CLACKAMAS COUNTY

OFFICE OF THE COUNTY ADMINISTRATOR
PUBLIC SERVICES BUILDING
2051 KAEN ROAD | OREGON CITY, OR 97045

March 28, 2019

Board of Commissioners
Clackamas County

Members of the Board:

Approval of a Resolution Supporting the
2020 Census Count in Clackamas County

Purpose/ Outcomes	Supporting the goals and ideals of the 2020 Census will: 1. Ensure accurate and fair representation in government programs for all communities in Clackamas County 2. Ensures that accurate formulas are used for the distribution of federal grants and funding opportunities.
Dollar Amount and Fiscal Impact	N/A
Funding Source	Existing resources, such as staff time will be utilized. No additional County General Funds are involved.
Duration	September 30, 2020
Previous Board Action	On November 5, 2009, the Board of County Commissioners adopted a Census Partner Proclamation for the 2010 Census.
Strategic Plan Alignment	An accurate Census count aligns with each of the 5 Strategic Goals 1. Grow a Vibrant Economy 2. Build a Strong Infrastructure 3. Ensure Safe, Healthy and Secure Communities 4. Honor, Utilize, Promote and Invest in our Natural Resources 5. Build Public Trust through Good Government
Contact Person	Drenda Howatt, Commission Staff Manager 503-742-5938

BACKGROUND:
The decennial (every 10 years) census is mandated by the U.S. Constitution, and has been conducted since 1790 to produce an accurate count of federal, state, and local populations. Accurate counts lead to better decision-making for both elected representatives and businesses (deciding where to base industries, build offices, and open stores).

Census numbers have a direct impact on the allocation of approximately $675 billion in federal funds, grants and supports to states, counties, and communities. Many have a direct effect on services we can provide. Programs include:

- Medicaid
- Supplemental Nutrition Assist. (SNAP)
- Medicare Part B
- Highway planning/construction
- Section 8 Housing Vouchers/Assistance
- State Children's Health Insur. (S-CHIP)
- Title I Grants to Local Education
- Head Start/Early Head Start
- Special Education Grants
- National School Lunch Program
- Health Center Programs
- Foster Care
- Supplemental Nutrition for Women, Infants Children (WIC)
- Child Care & Development Fund
- Low Income Home Energy Assistance

County Counsel reviewed and approved this resolution.

RECOMMENDATION:
Staff recommends the Board approval the resolution supporting the 2020 Census count in Clackamas County.

Respectfully submitted,

Drenda Howatt, Commission Staff Manager
Clackamas County Administration

BEFORE THE BOARD OF COUNTY COMMISSIONERS
OF CLACKAMAS COUNTY, STATE OF OREGON

In the Matter of Affirming Clackamas County's Dedication to an Accurate 2020 Census Count	Resolution No. _____

Whereas, the decennial census is mandated by the US Constitution and has been conducted every year since 1790 to produce an accurate count of federal, state, and local populations that leads to informed decision-making by elected representatives; and

Whereas, businesses use census data to decide which population centers to base industries, build offices, and open stores within, leading to local job growth; and

Whereas, census data is utilized for the redrawing of congressional maps that assure proper representation based on population, and that with a proper and accurate census count, Oregon is expected to gain one seat in the House of Representatives due to growth; and

Whereas, census data has a direct impact on the allocation of approximately $883 billion in federal funds, grants and supports to states, counties, and communities, including Medicaid, Medicare, highway planning, supplemental nutrition assistance, housing vouchers, school lunch, and countless others; and

Whereas, it is known that certain groups and populations have historically been undercounted and therefore underrepresented in our democratic system of government and in the funding received by cities, counties, schools and other public agencies seeking to serve their entire populations; and

Whereas, in order to encourage public involvement and ensure a complete count of communities, individual census records are confidential and protected for 72 years; and

Whereas, Clackamas County staff are in close coordination with representatives from Multnomah and Washington counties, and will continue to be, to collaborate on efforts aimed at ensuring an accurate census.

NOW THEREFORE, the Clackamas County Board of County Commissioners resolves as follows:

1. Each county supports the goals and ideals of the census, and will independently conduct robust public awareness and educational campaigns up to, on, and after the nationally-recognized "Census Day" on April 1, 2020
2. General populations will be urged to take the census online, which lowers the overall cost of conducting the census.
3. Members of historically undercounted populations will be specifically reached out to, in order to ensure they are confidentially yet fully recognized as members of the community.

DATED this 28th day of March, 2019

_____
Chair

_____
Recording Secretary

CLACKAMAS COUNTY

DAN JOHNSON
DIRECTOR

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DEVELOPMENT SERVICES BUILDING
150 BEAVERCREEK ROAD OREGON CITY, OR 97045

March 28, 2019

Board of County Commissioners
Clackamas County

Members of the Board:

Approval of 2019 Update to the Transportation Safety Action Plan

Purpose/Outcome	Update goals and priorities to the Clackamas County Department of Transportation and Development on traffic safety. The Transportation Safety Action Plan (TSAP) promotes actions that a variety of county agencies can undertake to eliminate serious and fatal traffic crashes by 2035.
Dollar Amount and Fiscal Impact	Varies based on budget allocation (see below)
Funding Source	Development of the TSAP plan is $150,000 plus staff time. An ODOT-TSD grant funded $77,807.17 of the cost. The remaining cost has been funded by Road Fund and General Fund. Funding for Drive-to-Zero outreach and non-infrastructure efforts will continue via General Fund allocation of $268,686. Infrastructure projects will be funded by Road Fund. The Road Fund has never had a budget line dedicated to safety projects. With the passage of HB2017, a safety project category will be created and funding will increase from $500,000 per year to $1,500,000 once the measure takes full effect.
Duration	Funding will be continuous but may vary each budget year.
Previous Board Action/Review	Policy Session on November 20, 2018- Presented an overview of the revised TSAP to the Board of County Commissioners.
Strategic Plan Alignment	- Ensure safe, healthy and secure communities - Build a strong infrastructure
Contact Person	Joseph Marek, Traffic Safety Program Manager 503-742-4705

BACKGROUND:
The first Clackamas County Transportation Safety Action Plan (TSAP) was adopted by the BCC in November of 2012 reflecting the Board's commitment to reducing fatal and serious injury crashes. Transportation safety was further affirmed in the 2015 Clackamas County Strategic Priorities with "Build a strong infrastructure" and "Ensure safe, healthy and secure communities". Additionally, the Blueprint for a Healthy Clackamas County 2017-2020 identifies a goal of eliminating fatal crashes. The proposed TSAP update is attached.

Transportation safety action plans are designed to be updated about every five years and with a grant from the Oregon Department of Transportation – Transportation Safety Division (ODOT-TSD), the County was able to take on this effort. The updated plan includes a review of 2009-2015 crash data and

updates the leading crash contributing factors. Since the first TSAP was adopted, there has been a much broader emphasis in the United States regarding efforts to eliminate fatal and serious injury crashes. This updated plan incorporates the most current crash data, research work and lessons learned from around the globe.

The TSAP update includes a summary of crash data, current policies, and review and update of action items based on broad stakeholder and citizen input. Additionally, the new plan includes a Local Road Safety Plan which outlines a prioritized list of safety related projects for County-owned roads.

The Drive to Zero Advisory Committee and a Traffic Safety Commission member has served as the policy level group reviewing the plan development along with a group focused on technical aspects, citizens and business input. Meetings were primarily with combined groups. Due to wide geographic area of the plan update, outreach was largely via social media and on virtual open house.

RECOMMENDATION
Staff respectfully recommends that the Board adopt the 2019 Transportation Safety Action Plan.

Respectfully submitted,

Joseph Marek
Traffic Safety Program Manager
Department of Transportation and Development

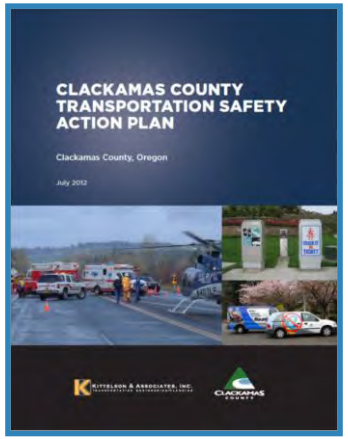
Transportation Safety Action Plan Update

Clackamas County Department of Transportation and Development

March 28, 2019

Where we started

-2012 TSAP



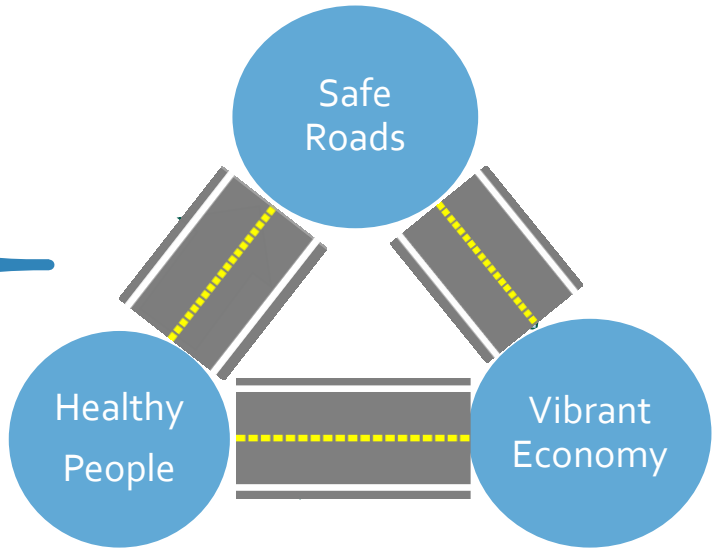
Reduce fatal and serious injury crashes by 50% by 2022.

2014 Toward Zero Deaths

2015 County Strategic Priorities

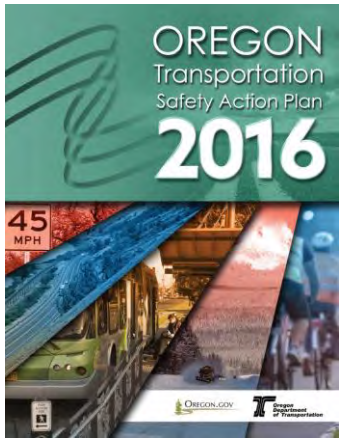
The National Strategy Vision is a highway system free of fatalities.

- Build public trust through good government
- Grow a vibrant economy
- Build a strong infrastructure
- Ensure safe, healthy and secure communities
- Honor, utilize, promote and invest in our natural resources



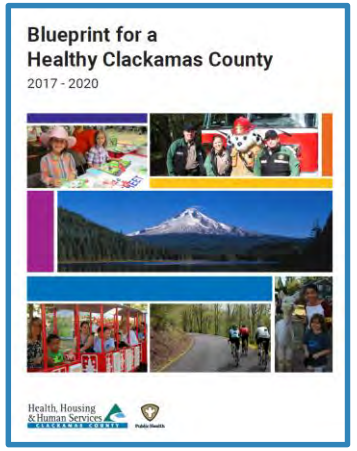
2016 ODOT Transportation Safety Action Plan

Eliminate fatal and serious injury crashes by 2035.



2017 H3S Community Health Improvement Plan

Eliminate all pedestrian, bicycle and Motor vehicle traffic crash fatalities in Clackamas County.



How many roadway fatalities are acceptable?

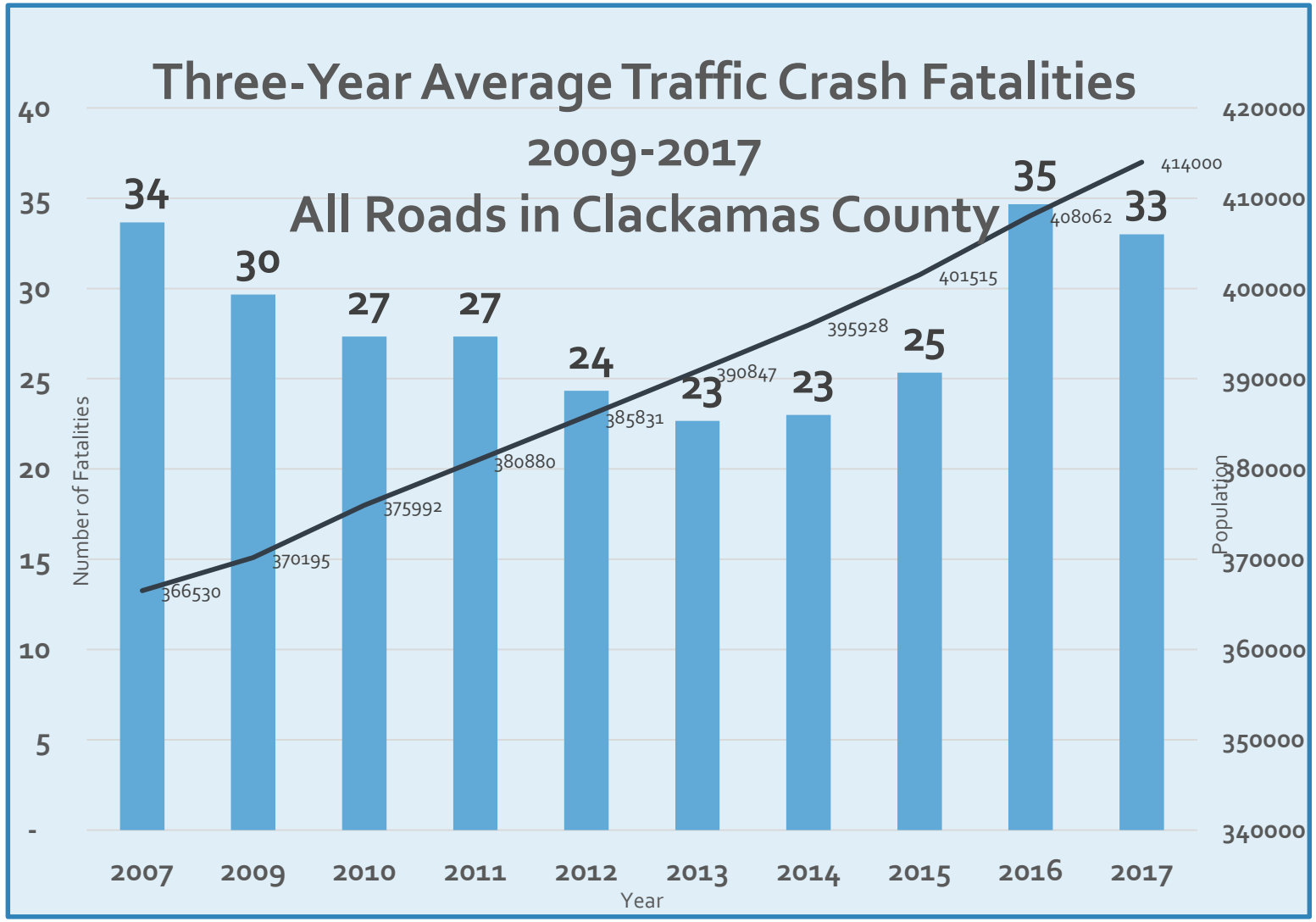
We heard from our stakeholders

Plan Goal

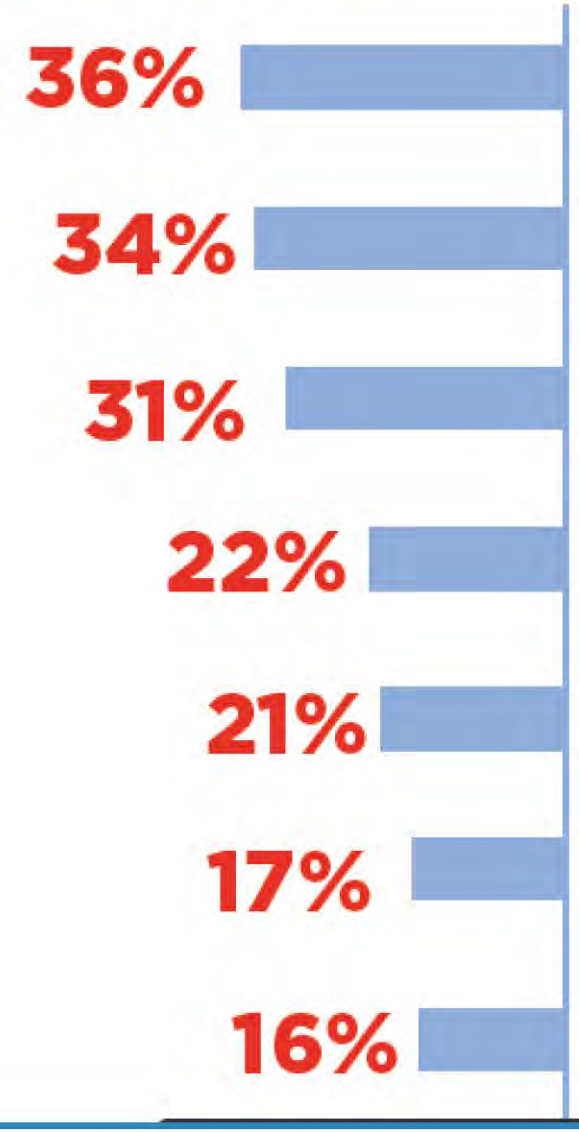
Eliminate fatal and serious injury crashes by 2035.

Fatalities are tracked as a Performance Measure

Three-year averages for crash fatalities



Fatal and Serious Injury Crashes by Contributing Factor



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

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

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

Aggressive Driving: Crashes in which 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 in which the driver was under the influence of alcohol or drugs.

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

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

Safe System Approach

Prioritize safety first when designing infrastructure. Principles include:

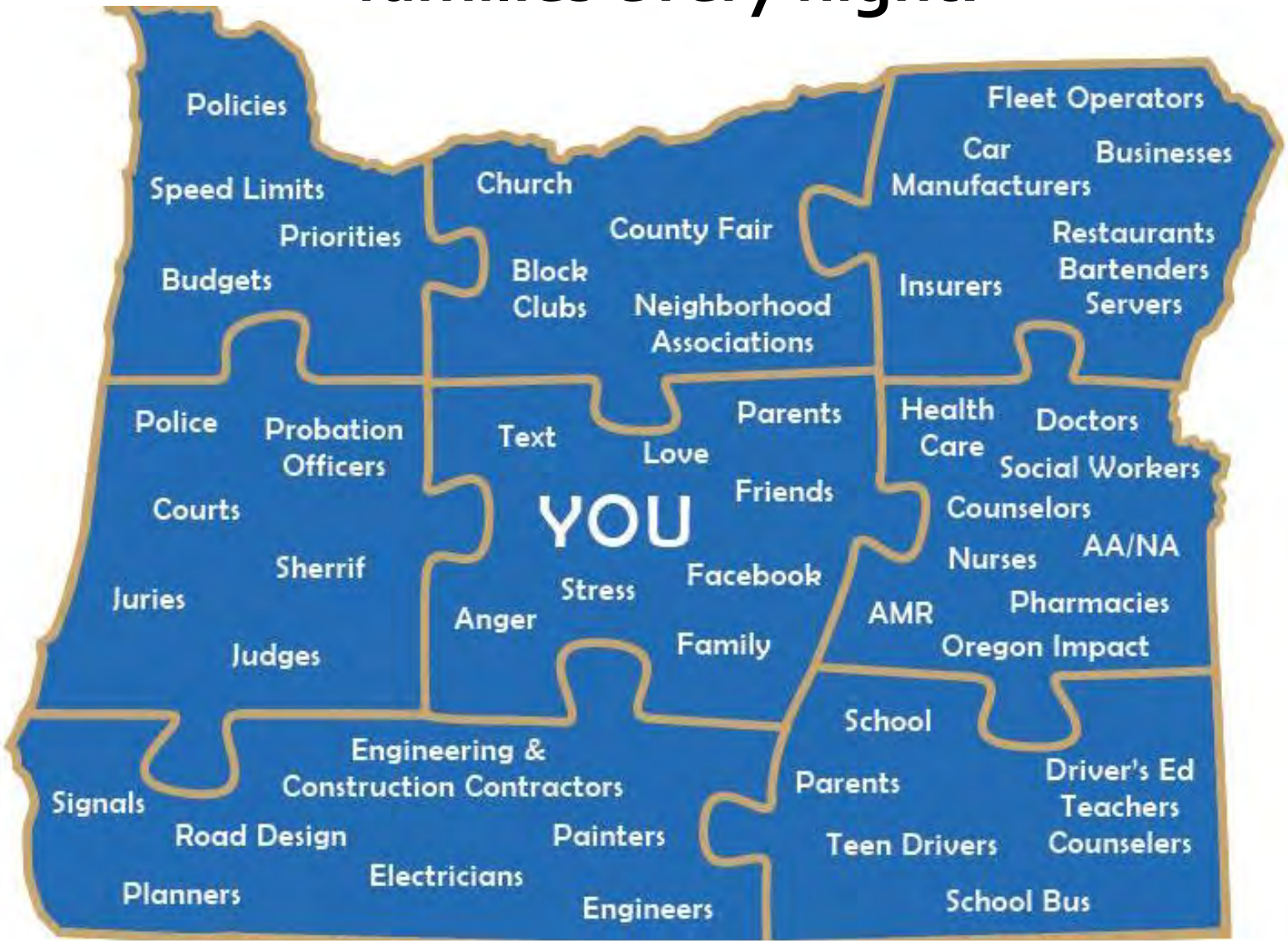
- People will make mistakes, but these mistakes should not lead to death or serious injury.
- Speeds have a direct relationship to the severity of crashes.
- Safety is everyone's responsibility, especially the designers of the system.
- Safety must be considered at all levels to provide redundancy when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

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

Safety Focus Areas

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

We all want everyone to get home safely to their families every night!



Local Road Safety Plan

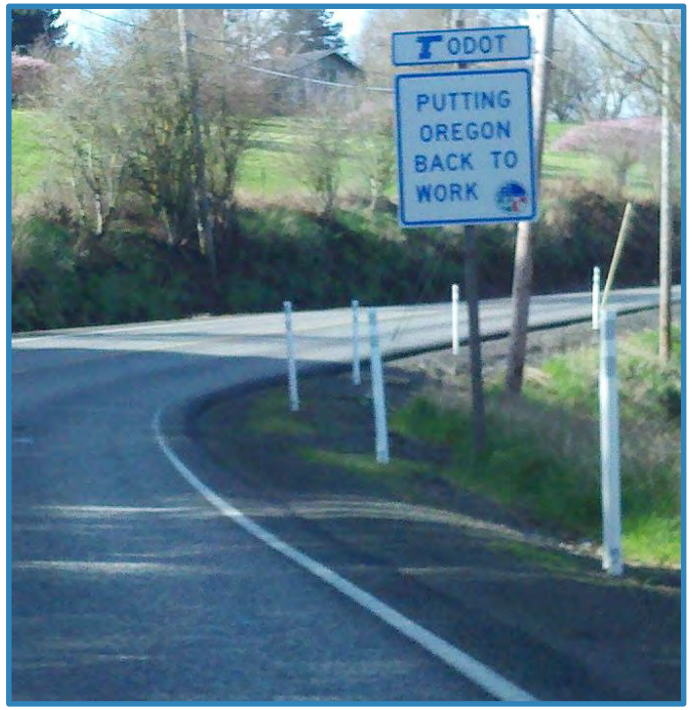
- Examine roadway system:
  - crash rate
  - severity
  - frequency
  - traffic volumes
- Review current projects in Capital Improvement Plan
- Road Safety Audits
- Other identified safety projects

Develop prioritized investment plan

- Predict revenue
  - Location-specific projects
  - Systemic safety projects
  - Safety outreach/people projects
- We will invest as much as we can based on the revenue

Rural Road Shoulder Widening and Rumble Strips

- Reduce crashes by 50% for all users
- $100,000 per mile



VS

Pedestrian Beacon and Sidewalks

- Reduce pedestrian crashes by 56%
- Up to $200,000 per site

VS

Curve Warning Signs

- Reduce crashes by 16% for all users
- $9,000 per mile

VS

Guardrail

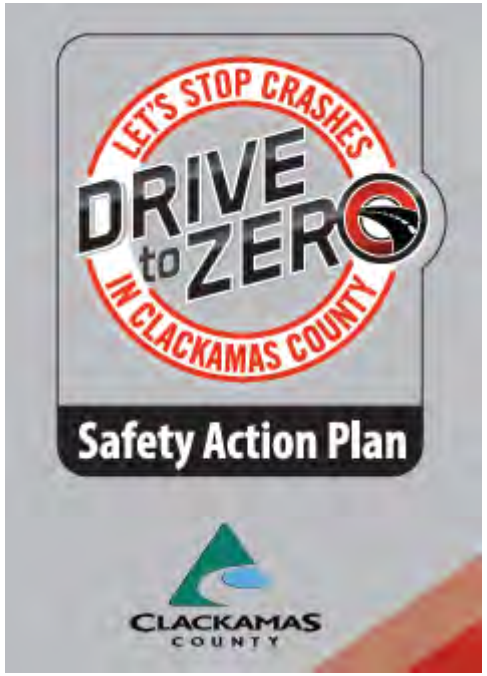
- Reduce crashes by 47% for all users
- $30,000-50,000 per installation

VS

Thank You

Recommendation:

The staff respectfully recommend adoption of the 2019 Clackamas County Transportation Safety Action Plan.



City of Molalla – Administration Office
117 N Molalla Avenue | PO Box 248 | Molalla, Oregon 97038
Phone: (503) 829-6855 Fax: (503) 829-3676

March 11, 2019

Board of Clackamas County Commissioners
2051 Kaen Road
Oregon City, OR 97045

RE: Transportation Safety Action Plan Update

Dear Commissioners:

The City of Molalla supports Clackamas County's efforts to improve traffic safety through their update to the Transportation Safety Action Plan. Molalla has made efforts to improve traffic safety through tireless negotiations with ODOT, a recently adopted Transportation System Plan and updated design standards.

Traffic safety is a commitment and multi-jurisdictional in focus. Thank you for your efforts in bringing traffic safety to the forefront.

Sincerely,

Dan Huff
City Manager

Clackamas County

DRIVE TO ZERO SAFETY ACTION PLAN

LET'S STOP CRASHES
DRIVE to ZERO
IN CLACKAMAS COUNTY

CLACKAMAS COUNTY

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

CLACKAMAS COUNTY

Acknowledgements

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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)

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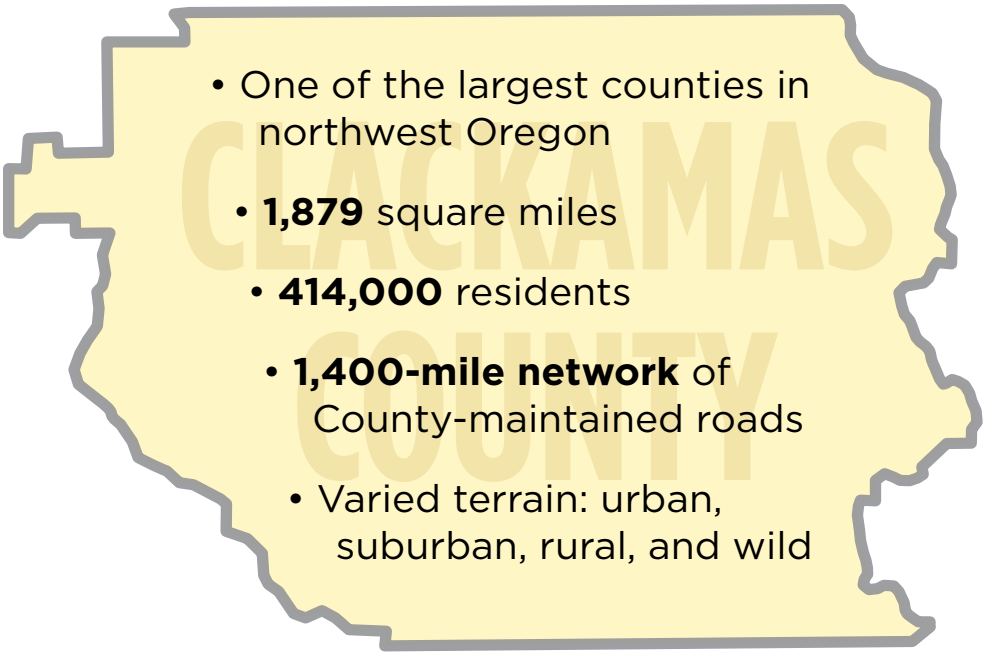
Drive to Zero Safety Action Plan

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

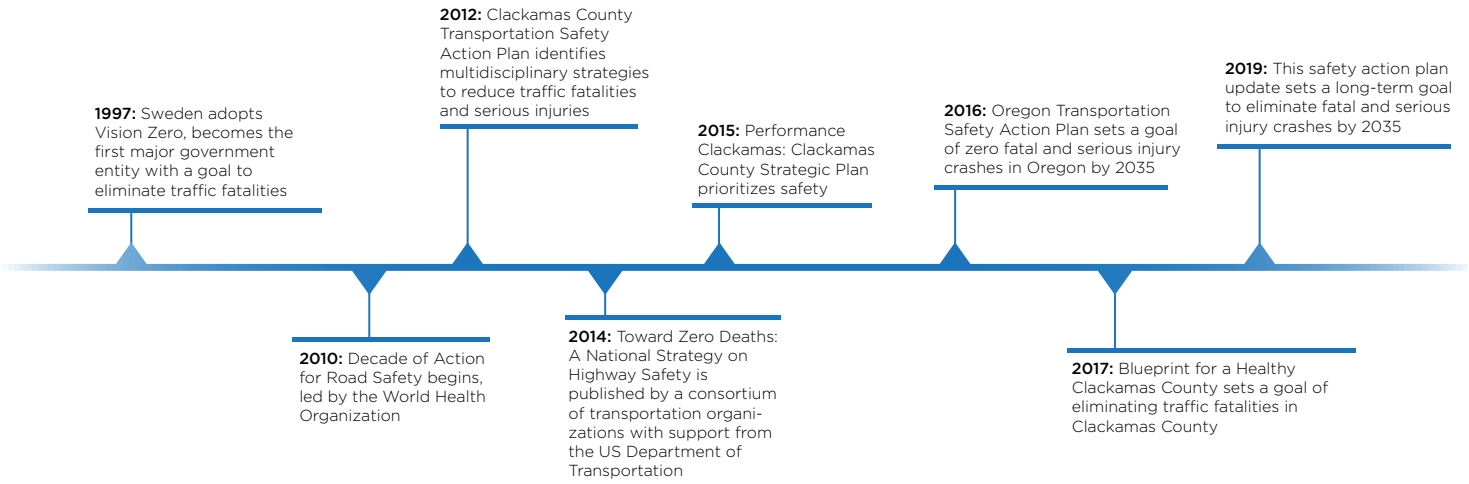
Other organizations:

- 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**

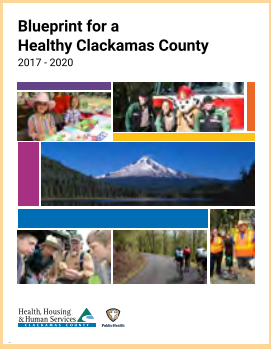
Plan Development Process

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].

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.

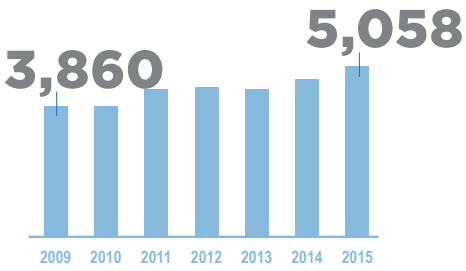
The economic impact of these and other less severe crashes was **$787.5 million,** or about **$112.5 million per year.** Economic costs during this time are shown by crash type below.

FATAL
183
$282 Million

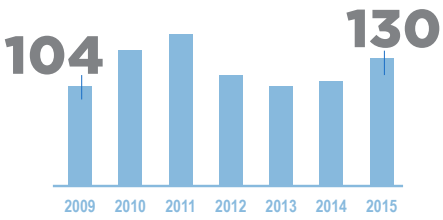
SERIOUS INJURY
795
$71.5 Million

ALL OTHER CRASHES
29,765
$434 Million

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.



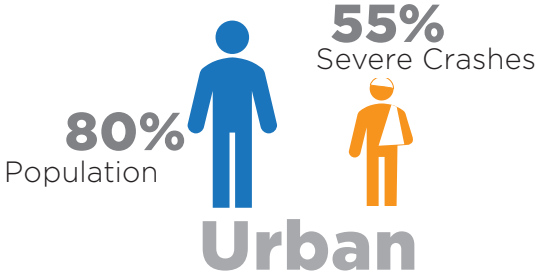
Total Crashes

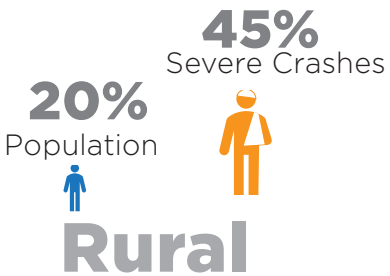


Fatal and Serious Injury Crashes

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.

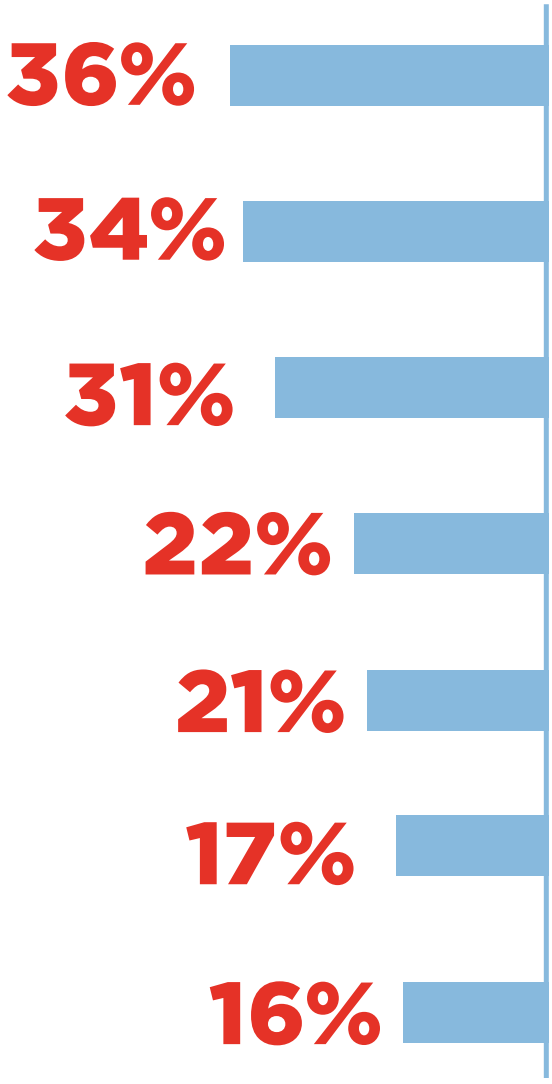
The most frequent contributing factors in reported crashes are:

Inexperienced Drivers

Roadway Departures

Aggressive Driving

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.

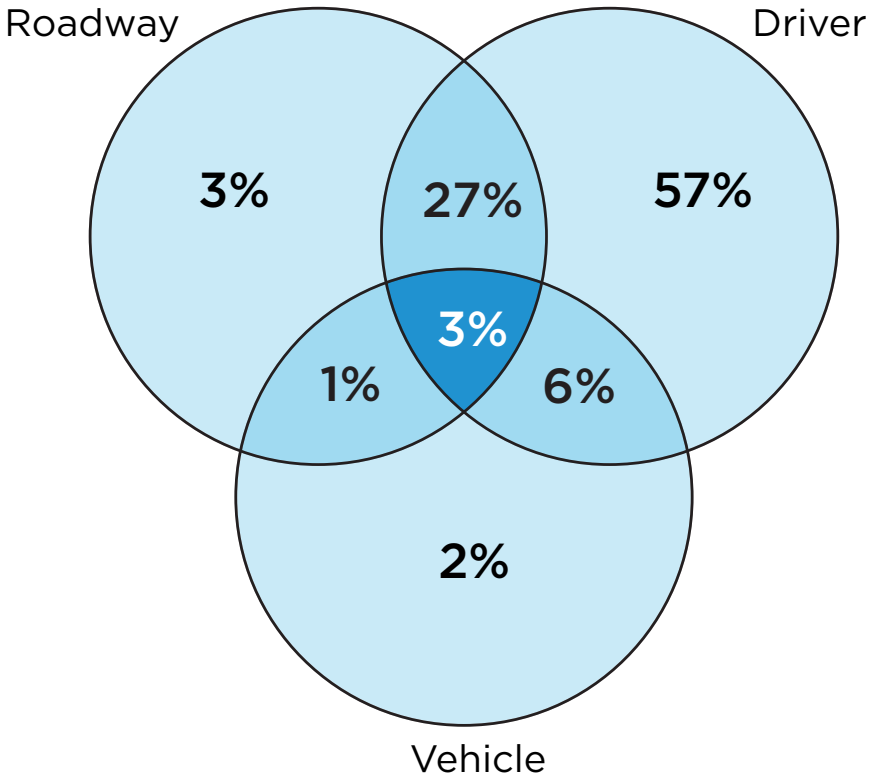
Pedestrians and Bicyclists: Crashes involving a person walking or bicycling.

* 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 Report[2] 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 Safety[3] 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.*[4]

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

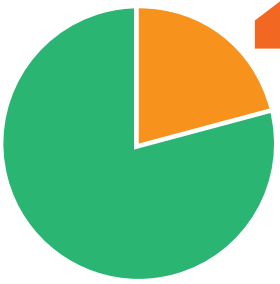
3 Visual and Cognitive Demands of Using In-Vehicle Infotainment Systems. AAA Foundation for Traffic Safety. October 2017.

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.



21%

of fatal and serious injury crashes involved an impaired driver (2009-15)

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.

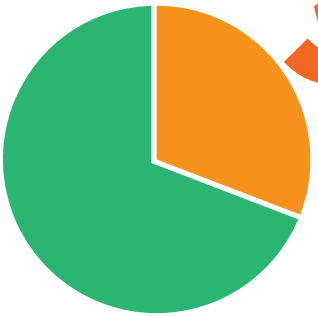
- Provide Drug Recognition Expert (DRE) training for all county law enforcement officers.
- Increase Driving Under the Influence of Intoxicants (DUII) and impaired driving enforcement.
  - » Data-driven saturation patrols.
  - » Drug recognition training (DRE & K9), standardized field sobriety tests 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.



31%

of fatal and serious injury crashes involved aggressive driving (2009-15)

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).

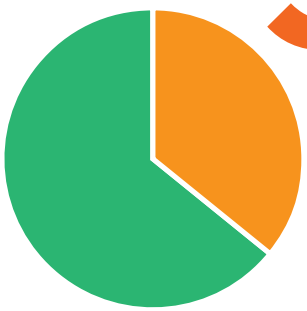
Calm Driving – What Can You Do?

- *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*.



36%

of fatal and serious injury crashes involved inexperienced drivers (2009-15)

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?

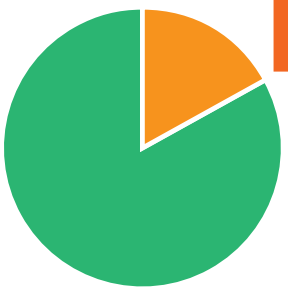
- *Work with young family members to impart safe driving principles before they reach driving age.*
- *Enroll teens approaching driving age in formal driver education courses.*
- *Sign a Parent-Teen Driving Contract[1] with young drivers in your family.*
- *Lead by example – always drive attentively,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



17%

of fatal and serious injury crashes involved senior drivers (2009-15)

Senior Drivers – What Can You Do?

- *Take the online AAA Roadwise Driver Course[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 possbile.*

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.

8%

of all fatal and serious injury crashes involved an occupant not wearing a seatbelt (2009–15)

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.

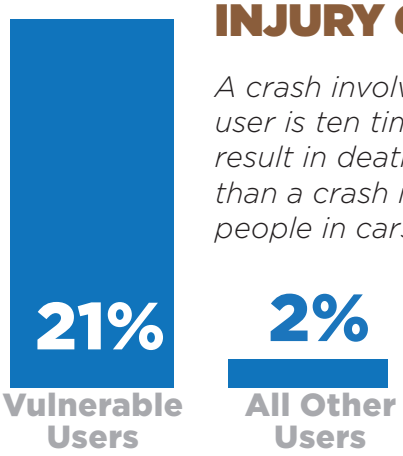
2 www.oregonimpact.org/car-seat-resources.htm

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

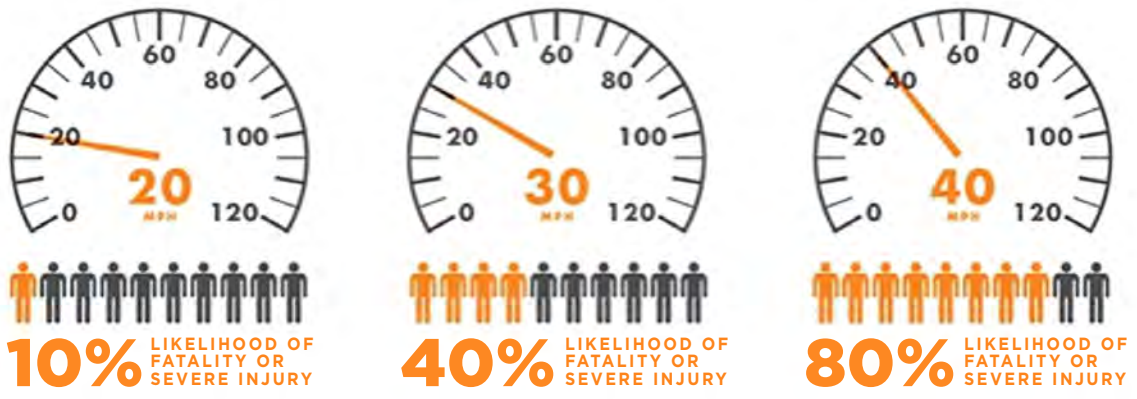
A crash involving a vulnerable user is ten times more likely to result in death or serious injury than a crash involving only people in cars or trucks.



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
- **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.

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.*

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

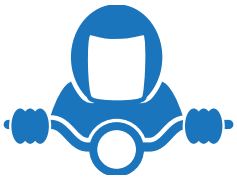
Bicyclists

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[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

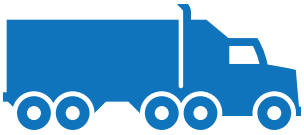
- Monitor future trends to discern best options for pursuing this action item.

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 States[1]. 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.

