

Section 8
Northwest County

OVERVIEW OF KEY FINDINGS – NORTHWEST COUNTY

Existing and 2035 future conditions analysis was conducted for the transportation system in the Northwest County area. Key findings from this analysis are summarized below. The full analysis of the existing conditions and future base conditions follows.

Existing Conditions:

Transportation Disadvantaged Populations

- The unincorporated areas have low population with the exception of the small unincorporated areas within Lake Oswego in Rivergrove, which have suburban densities. The Stafford Road area does not have any significant transportation disadvantaged populations, but the unincorporated area west of Wilsonville has some small areas of disadvantaged populations. The eastern half of Wilsonville has higher concentrations of transportation disadvantaged populations.

Roadways

- Two of the five study intersections are operating at volume-to-capacity ratios that do not meet performance standards:
 - SW Childs Road/SW Stafford Road
 - SW 65th Avenue/SW Stafford Road
- Roadway segments (excluding I-205 and I-5) are primarily uncongested during the weekday evening peak hour. Relatively short segments of Stafford Road south of Rosemont Road are estimated to experience some level of congestion.

Pedestrian System

- There are no deficiencies in the pedestrian system.
- Roadway shoulders are part of the rural roadway standards and are used by pedestrians in rural areas. The bicycle system gaps and deficiencies indicate areas where rural roads lack shoulders that are four feet or wider. These gaps and deficiencies should also be considered as important for rural pedestrians.
- While sidewalks are required in the County's urban areas, none of the streets in the County's urban areas in Lake Oswego are designated as part of the Essential Pedestrian Network.
- The County's Pedestrian Master Plan identifies priorities for filling in the pedestrian network gaps which will be reviewed using the TSP Vision and Goals evaluation criteria.

Bicycle System

- With the exception of Borland Road south of I-205, the rural portions have no shoulders wide enough to be designated as shoulder bikeways.
- The County's urban portions do not have any bicycle lanes.

- The County’s Bike Master Plan identifies priorities for filling in the bicycle network gaps. The priority of these projects will be reviewed based on the TSP Vision and Goals evaluation criteria. They are shown in the table below.

Safety Corridors

- One candidate safety corridor was identified based on crash data review -- Stafford Road from S Rosemont Road to SW Mountain Road.

Transit

- Transit service consists of fixed-route bus and heavy rail service as well as dial-a-ride service.
- Transit Service Frequency: A majority of the services currently operate at LOS D or below throughout the day with respect to frequency. TriMet Line 96, however, operates at LOS A during the morning and evening peak time periods.
- Hours of Service: A majority of the services currently operate at LOS D or below throughout the day with respect to hours of service. TriMet Line 78 operates at LOS A.
- Transit Service Coverage: The current population and employment service coverage is LOS E. Some of the transit supportive areas not currently served by transit may require additional transit routes or new connections to existing routes in order to be served.
 - The number of transit supportive areas is expected to increase significantly throughout Northwest County by 2035. While many of these areas are expected to be served by existing transit services, the remaining areas will require additional service routes or connections to existing routes in order to be served.

2035 Future Base Conditions:

- Three of the five study intersections operate at volume-to-capacity ratios in excess of performance standards under both the Low Build and Full Build future conditions:
 - SW Borland Road /SW Stafford Road
 - SW Ellingson Road /SW 65th Avenue
 - SW 65th Avenue/SW Stafford Road
- Two intersections operate at volume-to-capacity ratios in excess of performance standards under the Low Build, but meet performance standards under Full Build:
 - SW Childs Road/SW Stafford Road
 - SW Mountain Road /SW Stafford Road
- Of the five study intersections that do not meet performance standards in Low Build scenario, four are modified by a Full Build Project (e.g., a turn lane or other physical change made to the intersection).
 - SW Childs Road/SW Stafford Road

- SW Mountain Road /SW Stafford Road
- SW Ellingson Road /SW 65th Avenue
- SW 65th Avenue/SW Stafford Road
- Demand for travel is highest along Stafford Road, SW Borland Road, S Rosemont Road and SW Mountain Road under both the low build and full build future conditions.
- S Rosemont Road is estimated to experience some level of congestion under the 2035 Low and Full Build Scenarios. The remaining roadways (excluding I-205, I-5, and incorporated areas) are estimated to be uncongested.
- Overall, significant growth is forecast for the study roadways and intersections in this area.

EXISTING CONDITIONS - NORTHWEST COUNTY

INTRODUCTION

The Northwest County geographic area extends from the County's northwest boundary to the Willamette River. Portions of the area are inside the County's urban growth boundary (UGB), including the incorporated communities of Wilsonville, West Linn, Rivergrove, and Lake Oswego. These areas also fall within the Metro Urban Growth Boundary (UGB), as does the Stafford Hamlet. The Northwest County area also includes the unincorporated lands east and west of Wilsonville. Large sections of I-5 and I-205 run this area. The extent of the Northwest County area is illustrated in Figure NW 1.

LAND USE AND POPULATION

This section provides a general overview of existing land uses and population patterns. It identifies the activity centers in the area, reviews current land uses and zoning designations, assesses population density, and identifies transportation disadvantaged populations.

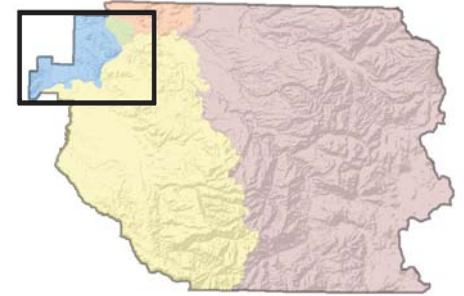
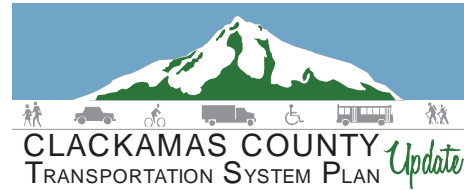
Activity Centers

The Northwest County area includes the incorporated areas of Lake Oswego, West Linn, and Wilsonville as well as the unincorporated Stafford community and other rural areas. The County's TSP update focuses on the communities, activities, and transportation systems within and surrounding the unincorporated communities of the County. It does take into consideration the employment, recreational and commercial activities taking place in incorporated areas that may attract trips from unincorporated areas and the reverse.

Figure NW 2 illustrates the locations of schools, parks, libraries, and other activity centers. The area is crisscrossed by three substantial physical elements – two man-made and one natural. These are the I-5 freeway, the I-205 freeway, and the Willamette River. These physical elements make transportation connections within the area and to other areas (e.g., from Northwest County to Southwest County) relatively challenging and constrained.

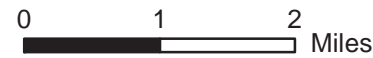
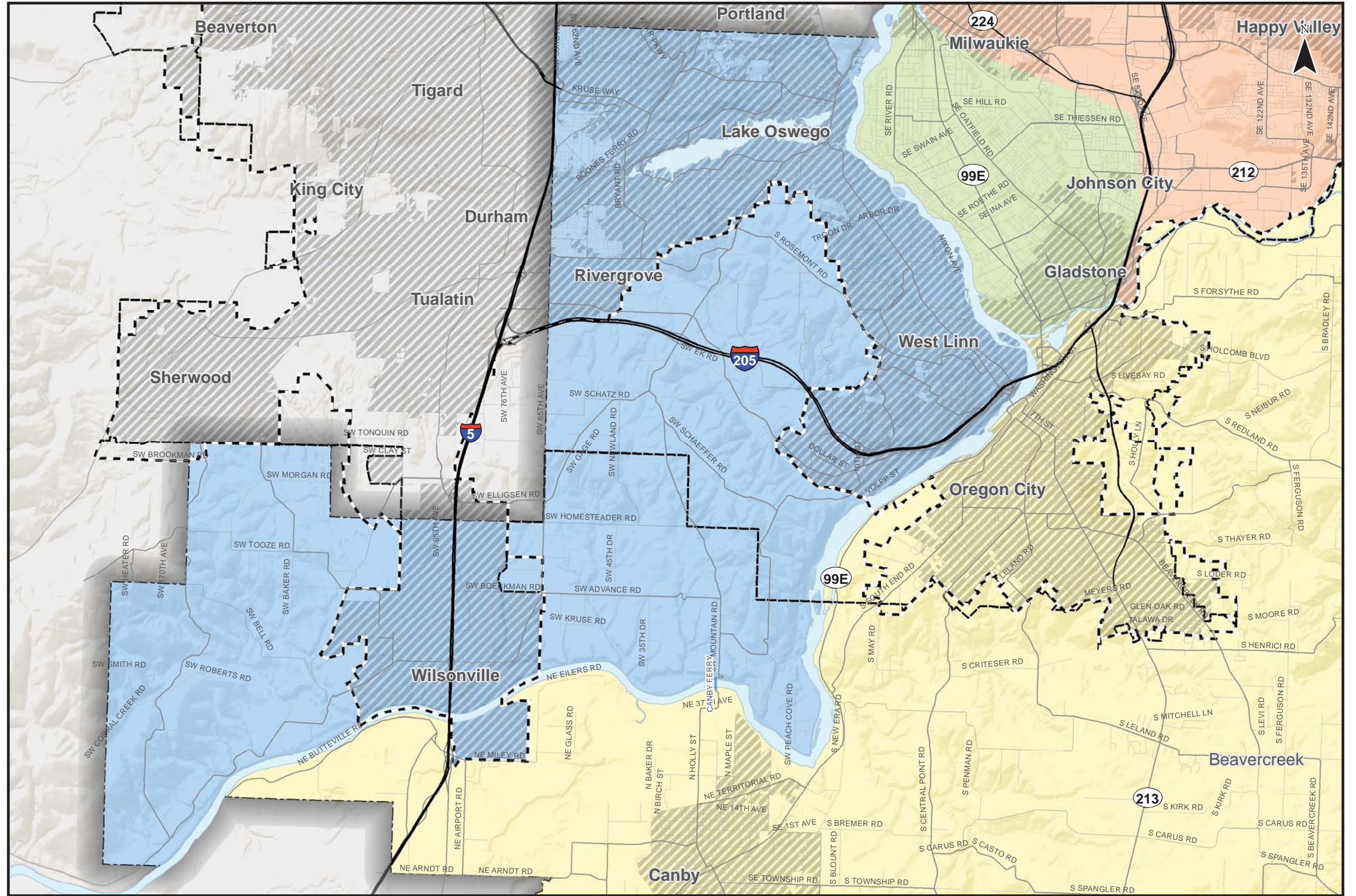
The major activity centers in terms of schools, government buildings, and shopping areas are located in Wilsonville, Rivergrove, Lake Oswego, and West Linn. The City of Wilsonville is a major employment center and home to several corporate headquarters and distribution firms. There is notable industrial development in Wilsonville, as well as some rail service and suburban office buildings. Marylhurst University, which has about 2,000 students, is located on the Willamette River south of downtown Lake Oswego. Park/ride locations in Wilsonville, West Linn, and Lake Oswego allow travelers to park for free and take bus or light rail service into Portland.

The unincorporated community of Stafford is located south of Lake Oswego and west of West Linn, and bordered to the south by the Willamette River. It is also located within an Urban Reserve area, which means it is reserved by the Portland Metropolitan region for urban development further into the future. The urbanized development for this area is forecast beyond the 2035 horizon year for the County's TSP update. Therefore, the influence of more urban development in the Stafford area will not be taken into account in this current update. Stafford is currently home to approximately 2,200 residents.



Geographic Analysis Sub Areas

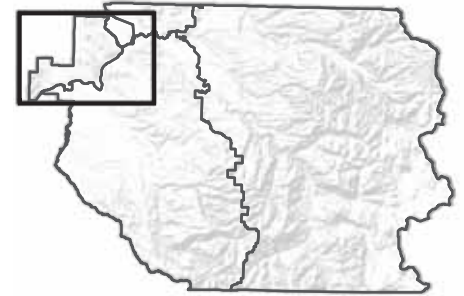
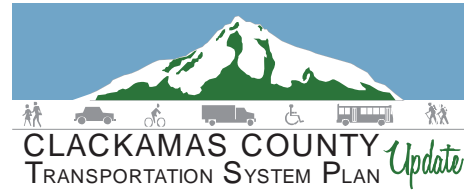
- East County
- Southwest County
- Greater McLoughlin Area
- Greater Clackamas Regional Center/ Industrial Area
- Northwest County
- Incorporated Areas
- County Boundary
- UGB
- Metro Area



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Northwest County Geographic Analysis Sub Areas

