually results in a focus in urban areas where more crashes occur or in rural locations where a fatality has occurred.

Systemic

The systemic approach addresses locations based on roadway characteristics that may be correlated with severe crashes. These locations may, or may not, have a history of severe crashes, but have characteristics that are similar to other sites where they have occurred. By selecting locations based on roadway characteristics instead of crash history, systemic treatments may help proactively reduce the risk of fatal and severe injury crashes. This approach is often used to address severe low-volume crashes, such as crashes in rural areas and bicycle and pedestrian crashes.



Location-Specific Safety Treatments

The Location-Specific approach uses crash history and road and traffic information at individual sites to identify and prioritize treatments for high-crash locations. Clackamas County identifies high-crash locations based on ODOT's SPIS¹ scores, based on a formula that considers crash frequency (i.e., number of crashes per year), crash rate (i.e., crashes by traffic volume), and crash severity. The county may also use other crash analysis information to identify high-crash locations (e.g., a review of fatal crash locations).

Projects in the Location-Specific program come from the following sources:

- The Five-Year Transportation Capital Improvement Program (CIP): Fiscal Years 2017-2021.
- ODOT's All Roads Transportation Safety (ARTS) program.

PROJECTS IDENTIFIED FOR FUNDING AND CONSTRUCTION

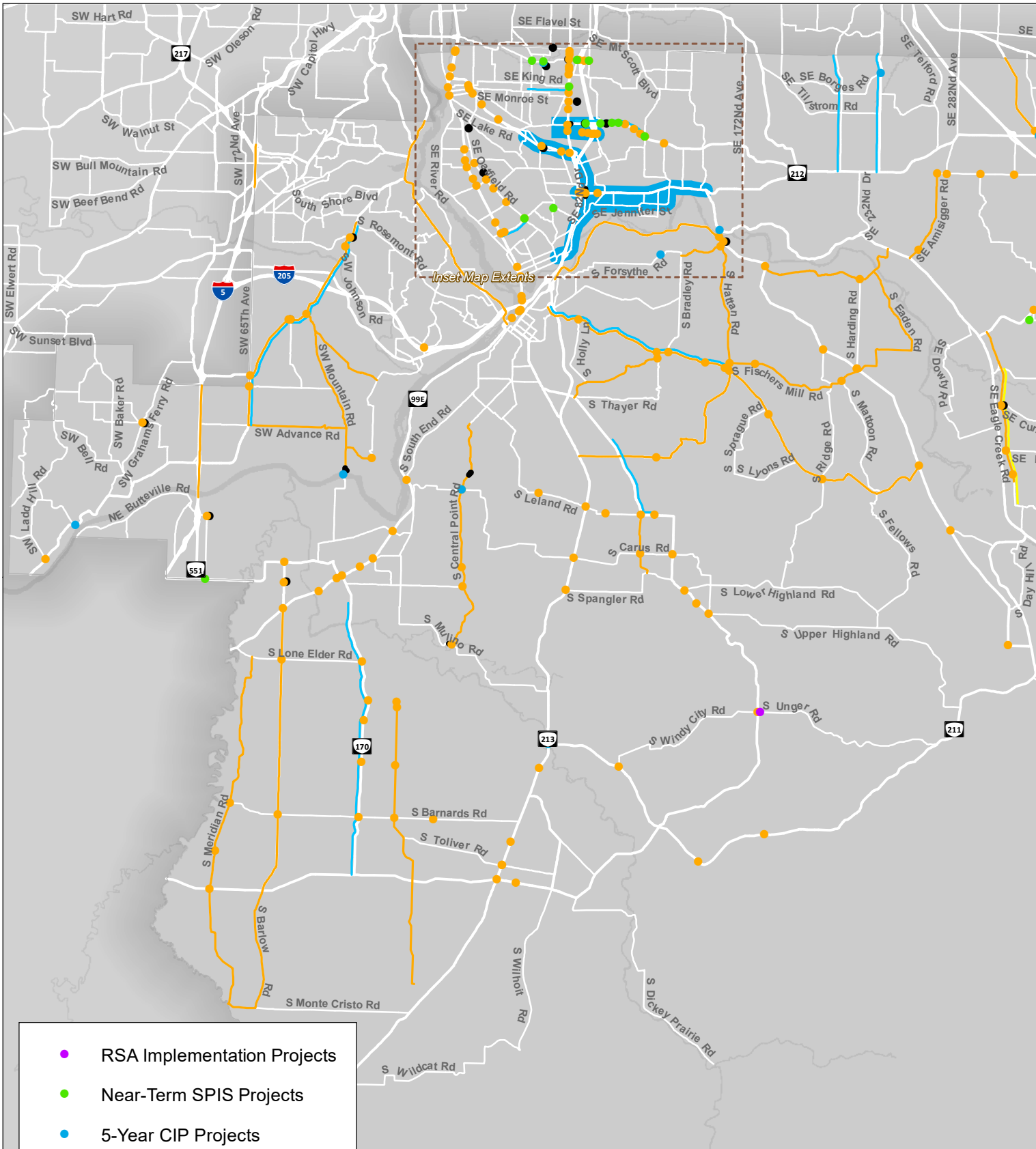
- The 20-Year CIP: Fiscal Years 2013-2033.
- Completed Road Safety Audits.
- Analysis of the 50 highest Safety Priority Index System sites in Clackamas County, based on 2013-15 crash data.
 - » More information on how these sites were selected and countermeasures identified can be found in Appendix A.

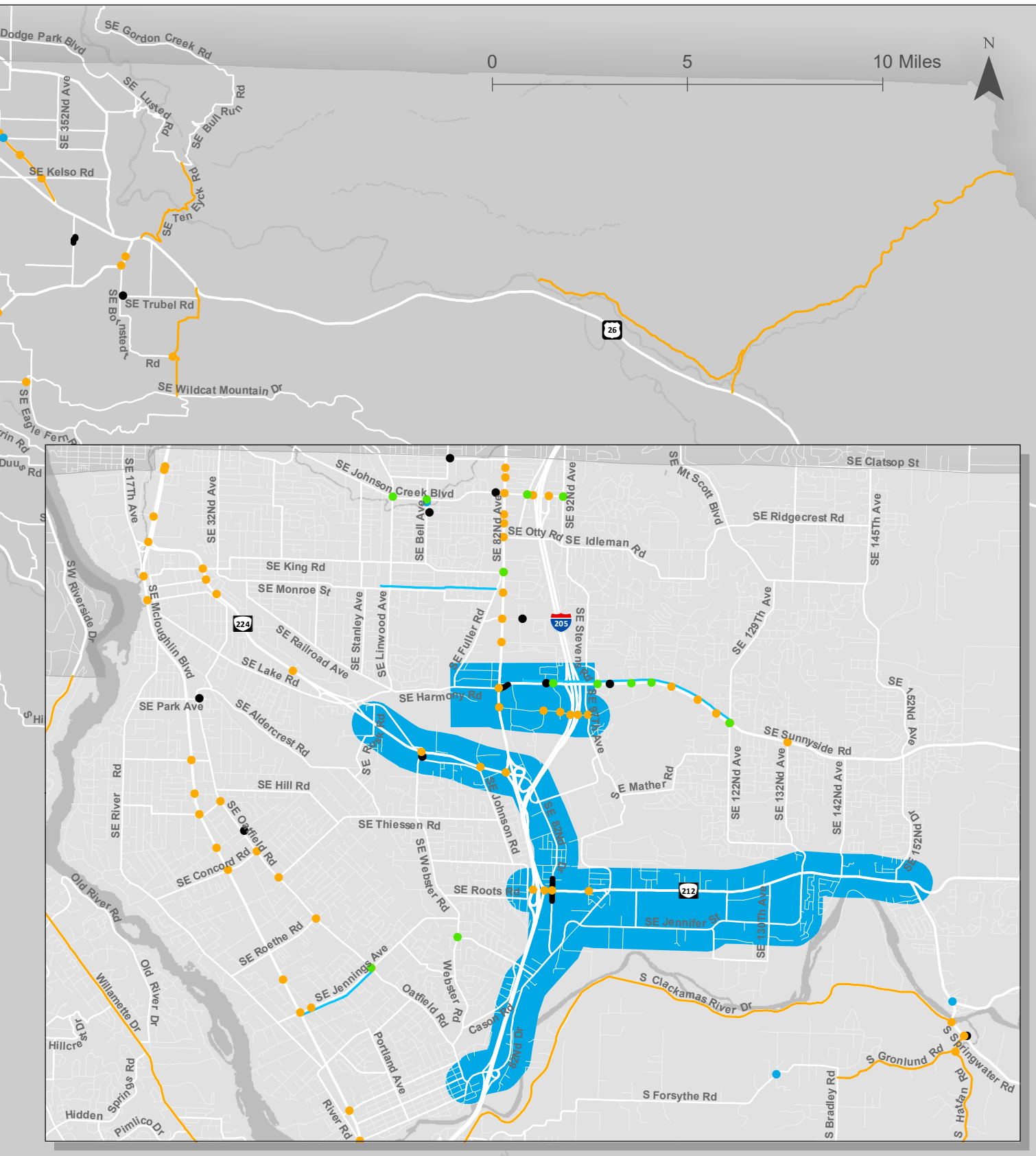
PROJECTS TO BE FUNDED

Projects Identified for Construction

Projects in the Five-Year CIP and ODOT ARTS program are anticipated to be funded for construction by the year 2021. These projects are shown in **Figure 2**. See **Appendix B** for a description of each project and subarea maps showing the projects in more detail.