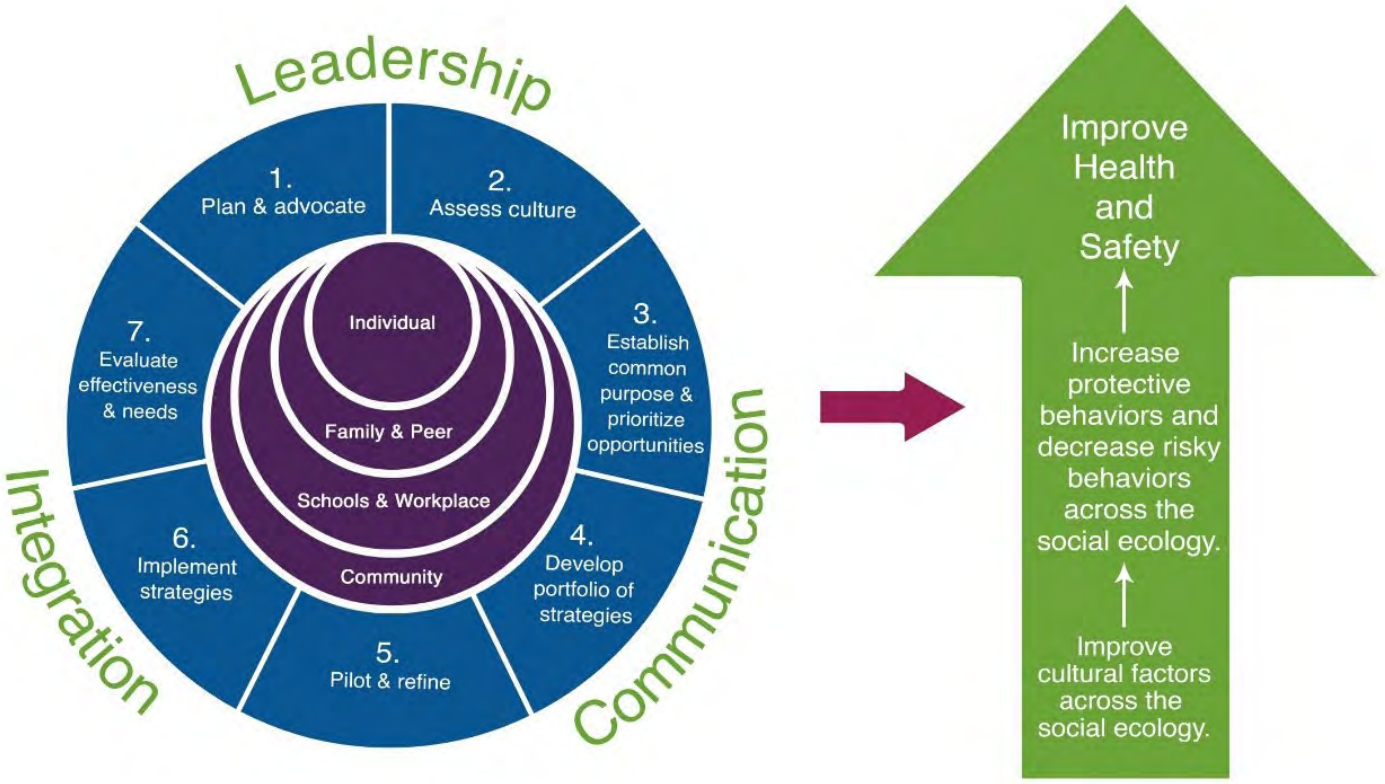
2 www.consumerreports.org/car-safety/cars-with-advanced-safety-systems/

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 Culture[1]



[1] Graphic courtesy Montana State Universtity

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

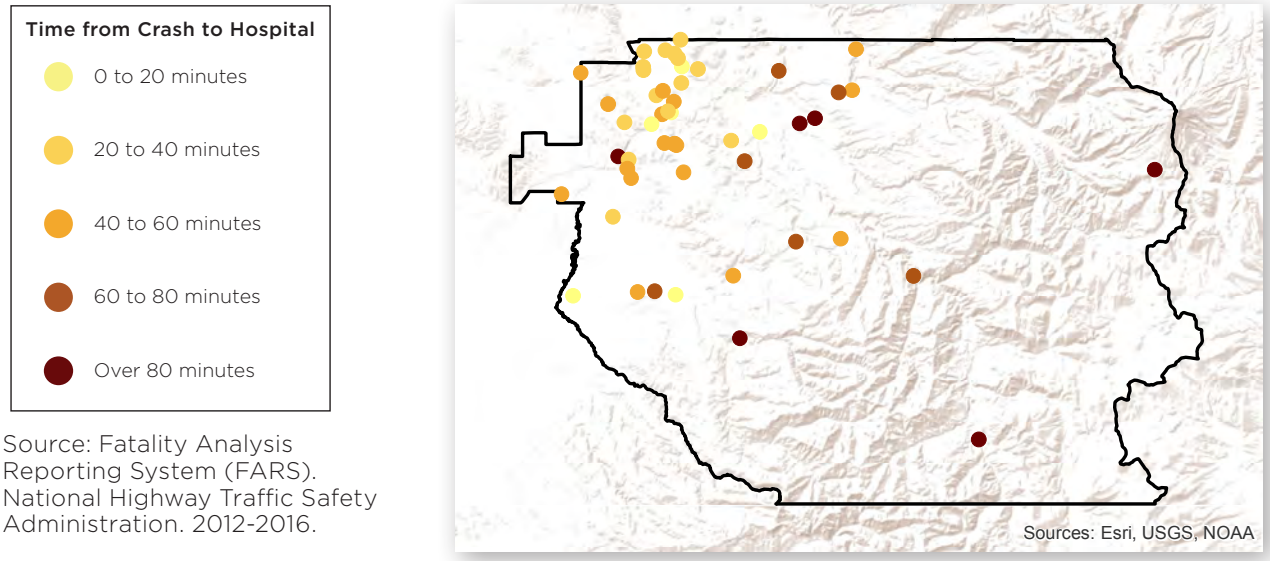
Emergency Medical Services (EMS) provide an opportunity to stabilize the life of a person injured in a crash. They are integral to Clackamas County reaching its goal of zero fatal or serious injury crashes. The effectiveness of EMS is tied closely to the time it takes for a person injured in a crash 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. *This can only be used in cities, not in unincorporated communities of Clackamas County.*
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.

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 DUII 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 *Highway Safety Manual* (*HSM*) 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 enforcment 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
• Specific locations identified through Safety Priority Index System (SPIS) analysis, Road Safety Audits (RSAs), or ther crash analyses	• Intersections • Roadway Departure • Pedestrian and Bicycle • Other	• 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 SPIS[1] 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:

PROJECTS IDENTIFIED FOR FUNDING AND CONSTRUCTION

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

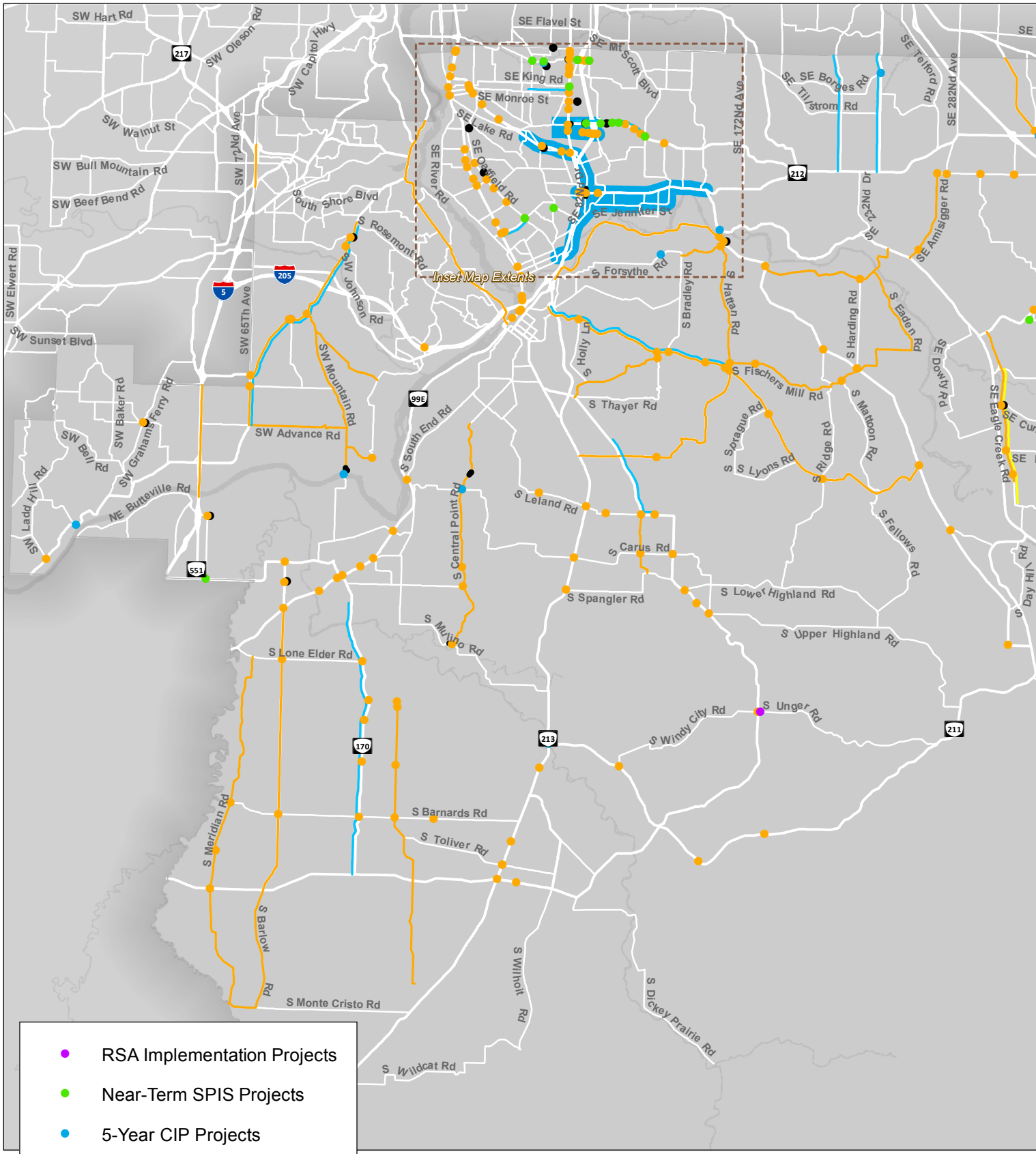
PROJECTS TO BE FUNDED

- 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 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.

[1] www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-Brochure.pdf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SE Monroe St
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SE Oatfield Rd
SE River Rd
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SE Telford Rd
SE 282Nd Ave
SE Borges Rd
SE Tillstrom Rd
SE 242Nd Dr
SE Amisigger Rd
SW Walnut St
SW Bull Mountain Rd
SW Beef Bend Rd
SW 72Nd Ave
South Shore Blvd
S Rosemont Rd
SW Johnson Rd
SW Elwert Rd
SW Sunset Blvd
SW 65Th Ave
SW Mountain Rd
SW Baker Rd
SW Graham Ferry Rd
SW Bell Rd
SW Advance Rd
Ladd Hill Rd
NE Butteville Rd
SW Meridian Rd
S South End Rd
S Central Point Rd
Inset Map Extents
S Forsythe Rd
S Bradley Rd
S Hattan Rd
S Holly Ln
S Thayer Rd
S Fischers Mill Rd
S Harding Rd
S Eaden Rd
SE Dowty Rd
SE Eagle Creek Rd
S Sprague Rd
S Lyons Rd
S Ridge Rd
S Mattoon Rd
S Fellows Rd
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S Lower Highland Rd
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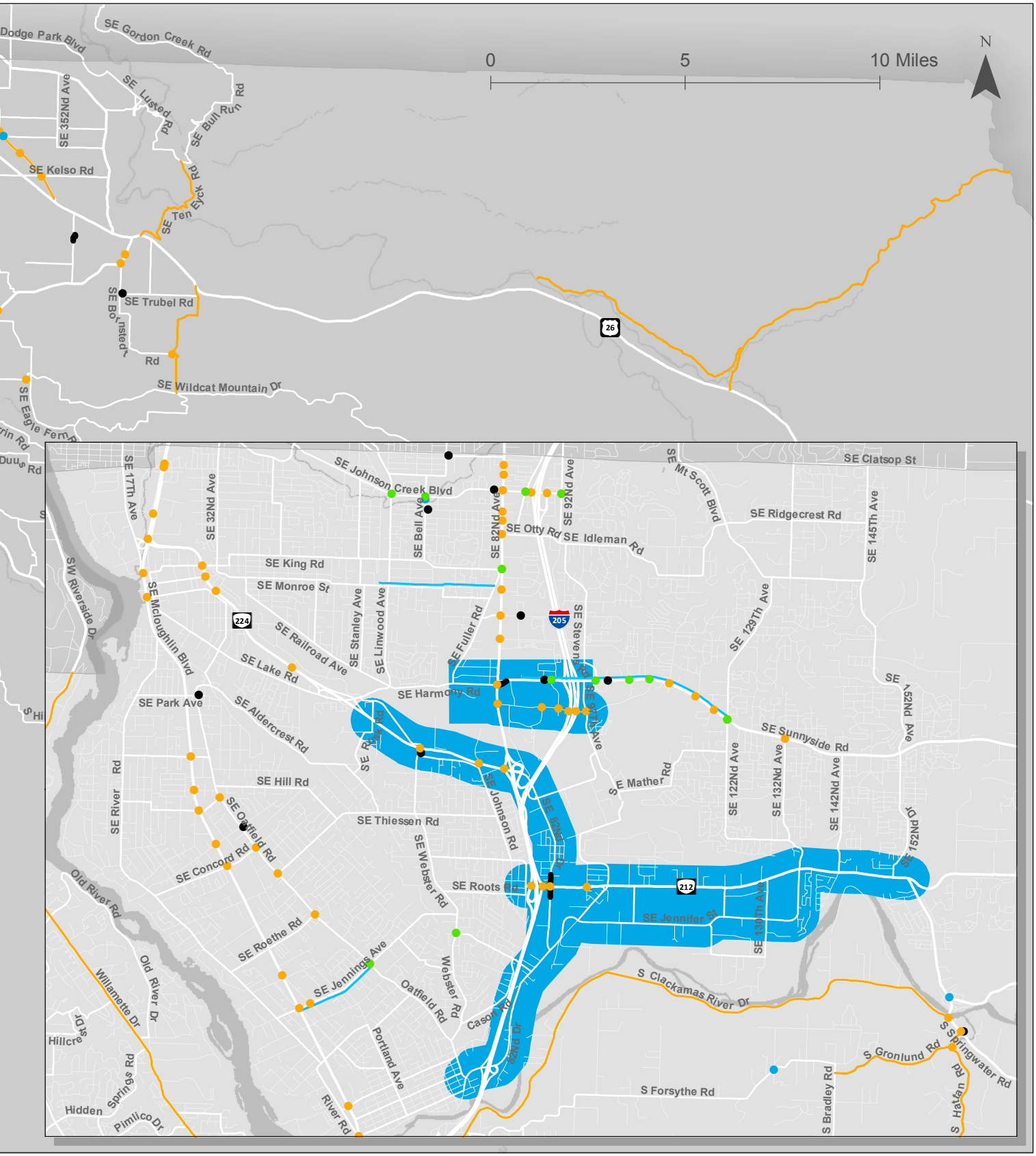
S Unger Rd
S Windy City Rd
S Barnards Rd
S Toliver Rd
S Barlow Rd
S Monte Cristo Rd
S Wilhoit Rd
S Dickey Prairie Rd
S Wildcat Rd
RSA Implementation Projects
Near-Term SPIS Projects
5-Year CIP Projects
ODOT ARTS Projects
Long-Term SPIS Projects



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.

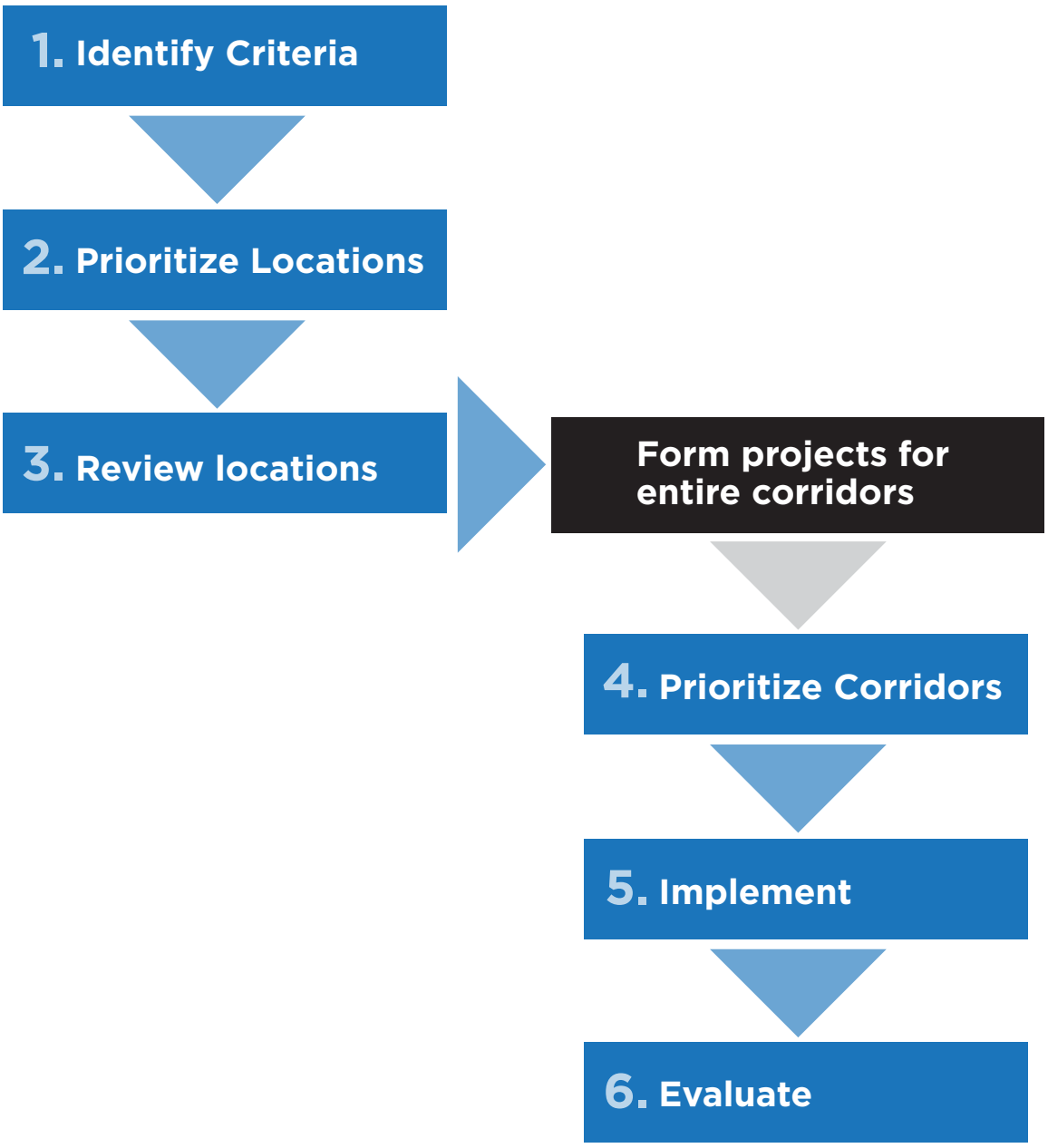
The final program recognizes that other opportunities may arise to implement low-cost countermeasures that may not directly address one of the other three emphasis areas (e.g., low-cost improvements from RSAs).

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 list[1], 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

[1]Cost estimates taken from *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017–2021*[2]

[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

[1]Cost estimates taken from *Five-Year Transportation Capital Improvement Program: Fiscal Years: 2017–2021*[2]

[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

[1]Cost estimates 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

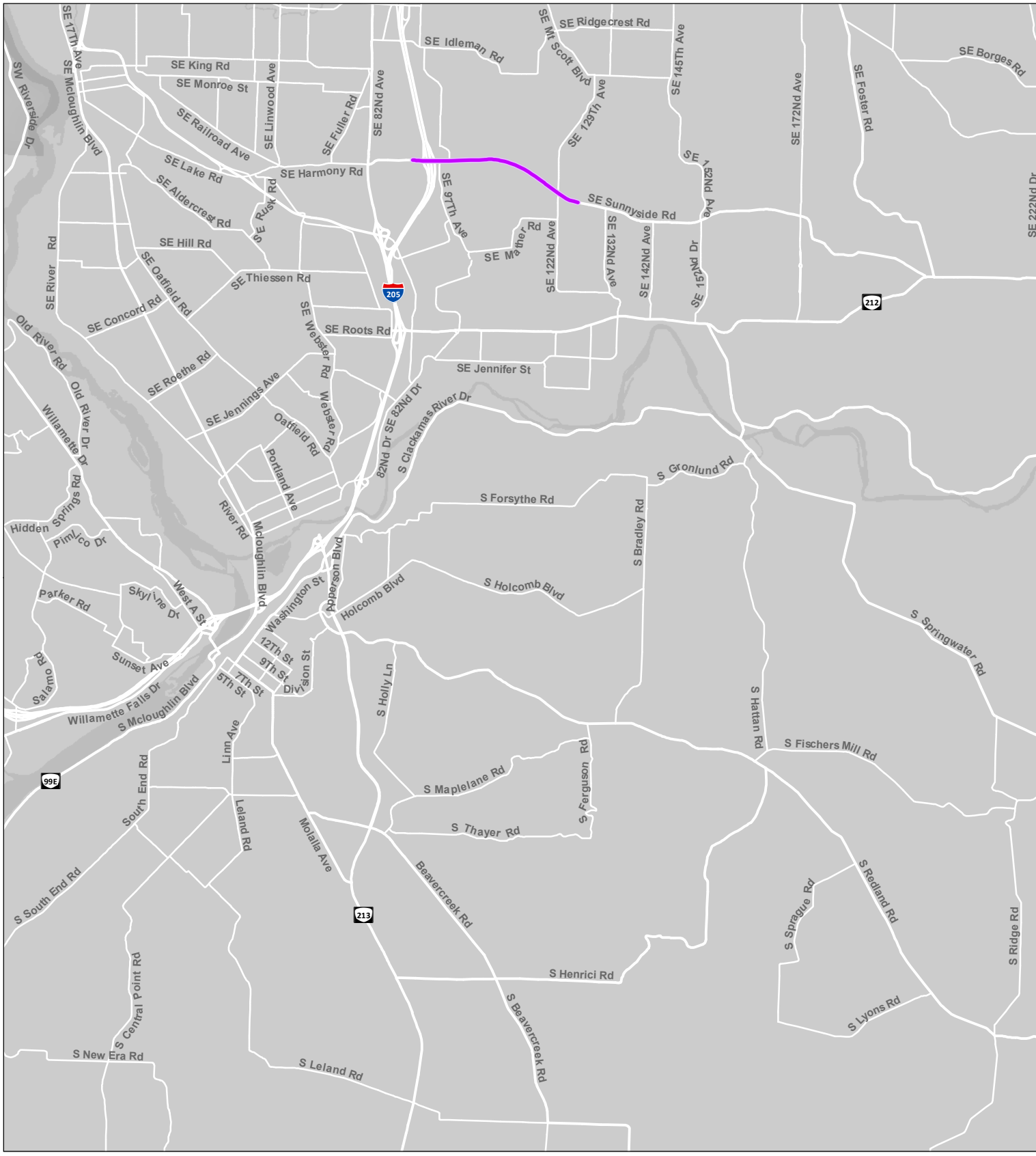
The county expects to split its infrastructure funding evenly between its Location-Specific and Systemic programs. **Table 4** summarizes the dedicated safety funds expected to be available to each program through fiscal year (FY) 2023–2024.

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

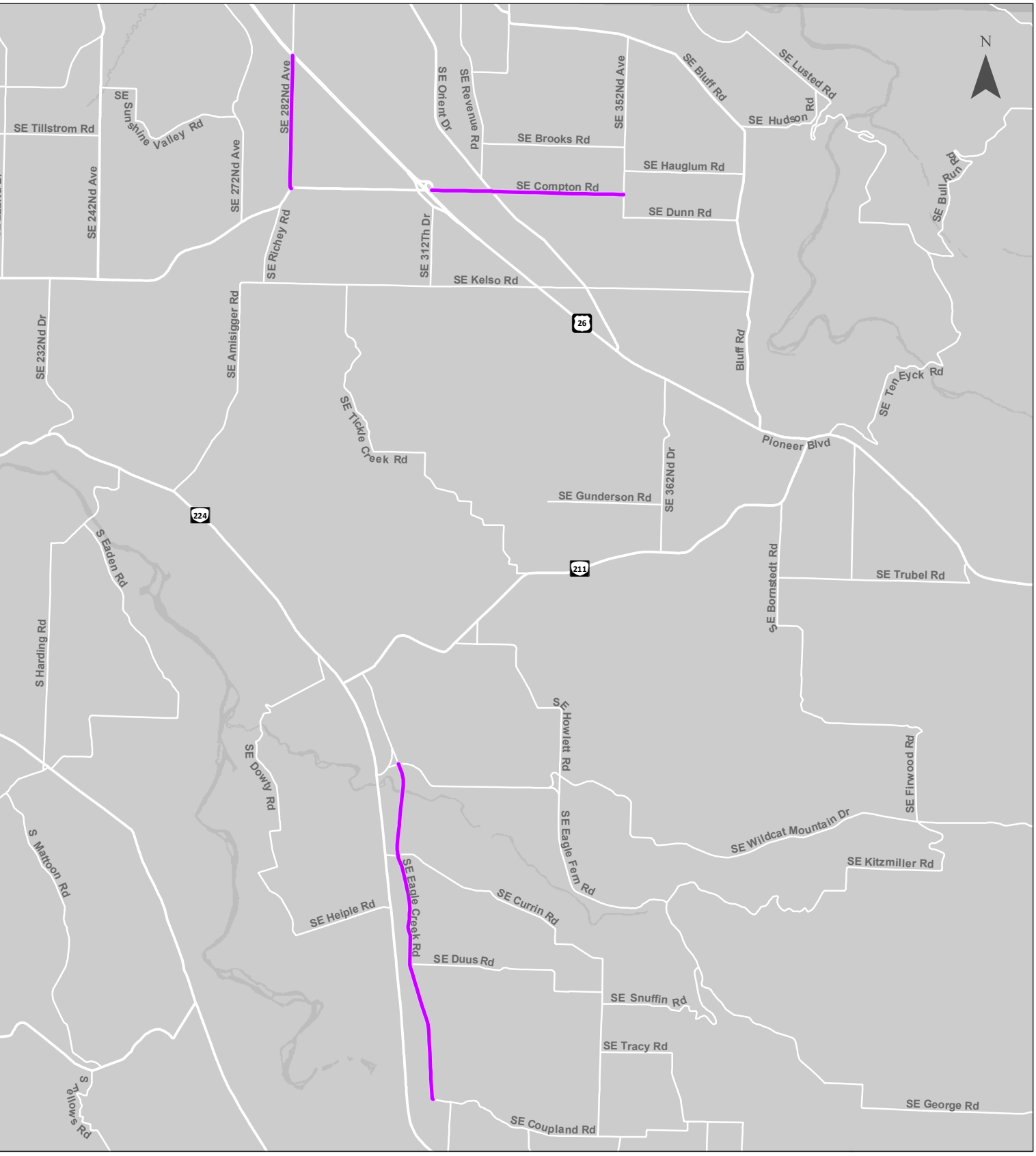
Fiscal Year (FY)	Location-Specific Program	Systemic Program	Total Safety Funds
2019–2020	$250,00	$250,00	$500,000
2020–2021	$500,000	$500,000	$1,000,000
2021–2022	$500,000	$500,000	$1,000,000
2022–2023	$500,000	$500,000	$1,000,000
2023–2024	$750,000	$750,000	$1,500,000

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.

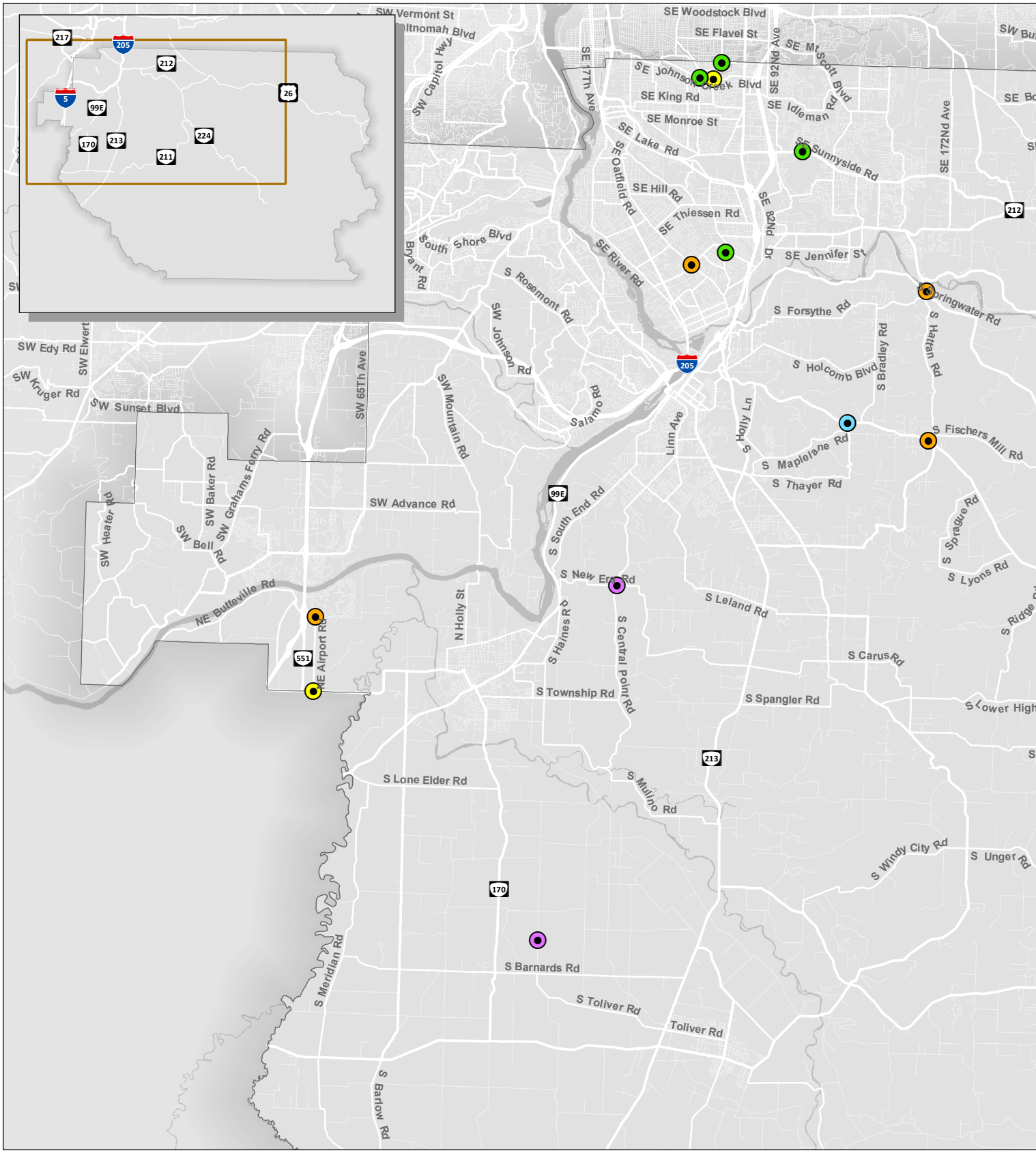
Location-Specific Project Evaluation

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.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SE Sunnyside Rd
SE 172Nd Ave
SE 92Nd Ave
SE 82Nd Dr
SE Jennifer St
SE River Rd
SE Idleman Rd
SE Mt Scott Blvd
SE 17Th Ave
SW Capitol Hwy
South Shore Blvd
Bryant Rd
S Rosemont Rd
SW Johnson Rd
Salamo Rd
S Forsythe Rd
Springwater Rd
S Holcomb Blvd
S Bradley Rd
S Henan Rd
SW Edy Rd
SW Elwert
SW Kruger Rd
SW Sunset Blvd
SW 65Th Ave
SW Mountain Rd
Linn Ave
Holly Ln
S Maplelane Rd
S Thayer Rd
S Fischers Mill Rd
SW Heater Rd
SW Baker Rd
SW Grahams Ferry Rd
SW Bell Rd
SW Advance Rd
S South End Rd
S Sprague Rd
S Lyons Rd
S New Era Rd
S Leland Rd
NE Butteville Rd
N Holly St
S Haines Rd
S Central Point Rd
NE Airport Rd
S Carus Rd
S Township Rd
S Spangler Rd
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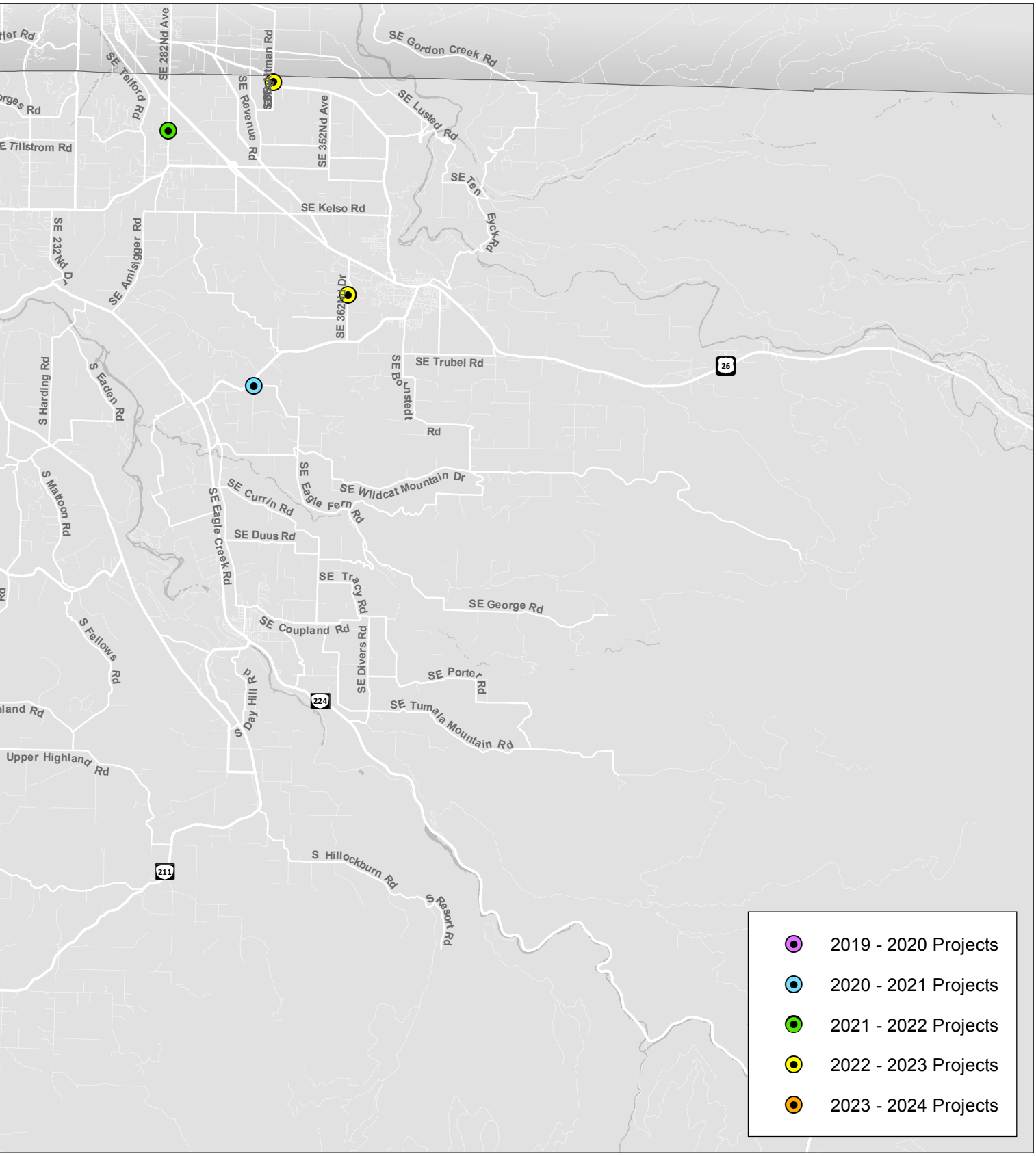
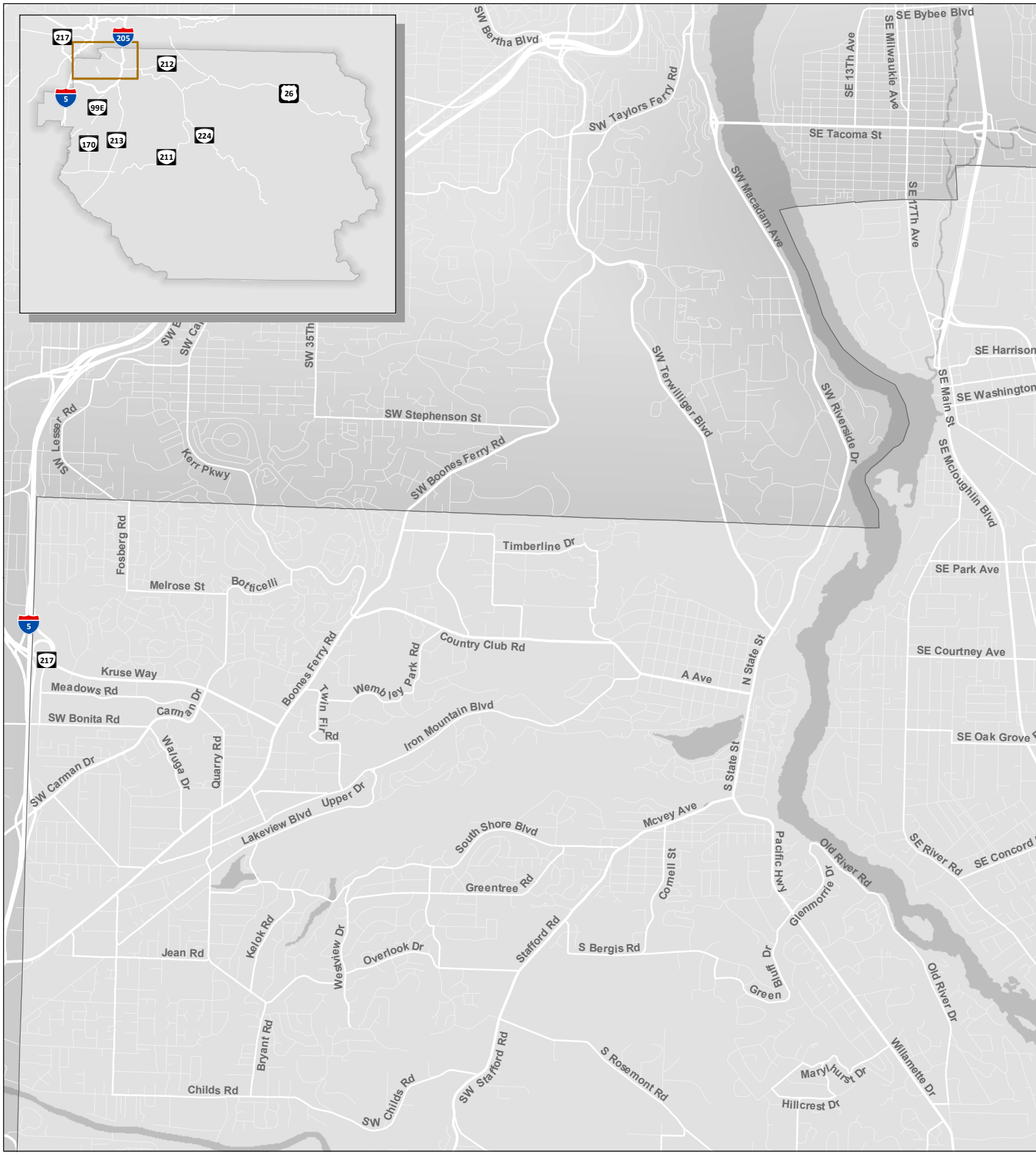


Funding Constrained Location-Specific Program
Clackamas County, Oregon

Figure
5A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SE Tacoma St
SW Macadam Ave
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SW Terwilliger Blvd
SW Riverside Dr
SE Harrison
SE Main St
SE Washington
SE Mcloughlin Blvd
SW Stephenson St
SW Boones Ferry Rd
Kerr Pkwy
Lesser Rd
Fosberg Rd
Timberline Dr
Melrose St
Borticelli
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Country Club Rd
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Meadows Rd
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Carman Dr
Wembley Park Rd
Boones Ferry Rd
Iron Mountain Blvd
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SE Courtney Ave
SE Oak Grove
SW Carman Dr
Waluga Dr
Quarry Rd
Upper Dr
Lakeview Blvd
South Shore Blvd
Mcvey Ave
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Pacific Hwy
Old River Rd
SE River Rd
Greentree Rd
Cornell St
Glenmorrie Dr
Kelok Rd
Westview Dr
Overlook Dr
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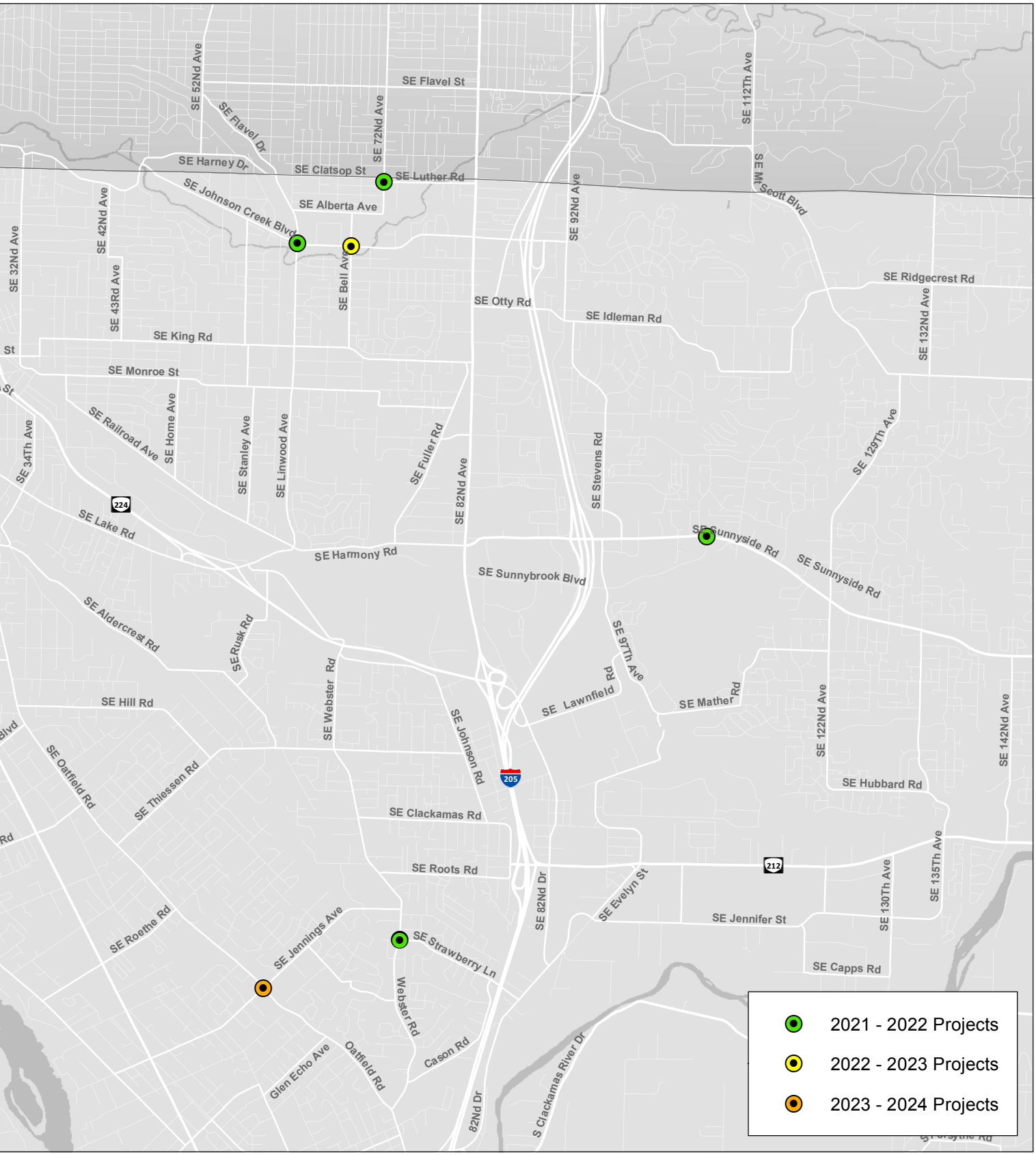
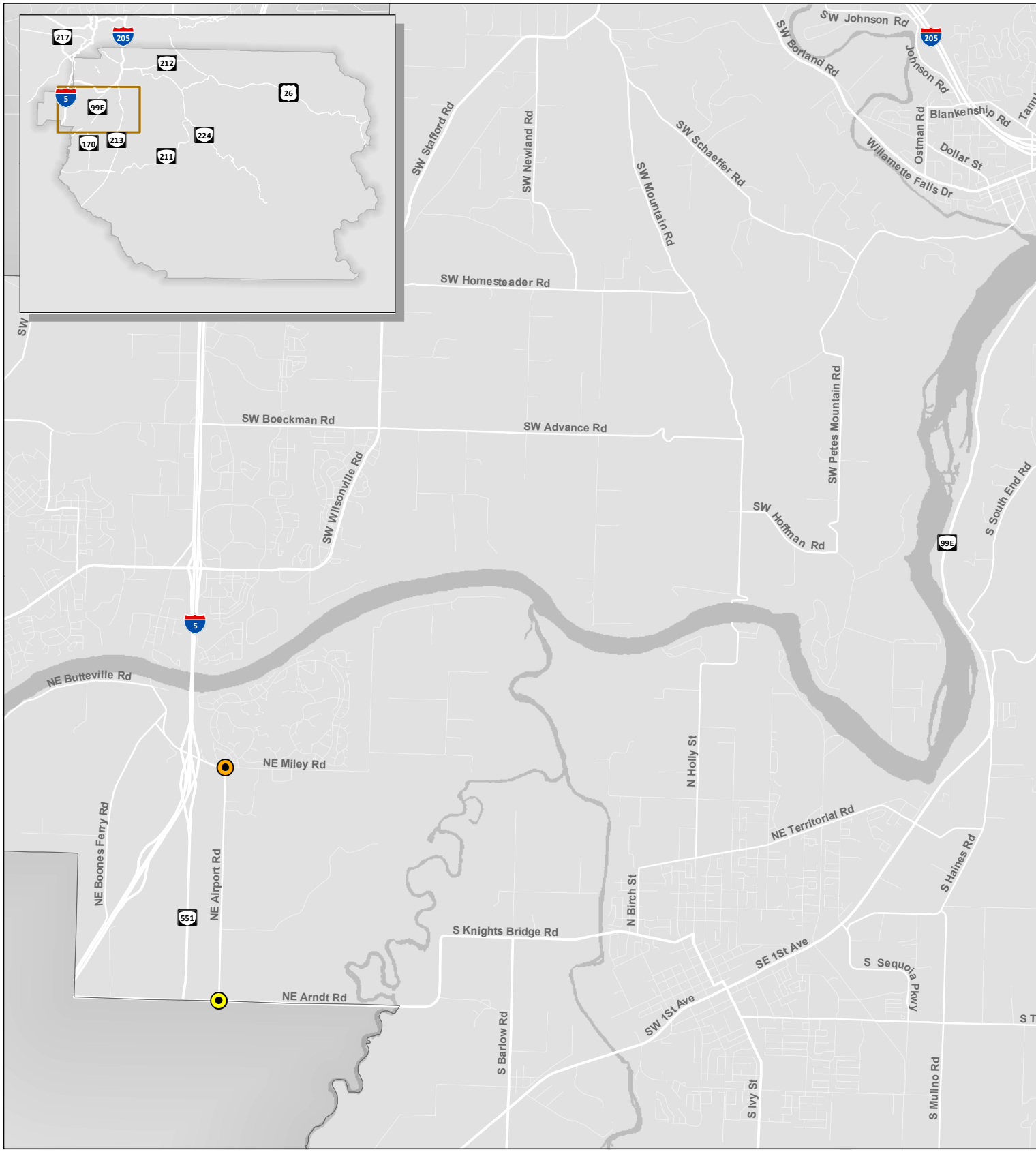
Willamette Dr
Hillcrest Dr