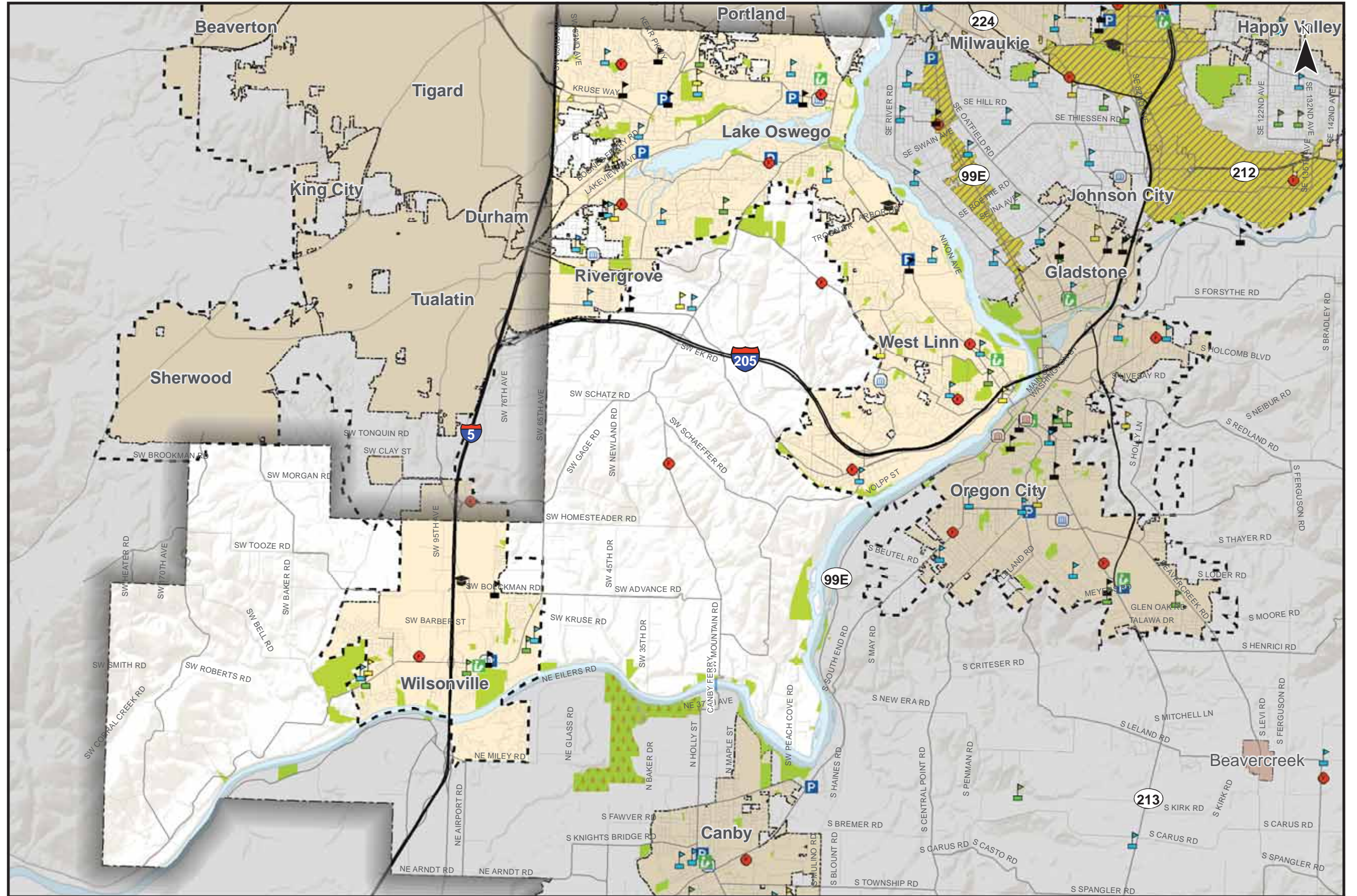
Figure
NW 1



- Fire Stations
- Museum
- City Hall
- Libraries
- Park & Ride
- Light Rail
- Schools**
- Public Elementary
- Public Middle School
- Public High School
- Private K-12
- College or University
- Parks
- State Parks
- Mt. Hood National Forest
- Urban Activity Centers
- Incorporated Areas
- Rural Centers
- County Boundary
- UGB

0 1 2 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center



**Activity Centers
Northwest County**

Figure
NW 2

Land Use and Zoning

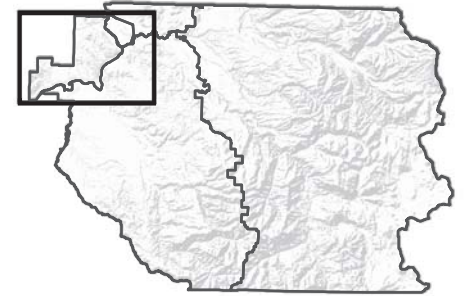
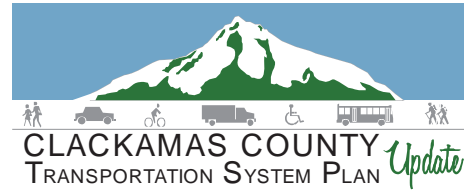
Figure NW 3 illustrates the current basic land use zoning designations throughout the Northwest County area. Each land use's purpose, area of application, uses, and regulations are described in the *Clackamas County Zoning and Development Ordinance*. As seen in the figure, the unincorporated areas are primarily zoned timber district, exclusive farm use, and rural residential. The rural residential areas near Stafford and west of Wilsonville are urban reserves, meaning they are designated as suitable for urban development in the future. Large portions of Lake Oswego, Rivergrove, and West Linn are zoned urban low density residential.

Population Inventory

Figure NW 4 illustrates the population density by census tract. From this figure, it is evident that the highest population density is in the most northwest portion of the County, closest to Portland. Portions of Lake Oswego, West Linn, and eastern Wilsonville also have higher population densities. The unincorporated areas are very low density with the exception of the small unincorporated areas within Lake Oswego in Rivergrove, which have suburban densities. In general, the population is most dense inside the urban growth boundary. Figures NW 5 through NW 8 illustrate demographic information about the households within Northwest County. Respectively, these figures show the elderly (age 65 and older) population, youth (age 17 and younger) population, low-income population, and vehicle ownership. The data within each of these figures were combined and used to identify the transportation disadvantaged populations.

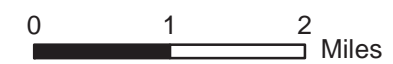
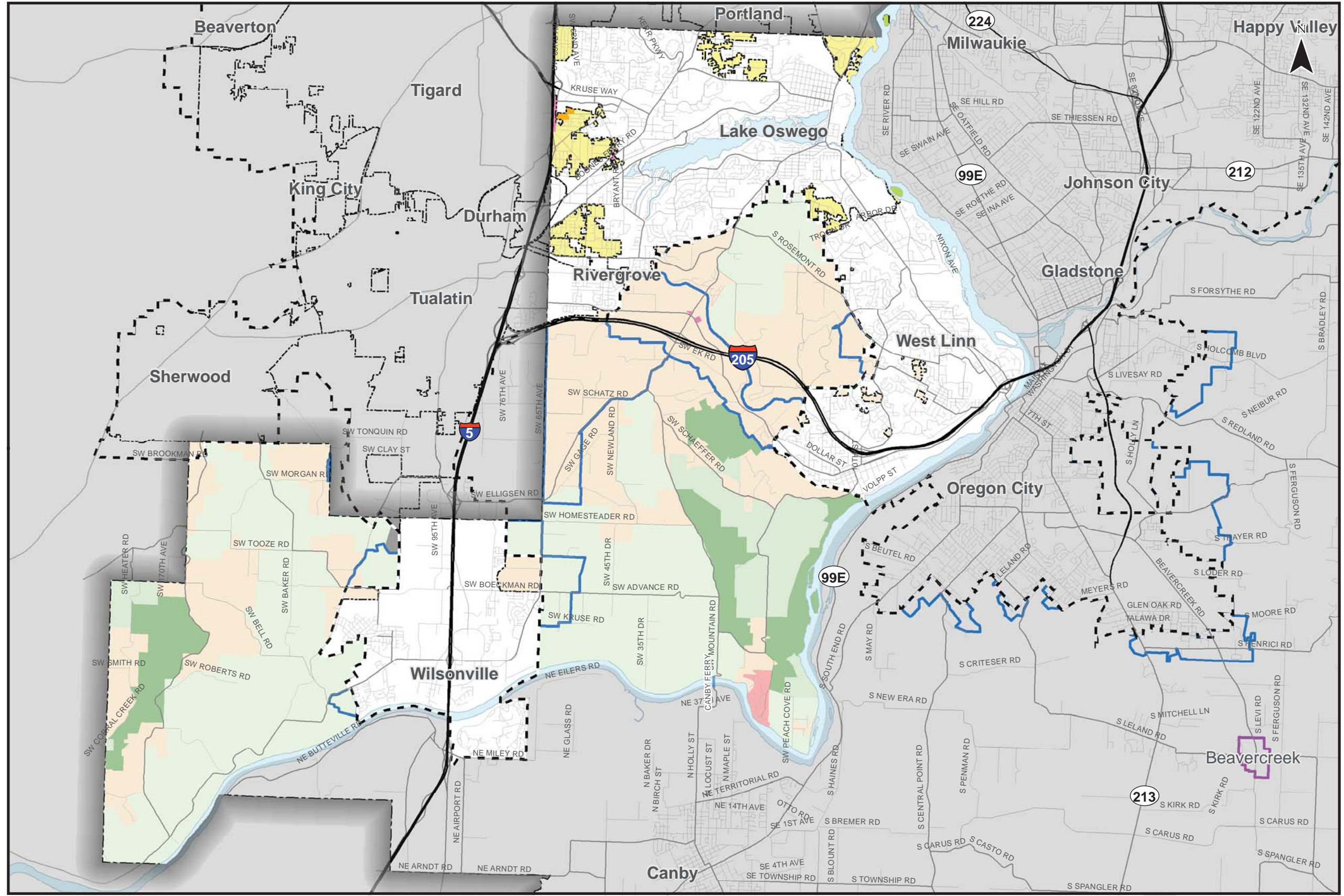
Figure NW 9 illustrates the location of transportation disadvantaged populations. Transportation disadvantaged populations are defined as populations who have historically had significant unmet transportation needs or who have experienced disproportionate negative impacts from the transportation system. Transportation disadvantaged populations were mapped by census block and calculated by considering the location of elderly populations, youth populations, low-income populations earning less than 200% of the poverty line, non-white and non-Hispanic populations, households with 0-1 vehicles, households where no adult speaks English well, and residential areas within 500 feet of a freeway or highway. Overall, most of the Northwest County area is categorized as "Least Disadvantaged" or "Somewhat Disadvantaged." The Stafford Road area does not have any significant transportation disadvantaged populations, but the unincorporated area west of Wilsonville has some small areas of disadvantaged populations (although they are very low density). The eastern half of Wilsonville has significant areas of disadvantaged populations.

The purpose of mapping this information is to be aware of where the population is living while considering their needs to access different destinations. Population density and the location of disadvantaged populations will both be considered when identifying transportation projects to include in the TSP Update.



Zoning Designations

- Exclusive Farm Use
- Ag. / Forest District
- Timber District
- Rural Center
- Rural Residential, Future Urban
- Urban Low Density Residential
- Village Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Planned Mixed Use
- Village Community Service
- Open Space Management
- Urban Reserves
- Rural Centers
- Incorporated Areas
- County Boundary
- UGB

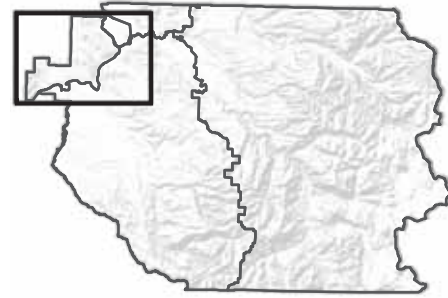
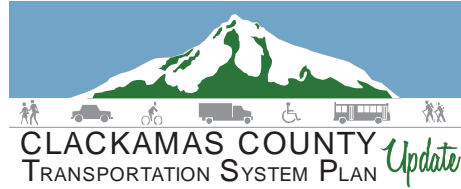


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Data Source:
Clackamas County, Metro Data Resouce Center

**Land Use Zoning Designations
Northwest County**

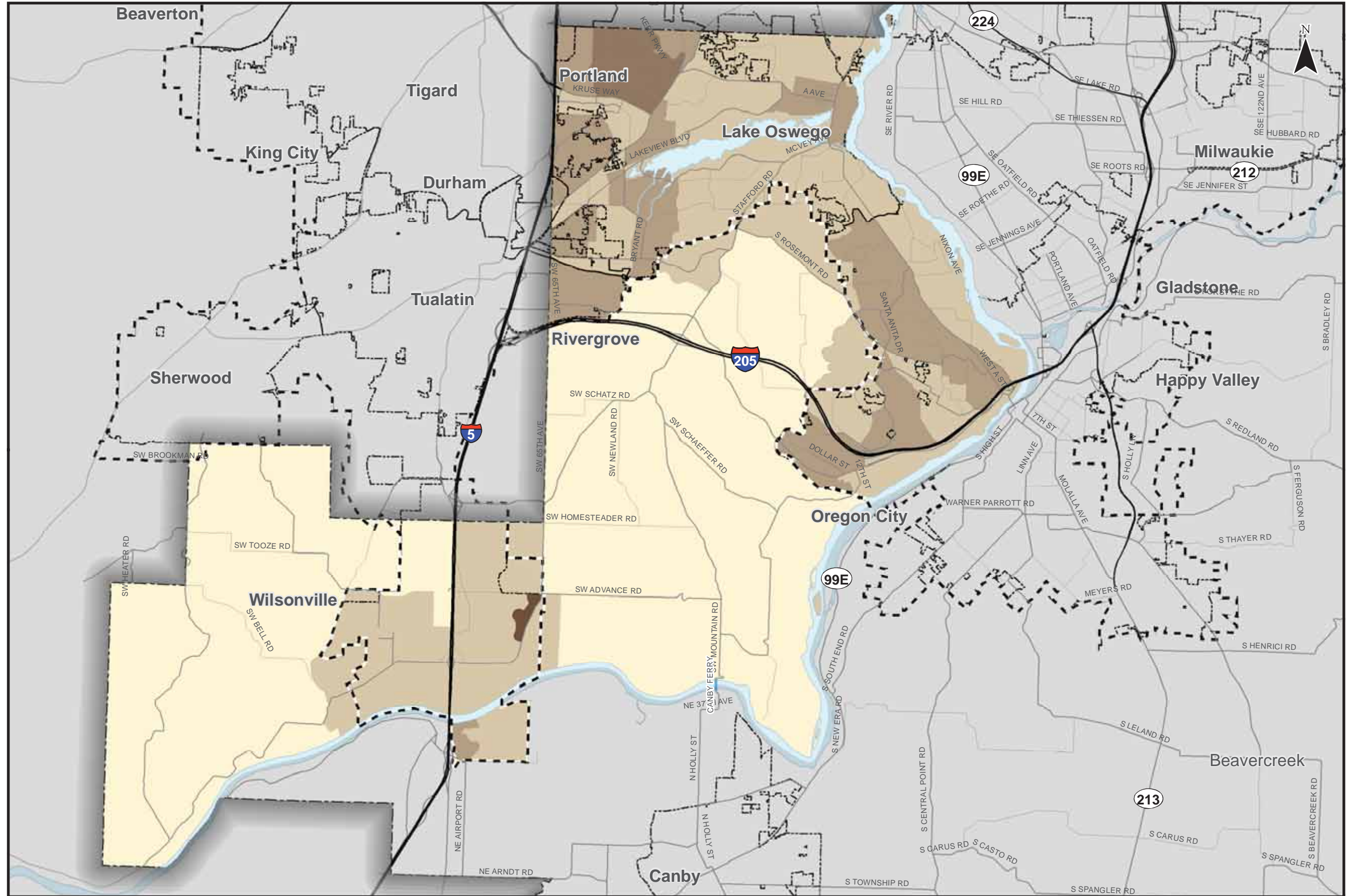
Figure
NW 3

H:\profile11732 - Clackamas County TSP\gis\11x17 Maps\03 Land Use Zoning Designations.mxd