¹www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-Brochure.pdf





**Funded and Planned Safety Projects
Clackamas County, Oregon**

**Figure
2**

Projects Planned but not Funded

Projects from the 20-year CIP, RSAs and SPIS are not yet funded and will be prioritized for funding in future Five-Year CIPs. The county intends to prioritize these projects for safety funding through benefit-cost (B/C) analyses. The county may elect to construct projects sooner than the B/C analysis would indicate when an opportunity arises to accelerate a project (e.g., funding from another source becomes available, or the project can be added to another planned capital or maintenance project).

Figure 2 shows, and **Appendix B** summarizes, safety-focused projects that still need to be funded for construction. These include projects that are listed in the 20-year CIP and projects that have arisen from analyses conducted for this plan and from completed RSAs. The appendix contains B/C ratios for potential near-term (i.e., low-cost) projects at the top 50 SPIS sites. Cost estimates are available for these projects from ODOT. However, cost estimates for the long-term projects will need to be individually prepared to calculate B/C ratios for these projects. Once this is complete, the county will prioritize these projects for implementation.

Long-Term Capital Improvement Program Projects

The county's TSP contains over 450 projects in longer-term categories, including:

- 20-Year Capital Projects (137 projects)
- Preferred Projects (44 projects)
- Long-term Capital Projects (182 projects)
- Regional Capital Projects (96 projects)

The projects in the latter three categories are the most long-term and are considered unfunded in the county's 20-year plan (2013–2033).

Many of the projects in these categories focus on reducing crash severity and/or frequency. Most projects contain some element with a crash reduction benefit including:

- Pedestrian and bicycle facilities and crossings
- Adding turn lanes
- Intersection control changes (e.g., installing a roundabout or signal)
- Roadway shoulder widening
- Road safety audits
- Roadway realignment (i.e., remove intersection skew, reduce horizontal and vertical curves)
- Traffic calming

Appendix B includes a complete listing of these projects and maps.

Systemic Safety Treatments

The systemic approach to traffic safety involves selecting locations for countermeasures based on roadway characteristics that may be correlated with severe crash types. These locations may, or may not, have a history of severe crashes, but have risk factors that are similar to other sites where crashes have occurred. By selecting locations based on roadway characteristics instead of crash history, systemic treatments may help to proactively reduce the risk of fatal and severe injury crashes.

The county intends to deploy systemic countermeasures through the following programs:

- Roadway Departure Crashes
- Intersection Crashes
- Pedestrian/Bicycle Crashes
- Other opportunities

The first three areas were identified through a data-driven process. Roadway departure and pedestrian/bicycle crashes were identified in Part 1 as two of the top seven most frequent contributing factors to fatal and serious injury crashes, along with Inexperienced Drivers, Aggressive Driving, Motorcyclists, Alcohol/Drugs, and Senior Drivers. The latter five areas are primarily addressed through the non-infrastructure programs described in Part 1. Intersections make up 42 out of the top 50 SPIS sites identified in the previous section.

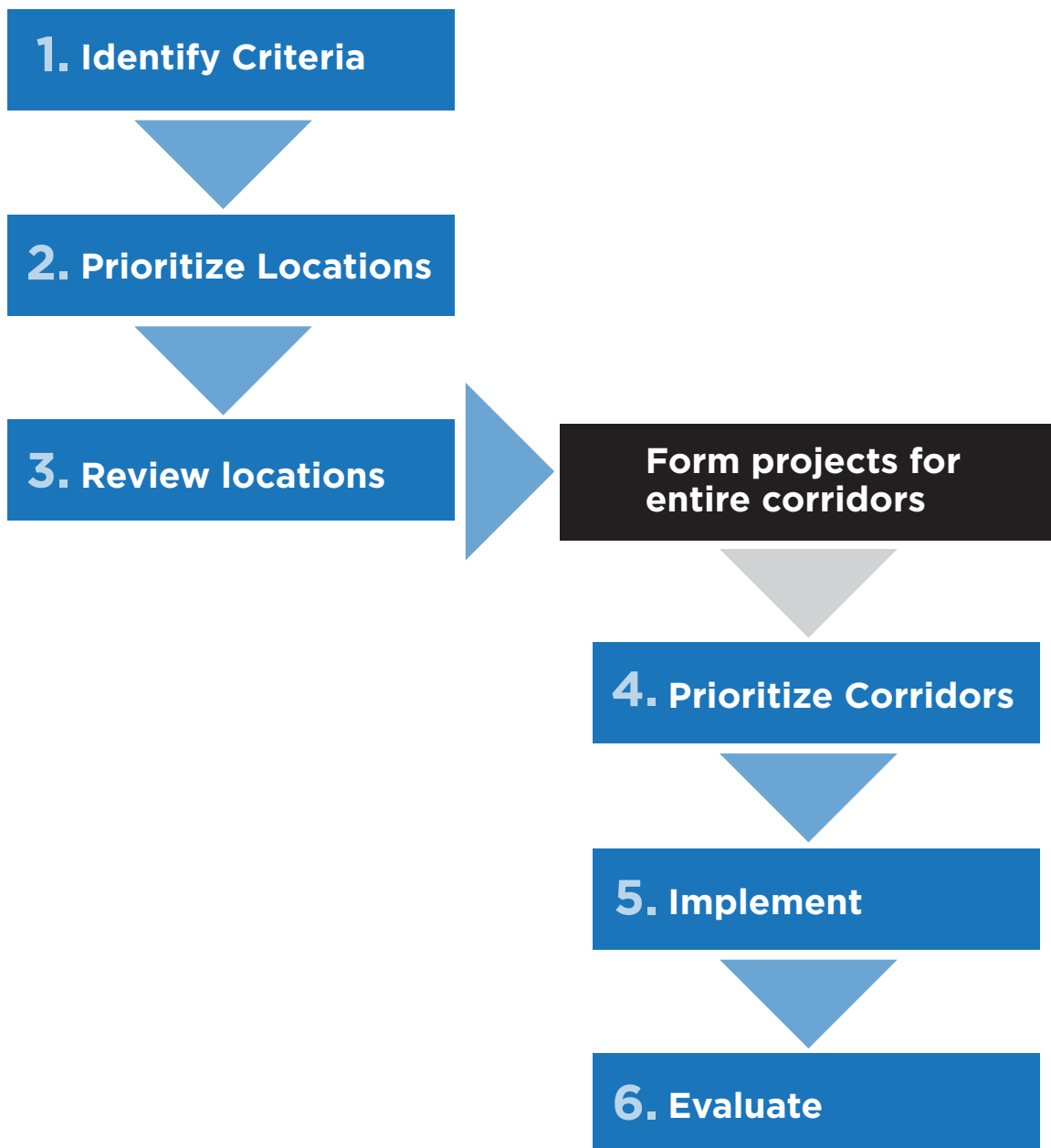
The final program recognizes that other opportunities may arise to implement low-cost countermeasures that may not directly address one of the other three emphasis areas (e.g., low-cost improvements from RSAs).

The following describes each program in greater detail.

Systemic Roadway Departure Crash Reduction Program

The roadway departure program focuses on identifying and treating roadway segments through risk-based screening. This new program is expected to be implemented through the six-step process shown in **Figure 3** and described in the following text.

Figure 3. Roadway Departure Crash Reduction Program Process





Step 1: Identify Criteria – Use geometric, traffic, and crash data to determine factors correlated with roadway departure crashes, and assign a point scale for each criterion. Previous analysis, described in **Appendix C**, identified two lanes, rural area, shoulders less than four feet wide, and speeds of 45 miles-per-hour (MPH) or greater as factors that could be used as screening criteria. Functional classification, traffic volumes, and presence of advisory signs (as a surrogate for curves or other situations) will also be analyzed.

Step 2: Prioritize Locations – Select up to five criteria from Step 1 to identify and prioritize locations for treatment by evaluating the road network against each criteria and ranking sites based on their scores.

Step 3: Review Locations – Review a predetermined number of locations from Step 2 (e.g., for the first year it is expected to be the top 20 locations) to form potential projects on complete corridors and compare these corridors with projects in the CIP and other relevant plans.

- Where there is overlap, review whether the planned project may address roadway departure crashes and how additional countermeasures may be incorporated. Work with other county staff to identify whether safety-focused funds could be used to raise the priority of the previously planned project.
- Where there is no overlap, identify potential countermeasure strategies for the corridor using the ODOT ARTS crash reduction factor list¹, and drawing on other resources as appropriate. Categorize strategies based on expected order of magnitude cost (e.g., “high-cost” vs. “low-cost.”)

Step 4: Prioritize Corridors – Prioritize corridors with low-cost treatments (high-cost treatments are deferred to the Location-Specific program) for implementation based on prioritization criteria and estimated cost (if available).

Step 5: Implement – Program the countermeasures determined in Step 4 for funding and design and construct them. In some cases, projects may be implemented as part of routine maintenance projects.