Funding Constrained Location-Specific Program
Clackamas County, Oregon

Figure
5B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SW Hoffman Rd
S South End Rd
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NE Miley Rd
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NE Territorial Rd
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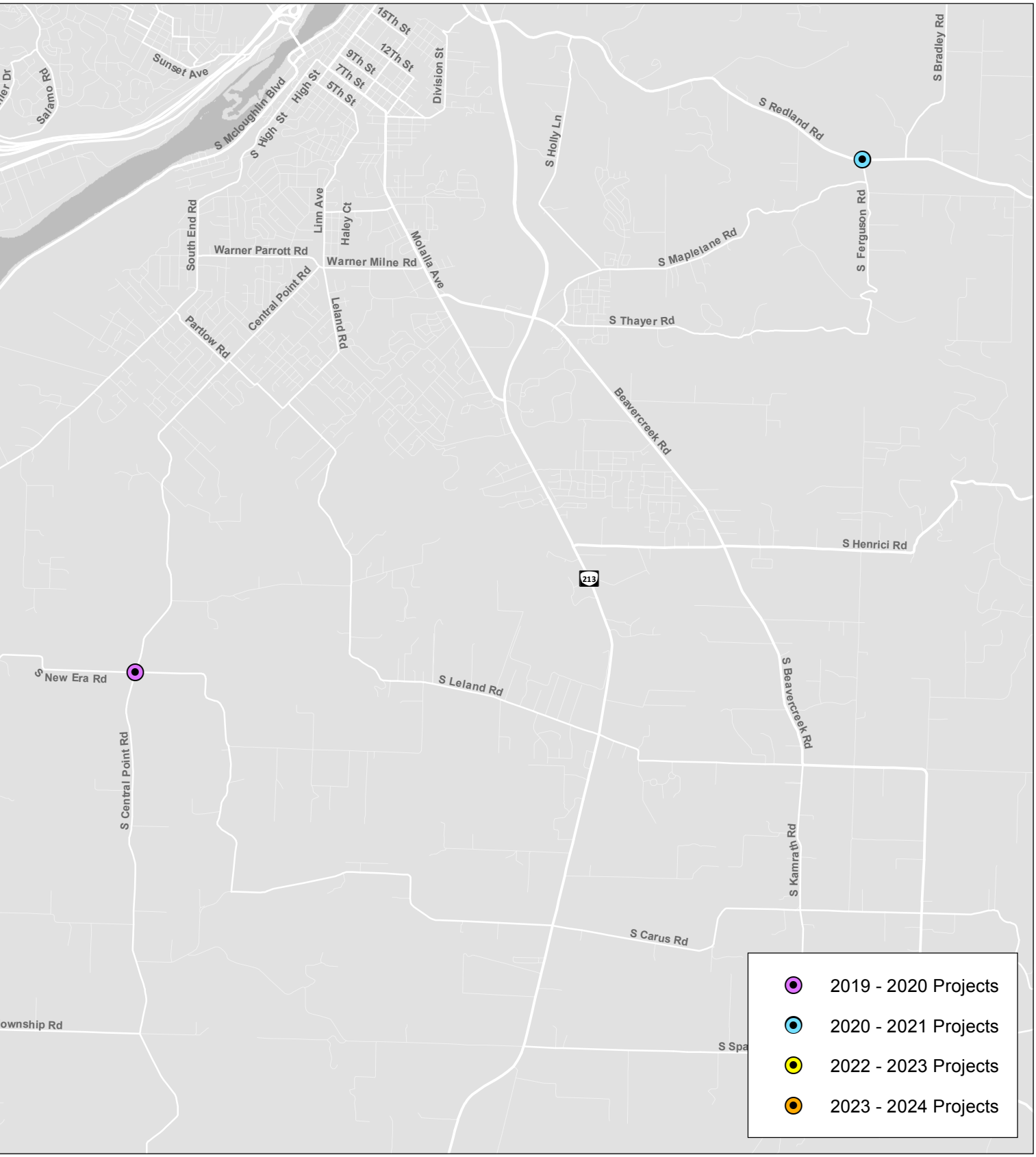
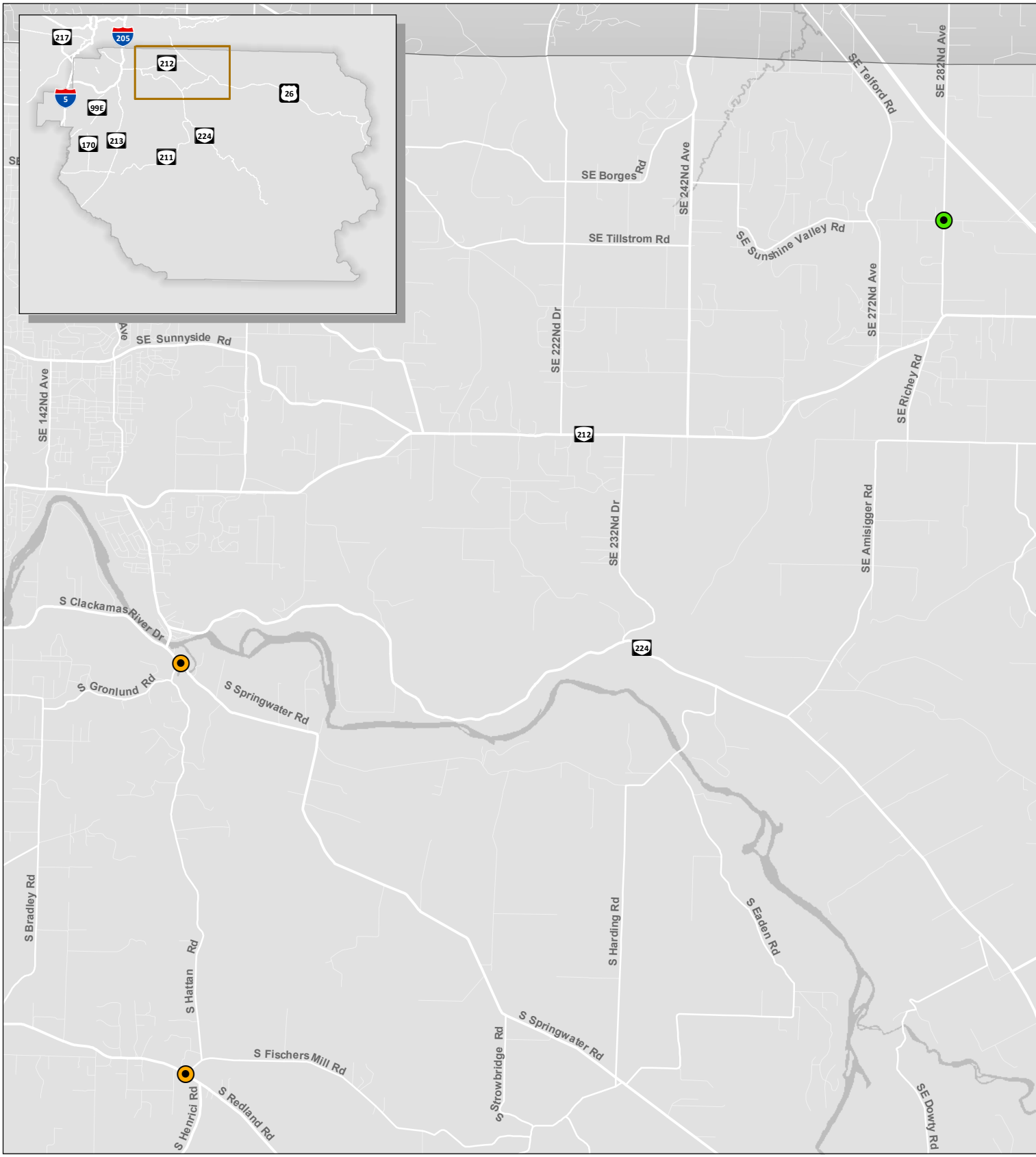


Funding Constrained Location-Specific Program
Clackamas County, Oregon

Figure
5C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S Springwater Rd
S Bradley Rd
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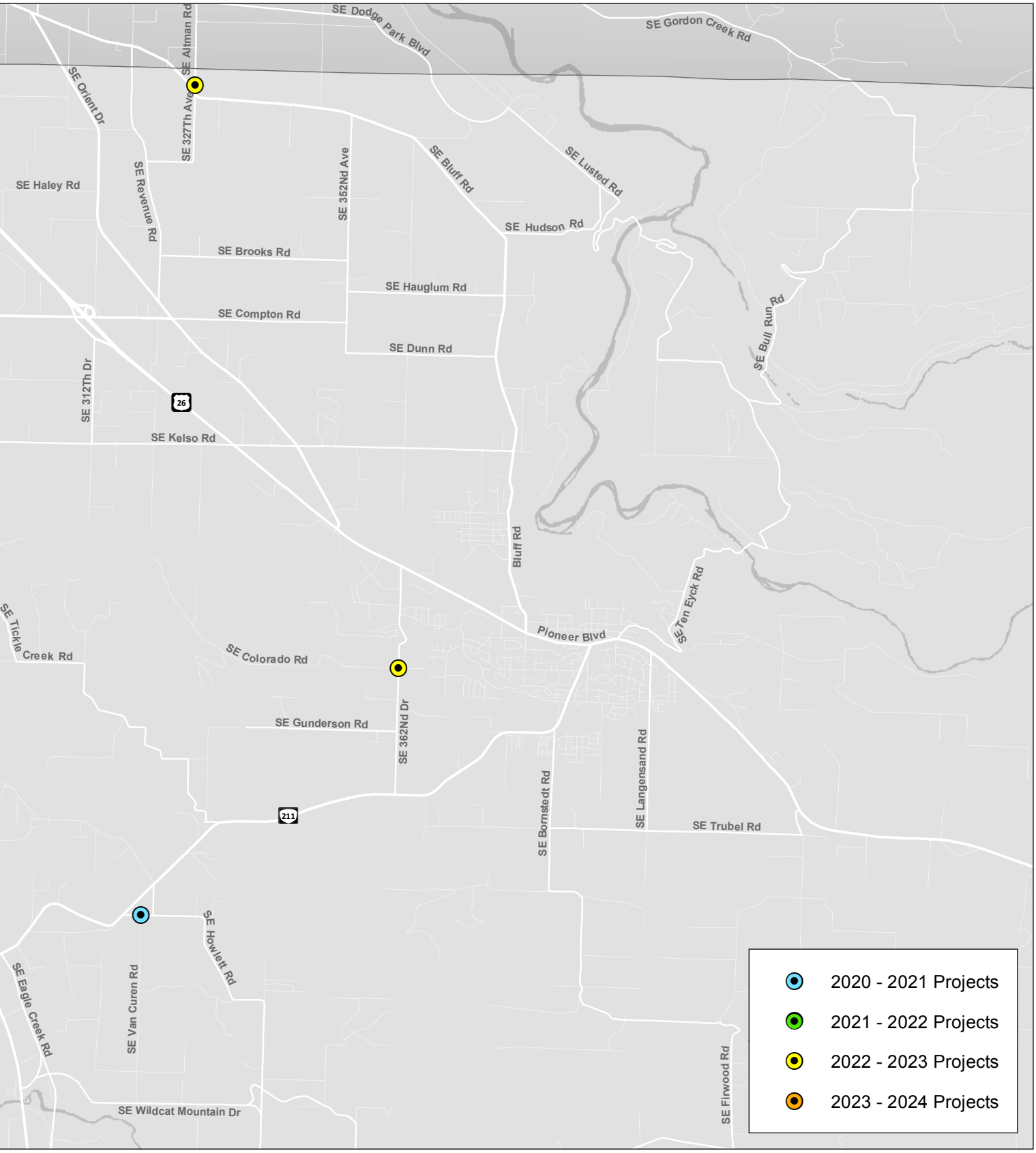
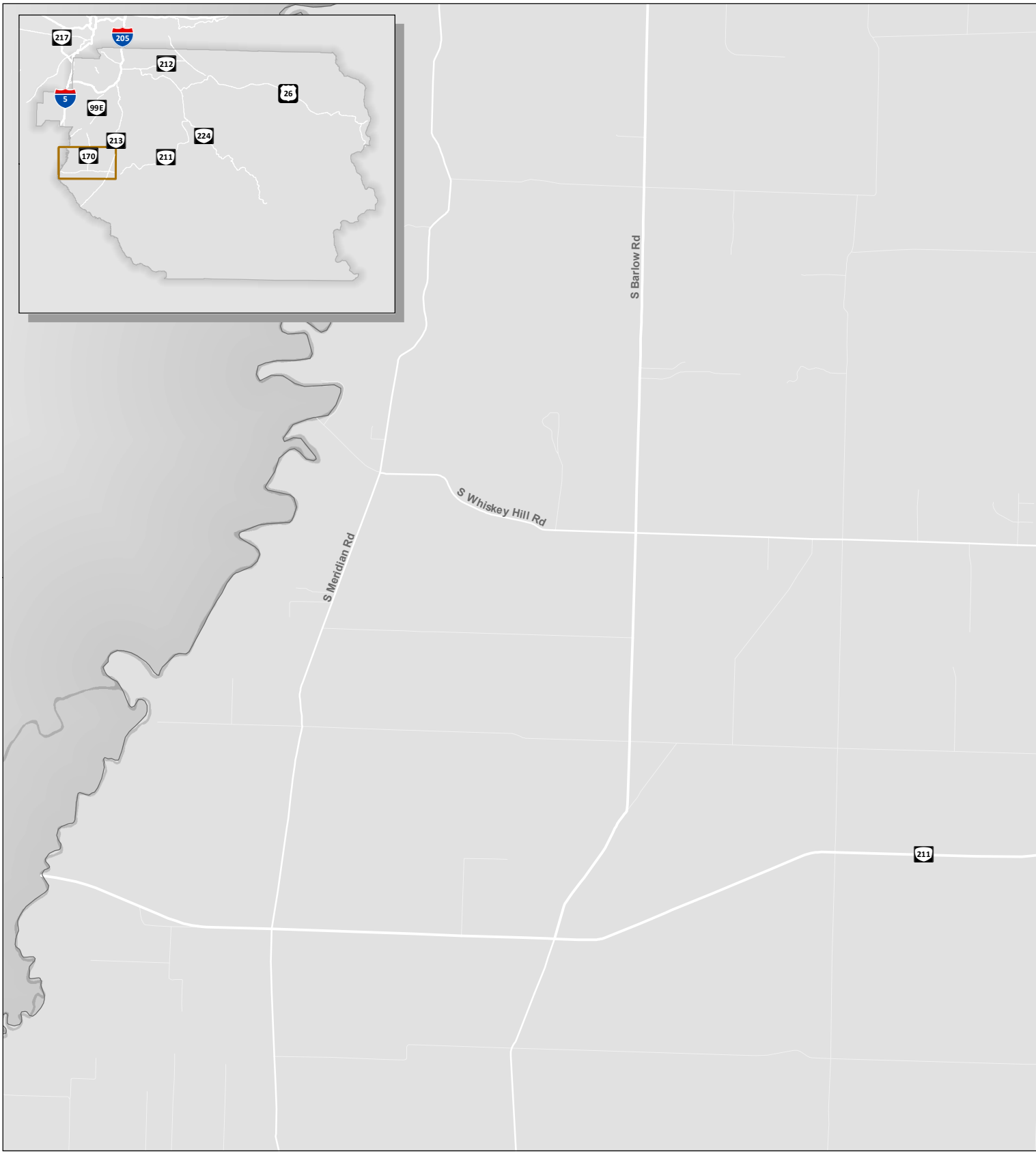


Funding Constrained Location-Specific Program
Clackamas County, Oregon

Figure
5D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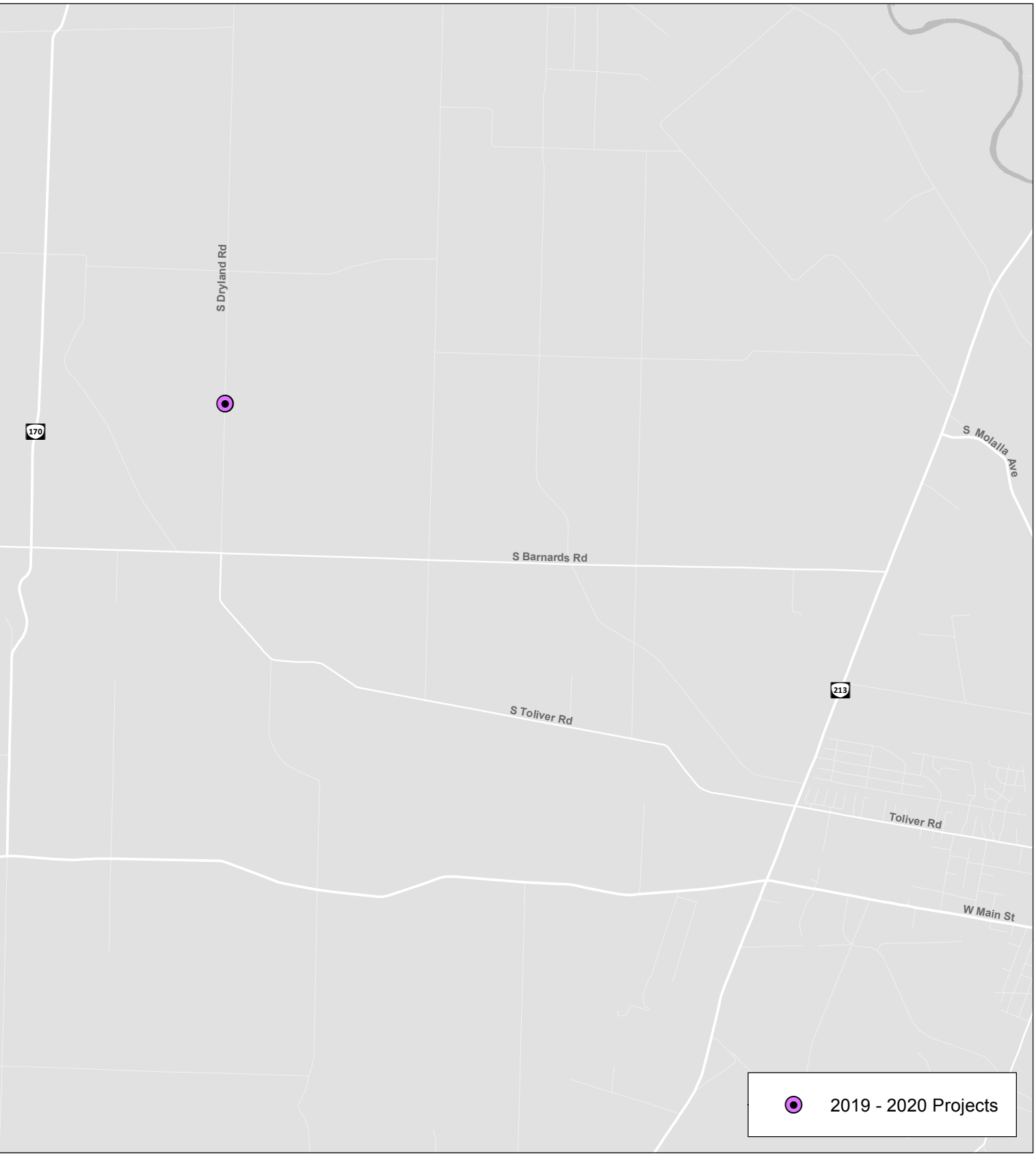

Funding Constrained Location-Specific Program
Clackamas County, Oregon

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-nerm nrojects 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.

Safety Action Plan

Part 1

Appendix A

Literature and Initial Data Review Summary

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610 SW ALDER STREET, SUITE 700
PORTLAND, OR 97205
P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: December 21, 2017

Project #: 20716

To: Joseph F. Marek, PE, PTOE, Christian Snuffin, PE, PTOE, and Patty McMillan; Clackamas County

From: Brian Ray, PE, Nick Foster, PE, and Bryan Graveline; Kittelson & Associates, Inc.
Geri Bartz, RN; Legacy Health

Project: Clackamas County Safety Plan Update

Subject: Literature and Initial Data Review Summary (Task 2 Memorandum)

OVERVIEW

Clackamas County is updating its Transportation Safety Action Plan (TSAP). Published in 2012, the Clackamas County TSAP was one of the first plans of its kind to be completed in Oregon. It outlines a strategy for Clackamas County to create a County-wide Safety Culture with an ultimate goal of reducing transportation-related fatalities and serious injuries by 50% by 2022. Recognizing transportation safety is a multidisciplinary concern, the TSAP uses a "5 E's" approach; it draws from several key areas associated with traffic safety (engineering, education, enforcement, emergency medical services, and evaluation) in a holistic effort to build a Safety Culture. Based on crash data analysis, it identifies the focus areas of aggressive driving, young drivers, and roadway departure crashes. Specific details and actions for each of these areas are discussed in the TSAP.

To prepare an updated version of the TSAP, our project team has first reviewed the current state-of-the practice in national, state, and local safety planning and existing Clackamas County public health and crash data. We have also reviewed best practices from Sweden, where the Vision Zero concept originated, and guidance published by the International Organization for Standardization. This review will allow us to identify potential opportunities to improve the existing TSAP and areas to focus on with future analyses. This memo summarizes the results of this review, analyzes Oregon Department of Transportation (ODOT) crash data provided by the County, and discusses performance measures to consider incorporating into the updated TSAP.

LITERATURE REVIEW

We have reviewed current transportation safety plans and national and international guidance documents. The purpose of this review is to identify best practices that could be incorporated into the updated TSAP.

Transportation Safety Action Plans

We reviewed five TSAPs and comparable documents for other jurisdictions. This review includes plans from Oregon, as well as from other states Specifically, we reviewed the Oregon TSAP, Washington County TSAP, Lane County TSAP, Cass County (North Dakota) Local Road Safety Program, and Sun Corridor (Arizona) Strategic Transportation Safety Plan. The Washington County and Lane County TSAPs were reviewed because of their similarities in population and geography to Clackamas County, as well as their proximity to the County. We reviewed the Cass County and Sun Corridor plans because they are in different regions of the country and provide a perspective on safety planning outside of the Northwest. These two agencies are also both in states that are requiring local safety plans be completed by all counties (North Dakota) or metropolitan planning organizations (Arizona). For each of these plans, we identified key similarities and differences between the respective plan and the 2012 Clackamas County TSAP.

Oregon TSAP

The Oregon TSAP provides a framework for engaging residents, stakeholders, employers, planners, engineers, enforcement agencies, and Emergency Medical Services (EMS) providers across the state in improving transportation safety in Oregon. It aims to integrate behavioral and engineering safety practices into all aspects of planning, programming, and policy activities in the state. The document was created to fulfill the federal requirement for a Strategic Highway Safety Plan. Similar to the 2012 Clackamas County TSAP, the Oregon TSAP sets near-term emphasis areas and long-term goals, as listed below:

Table 1 Oregon DOT TSAP Emphasis Areas and Goals

Near-Term Emphasis Areas	Description
Risky Behaviors	Minimize impaired driving, unbelted, speeding, and distracted driving crashes
Infrastructure	Minimize intersection and roadway departure crashes
Vulnerable Users	Minimize pedestrian, bicycle, motorcycle, and older road user crashes
Improved Systems	Continually improve data, train and educate transportation and safety staff, support law enforcement and emergency responders, and minimize commercial vehicle crashes
Long-Term Goals	**Description**
Safety Culture	Transform public attitudes and organizational transportation safety culture to integrate safety considerations into all responsibilities
Infrastructure	Develop and improve infrastructure to eliminate fatalities and serious injuries for users of all modes
Healthy, Livable Communities	Plan, design, and implement safe systems. Support enforcement and emergency medical services to improve the safety of communities
Technology	Plan, prepare for, and implement technologies (existing and new) that can affect transportation safety for all users
Collaborate and Communicate	Create and support a collaborative environment for transportation system providers and public and private stakeholders to work together

Other key similarities to the 2012 Clackamas County TSAP include:

- Each goal includes individual policies and strategies in an effort to create actionable items.
- Outlines safety emphasis areas and proposes countermeasures for these areas.
- Includes actions related to all 5 E's (though the document only refers to 4 E's, there are evaluation actions, too).
- Discusses difficulty of successful implementation and necessity of strong leadership and partnerships with, and between, many different types of groups.
- Summarizes crash data based on crash type and severity, as well as by contributing factors.
- Data is not analyzed by specific crash locations.

Notable differences from the 2012 Clackamas County TSAP include:

- Presents ultimate goal of eliminating deaths and life-changing injuries on Oregon's transportation system by 2035.
- Sets performance targets for each of the five Federal Highway Authority (FHWA) performance measures (fatalities, fatality rate, serious injuries, serious injury rate, and non-motorized fatalities and serious injuries) and assigns responsibility for meeting these to the State.

Washington County TSAP - Adopted September 2016

Washington County includes the mid-sized cities of Hillsboro, Beaverton, and Tigard, and comprises the southwest region of the Portland metro area. It borders the west side of Clackamas County.

Key similarities to the 2012 Clackamas County TSAP include:

- Identifies focus areas such as pedestrians and distracted driving and proposes strategies for addressing these areas. Strategies are listed both by safety focus and "E" being addressed.
- Assigns a general timeline for each strategy (near-term, mid-term, or as-possible).

Notable differences from the 2012 Clackamas County TSAP include:

- Lists 4 E's of safety: Engineering, Enforcement, Education, and Emergency Response. Does not list Evaluation.
- Presents goal of striving toward zero transportation-related serious injury and fatality crashes; no target date for this goal is given.
- Includes an in-depth review of existing crash data, including a location-based analysis of crashes.
- Assigns a lead agency and a supporting agency for each individual strategy, while the 2012 Clackamas County TSAP assigns a lead agency for each "E."

Lane County TSAP – Adopted July 2017

Lane County includes the Eugene-Springfield metropolitan area, along with surrounding smaller urban and rural areas.

Key similarities to the 2012 Clackamas County TSAP include:

- Outlines broad goals of how to move towards zero deaths and reduce serious injuries, such as building a safe infrastructure and preparing for advanced technologies.
- Establishes short-term and long-term action items to help achieve goals and sorts action items by "E" category and timeframe. Most action items are not linked to an explicit responsible agency.

Notable differences from the 2012 Clackamas County TSAP include:

- Uses Oregon TSAP emphasis areas instead of developing areas based on analysis and local context.
- Refers to the 6 "E's": The 5 "E's" in the 2012 Clackamas County TSAP plus Equity.
- Uses crash analysis to draw distinctions between urban safety issues (more crashes, but less severe) and rural safety issues (less crashes, but more severe).
- Engaged non-engineering groups through three stakeholder advisory committees. Agencies included law enforcement, engineering, education and marketing, advocacy, EMS, and public health. Three additional focus groups with partner agencies and advocates addressed individual emphasis areas.

Cass County Local Road Safety Program - Adopted June 2014

Cass County is located in eastern North Dakota. Its county seat and most populous city is Fargo, and it also includes large amounts of rural areas. It developed a Local Road Safety Program (LRSP) in 2014, which is comparable to a TSAP.

Key similarities to the 2012 Clackamas County TSAP include:

- Describes safety emphasis areas and identifies actionable strategies. Assigns a timeframe to implement each strategy.

Notable differences from the 2012 Clackamas County TSAP include:

- Law enforcement and education/outreach stakeholders as well as governmental staff were part of a workshop to discuss preferred actionable safety strategies to address emphasis areas.
- Uses emphasis areas from the American Association of State Highway and Transportation Officials (AASHTO) *Strategic Highway Safety Plan* instead of developing their own based on analysis and local context.
- Documents at-risk locations that are considered candidates for safety investment based on either crash history or geometric/traffic characteristics.
- Identifies priority safety strategies based on "behavior" or "infrastructure" categories instead of by "E's." Ideas related to the 4 "E's" can still be found throughout the strategies and document, however.
- Rates each proposed strategy as "proven, tried, or experimental" based on body of evidence supporting strategy as effective in other locations.
- Develops specific suggested projects and begins process of submitting for Highway Safety Improvement Program (HSIP) funding based upon identified strategies.

Sun Corridor Strategic Transportation Safety Plan - Adopted December 2016

The Sun Corridor Metropolitan Planning Organization (MPO) provides transportation planning to the City of Casa Grande and surrounding regions of Pinal County, Arizona between Phoenix and Tucson. It developed a Strategic Transportation Safety Plan in 2016 that is similar to a TSAP.

Key similarities to the 2012 Clackamas County TSAP include:

- Sets a near-term goal: reduce the number of fatalities and serious injuries in the region by 3 to 7 percent over the next 5 years.
- Generates safety strategies based on 4 "E's" (leaves out evaluation). However, it includes evaluation of performance measures.
- Describes safety emphasis areas and identifiable action strategies.

Notable differences from the 2012 Clackamas County TSAP include:

- Uses safety emphasis areas from the 2014 *Arizona Strategic Highway Safety Plan* instead of developing emphasis areas based on analysis and local context.
- Sets specific performance measures based on Federal Highway Administration (FHWA) generated requirements for State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs): fatalities, fatality rate, serious injuries, serious injury rate, and number of combined non-motorized fatalities and serious injuries.
- Analyzes 10 years of crash data based on frequency, rate, severity, and location. Individual intersections and segments were deemed priority locations for future projects based on this analysis.
- Engaged non-engineering professionals with four public meetings and two stakeholder meetings. Purpose of meetings was to obtain input for plan development, educate on traffic safety issues, and solicit cooperation in implementing the plan.
- Describes strategies for securing funding for safety projects are described.

Summary of Best Practices for Updated Clackamas County TSAP

We have identified the following best practices to consider including in the updated Clackamas County TSAP:

- Assign a lead agency or responsible team/individual for safety strategies/proposed countermeasures. (Washington County)
- Assign performance measures and target date(s) to meet them by. (State of Oregon, Cass County, Sun Corridor)
- Add a long-term goal that describes the County's ultimate vision (e.g., zero fatalities and serious injuries). (State of Oregon, Washington County, Lane County)
- Align some or all emphasis areas with state emphasis areas. (Lane County, Sun Corridor)
- Engage non-engineering stakeholders (who will be responsible for plan implementation) in developing the plan. (Lane County, Cass County)
- Include an in-depth review of crash data to analyze trends that can inform safety strategies and countermeasures. In addition to focusing on crash type and contributing factors, focus on crash locations to outline high crash corridors, and rural vs. urban context. (Washington County, Cass County, and Lane County)
- Turn proposed countermeasures into specific actionable project proposals and/or locations or concepts for future projects. (Cass County)
- Outline broad strategies to secure future funding for safety projects. (Sun Corridor MPO)

Other Applicable Transportation Documents

We reviewed a variety of other documents pertaining to the transportation system and transportation safety. The Clackamas County Transportation System Plan, the Towards Zero Deaths National Strategy, Road Traffic Safety Management ISO 39001 from the International Organization for Standardization,

and the Molalla Transportation Safety Culture Project shed light on various aspects of transportation and safety within and outside of Clackamas County.

Clackamas County Transportation System Plan – Adopted December 2013

The Clackamas County Transportation System Plan (TSP) guides transportation-related decisions and identifies the capital construction needs and priorities in Clackamas County over a 20-year horizon. One of its six goals is to promote a transportation system that maintains or improves our safety, health, and security, and it includes multiple references to safety as a fundamental item to be prioritized in the transportation planning process.

The TSP references the Capital Improvement Plan (CIP), which prioritizes potential transportation construction projects with respect to the TSP goals. As such, the CIP specifically references safety as a category of projects in the project prioritization process. The TSP also specifically references the goals outlined in the 2012 Clackamas County TSAP.

Ultimately, projects resulting from the TSAP will need to be integrated into the TSP. Therefore, the updated TSAP should be consistent with the TSP to ensure that project efforts are streamlined and consistent.

Towards Zero Deaths National Strategy – Adopted June 2014

The Towards Zero Deaths National Strategy (TZD) was developed by a partnership of several organizations representing public agencies (e.g., American Association of State Highway and Transportation Officials, Governors Highway Safety Association, International Association of Police Chiefs, National Association of County Engineers,) and the US Department of Transportation. It is a tool to help agencies and stakeholders across the country consolidate efforts toward reducing fatalities and serious injuries caused by traffic crashes. It describes Safety Culture as a holistic topic that refers to safety decisions of road users, the consideration of safety impacts during transportation network planning and design, and how employees within an organization consider safety. It presents a positive transportation Safety Culture as one of the key building blocks of eliminating traffic deaths and serious injuries.

TZD lists various strategies to be used to shift the country's culture away from inherently accepting risks and towards a social imperative to reject risky behaviors, engage protective behaviors, and embrace traffic safety policies. It lists 6 key areas, as listed below, which holistically examine the sources of risk in our transportation system. It proceeds to discuss broad proposed countermeasures related to each key area.

- Safer Drivers and Passengers
- Safer Vulnerable Users
- Safer Vehicles
- Safer Infrastructure

- Enhanced Emergency Medical Service
- Improved Safety Management

The TZD document will serve as a reference for potential strategies when developing the updated TSAP, especially as it pertains to creating a positive transportation safety culture.

Road Traffic Safety Management System ISO 39001

Developed by the International Organization for Standardization (ISO), a worldwide federation of national standards bodies, this international standard document specifies requirements for road traffic safety (RTS) management systems for organizations that want to achieve ISO certification. It enables organizations that interact with the road traffic system to reduce deaths and serious injuries related to road traffic crashes. The document contains broad language describing evaluation methods, quality control, and management styles related to an organization's ability to successfully bolster road traffic safety.

While ISO certification may not be relevant to the County, the best practices and guidelines contained in this document will may help inform the TSAP update process.

Molalla Transportation Safety Culture Project – Published June 2017

Montana State University worked with Clackamas County to cultivate a positive transportation Safety Culture and reduce crashes in Molalla, Oregon. Local stakeholders (traffic safety professionals, prevention leaders, and residents) engaged in "capacity building" (changing a community's ability to address health issues by creating new structures, approaches, and/or values). A "Positive Culture Framework" (PCF) guided discussion and action. It consists of the following structure:

1) Improve cultural factors
2) Increase protective behaviors and decrease risky behaviors
3) Improve health and safety

Stakeholders identified aggressive driving as a risky behavior to be addressed. The existing culture of aggressive driving was assessed using a mail survey, and existing programs and strategies aimed at improving this culture were also evaluated. Potential new strategies for improving the culture of aggressive driving were assessed, and methods such as radar feedback signs, education in schools and senior centers, and media campaigns were prioritized. The implementation of these strategies is still in process.

The strategies and methods used throughout this effort will be considered for use in the Clackamas County TSAP update.

Sweden's Vision Zero Initiative

Sweden is often credited as being the first major government entity to adopt the concept that zero is the only acceptable number of deaths from traffic crashes. Their Vision Zero initiative began in 1994 and the concept was passed into law by the Swedish Parliament in 1997 (Reference 1). Sweden has a fatality rate that is less than one-third of the rate in the United States (i.e., 2.8 traffic deaths per 100,000 people in Sweden compared to about 10.6 deaths per 100,000 people in the United States; Reference 2). The fatality rate in Sweden has fallen from about 7 deaths per 100,000 people since the law was passed (Reference 3), to approximately 3 deaths per 100,000 people in 2013 (Reference 2).

Sweden's Vision Zero program takes a multifaceted approach to transportation safety, but it emphasizes the importance of design and management of the transportation system in achieving the goal. It assumes that humans will make mistakes, no matter how well educated they are, or how aggressive enforcement is, and puts the responsibility for preventing these mistakes on the owners of the transportation system. The Vision Zero Initiative summarizes this approach with the statement that

> *In every situation a person might fail. The road system should not*. (Reference 1).

An example of this approach in action is related to managing speed. In a 2014 interview, the Swedish Transport Administration's Traffic Safety Strategist noted that they recognize that changing speed limits is not enough in urban areas to manage speeds at a desired level. Therefore, they use traffic calming tools to obtain their desired speeds when necessary (Reference 3).

PUBLIC HEALTH RELATED DOCUMENTS

Transportation safety is a public health concern. On the international level, the World Health Organization declared 2011-2020 to be a Decade of Action for Road Safety, with a global goal of stabilizing and then reducing the level of road fatalities by increasing safety activities conducted at national, regional, and global levels. To gain a better understanding of what relevant data might be available from public health professionals and how transportation safety is perceived in the public health professional community, we reviewed two documents: the *2016 Healthy Columbia Willamette Collaborative Community Health Needs Assessment* and the *2017-2020 Blueprint for a Healthy Clackamas County*.

2016 Healthy Columbia Willamette Collaborative Community Health Needs Assessment

The Healthy Columbia Willamette Collaborative is a public-private partnership that includes hospitals, local public health agencies, and coordinated care organizations in the four counties of the Portland metro area (i.e., Clackamas, Multnomah, and Washington counties in Oregon and Clark County, Washington). It serves as a platform for collaboration around health improvement plans and created the 2016 Community Health Needs Assessment (CHNA) to analyze health needs and assets as required by the federal Affordable Care Act. It incorporates community surveys that help identify public opinion and areas of concern related to transportation.

The CHNA discusses a variety of topics that relate transportation safety to public health. Chief among these are unsafe streets, unsafe driving practices, and extensive time spent driving. Throughout the surveys and the report, an understanding by the community of the importance of transportation safety to community health is shown.

A Clackamas County community survey identified unsafe streets (streets with limited crosswalks, bike lanes, lighting, etc.) as the 9th most important issue out of 25 that needs to be addressed to make the community healthier. A similarly structured survey identified unsafe driving practices (such as not using seat belts/child safety seats and distracted driving) as the 7th most important risky behavior out of 12 that can endanger health in the community.

The CHNA also found that Clackamas County residents commute for close to a half hour on average, the longest in the metro area. This additional time in vehicles could lead to more exposure to the risk of a crash. It can also lead to higher stress levels (Reference 4), which can in turn result in negative driving behaviors (Reference 5).

In addition to safety related issues, transportation systems affect health in a variety of other ways. Safe, nearby transportation was identified by Clackamas County residents as the 12th most important characteristic out of 21 that leads to a healthy community, as it allows access to activities necessary for healthy living, such as healthy food sources and health care. In addition to increasing driving exposure, a long commute to work can increase stress, risk of obesity, and back pain, and it can also limit available time for physical and social activities. Lastly, a transportation system that leads to a pleasant neighborhood environment can support community health through walkability, community size, and access to parks and nature. Focus groups suggested investing in safe parks, neighborhoods, and routes to school, as well as supporting housing policies that create walkable and accessible communities for all.

2017 – 2020 Blueprint for a Healthy Clackamas County

The *2017-2020 Blueprint for a Healthy Clackamas County*, which serves as the Community Health Improvement Plan (CHIP) for Clackamas County, is the Clackamas County Public Health Division's plan to improve the health and quality of life the county's residents. Throughout the document, community feedback and collaboration with experts are used to identify needs and solutions for better health in the community.

The CHIP establishes a long-term goal of eliminating all pedestrian, bicycle, and motor vehicle traffic crash fatalities in Clackamas County. The plan emphasizes pedestrian crashes because they make up close to a quarter of all traffic fatalities. Also noted is that more women are injured in crashes each year than men, which is an uncommon outcome compared to nationwide statistics.

Like the CHNA, the CHIP calls out the importance of improving the built environment through our transportation system. It specifically mentions the necessity of creating places where residents can live and age well in healthy communities. Walkable and connected communities help older residents access

the things they need to live healthy lives, and they also decrease the need to drive, making it easier for older residents to give up, or limit, driving when their ages necessitate it.

The CHIP also discusses the negative effects of Clackamas County's long average commute times. It echoes the CHNA's viewpoint that this trend can lead to sedentary lifestyles and negative health outcomes. It also notes the adverse effects large numbers of long commuters can have on air quality.

CRASH DATA REVIEW

Kittelson analyzed the most recent seven years of ODOT crash data (2009-2015) and identified the top fatal and serious injury (F&SI) crash types. The analysis included (but was not limited to) crashes with the following contributing factors:

- Aggressive driving (i.e., driving too fast for conditions, following too closely, failing to avoid the vehicle ahead, or exceeding the posted speed)
- Young drivers ages 15-25
- Roadway departures
- Vulnerable users (bicyclists, pedestrians, and motorcyclists)
- Driving under the influence of intoxicants (DUII) related
- Older drivers ages 65+

Distracted driving has been at the center of much of the recent national conversation related to safety. Tracking distracted driving related crashes tends to be problematic because it is often more difficult to identify as a cause factor as motorists involved in the crashes are unlikely to admit to being distracted. As a result of this, robust data isn't available to identify this as a top cause factor, but it is well known that distracted driving is a concern.

Total crashes and total fatal and serious Injury (F&SI) crashes by year exhibit an upward trend since 2009, as shown in Figures 1 and 2 below; though the trend in F&SI crashes varies some between 2009 and 2015. The trend of increasing fatalities beginning around 2013 matches a global trend. Reasons for this increase are not fully understood by the research community. Factors of consideration include more vehicle miles traveled due to a more robust economy, reductions in seat belt use, increases in travel speeds, and distractions. Additionally, the population of Clackamas County has been steadily increasing with a population of 375,992 in 2010 and an estimate of 413,000 in 2017.