People Per Acre

- <1
- 1 - 5
- 6 - 8
- 9 - 12
- 13 - 17
- Incorporated Areas
- County Boundary
- UGB

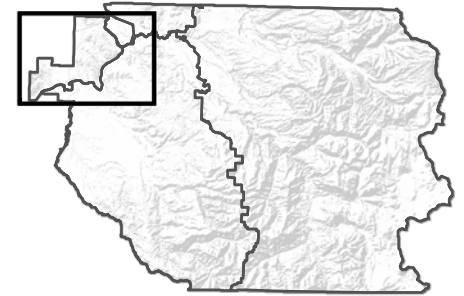
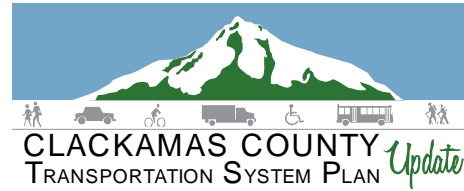


**Population Density by Census Tract
Northwest County**

Figure
NW 4

0 1 2
Miles

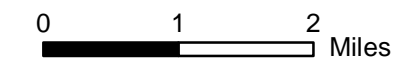
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Data Source:
Clackamas County, Metro Data Resouce Center



Population Age 65 and Older

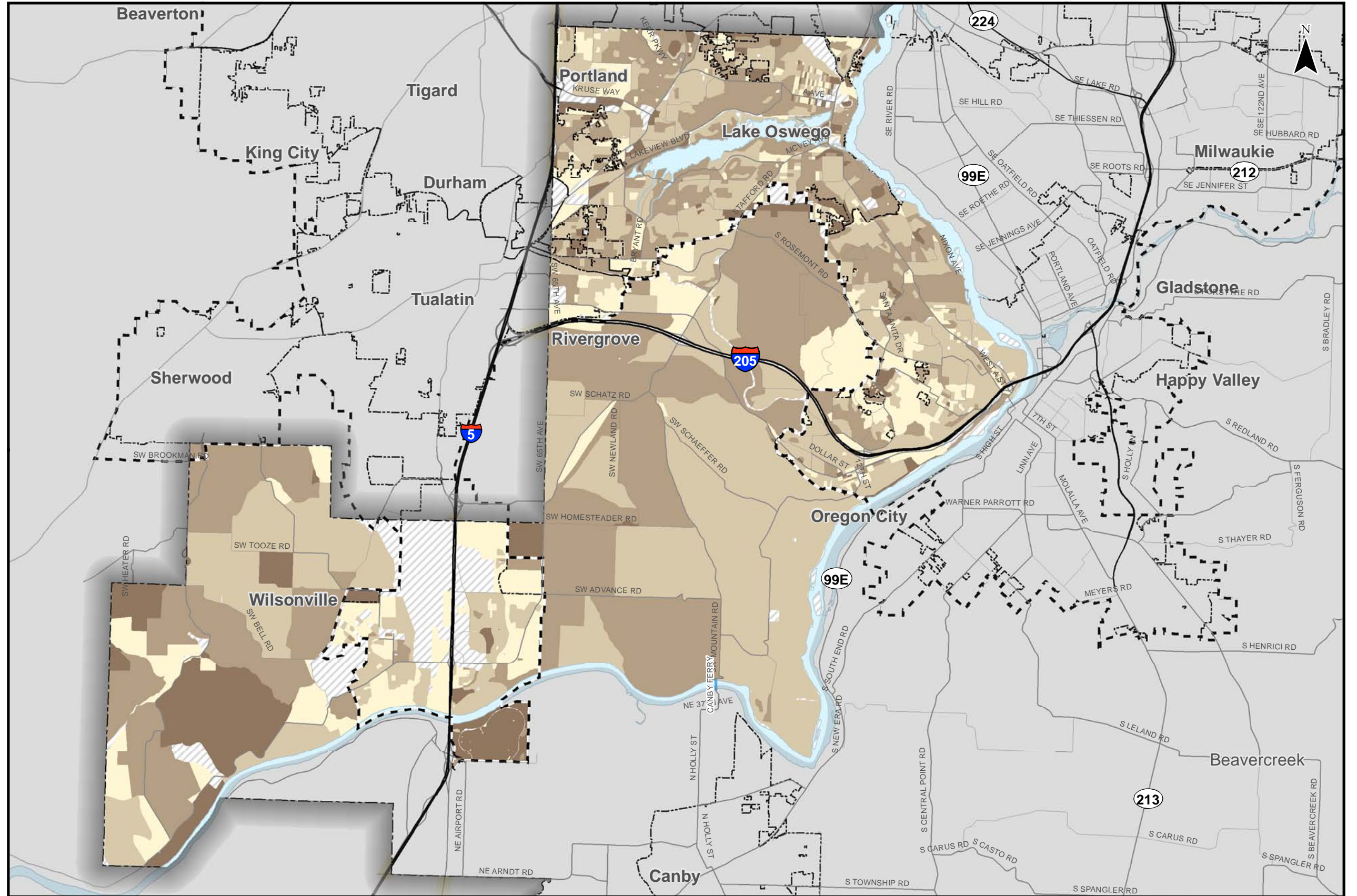
- 0% - 6%
- 6% - 15%
- 15% - 30%
- 30% - 100%

- No Data
- Incorporated Areas
- County Boundary
- UGB



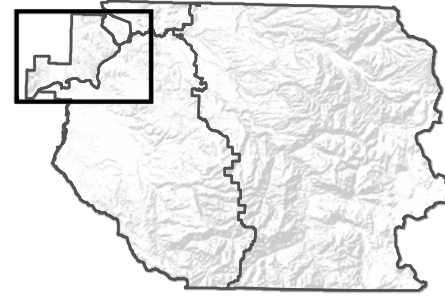
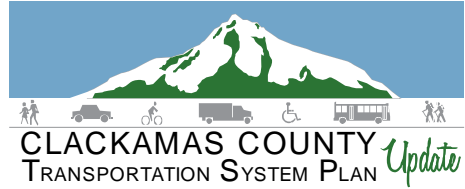
Coordinate System:
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Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resource Center



**Elderly Population by Census Block
Northwest County**

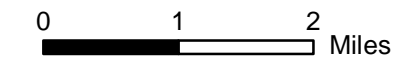
Figure
NW 5



Population Under Age 18

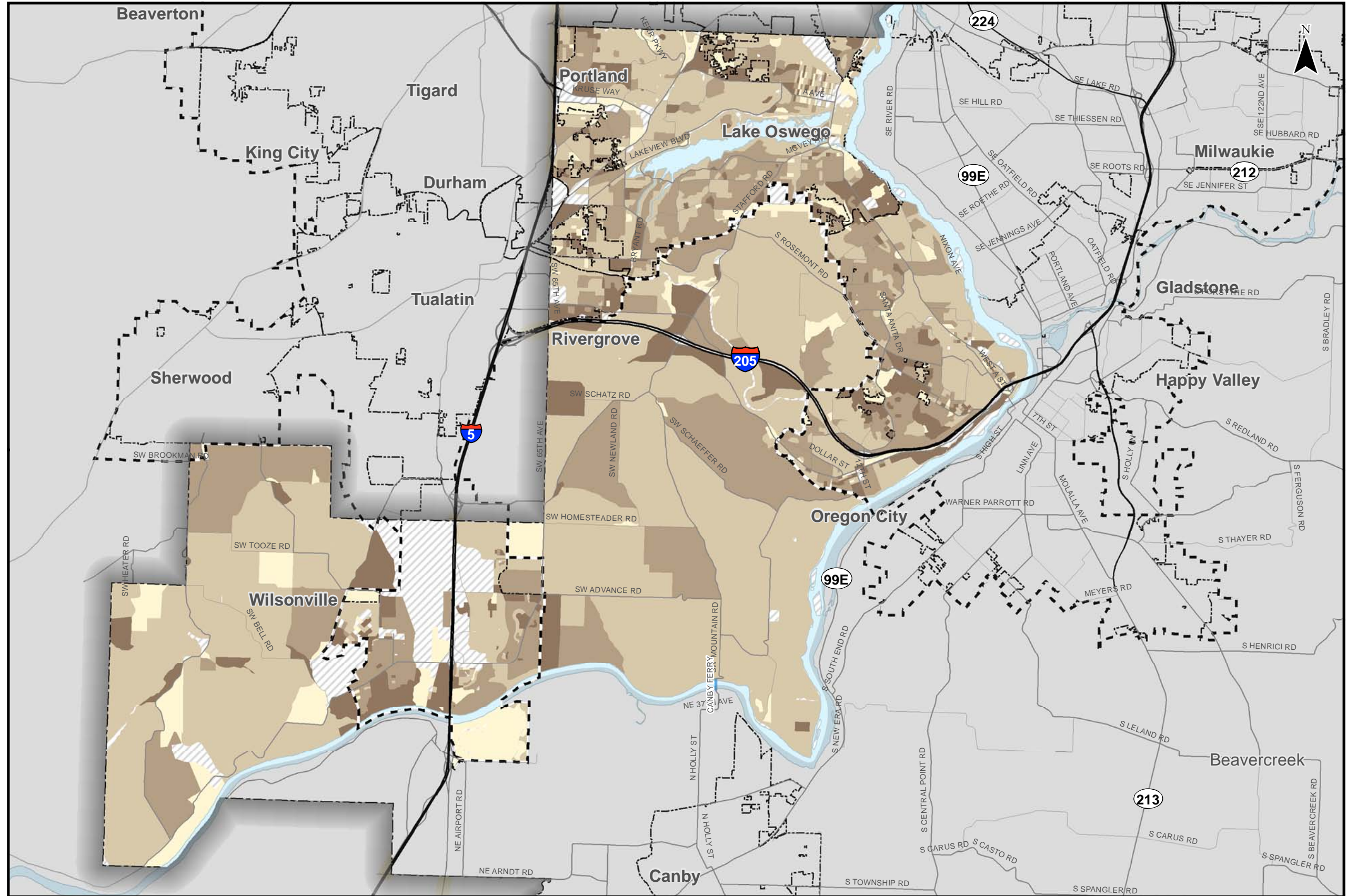
- 0% - 10%
- 10% - 25%
- 25% - 33%
- 33% - 100%

- No Data
- Incorporated Areas
- County Boundary
- UGB



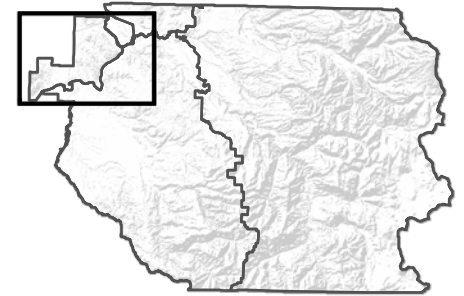
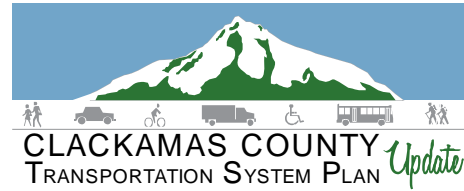
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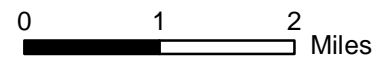
**Youth Population by Census Block
Northwest County**

Figure
NW 6



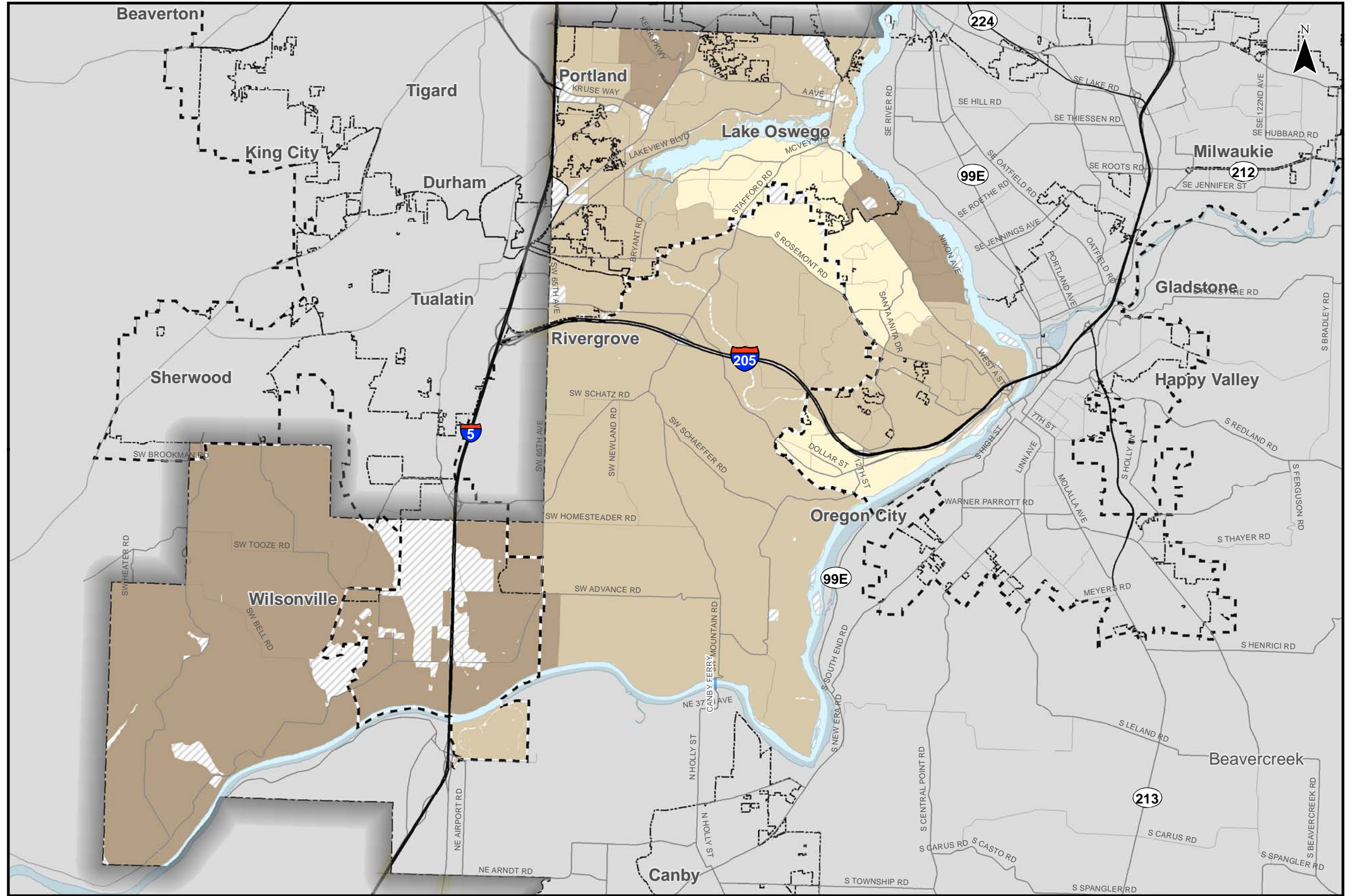
**Population Under
200% Poverty**

- 0% - 10%
- 10% - 20%
- 20% - 33%
- 33% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB



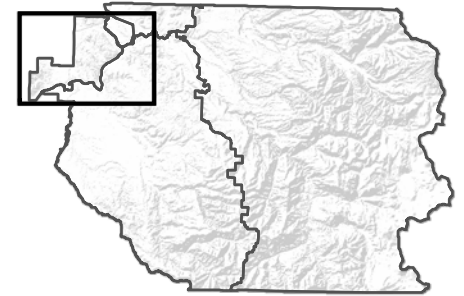
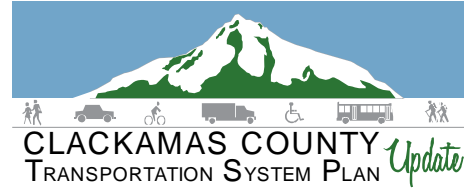
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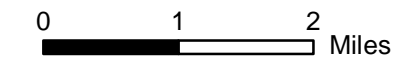
**Low Income Population by Census Block
Northwest County**

Figure
NW 7



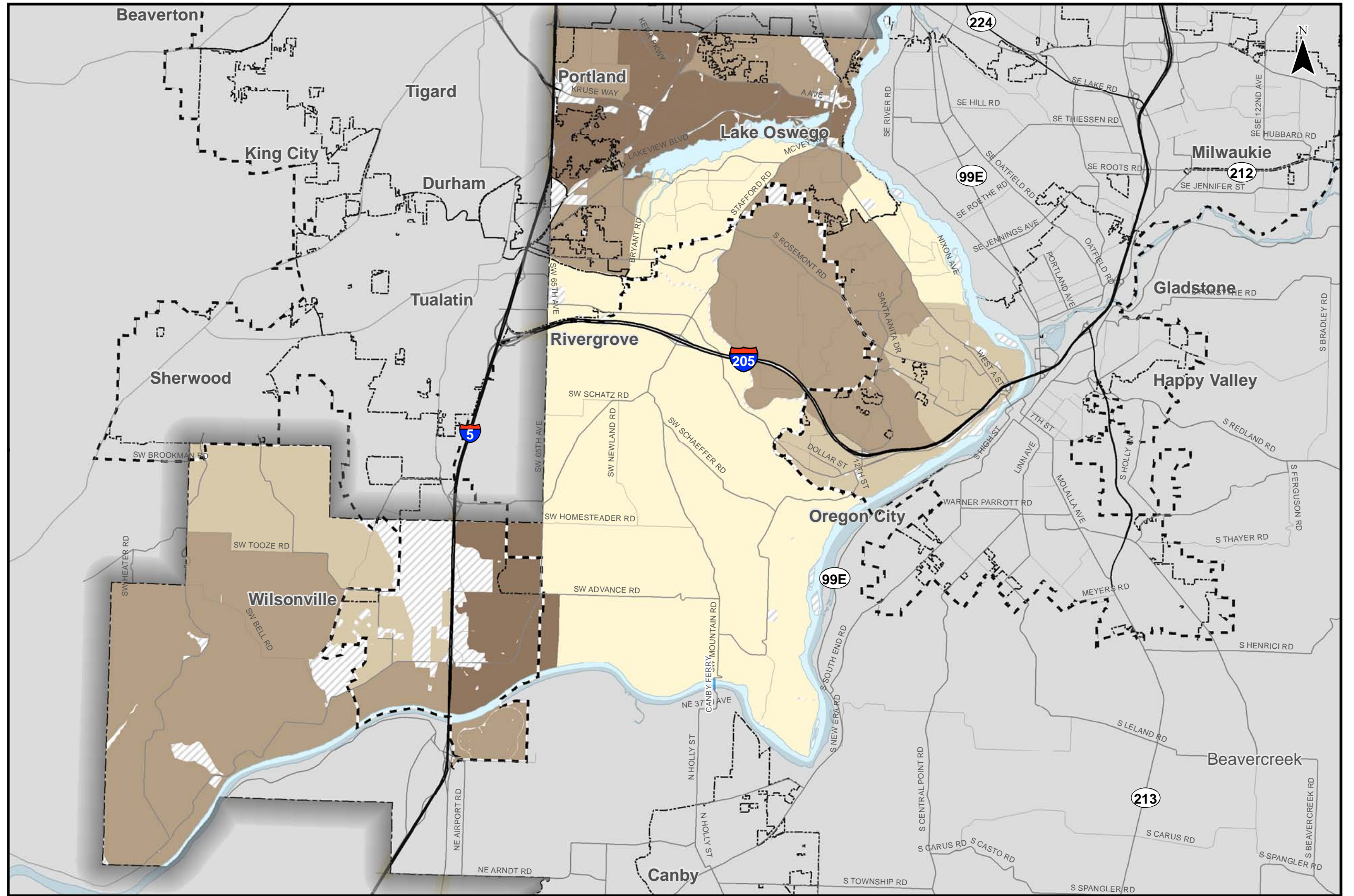
Households with Less Than Two Vehicles

- 0% - 10%
- 10% - 15%
- 15% - 25%
- 25% - 100%
- No Population/No Data
- Incorporated Areas
- County Boundary
- UGB



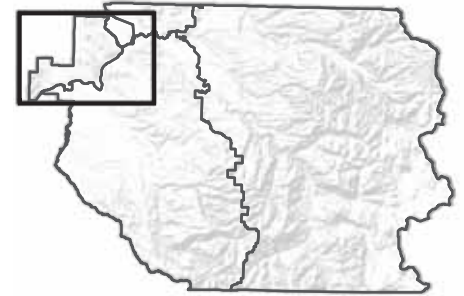
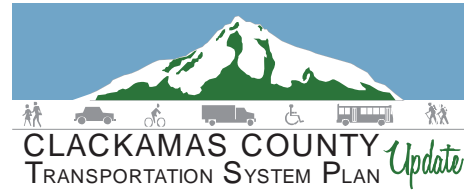
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Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, TigerLine Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resource Center



**Vehicle Ownership by Census Block
Northwest County**

Figure
NW 8

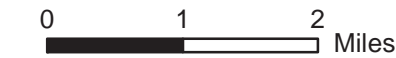


Transportation Disadvantaged

- No Data
- Least Disadvantaged
- Somewhat Disadvantaged
- Disadvantaged
- Most Disadvantaged
- Incorporated Areas
- County Boundary
- UGB

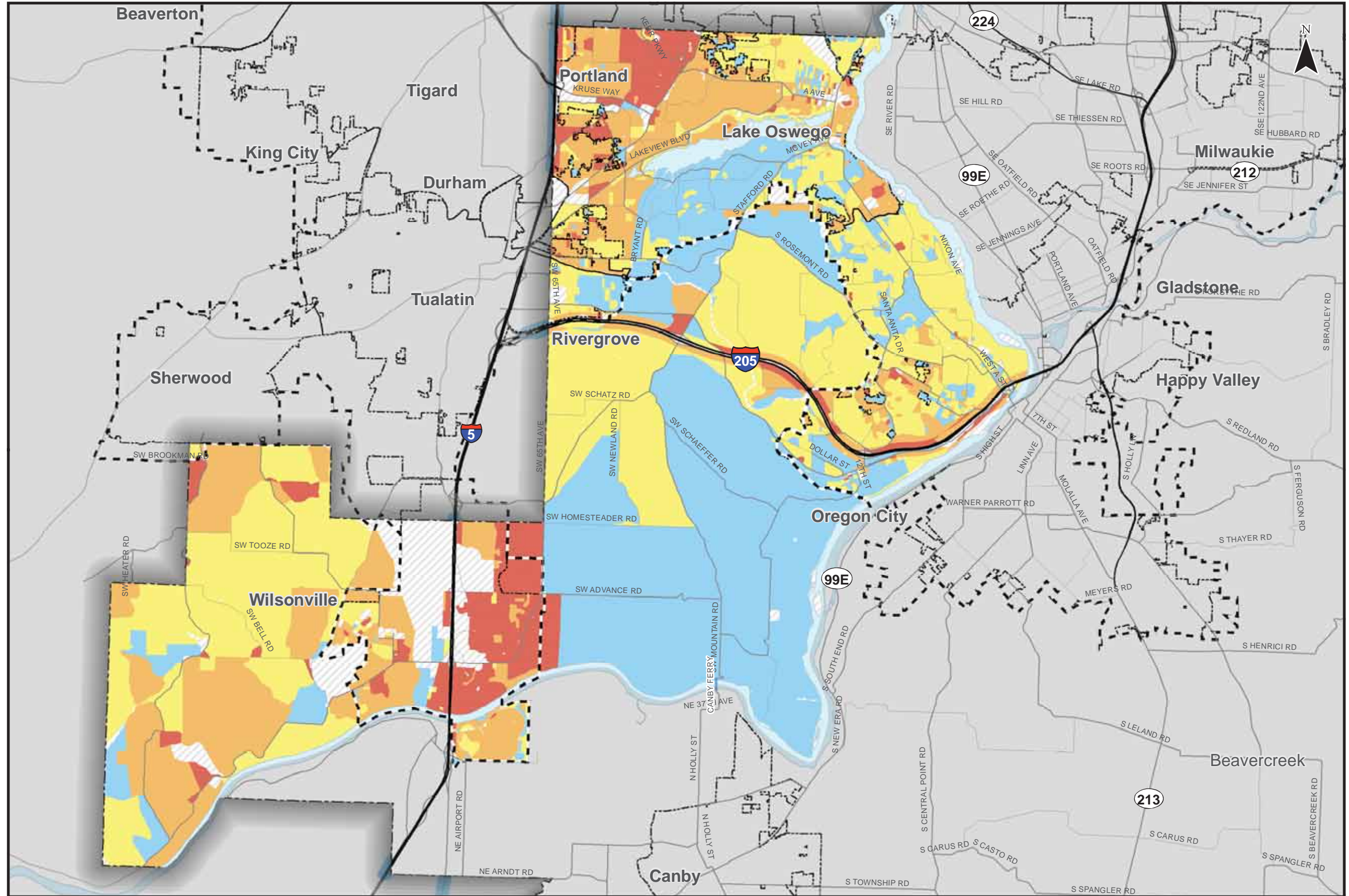
The Transportation Disadvantaged Index takes into account a number of demographic characteristics including age, income, ethnicity, vehicle ownership, ability to speak English, and proximity of freeway or highways to a household. The higher the index number the more disadvantaged the population is with respect to transportation.

More specifically the index is calculated at the census block level as the sum of people 65 and older, 17 and younger, under 200% of the poverty line, non-white and non-Hispanic, living in households with 0-1 vehicles, and living in households where no adult speaks English well. That sum is divided by total block population; twenty-five is added for areas within 500 feet of a freeway or highway. People fitting into multiple vulnerability categories are counted multiple times. Data at the household level is multiplied by 2.56 to convert it to a person unit. The number 2.56 is the average household size for Clackamas County. Data only available by tract is distributed among blocks based on the distribution of tract population.



Coordinate System:
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Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute, Clackamas County, Metro Data Resource Center



**Transportation Disadvantaged Populations by Census Block
Northwest County**

Figure
NW 9

H:\profile11732 - Clackamas County TSP\figs\11x17 Maps\09 Transportation Disadvantaged Populations by Census Block.mxd

TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

This section summarizes the existing transportation system operations within the Northwest area. It includes a review of the roadway and intersection operations with a focus on vehicular travel, as well as the pedestrian and bicycle system, public transportation system, and crash analysis. A discussion of the methodology and approach for this analysis is provided in Section 3 of this report. While this report attempts to accurately reflect the existing conditions of the transportation system, it is not meant to serve as an all-encompassing and comprehensive final assessment. Rather, it is meant to serve as a starting point for discussion by the broader community about the current state of the transportation system in Clackamas County. This information will be used to help inform the development of the Clackamas County TSP.

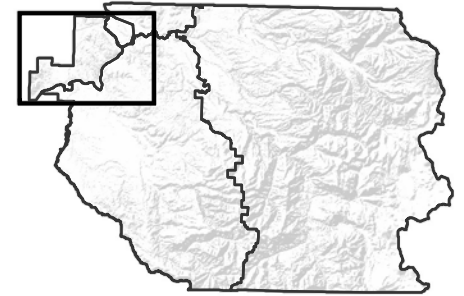
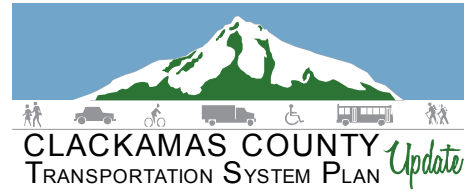
Figure NW 10 illustrates the functional classification designations of the streets. A street's functional classification reflects its role in the transportation system and defines desired operational and design characteristics. Clackamas County has six functional street classifications:

- Freeway and Expressway,
- Major Arterial,
- Minor Arterial,
- Collector,
- Connector, and
- Local Street.