Step 6: Evaluate – After the countermeasure is implemented, monitor results to determine whether implementation has improved safety outcomes.

¹ Oregon Department of Transportation (ODOT). All Roads Transportation Safety. www.oregon.gov/ODOT/Engineering/Pages/ARTS.aspx. Accessed February 2019.

Systemic Pedestrian and Bicyclist Crash Reduction Programs

The county has several ongoing systemic programs related to pedestrian and bicycle crashes. In addition, the county intends to initiate a program to proactively identify and treat pedestrian and bicycle crossing locations. These programs are described in the following sections.

Ongoing Programs

Table 1. Ongoing Pedestrian and Bicyclist Systemic Safety Programs

Project Name	Description/Application	Cost Estimate (\$2014) ¹
Advance Ped Crossing (1)	Upgrade push buttons at all signalized intersections to new standard accessible pedestrian signal (APS) buttons.	\$800,000
Advance Ped Crossing (2)	Install pedestrian countdown heads at all signalized intersections.	\$500,000
School zone beacon signs	Evaluate 7 a.m.–5 p.m. school zones and replace static “School Zone” signs with “When Flashing School Zones” signs when warranted.	\$750,000
Changeable message signs at school zones	Install radar reader signs approaching a school zone.	\$750,000
Advance Ped Crossing (3)	Install rectangular rapid flashing beacons at mid-block crossings at crossings near school frontage locations.	\$400,000
Improve Bike Detection	Deploy radar or bike loops at all signalized intersections with bike lanes.	Variable
Neighborhood Traffic Calming	Use mobile radar reader signs placed in neighborhoods. Move signs every other month to requested roadways throughout the county.	\$250,000
Traffic Calming Program—Collector Streets	Develop a program to support traffic calming on collector streets in the urban area.	\$30,000
I-205 Multi-Use Path Connection	Construct ADA compliant access to the commercial area from the I-205 Multi-Use Path.	\$80,000
ADA sidewalk ramps	Improve all non-compliant sidewalk ramps at/near push buttons and mid-block crossings.	\$3,000,000
School zone evaluations/safety upgrades	Evaluate all school zones and implement improvements as needed including sidewalks, curb ramps, crosswalks, radar speed signs, flashers, rapid flashing beacons, traffic calming.	\$4,000,000
Bike/Pedestrian facilities	Systemic review of urban collectors and arterials for possible reallocation of space for bike/ped facilities.	\$200,000
Rural Bike Program	Create rural bike boulevards.	\$50,000
Safe Routes to School Plans	Plans for several schools containing infrastructure and non-infrastructure programs.	Variable

¹Cost estimates are for five years and are taken from *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017-2021*². Projects listed in Table 1 are projected to be funded through the Five-Year Transportation Capital Improvement Plan as funds are programmed.

² Clackamas County. *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017 - 2021*. <https://dochub.clackamas.us/documents/drupal/daebbe21-a78d-4e08-955a-d4b767230033>. Accessed February 2019.

New Programs

The county intends to create three new systemic programs to reduce the risk of pedestrian and bicyclist crashes. They include:

- **Traffic calming:** Identify collector streets that could benefit from traffic calming and implement solutions to reduce motor vehicle speeds and/or volumes on these streets.
- **Urban intersection crossing upgrades:** The county has a program to review crossings near schools and this will complement it by reviewing crossings in other high-demand locations. It will be conducted using a similar process as the one described for roadway departure crashes. Potential contributing factors to evaluate include speed; traffic volumes; number of lanes; functional classification; crosswalk, signal, and beacon locations; potential generators of walking and biking activity (e.g., commercial zoning, transit stops, and trails).
- **Responding to locations identified by Pedestrian/Bikeway Advisory Committee:** Set aside funds to treat locations identified as problematic by the Pedestrian/Bikeway Advisory Committee.

Systemic Intersection Crash Reduction Programs

Because many fatal and serious injury crashes occur at intersections, Clackamas County seeks to systemically improve safety outcomes at its intersections. For instance, many of the 42 intersection SPIS sites have planned low-cost treatments that are expected to be applied systemically at other similar locations. **Table 2** summarizes the county's intersection safety programs.

Table 2. Systemic Intersection Crash Reduction Programs

Project Name	Description/Application	Cost Estimate (\$2014) ¹
Flashing Yellow Arrow (FYA)	All signalized intersections with 5-section (doghouse) signals.	\$120,000
Reflective strips on backplates	Signalized intersections with a high crash history.	\$150,000
Red/Green Light Extension Project	Signalized intersections with high red-light crashes.	\$30,000
Supplemental signal heads (left turn/through, far side and/or near side)	Signalized intersections with high left-turn and red-light crash history.	Variable
"T" Intersection sign/markings treatments	Create standard list of treatments to improve safety at all T-intersections, focusing first on rural area and then the urban area.	\$750,000
2-way stop controlled intersection treatments	Create standard list of treatments to improve safety at all 2-way stop-controlled intersections, focusing first in rural area and then the urban area.	\$900,000
All-way stop-controlled intersection treatments	Create standard list of treatments to improve safety at all all-way stop-controlled intersections, focusing first in rural area and then the urban area.	\$150,000

¹Cost estimates are for five years and are taken from *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017-2021*². Projects listed in Table 2 are projected to be funded through the Five-Year Transportation Capital Improvement Plan as funds are programmed.

² Clackamas County. Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017 - 2021. <https://dochub.clackamas.us/documents/drupal/daebbe21-a78d-4e08-955a-d4b767230033>. Accessed February 2019.

Other Programs

Clackamas County conducts Road Safety Audits (RSAs) to determine potential multimodal traffic safety improvements along roadway segments or at intersections. RSAs typically produce a range of projects. Larger projects will be prioritized through the Location-Specific program, while smaller projects may receive funds set aside within the Systemic program.

Currently, Clackamas County plans to conduct RSAs on Compton Road, 282nd Avenue, Eagle Creek Road, and Sunnyside Road, as shown in **Figure 4** on page 50, 51.

Maintenance

Maintenance projects provide opportunities to systematically improve infrastructure and to help infrastructure function as it was designed to. **Table 3** describes the safety-focused programs completed by road maintenance crews.

Table 3. Maintenance Safety Programs

Project Name	Description/Application	Cost Estimate (\$2014) ¹
Reflectorized Buttons	Support installation/maintenance of centerline buttons on all rural collectors and arterials.	\$400,000
Guardrails	Support installation/removal/maintenance/cleaning/repair and delineation of guardrails.	\$750,000
Roadway General	Shoulders, safety edge, centerline rumble strips, pavement markings, clear zone.	\$750,000
Signs	Clean, repair and/or replace (if not current) with Manual on Uniform Traffic Control Devices requirements.	\$200,000
Vegetation Management	Remove overgrown vegetation inhibiting sight distance along all roads.	\$250,000

¹Cost estimates are for five years and are taken from *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017-2021*³

³ Clackamas County. Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017-2021. <https://dochub.clackamas.us/documents/drupal/daebbe21-a78d-4e08-955a-d4b767230033>. Accessed February 2019.



PROJECTED FUNDING PLAN

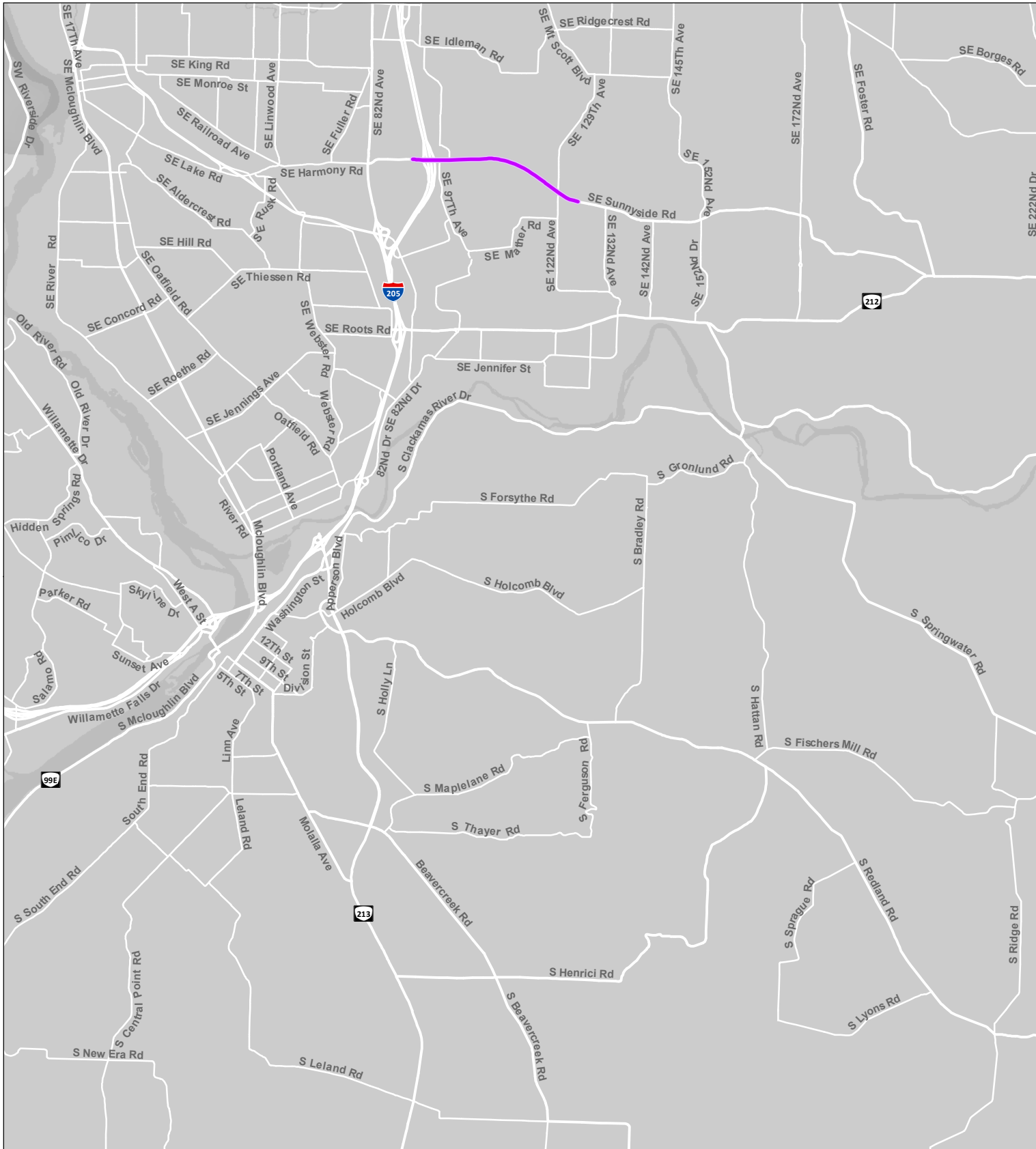
The county expects to split its infrastructure funding evenly between its Location-Specific and Systemic programs. **Table 4** summarizes the dedicated safety funds expected to be available to each program through fiscal year (FY) 2023–2024.