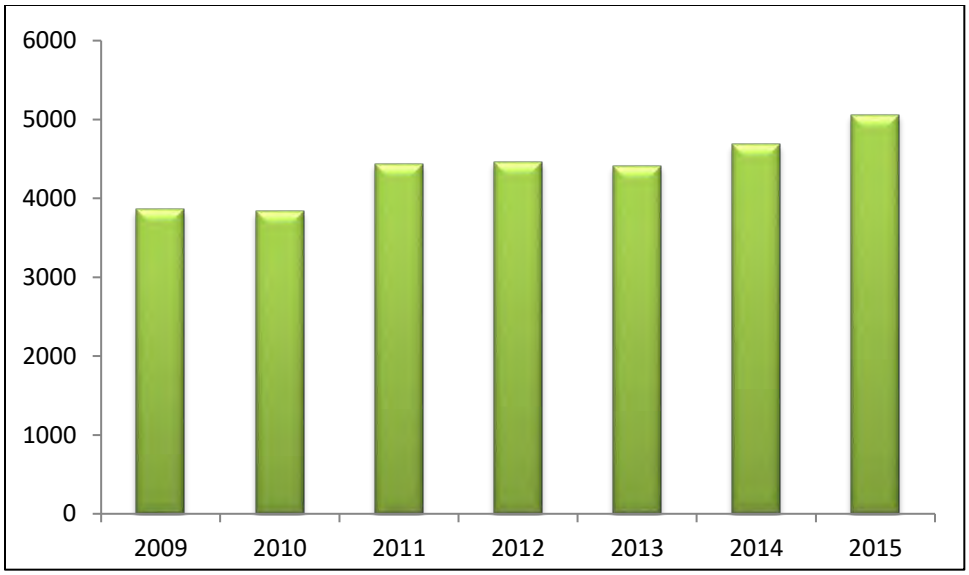

Figure 1. Total Crashes

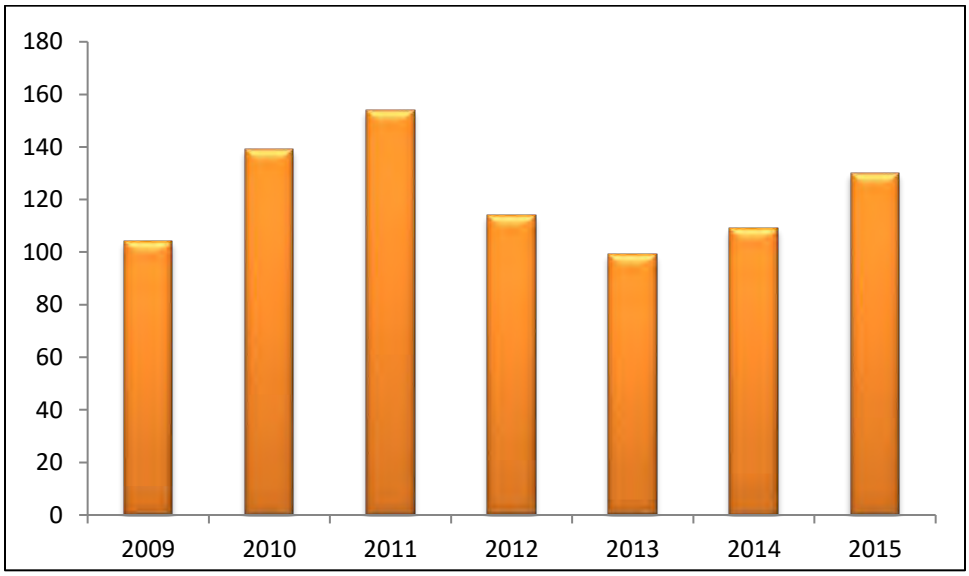

Figure 2. Fatal and Serious Injury Crashes

Kittelson analyzed total crashes and total F&SI crashes based on their contributing factors. The total number of crashes with each of the contributing factors over the seven year period is presented in Figures 3 and 4.

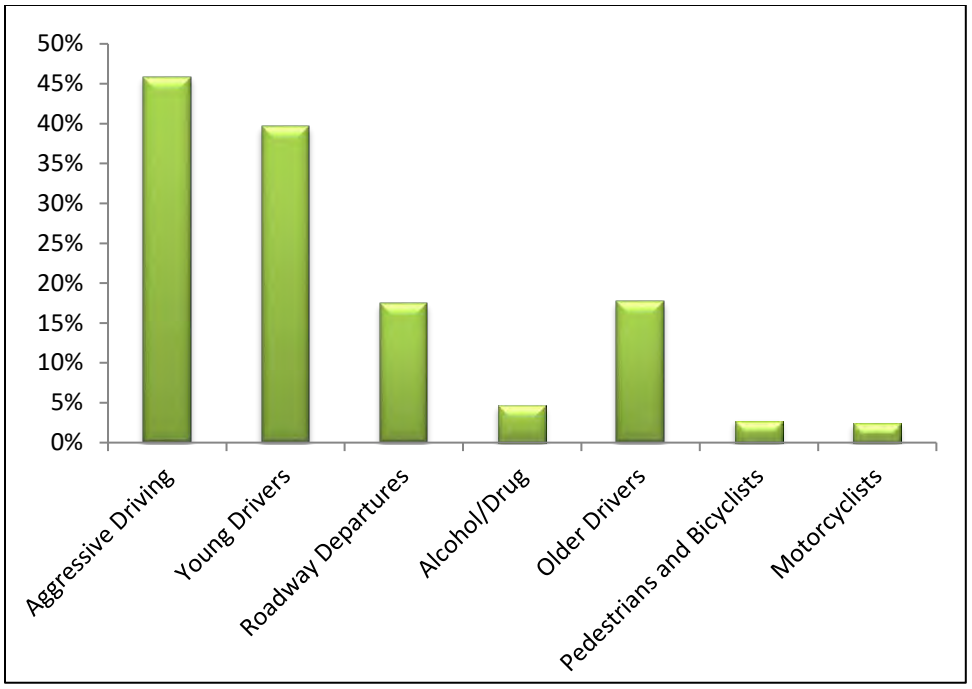

Figure 3. Total Crashes by Contributing Factor

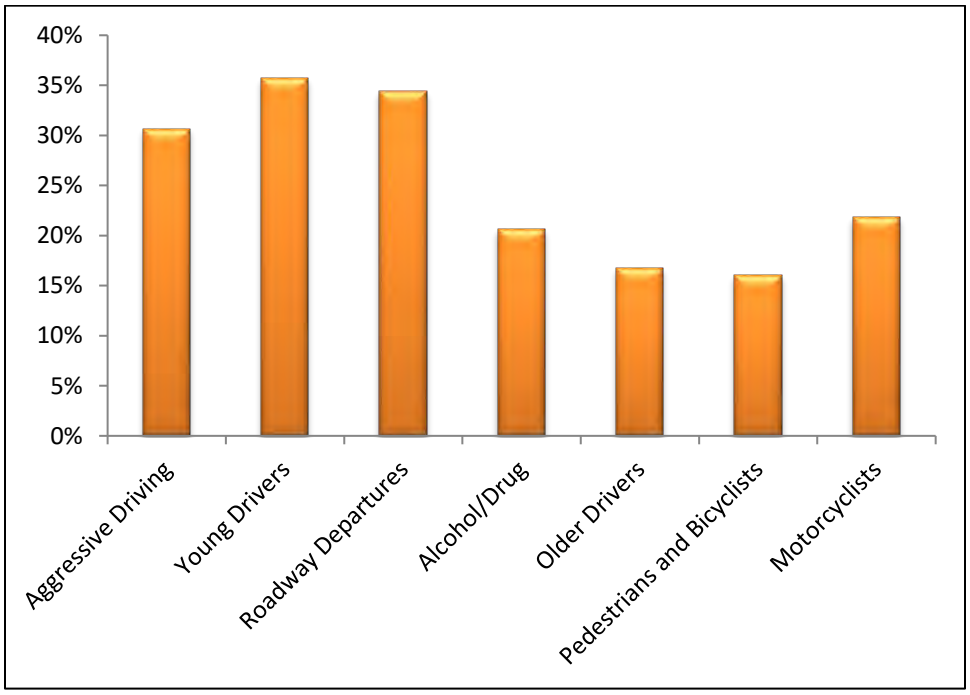

Figure 4. Fatal and Serious Injury Crashes by Contributing Factor

The most prevalent three contributing factors (aggressive driving, young drivers, and roadway departures) from the 2012 TSAP were found to again be the most prevalent three contributing factors with updated data ranging from 2009 through 2015. The proportion of F&SI crashes involving young drivers decreased from about 47% to approximately 36% of all F&SI crashes since the previous study

period. Similarly, the percentage of F&SI crashes related to roadway departures declined from approximately 44% to about 35%. Finally, aggressive driving decreased from being a contributing factor to nearly 60% of F&SI crashes in the 2012 TSAP's dataset to now being cited as a cause in about 30% of all F&SI crashes. A further review of the data used to develop the 2012 TSAP shows that there was one year where aggressive driving related factors were cited three to six times more frequently compared to other years. Had the number of aggressive driving related F&SI crashes that year been consistent with other years in the dataset, the overall percentage would have been under 40% of all F&SI crashes, similar to what is seen in the 2009 – 2015 data.

Additional contributing factors were analyzed further, as described below.

The Towards Zero Deaths National Strategy describes pedestrians, bicyclists, and motorcyclists as vulnerable users because they are more susceptible to injury or death when involved in a traffic crash. Although pedestrian and bicyclist crashes represented 3% of total crashes in Clackamas County during the study period, they represented 16% of fatal and serious injury crashes. Similarly, though motorcyclists were involved in 2% of all crashes in Clackamas County during the study period, they were in 22% of F&SI crashes.

Crashes due to alcohol/drugs and crashes involving older drivers (65+) each represented approximately 15-20% of F&SI crashes.

Figures 5 shows the proportion of all crashes with a given contributing factor for each year, while Figure 6 shows proportion of fatal and serious injury crashes by contributing factor each year. Some crashes have multiple contributing factors, so the contributing factors add up to more than 100% each year.

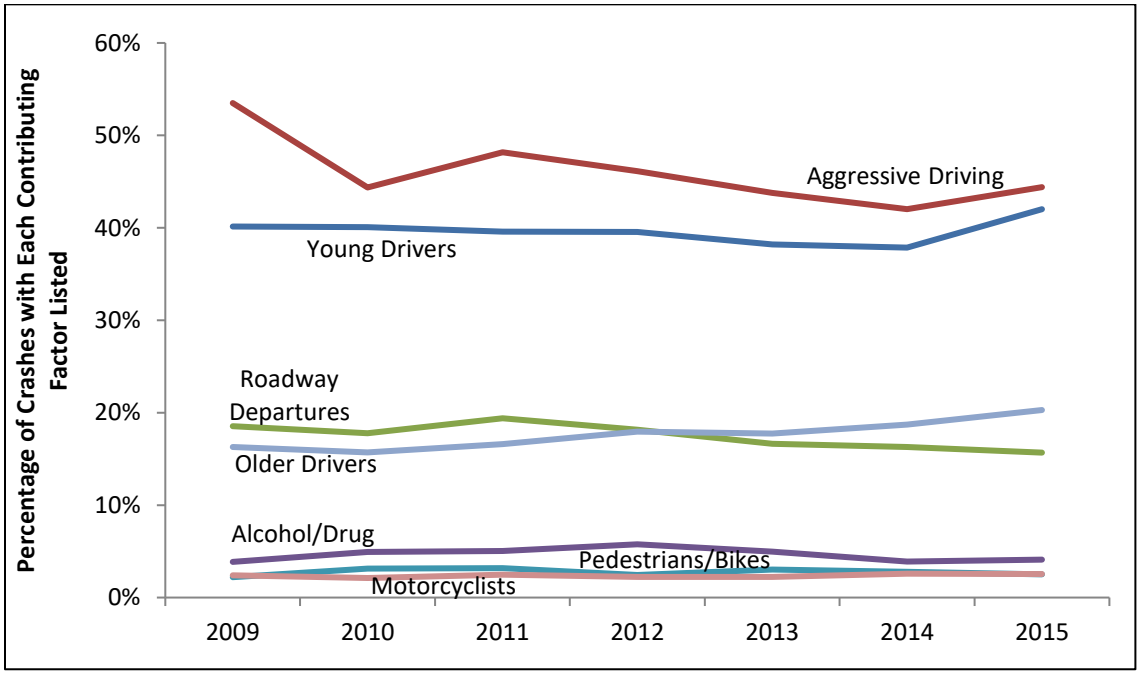

Figure 5. Proportion of Total Crashes by Contributing Factors by Year

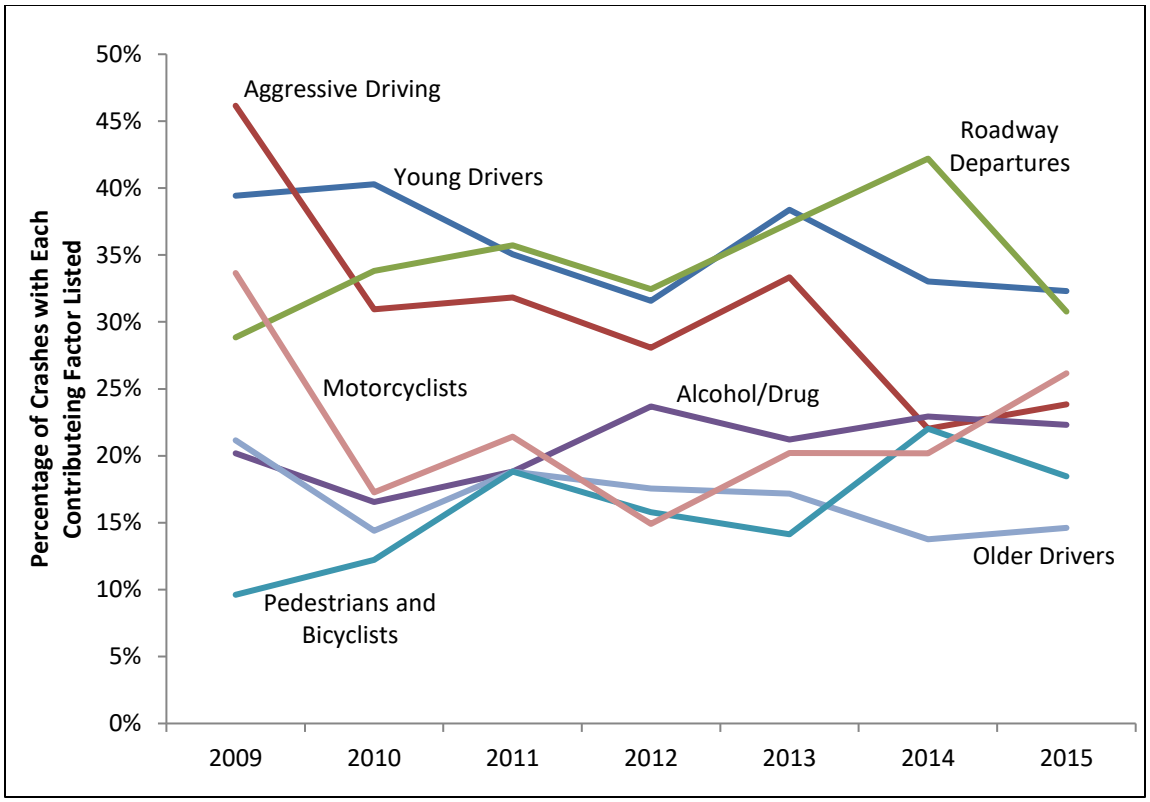

Figure 6. Proportion of Fatal and Serious Injury Crashes by Contributing Factors by Year

The data shows that total crashes related to each contributing factor stayed mostly consistent over the study period.

The F&SI crash data shows greater variability. This is likely due to the smaller sample size of F&SI crashes compared to total crashes. There is a general downward trend over time in the proportion of F&SI crashes involving aggressive driving factors; though the proportion is relatively consistent from 2010 to 2013. Conversely, there is an upward trend over time in the proportion of F&SI crashes involving pedestrians and bicyclists.

Distracted Driving

Distracted driving refers to partaking in any activity that diverts attention from driving, including using a cell phone, eating or drinking, and adjusting entertainment or navigation systems. It was reported as a contributing factor in 5% of total crashes and 4% of F&SI crashes. However, current literature shows these values may be underreported since many drivers are unwilling to admit to a crash being caused by distraction (or often are simply not asked) a recent ODOT task force showed that distracted driving is often underreported. (Reference 6) So, it is possible that driving is a more significant problem in Clackamas County than shown in the ODOT data.

PERFORMANCE MEASURES

Clackamas County recently defined performance measures for the Transportation Safety as part of its *Performance Clackamas: Strategic Business Plan* effort. The Transportation Safety program's near-term goal for this plan is to reduce the rolling annual three-year average number of traffic fatalities from 26 to 14. To track its progress toward this goal, the following measures are identified:

- # students receiving Drive to Zero safety presentations
- # of temporary radar speed feedback signs installed
- # safety evaluations completed
- # heavy vehicles inspected
- % of heavy vehicles taken out of service and in need of repair
- # requests for placement of the radar-reader sign
- # road safety evaluations requested

Additionally, the Transportation Maintenance Division has a performance target of having 75% of County roads with adequately visible pavement markings.

In addition to the measures identified above, in the updated TSAP the County may want to consider measures related to the following:

- Implementation of TSAP related action items
- Crash data trends in the identified emphasis areas

NEXT STEPS

The results of this memorandum will be used to inform the development of the updated Transportation Safety Action Plan. Specifically, those areas as identified as the largest contributors to fatal and serious injury crashes may be emphasis areas in the plan. These areas will be investigated further in the development of the plan.

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Part 1

Appendix B

Action Items Spread Sheet

Section	*Action Item Category*	*Action Item*	*Lead Agency*	*Supporting Agency/Agencies*	*Implementation Timeline*
Safe Drivers and Passengers	Attentive Driving	Work with employers to institute distracted driving policies at their workplaces.	Oregon Impact	Molalla DTZ	short
		Educate youth and adults on the importance of paying attention when using the transportation system.	ODOT/DTZ	Molalla DTZ, TSC, schools	short
		Encourage businesses, institutions, and families to create policies related to driving safety, including attentive driving			
	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 customers.	Office of Children, Youth and Families/DTZ/OLCC	law enforcement	short
		Promote the Oregon Liquor Control Commission's Responsible Vendor program.	Public Health/DTZ	Molalla DTZ	short
		Provide educational posters, social media posts, and public service announcements to inform the dangers of impaired driving.	Oregon Impact/DTZ	Molalla DTZ, AMR, Safe Kids, TSC	short
		Work in schools to educate students on the consequences of impaired driving	DTZ/Oregon Impact	Molalla DTZ, AMR, Safe Kids, Oregon Impact	short
		Coordinate with enforcement agencies to gain support of legislation and penalties associated with impaired driving.	ODOT/Legislators	Counties and Cities	medium
		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 assign a dedicated DUII enforcement unit to County roads.	CCSO/City PD's	DTZ/Oregon Impact	medium
		Develop repeat DUII driver offender programs focused on treating the causes of DUII.	ODOT	Oregon Impact	medium
		Provide Drug Recognition Expert (DRE) training for all county law enforcement officers.	ODOT/CCSO/City PD's	DTZ	medium
		Grow partnerships and support existing efforts to reduce underage drinking, underage marijuana use, and drug use through funding, educational outreach, and coalition membership	Office of Children, Youth and Families/DTZ	Public Health, Molalla DTZ, Oregon Impact	short
	Calm Driving	Implement automated enforcement of speeding and red-light running. This can only be used in cities, not in unincorporated communities of Clackamas County.	BCC/Legislature	law enforcement/ DTZ	medium
		Install speed feedback signs.	DTZ	TSC	short
		Work with ODOT and individual cities to implement best practices in setting design speeds and speed limits, including implementing risk-based speed limits	ODOT	Cities and counties	medium
	Inexperienced Drivers	Support driver education programs, especially in rural areas that may struggle with access to programs.	ODOT/DTZ	Molalla DTZ	short
		Begin safety education before young people reach driving age.	Public Health/DTZ/ODOT	Molalla DTZ, TSC	medium
		Support family-based safety education to leverage parental influence.	Office of Children, Youth and Families/DTZ	Molalla DTZ	short
		Continue to support peer-based marketing efforts on safe driving.	Office of Children, Youth and Families	Molalla DTZ	short
		Continue outreach program in high schools countywide to provide driver, pedestrian, and bicyclist safety education.	DTZ	Molalla DTZ	short
	Senior Drivers	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.	Public Health/DTZ	Molalla DTZ	short
		Teach people about the impact of medicines on their ability to think clearly and react quickly.	Public Health/DTZ	Molalla DTZ, TSC	short
		Support training sessions through AARP and insurance companies to help seniors maintain driving skills.	Public Health/DTZ	Molalla DTZ	short
		Provide transportation options through multimodal infrastructure.	Transit agencies in County	Clackamas County Volunteer Connection Transportation Reaching People	medium
	Restraining Devices	Support Safe Kids Oregon, ODOT, and Oregon Impact in their education efforts on child passenger safety.	Oregon Impact/DTZ	Molalla DTZ, AMR, Safe Kids	short

Section	*Action Item Category*	*Action Item*	*Lead Agency*	*Supporting Agency/Agencies*	*Implementation Timeline*
		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.	ODOT/DTZ/Oregon Impact	Public Health, Molalla DTZ	short
		Provide car seat installation assistance. If possible, offer reduced priced seats for low-income families.	ODOT/DTZ/Oregon Impact	Molalla DTZ	short
		Complete gap analysis of child passenger safety in Clackamas County.	DTZ	Oregon Impact	short
		Implement recommendations from gap analysis report.	DTZ/Oregon Impact	Safe Kids	short
		Support education, marketing, and enforcement efforts to further increase seat belt usage in Clackamas County.	ODOT/DTZ/Oregon Impact	Molalla DTZ	short
Safe Vulnerable Users	Pedestrians	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 importance of adult supervision.	CCSafeRoutes/DTZ	Public Health, Molalla DTZ, Safe Kids, Oregon Impact	short
		Provide adult pedestrian outreach, such as safe crossing practices and new pedestrian infrastructure education.	DTZ	Public Health	medium
		Promote roadway design that integrates 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).	CCTransPlanning/CCSafety/CCCapital	Public Health	medium
		Continue to support the Clackamas County Safe Routes to School program.	DTD	Public Health, Molalla DTZ	short
		Continue support for the County Bike and Pedestrian Program.			
	Bicyclists	Provide education and awareness campaigns centered around driver and bicyclists behavior, common crash types, and low-ligh visibility issues.	DTZ	Public Health, Molalla DTZ	short
		Promote oadway design that integrates bicycle safety considerations by providing appropriate bicycle infrastructure, encouraging slower motor vehicle speeds, and minimizing conflict points between bicyclists and motorists (see Part 2 for more information).	CCTransPlanning/CCSafety/CCCapital	Public Health, Molalla DTZ	medum
		Continue to support the Clackamas County Safe Routes to School program.	DTD	Public Health, Molalla DTZ	short
		Continue support for the County Bike and Pedestrian Program			
		Support prevention agencies such as Think First who provide training and education related to helmet use	DTZ/Public Health	Molalla DTZ	short
	Motorcyclists	Consider outreach regarding proper safety equipment.	Team Oregon/DTZ		short
		Consider outreach regarding safe riding practices.	Team Oregon/DTZ		medium
		Consider outreach regarding motorcycle handling skills and maintenance.	Team Oregon/DTZ		medium
		Support ODOT and Team Oregon training and outreach.	ODOT		short
Safe Infrastructure	Safety Should be a Priority on Every Project	Consider safety-based measures for design criteria to evaluate roadway performance.	CCTransPlanning/CCSafety/CCCapital	Public Health	short
		Develop a policy and practice for incorporating safety assessments into project development, design, and construction.	CCTransPlanning/CCSafety/CCCapital	Public Health	medium
		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.	CCDevRev/CCSafety	Public Health	short
		Integrate Road Safety Audits (RSAs) into the project development process. Encourage RSAs on existing roads and intersections.	CCDevRev/CCSafety		medium
	Deploy Safety Countermeasures Related to Safety Emphasis Areas	See Part 2 of the plan for more information on specific countermeasures and locations	CCSafety	CCRoadMaint	Short
	Design for All Expected Users	Design appropriate infrastructure for people walking and biking.	CCTransPlanning/CCSafety/CCCapital	Public Health	Medium

Section	*Action Item Category*	*Action Item*	*Lead Agency*	*Supporting Agency/Agencies*	*Implementation Timeline*
		Educate and inform users of infrastructure changes.	CCTransPlanning/CCSafety/CCCapital	Public Health	short
		Enact roadway design standards that encourage vehicle speeds appropriate for the surrounding land use.			
	Performance Clackamas sets Pavement Condition Index (PCI) goals to:	By 2022, maintain the average condition of paved county roads at 70 PCI or higher.	CCTrafMaint		short
		By 2022, maintain the average condition of County urban local roads at 70 PCI or higher.	CCTrafMaint		short
	Prepare roadways, streetlights, signals, etc. for vehicle to infrastructure communication	Monitor future trends to discern best way to pursue this action item.	CCSafety		medium
Safe Vehicles	Commercial Vehicles	Increase Motor Carrier Safety inspections and outreach.	CCSafety	local law enforcement	medium
		Develop safety standards for County fleet vehicles	Fleet/RiskMan		short
	Personal Vehicles	Implement education and outreach efforts to communicate safety benefits and limitations of new vehicle technologies.	RiskMan/DTZ	Molalla DTZ	short
		Analyze crashes involving vehicle malfunctions and use results to inform outreach, and possibly enforcement, efforts.	CCSO/CCSafety	Molalla DTZ	medium
Safety Culture		Continue improving safety culture within the County, starting with departments directly associated with transportation safety, including Transportation and Development and Health, Housing, and Human Services	DTZ/Public Health	Public Health, Molalla DTZ, TSC	short
		Build off the Molalla Drive to Zero project and extend Positive Culture Framework applications to other communities in the County.	DTZ/Public Health		short
		Reach out to media to encourage positive reporting instead of negative or traumatic messaging	CCPGA/DTZ	Public Health	short
		Continue to support the Clackamas County Safe Routes to School program, including education and encouragement efforts.	DTD	Public Health, Molalla DTZ	short
Safety Management	Data Management	Integrate Roadway Infrastructure Management Systems (RIMS), crash, and traffic databases.	DTD/RdMaint		medium
		Manage assets efficiently.	RdMaint		medium
		Improve data inventory elements including addition of curve data.	RdMaint/CCSafety		medium
		Partner with Public Health and the Center for Public Health Advancement to: overlay substance abuse data with DUII data to identify locations to focus interventions and overlay chronic disease impacts with transportation safety 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.	DTZ/Public Health	Public Health	medium
		Provide crash data recording training for law enforcement officers.	ODOT	law enforcement agencies	short
	Safety Analysis Capacity Building	Pursue grants to provide additional training and/or software tools.	CCSafety		short
		Plan and execute data analysis training sessions.	CCSafety		short
		Add data analysis capabilities	DTD/CCSafety		short
		Integrate the Highway Safety Manual (HSM) Predictive Method analyses into the roadway database for segments and intersections.	CCSafety		short
		Automate network screeing using a custom or off-the-shelf tool.	CCSafety		medium
		Support Data-Driven Approaches to Crime and Traffic Safety (DDACTS).	CCSO/CCSafety		medium
	Communication Between Safety Partners	Continue DTZ Advisory Board and potentially expand membership.	DTZ	AMR, Safe Kids, Oregon Impact	short
		Develop other forums and tools for cross-organization information sharing and communication.	DTZ/RiskMan/Public Health	Molalla DTZ	short

Section	*Action Item Category*	*Action Item*	*Lead Agency*	*Supporting Agency/Agencies*	*Implementation Timeline*
		Collaborate with Department of Public Health to work on active transportation, safe routes to school, health impact assessments, and rural access to health care.	CCTransPlan/Public Health/RiskMan	Public Health, Molalla DTZ	short
		Include transportation safety in County public health education programming.			
		Better incorporate safety into long-range planning and project development processes.	CCTransPlan/CCSafety	Molalla DTZ	short
		Develop a formal method for sharing safety data with partners, such as a website or a recurring presentation.	CCSafety	Molalla DTZ	medium
		Collaborate with local law enforcment agencies to identify and evaluate top County crash locations	CCSO/CCSafety	Molalla DTZ	medium
		Continue to promote and support the Clackamas County Traffic Safety Commission.	CCSafety	Molalla DTZ	short
Enhanced Emergency Medical Services		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).	DisasterMan/Public Health	Molalla DTZ, AMR	medium
	Work with the Emergency Medical Services Council and other stakeholders to:	Maximize efficiency with urban and rural response times through evidence-based techniques.	Public Health	Fire districts in County	medium
		Optimize activation of Life Flight based on risk.	Public Health	Public Health, Clackamas EMS Council; Life Flight; CCOM, LOCOM (Lake Oswego Dispatch Center)	short
		Continue to build advanced education EMS personnel capacity in rural areas.	Public Health	Clackamas EMS Training Group	short
		Continue to identify reasons for delay in transport for both ground EMS (GEMS) and helicopter EMS (HEMS) using registry data and EMS records.	Public Health	Public Health, Clackamas EMS Operations Committee	short
		Continue to consider process improvement initiatives to increase EMS documentation and data collection.	Public Health	Public Health, Clackamas EMS QI Committee	short
		Continue to work with stakeholders to identify equipment upgrades, training, or enhancements that would improve patient outcomes.	Public Health	Public Health, Molalla DTZ, Clackamas EMS System Enhancement Committee	short
		Continue to identify barriers, if any, to rapid transfer of patients from lower-acuity hospitals in Clackamas County to nearby trauma centers.	Public Health	Public Health, Regional ED/EMS Learning Collaborative	short
		Explore accreditation of County dispatch centers	CCOM	LOCOM (Lake Oswego Dispatch Center)	
	Support the Oregon Area Trauma Advisory Board in their efforts to:	Continue to review patient transport time data, identify barriers to rapid transport, and work with stakeholders to find solutions.	Public Health	Public Health, "Clackamas EMS Operations Committee Regional Hospital Preparedness Organization"	short
		Continue to enhance quality assurance for delivery of emergency medical services and review improvement opportunities.	Public Health	Public Health, Clackamas EMS QI Committee	short
		Continue collaboration with EMS providers as part of the Drive to Zero Advisory Board and expand to other groups as necessary.	DTZ	Public Health	short
	Enhance collaboration between the County and rural fire districts with emphasis on unique rural needs.		CCOM	Public Health, Molalla DTZ	short
	Work with the County 9-1-1 team to:	Involve them at appropriate times in project planning and design review to identify opportunities to improve EMS access and location identification.	CCOM	Public Health EMS Council LOCOM (Lake Oswego Dispatch Center) AMR Dispatch WCCCA	medium

Section	*Action Item Category*	*Action Item*	*Lead Agency*	*Supporting Agency/Agencies*	*Implementation Timeline*
				Public Health EMS Council LOCOM (Lake Oswego Dispatch Center) AMR Dispact	
		Involve them in enforcement and EMS grant opportunities.	CCOM	WACCA Public Health EMS Council	short
		Develop/purchase a system that allows County 911 dispatchers to quickly input reported road issues and have the information be sent to the appropriate agency (i.e., County, City, or ODOT Region).	CCOM	LOCOM (Lake Oswego Dispatch Center) AMR Dispact WACCA	long
	Consider a media campaign to inform/educate the public on how to help emergency vehicles move faster by slowing down and moving over.		CCPGA/ODOT	Public Health, Molalla DTZ	short

Part 1

Appendix C

Acronyms

Appendix C - Acronyms

Acronym	Definition
AAA	American Automobile Association
APS	Accessible Pedestrian Signal
ARTS	All Roads Transportation Safety
CERT	Community Emergency Response Team
CIP	Capital Improvement Program
DDACTS	Data-Driven Approaches to Crime and Traffic Safety
DRE	Drug Recongition Expert
DTD	Department of Transportation and Development
DTZ	Drive to Zero
DUII	Driving Under the Influence of Intoxicants
EMS	Emergency Management Services
FARS	Fatality Analysis Reporting System
FFF	Ford Family Foundation
FYA	Flashing Yellow Arrow
GEMS	Ground Emergency Medical Services
GIS	Geographic Information Systems
GPS	Global Positioning System
HEMS	Helicopter-Based Emergency Medical Services
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
K9	K9 Unit of Clackamas County Sheriff's Office
M-DTZ	Molalla Drive to Zero
MSU	Montana State University
MP	Milepost
MPH	Miles Per Hour
ODOT	Oregon Department of Transportation
PCI	Pavement Condition Index
PCF	Positive Culture Framework
RDI	Rural Development Initiative
RIMS	Roadway Infrastructure Management Systems
RSA	Road Safety Audit
SPIS	Safety Priority Index System
STP	Surface Transportation Program
STIP	Statewide Transportation Improvement Program
SDCs	System Development Charges
TSP	Transportation System Plan
TSAP	Transportation Safety Action Plan

Safety Action Plan

Part 2

Appendix A

Top 50 SPIS Sites Analysis

Appendix A – Top 50 SPIS Sites Analysis

Appendix A describes the identification and analysis of the top 50 high-crash sites, based on SPIS scores, and the countermeasures considered and recommended for them.

Hotspot Screening

Clackamas County uses the Oregon Department of Transportation's Safety Priority Index System (SPIS) to rank high crash locations on County-owned roadways. The SPIS score for a given intersection or road segment is a function of crash frequency, crash rate, and crash severity. This list consists of 366 intersections and 274 500-foot segments. High-crash segments that overlap high-crash intersections were removed from the list to ensure that each high-crash location is only analyzed once. The top 50 high-crash locations, based on SPIS score calculated by Clackamas County, are analyzed further for potential improvements in this plan.

Priority Locations

Figure A-1 shows the top 50 high-crash sites, based on SPIS score using crash data from 2013 to 2015. It includes 42 intersections and 8 road segments. Several of these locations overlap with areas identified as candidates for road safety audits (RSAs) in the County's Transportation System Plan (TSP), as shown in the figure. Table 1 describes the crash patterns identified at each site.

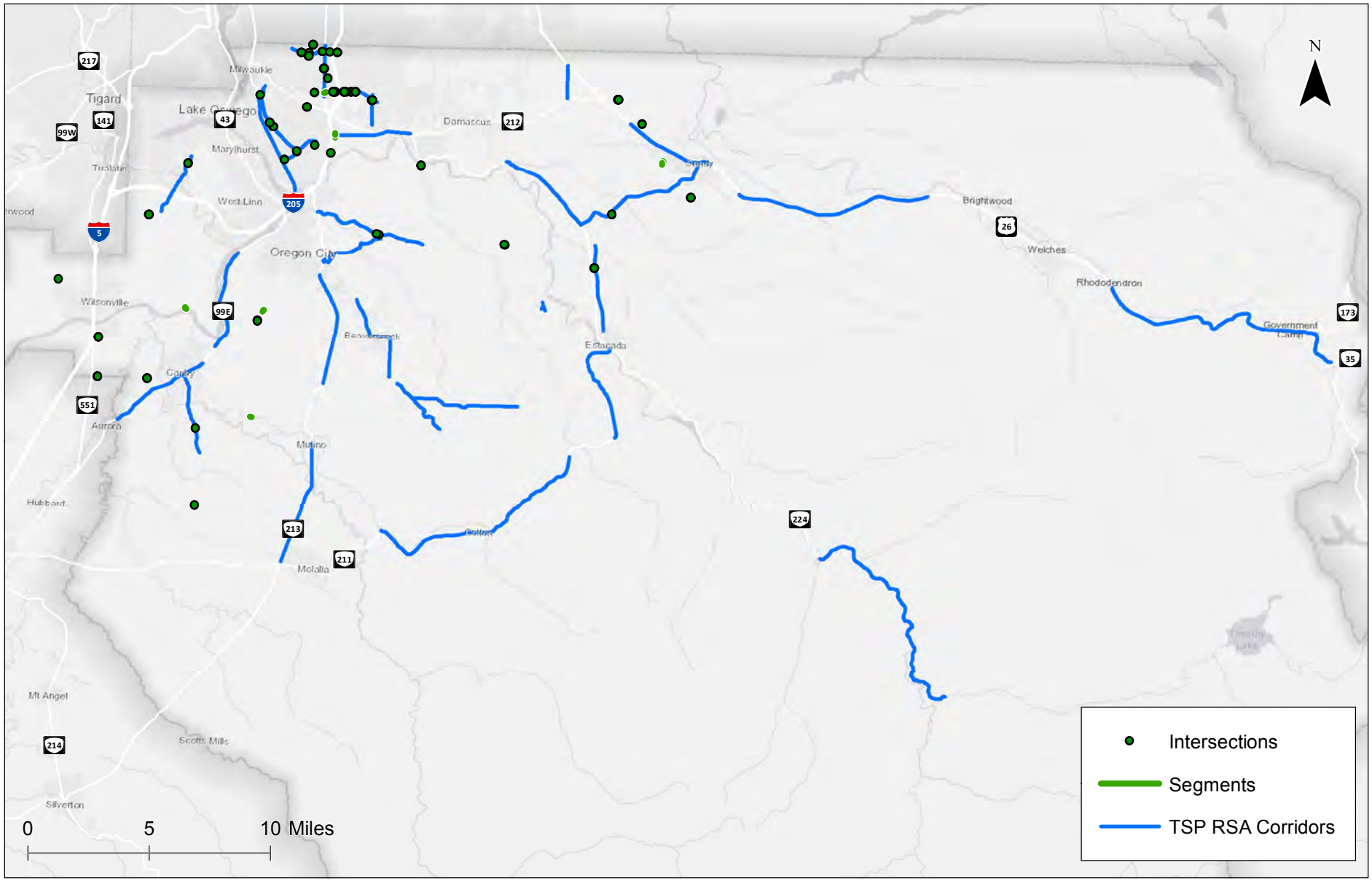
Table 1. Site Crash Patterns

Location Number	Location Name	Prevalent Crash Patterns
1	Fuller Road / Johnson Creek Boulevard	Rear-end crashes
2	Kelso Road / Orient Drive	Angle and turning crashes
3	Sunnyside Road / SE 101st Avenue	Rear-end crashes
4	Sunnyside Road / Stevens Road	Rear-end, angle, and turning crashes
5	Webster Road / Lake Road	Angle, turning, and rear-end crashes
6	Johnson Creek Boulevard / 80th Avenue	Angle crashes
7	Sunnyside Road / Clackamas Town Center	Angle and turning crashes
8	Sunnyside Road / 122nd Avenue	Rear-end crashes
9	King Road / 82nd Avenue	Angle, turning, and rear-end crashes
10	King Road / Fuller Road	Angle and turning crashes
11	Sunnyside Road / 93rd Avenue	Turning crashes
12	Johnson Creek Boulevard / Bell Road	Angle, turning, and rear-end crashes
13	Sunnybrook Boulevard / Sunnyside Road	Turning and rear-end crashes
14	Fuller Road / Harmony Road	Turning and rear-end crashes
15	82nd Drive (s/o OR 212)	Turning crashes at driveways
16	72nd Avenue / Luther Road	Turning crashes
17	82nd Drive (n/o OR 212)	Angle and turning crashes
18	Ferguson Road / Redland Road	Turning and rear-end crashes
19	Howlett Road / VanCuren Road	Fixed object crash (one total)
20	Airport Road / Arndt Road	Angle, turning, and rear-end crashes

21	Oatfield Road / Jennings Avenue	Angle, turning, and rear-end crashes
22	Jennings Avenue / Addie Street	Angle and turning crashes
23	Sunnyside Road	Fixed object and turning crashes and one pedestrian crash
24	Bornstedt Road / Trubel Road	Angle and turning crashes
25	Miley Road / Airport Road	Turning and fixed object crashes
26	Bell Avenue / Overland Street	Fixed object, angle, and turning crashes and one pedestrian crash
27	Springwater Road / Harding Road	Angle and turning crashes
28	Central Point Road / New Era Road	Angle and turning crashes
29	Oatfield Road / Concord Road	Angle and turning crashes
30	Eagle Creek Road / Currin Road	Fixed object crashes
31	82nd Drive / Strawberry Lane	Angle and turning crashes
32	Compton Road / Orient Road	Angle, turning, and rear-end crashes
33	362nd Drive (s/o Skogan Road)	Fixed object crashes and one pedestrian crash
34	Webster Road / Strawberry Lane	Rear-end, angle, sideswipe, and fixed object crashes
35	Causey Avenue / 85th Avenue	One fixed object, rear-end, angle, and pedestrian crash
36	Grahams Ferry Road / Tooze Road	Angle crashes
37	Central Point Road	Fixed object crashes
38	Mulino Road	Fixed object crashes
39	Risley Avenue / Oatfield Road	Angle, turning, and rear-end crashes
40	Park Avenue / Oatfield Road	Angle and turning crashes
41	Arndt Road / Barlow Road	Rear-end crashes
42	Childs Road / Stafford Road	Angle and turning crashes
43	92nd Avenue / Johnson Creek Boulevard	Rear-end and angle crashes
44	Hattan Road / Springwater Road	Angle and turning crashes
45	Johnson Creek Boulevard / Linwood Avenue	Angle and turning crashes
46	Canby Marquan Highway / Lone Elder Road	Rear-end crashes
47	Mountain Road	Fixed object crashes
48	362nd Drive (n/o Colorado Road)	Fixed object crashes
49	Sunnyside Road / 105th Avenue	Rear-end crashes
50	Stafford Road / Schatz Road	Angle, turning, and fixed object crashes

The project team identified the following crash trends through its review of the top 50 sites by SPIS score. It used these findings to identify the most appropriate ODOT All Roads Transportation Safety (ARTS) program countermeasures to apply to the 50 high-crash locations.

- Many unsignalized intersections experience a high proportion of angle and turning crashes.
- Many signalized intersections experience a high proportion of rear-end crashes.
- Many signalized intersections with permissive left-turn phasing experience a high number of left-turn crashes.
- Many rural segments experience a high number of fixed object crashes caused by roadway departures.
- Urban segments tend to experience crashes related to intersections and/or driveways.



Top 50 SPIS Intersections and Segments
Claclakamas County, Oregon

Figure
A - 1

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Countermeasures Toolbox

Countermeasures from the ODOT ARTS program were considered as potential treatments for the sites analyzed for this plan. These treatments may be applicable only to sites that exhibit contributing factors potentially mitigated by the specific countermeasures. For all sites, further engineering study, including reviewing the detailed crash report narratives can help confirm the appropriateness and feasibility of specific countermeasures for a given location.

A brief description of each countermeasure and the types of locations it's proposed to be deployed at is shown below in Table 2. A full description of each countermeasure can be found in ODOT's HSIP Countermeasures and Crash Reduction Factors document.

Table 2. Countermeasure Descriptions

Treatment	ODOT ARTS Countermeasure Number(s)	Applicable Locations	Crash Patterns Addressed	Crash Reduction Factor
Roundabout	H16-17	All Intersections	Severe Crashes	78-82%
Traffic Signal	H20-21	Unsignalized Intersections	Angle Crashes[1]	67-77%
Protected Left-Turn Phasing	I4-5	Signalized Intersections	Turning Crashes	99%
Left-Turn Lanes	H7-14	All Intersections	All	7-48%
Right-Turn Lanes	H2-3	All Intersections	All	14-26%
Improve Signal Visibility	I2	Signalized Intersections	All	13-36%
Advance Intersection Warning	I8-9, I12	All Intersections	All[2]	13-36%
Shoulder Widening	RD20	Rural Roadway Segments	All	18%
Rumble Strips	RD16	Rural Roadway Segments	Severe Crashes	22%
Guardrail	H28	Rural Roadway Segments	Severe Run off the Road Crashes	47%
Curve Warning Signs	RD9	Rural Roadway Segments	Severe Crashes on Curves	13%

[1]This countermeasure has a detrimental effect on the frequency of rear-end crashes
[2]The crash reduction factor for some forms of advance intersection warning, such as flashing beacons that are coordinated with the intersection's signal, are applicable to rear-end crashes only. The factor for other forms, such as stop ahead pavement markings and signs, are applicable to all crashes.

Applying Countermeasures to Priority Locations

Countermeasures are identified for the top 50 high-crash sites based on their potential ability to address the crash patterns summarized in Table 1 and their applicability to the site's land-use, traffic, and roadway characteristics. Table 3 summarizes the recommended countermeasures for each site.