These classifications and the role they play in defining a street's design and character are further described in *Section 3 Assumptions and Methods* of this report.

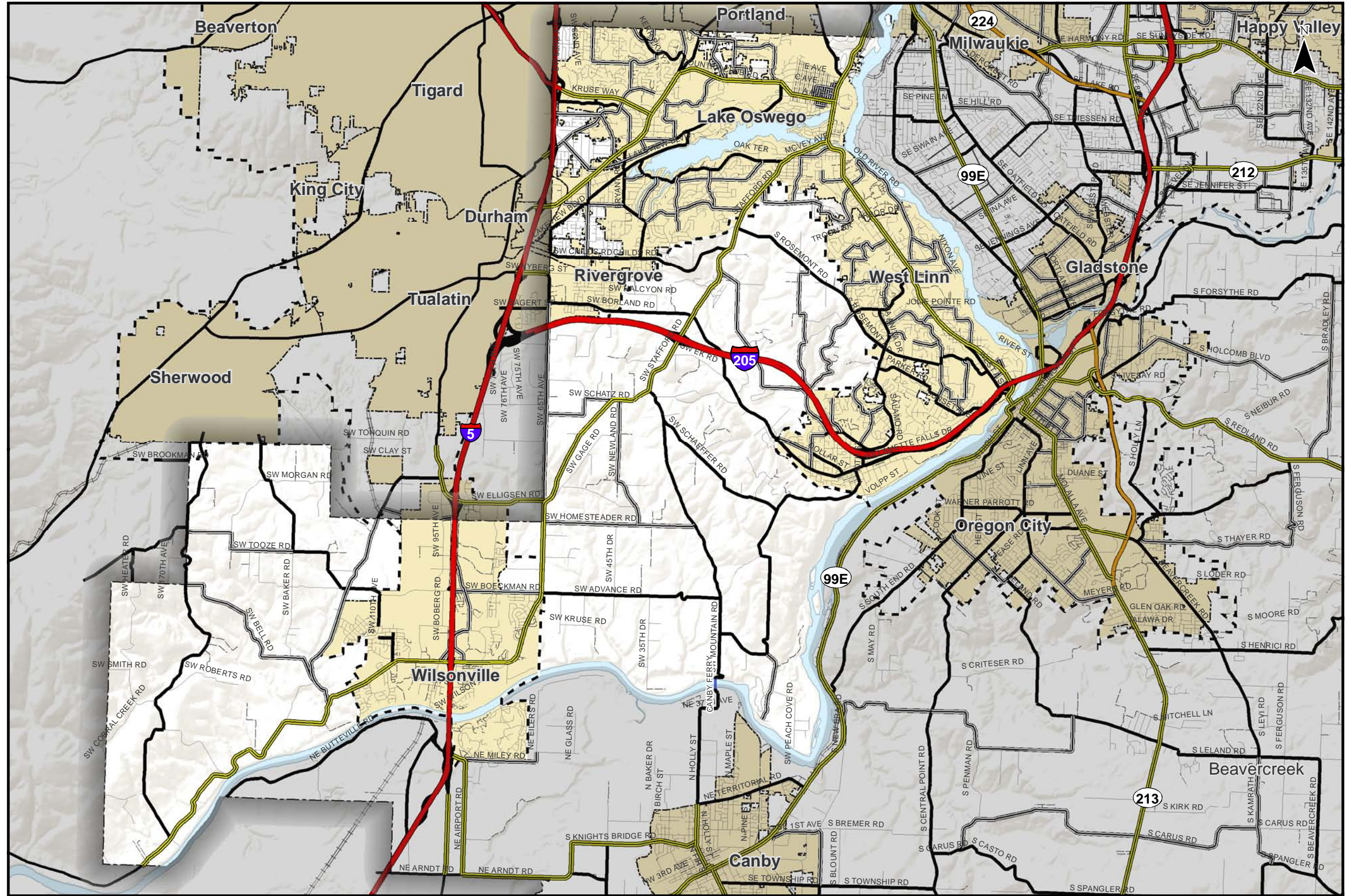
Figure NW 11 illustrates the existing signal locations and notes which roadways are maintained by the County. As seen in the figure, most signalized intersections are in the incorporated areas, particularly in Wilsonville, West Linn, and Lake Oswego. The County does not maintain most roadways in Wilsonville, West Linn, Lake Oswego, or portions of Rivergrove. There are also several state highways in the Northwest County maintained by ODOT, including I-5 and I-205.

Figure NW 12 maps at-grade railroad crossing locations. There are several railroad crossings along the Portland/Western rail line that runs through Wilsonville.



Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroads
- Ferry
- Incorporated Areas
- County Boundary
- UGB



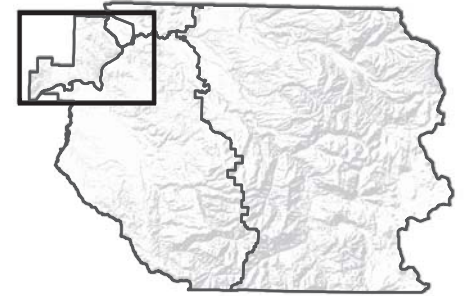
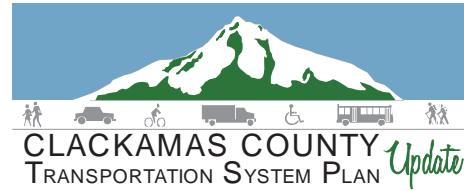
**Roadway Functional Classifications
Northwest County**

Figure
NW 10

0 1 2 Miles

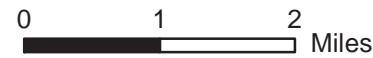
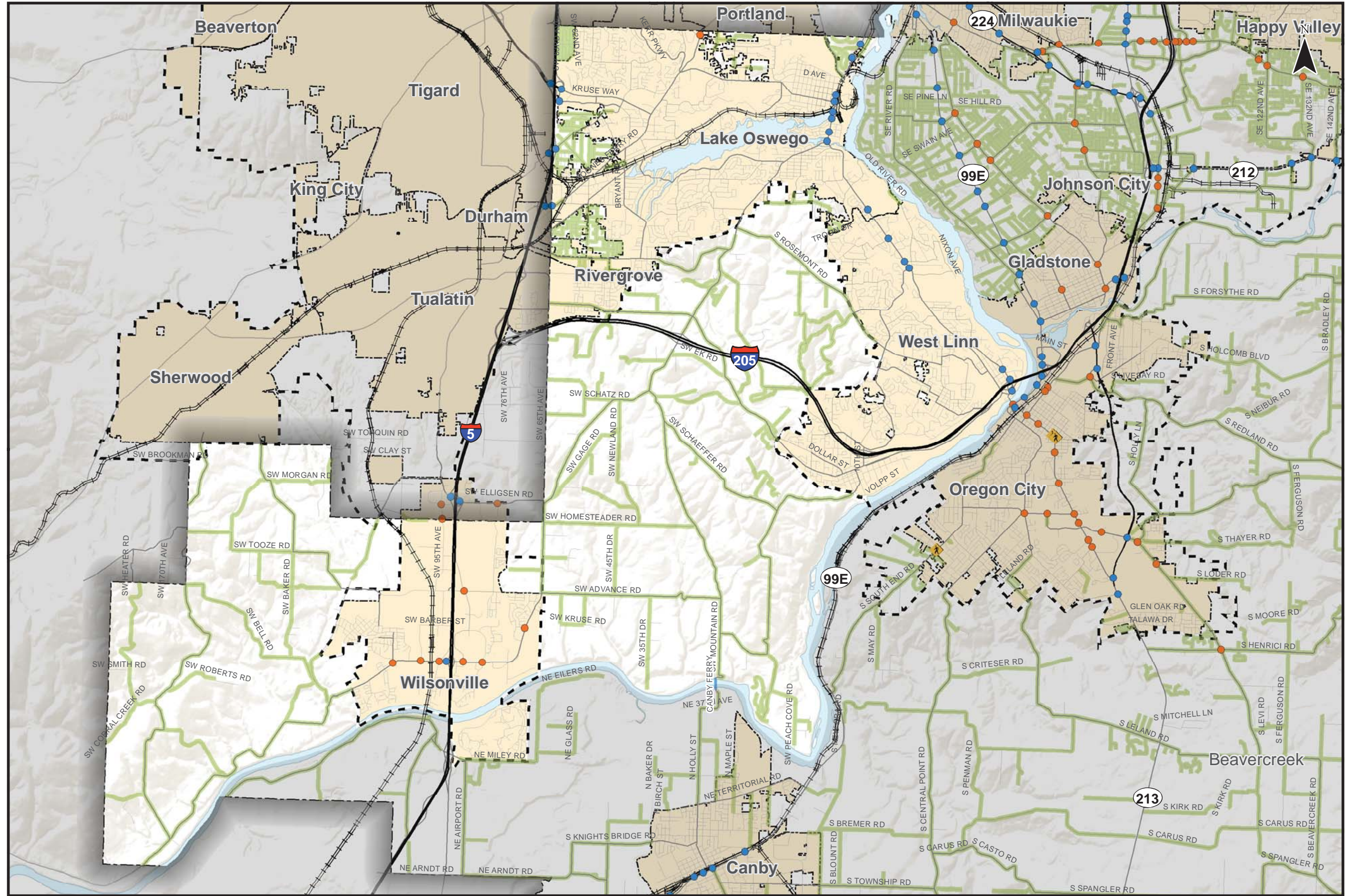
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Data Source:
Clackamas County, Metro Data Resouce Center

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Existing Traffic Signals

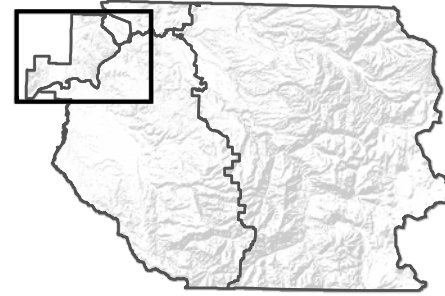
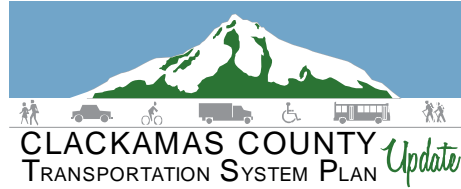
- County Owned
- ODOT Owned
- ▲ Ped Crossing Flasher
- County Maintained Roads
- Incorporated Areas
- County Boundary
- UGB



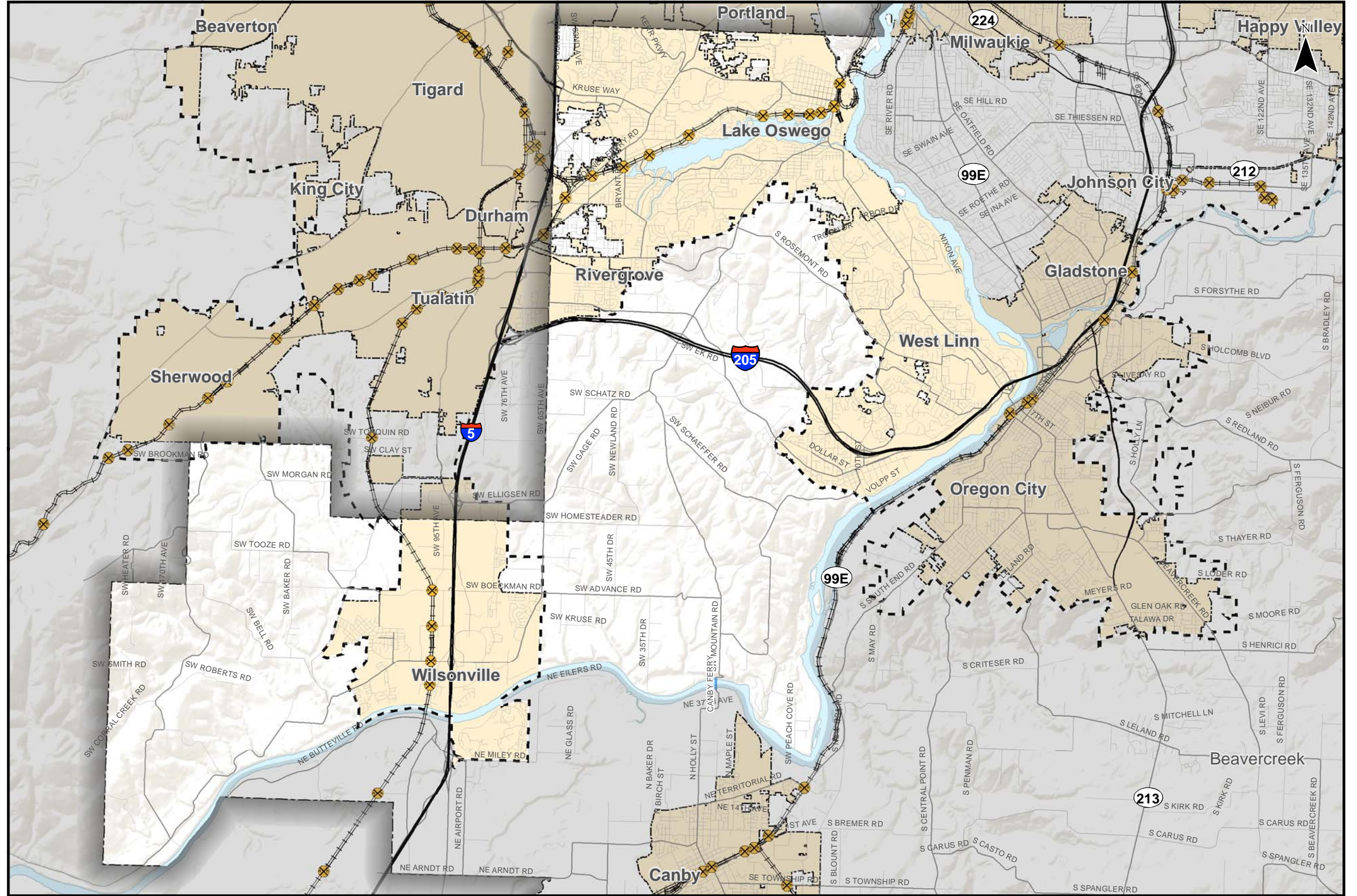
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

**Existing Signal Locations
Northwest County**

Figure
NW 11



- At-Grade Rail Crossings
- Railroads
- Incorporated Areas
- County Boundary
- UGB



**At-Grade Railroad Crossing Locations
Northwest County**

Figure
NW 12

0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Intersection and Road System Operations Analysis

This section summarizes the analysis and findings related to existing traffic operations with a focus on auto transportation modes. Operations were analyzed at key study intersections and roadway segments.