Table 4. Expected Safety Funding Levels Through FY 2023–2024

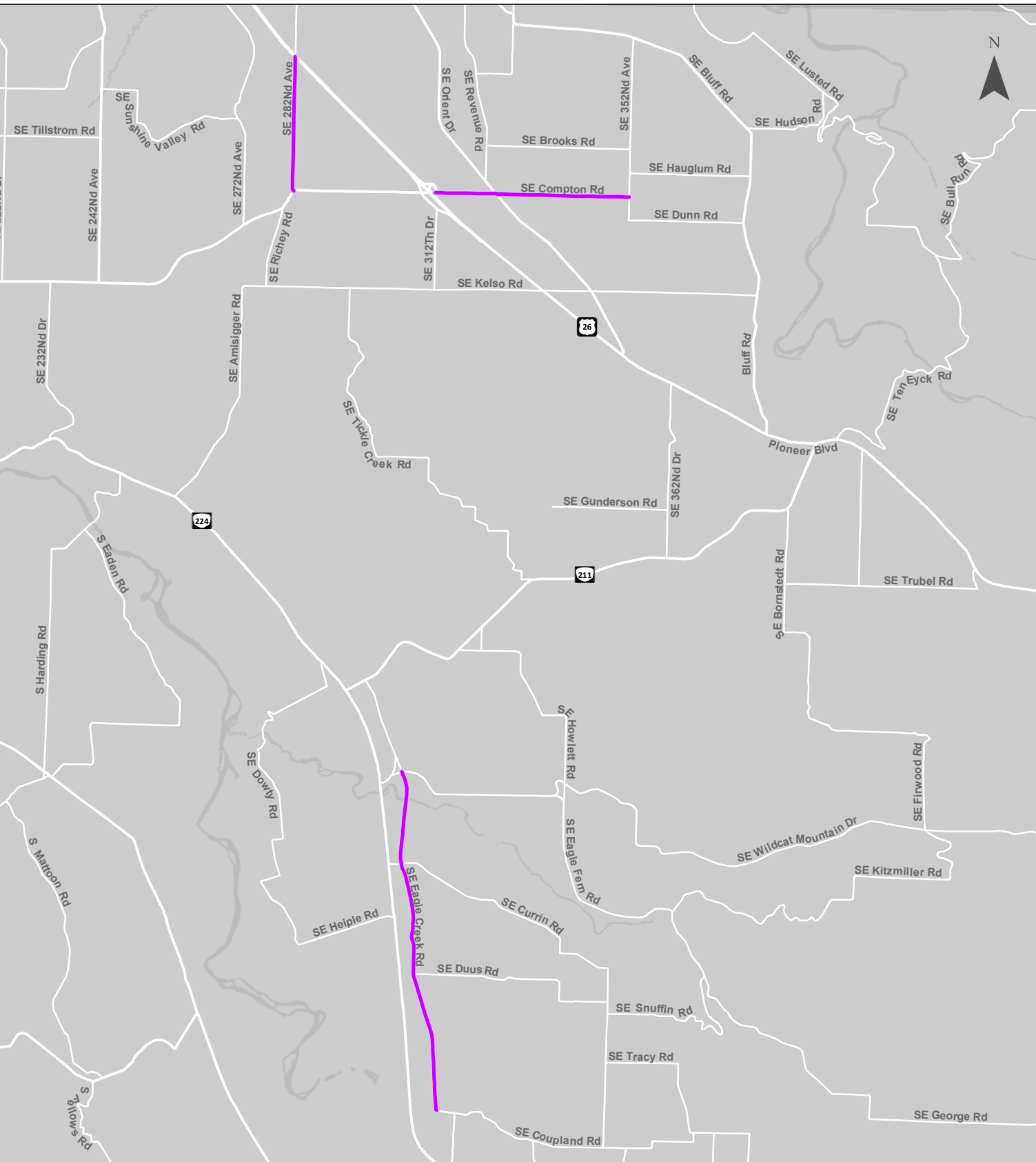
Fiscal Year (FY)	Location-Specific Program	Systemic Program	Total Safety Funds
2019–2020	\$250,00	\$250,00	\$500,000
2020–2021	\$500,000	\$500,000	\$1,000,000
2021–2022	\$500,000	\$500,000	\$1,000,000
2022–2023	\$500,000	\$500,000	\$1,000,000
2023–2024	\$750,000	\$750,000	\$1,500,000

Dedicated safety funds are not the only funding options for projects in this plan. Other funding sources include:

- Local:
 - » Tax Increment Financing
 - » Clackamas County Road Fund
 - » System Development Charges (SDCs)
- Regional
 - » Flexible Fund Allocation (Metro)
- Federal/State (Administered by ODOT):
 - » Highway Safety Improvement Program (HSIP)
 - » Statewide Transportation Improvement Program (STIP)
 - » Surface Transportation Program (STP)
 - » All Roads Transportation Safety (ARTS) Grants
 - » Federal Lands Access Program
 - » Oregon Safe Routes to School Program



 Planned RSA Locations



**Planned Road Safety Audits
Clackamas County, Oregon**

**Figure
4**

Location-Specific Program

Given the funding levels shown in **Table 4**, the county would be able to implement the Location-Specific projects shown in **Table 5**. This is referred to as the funding constrained plan.

Table 5. Funding Constrained Location-Specific Program

Fiscal Year	Location	Project Description	Project Cost Estimate	Funding Source
2019-2020	Central Point Road & New Era Road	Intersection realignment	\$1,100,000	Road fund
2019-2020	Dryland Road: MP 5.2-5.3	Guardrail	\$85,000	Road fund
FY 2019-2020 Total			\$1,185,000	
2020-2021	Redland Road & Ferguson Road	Westbound left turn lane	\$800,000	Road fund
2020-2021	Howlett Road & Van Curen Road	Intersection safety enhancements	\$50,000	Road fund
FY 2020-2021 Total			\$850,000	
2021-2022	72nd Avenue & Luther Road	Intersection safety enhancements	\$50,000	Road fund/TIF
2021-2022	Sunnyside Road & Sunnybrook Road	Signal upgrades and other safety enhancements	\$100,000	Road fund
2021-2022	Webster Road & Strawberry Road	Intersection safety enhancements	\$50,000	Road fund
2021-2022	282nd Avenue & Haley Road	Intersection safety enhancements	\$100,000	Road fund
2021-2022	Johnson Creek Boulevard & Linwood Avenue	Signal upgrades and other safety enhancements	\$250,000	Road fund/TIF
FY 2021-2022 Total			\$550,000	
2022-2023	Airport Road & Arndt Road	Signal upgrades and other safety enhancements	\$250,000	Road fund/ Marion County
2022-2023	Johnson Creek Boulevard & Bell Road	Signal upgrades and other safety enhancements	\$250,000	Road fund/TIF
2022-2023	Bluff Road & 327th Avenue	Intersection safety enhancements	\$50,000	Road fund
2022-2023	362nd Avenue & Colorado Road	Intersection safety enhancements	\$50,000	Road fund
FY 2022-2023 Total			\$600,000	
2023-2024	Oatfield Road & Jennings Avenue	Signal upgrades and other safety enhancements	\$250,000	Road fund
2023-2024	Springwater Road & Hattan Road	Intersection safety enhancements	\$100,000	Road fund
2023-2024	Airport Road & Miley Road	Intersection safety enhancements	\$250,000	Road fund
2023-2024	Redland Road & Fischers Mill Road	Intersection safety enhancements	\$250,000	Road fund
FY 2023-2024 Total			\$850,000	

The actual implementation of these projects is subject to change based on changes in project costs, funding levels, and other factors.