Table 3. Recommended Countermeasures

Location Number	Location Name	Project Description	Overlapping TSP Project IDs
1	Fuller Road / Johnson Creek Boulevard	Install pedestrian countdown timers, coordinated/adaptive signal timing, and dilemma zone protection system (ARTS), install reflectorized backplates	1020, 1031
2	Kelso Road / Orient Drive	Install advance intersection warning signs, advance "Stop Ahead" signs and intersection striping, and increase size of stop sign (ARTS)	3047,3050
3	Sunnyside Road / SE 101st Avenue	Add adaptive timing to traffic signals (5-Year CIP), install reflectorized backplates, add left-turn signal head	1045, 3027

4	Sunnyside Road / Stevens Road	Intersection improvements, such as additional turn lanes, turn lane extensions, and/or signal timing modifications, add adaptive timing to traffic signals (5-Year CIP), install reflectorized backplates	1045, 1132
5	Webster Road / Lake Road	Install reflectorized backplates, protected left-turn phasing, left-turn lanes	1076, 2025, 3019
6	Johnson Creek Boulevard / 80th Avenue	Study further to determine appropriate and feasible countermeasures	1027, 1028, 3016
7	Sunnyside Road / Clackamas Town Center	Add adaptive timing to traffic signals (5-Year CIP), re-evaluate intersection after implementation of project	2015
8	Sunnyside Road / 122nd Avenue	Add supplemental signal head for eastbound left turn on existing NE signal pole riser; add supplemental signal head for westbound left turn on existing SW signal pole riser; advance warning dilemma zone radar detection units will be installed for east and west approaches on NW an SE existing signal poles; add one eastbound through signal head on existing SE signal pole mast arm and rearrange existing heads over travel lanes (ARTS), Add adaptive timing to traffic signals (5-Year CIP), install reflectorized backplates	1045
9	King Road / 82nd Avenue	Install reflectorized backplates, install supplemental signal heads on signal poles, increase size of stop sign, properly place stop bar, and remove foliage for sight distance (ARTS), protected left-turn phasing	3010, 3017, 4004, 4089, 4047, 4046
10	King Road / Fuller Road	Restrict access to right-in/right-out only (5-Year CIP)	3010, 3017
11	Sunnyside Road / 93rd Avenue	Add adaptive timing to traffic signals (5-Year CIP), install reflectorized backplates	1045, 2015
12	Johnson Creek Boulevard / Bell Road	Install reflectorized backplates, protected left-turn phasing, advance intersection warning	1027, 1029, 2000, 3016
13	Sunnybrook Boulevard / Sunnyside Road	Add adaptive timing to traffic signals (5-Year CIP), install reflectorized backplates, advance intersection warning	1045
14	Fuller Road / Harmony Road	Install reflectorized backplates, advance intersection warning (5-Year CIP)	1022
15	82nd Drive from OR 212 to Greenhouse Square Access	Construct ITS improvements (5-Year CIP), Study further to determine appropriate and feasible countermeasures, including potential access management measures	1008, 3004, 4044
16	72nd Avenue / Luther Road	Study further to determine appropriate and feasible countermeasures	2000, 2001
17	82nd Drive from OR 212 to SE Adams Street	Construct ITS improvements (5-Year CIP), study further to determine appropriate and feasible countermeasures, including potential access management measures	1008, 3004, 4044
18	Ferguson Road / Redland Road	Install advance intersection warning signs with street name, advance “Stop Ahead” signs and intersection striping, increase size of stop sign, and install Double Arrow warning sign (ARTS), Perform road safety audit or transportation safety review to identify appropriate safety improvements (5-Year CIP)	3142
19	Howlett Road / VanCuren Road	Advance intersection warning	3045
20	Airport Road / Arndt Road	Install reflectorized backplates, protected left-turn phasing, advance intersection warning	
21	Oatfield Road / Jennings Avenue	Install supplemental signal heads and pedestrian countdown timers (ARTS), widen Jennings Avenue to 2-lane urban minor arterial standard with bikeway and pedestrian facilities infill (5-Year CIP), protected left-turn phasing	2021, 3065
22	Jennings Avenue / Addie Street	Perform road safety audit or transportation safety review to identify appropriate safety improvements (5-Year CIP)	-
23	Sunnyside Road from OR 213 to Discount Tires Access	Add bikeways, pedestrian facilities ways, dual northbound and southbound left-turn lanes, and lighting at OR 213 / Harmony Road (5-Year CIP), study further to determine appropriate and feasible countermeasures, including potential access management measures	2015, 3027, 4004, 4030, 4046, 4047

24	Bornstedt Road / Trubel Road	Study further to determine effectiveness of recently implemented all-way stop control	-
25	Miley Road / Airport Road	Install advance intersection warning signs with street name, advance "Stop Ahead" signs and intersection striping, increase size of stop sign, and install Double Arrow warning sign (ARTS), re-evaluate intersection after implementation of ARTS project and consider installing roundabout	1093, 3100, 3136
26	Bell Avenue / Overland Street	Re-evaluate intersection after implementation of curb widening and sidewalk implementation project	2000
27	Springwater Road / Harding Road	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and advance striping, and increase size of stop sign (ARTS)	3149
28	Central Point Road / New Era Road	Change in traffic control/intersection enhancements (5-Year CIP)	3112, 3138
29	Oatfield Road / Concord Road	Install supplemental signal heads and pedestrian countdown timers (ARTS), install protected left-turn phasing	1061, 1062, 1070
30	Eagle Creek Road / Currin Road	Install advance intersection warning signs with street name, advance "Stop Ahead" signs and intersection striping, and increase size of stop sign (ARTS), re-evaluate intersection after implementation of ARTS project and consider installing roundabout	1055, 2018, 3042
31	Left intentionally blank		
32	Compton Road / Orient Road	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and advance striping, and increase size of stop sign (ARTS), remove vertical curve near Orient Drive and relocate intersection; add paved shoulders. (5-Year CIP)	1052, 3050
33	362nd Drive from Skogan Road to 500 feet south of Skogan Road	Guardrail, rumble strips, and shoulder widening	2017, 3033
34	Webster Road / Strawberry Lane	Advance intersection warning	2025, 3074, 3078
35	Causey Avenue / 85th Avenue	Study further to determine appropriate and feasible countermeasures	1009, 1014, 3026
36	Grahams Ferry Road / Tooze Road	Study further to determine effectiveness of recently implemented signal	3084
37	Central Point Road from 200 feet south of S Criteser Road to 700 feet south of S Criteser Road	Install enhanced curve warning signs (ARTS), re-evaluate segment after implementation of ARTS project, consider installing rumble strips and widening shoulder	3112
38	Mulino Road from Central Point Road to 500 feet west of Central Point Road	Shoulder widening	2039, 3153
39	Risley Avenue / Oatfield Road	Left-turn lanes, signal	1070, 3065, 3069
40	Park Avenue / Oatfield Road	Study further to determine effectiveness of recently implemented signal	1070, 1071, 3065
41	Arndt Road / Barlow Road	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and advance striping, increase size of stop sign, and double arrow warning signs (ARTS), re-evaluate intersection after implementation of ARTS project and consider installing roundabout	2029, 2030, 3180
42	Childs Road / Stafford Road	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and advance striping, increase size of stop sign, and double arrow warning signs (ARTS), perform road safety audit or transportation safety review to identify appropriate safety improvement (5-Year CIP), re-evaluate intersection after implementation of ARTS project and consider installing roundabout	1088, 1089, 3083

43	92nd Avenue / Johnson Creek Boulevard	Install pedestrian countdown timers, coordinated/adaptive signal timing, and dilemma zone protection system (ARTS), install reflectorized backplates	1010, 1031
44	Hattan Road / Springwater Road	Install advance intersection warning signs with street name and advance “Stop Ahead” intersection warning signs and advance striping, and increase size of stop sign (ARTS), re-evaluate intersection after implementation of ARTS project and consider installing roundabout	1044
45	Johnson Creek Boulevard / Linwood Avenue	Add pedestrian facilities and bikeways in accordance with the Active Transportation Plan (5-Year CIP), protected left-turn phasing, advance intersection warning	1027, 1029
46	Canby-Marquam Highway / Lone Elder Road	Canby-Marquam RSA recommendation intersection improvements (5-Year CIP)	1099, 1177, 3128, 3177
47	Mountain Road from 750 feet north of Willamette River to 1,250 feet north of Willamette River	Install advance curve warning signs (ARTS), re-evaluate intersection after implementation of ARTS project and consider installing guardrail and widening shoulder	3090
48	362nd Drive from 500 feet south of Skogan Road to 1000 feet south of Skogan Road	Guardrail, rumble strips, shoulder widening	2017, 3033
49	Sunnyside Road / 105th Avenue	Add adaptive timing to traffic signals (5-Year CIP), add reflectorized backplates	1045
50	Stafford Road / Schatz Road	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and intersection striping, increase size of stop sign, install double arrow warning sign (ARTS), perform road safety audit or transportation safety review to identify appropriate safety improvements (5-Year CIP), realign intersection	2028, 3094

Let's Stop Crashes
Drive to Zero
In Clackamas County
Safety Action Plan

Part 2

Appendix B

Project Lists and Maps

Programmed Projects

Projects Programmed for Construction

Projects in the Five-Year CIP and ODOT's ARTS program are funded for construction by the year 2021. These projects are summarized in **Table B-1** and shown in **Figure B-1**

Table B1. Projects Programmed for Construction by 2021

Project Number[1]	Location	Project Description	Programmed Construction Year
		ARTS Projects	
20335	OR-213 (82nd): MP 7.25 to MP 9.4	Install reflectorized backplates, install supplemental signal heads on signal poles, increase size of stop sign, properly place stop bar, and remove foliage for sight distance on OR-213 at Luther, Cornwell, Lindy, Johnson Creek, Overland, Lamphier, King, Boyer, Causey, Monterey, Sunnyside, Sunnyside/Harmony, and Sunnybrook.	2020
20335	OR-99E: MP 2.33 to MP 5.93	Install reflectorized backplates and supplemental signal heads at Milport, Holgate, 17th, Harold, Ochoco, 17th/Harrison, and Washington; Increase triangle sight distance at the intersection of OR-99E at Milport.	2020
20336	Sunnyside Rd: Valley View Ter to 132nd Ave	Install urban green bike lanes at conflict points, supplemental signal heads, and actuated advance warning dilemma zone protection system at Valley View Terrace, 117th, 119th, and 132nd.	2020
20339	OR-213: MP 11.96 to MP 16.1	Install illumination, reflectorized backplates, and advance warning flashing beacons at Macksburg. Increase size of stop sign, properly place stop bar, and install advance "Stop Ahead" striping legend at Cadillac, Macksburg, Vick, and OR-211.	2020
20339	OR-213: MP 5.73 to MP 7.96	Install illumination at S Spangler Rd; Install reflectorized backplates and supplemental signal heads at S Leland Rd; Install intersection warning signs and stop sign at S Carus Rd; Install "Stop Ahead" intersection striping at Carus and Spangler.	2020
20339	OR-99E: MP 10.75 to MP 12.19	Install reflectorized backplates and supplemental signal heads at Gloucester, W Arlington/River, Dunes Drive, I-205 northbound, 14th St, and 10th St; Install increased size of stop sign at 15th St.	2020
20339	OR-99E: MP 13.70 to MP 22.89	Install reflectorized backplates and supplemental signal heads at Territorial Rd, N Redwood St/S Sequoia Pkwy, NE 4th Av/ Pine St, Ivy St, Grant St, SW Berg Pkwy, and SW Barlow Rd; Install increased size of stop sign, properly placed stop bar, and advance "Stop Ahead" intersection striping at Paquet St and South End Rd.	2020
20339	OR-99E: MP 7.41 to MP 9.8	Install illumination at SE Maple St; Install reflectorized backplates and supplemental signal heads at SE Courtney Av, SE Oak Grove Blvd, SE Concord Rd, and SE Jennings Ave; Install advance intersection warning signs and properly placed stop bars at SE Maple St and SE Risley Ave.	2020

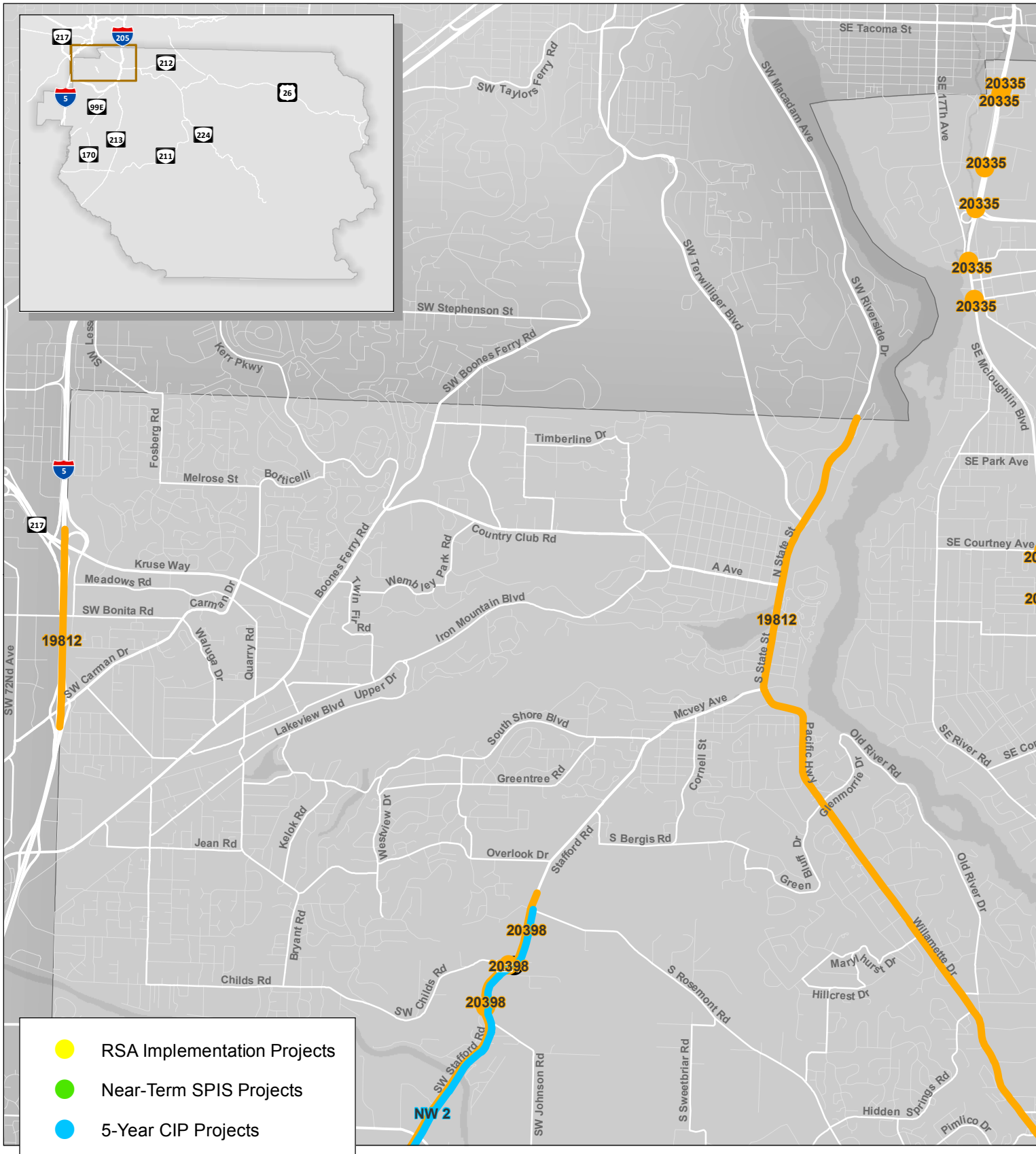
Project Number[1]	Location	Project Description	Programmed Construction Year
20339	OR-224: MP 0.68 to MP 5.36	Replace urban permissive or protected/permissive left turns to protected only at Oak St; Increase triangle sight distance and removal of trees at 98th Ave; Install reflectorized back plates and supplemental signal heads at Monroe St, Oak St, Harrison St, Edison/International Way, Freeman Way, Webster Rd/ Lake Rd, Johnson Rd, 82nd Ave southbound off Ramp, I-205 northbound off ramp, and 82nd Dr.	2020
20336	Sunnybrook Blvd: Oak Bluff Blvd to 97th Ave	Install supplemental signal heads, coordinated or adaptive signal timing, and actuated advance warning dilemma zone at Oak Bluff, 93rd Ave, I-205 southbound, I-205 northbound, and 97th.	2020
20336	Oatfield Rd: Oak Grove Blvd to Jennings Ave	Install supplemental signal heads and pedestrian countdown timers at Oatfield and Oak Grove, Concord, Thiessen, Roethe, and Jennings. Replace doghouses at Roethe with flashing yellow arrow.	2020
20336	Johnson Creek Blvd: Fuller Rd to 92nd Ave	Install pedestrian countdown timers, coordinated/adaptive signal timing, and dilemma zone protection system at Johnson Creek Blvd and Fuller Rd, I-205 southbound ramp, I-205 northbound ramp, and 92nd Ave.	2020
20336	SE Sunnyside Rd at SE 122nd Ave	Add green conflict markings in bike lane, east of the intersection at entrance to strip mall, in area of dropped through lane; Add merge arrows to drop lane; Relocate lane drop sign; Add supplemental signal head for eastbound left turn on existing NE signal pole riser; Add supplemental signal head for westbound left turn on existing SW signal pole riser; Advance warning dilemma zone radar detection units will be installed for east and west approaches on NW an SE existing signal poles; Add one eastbound through signal head on existing SE signal pole mast arm and rearrange existing heads over travel lanes.	2020
20337	OR 213 @ Toliver and OR 211 @ Ona Way.	Install illumination, advance intersection warning signs with street names, transverse rumble strips on approaches, and increase triangle sight distances at the intersections of OR-213 at Toliver, and OR-211 at Ona Way.	2020
20398	Rural Corridor A: 11 intersections	Install advance intersection warning signs with street name and advance "Stop Ahead" intersection warning signs and intersection striping, increase size of stop sign, install double arrow warning sign at "T" intersections at intersections: Grahams Ferry at Tooze, Hoffman at Petes Mtn, Stafford at Homesteader, Stafford at 65th, Stafford at Schatz, Stafford at Newland, Stafford at Mountain, Stafford at Johnson, Stafford at Childs, and Airport at Miley.	2019
20398	Rural Corridor D: 22 intersections	Install advance intersection warning signs with street name, advance "Stop Ahead" signs and intersection striping, increase size of stop signs, and install Double Arrow warning sign at "T" intersections at intersections: Bakers Ferry at Harding, Fischers Mill at Hattan, Fischers Mill at Deininger, Fischers Hill at Mattoon, Gronlund at Hattan, Maple Lane at Ferguson, Redland at Springwater, Redland at Ridge, Redland at Hinkle, Redland at Henrici, Redland at Fischers Mill, Redland at Fieldstone, Redland at Bradley, Redland at Ferguson, Redland at Holly, Springwater at Clackamas River, Springwater at Hattan, Springwater at Bakers, Springwater at Strowbridge, Springwater at Hayden and Springwater at Metzler Park.	2019

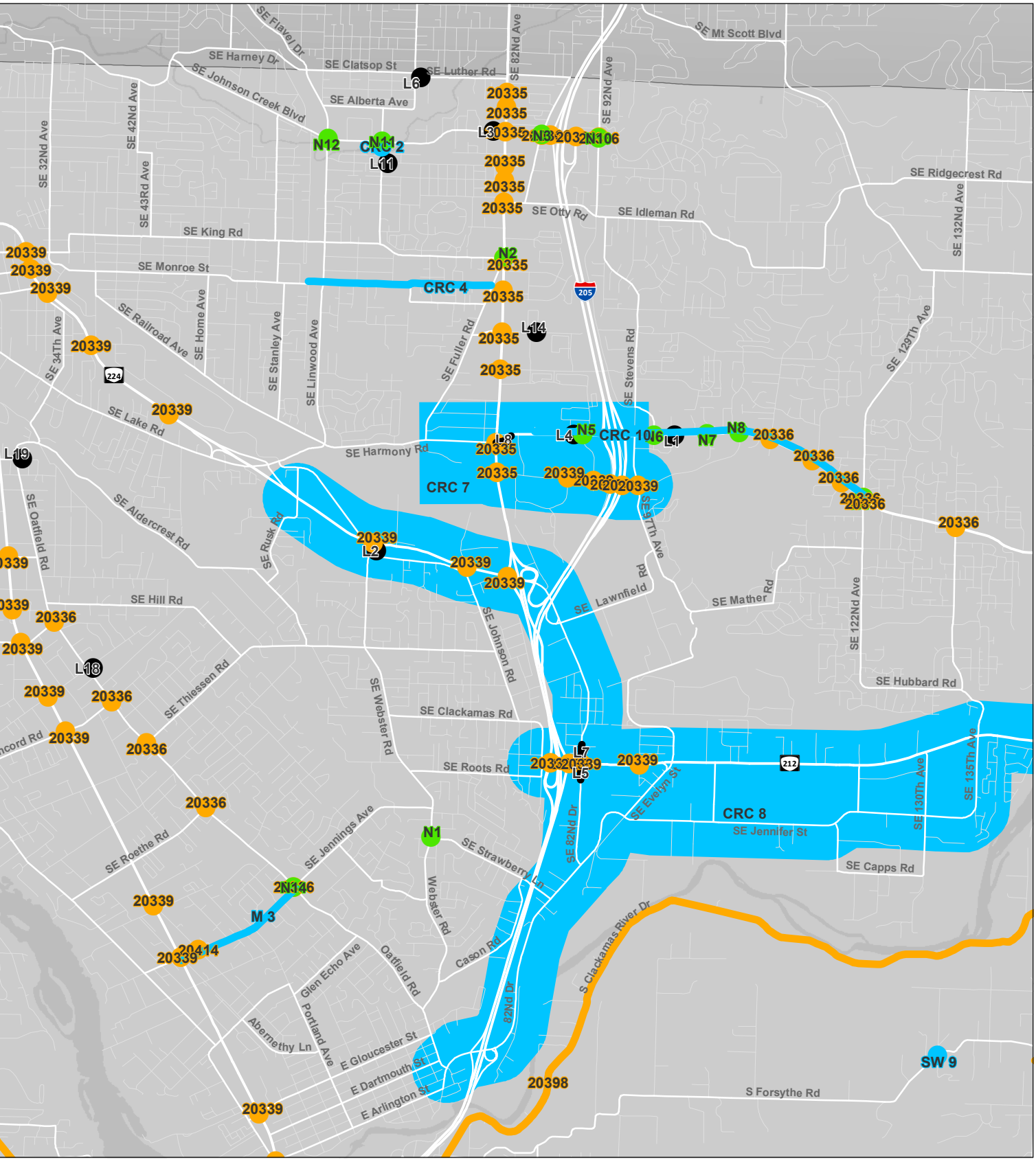
Project Number[1]	Location	Project Description	Programmed Construction Year
20398	Rural Corridor E: 14 intersections	Install advance intersection warning signs, advance "Stop Ahead" signs and intersection striping, increase stop sign size, and install double arrow warning signs at "T" intersections at the intersections of Amisigger at Judd, Eagle Creek at Currin, Eagle Creek at Duus, Eagle Creek at River Mill, Firwood at Bornstedt, Kelso at Amisigger, Kelso at Richey, Kelso at Tickle Creek, Kelso at 312th, Kelso at Orient, Orient at Bobby Bruce, Orient at Compton, Orient at Revenue, and Wildcat Mountain at Eagle Fern.	2019
20398	Rural Corridor C: 16 intersections	Install advance intersection warning signs with street names, advance "Stop Ahead" intersection warning signs, increase size of stop sign, advance "Stop Ahead" striping legend, and double arrow warning sign at "T" intersections at Beavercreek at Windy City/Unger, Beavercreek at Upper Highland, Beavercreek at Larkin, Beavercreek at Lower Highland, Beavercreek at Carus, Beavercreek at Ferguson, Beavercreek at Kamrath/Leland, Central Point at Mulino, Central Point at Township, Central Point at Carus, Central Point at New Era, Henrici at Ferguson, Kamrath at Carus, Leland at Leslie, Leland at New Era, and Union Mills at Windy City/Marshall. Install Flashing Beacons at minor road stop and transverse rumble strips on approaches at Intersection of Central Point at New Era Rd.	2019
20398	Rural Corridor B: 18 intersections	Install advance intersection warning signs, advance "Stop Ahead" intersection warning signs, increase size of stop sign, advance "Stop Ahead" intersection striping legend, and double arrow warning signs at "T" intersections at the intersections of Barlow at Arndt, Knights Bridge, Lone Elder, Barnards/Whiskey Hill, Meridian, Elisha, and Dryland; Canby-Marquam Hwy at Barnards, Heinz, Gribble, Macksburg, and Lone Elder; Dryland at Heinz, Macksburg, and Harms; and Meridian at Whiskey Hill, Sconce, and Elliott Prairie.	2019
20398	Clackamas County Curve Warning Signs: 8 roads	Install enhanced curve warning signs on Bakers Ferry Rd: MP 0 - MP 3.98, Clackamas River Dr: MP 0 - MP 5.51, Eaden Rd: MP 0 - MP 4.17, Fischers Mill Rd: MP 0 - MP 3.95, Gronlund Rd: MP 0 - MP 1.12, Hattan Rd: MP 0- MP 3.32, Maplelane Rd: MP 0 - MP 2.67, and Redland Rd: MP 0 - MP 12.17.	2019
20398	Clackamas County Curve Warning Signs: 7 roads	Install enhanced curve warning signs on Amisigger Rd: MP 0 - MP 2.41, Barlow Trail Rd: MP 0 - MP 6.73, Eagle Creek Rd: MP 0 - MP 3.99, Firwood Rd: MP 0 - MP 3.31, Lolo Pass Rd: MP 0 - MP 4.23, Orient Dr: MP 0.60 - MP 4.46, and Ten Eyck Rd: MP 0.00 - MP 3.48.	2019
20398	Clackamas County Curve Warning Signs: 5 roads	Install enhanced curve warning signs on Advance Rd: MP 0 - MP 2.63, Hoffman Rd: MP 0 - MP 0.78, Mountain Rd: MP 0 - MP 4.43, Schaeffer Rd: MP 0 - MP 2.13, and Stafford Rd: MP 0 - MP 6.54.	2019
20398	Clackamas County Curve Warning Signs: 3 roads	Install enhanced curve warning signs on Central Point Rd: MP 0 - MP 6.22, Henrici Rd: MP 0 - MP 5.77, and Kamrath Rd: MP 0 - MP 1.63.	2019
20398	Clackamas County Curve Warning Signs: 3 roads (4 segments)	Install enhanced curve warning signs on Barlow Rd: MP 0 - MP 11.21, Dryland Rd: MP 0.53 - MP 7.56, and Meridian Rd: MP 0 - MP 9.58.	2019

Project Number[1]	Location	Project Description	Programmed Construction Year
20398	Springwater Rd at Harding Rd	Install "Stop Ahead" signs and pavement markings on Springwater Rd on the eastbound approach to Harding Rd intersection; "Stop Ahead" sign should have "Harding Rd" rider; Install stop signs and stop bars on Springwater Rd at intersection with Harding Rd; Install "Stop Ahead" signs and pavement markings on Springwater Rd on the westbound approach to Eaden Rd intersection; Install solar powered red flashing beacons on new stop signs and yellow beacons on new "Stop Ahead" signs on Springwater Rd.	2019
19812	OR-211: MP 17.79 to MP 19.78	Install properly placed stop bars, larger stop signs, advance "Stop Ahead" intersection warning signs at S Grimm Rd and S Dhooghe Rd.	2019
19812	OR-211: MP 1.55 to MP 5.39	Install advance intersection warning signs with street name, advance "Stop Ahead" intersection warning signs, and increase size of stop sign for the intersection of OR-211 at Judd. Increase size of stop sign for the intersection of OR-211 at Bornstedt.	2019
19812	Region 1 Curve Warning Signs (Multiple Locations)	Install enhanced curve warning signs on OR-8, US-26, OR-219, US-30, OR-10, OR-99W, I-5, OR-43, OR-141, and OR-210. Project includes 106 curves, 148 ramps, and 25 frontages.	2019
20339	OR 211 at Dubarko	Install illumination at the intersection of OR-211 and Dubarko.	2020
20414	SE Jennings Avenue at SE Addie road	Install a 75 foot long median traffic seperator with candlesticks on Jennings Avenue starting 25 feet east of Addie road. Avoid blocking driveway on the north side of east leg. Install a 75 foot long median traffic seperator with candlesticks on Jennings 25 feet west of Addie Road; and restripe Jennings Avenue for the length of the median barriers.	2020
20478	DESIGN ONLY - OR213 AT MP 15.71 (TOLIVER RD)	Design only for a roundabout at intersection of OR-213 and Toliver road.	N/A
		Five-Year CIP Projects	
CRC 10	Sunnyside Road from 8600 block to 122nd Avenue	Deploy Adaptive Signal Control Technology (smarter signals) along Sunnyside Road from 8600 block to 122nd Avenue.	FY 2018
CRC 7	In the area between Sunnyside Rd, Sunnybrook Blvd, Fuller Rd and Stevens Rd	33 discrete or interconnected projects that improve safety and operations of motor vehicle, transit, freight, and pedestrian and bicycle facilities.	FY 2019
CRC 4	Boyer Extension from 82nd to Fuller	Construct 2-lane roadway with turn lanes at OR 213 and Fuller Road, bikeways and pedestrian facilities; install flashing yellow arrow for left turns on northbound and southbound approaches at OR 213 intersection; right-in right-out at Fuller/King; Fuller Rd from King to Monroe: sidewalk and drainage improvements.	FY 2018
CRC 8	Clackamas Industrial Area to Wilsonville	Construct ITS improvements in the following freight corridors/ employment areas: 1) OR 224 (Milwaukie Expressway); 2) OR 212 / 224 Clackamas Highway; 3) 82nd Drive between the Gladstone Interchange and OR 213 (82nd Avenue); 4) The City of Wilsonville; and 5) Other areas identified in the planning process.	FY 2020
SW 8	Redland Road from Abernethy to Henrici	Perform road safety audit to identify appropriate safety improvements.	FY 2018

Project Number[1]	Location	Project Description	Programmed Construction Year
M 3	Jennings Avenue from McLoughlin Blvd to Oatfield	Construct curb-tight sidewalk on the north side of Jennings Ave and bike lanes on both sides. Widening the roadway to accommodate bike lanes and sidewalk will require general excavation, rock excavation and new water quality and detention facilities, including new storm water collection infrastructure, removal and construction of a retaining wall and replacement of a guardrail.	FY 2020
SW 6	Central Point / New Era	Changes in traffic control/intersection enhancements.	FY 2018
East 2	Orient / Compton	Convert to all-way stop control.	FY 2018
NW 2	Stafford Road from Boeckman to Rosemont	Implement RSA recommendations along corridor.	FY 2018
CRC 2	Linwood Avenue from Johnson Creek Boulevard to Monroe Street	Improve to minor arterial standards; add sidewalks, bicycle lanes and stormwater control.	FY 2021
SW 3	Canby Marquam Highway from 13th to Highway 211	Intersection improvements at Lone Elder, Macksburg and Gribble, and other corridor work.	FY 2018
NW 3	Canby Ferry	Extend fiber optic cable from the existing County fiber from Advance Road to Ferry signals, add up to two pan-tilt-zoom CCTV cameras to view the ferry and have images posted on the County's Travel Information website; upgrade ferry notification signs to display green "OPEN" and red "CLOSED" and enhance the bank on the north side roadway approach by removal of hazard trees and bank stabilization.	FY 2019
SW 5	Union Mills Road at Hwy 213	Intersection with Hwy 213—add turn lane for logging trucks.	FY 2019
CRC 11	HWY 224 @ Springwater—Temporary Signal	Install a temporary traffic signal at the intersection of Highway 224 and Springwater Road.	FY 2018
CRC 12	SE 242nd Ave and SE 222nd Dr RSA Implementation	Implement RSA recommendations.	FY 2018
CRC 13	242nd / Borges Realignment	Realign/regrade intersection of SE 242nd & SE Borges Road.	FY 2019
NW 1	Edminston Rd / Wilsonville Rd	Convert to all-way stop control.	FY 2018
SW 7	Beavercreek from OC Limits to Ferguson	Finish RSA implementation work, primarily shoulder work.	FY 2018
SW 9	Victory Blvd and Forsythe Rd	Intersection realignment.	FY 2018

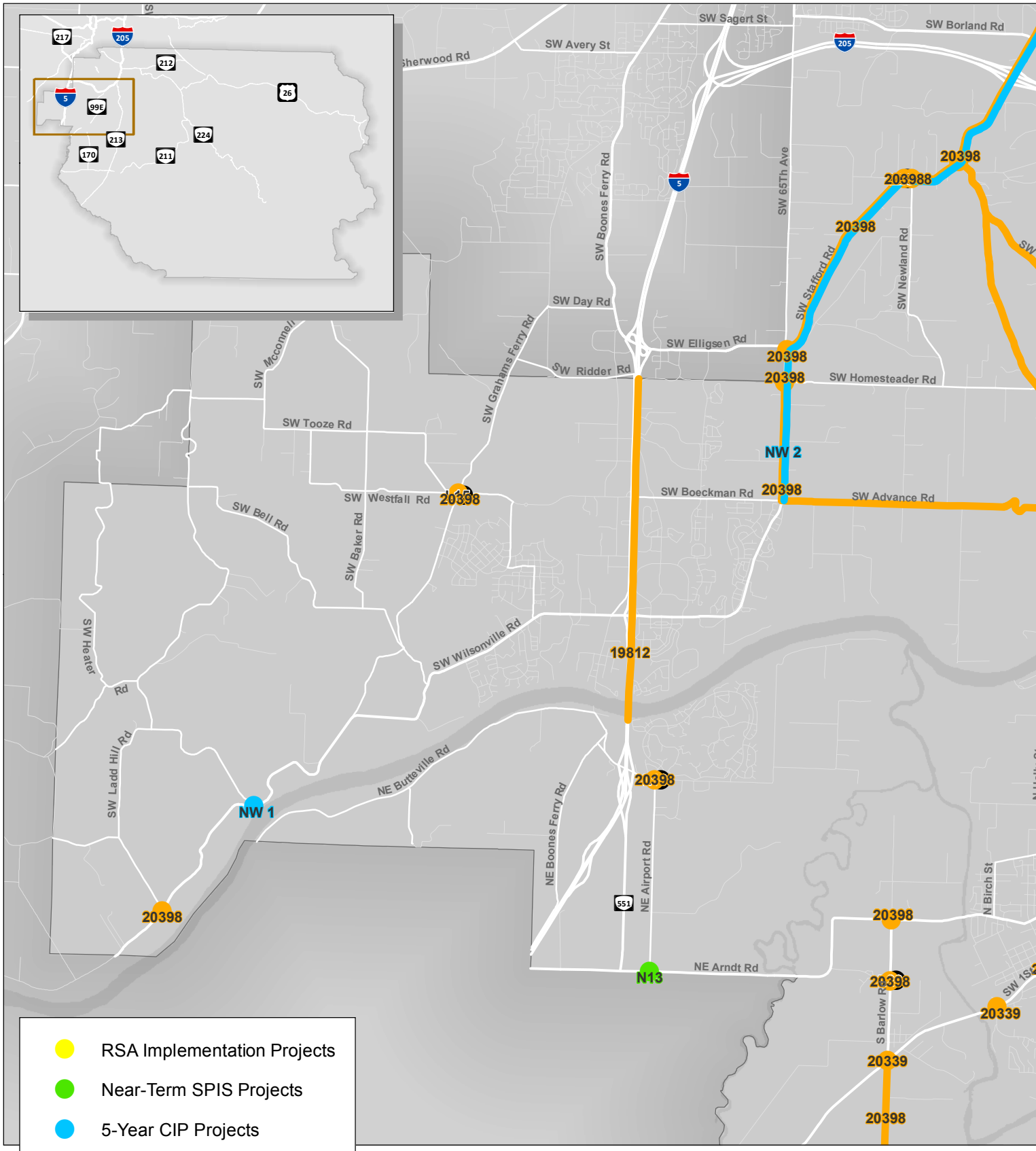
[1]For ease of reference project numbers from the original source are retained in this plan.





Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1A



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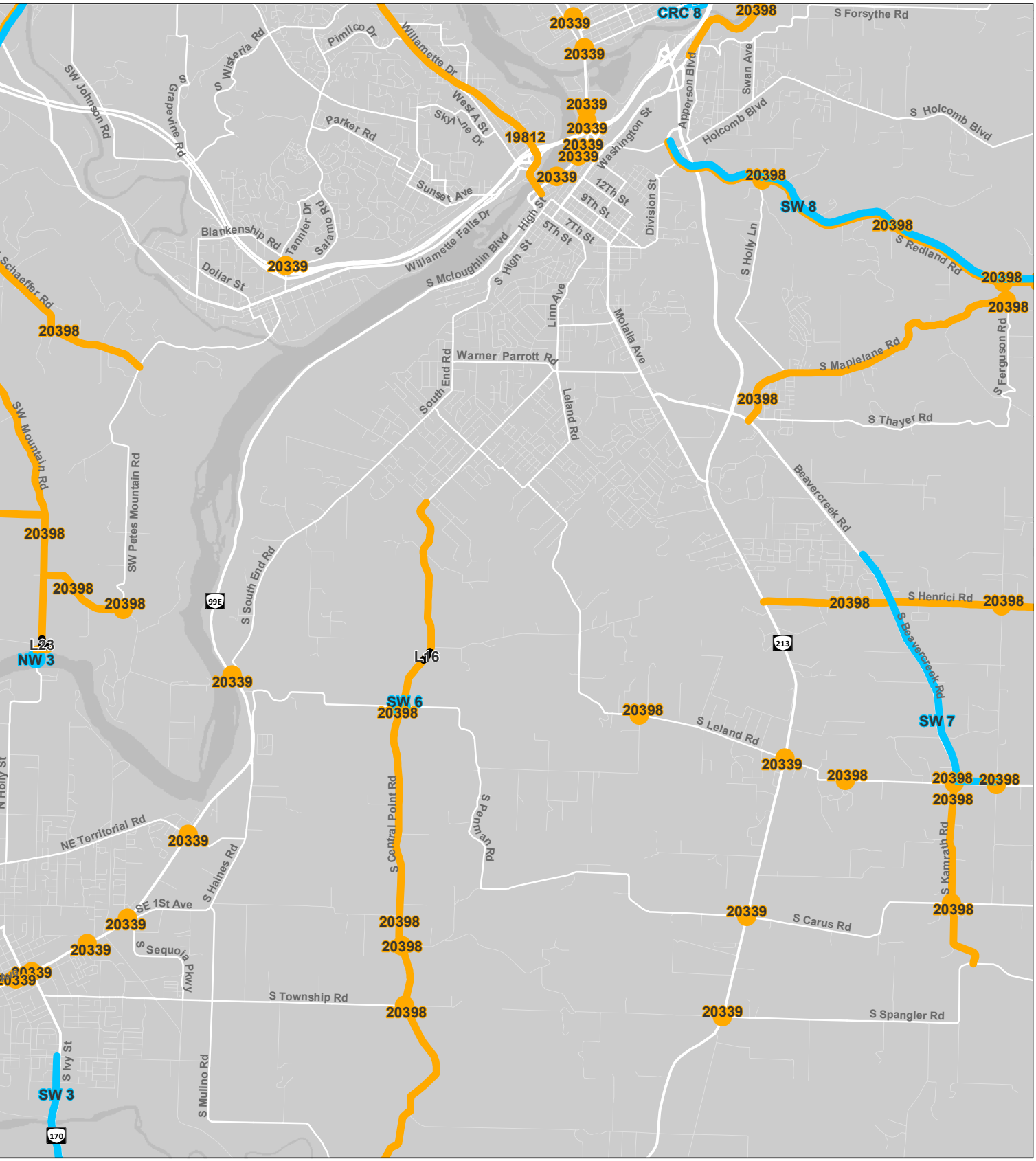
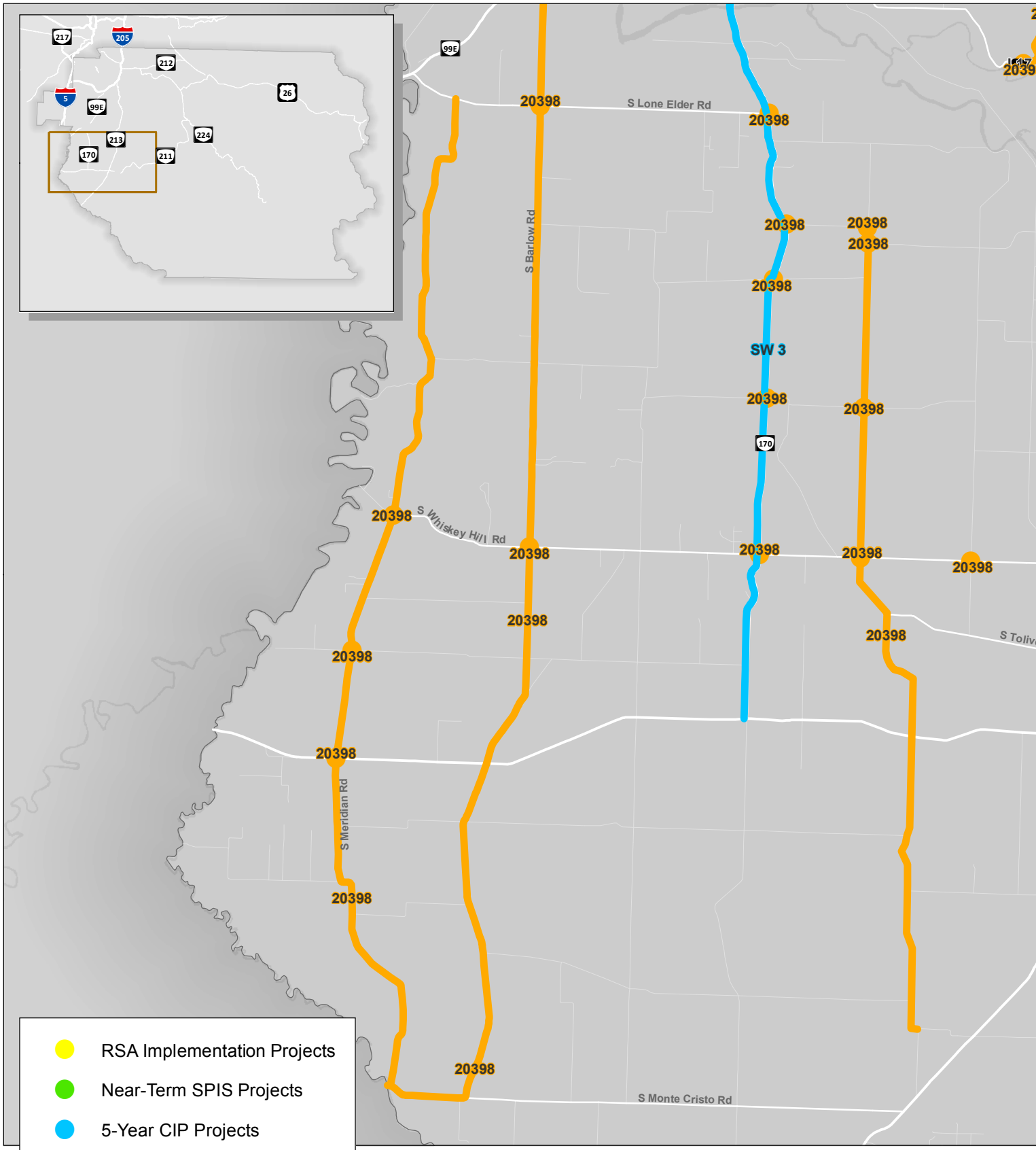


Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1B



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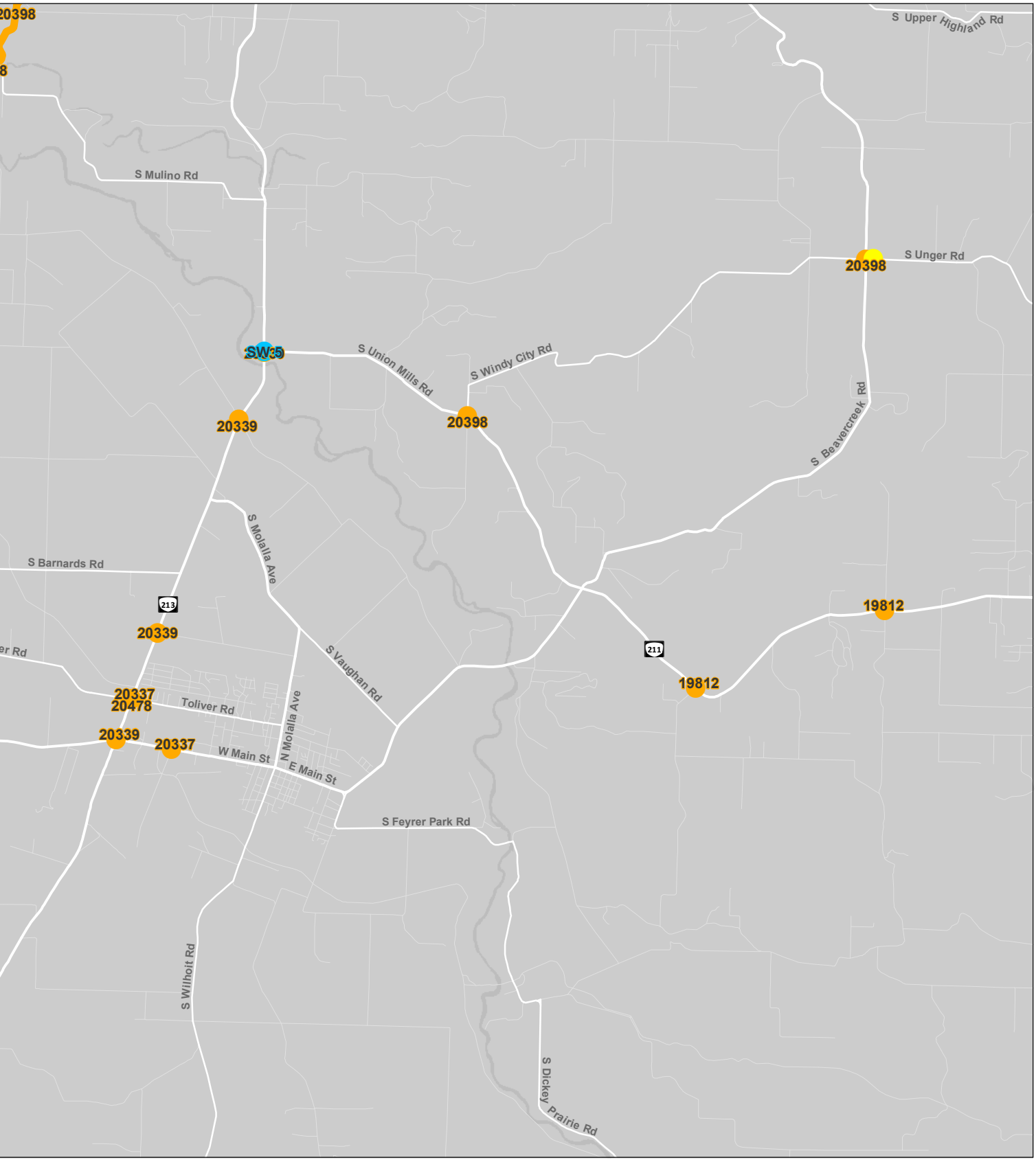
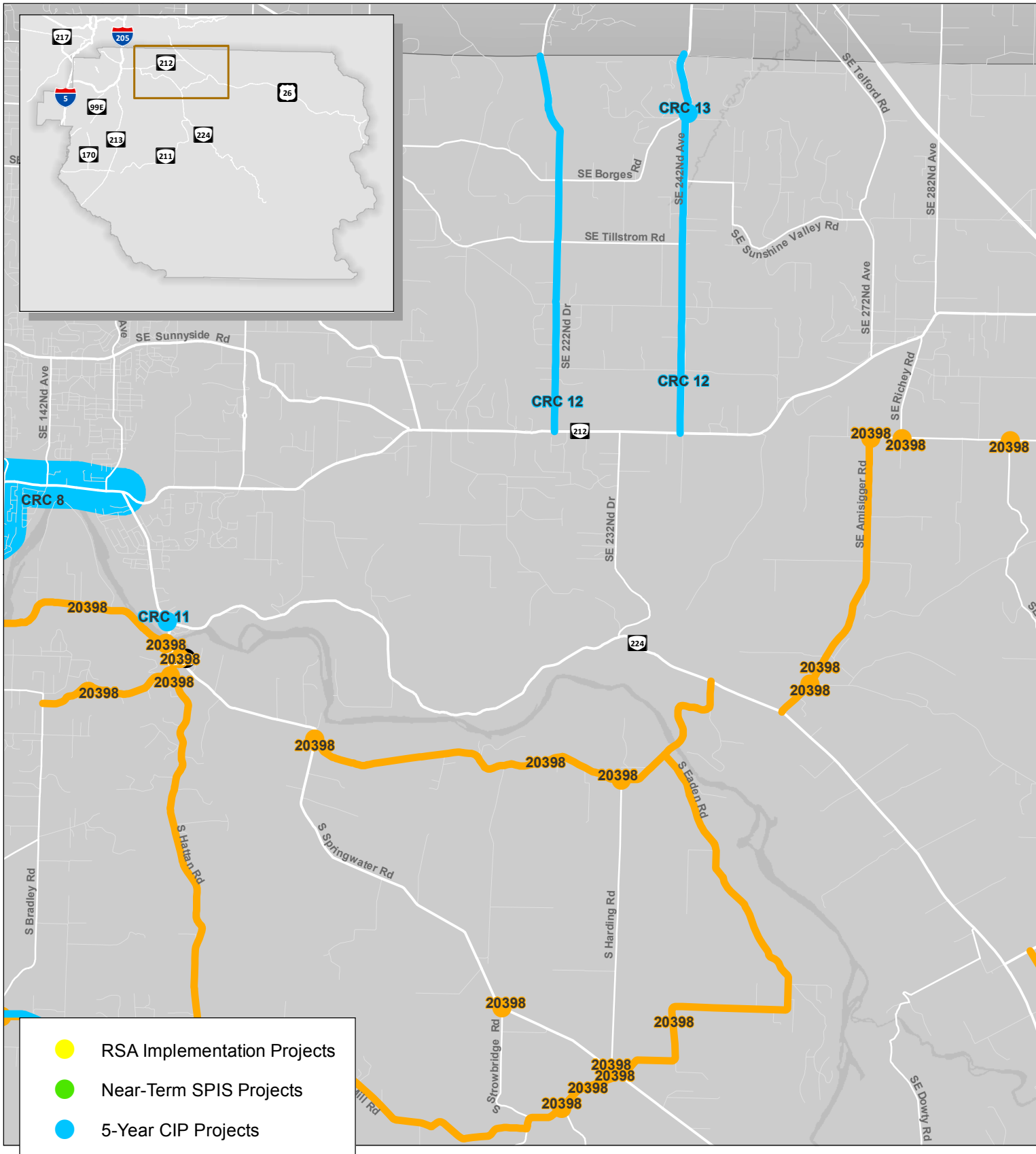


Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1C



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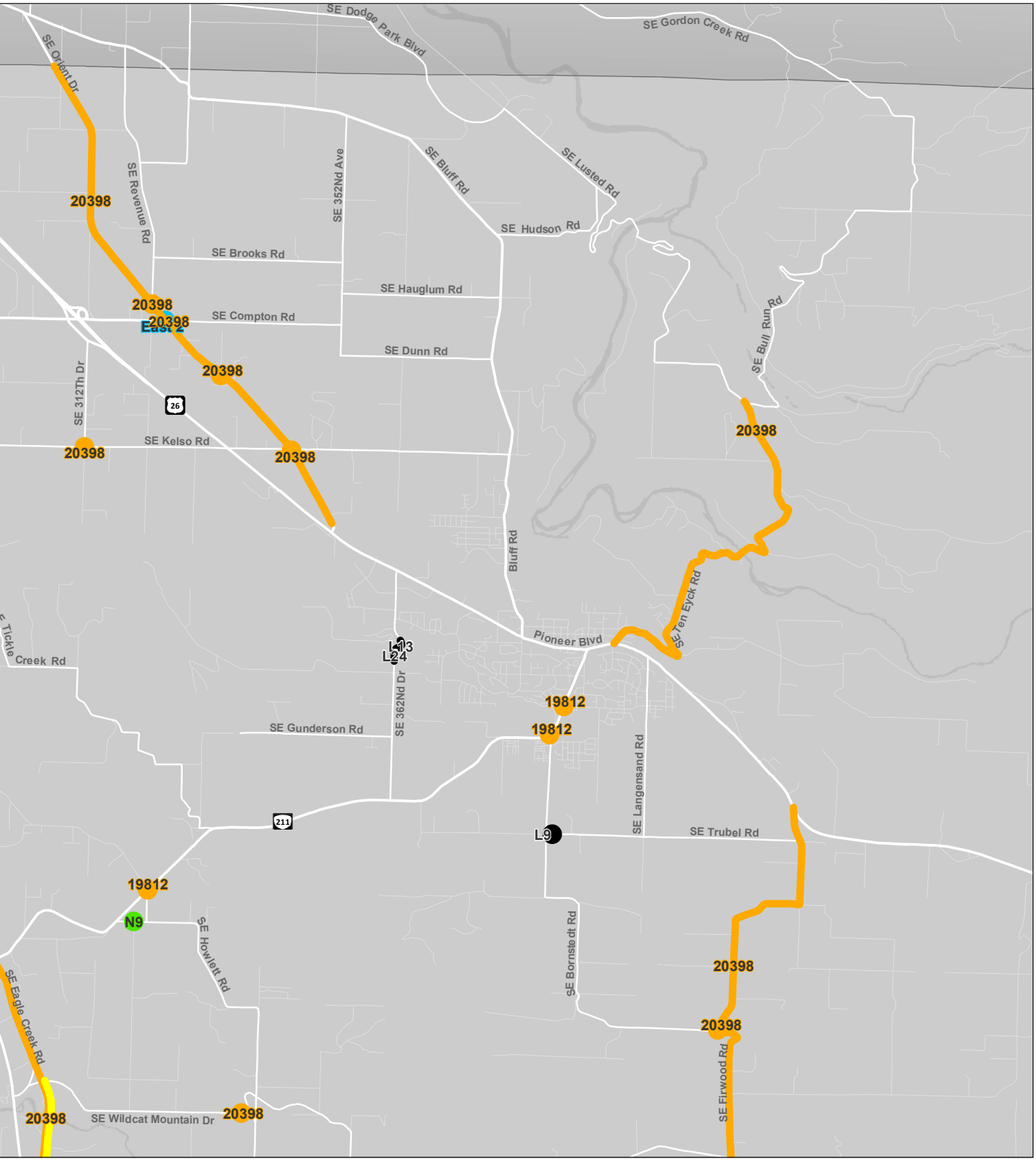
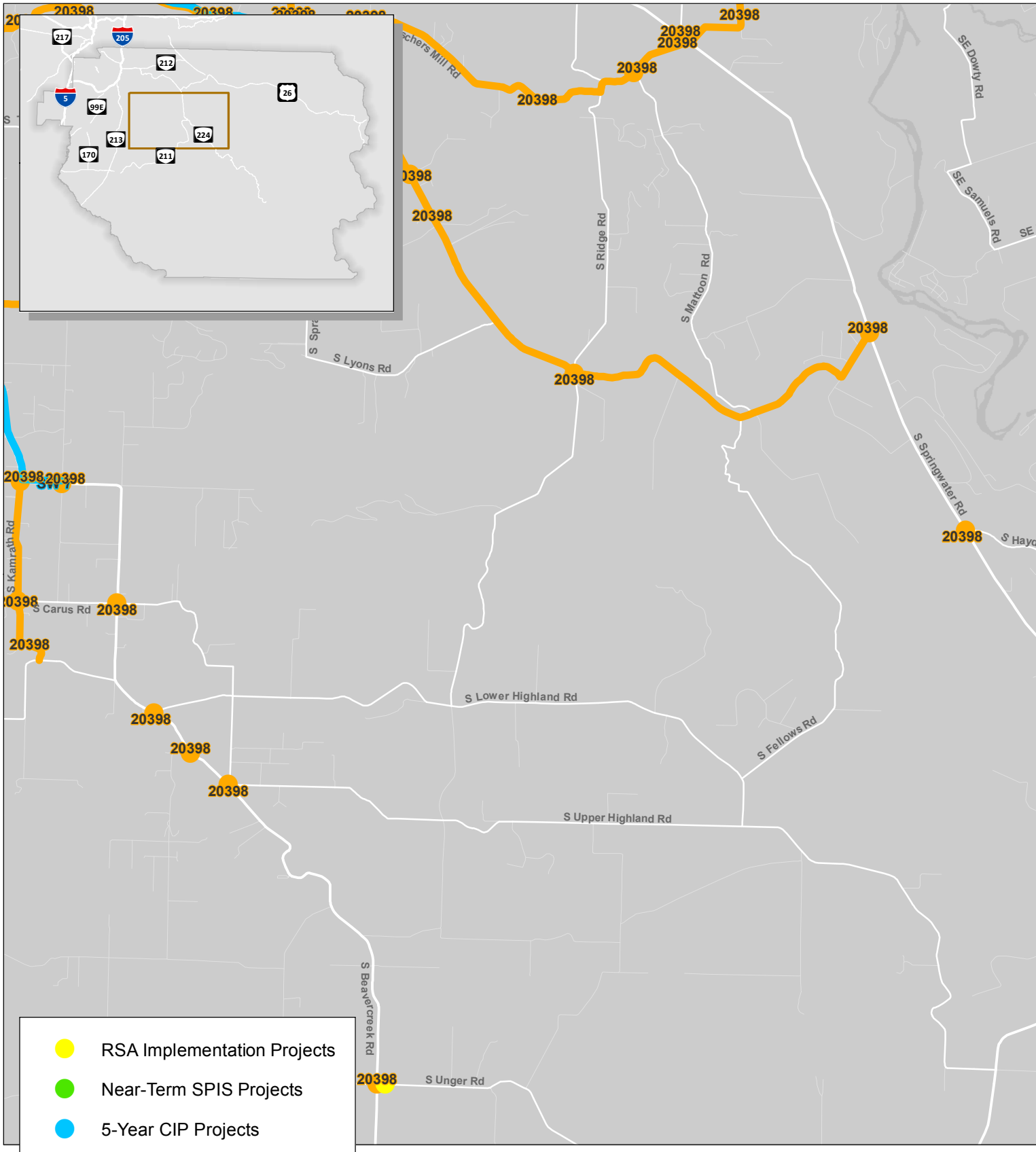


Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1D



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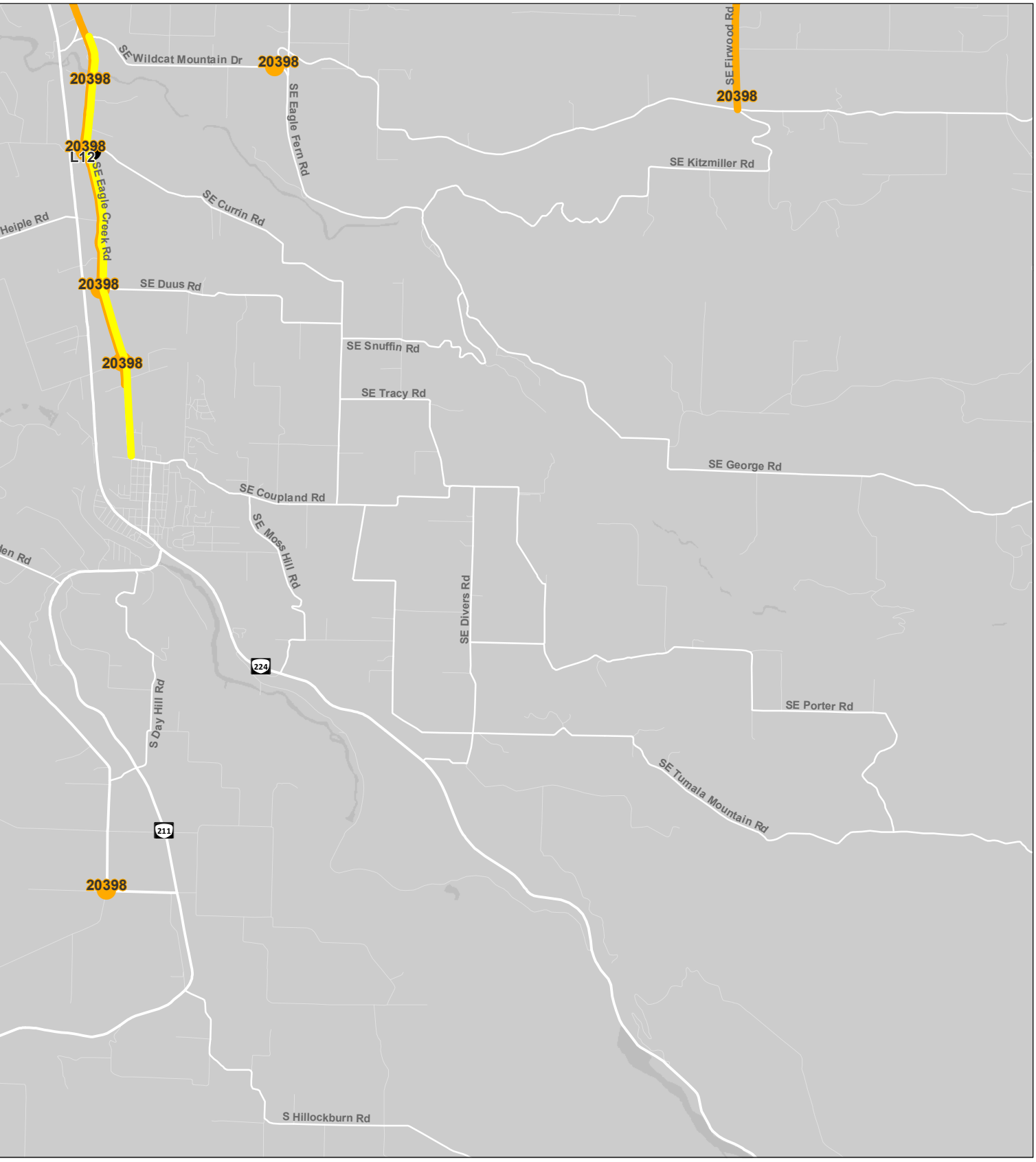
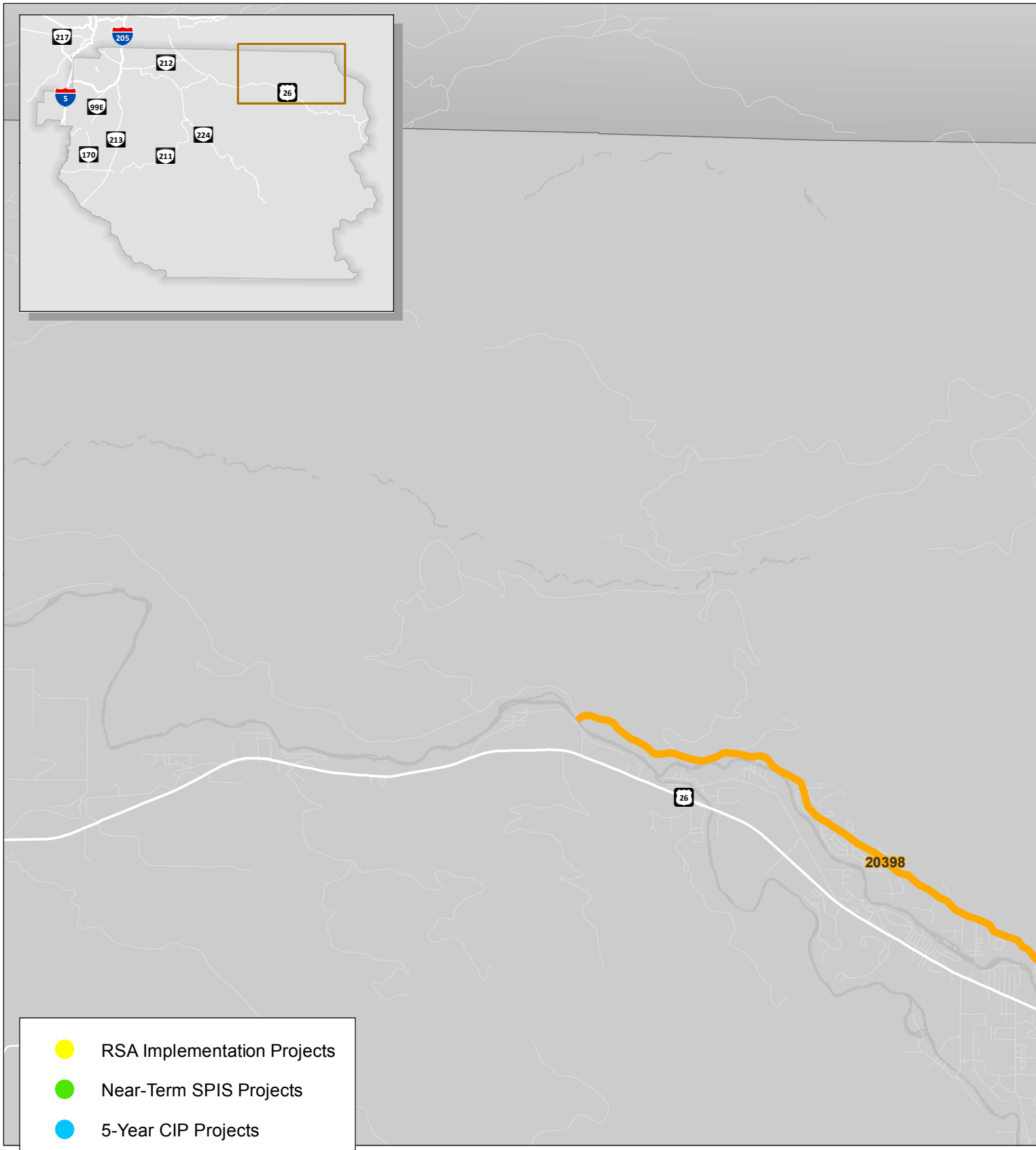


Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1E



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Programmed and Planned Safety Projects
Clackamas County, Oregon

Figure
B-1F

Projects to be Programmed

Table B-2 summarizes safety-focused projects that still need to be programmed for construction that are not already in the 20-Year CIP (i.e., projects identified at the Top 50 SPIS locations and projects identified by completed RSAs). These projects are shown in **Figure B-1.** The table also includes B/C ratios for potential near-term (i.e., low-cost) projects at the top 50 SPIS sites. Cost estimates are readily 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. The table also cross-references overlapping projects found in **Table B-1.**

Table B-2. Location-Specific Projects to be Programmed

Project Number	Location	Project Description	Other Projects at Location	B/C Ratio
Near-Term Projects at SPIS High-Crash Locations				
N1	Webster Road / Strawberry Lane	Advance intersection warning.	-	321.7
N2	King Road / 82nd Avenue	Protected left-turn phasing.	20335	131.9
N3	Fuller Road / Johnson Creek Boulevard	Install reflectorized backplates.	20336	118.8
N4	Sunnyside Road / 122nd Avenue	Install reflectorized backplates.	20336, CRC 10	48.6
N5	Sunnyside Road / 93rd Avenue	Install reflectorized backplates.	CRC 10	42.6
N6	Sunnyside Road / Stevens Road	Install reflectorized backplates.	CRC 7	36.7
N7	Sunnyside Road / 105th Avenue	Add reflectorized backplates.	-	32.8
N8	Sunnybrook Boulevard / Sunnyside Road	Install reflectorized backplates, advance intersection warning.	CRC 10	30.7
N9	Howlett Road / Van Curen Road	Advance intersection warning.	-	29.5
N10	92nd Avenue / Johnson Creek Boulevard	Install reflectorized backplates.	20336	24.0
N11	Johnson Creek Boulevard / Bell Avenue	Install reflectorized backplates, protected left-turn phasing, advance intersection warning.	-	16.3
N12	Johnson Creek Boulevard / Linwood Avenue	Protected left-turn phasing, advance intersection warning.	CRC 2	11.3
N13	Airport Road / Arndt Road	Install reflectorized backplates, protected left-turn phasing, advance intersection warning.	-	9.6
N14	Oatfield Road / Jennings Avenue	Protected left-turn phasing.	20336, M 3	2.0

Project Number	Location	Project Description	Other Projects at Location	B/C Ratio
Long-Term Projects at SPIS High-Crash Locations				
L1	Sunnyside Road / SE 101st Street	Install reflectorized backplates, add left-turn signal head.	CRC 10	TBD
L2	Webster Road / Lake Road	Install reflectorized backplates, protected left-turn phasing, left-turn lanes.	-	TBD
L3	Johnson Creek Boulevard / 80th Avenue	Study further to determine appropriate and feasible countermeasures.	-	TBD
L4	Sunnyside Road / Clackamas Town Center	Re-evaluate intersection after implementation of project.	CRC 10	TBD
L5	82nd Drive from OR 212 to Greenhouse Square Access	Study further to determine appropriate and feasible countermeasures, including potential access management measures.	CRC 8	TBD
L6	72nd Avenue / Luther Road	Study further to determine appropriate and feasible countermeasures.	-	TBD
L7	82nd Drive from OR 212 to SE Adams Street	Study further to determine appropriate and feasible countermeasures, including potential access management measures.	CRC 8	TBD
L8	Sunnyside Road from OR 213 to Discount Tires Access	Study further to determine appropriate and feasible countermeasures, including potential access management measures.	CRC 7	TBD
L9	Bornstedt Road / Trubel Road	Study further to determine effectiveness of recently implemented all-way stop control.	-	TBD
L10	Miley Road / Airport Road	Re-evaluate intersection after implementation of ARTS project and consider installing roundabout.	20398	TBD
L11	Bell Avenue / Overland Street	Re-evaluate intersection after implementation of curb widening and sidewalk implementation project.	-	TBD
L12	Eagle Creek Road / Currin Road	Re-evaluate intersection after implementation of ARTS project and consider installing roundabout.	20398	TBD
L13	362nd Drive from Skogan Road to 500 feet south of Skogan Road	Guardrail, rumble strips, and shoulder widening.	-	TBD
L14	Causey Avenue / 85th Avenue	Study further to determine appropriate and feasible countermeasures.	-	TBD
L15	Grahams Ferry Road / Tooze Road	Study further to determine effectiveness of recently implemented signal.	-	TBD
L16	Central Point Road from 200 feet south of S Criteser Road to 700 feet south of S Criteser Road	Re-evaluate segment after implementation of ARTS project, consider installing rumble strips and widening shoulder.	20398	TBD
L17	Mulino Road from Central Point Road to 500 feet west of Central Point Road	Shoulder widening.	-	TBD
L18	Risley Avenue / Oatfield Road	Left-turn lanes, signal.	-	TBD

Project Number	Location	Project Description	Other Projects at Location	B/C Ratio
L19	Park Avenue / Oatfield Road	Study further to determine effectiveness of recently implemented signal.	-	TBD
L20	Arndt Road / Barlow Road	Re-evaluate intersection after implementation of ARTS project and consider installing roundabout.	20398	TBD
L21	Childs Road / Stafford Road	Re-evaluate intersection after implementation of ARTS project and consider installing roundabout.	20398, NW 2	TBD
L22	Hattan Road / Springwater Road	Re-evaluate intersection after implementation of ARTS project and consider installing roundabout.	20398	TBD
L23	Mountain Road from 750 feet north of Willamette River to 1,250 feet north of Willamette River	Re-evaluate intersection after implementation of ARTS project and consider installing guardrail and widening shoulder.	20398	TBD
L24	362nd Drive from 500 feet south of Skogan Road to 1000 feet south of Skogan Road	Guardrail, rumble strips, and shoulder widening.	-	TBD
L25	Stafford Road / Schatz Road	Realign intersection.	20398, NW 2	TBD
RSA Implementation Projects				
RSA 1	Beavercreek/ Unger Intersection	Install intersection beacon or vehicle activated warning system.		TBD
RSA 2	Eagle Creek Road	Remove horizontal curve, relocate intersection, add paved shoulders and turn lanes at major intersection; investigate speed zone south of Currin Rd.	20398	TBD

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1000	County-wide	ITS Plan Program	N/A	Develop a program to support the implementation of the County's ITS Plan and support the County's efforts to make improvements to traffic operations based on the ITS Plan. Deploy traffic responsive signal timing, ramp metering, traffic management equipment for better routing of traffic during incidents along the three key ODOT corridors - I-205, I-5, 99E. Install signal controller upgrades and update County ITS plan.
1001	County-wide	Transportation Safety Action Plan Program	N/A	Develop a program to support the implementation of the County's TSAP and support the County's efforts to make improvements based on the outcomes of the road safety audits and other safety studies.
1002	5-11a	122nd Ave	Eagle Glen Dr to Hubbard Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1003	5-11a	122nd Ave	Sunnyside Rd to Hubbard Rd	Fill gaps in pedestrian facilities, turn lanes at Mather Rd
1004	5-11a	122nd Ave	Sunnyside Rd to Timber Valley Dr	Add bikeways and turn lanes at major intersections
1005	5-11a	132nd Ave	Sunnyside Rd to OR 212	Add bikeways, pedestrian facilities, traffic calming and turn lanes at major intersections
1006	5-11a	142nd Ave	Sunnyside Rd to OR 212	Add bikeways and pedestrian facilities
1007	5-11a	72nd Ave Multi-Use Path Connection	Thompson Rd to Harmony Rd	Construct multi-use path
1008	5-11a	82nd Dr	OR 212 to Lawnfield Rd	Fill in bikeways and pedestrian facilities gaps
1009	5-11a	85th Ave	Causey Ave to Monterey Ave	Add sidewalks and bikeways. Perform Pedestrian Safety Audit to verify lighting, crosswalk striping and signing at Causey Ave.
1010	5-11a	92nd Ave	Johnson Creek Blvd to Emmert View Ct	Fill gaps in pedestrian facilities
1011	5-11a	97th Ave / Mather Rd	Lawnfield Rd to Summers Ln	Add bikeways, pedestrian facilities and eastbound left turn lanes at Mather Rd / Summers Ln
1012	5-11a	Boyer Dr	OR 213 to Fuller Rd	Construct new 2 lane roadway with turn lanes at OR 213 and Fuller Rd, bikeways and pedestrian facilities; install flashing yellow arrow for left turns on northbound and southbound approaches at OR 213 intersection.
1013	5-11a	Boyer Dr / 85th Ave / Spencer Dr	OR 213 to I-205 bike path	Add bikeways
1014	5-11a	Causey Ave	Fuller Rd to I-205	Add bikeways and shared facility markings in accordance with the Active Transportation Plan.
1015	5-11a	Clackamas Industrial area multi-modal improvements	N/A	Complete bike and pedestrian connections within the Clackamas Industrial area on Jennifer St., Evelyn St., 106th Ave, 122nd Ave, 130th Ave and 135th Ave.
1016	5-11a	Clackamas Regional Center Bike/Pedestrian Corridors	N/A	Construct pedestrian and bike improvements as described in the Clackamas Regional Center Pedestrian / Bicycle Plan
1017	5-11a	Clackamas Town Center Alternative Performance Standards Study	Clackamas Regional Center	Develop alternative performance standards for the intersections within the Clackamas Regional Center.
1018	5-11a	Clackamas Town Center Circulation Plan	West of the Town Center	Study area circulation and create plan
1019	5-11a	Flavel Dr	Alberta Ave to County boundary	Add bikeways in accordance with the Active Transportation Plan.
1020	5-11a	Fuller Rd	Otty St to Johnson Creek Blvd	Add pedestrian facilities, turn lanes, on-street parking, central median and landscaping.
1021	5-11a	Fuller Rd / King Rd Improvements	Fuller Rd / King Rd intersection	Restrict access to right-in/right-out only

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1022	5-11a	Harmony Rd	OR 213 to OR 224	Construct bikeways and pedestrian facilities. Linwood Ave to Aquatic Center, construct in accordance with the Active Transportation Plan. Provide left turn movement for cyclists from Harmony Rd to CCC Harmony Campus and a pedestrian crossing.
1023	5-11a	Harmony Rd	Railroad Ave / Linwood Ave / Harmony Rd	Railroad crossing and intersection improvements based on further study of intersection operations including bikeways and pedestrian facilities to be undertake jointly by the City of Milwaukie and the County
1024	5-11a	Harmony Rd / Sunnyside Rd	Harmony Rd / Sunnyside Rd / OR 213 intersection	Extend queue storage and double left turn lanes on westbound approach and rebuild median, including pedestrian island; extend queue storage on eastbound approach and install median; convert to right-in-right-out accesses on frontage road.
1025	5-11a	I-205 Multi-Use Path Connection	Between Sunnyside Rd and Sunnybrook Blvd	Construct ADA compliant access to the commercial area from the I-205 Multi-Use Path
1026	5-11a	I-205 Multi-Use Path Gap	OR 224/OR 213 to OR 212	Study the I-205 multi-use path gap to create a plan for connection and path completion in accordance with the Active Transportation Plan
1027	5-11a	Johnson Creek Blvd	55th Ave to I-205	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1028	5-11a	Johnson Creek Blvd	Johnson Creek Blvd near 79th Pl	Add signal to either Johnson Creek Blvd and 79th Pl or 80th Ave
1029	5-11a	Johnson Creek Blvd	55th Ave to Bell Ave	Widen to 3 lanes with bikeways and pedestrian facilities
1030	5-11a	Johnson Creek Blvd	Johnson Creek Blvd / OR 213 intersection	Extend westbound left-turn lane and rebuild median; install dual northbound and southbound left-turn lanes
1031	5-11a	Johnson Creek Blvd	OR 213 to 92nd Ave	Add pedestrian facilities with a crossing near 77th Ct, restripe for bikeways. Analyze for turn lane improvements at 92nd Ave.
1032	5-11a	Johnson Rd	SE Lake Rd to North Clackamas Park Trail	Identify bike/pedestrian connections to fill gaps along 82nd Ave
1033	5-11a	Lake Rd	Lake Rd / International Way intersection	Add northbound right-turn lane
1034	5-11a	Linwood Ave	Monroe St to Johnson Creek Blvd	Add pedestrian facilities in accordance with the Active Transportation Plan.
1035	5-11a	Monroe St	72nd Ave to Fuller Rd	Add bikeways, pedestrian facilities and traffic calming in accordance with the Active Transportation Plan.
1036	5-11a	Monroe St / 72nd Ave / Thompson Rd / Fuller Rd	Linwood Ave to Causey Ave	Add bikeways and traffic calming in accordance with the Active Transportation Plan.
1037	5-11a	Monterey Ave	Stevens Rd to Bob Schumacher Rd	Construct collector roadway with bikeways and pedestrian facilities
1038	5-11a	Monterey Ave	OR 213 to Fuller Rd	Construct new 2 lane extension with pedestrian facilities and bikeways. Install flashing yellow arrow for left-turns on northbound and southbound approaches at OR 213 intersection.
1039	5-11a	North Clackamas Regional Park Trail	Linwood Ave to North Clackamas Park Complex	Construct multi-use path
1040	5-11a	North Clackamas Regional Parks Trail	OR 213 to Linwood Ave	Construct multi-use path
1041	5-11a	Otty Rd	OR 213 to 92nd Ave	Improve to minor arterial standard consistent with Fuller Road Station Plan; improve curb radius; add turn lanes, on-street parking, central median, landscaping, bikeways and pedestrian facilities. Install pedestrian crossings between Fuller Rd and I-205 and near 91st Ave.
1042	5-11a	Otty St	Otty St / OR 213 / Otty Rd	Realign Otty St with Otty Rd at OR 213; install dual westbound left-turn lanes; install flashing yellow arrow for left-turns on northbound and southbound approaches.
1043	5-11a	Southwest Connector Multi-Use Path	North Clackamas Aquatic Center access road to 82nd Ave	Construct multi-use path in accordance with the Active Transportation Plan.

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1044	5-11a	Springwater Rd	OR 224 to Hattan Rd	Widen to 3 lanes with shoulders (in accordance with the Active Transportation Plan between Clackamas River Dr and Gronlund Rd) and pedestrian facilities; bridge remains two lanes
1045	5-11a	Sunnyside Rd	93rd Ave to 126th Ave	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1046	5-11a	Sunnyside Rd	Sunnyside Rd / Stevens Rd intersection	Intersection improvements, such as additional turn lanes, turn lane extensions, and/or signal timing modifications
1047	5-11a	Tolbert St Overcrossing	82nd Dr to Industrial Way	Construct new 2 lane overcrossing with bikeways and pedestrian facilities
1048	5-11b	282nd Ave	US 26 to OR 212	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1049	5-11b	Amisigger Rd / Kelso Rd	OR 224 to Kelso / Richey Rd	Add paved shoulders; turn lanes at Amisigger/OR 212 and Kelso/Richey; smooth curves.
1050	5-11b	Arrah Wanna Blvd	US 26 to Fairway Ave	Add paved shoulders. In the interim, add 4-foot paved shoulders.
1051	5-11b	Cazadero Multi-Use Trail	Community of Boring to City of Estacada	Construct multi-use path in accordance with the Active Transportation Plan.
1052	5-11b	Compton Rd	US 26 to 352nd Ave	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1053	5-11b	Dodge Park Rd Bridge	~192 feet south of Pipeline Rd	Replace bridge nearing the end of its useful life and include paved shoulders
1054	5-11b	Eagle Creek Rd	Firwood Rd to Duus Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1055	5-11b	Eagle Creek Rd	Currin Rd to Duus Rd	Remove horizontal curve, relocate intersection, add paved shoulders and turn lanes at major intersection; investigate speed zone south of Currin Rd
1056	5-11b	Fairway Ave	Arrah Wanna Blvd to Salmon River Rd	Add paved shoulders
1057	5-11b	OR 211	OR 211 / Judd Rd intersection	Realign roadway
1058	5-11b	Richey Rd	Kelso Rd to OR 212	Add paved shoulders and left turn lane at Richey Rd and OR 212
1059	5-11b	Welches Rd	US 26 to Birdie Ln	Add paved shoulders; add pedestrian facilities in Welches rural center; evaluate pedestrian crossing near Stage Stop Rd; add multi-use path. Improve pedestrian crossing near Fairway Ave with advance signs and split flashing beacons
1060	5-11c	Aldercrest Dr	Thiessen Rd to Oatfield Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1061	5-11c	Concord Rd	River Rd to Oatfield Rd	Fill gaps in pedestrian facilities
1062	5-11c	Concord Rd	River Rd to Oatfield Rd	Add turn lanes at major intersections
1063	5-11c	Courtney Ave	OR 99E to Oatfield Rd	Fill gaps in pedestrian facilities and bikeways
1064	5-11c	Courtney Ave	River Rd to OR 99E (McLoughlin Blvd)	Construct pedestrian facilities / complete gaps on the south side; add bikeways
1065	5-11c	Harold Ave	Concord Rd to Roethe Rd	Add pedestrian facilities and traffic calming
1066	5-11c	Hull Ave	Wilmot St to Tims View Ave	Fill gaps in pedestrian facilities
1067	5-11c	Jennings Ave	Webster Rd to OR 99E	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1068	5-11c	Jennings Ave	River Rd to Oatfield Rd	Widen to 2-lane urban minor arterial standard with bikeway and pedestrian facilities infill
1069	5-11c	Oak Grove Blvd	Oatfield Rd to River Rd	Fill gaps in pedestrian facilities and bikeways
1070	5-11c	Oatfield Rd	Jennings Ave to Lake Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1071	5-11c	Oatfield Rd	Oatfield Rd / Park Rd intersection	Install traffic signal and add turn lanes

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1072	5-11c	Oatfield Rd	Oatfield Rd / McNary Rd intersection	Add southbound and eastbound left-turn lanes
1073	5-11c	Park Ave	River Rd to OR 99E (McLoughlin Blvd)	Add pedestrian facilities
1074	5-11c	River Rd	Lark St to Courtney Ave	Add pedestrian facilities
1075	5-11c	River Rd	Oak Grove Blvd to Risley Ave	Fill gaps in bikeways in accordance with the Active Transportation Plan and fill gaps in pedestrian facilities
1076	5-11c	School Pedways	Johnson Rd / Clackamas Rd / Webster Rd	Fill gaps in pedestrian facilities on Johnson Rd, Clackamas Rd and Webster Rd within 1/4 mile of schools
1077	5-11c	Thiessen Rd	Thiessen Rd / Aldercrest Rd intersection	Add turn lanes on Thiessen Rd; consider converting to two-way stop controlled
1078	5-11c	Torbank Rd	River Rd to Trolley Trail	Fill gaps in pedestrian facilities
1079	5-11d	65th Ave	65th Ave / Elligsen Rd / Stafford Rd intersection	Construct roundabout
1080	5-11d	Advance Rd	53rd Ave to 43rd Dr	Grade and sight distance improvements
1081	5-11d	Borland Rd	Tualatin city limits to Stafford Rd	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections
1082	5-11d	Borland Rd	Stafford Rd to West Linn city limits	Add paved shoulders in accordance with the Active Transportation Plan
1083	5-11d	Carman Dr	Lake Oswego city limits to Roosevelt Ave	Add bikeways and pedestrian facilities; analyze for turn lanes
1084	5-11d	Childs Rd	Sycamore Ave to 65th Ave	Transfer roadway to local jurisdiction
1085	5-11d	French Prairie Bridge	Willamette River near I-5	Construct a bridge in accordance with the Active Transportation Plan
1086	5-11d	Rosemont Rd	Stafford Rd to West Linn	Add paved shoulders and turn lanes at major intersections
1087	5-11d	Stafford Rd	I-205 to Boeckman Rd / Advance Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1088	5-11d	Stafford Rd	Rosemont Rd to I-205	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections
1089	5-11d	Stafford Rd	Stafford Rd / Childs Rd intersection	Install traffic signal and southbound and northbound turn lanes or roundabout
1090	5-11d	Stafford Rd	Rosemont Rd to I-205	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1091	5-11d	Tonquin Trail	Willamette River through Wilsonville	Construct bike / pedestrian facilities pursuant to the Tonquin Trail Master Plan
1092	5-11d	Wilsonville Rd / Ladd Hill Rd	Wilsonville Rd / Ladd Hill Rd	Install Collision Countermeasure System
1093	5-11e	Airport Rd	Airport Rd / Miley Rd intersection	Install traffic signal
1094	5-11e	Barlow Rd	Barlow Rd / OR 99E intersection	Add dual left-turn lanes on southbound Barlow Rd
1095	5-11e	Beavercreek Rd	Lower Highland Rd to Butte Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1096	5-11e	Beavercreek Rd	Ferguson Rd to Spangler Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1097	5-11e	Beavercreek Rd	Henrici Rd to Yeoman Rd/Steiner Rd	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections.
1098	5-11e	Beavercreek Rd	Beavercreek Rd / Leland Rd / Kamrath Rd intersection	Construct roundabout with additional analysis

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1099	5-11e	Canby-Marquam Highway	Canby-Marquam Hwy / Lone Elder Rd intersection	Reconstruct intersection; install northbound left-turn lane and southbound right-turn lane
1100	5-11e	Canby-Marquam Highway	~1,900 ft south of Barnards Rd	Replace bridge nearing the end of its useful life with 2-lane structure including paved shoulders
1101	5-11e	Clarkes Four Corners Intersection	Beavercreek Rd / Unger Rd	Reconstruct intersection
1102	5-11e	Emerald Necklace Trail	To Canby Ferry	Extend Molalla Forest Rd to Locust St in accordance with the Active Transportation Plan.
1103	5-11e	Ferguson Multi-Use Path	Thayer Rd to Ferguson Rd	Multi-use path to connect Ferguson Rd to Thayer Rd
1104	5-11e	Fischers Mill Rd	Fischers Mill / Hattan Rd intersection	Install eastbound left-turn lane
1105	5-11e	Graves Rd/Passmore Rd/Mulino Rd/ OR 213	Graves Rd/Passmore Rd/Mulino Rd/ OR 213	Work in conjunction with the Molalla River School District, ODOT and community stake-holders to complete a safety audit to look at all options for the safe movement of Mulino Elementary School students in relation to the adjacent transportation system. Utilize the results from the audit to develop a list of projects and/or programs to maximize safety for all users.
1106	5-11e	Greater Arndt Rd/I-5/Canby Access Feasibility Study	Southwest County in the vicinity of Arndt Rd/I-5/Canby	Conduct an alternatives analysis and land use study to identify and consider roadway improvements to address access to I-5 within the Southwest County and address capacity deficiencies.
1107	5-11e	Hattan Rd	Hattan Rd / Gronlund Rd intersection	Install southbound right-turn lane
1108	5-11e	Henrici Rd	Beavercreek Rd to Ferguson Rd	Add paved shoulders and turn lanes at major intersections. Remove horizontal and vertical curves
1109	5-11e	Holly St	Territorial Rd to Canby Ferry	Add paved shoulders in accordance with the Active Transportation Plan.
1110	5-11e	Hult Rd	OR 211 to Unger Rd	Re-open and improve Hult Rd
1111	5-11e	Klang's Mill Bridge	~1,000 ft north of OR 211	Replace bridge nearing the end of its useful life
1112	5-11e	Lone Elder Rd Bridge	~5,800 feet east of Barlow Rd	Replace bridge (nearing the end of its useful life) and include paved shoulders
1113	5-11e	Maplelane Rd	Beavercreek Rd to Ferguson Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1114	5-11e	Meridian Rd	Meridian Rd / Whiskey Hill Rd intersection	Limit access/egress points to and from school on NE corner of intersection
1115	5-11e	Molalla Ave Flooding	Just south of city of Molalla	Construct bridge to resolve flooding issues
1116	5-11e	Mulino Rd	Mulino Rd / 13th Ave	Relocate intersection to south away from railroad trestle
1117	5-11e	OR 170	OR 99E to Macksburg Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1118	5-11e	Redland Rd	OR 213 to Hattan Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1119	5-11e	Redland Rd	Redland Rd / Springwater Rd intersection	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1120	5-11e	Redland Rd	Redland Rd / Holly Rd intersection	Install traffic signal and westbound and northbound left-turn lanes or roundabout
1121	5-11e	Redland Rd	Redland Rd / Ferguson Rd intersection	Construct roundabout
1122	5-11e	Ridge Rd	~1 miles north of Lower Highland Rd	Fix sinkhole
1123	5-11e	Springwater Rd	Springwater Rd / Clackamas River Dr intersection	Install signal at Clackamas River Dr