Study Intersection Traffic Operations Analysis

TSP study intersections were selected based on input from ODOT, city, and County staff. Figure NW 13 shows the location of each study intersection and notes whether intersections fall under the County's jurisdiction or the Oregon Department of Transportation's (ODOT's) jurisdiction. All five study intersections are on County facilities. Figure NW 14 shows the existing lane configurations and traffic control devices at each location. With the exception of the roundabout at the intersection of SW Borland Road and SW Stafford Road, all study intersections are currently stop-controlled.

Traffic Operations Analysis Results for Study Intersections

Existing traffic operations at the study intersections were assessed based on seasonally adjusted year 2012 turning movement counts, which reflect weekday p.m. peak hour traffic conditions. The operations at each intersection were compared to the respective performance standards. All study intersections are located outside the UGB and on County facilities. Therefore, the standard is level-of-service D. The process used to evaluate the traffic operations is more extensively described in *Section 3 Assumptions and Methods* of this report. The results are shown in Table NW 1 and Figure NW 15, with intersections that are operating below performance standards noted.

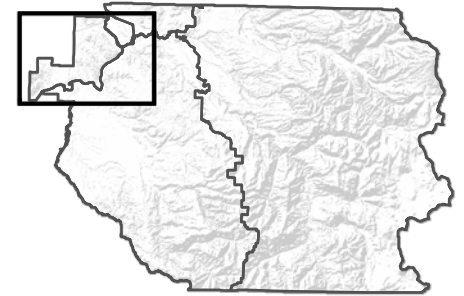
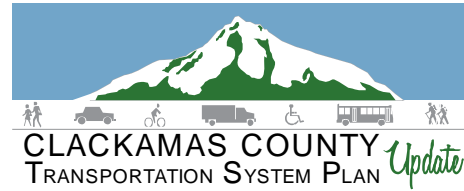
Table NW 1 Traffic Operations Analysis Results at Study Intersections in the Northwest County

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard?
301	SW Childs Rd/SW Stafford Rd	County	LOS = D	No (LOS=F)
302	SW Borland Rd/SW Stafford Rd	County	LOS = D	Yes
303	SW Mountain Rd/SW Stafford Rd	County	LOS = D	Yes
304	SW Ellingson Rd/SW 65th Ave	County	LOS = D	Yes
305	SW 65th Ave/SW Stafford Rd	County	LOS = D	No (LOS=E)

As shown, two intersections do not meet standards:

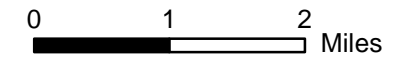
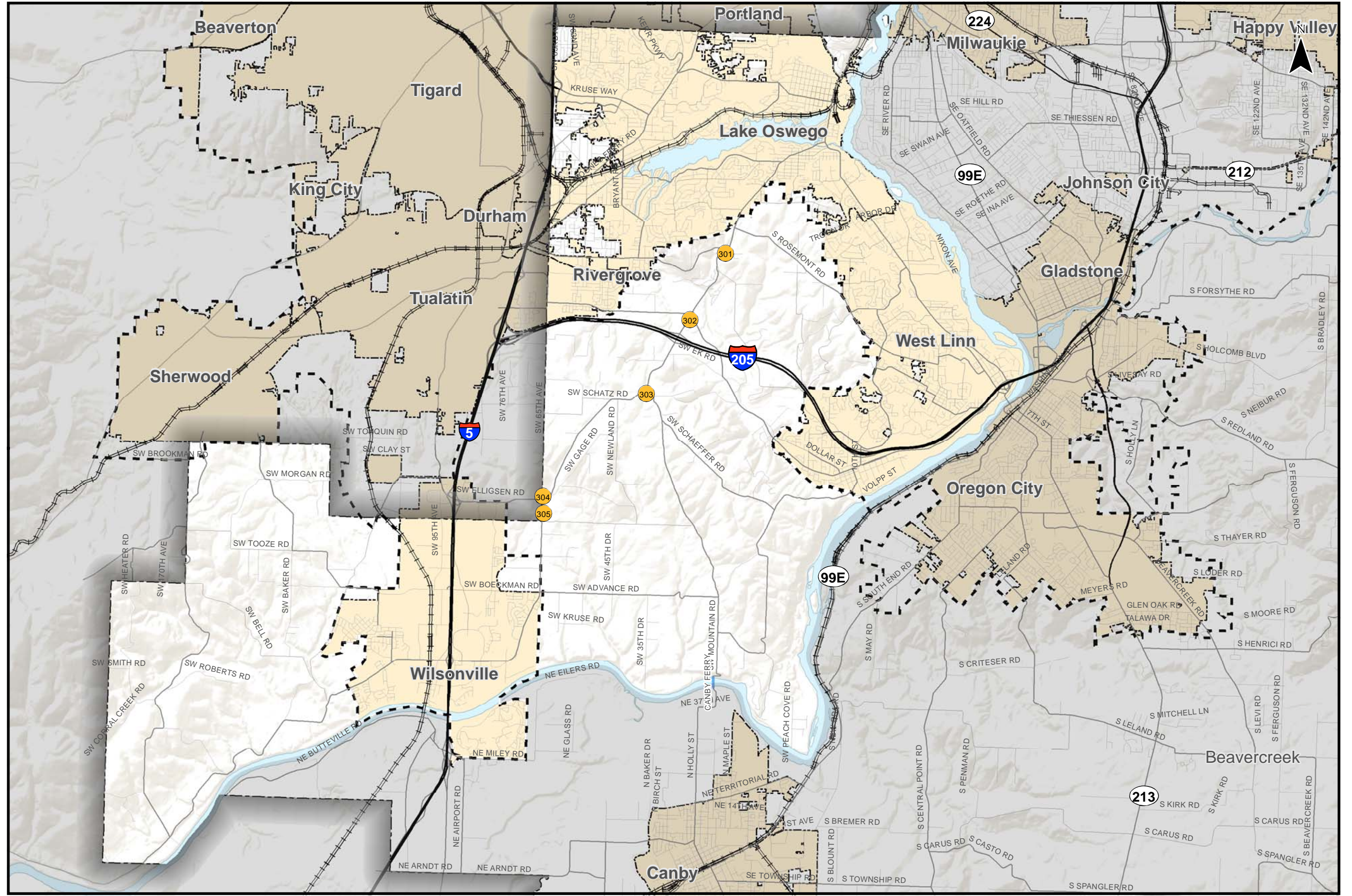
- SW Childs Road/SW Stafford Road (301) and
- SW 65th Avenue and SW Stafford Road (305).

All other intersections operate below the volume-to-capacity ratio standards. *Appendix 8* contains detailed traffic operations analysis results.



Study Intersection Jurisdiction

- ODOT
- Clackamas County
- Incorporated Areas
- County Boundary
- UGB

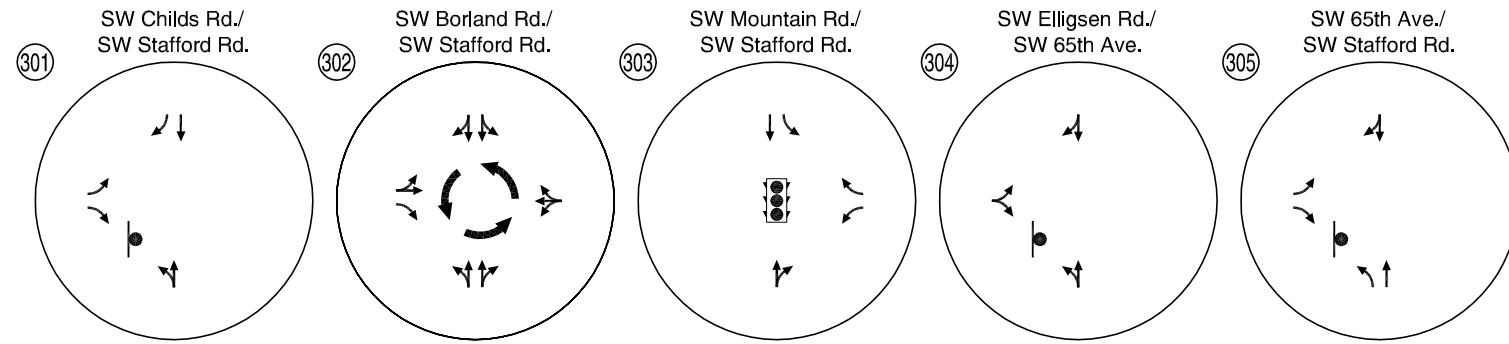


Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

**Transportation System Plan Study Intersections
Northwest County**

Figure
NW 13

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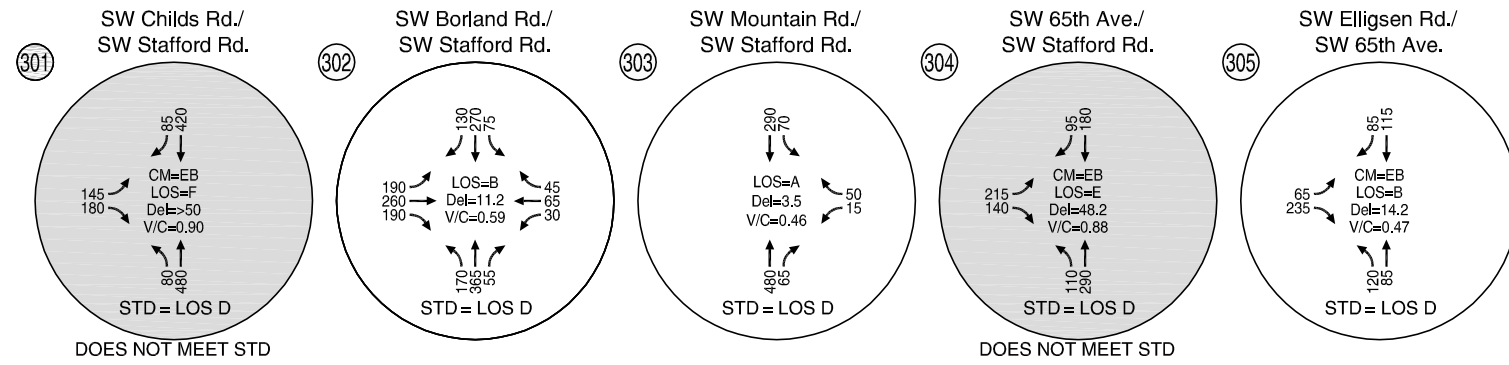


Existing Lane Configuration and Traffic Control Devices Northwest County

- ## - ODOT STUDY INTERSECTION
- ## - COUNTY STUDY INTERSECTION
- - STOP SIGN
- ⬆️ - TRAFFIC SIGNAL
- ⦿ - ROUNDABOUT



**Figure
NW 14**



H:\profile\11732 - Clackamas County TSP\dwg\figs\11732AnalysisIntersections_ExCond_Satflow.dwg May 28, 2012 - 9:21am - klausse Layout Tab: C_Ops

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 STD = OPERATIONAL STANDARD

Existing Intersection Operations PM Peak Hour Northwest County



**Figure
 NW 15**

Roadway Segment Operations Analysis

The roadway segment operations analysis consists of considering the roadway segment volumes and approximate level of congestion based on a comparison of the volume to the segment capacity. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure NW 16 illustrates the roadway link volumes from the weekday evening peak hour. The roadway segment volumes are from Metro’s travel demand model; therefore, the roadway segment links approximate the actual roadway geometry. The roadway segment links in the model do not reflect roadway curvature. Also, the roadway segment link volumes from the model are provided for roadways of generally a major collector designation or higher, so traffic volume on local roads are not reflected.

As is evident from Figure NW 16, under the existing roadway system demand for travel is highest along Stafford Road, SW Borland Road, S Rosemont Road and SW Mountain Road.

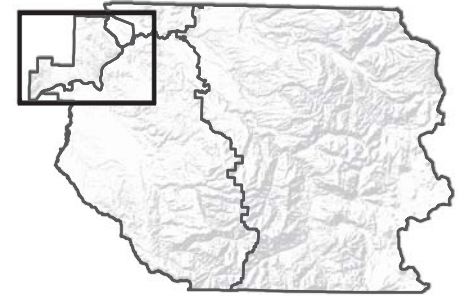
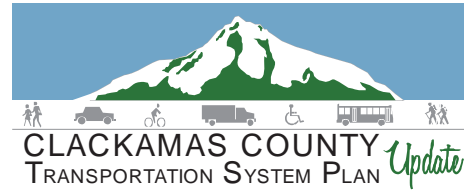
Approximate Level of Congestion

The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro base model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion. Table NW 2 summarizes the level of congestion that corresponds to different volume-to-capacity ratios.