The projects from **Table 5** are illustrated in **Figures 5A-5E** on pages 54, 63.

Systemic Program

Following adoption of this plan and completion of the first analyses for the new Roadway Departure, and Pedestrian and Bicycle Crossing programs, the county will plan how to allocate systemic funding across its different programs. This plan is expected to be completed in summer 2019.

PROJECT EVALUATION AND TRACKING

The county will evaluate the effectiveness of projects to inform ongoing efforts to reduce severe crashes. For the projects in the Local Road Safety Plan, this will likely mean follow-up studies to evaluate the effects the treatments have had on fatal and severe crashes after they are implemented.

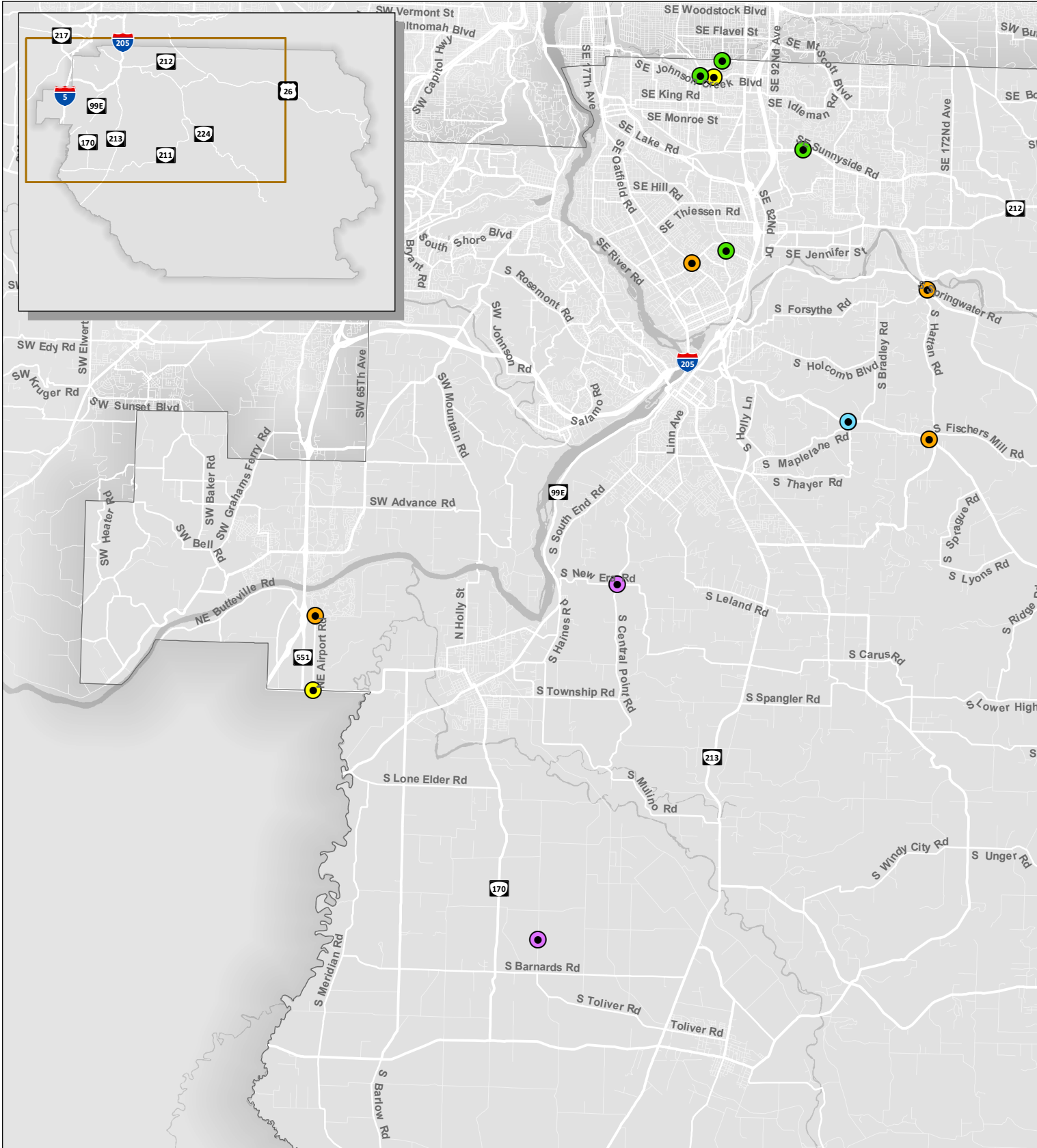
Location-Specific Project Evaluation

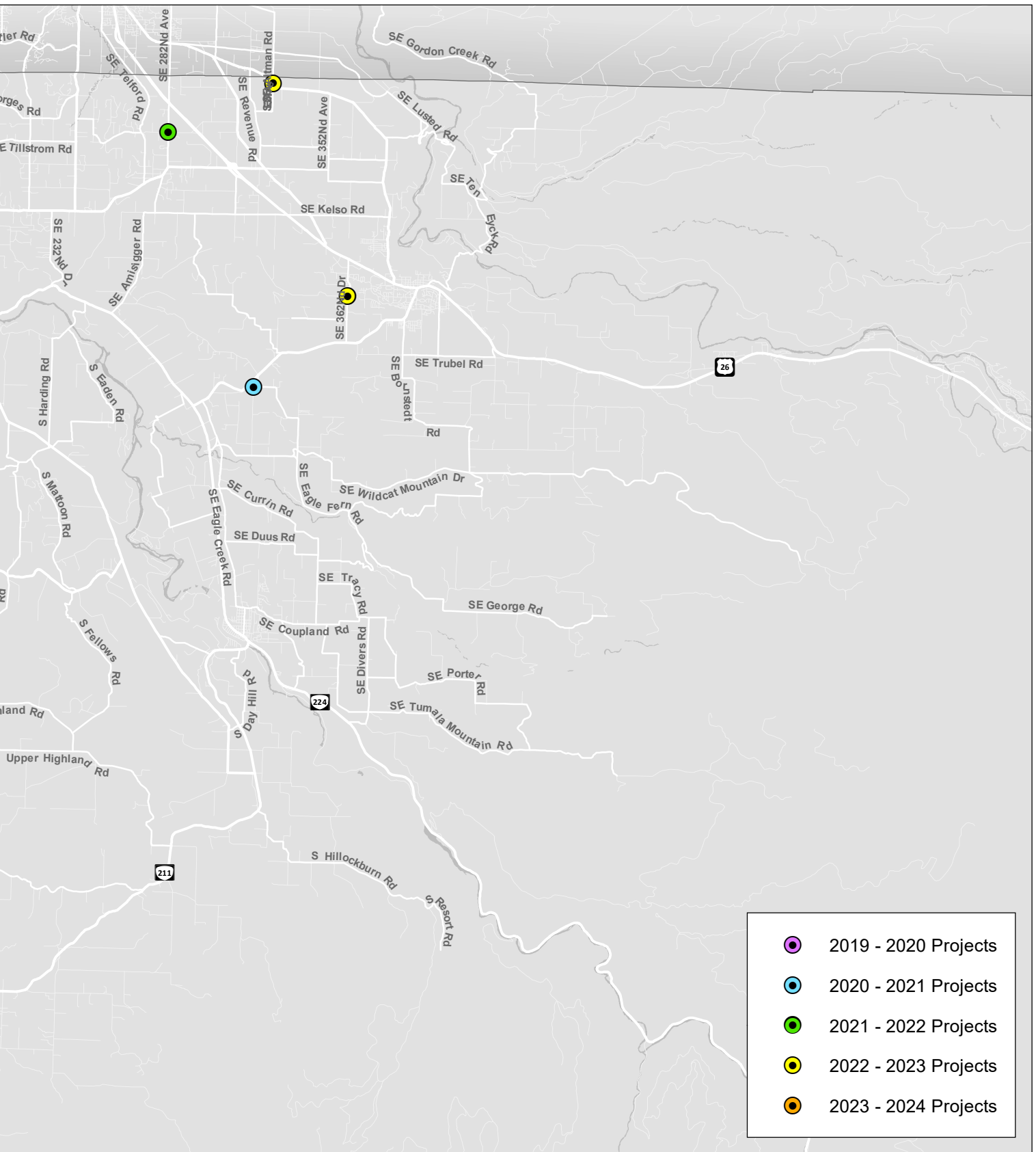
Location-Specific projects can be evaluated through a before-after comparison study of each site. The *Highway Safety Manual* describes different methods for these studies. The most common is the simple before-after study, which involves directly comparing crash data from the period before the treatment was applied to crash data from the period after the treatment. However, this leaves out the effect of time trends and other variations that tend to occur in crashes. More robust methods include the “Empirical Bayes” and the comparison group methods. Both of these require more data and, in some cases, may not be practical for the county.

Some of the weaknesses of the simple method can be overcome by using a larger sample. To accomplish this, relatively comparable sites that have been treated with similar countermeasures (e.g., widening shoulders on two-lane roadways) during the same time period can be grouped together.