Table 5-3a 20-Year Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
1124	5-11e	Springwater Rd	400 ft east of Hattan Rd	Construct bridge to accommodate paved shoulders
1125	5-11e	Springwater Rd	Hattan Rd to Bakers Ferry Rd	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections
1126	5-11e	Township Rd	Central Point Rd to Canby City limit	Add paved shoulders and turn lanes at major intersections
1127	5-11e	Union Mills Rd	OR 213 to OR 211	Add turn lanes at major intersections
1128	5-11e	Union Mills Rd	OR 213 to OR 211	Construct a shoulder on the south side of the roadway
1129	5-11e	Upper Highland Rd	Beavercreek Rd to Lower Highland Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements
1130	5-11c	Oetkin Rd - Naef Rd	Thiessen Rd to River Rd	Construct bike boulevard consistent with the Active Transportation Plan
1131	5-11c	River Rd	Park Ave to Glen Echo Ave	Construct buffered bike lane in accordance with the Active Transportation Plan.
1132	5-11a	Bob Schumacher Rd	Otty Rd to Sunnyside Rd	Investigate improved striping including centerline rumble stripe.
1133	5-11a	97th Ave	Sunnybrook Blvd to Mather Rd	Investigate improved striping including outside fog lines and rumble striping. Verify lighting, drainage and surface friction.
1134	5-11a	92nd Ave	Phillips Pl	Install a pedestrian crossing near Phillips Pl
1135	5-11a	Otty St	80th Ave	Install a pedestrian crossing near 80th Ave
1136	5-11a	Fuller Rd	Boyer Dr to Sunnyside Dr	Install pedestrian crossings near Boyer Dr, Causey Ave, Stephanie Ct and Southgate St
1137	5-11b	Brightwood Loop Rd	US 26 to US 26	Add 4-foot paved shoulders

Table 5-3b Preferred Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
2000	5-11a	Bell Ave / Alberta St / 72nd Ave	King Rd to County line	Add bikeways and pedestrian facilities
2001	5-11a	Clatsop St / Luther Rd	72nd Ave to Fuller Rd	Add turn lanes and signals at OR 213 intersection; add bikeways, pedestrian facilities and traffic calming
2002	5-11a	Evelyn St	OR 224 to Jennifer St	Add bikeways and pedestrian facilities
2003	5-11a	Evelyn St / Mangan Dr	Jennifer St to Water Ave	Add bikeways
2004	5-11a	Hubbard Rd	122nd Ave to 132nd Ave	Fill gaps in pedestrian facilities
2005	5-11a	Jennifer St	82nd Dr to 135th Ave	Add pedestrian facilities
2006	5-11a	Lake Rd	Milwaukie City limits east to OR 224	Fill gaps in pedestrian facilities
2007	5-11a	Linwood Ave	Linwood Ave / Monroe St intersection	Add curbs/sidewalks, improve horizontal alignments
2008	5-11a	Linwood Ave	Queen Rd to Johnson Creek Blvd	Add bikeways in accordance with the Active Transportation Plan
2009	5-11a	Mather Rd	Summers Ln Rd to 122nd Ave	Add bikeways, pedestrian facilities and eastbound left turn lanes at Mather Rd / 122nd Ave
2010	5-11a	Monroe St / 72nd Ave / Thompson Rd	Linwood Ave to Fuller Rd	Add pedestrian facilities
2011	5-11a	Scouters Mountain / Mt Scott Loop Trail	Loop trail through Happy Valley, Damascus, Clackamas County and Portland	Construct multi-use path in accordance with the Active Transportation Plan
2012	5-11a	Stevens Rd / Stevens Way	Causey Ave to Idleman Rd	Add pedways and optional traffic calming
2013	5-11a	Strawberry Ln	Strawberry Ln / 82nd Dr intersection	Install traffic signal and eastbound turn lane
2014	5-11a	Sunnybrook Blvd	Sunnybrook Blvd / 82nd Ave intersection	Add dual southbound left-turn lanes, extend queue storage for southbound lefts and westbound lefts
2015	5-11a	Sunnyside Rd	OR 213 to 97th Ave	Modified boulevard treatment including lane redesign, medians, beautification, curb extensions, reconstructed sidewalks, landscaping, south side bikeways. Consider flashing yellow arrow for left-turns at signalized intersections.
2016	5-11b	282nd Ave	282nd / Haley Rd intersection	Install traffic signal and reduce speed limit on 282nd
2017	5-11b	362nd Ave	Skogan Rd to OR 211	Add paved shoulders
2018	5-11b	Eagle Creek Rd	OR 211 to Duus Rd	Add paved shoulders
2019	5-11b	Firwood Rd	Wildcat Mountain Dr to US 26	Add paved shoulders and turn lanes at major intersections.
2020	5-11c	Clackamas Rd	Johnson Rd and Webster Rd	Fill gaps in bikeways and pedestrian facilities
2021	5-11c	Jennings Ave	Oatfield Rd to Webster Rd	Widen to 2-lane urban minor arterial standard with bikeway and pedestrian facilities infill
2022	5-11c	Lake Oswego to Milwaukie Bridge	Between Sellwood and Oregon City	Construct bike/pedestrian crossing over the Willamette River in accordance with the Active Transportation Plan
2023	5-11c	Roots Rd	Webster Rd to McKinley Rd	Add pedestrian facilities

Table 5-3b Preferred Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
2024	5-11c	Thiessen Rd	Oatfield Rd to Webster Rd	Add bikeways and pedestrian facilities. For the Oetkin Rd to Webster Rd section, construct in accordance with the Active Transportation Plan
2025	5-11c	Webster Rd	OR 224 to Gladstone	Fill gaps in bikeways and pedestrian facilities
2026	5-11d	Advance Rd	~2,900 ft west of Mountain Rd	Realign roadway and grade improvements
2027	5-11d	Advance Rd	65th Ave to Mountain Rd	Add paved shoulders
2028	5-11d	Stafford Rd / 65th Ave	I-205 to Boeckman Rd / Advance Rd	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections
2029	5-11e	Arndt Rd Extension	Barlow to OR 99E	Construct new 2 or 3 lane roadway
2030	5-11e	Barlow Rd	Knights Bridge Rd to OR 99E	Add paved shoulders
2031	5-11e	Beavercreek Multi-Use Path	Loder Rd to Ferguson Rd	Construct multi-use path consistent with the Beavercreek Road Concept Plan
2032	5-11e	Boones Ferry Rd	Boones Ferry Rd / Butteville Rd intersection	Remove bank, remove/decrease horizontal curve
2034	5-11e	Dryland Rd	Macksburg Rd S to Macksburg Rd N	Realign to form one intersection at Dryland Rd
2035	5-11e	Hattan Rd	Fischers Mill Rd to Gronlund Rd	Add paved shoulders and turn lanes at major intersections
2036	5-11e	Henrici Rd	OR 213 to Beavercreek Rd	Add paved shoulders and turn lanes at major intersections
2037	5-11e	Henrici Rd	Ferguson Rd to Redland Rd	Add paved shoulders and turn lanes at major intersections. Remove horizontal and vertical curves
2038	5-11e	Molalla Forest Rd	City of Canby to City of Molalla	Pave to provide bicycle access in accordance with the Active Transportation Plan
2039	5-11e	Mulino Rd (13th St segment)	Canby city limits to OR 213	Add paved shoulders and turn lanes at major intersections
2040	5-11e	Newell Creek Trail / Oregon City Loop Trail	Loop around the perimeter of Oregon City	Construct Oregon City Loop Trail and Newell Creek Trail in accordance with the Active Transportation Plan
2041	5-11e	Redland Rd	Redland Rd / Bradley Rd intersection	Install eastbound left-turn lane
2042	5-11e	Redland Rd	Redland Rd / Fischers Mill Rd / Henrici Rd intersection	Install eastbound left-turn, eastbound right-turn and westbound right-turn lanes at Henrici Rd
2043	5-11e	Springwater Rd	Springwater Rd / Bakers Ferry Rd intersection	Install southbound left-turn lane; realign intersection to fix skew
2044	5-11b	Sleepy Hollow Rd	Barlow Trail Rd to US 26	Add 4-foot paved shoulders

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3000	5-11a	106th Ave	OR 212 to Jennifer St	Add bikeways and pedestrian facilities
3001	5-11a	152nd Ave Phase 2	Sunnyside Rd to OR 212	Add bikeways, pedestrian facilities and turn lanes at major intersections
3002	5-11a	162nd Ave	Sager Rd north to County line	Add bikeways, pedestrian facilities, turn lanes at major intersections
3003	5-11a	172nd Ave Bridge	~140 feet south of Troge Rd	Replace bridge nearing the end of its useful life
3004	5-11a	82nd Dr	OR 212 to Gladstone	Widen to 5 lane with bikeways and pedestrian facilities
3005	5-11a	84th Ave	Sunnyside Rd to Sunnybrook Blvd	Fill in bikeways and pedestrian facilities gaps
3006	5-11a	93rd Ave	Sunnyside Rd to Sunnybrook Blvd	Add bikeways in accordance with the Active Transportation Plan
3007	5-11a	Cheldelin Rd	Foster Rd to 190th Dr	Add bikeways and pedestrian facilities
3008	5-11a	Cheldelin Rd (Clatsop St extension)	172nd Ave to Foster Rd	Construct new two lane roadway with bikeways and pedestrian facilities
3009	5-11a	Cornwell Ave	OR 213 to Fuller Rd	Add pedestrian facilities; connect to I-205 Multi-Use Path
3010	5-11a	Fuller Rd	Otty Rd to King Rd / OR 213	Construct new 2 lane extension with pedestrian facilities and bikeways
3011	5-11a	Fuller Rd	Johnson Creek Blvd to County line	Add pedestrian facilities
3012	5-11a	Hillcrest St	92nd Ave to Stevens Rd	Add pedestrian facilities
3013	5-11a	I-205 Pedestrian / Bike Overpass	Between Causey Ave and Sunnyside Rd	Construct a bike / pedestrian crossing over I-205 to connect transit services, businesses and residents in accordance with the Active Transportation Plan
3014	5-11a	Idleman Rd	92nd Ave to Westview Ct	Fill gaps in bikeways and pedestrian facilities
3015	5-11a	Jennifer St	106th Ave to 130th Ave	Add bikeways
3016	5-11a	Johnson Creek Blvd	Bell Ave to OR 213	Widen to 3 lanes from Bell Ave to 76th Ave and 5 lanes from 76th Ave to 82nd Ave ; add bikeways and pedestrian facilities
3017	5-11a	King Rd	Milwaukie City Limits to Spencer Dr	Fill gaps in pedestrian facilities in accordance with the Active Transportation Plan
3018	5-11a	Lake Rd	OR 224 west to Milwaukie city limits	Add pedestrian facilities and turn lanes at major intersections
3019	5-11a	Lake Rd	Johnson Rd to Webster Rd	Fill gaps in pedestrian facilities and bikeways
3020	5-11a	Linwood Ave Bridge over Johnson Creek	Bridge	Construct bridge with bike lanes and sidewalks in accordance with the Active Transportation Plan
3021	5-11a	Luther Rd Bridge	Bridge crossing Johnson Creek	Replace bridge
3022	5-11a	Mather Rd	Mather Rd / 122nd Ave intersection	Install traffic signal or compact roundabout
3023	5-11a	Mather Rd	122nd Ave to 132nd Ave	Construct new 2 lane roadway with pedestrian facilities and bikeways
3024	5-11a	Mather Rd	Industrial Way to 98th Ave	Maintain as pedestrian facilities and bikeway. Construct undercrossing at Sunrise Expressway.
3025	5-11a	Michael Dr	72nd Ave to Fuller Ave	Fill gaps in pedestrian facilities
3026	5-11a	Phillips Creek Multi-Use Path	Causey Ave to North Clackamas Regional Parks Trail	Construct multi-use path
3027	5-11a	Sunnyside Rd Adaptive Signal Timing	OR 213 to 172nd Ave	Add adaptive timing to traffic signals
3028	5-11a	Valley View Terrace	Sunnyside Rd to Otty Rd	Add bikeways and pedestrian facilities

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3029	5-11a	West 82nd Ave Parallel Road	King Rd to Luther Rd	Construct collector road parallel to OR 213 with bikeways and pedestrian facilities
3030	5-11b	282nd Ave	282nd Ave / OR 212 intersection	Add second right-turn lane on 282nd Ave and additional intersection improvements as needed
3031	5-11b	282nd Ave	OR 212 to Multnomah County line	Add paved shoulders
3032	5-11b	352nd Ave / Dunn Rd	Bluff Rd to Bluff Rd	Add paved shoulders
3033	5-11b	362nd Dr	Colorado Rd to Dubarko Rd	Remove or decrease horizontal and vertical curves
3034	5-11b	362nd Dr	362nd Ave / Deming Rd intersection	Remove or decrease vertical curve, relocate intersection
3035	5-11b	Barlow Trail Rd/ Lolo Pass Rd	Between communities of Timberline, Welches and Zig Zag	Add paved shoulders in accordance with the Active Transportation Plan. In the interim, install 4-foot shoulders or 4-foot shoulders at specific areas with limited sight distance or steep uphill sections.
3036	5-11b	Bluff Rd	City of Sandy to County line	Add paved shoulders in accordance with the Active Transportation Plan
3037	5-11b	Bull Run Rd	Ten Eyck Rd to Multnomah County line	Add paved shoulders and turn lanes at major intersections.
3038	5-11b	Bull Run Truss	Bull Run truss between Waterworks Rd and Bowman Rd	Replace bridge nearing the end of its useful life
3039	5-11b	Coalman Rd / Cherryville Dr	Ten Eyck Rd to US 26	Add paved shoulders. In the interim, add 4-foot paved shoulders.
3040	5-11b	Compton Rd	US 26 to 352nd Ave	Remove vertical curve near Orient Dr and relocate intersection; add paved shoulders
3041	5-11b	Coupland Rd	Estacada City limits to Divers Rd	Add paved shoulders and turn lanes at major intersections
3042	5-11b	Eagle Creek Rd	Keegan Rd to Currin Rd	Realign Eagle Creek Rd to remove or decrease downgrade
3043	5-11b	Firwood Rd	Firwood Rd / Trubel Rd intersection	Realign Trubel Rd to remove or decrease downgrade
3044	5-11b	Hayden Rd	Springwater Rd to OR 211	Add paved shoulders in accordance with the Active Transportation Plan
3045	5-11b	Howlett Rd	OR 211 to Wildcat Mountain Dr	Add paved shoulders
3046	5-11b	Kelso Rd	Richey Rd to Orient Dr	Add paved shoulders
3047	5-11b	Kelso Rd	Orient Dr to Sandy Urban Growth Boundary	Remove vertical curve, relocate intersection, add paved shoulders and turn lanes at major intersections; investigate speed zone
3048	5-11b	Lolo Pass Rd	US 26 to Barlow Trail Rd	Safety analysis; add paved shoulders in accordance with the Active Transportation Plan
3049	5-11b	Mt Hood Aerial Transportation Link	Between Ski Bowl, Government Camp Village and Timberline Lodge	Aerial transportation link
3050	5-11b	Orient Dr	US 26 north to County line	Add paved shoulders
3051	5-11b	Porter Rd Bridge over Delph Creek	~100 ft east of Wilcox Rd	Replace bridge
3052	5-11b	Salmon River Rd	US 26 to Welches Rd	Add paved shoulders. Between US 26 and Fairway Ave, add paved shoulders or multi-use path
3053	5-11b	Springwater Rd	Hayden Rd to OR 211	Add paved shoulders

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3054	5-11b	Ten Eyck Rd	Lusted Rd to City of Sandy	Remove vertical curve, relocate intersection, add paved shoulders, turn lanes at major intersections; investigate speed zone. For paved shoulders between City of Sandy and Marmot Rd, refer to the Active Transportation Plan
3055	5-11b	Tickle Creek Trail	Springwater Corridor to Sandy city limits	Construct multi-use path in accordance with the Active Transportation Plan
3056	5-11b	Welches Rd	Birdie Ln to Salmon River Rd	Add paved shoulders or add multi-use path
3057	5-11b	Wildcat Mountain Dr	OR 224 to Firwood Rd	Add paved shoulders
3058	5-11c	Aldercrest Dr	Thiessen Rd to Oatfield Rd	Add pedestrian facilities to one side of the road and bikeways
3059	5-11c	Clackamas Rd	Clackamas Rd / I-205 interchange	Construct bike/pedestrian bridge over I-205
3060	5-11c	Hill Rd	Oatfield Rd to Thiessen Rd	Add bikeways and pedestrian facilities
3061	5-11c	Johnson Rd / McKinley Rd	OR 224 to I-205 multi-use path	Bikeway and pedestrian facilities infill. From Thiessen Rd to I-205 Multi-use Path, construct in accordance to the Active Transportation Plan
3062	5-11c	McNary Rd / Mabel Ave	Oatfield Rd to Webster Rd	Add bikeways and pedestrian facilities
3063	5-11c	Naef Rd	Oatfield Rd to River Rd	Add pedestrian facilities in accordance with the Active Transportation Plan
3064	5-11c	Oatfield Rd	Oatfield Rd / Hill Rd intersection	Add left-turn lanes, install signal if warranted
3065	5-11c	Oatfield Rd	Milwaukie city limits to Gladstone city limits	Fill gaps in pedestrian facilities and bikeways
3066	5-11c	Oatfield Ridge Connection	Between Jennings Ave and Thiessen Ave over Oatfield Ridge	Construct multi-use path
3068	5-11c	Portland Ave	Jennings Ave to Hull Ave	Fill gaps in pedestrian facilities
3069	5-11c	Risley Ave	Arista Dr to Hager Rd	Fill gaps in pedestrian facilities
3070	5-11c	River Rd	Courtney Ave to Oak Grove Blvd	Add pedestrian facilities
3071	5-11c	River Rd	Risley Ave to Rinearson Rd	Add pedestrian facilities
3072	5-11c	Roethe Rd	River Rd to OR 99E (McLoughlin Blvd)	Add bikeways, pedestrian facilities and traffic calming
3073	5-11c	Rusk Rd	OR 224 South to Aldercrest Rd	Add pedestrian facilities on one side of the roadway and bikeways
3074	5-11c	Strawberry Ln	Webster Rd to 82nd Dr	Add pedestrian facilities and fill bikeway gaps
3075	5-11c	Thiessen Rd	Thiessen Rd / Hill Rd intersection	Add right-turn lane on Thiessen Rd; consider converting to two-way stop controlled or installing roundabout
3076	5-11c	View Acres Rd	Oatfield Rd to Hill Rd	Add pedestrian facilities and traffic calming
3077	5-11c	Webster Rd	Webster Rd / Jennings Ave and Webster Rd / Roots Rd intersections	Construct traffic signals, turn lanes
3078	5-11c	Webster Rd	Webster Rd / Strawberry Ln intersection	Add signal; construct southbound and westbound left-turn lane
3079	5-11d	65th Ave	Stafford Rd to Tualatin city limits	Add paved shoulders
3080	5-11d	Baker Rd	Tooze Rd to County line	Add paved shoulders

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3081	5-11d	Bell Rd	Ladd Hill Rd to Wilsonville Rd	Add paved shoulders
3082	5-11d	Bonita Rd	Carman Dr to I-5	Add bikeways and pedestrian facilities
3083	5-11d	Childs Rd	Stafford Rd to Lake Oswego city limits	Add pedestrian facilities, bikeways and turn lanes at major intersections
3084	5-11d	Graham's Ferry Rd	County line to Westfall Rd	Add paved shoulders
3085	5-11d	Graham's Ferry Rd	Wilsonville Rd to Wilsonville city limits	Add paved shoulders
3086	5-11d	Hoffman Rd / Peach Cove Rd / Riverwood Rd	Mountain Rd to Tualatin River	Add paved shoulders
3087	5-11d	Homesteader Rd	Stafford Rd to Mountain Rd	Add paved shoulders
3088	5-11d	Johnson Rd	Stafford Rd to West Linn city limits	Add paved shoulders and turn lanes at major intersections
3089	5-11d	Ladd Hill Rd	Wilsonville Rd to Washington County line	Add paved shoulders and turn lanes at major intersections
3090	5-11d	Mountain Rd	Stafford Rd to Canby Ferry	Add paved shoulders in accordance with the Active Transportation Plan
3091	5-11d	Petes Mountain Rd	West Linn city limits to Hoffman Rd	Add paved shoulders and turn lanes at major intersections
3092	5-11d	Pleasant Hill Rd / McConnell Rd / Tooze Rd	Ladd Hill Rd to Westfall Rd	Add paved shoulders
3093	5-11d	Schaeffer Rd	Mountain Rd to Petes Mountain Rd	Add paved shoulders
3094	5-11d	Schatz Rd / 55th Ave / Meridian Way	65th Ave to Stafford Rd	Add paved shoulders
3095	5-11d	Tualatin / Lake Oswego Pedestrian and Bicycle Bridge	Tualatin River Bridge	Construct bike / pedestrian bridge
3096	5-11d	Wilsonville Rd	Wilsonville Rd / Bell Rd intersection	Realign roadway and grade improvements
3097	5-11d	Wilsonville Rd	Wilsonville Rd / Edminston Rd intersection	Remove bank, remove horizontal curve, relocate intersection
3098	5-11d	Wilsonville Rd Bridge	~300 feet south of Bell Rd	Replace bridge nearing the end of its useful life
3099	5-11d	Wisteria Rd / Woodbine Rd	Rosemont Rd to Johnson Rd	Add paved shoulders
3100	5-11e	Airport Rd	Arndt Rd to Miley Rd	Add turn lanes at major intersections
3101	5-11e	Bakers Ferry Rd	Springwater Rd to OR 224	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections; remove horizontal curve and relocate intersection from Eaden Rd to OR 224
3102	5-11e	Barnards Rd	Meridian Rd to Canby-Marquam Hwy	Add paved shoulders
3103	5-11e	Barnards Rd	Needy Rd to Stuwe Rd	Reconstruct bridge and widen to 36 feet
3104	5-11e	Beavercreek Rd	Yeoman Rd/Steiner Rd to OR 211	Add paved shoulders
3105	5-11e	Bradley Rd	Redland Rd to Holcomb Blvd	Add turn lanes at major intersections
3106	5-11e	Bradley Rd	Gronlund Rd to Redland Rd	Add paved shoulders

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3107	5-11e	Buckner Creek Rd	Gard Rd to Cochell Rd	Add paved shoulders
3108	5-11e	Canby-Marquam Highway	OR 170 / Macksburg Rd intersection	Reconstruct intersection; install southbound left-turn lane and northbound right-turn lane
3109	5-11e	Canby-Marquam Highway	City of Canby to OR 211	Add paved shoulders
3110	5-11e	Carus Rd	Central Point Rd to Beavercreek Rd	Add paved shoulders in accordance with the Active Transportation Plan
3111	5-11e	Casto Rd	Spangler Rd to Central Point Rd	Add paved shoulders and turn lanes at major intersections
3112	5-11e	Central Point Rd	Parrish Rd to Mulino Rd	Smooth curves; add paved shoulders (Parrish Rd to Bremer Rd in accordance with the Active Transportation Plan)
3113	5-11e	Clackamas River Dr	Oregon City limits to Springwater Rd	Construct bikeway in accordance with the Active Transportation Plan. Add turn lanes at Springwater Rd and Forsythe Rd.
3114	5-11e	Fellows Rd	Redland Rd to Lower Highland Rd	Add paved shoulders and turn lanes at major intersections
3115	5-11e	Ferguson Rd	Beavercreek Rd and Henrici Rd	Reduce the speed limit and install traffic calming
3116	5-11e	Fischers Mill Rd	Redland Rd to Springwater Rd	Add paved shoulders in accordance with the Active Transportation Plan
~~3117~~	~~5-11e~~	~~Forsythe Rd~~	~~Oregon City line to Bradley Rd~~	~~Add paved shoulders~~
3118	5-11e	Forsythe Rd	Oregon City limit to Bradley Rd	Add center turn lane and paved shoulders
3119	5-11e	Forsythe Rd	Forsythe Rd / Victory Rd intersection	Realign, widen Victory Rd; remove or decrease curves along Forsythe Rd; relocate intersection
3120	5-11e	Gard Rd	~100 ft south of Old Clarke Rd	Reconstruct bridge to accommodate paved shoulders
3121	5-11e	Gronlund Rd / Hattan Rd	Bradley Rd to Springwater Rd	Add paved shoulders and turn lanes at major intersections
3122	5-11e	Henrici Rd	Between Driftwood Dr and Shore Vista Dr	Widen bridge to accommodate paved shoulders
3123	5-11e	Holcomb Blvd	Edenwild Ln to Bradley Rd	Add paved shoulders and turn lanes at Holcomb Blvd / Bradley Rd
3124	5-11e	Kamrath Rd	Carus Rd to Spangler Rd	Safety analysis at Carus Rd, add paved shoulders, remove or decrease horizontal curves north of Spangler Rd
3125	5-11e	Knights Bridge Rd Bridge	~3,200 feet east of Barlow Rd	Replace bridge (nearing the end of its useful life)
3126	5-11e	Leland Rd	Oregon City line to Beavercreek Rd	Add paved shoulders
3127	5-11e	Leland Rd	~1,000 ft north of Warnock Rd	Reconstruct bridge to accommodate paved shoulders
3128	5-11e	Lone Elder Rd	County line to Canby-Marquam Hwy	Add paved shoulders
3129	5-11e	Lower Highland Rd	Beavercreek Rd to Fellows Rd	Add paved shoulders and turn lanes at major intersections
3130	5-11e	Macksburg Rd	Canby Marquam Hwy to OR 213	Add paved shoulders and turn lanes at major intersections
3131	5-11e	Maplelane Rd	~1,800 ft west of Walker Rd	Add paved shoulders
3132	5-11e	Maplelane Rd	Oregon City Urban Growth Boundary to Ferguson Rd	Add paved shoulders
3133	5-11e	Mattoon Rd	Fischers Mill Rd to Redland Rd	Add paved shoulders in accordance with the Active Transportation Plan and turn lanes at major intersections; remove vertical curves, remove horizontal curves north of Redland Rd

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3134	5-11e	Meridian Rd	Lone Elder Rd to OR 211	Add paved shoulders
3135	5-11e	Meridian Rd	Elliott Prairie Rd to Barlow Rd	Add paved shoulders; remove or decrease horizontal and vertical curves
3136	5-11e	Miley Rd	Airport Rd to Eilers Rd	Add paved shoulders
3137	5-11e	Molalla Ave	OR 213 to Molalla City limits	Add paved shoulders
3138	5-11e	New Era Rd / Haines Rd	OR 99E to Leland Rd	Add paved shoulders
3140	5-11e	Redland Rd	~900 ft west of Holly Ln	Reconstruct bridge to include shoulders and bikeways
3141	5-11e	Redland Rd	~400 ft west of Holly Ln	Reconstruct bridge to include shoulders and bikeways
3142	5-11e	Redland Rd	Henrici Rd to Oregon City limit	Add paved shoulders and bikeway in accordance with the Active Transportation Plan
3143	5-11e	Redland Rd	Henrici Rd to Springwater Rd	Add paved shoulders and turn lanes at major intersections. For the section between Mattoon Rd and Jubb Rd, see the Active Transportation Plan.
3144	5-11e	Ridge Rd	Lower Highland Rd to Redland Rd	Add paved shoulders
3145	5-11e	Rock Creek (Kropf Rd) Bridge	~3,500 ft north of Gibson Rd	Replace bridge
3146	5-11e	S Killdeer Rd	Ferguson Road and Yeoman Road	Extend S Killdeer Rd to connect with S. Ivel Rd. and provide bike/pedestrian access
3147	5-11e	South End Rd	Oregon City limits to OR 99E	Smooth curves; add paved shoulders
3148	5-11e	Spangler Rd	Casto Rd to Beavercreek Rd	Add paved shoulders and turn lanes at major intersections
3149	5-11e	Springwater Rd	Bakers Ferry Rd to Hayden Rd	Add paved shoulders and turn lanes at major intersections. For paved shoulders between Eaden Rd and Hayden Rd, see the Active Transportation Plan.
3150	5-11e	Thayer Rd/Ferguson Rd	Oregon City line to Redland Rd	Add paved shoulders
3151	5-11e	Toliver Rd	Dryland Rd to Molalla city Limits	Add paved shoulders in accordance with the Active Transportation Plan
3152	5-11e	Unger Rd	Beavercreek Rd to OR 211	Add paved shoulders and turn lanes at major intersections
3153	5-11e	Union Hall Rd	Central Point Rd to El Dorado Rd	Add paved shoulders
3154	5-11f	Bird Rd	Groshong Rd to Wilhoit Rd	Add paved shoulders and turn lanes at major intersections
3155	5-11f	Blair Rd	Groshong Rd to Maple Grove Rd	Add paved shoulders and turn lanes at major intersections
3156	5-11f	Callahan Rd S / Ramsby Rd	Dickey Prairie Rd to Fernwood Rd	Add paved shoulders and turn lanes at major intersections
3157	5-11f	Dhooghe Rd	OR 211 to Fernwood Rd	Add paved shoulders and turn lanes at major intersections
3158	5-11f	Fernwood Rd	Dhooghe Rd to Callahan Rd	Add paved shoulders and turn lanes at major intersections
3159	5-11f	Gray's Hill Rd	Green Mountain Rd to OR 211	Add paved shoulders
3160	5-11f	Maple Grove Rd	Nowlens Bridge Rd to Sawtell Rd	Add paved shoulders and turn lanes at major intersections
3161	5-11f	Nowlens Bridge Rd	OR 213 to Maple Grove Rd	Add paved shoulders and turn lanes at major intersections

Table 5-3c Long Term Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description
3162	5-11f	Sawtell Rd	Maple Grove Rd to Wilhoit Rd	Add paved shoulders and turn lanes at major intersections
3163	5-11f	Wildcat Rd	Wilhoit Rd to OR 213	Add paved shoulders and turn lanes at major intersections
3164	5-11f	Wright Rd	OR 211 to Callahan Rd	Add paved shoulders
3165	5-11a	Sunnyside Rd	93rd Ave to OR 212	Add pedestrian facilities and bikeways in accordance with the Active Transportation Plan
~~3166~~	~~5-11b~~	~~Barlow Trail Rd~~	~~Marmot Rd to Lolo Pass Rd~~	~~Add paved shoulders in accordance with the Active Transportation Plan~~
3167	5-11b	Marmot Rd	Ten Eyck to Barlow Trail Rd	Add paved shoulders in accordance with the Active Transportation Plan. In the interim, widen to 4-feet within Wildwood/Timberline, Zigzag, Rhododendron and Wemme/Welches.
3168	5-11c	Thiessen Rd	Webster Rd to Johnson Rd	Add pedestrian facilities and bikeways in accordance with the Active Transportation Plan
3169	5-11d	Willamette River Greenway	Lake Oswego north to County Line	Construct multi-use path in accordance with the Active Transportation Plan.
3170	5-11d	Willamette River Greenway	Canby Ferry to City of Wilsonville	Construct multi-use path in accordance with the Active Transportation Plan.
3171	5-11e	Bremer Rd	Central Point Rd to Haines Rd	Add paved shoulders in accordance with the Active Tranportation Plan
3172	5-11e	Butteville Rd	Willamette River to County line	Add paved shoulders in accordance with the Active Tranportation Plan
3173	5-11e	Dryland Rd	Macksburg Rd to Toliver Rd	Add paved shoulders in accordance with the Active Tranportation Plan
3174	5-11e	Eaden Rd	Bakers Ferry Rd to Springwater Rd	Add paved shoulders in accordance with the Active Tranportation Plan
3175	5-11e	Haines Rd	Bremer Rd to Territorial Rd	Add paved shoulders in accordance with the Active Transportation Plan
3176	5-11e	Harms Rd	Kraxberger Rd to Macksburg Rd	Construct bikeway in accordance with Active Transportation Plan
3177	5-11e	Hwy 170 / Kraxberger Rd	City of Canby to Harms Rd	Add paved shoulders in accordance with the Active Transportation Plan
3178	5-11e	Jubb Rd	Redland Rd to Springwater Rd	Add paved shoulders in accordance with the Active Tranportation Plan
3179	5-11e	Kamrath Rd	Leland Rd to Carus Rd	Add paved shoulders in accordance with the Active Transportation Plan
3180	5-11e	Knights Bridge Rd / Barlow Rd / Arndt Rd	Canby boundary to Airport Rd	Add bikeway in accordance with the Active Tranportation Plan
3181	5-11e	Territorial Rd	Haines Rd to OR 99E	Add bikeways in accordance with the Active Transportation plan
3182	5-11e	Willamette River Greenway	Oregon City to Canby	Construct multi-use path in accordance with the Active Transportation Plan.

Removed Projects:

3117: removed due to duplication with 3118

3166: removed due to duplication with 3035

Table 5-3d Regional Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description	Priority
4000	County-wide	TSP Refinement	State facility locations applicable where mobility target is not met in 2035	TSP Refinement to develop alternative mobility targets for state facilities consistent with Oregon Highway Plan (OHP) 1F3.	High
4001	5-11a	I-205 / Sunnyside Road interchange	I-205 / Sunnyside Road interchange	Add dual northbound right-turns; install bike signal; construct sidewalk extension / bulb to accommodate pedestrians and bicyclists around signal pole.	High
4002	5-11a	OR 212	OR 212 / 172nd Ave intersection	Add second eastbound left-turn lane	High
4003	5-11a	OR 212	SE 162nd to Anderson Rd	Add bikeways, pedestrian facilities ways, and landscape pedestrian facilities buffer; widen to 6 lanes within Happy Valley; add center turn lane within Damascus	High
4004	5-11a	OR 213	Sunnybrook Blvd to Portland City Limits	Extend fiberoptic communications, CCTV at key intersections and adaptive signal timing	High
4005	5-11a	OR 224	OR 224 / Lake Rd / Webster Rd intersection	Add turn-lanes, including second left-turn lane on westbound OR 224, second left-turn lane and right-turn lane on northbound SE Webster Rd, and second left-turn lane on southbound SE Lake Rd	High
4006	5-11a	OR 224	OR 224 / Johnson Rd intersection	Add second left-turn lane on westbound OR 224	High
4007	5-11a	OR 224	OR 224 / Hubbard Rd / 135th Ave intersection	Add intersection improvements, including right-turn lanes	High
4008	5-11a	OR 224	Springwater Rd / OR 224 intersection	Add signal and turn lanes on all approaches	High
4009	5-11a	OR 224	Rock Creek Junction to Midway St	Widen to four lanes; add bikeways.	High
4010	5-11a	Sunrise Project - Preliminary Engineering	Webster Rd/ OR 224 to 172nd Ave / OR 212	Preliminary engineering from Webster Rd to 172nd Ave	High
4011	5-11a	Sunrise Project - Right-of-Way	Webster Rd/ OR 224 to 172nd Ave / OR 212	Acquire right-of-way to accommodate 6 lane expressway plus auxiliary lanes	High
4012	5-11a	SunriseProject - Multi-use Path	122nd to Rock Creek Junction	Construct multi-use path from 122nd to Rock Creek Junction parallel to the Sunrise project consistent with FEIS.	High
4013	5-11b	OR 224	OR 224 /232nd Ave intersection	Install traffic signal or roundabout	High
4014	5-11b	OR 224	Eaglecreek Rd / OR 224 intersection	Install signal	High
4015	5-11c	OR 99E	Milwaukie city limit to Gladstone city limit	Add bikeways, pedestrian facilities ways, median enhancements, crosswalks and pedestrian facilities refuges	High
4016	5-11d	I-205	Stafford Rd to OR 99E	Work with ODOT, Metro, Oregon City, West Linn and any other effected jurisdictions to analyze and develop a solution to the transportation bottle neck on I-205 between Oregon City and I-205 / Stafford Road Interchange. Possible solutions include widening to 3-lanes in each direction.	High
4017	5-11e	I-205	Willamette River to West Linn city limit	Add southbound truck climbing lane	High
4018	5-11e	I-205	I-205 Corridor	Corridor-wide operational improvements	High
4019	5-11e	OR 211	Beavercreek Rd, Union Hall Rd to Dhooghe Rd	Widen to include shoulders, bikeways, add passing lanes where needed and turn lanes at major intersections	High
4020	5-11e	OR 213	OR 213 / Spangler Rd intersection	Install traffic signal to replace existing two-way stop	High

Table 5-3d Regional Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description	Priority
4021	5-11e	OR 213	OR 213 / Henrici Rd intersection	Install traffic signal or roundabout and additional intersection improvements as needed	High
4022	5-11e	OR 213	OR 213 / Leland Rd intersection	Add northbound through auxiliary lane	High
4023	5-11e	OR 213	Leland Rd / Union Hall Rd intersection	Add southbound auxiliary lane	High
4024	5-11e	OR 213	Mulino to Molalla	Perform road safety audit or transportation safety review to identify appropriate safety improvements	High
4025	5-11e	OR 99E	OR 99E / Barlow Rd intersection	Add left-turn lane on southbound Barlow Rd - To widen Barlow Rd to add a southbound left turn lane on the north approach would need to modify the existing railroad crossing warning system	High
4026	5-11a	I-205 / Johnson Creek Blvd interchange	I-205 / Johnson Creek Blvd interchange	Add loop ramp and northbound on-ramp; realign southbound off-ramp and install dual right-turn lanes	Medium
4027	5-11a	I-205 / OR 212/224 Interchange	In vicinity of Roots Rd and McKinley Ave	Connect bikeways in accordance with the Active Transportation Plan	Medium
4028	5-11a	OR 212	Rock Creek Junction to 172nd	Construct climbing lane	Medium
4029	5-11a	OR 212	OR 212 / SE 162nd Ave intersection	Add left-turn pockets and traffic signal	Medium
4030	5-11a	OR 213	Sunnyside Rd to Sunnybrook Rd	Widen to 7 lanes with boulevard treatments	Medium
4031	5-11a	OR 213	OR 213 / Harmony Rd / Sunnyside Rd intersection	Add bikeways, pedestrian facilities ways, dual northbound and southbound left-turn lanes, and lighting; convert driveways north of intersection to right-in / right-out	Medium
4032	5-11a	OR 224	OR 224 / Rusk Rd off-ramp	Extend right-turn lane on OR 224	Medium
4033	5-11a	OR 224	Milwaukie city limits to I-205	Construct multi-use path as parallel route to OR 224	Medium
4034	5-11a	OR 224	Lake Rd / Johnson Rd / Pheasant Ct	Realign Lake Rd / Johnson Rd to provide southern OR 224 access via Pheasant Ct; add turn lanes at OR 224 / Pheasant Ct intersection; close access at Lake / Webster south of OR 224	Medium
4035	5-11a	OR 99E	OR 99E / Jennings Ave intersection	Determine safe connection of Trolley Trail at OR 99E / Jennings Ave intersection	Medium
4036	5-11a	Sunrise Project	I-205 to 172nd Ave	Construct improvements to 172nd	Medium
4037	5-11b	OR 211	Hayden Rd to OR 224	Widen to rural arterial standard with shoulders, bikeways in accordance with the Active Transportation Plan and turn lanes at major intersections	Medium
4038	5-11b	US 26	Govt. Camp Loop W to OR 35	Implement Finding of Mt Hood Multimodal Study including phased safety improvements	Medium
4039	5-11b	US 26	OR 35 Junction to Wasco County line	Widen roadway to include bikeways /shoulders, add passing lanes where needed and turn lanes at major intersections	Medium
4040	5-11e	OR 211	OR 170 (Canby-Marquam Hwy) / OR 211 intersection	Install eastbound and westbound left-turn lanes, and eastbound right-turn lane; remove or decrease horizontal curve	Medium
4041	5-11e	OR 211	Marion County line to OR 170 (Canby-Marquam Hwy)	Widen to include shoulders, bikeways, add passing lanes where needed and turn lanes at major intersections	Medium
4042	5-11e	OR 99E	Barlow Rd to Marion County line	Four lane widening with median, left-turn lanes from mile post 24.05	Medium
4043	5-11e/f	OR 213	Oregon City boundary to Marion County line	Add shoulders and bikeways	Medium

Table 5-3d Regional Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description	Priority
4044	5-11a	OR 212	I-205 to OR 224	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4045	5-11a	OR 212	Within the Damascus City Limits (Armstrong Cr to 257th)	Obtain right-of-way for future 4 lane facility with planted median and 5 lanes at major intersections; build as major development occurs and apply access management to reduce number of driveways.	Low
4046	5-11a	OR 213	Clatsop St to Sunnyside Rd	OR 213/82nd Avenue Boulevard Design Improvements - Widen to add sidewalks, lighting, central median, planting strips and landscaping; fill gaps in the bike and pedestrian facilities network. Add pedestrian crossings in the vicinity of Luther Rd, Glencoe Rd and south of Boyer Dr. Install access management median Hinkley Ave to Lindy St and Monterey Ave to Harmony Rd. Install advanced street name signs from Sunnyside Rd to Sunnyside Dr. Remove signal at north entrance of Clackamas Town Center and evaluate traffic diversion. 2014 ODOT OR 213 paving project programmed King to OR 224.	Low
4047	5-11a	OR 213 (82nd Ave)	Luther Road to Sunnybrook Blvd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4048	5-11a	OR 224	Webster Rd and 82nd Ave	Provide frontage connection on the north side of OR 244	Low
4049	5-11a	OR 224	Springwater Rd to 232nd Dr	Shoulder widening, horizontal realignment, realignment of roadway to bluff	Low
4050	5-11b	OR 211	OR 224 to eastbound US 26	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4051	5-11b	OR 211	OR 224 to Hillcockburn Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4052	5-11b	OR 211	Tickle Creek Rd/OR 211 intersection	Remove or decrease horizontal curve, relocate intersection	Low
4053	5-11b	OR 211	362nd Dr / OR 211 intersection	Remove or decrease vertical curve and remove vegetation	Low
4054	5-11b	OR 211	Eagle Creek Rd to Tickle Creek Rd	Widen to include bikeways /shoulders and add passing /climbing lanes where needed	Low
4055	5-11b	OR 211	0.14 miles east of Coop Rd to Jacknife Rd	Widen to add shoulder / bikeways; realign to remove horizontal and vertical curves	Low
4056	5-11b	OR 211	Tickle Creek Rd to 362nd Dr	Widen to include bikeways /shoulders and add passing /climbing lanes where needed	Low
4057	5-11b	OR 211	Bornstedt Rd to City of Sandy	Add shoulders and bikeways	Low
4058	5-11b	OR 224	232nd Ave to OR 211	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4059	5-11b	OR 224	Fish Creek Rd to National Forest Rd 46	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4060	5-11b	OR 224	Bakers Ferry Rd / OR 224 intersection	Add eastbound right-turn lane	Low
4061	5-11b	OR 224	Amisigger Rd / OR 224 intersection	Install traffic signal; add southbound and eastbound left-turn lanes and westbound right-turn lane	Low
4062	5-11b	OR 224	Heiple Rd / OR 224 intersection	Add southbound right-turn lane	Low
4063	5-11b	OR 224	OR 212 to Estacada city limits	Widen to include shoulders and bikeways; add passing lanes where needed	Low
4065	5-11b	US 26	US 26 / Haley Rd intersection	Develop a plan to address to address access and safety issues on US 26 at this intersection and implement that plan	Low