Table NW 2 Volume-to-Capacity Ranges for Roadway Segment Congestion Estimates

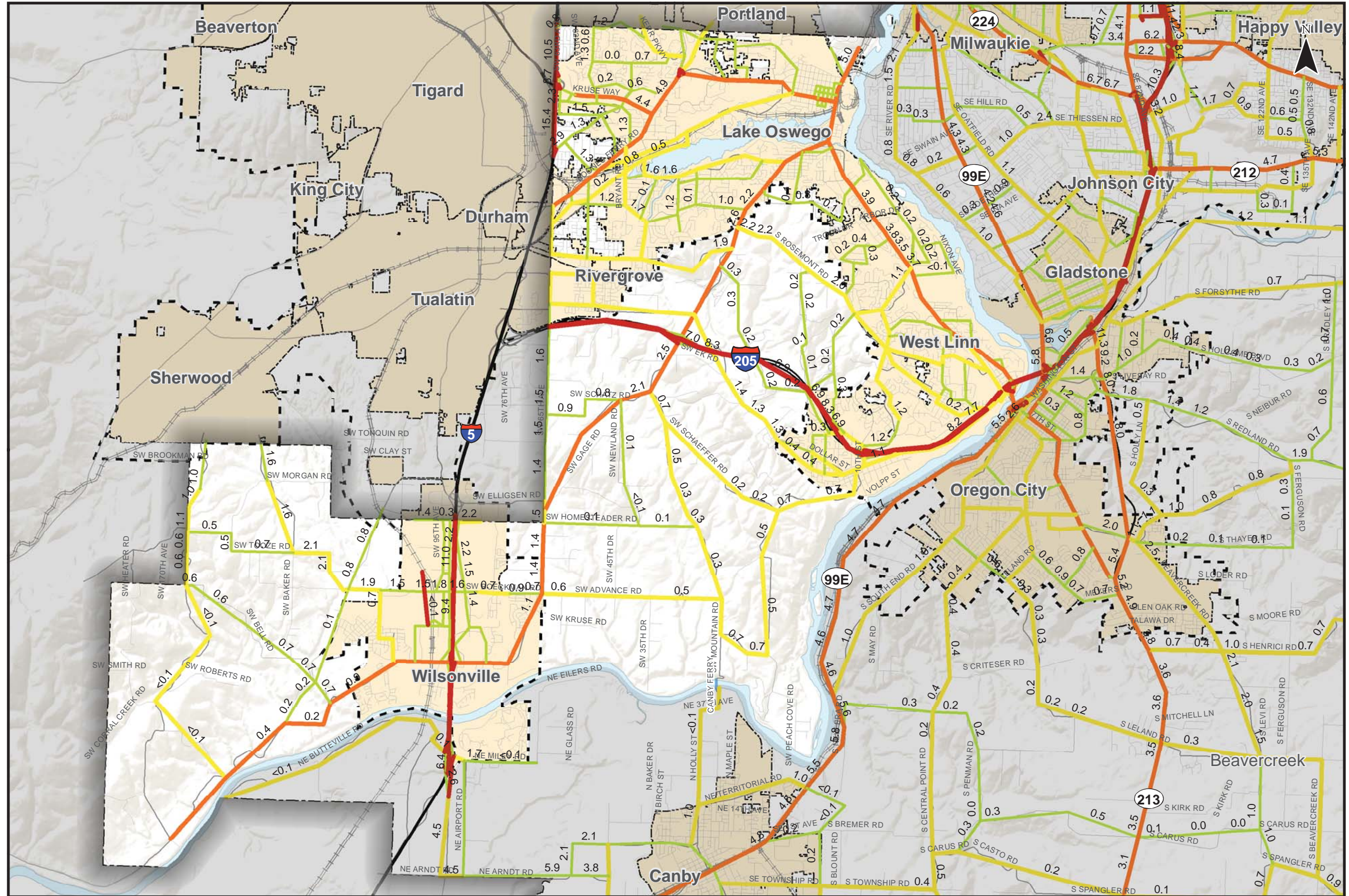
Congestion Level	Volume to Capacity Range
Very Congested	1.1 or greater
Congested	1.0 to 1.1
Some Congestion	0.9 to 1.0
Nearing Congestion	0.8 to 0.90
Less Congested	0.0 to 0.80

Figure NW 17 illustrates the relative congestion during the weekday evening peak hours on roadways based on the estimated roadway segment volumes and capacity. It is possible for the study intersection analysis results to indicate there are intersections experiencing relatively high amounts of delay on roadway segments that are shown as experiencing relatively minimal congestion. The roadway segment analysis considers only the capacity of the lanes on the segment and the volumes on the segment. It is an idealized assessment of volume to capacity (e.g., if all vehicles were traveling in the same direction along a roadway, how many vehicles could the roadway carry). In actuality, motorists experience congestion on roadway segments due to intersection operations. The purpose of the roadway segment analysis is to help identify if the delay being experienced (or anticipated to be experienced in the future) is primarily related to the intersection or the roadway segment.



2010 Base Volumes

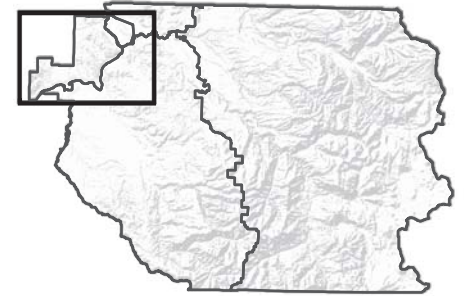
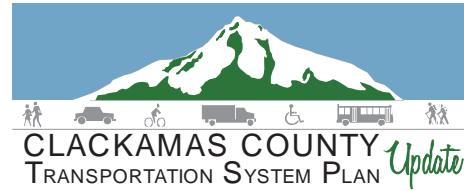
- Freeway
- Principal / Major Arterial
- Minor Arterial
- Lower Order Facility
- ##** PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



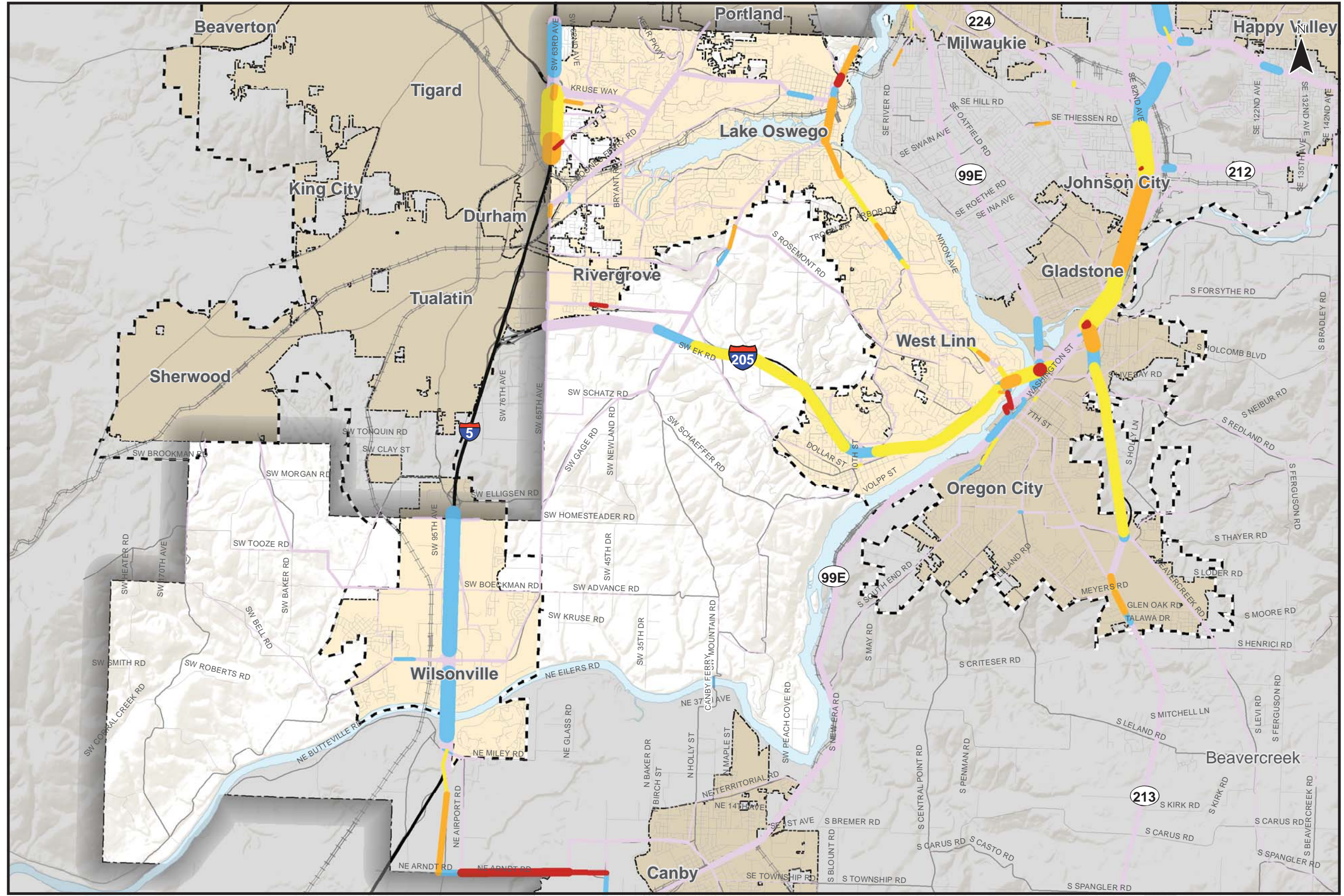
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County,
Metro Data Resource Center

**Evening Weekday Peak Hour Link Volumes 2010 Base Year
Northwest County**

Figure
NW 16



- Very Congested >1.10**
- 1,000 Vehicles
 - 5,000 Vehicles
 - 10,000 Vehicles
- Congested 1.0 - 1.1**
- 1,000 Vehicles
 - 5,000 Vehicles
 - 10,000 Vehicles
- Some Congestion 0.9 - 1.0**
- 1,000 Vehicles
 - 5,000 Vehicles
 - 10,000 Vehicles
- Nearing Congestion 0.8 - 0.9**
- 1,000 Vehicles
 - 5,000 Vehicles
 - 10,000 Vehicles
- Less Congested <0.8**
- 1,000 Vehicles
 - 5,000 Vehicles
 - 10,000 Vehicles
- Incorporated Areas
 - County Boundary
 - UGB



**Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year
Northwest County**

Figure
NW 17

0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County,
Metro Data Resource Center

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As can be seen in Figure NW 17, under the 2010 Base Year the roadway segments (excluding I-205 and I-5) are primarily uncongested during the weekday evening peak hour. Relatively short segments of Stafford Road south of Rosemont Road are estimated to experience some level of congestion. A similar analysis was conducted for two future year scenarios; the results of that analysis are discussed further below in the section presenting Future Conditions for Northwest County.

Table NW 3 lists the roadway segments that have volume-to-capacity ratios over 0.8 and describes the level of congestion as nearing congestion, some congestion, congested, or very congested.

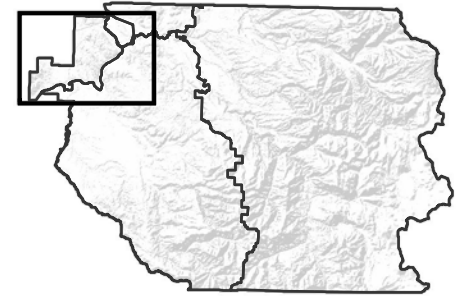
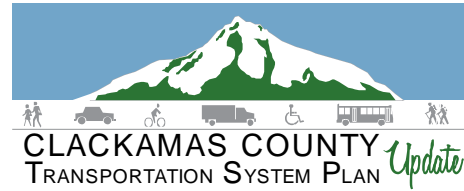
Table NW 3 2010 Base Year Roadway Segment Congestion in Northwest County

Roadway	Segment	Level of Congestion
I-5	Through Wilsonville	Nearing Congestion
SW Wilsonville Rd	Western Wilsonville	Nearing Congestion
I-205	SW Stafford Rd to east border of area	Nearing Congestion to Congested
OR 43	Through Lake Oswego and portions of West Linn	Nearing Congestion to Very Congested
SW Stafford Rd	SW Johnson Rd to Rosemont Rd	Nearing Congestion to Congested
SW Borland Rd	Through south Rivergrove	Very Congested
SW A Ave	Through Lake Oswego	Nearing Congestion

Pedestrian and Bicycle System

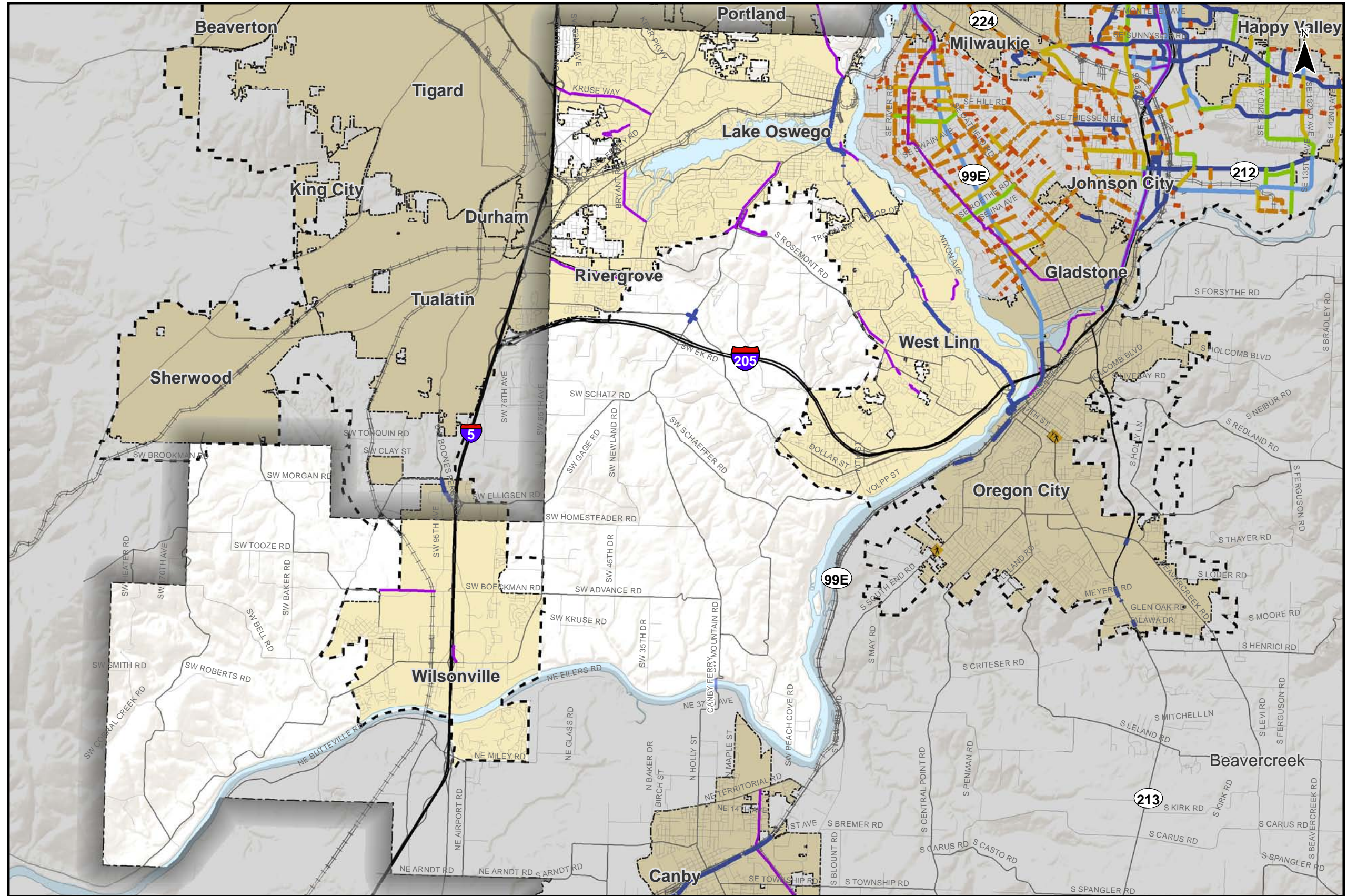
Figure NW 18 illustrates the location of sidewalks, multi-use paths, and crosswalk signals. Figure NW 19 illustrates the location of bike lanes, multi-use paths and shoulder bikeways on roadways in the County. The information is based on inventory data obtained from the County, TriMet, and ODOT.