Systemic Project Evaluations

Systemic projects are meant to be deployed broadly across locations with the potential for crashes, not necessarily where crashes have recently occurred. Therefore, a simple before-after evaluation of a single site will not accurately capture the effects of the systemic program. Instead, relatively comparable sites that have been treated with similar countermeasures (e.g., shoulder rumble strips on two-lane rural roads) during the same time period should be grouped together in the before-after evaluation.

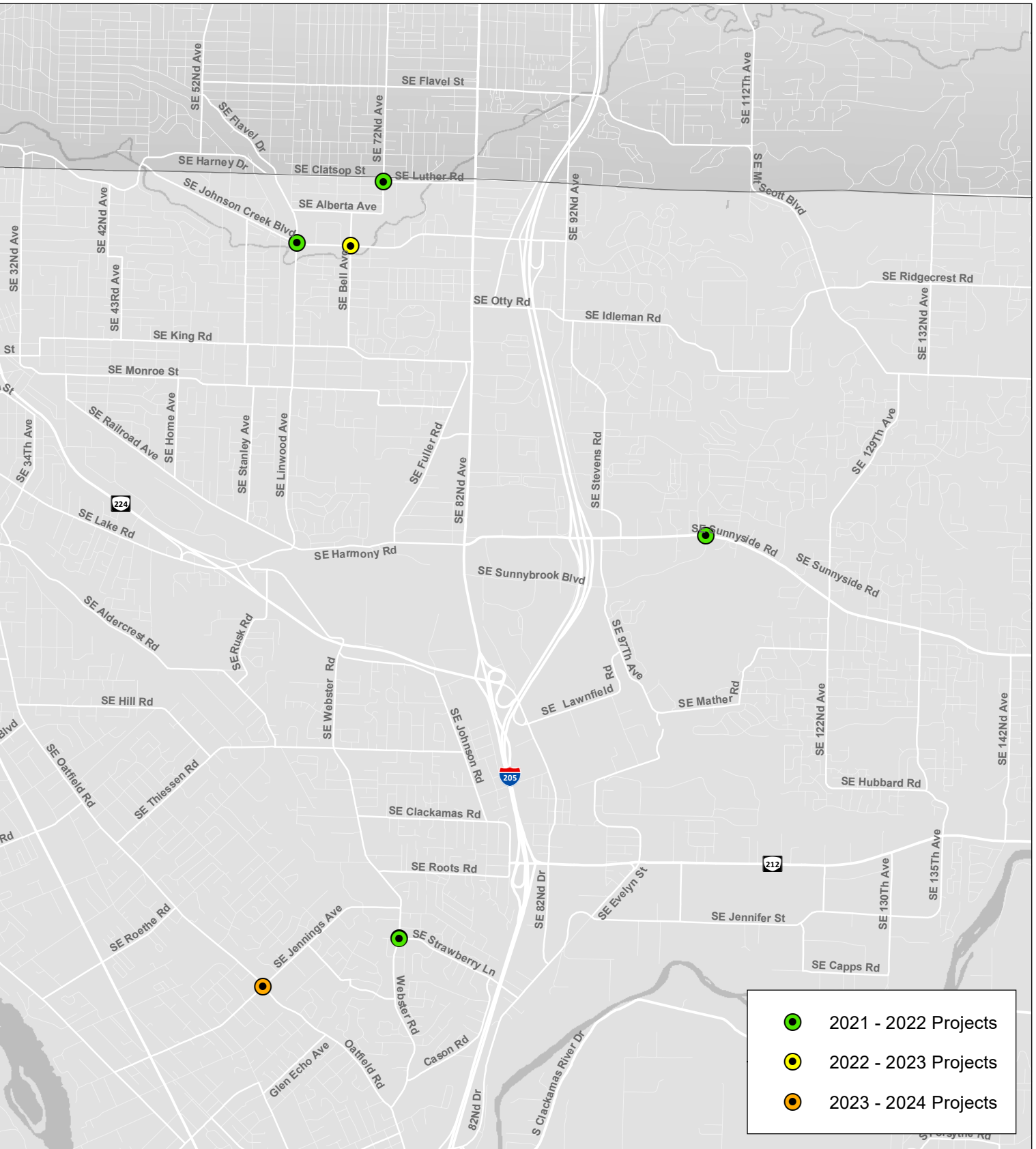




Funding Constrained Location-Specific Program
Clackamas County, Oregon

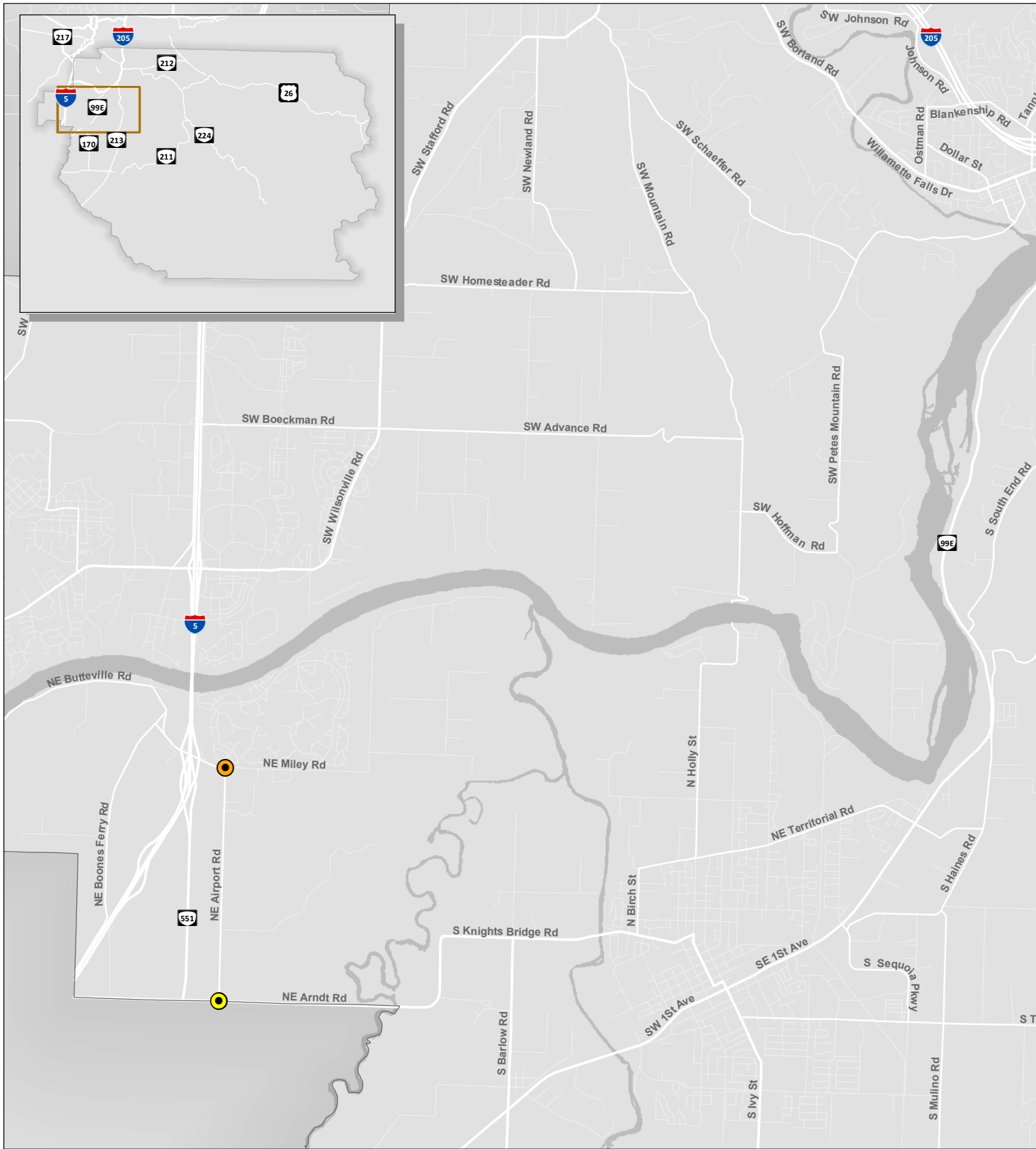
Figure
5A

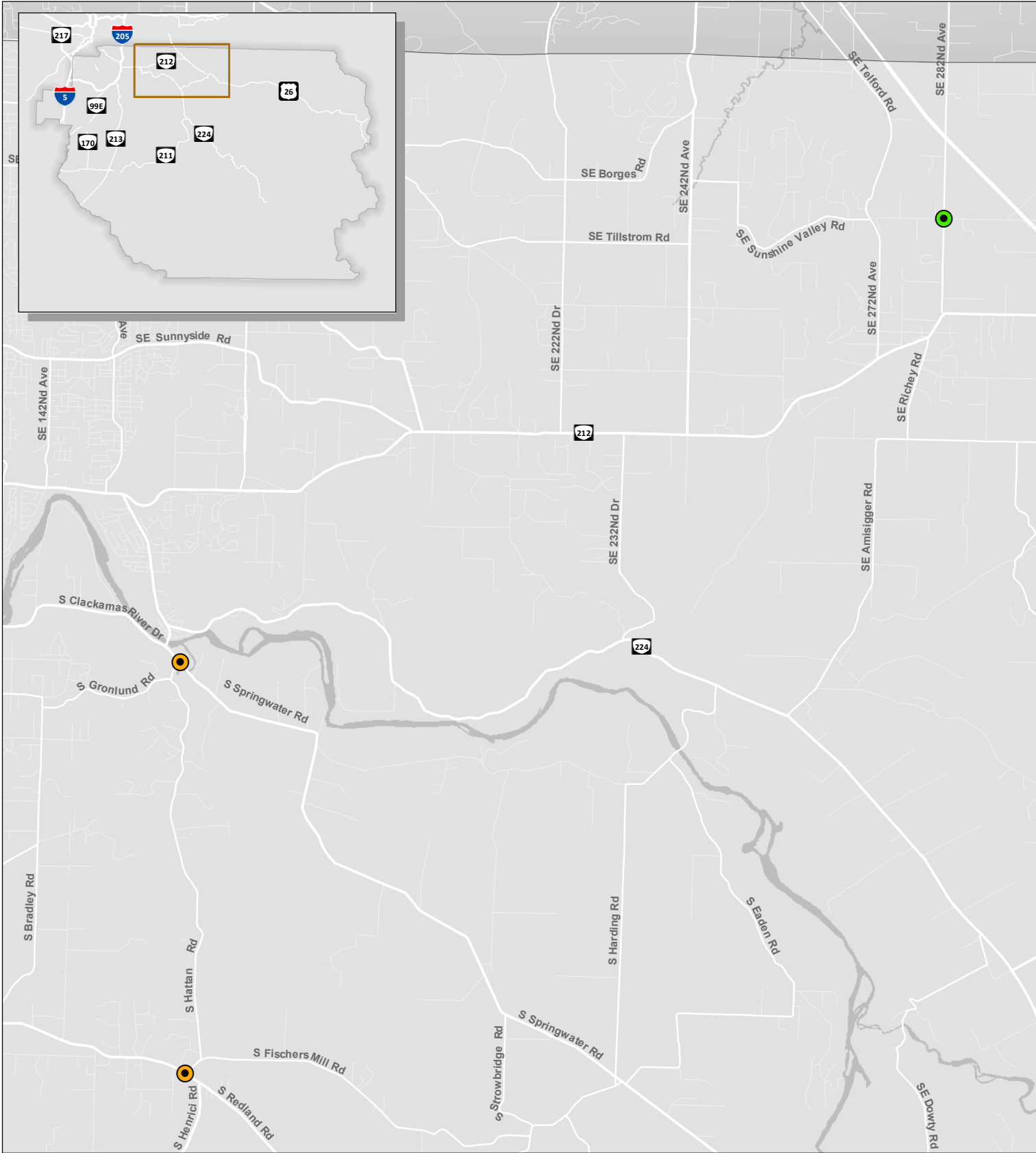


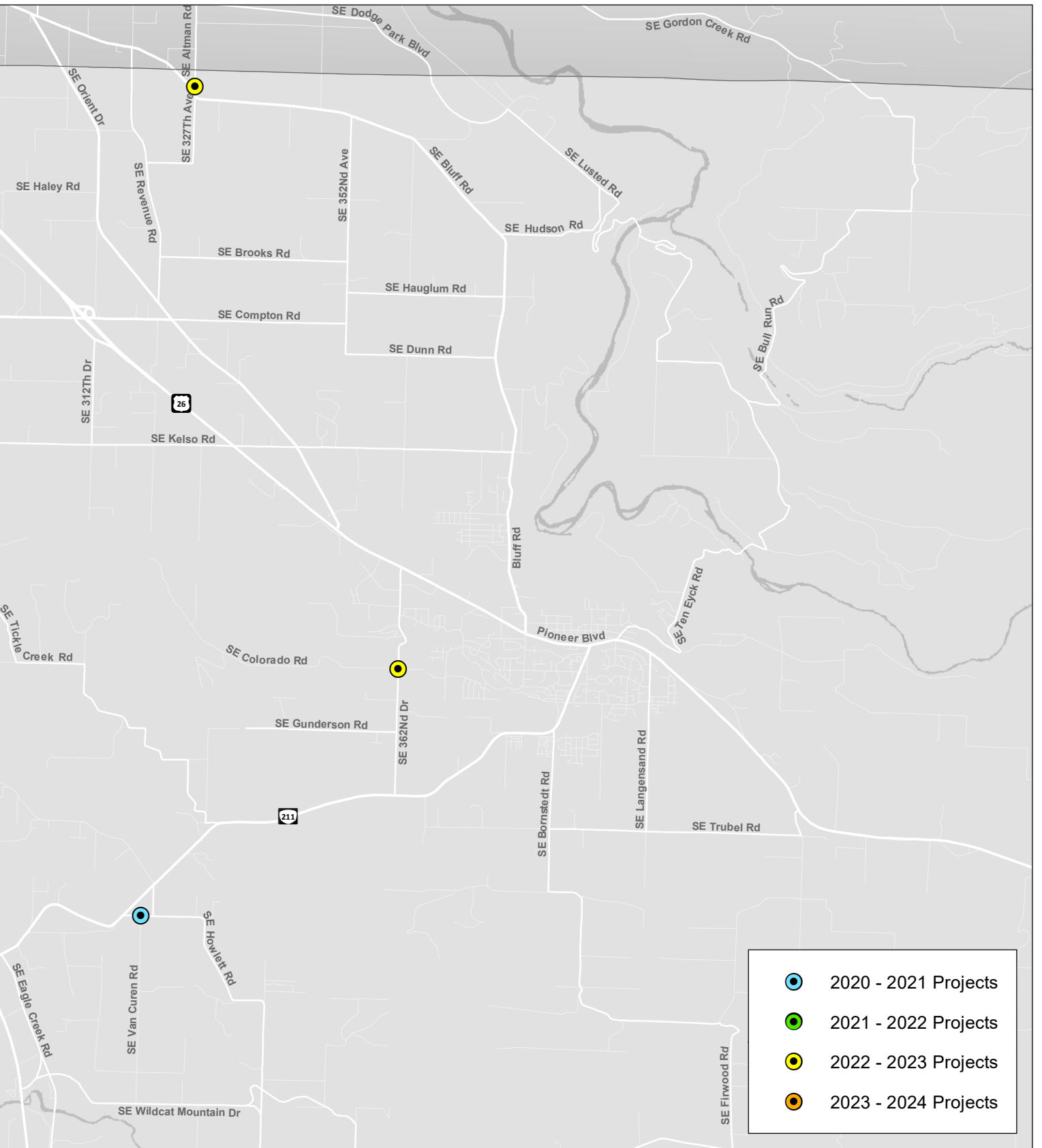


**Funding Constrained Location-Specific Program
Clackamas County, Oregon**

**Figure
5B**

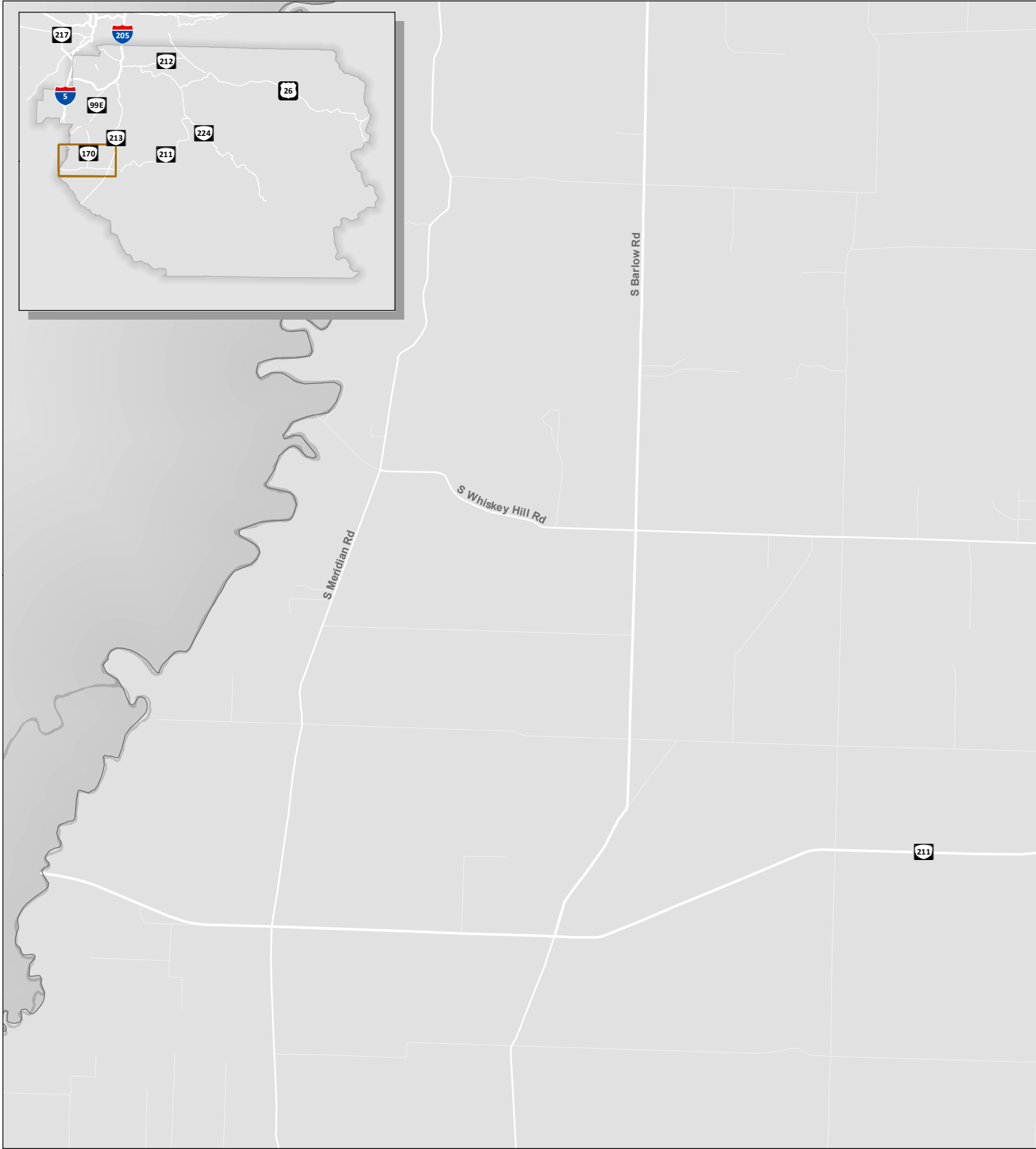


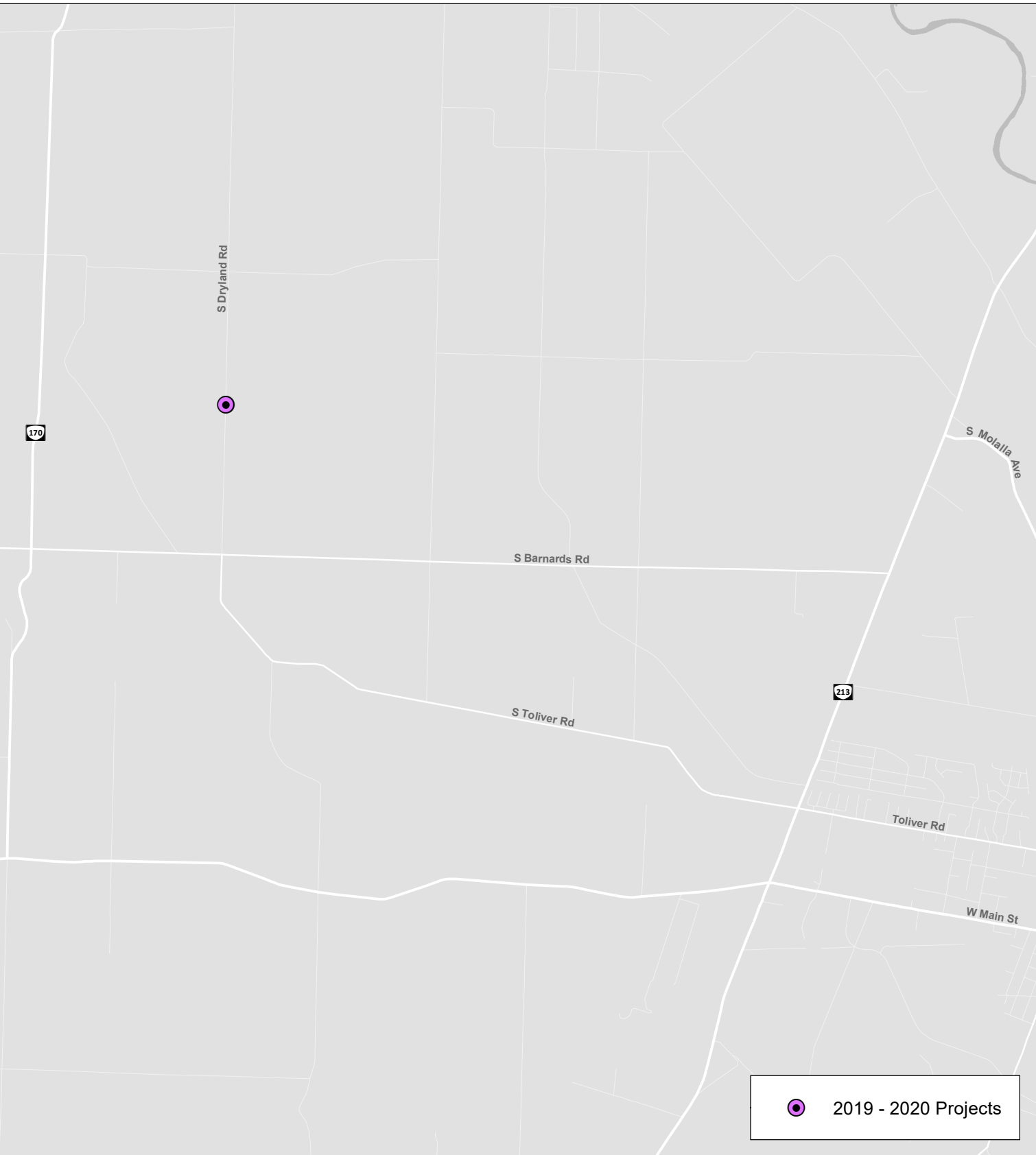




**Funding Constrained Location-Specific Program
Clackamas County, Oregon**

**Figure
5D**





**Funding Constrained Location-Specific Program
Clackamas County, Oregon**

**Figure
5E**

Project Tracking

The county is considering how to track the status of projects. One means would be through a spreadsheet or database that is regularly updated. Another would be through a GIS-based tool with each project mapped with supporting information (e.g., estimated cost, benefit, year programmed, priority, description). This would be updated regularly to capture when projects are completed. Information important to capture after a project is completed includes:

- Project cost (actual)
- Date construction started
- Date construction ended
- Description of project as constructed, including treatments applied and locations (e.g., centerline rumble strips from X to Y, left-turn lanes added on both approaches of Z Street)
- Links to as-built plans or other construction drawings and any studies or completed analyses