Table 5-3d Regional Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description	Priority
4066	5-11b	US 26	Kelso Rd to Duncan Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4067	5-11b	US 26	Duncan Rd to Langensand Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4068	5-11b	US 26	Firwood Rd to Sleepy Hollow Dr	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4069	5-11b	US 26	Rhododendron to OR 35	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4070	5-11b	US 26	US 26 / Firwood Rd intersection	Add eastbound right-turn lane	Low
4071	5-11b	US 26	US 26 / Brightwood Loop W	Add westbound right-turn lane	Low
4072	5-11b	US 26	US 26 / Brightwood Loop E	Add westbound right-turn lane	Low
4073	5-11b	US 26	Lolo Pass Rd to Govt. Camp Loop Rd. W	Implement Finding of Mt Hood Multimodal Study including ITS approach with variable speed signage; construct multi-use path between Lolo Pass Rd and John Lake Rd; add enhanced pedestrian crossing, sidewalks, curbs, gutters, pedestrian refuge island, pedestrian illumination and access management in Rhododendron; construct multi-use path connecting Mt. Hood Express transit stop and Pioneer Bridle Trailhead	High
4074	5-11c	OR 99E	Park Ave to Gladstone city limits	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4075	5-11d	OR 43	Lake Oswego to Portland	Develop active transportation connection in accordance with the Active Transportation Plan.	Low
4076	5-11e	OR 211	Dhooghe Rd / OR 211 intersection	Remove or decrease horizontal curve, relocate intersection	Low
4077	5-11e	OR 211	OR 170 (Canby-Marquam Hwy) to City of Molalla	Add shoulders and bikeways	Low
4078	5-11e	OR 211	Needy Rd to 0.6 miles west of Needy Rd	Remove or decrease vertical curve to allow passing zone, add passing lane in one or both directions, possible relocation of intersection	Low
4079	5-11e	OR 211	Molalla city limits to Hayden Rd	Widen to rural arterial standard (2 lanes) with shoulders and bikeways	Low
4080	5-11e	OR 211	Beavercreek Rd to Upper Highland Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4081	5-11e	OR 213	OR 213 / Carus Rd intersection	Install traffic signal to replace existing two-way stop See U339	Low
4082	5-11e	OR 213	OR 213 / Beavercreek Rd intersection	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4083	5-11e	OR 213	Carus Rd / OR 213 intersection	Install southbound left-turn and right-turn lanes	Low
4085	5-11e	OR 99E	Oregon City to Canby	Add shoulders and bikeways	Low
4086	5-11e	OR 99E	Sequoia Parkway to Lone Elder Rd	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4087	5-11e	OR 99E	Territorial Rd to Metro boundary	Perform road safety audit or transportation safety review to identify appropriate safety improvements	Low
4088	5-11b	Government Camp Loop Rd	US 26 to US 26	Add bikeways through Government Camp in accordance with the Active Transportation Plan	High
4089	5-11a	OR 213	Causey Ave to King Rd	Work with TriMet and ODOT to evaluate the Business Access Transit lane and identify projects / approaches to improve safety and enhance transit operation.	High

Table 5-3d Regional Capital Projects

Project ID	Map	Project Name / Street Name	Segment / Locations	Project Description	Priority
4090	5-11a	I-205 MUP	I-205 SB Ramp / Sunnyside Rd	Travelling south on the I-205 multi-use path, install a pedestrian signal to cross the I-205 southbound / Sunnyside right turn lane. Perform traffic analysis to evaluate impacts to vehicle queuing. Modification subject to ODOT approval.	High
4091	5-11a	I-205 MUP	Monterey Ave	Install parabolic mirror and/or signage to resolve limited sight distance issues at the intersection of the I-205 MUP and the path extension at Monterey Ave.	High
4092	5-11b	US 26	Arrah Wanna Blvd to Welches Rd	Add multi-use path on north side of US 26	High
4093	5-11b	US 26	Main Park Rd to Salmon River Rd	Add multi-use path on south side of US 26	High
4094	5-11b	US 26 / Welches Rd	US 26 / Welches Rd	Pedestrian and ADA improvments at signal, including crossing improvments on the north side of the intersection.	Medium
4095	5-11b	US 26 / Arrah Wanna Blvd	US 26 / Arrah Wanna Blvd	Install a continental style crosswalk, accompanied by roadway and streetscape improvements	Medium
4096	5-11b	US 26 / Salmon River Rd	US 26 / Salmon River Rd	Install an enhanced pedestrian crossing	High

Capital Improvement Plan

Greater Clackamas Regional Center / Industrial Area

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

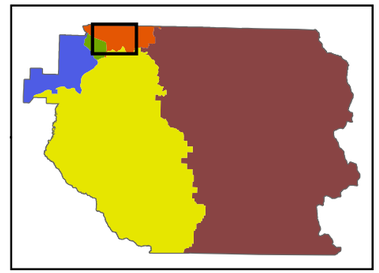
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

NORTH

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

0 0.25 0.5 1 Miles



Last Amended January 18, 2017

CLACKAMAS COUNTY

Department of Transportation & Development
150 Beavercreek Rd Oregon City, OR 97045

CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11a

Capital Improvement Plan

East County

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

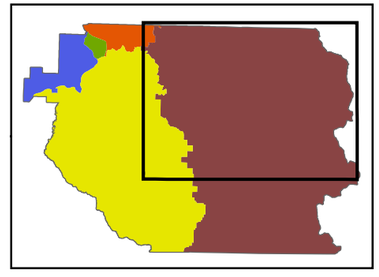
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

NORTH

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

0 1.25 2.5 5 Miles



Last Amended January 18, 2017

CLACKAMAS COUNTY

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CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11b

See Inset Map

Mt. Hood Corridor Inset Map

Capital Improvement Plan

Greater McLoughlin Area

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

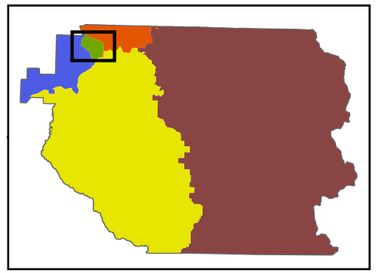
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

NORTH

0 0.25 0.5 1 Miles



Last Amended June 1, 2015

CLACKAMAS COUNTY

Department of Transportation & Development
150 Beavercreek Rd Oregon City, OR 97045

CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11c

Capital Improvement Plan

Northwest County

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

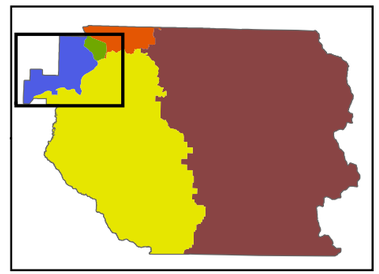
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

NORTH

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

0 0.5 1 2 Miles



Last Amended June 1, 2015

CLACKAMAS COUNTY

Department of Transportation & Development
150 Beavercreek Rd Oregon City, OR 97045

CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11d

Capital Improvement Plan

Southwest County - Northern Portion

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

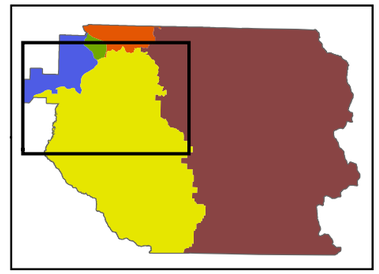
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

NORTH

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

0 1 2 4 Miles



Last Amended June 1, 2015

CLACKAMAS COUNTY

Department of Transportation & Development
150 Beavercreek Rd Oregon City, OR 97045

CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11e

Capital Improvement Plan

Southwest County - Southern Portion

Priority

- 20-Year Capital Projects (Table 5-3a)
- Preferred Capital Projects (Table 5-3b)
- Long-Term Capital Project Needs (Table 5-3c)

Projects on Non-County Facilities

Priority

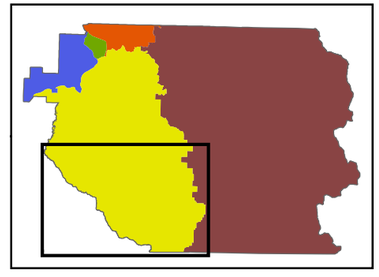
- High (Table 5-3d)
- Medium (Table 5-3d)
- Low (Table 5-3d)

NORTH

- Study*
- Multi-Use Path*
- Metro Urban Growth Boundary
- Incorporated City

*Symbol color consistent with Priority symbologies shown above

0 1 2 4 Miles



Last Amended June 1, 2015

CLACKAMAS COUNTY

Department of Transportation & Development
150 Beavercreek Rd Oregon City, OR 97045

CLACKAMAS COUNTY COMPREHENSIVE PLAN

MAP 5-11f

Safety Action Plan

Part 2

Appendix C

Preliminary Systemic Safety Analysis

Appendix C - Preliminary Systemic Safety Analysis

Systemic safety treatments are meant to be deployed at locations with identified corresponding contributing factors for fatal and severe injury 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. The County may be able to reduce risk of fatal and severe injury crashes occurring by proactively deploying countermeasures systemically across locations with characteristics identified in the systemic screening, which is expected to be completed beyond what is contained in this appendix as a follow-up to this plan.

Part 1 of the plan identified the top seven most frequent contributing factors to fatal and serious injury crashes: Inexperienced Drivers, Roadway Departures, Aggressive Driving, Motorcyclists, Alcohol/Drugs, Senior Drivers, and Pedestrians and Bicyclists. It also identified several action items to reduce crashes in each of these areas; though it did not describe specific infrastructure treatments and locations. The systemic network screening analysis was able to use available data to further evaluate contributing factors to roadway departure and pedestrian and bicycle crashes. This appendix builds on Part 1 by describing specific infrastructure countermeasures, in addition to those programmed and planned countermeasures identified in the Part 2 report, that could be deployed systemically to reduce roadway departure crashes and crashes involving people walking and bicycling.

Systemic Screening Methodology

The systemic approach to safety is complementary to the traditional site-specific approach and the Federal Highway Administration (FHWA) recommends that agencies use both approaches[1]. The objective of a systemic approach to safety is to identify countermeasures that address high-risk roadway characteristics through system-wide analysis of specific target crash types and/or severities. This method focuses on system-wide roadway characteristics, rather than specific high-crash locations. This results in the method being **particularly effective at reducing severe crashes on rural roads and involving vulnerable users** (i.e., pedestrians, bicyclists, motorcyclists)[2]. Oftentimes agencies use the systemic approach to deploy countermeasures that are low-cost and can be readily implemented at a range of sites[3]. The County has systemically deployed countermeasures in the past, including the flashing yellow arrow (FYA) with pedestrian inhibit features at signalized intersections with permissive/protected left-turns.

Fatal and serious injury crashes are spread throughout the county. They do not always occur at the same locations year after year. Further, many of these severe crashes have occurred in locations with only one or two crashes over the past seven years and that may not experience another crash for several more

[1] https://safety.fhwa.dot.gov/systemic/about.cfm

[2] Walden, T.D., Lord, D., Ko, M., Geedipally, S., and Wu, L. *Developing Methodology for Identifying, Evaluating, and Prioritizing Systemic Improvements*. Traffic Operations Division, Texas Department of Transportation, August 2015.

[3] Julian, F. *Systemic Approach Versus Black Spot Approach*, 2011.

years. Similarly, there will likely be severe crashes in the coming years at locations that have experienced few, if any, crashes in the past seven years. One way to proactively mitigate the risk for fatal and severe injury crashes in these low-crash locations is through the systemic approach to safety. For this plan, the systemic approach involves reviewing county-wide crash, road, and traffic data to identify roadway and traffic features that are correlated with fatal and serious injury crashes. By identifying these features, the County can deploy countermeasures to proactively mitigate them in locations where they are present, regardless of crash history at specific locations.

Crash Data

The systemic screening uses crash data from the years 2009 to 2015 provided by Clackamas County. The crash data is limited to County-owned roadways. Crash types examined in the systemic screening include:

- Fatal and Severe Injury Crashes
- Aggressive Driving Crashes
- Roadway Departure Crashes
- Pedestrian and Bicycle Crashes

Roadway and Traffic Data

Clackamas County maintains various roadway and traffic databases. This analysis is limited to complete datasets provided to the project team. Roadway and traffic data considered in this analysis includes:

- Road surface width (primarily used as a surrogate for number of lanes)
- Median width
- Speed limit
- Shoulder type
- Shoulder width

Systemic Screening Findings

The analysis found a variety of trends related to crash types, as described in detail below. Some of the most notable trends identified include:

- Roadway departure crashes are most likely to occur on higher-speed two-lane roads with limited shoulders.
- Lower speed limits are correlated to a lower frequency of severe crashes.
- Crashes involving a pedestrian or bicyclist occur most frequently on roadways with speed limits ranging from 30 mph to 40 mph**.**

Fatal and Severe Injury Crashes

- Lower speed limits are correlated with a lower frequency of severe crashes. (Exhibit 1)
- Two-lane roadways are more likely to have severe crashes than multilane roadways. There could be a number of confounding factors that contribute to this result, including the average speeds of the respective roads and their surrounding land-use contexts. (Exhibit 2)
- Curbed shoulders are correlated with a lower percentage of severe crashes than gravel shoulders. This is likely because curbed shoulders are more frequently found in urban street contexts where speeds are lower, while gravel shoulders are more frequently found on rural or higher-speed roadways. (Exhibit 3)
- Presence of medians was associated with a lower frequency of severe crashes; however, the width of this median is not associated with an effect on the frequency of severe crashes, but this is a small sample. (Exhibit 4)

Exhibit 1 – Crashes by Speed Limit

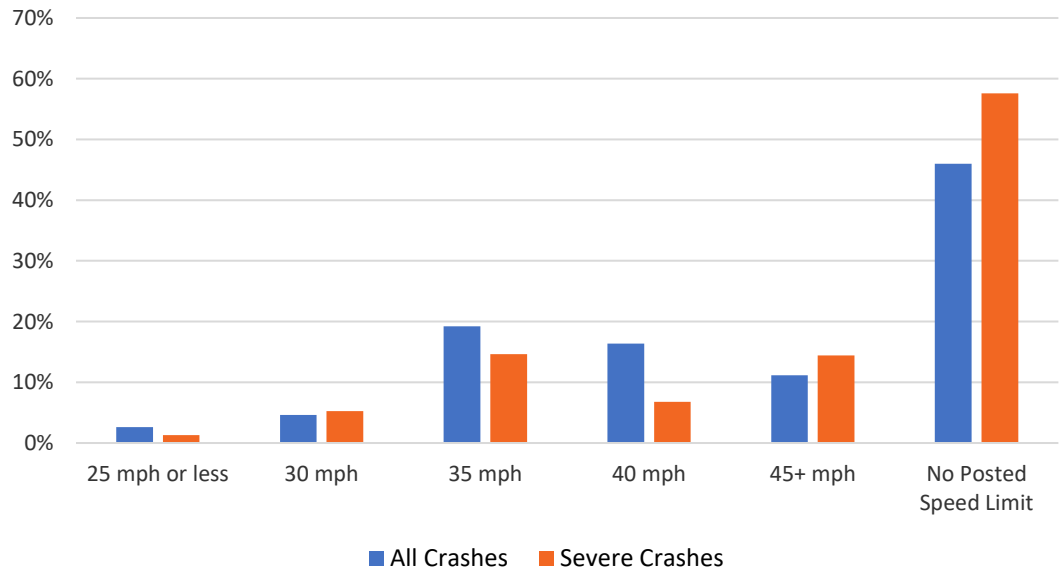


Exhibit 2 – Severe Crashes by Roadway Width

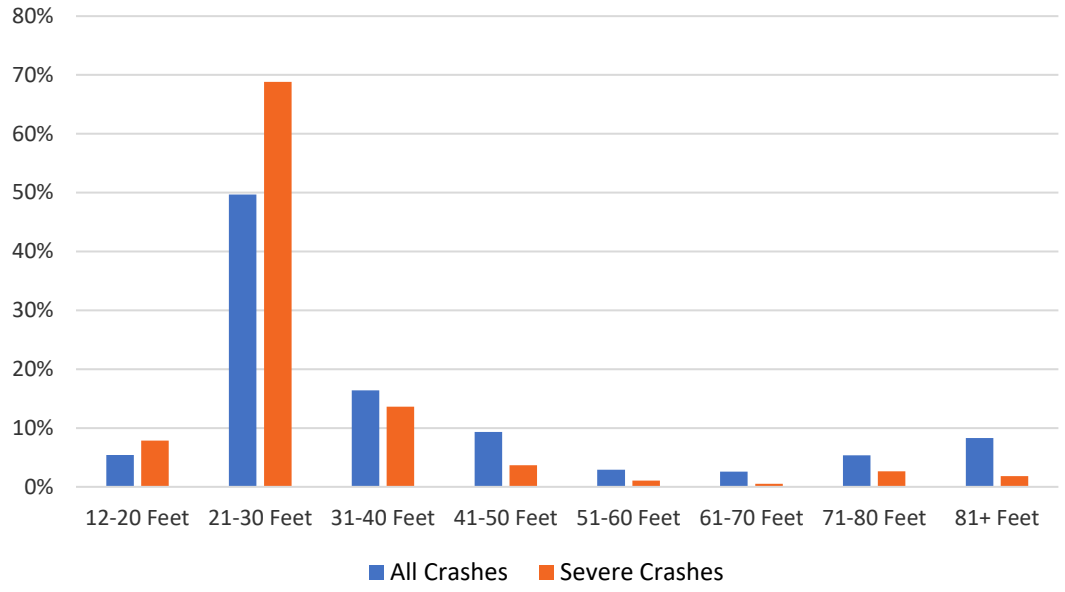


Exhibit 3 – Severe Crashes by Shoulder Type

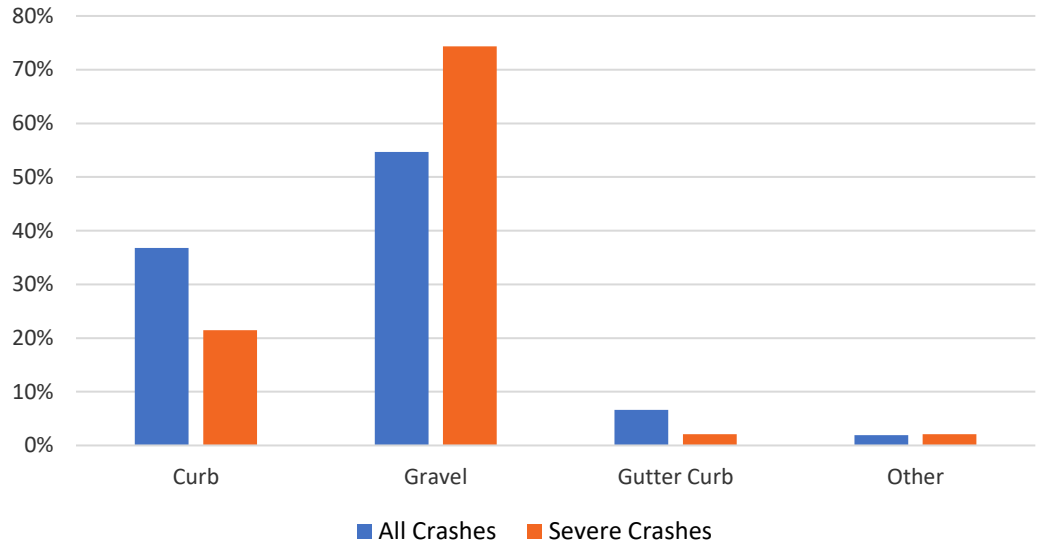
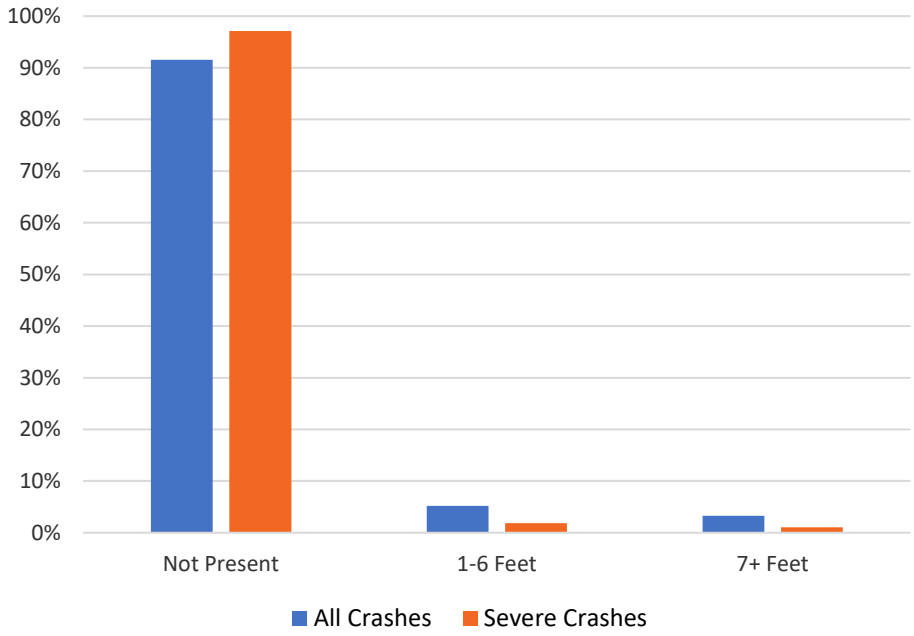


Exhibit 4 – Crashes by Median Presence



Roadway Departure Crashes

- Crashes are most likely to involve a roadway departure at speed limits of 45 miles per hour or greater or on roads without speed limits (most roads in the County do not have posted speed limits). (Exhibit 5)
- **Wider shoulders are correlated with a lower probability that crashes involve roadway departure.** (Exhibit 6)
- A similar trend is seen with surface widths: 20- to 29-foot surface widths (most two-lane roadways have these measurements) are correlated with a higher probability that crashes involve roadway departure. (Exhibit 7)
- **Given the above, it appears that roadway departure crashes are most likely to occur on higher-speed two-lane roads with limited shoulders.**

Exhibit 5 – Roadway Departure Crashes by Speed Limit

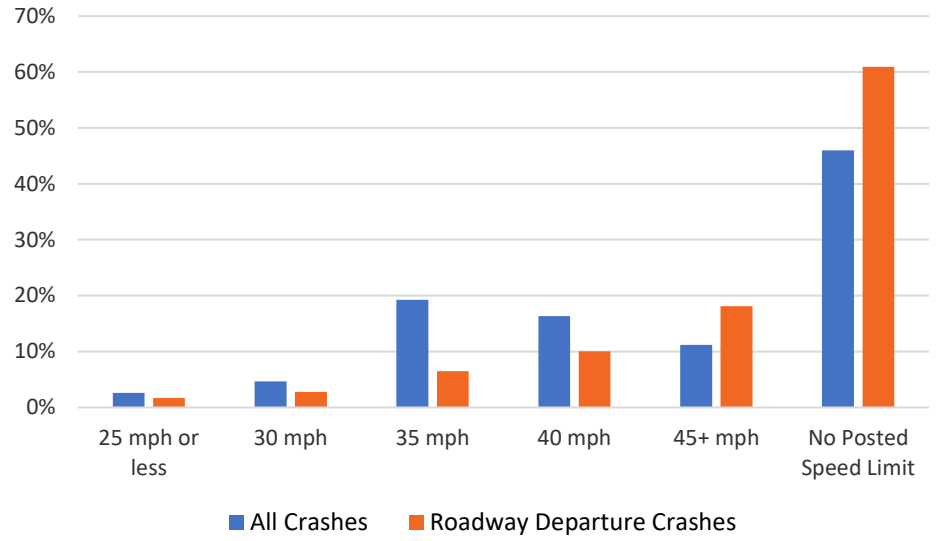


Exhibit 6 – Roadway Departure Crashes by Shoulder Width

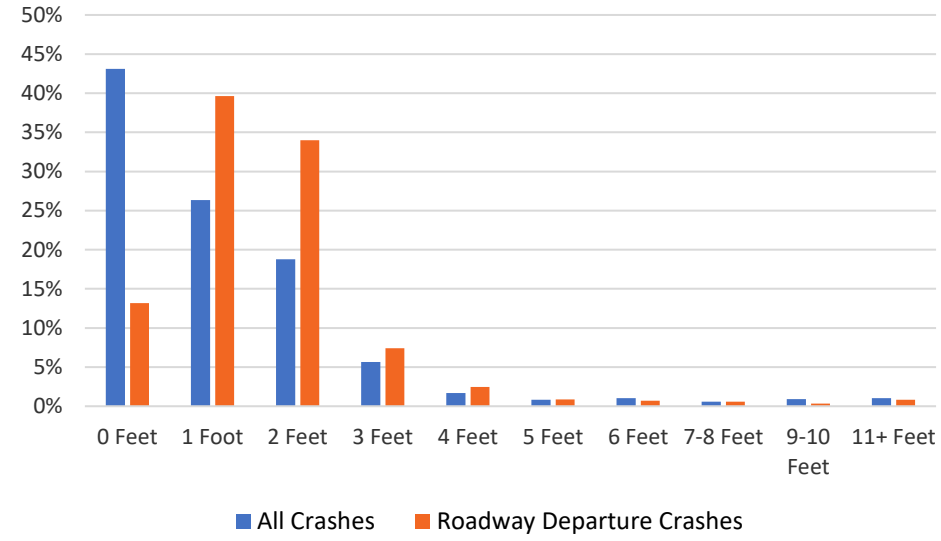
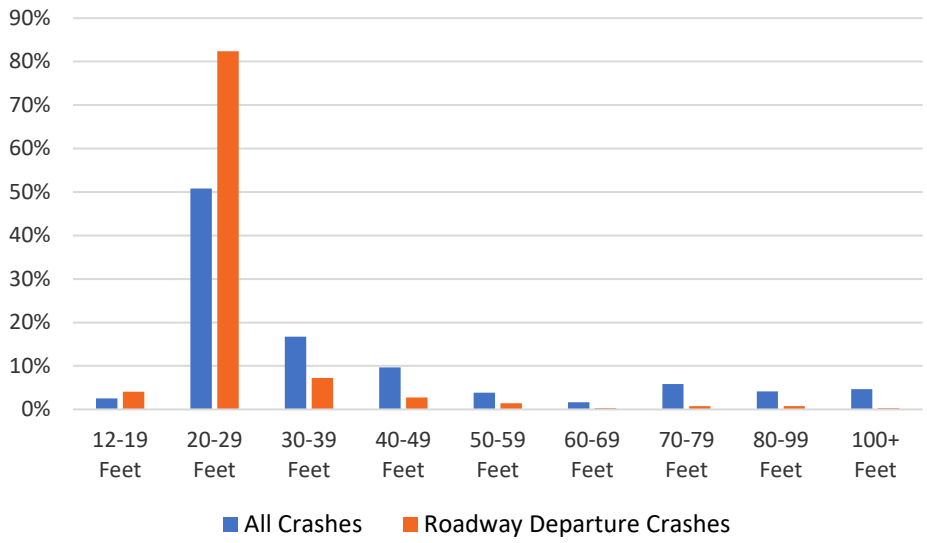


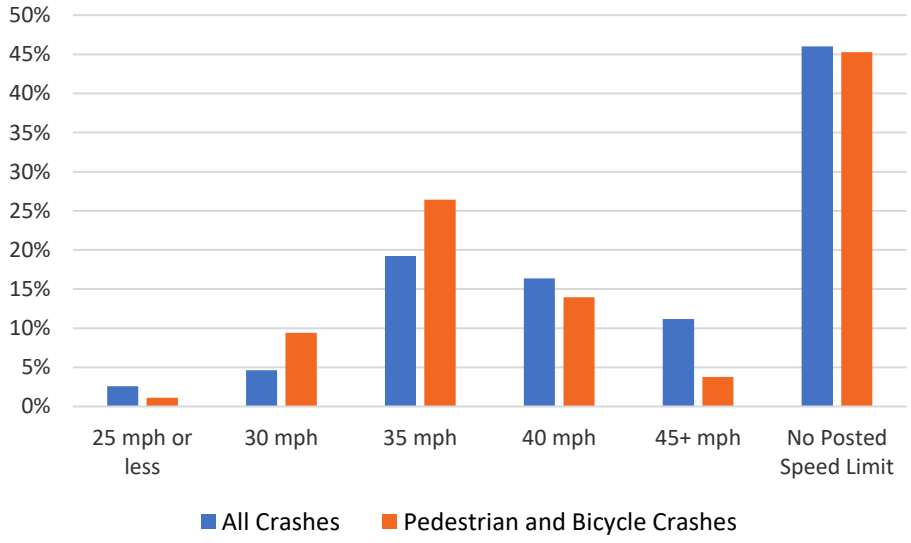
Exhibit 7 – Roadway Departure Crashes by Surface Width



Pedestrian or Bicyclist Crashes

- **Crashes involving a pedestrian or bicyclist occur most frequently on roadways with speed limits ranging from 30 mph to 40 mph** or no posted speed limit (most roads in the County do not have posted speed limits). (Exhibit 8) This indicates that focusing on these roadways for improved crossings, reduced speeds, or additional pedestrian and bicycle infrastructure could provide the greatest return in terms of reducing pedestrian and bicycle crashes.

Exhibit 8 – Pedestrian and Bicycle Crashes by Speed



Aggressive Driving Crashes

- Crashes on roads with wider surface widths (i.e., more lanes) are more likely to involve aggressive driving. (Exhibit 9)

- A crash is more likely to involve aggressive driving on streets with posted speed limits, which are more likely to be in developed areas and not in residential neighborhoods. (Exhibit 10)

Exhibit 9 – Aggressive Driving Crashes by Surface Width

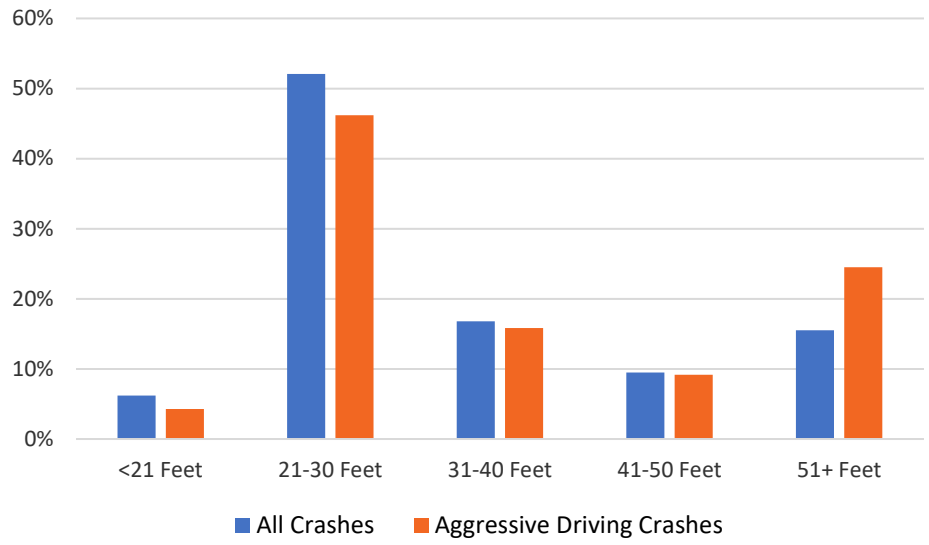
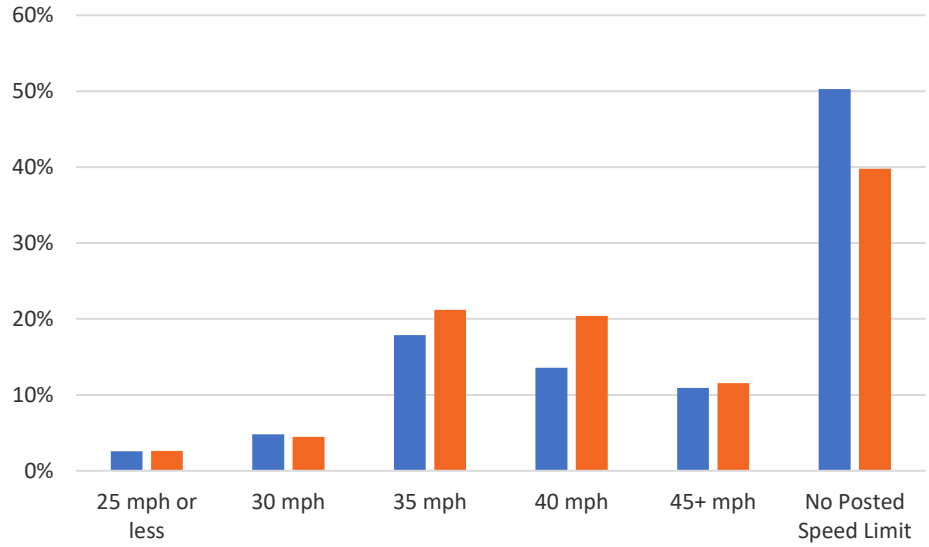


Exhibit 10 – Aggressive Driving Crashes by Speed Limit



Priority Locations

As described above, the systemic network screening analysis identified the following as priority locations for systemic treatments:

- Roadway Departure Crashes – Two-lane, rural roads with limited shoulders (i.e., less than four feet wide) and speeds of 45 miles-per-hour (MPH) or greater. These locations are shown in Figure C-1.

- Bicycle and Pedestrian Crashes – Roads with speeds of 30 MPH or greater. Further priority could be given to urban areas near likely generators of walking and biking activity. Urban roads with speeds of 30 MPH or greater are shown in Figure C-2.

Systemic Countermeasures Tool Box

The following countermeasures could be deployed systemically at locations with contributing factors identified in the Systemic Screening section. These countermeasures can be installed as part of safety-focused projects, as part of capital projects, or, in some cases, as part of routine maintenance work (e.g., installing shoulder rumble strips when repaving a higher speed two lane road with narrow shoulders if the surrounding land-use context is appropriate,).

Roadway Departure Crashes

Table 4 shows countermeasures the County could deploy systemically to reduce roadway departure crashes. These come from ODOT's ARTS Program.

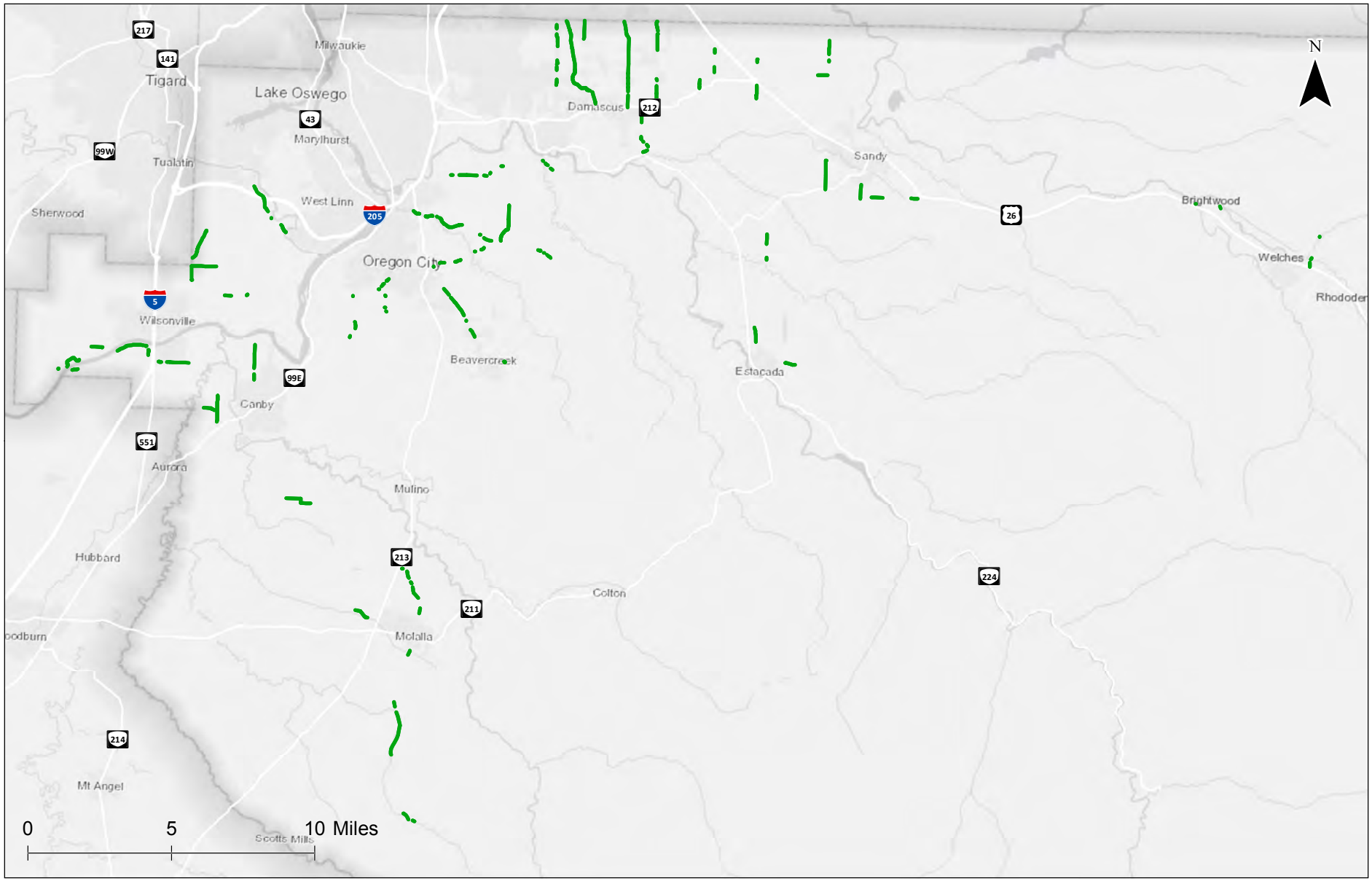
Table 4. Systemic Countermeasures

Treatment	Crash Patterns Addressed	Crash Reduction Factor
Shoulder Widening	All	18%
Rumble Strips	Severe Crashes	22%
Guardrail	Severe Run off the Road Crashes	47%
Post-Mounted Delineators on Curves	Curve Crashes at Night	30%
High-Friction Surface Treatments	Wet Road Crashes	57%

ODOT's ARTS programs contains other roadway departure focused countermeasures that may also be applicable. Further, ODOT completed a statewide roadway departure plan, *Oregon Roadway Departure Implementation Plan Update*, in 2017, that identifies locations in Clackamas County for roadway departure focused treatments.

Bicycle/Pedestrian Crashes

Part 1 contains action items to reduce the frequency and severity of crashes involving people walking and biking. The infrastructure related items in Part 1 are broadly targeted at providing appropriate crossing treatments and separation between motor vehicles and people walking and biking and selecting and designing for appropriate speeds on streets where people are likely to be walking and biking. Building off these action items and the systemic screening analysis described above, the following are countermeasures the County could deploy systemically to reduce bicycle and pedestrian crashes. Most of these come from ODOT's ARTS Program:



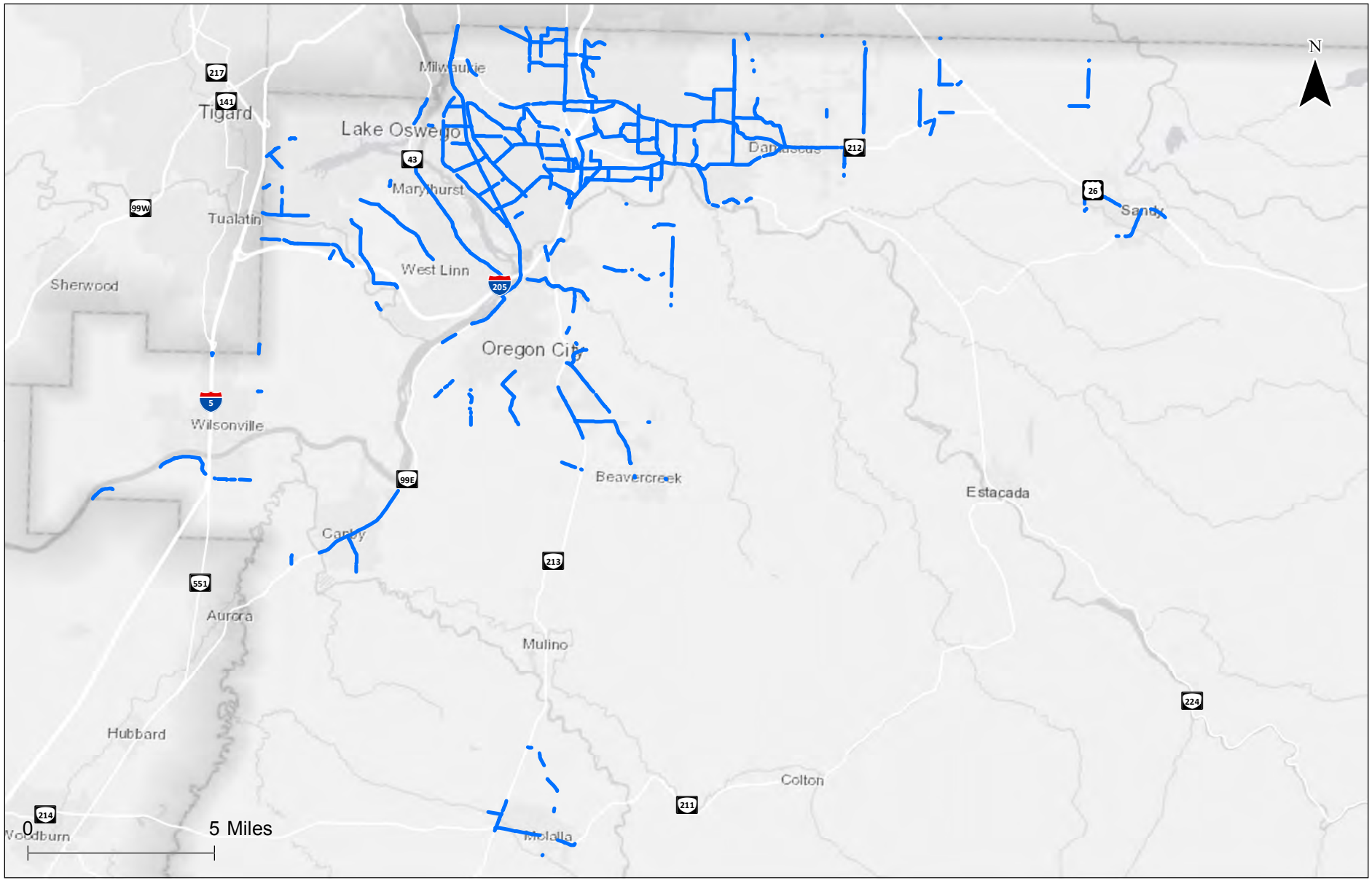
Systemic Countermeasure Deployment
Locations with: 45+ mph Speed Limit, 2 Lanes, and Shoulder Width <4 Feet
Clackamas County, Oregon

Figure
C - 1

H:\20\20716 - Clackamas County Safety Plan Update\task 6\Systemic Locations\Systemic Deployment Locations.mxd - bgraveline - 8:17 AM 11/13/2018

KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl



Systemic Countermeasure Deployment
Urban Roads with Speed Limits between 30 MPH and 45 MPH
Clackamas County, Oregon

Figure
C - 2

KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

- Provide an appropriate level of separation between people driving and biking based on roadway and traffic characteristics through bike lanes, buffered bike lanes and cycle tracks. The Clackamas County Active Transportation Plan[4] provides a toolkit for determining the most suitable bicycle facility for a roadway based on its functional classification, motor vehicle speed, and motor vehicle volume.
- Provide sidewalks along roads to separate people walking and people driving
- Install enhanced crossing treatments at unsignalized intersections where warranted, such as:
    - Rectangular rapid flashing beacons
    - Pedestrian refuge islands
    - Crosswalk markings and signs
    - Curb extensions
    - Pedestrian hybrid beacons
- Implement signal timing and phasing treatments at signalized intersections where warranted, such as:
    - Leading pedestrian interval
    - No pedestrian phase feature with flashing yellow arrow (County has done this at many locations already)
    - Bike signals

Applying Systemic Countermeasures to Priority Locations

Additional screening analyses will be completed to further screen the County road network using the data described above and additional data provided by the County, such as traffic volumes and the presence of advisory signs. This effort will follow the process described in Part 2 for both roadway departure crashes and pedestrian and bicyclist crossings. During this process, each criterion will be assigned a point scale (e.g., for shoulders this could be 5 points for no shoulder, 4 points for a one foot shoulder, 3 points for a two-foot shoulder, 2 points for a three-foot shoulder, 1 point for a four-foot shoulder and no points for shoulders wider than 4 feet).

[4] https://digital.osl.state.or.us/islandora/object/osl%3A42188