- Information on crashes (by type and severity) before and after the treatment, along with the results of the before-after study

NEXT STEPS

Location-Specific Program

- Develop cost estimates for long-term projects at SPIS High-Crash Locations and RSA projects;
- Use the cost estimates to calculate B/C ratios; and
- Prioritize sites based on B/C ratios along with the remaining near-term projects at SPIS High-Crash Locations.

Systemic Program

- Complete Roadway Departure and Pedestrian and Bicycle Crossing analyses and identify priority locations for treatment.
- Determine how to allocate Systemic funds across all sub-programs and program through FY 2023-2024.



Implementation

Drive to Zero Safety Action Plan

PLAN IMPLEMENTATION AND EVALUATION

This section describes the performance measures the county will use to judge the success of this plan and the evaluation steps needed to determine how to update this plan in the future.

Performance Measures

The success of this plan will be judged on its results. Performance measures are included here to evaluate the success of the plan in eliminating fatal and serious injury crashes, as well as to evaluate the success of the county and its partners in implementing this plan.

Outcome Measures

Measures the county will use to evaluate the ongoing success of the plan toward achieving its ultimate goal include:

- Number of fatalities and serious injuries in the county
 - » Fatal crashes will be reported quarterly in total and by Part 1 emphasis area.
 - » Fatal and serious injury crashes will be reported annually in total, per capita, and by emphasis area using data from the most recent year.

Implementation Measures

Measures the county will use to evaluate progress in implementing this plan include:

- Number of Part 1 action items implemented—in total and by emphasis area
- Number of Part 1 action items continued from a previous year—in total and by emphasis area
- Number of road safety projects completed (over \$5,000 in cost)
- *Performance Clackamas* measures, including:
 - » Number of students receiving Drive to Zero safety presentations
 - » Number of requests for temporary radar speed feedback signs
 - » Number of temporary radar speed feedback signs installed
 - » Number of road safety evaluations requested
 - » Number of road safety evaluations completed
 - » Number of heavy vehicles inspected
 - » Percentage of heavy vehicles taken out of service and in need of repair

Further, the county and its partners could develop performance measures to evaluate the effectiveness of individual measures (e.g., has improved software for 911 allowed dispatchers to take more emergency calls? Did adding turn lanes result in fewer rear-end crashes at the intersection?). Developing these measures will be the responsibility of the implementing organization and will depend on the availability of data to use for the evaluation.

PLAN UPDATES AND EVALUATION

This plan updates the 2012 TSAP to current conditions and knowledge. Update cycles for the TSAP should be five to seven years. County staff will report on the performance measures listed above annually. As crash and other data are available, the county can evaluate the plan's progress (i.e., about 5-7 years). The county and its partners should take a holistic look at the plan's progress and current data trends and technologies to determine whether this plan should be updated and to what extent (e.g., to incorporate new technologies or practices, to modify action items based on what is and is not working, to address emerging crash trends).

Evaluation needs to be included as part of each activity so that actions, projects, and partnerships can be modified as needed. The ability to adjust the plan will better help build a road to success and, ultimately, help the county achieve its long-term goal of eliminating fatal and serious injury crashes by 2035. More information on tracking and evaluating roadway projects is described in Part 2.