As shown in Figure NW 18, the majority of the unincorporated area in Northwest County is rural. The rural areas of the county have no sidewalks except a small portion of Rosemont Road. There are sidewalks within Lake Oswego, West Linn, and Wilsonville that are not shown in Figure NW 18. *(Note that the data shown within cities is not complete and primarily includes state and county facilities only.)* Sidewalks are required on all roadways in urban areas from local streets to Major Arterials, but are not required in rural areas. However, within “unincorporated communities,” sidewalks or walkways are to be provided adjacent to or within areas of development, such as schools, businesses, or employment centers near or along highways. Based on rural standards, there are no gaps in the pedestrian system in the rural areas of the Northwest County area. However, roadway shoulders are part of the rural roadway standards and are used by pedestrians in rural areas. The bicycle system gaps and deficiencies in the following section indicate areas where rural roads lack shoulders that are four feet or wider. These gaps and deficiencies should also be considered as important for rural pedestrians. While the county’s standards require sidewalks on all streets in the urban area, none of the streets in the county’s urban areas west of Lake Oswego are designated as part of the Essential Pedestrian Network in the County’s comprehensive plan (see Appendix 5).



Pedestrian Network

- Sidewalks
- 76% to 99% Complete
- 51% to 75% Complete
- 26% to 50% Complete
- 1% to 25% Complete
- - - No Sidewalks
- Multi-Use Path
- ◆ Ped Crossing Flasher
- Incorporated Areas
- County Boundary
- UGB



0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Int
Data Source:
Clackamas County, Metro Data Resouce Center

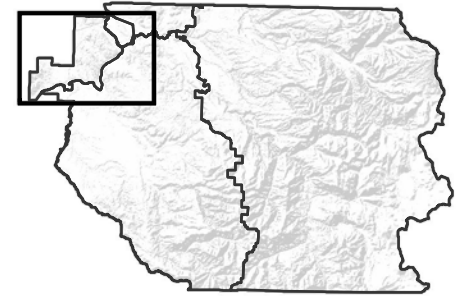
**Essential Pedestrian Network
Northwest County**

Figure
NW 18

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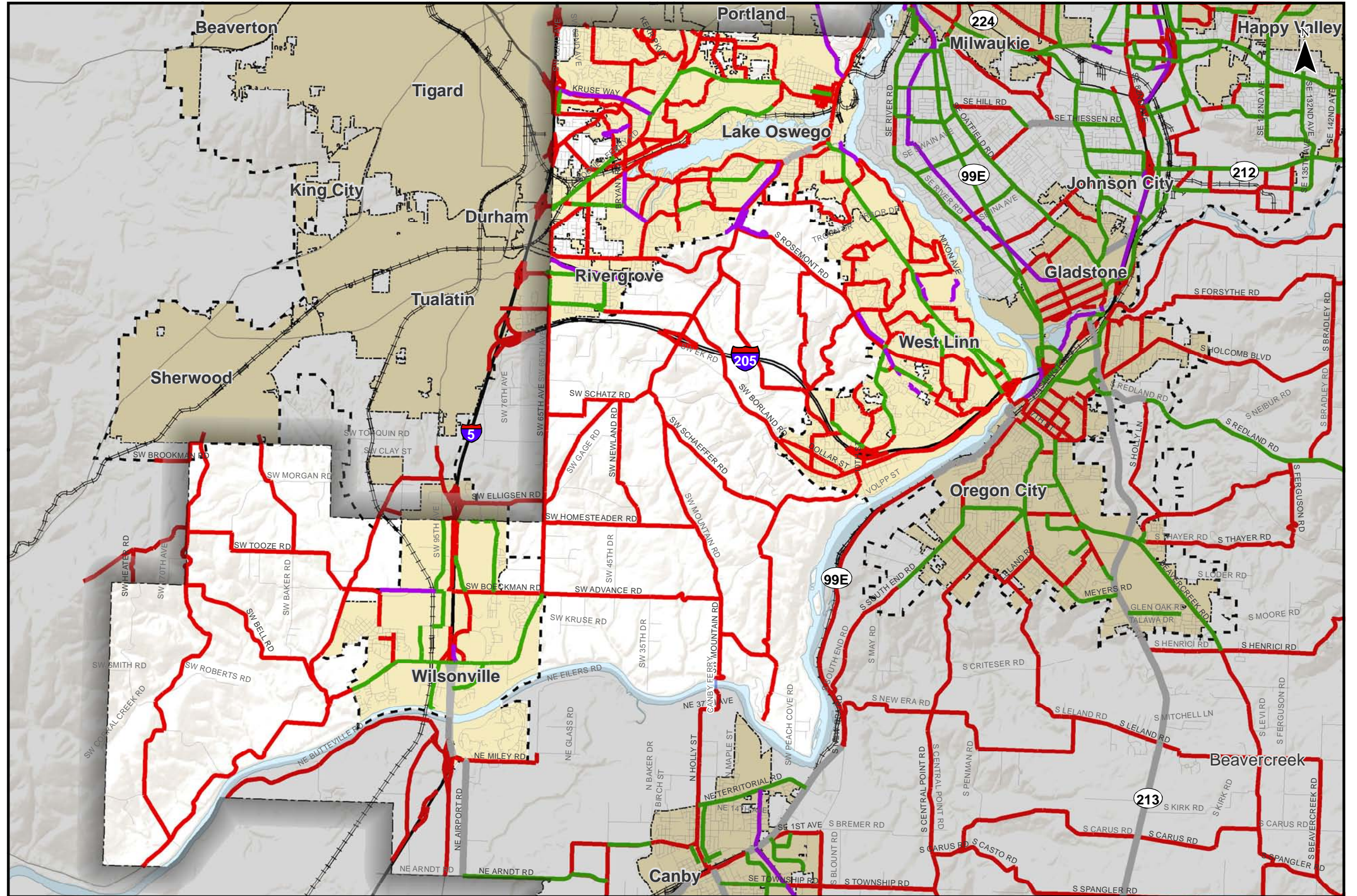


CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN *Update*



Bike Facilities

- Bike Lane
- Multi-Use Path
- Shoulders (At Least 4ft Wide)
- Gap in Bikeway Network
- Incorporated Areas
- County Boundary
- UGB



0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Int
Data Source:
Clackamas County, Metro Data Resouce Center

**Existing Bikeway Network
Northwest County**

Figure
NW 19

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As shown in Figure NW 19, with the exception of Borland Road south of I-205, the rural portions of the area have no shoulders wide enough to be designated as shoulder bikeways. However, there are some bicycle facilities within Lake Oswego, West Linn, and Wilsonville.

Bicycle facilities should be provided on all roadways designated as Collectors or higher (i.e. Major Arterials, Minor Arterials, Connectors, and Collectors). Based on the County’s current design standards, in urban areas the facility should be a bike lane and in rural areas it should be a 6 foot shoulder. The County’s current Comprehensive Plan identifies all collector and arterial roadways (urban and rural) as part of the Existing Bikeway Network (see Appendix 5 for the County’s essential pedestrian and bicycle network maps). Existing gaps in the network include all roadways identified on the Existing Bikeway Network that do not have an existing bicycle facility (nearly all County collectors and arterials).

The County’s Bicycle Master Plan identifies priorities for filling in the bicycle network gaps. The priority for these projects will be reviewed by applying the evaluation criteria of the TSP Vision and Goals. Table NW 4 below identifies the priority bicycle projects from the Bicycle Master Plan.

Table NW 4 Bicycle Master Plan Projects in the Northwest County Area

Bike Master Plan Project Number	Street Name	Section Description	Project Elements
B18	BONITA	Carman Drive to I-5	Bike lanes
B19	BOONES FERRY	Portions maintained by County	Bike lanes. Striping possibly in Tualatin / Lake Oswego jurisdiction.
B20	CARMAN	Kruse Way to I-5	Bike lanes, Reconstruction and Widening
B22	CHILDS	65th to Stafford Road	Bike lanes
B41	PILKINGTON	Boones Ferry to Childs Road	Bike lanes
RB 404	65TH	Stafford Rd to Tualatin	Widen / Shoulder Bikeways
RB 407	BORLAND	Tualatin to Stafford	Widen / Shoulder Bikeways
RB 408	BORLAND	Stafford Rd to West Linn	Widen / Shoulder Bikeways
RB 419	JOHNSON	Stafford Rd to West Linn	Widen / Shoulder Bikeways
RB 428	ROSEMONT	Stafford Rd to Summit	Widen / Shoulder Bikeways
RB 432	STAFFORD	Lake Oswego to Borland	Widen / Shoulder Bikeways
RB 433	STAFFORD	Borland to Mountain	Widen / Shoulder Bikeways
RB 434	STAFFORD	Mountain to Boeckman	Widen / Shoulder Bikeways

B= Urban Bike Facility, RB = Rural Bikeway

Public Transportation System

The public transportation system in Northwest County consists of fixed-route and dial-a-ride services as well as regional transit centers and park/rides. Frequent morning and evening peak hour service provides residents with the ability to use public transit for daily commuting, while less frequent mid-day, Saturday, and Sunday service provides residents with the ability to use public transit to access areas located throughout Clackamas County and the region.

Providers in Northwest County

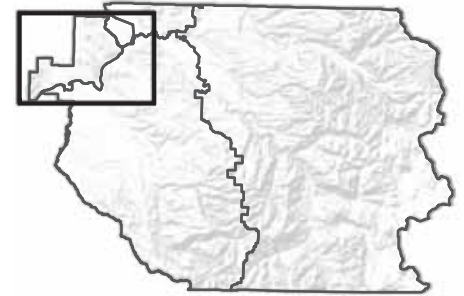
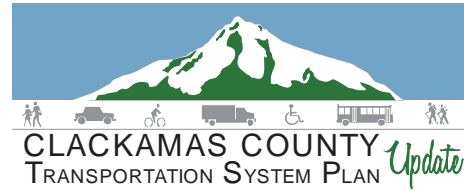
Two transit agencies currently provide service in this area, including TriMet and South Metro Area Regional Transit (SMART). Figure NW 20 displays the fixed-route services provided by each agency. These services are discussed in greater detail below.

Fixed Route Service

TriMet

TriMet operates six fixed-route bus lines and one fixed-route heavy rail line in Northwest County, including lines 36, 37, 38, 78, 96, 154 and the WES Commuter Rail.

- Line 36 provides weekday service between the Tualatin Park/Ride and the Lake Oswego City Center via S Shore Boulevard from 5:52 a.m. to 6:26 p.m. on approximately 30 minutes headways during the morning peak period and 90 minute headways during all other times of the day.. During the morning and evening peak periods, Line 36 operates north of Lake Oswego along Riverside Drive to provide service to the Portland City Center. *Line 36 connects to SMART's Line 2X at the Tualatin Park/Ride.*
- Line 37 provides weekday service between the Tualatin Park/Ride and the Lake Oswego City Center via Boones Ferry Road and Country Club Road, from 7:03 a.m. to 5:54 p.m. on approximately 90 minute headways. *Line 37 connects to SMART's Line 2X at the Tualatin Park/Ride.*
- Line 38 provides weekday rush-hour service between the Tualatin Park/Ride and the Portland City Center via Terwilliger Boulevard from 5:57 a.m. to 6:27 p.m. on approximately 30-60 minute headways. *Line 38 connects to SMART's Line 2X at the Tualatin Park/Ride.*
- Line 78 provides weekday service between the Beaverton Transit Center and the Lake Oswego City Center via the Washington Square Transit Center and the Tigard Transit Center from 5:32 a.m. to 12:27 a.m. on approximately 30 minute headways. *Line 78 connects to TriMet's WES Commuter Rail at the Beaverton Transit Center and the Tigard Transit Center where it also connects to Yamhill County Transit Authority's (YCTA) fixed-route services.*
- Line 96 provides weekday rush-hour service between the SW 95th Avenue and SW Commerce Circle in Wilsonville and the Portland City Center via the Tualatin Park & Ride from 5:17 a.m. to 9:00 p.m. on approximately 10-30 minute headways. *Line 96 connects to SMART in the SW 95th Avenue and SW Commerce Circle in Wilsonville and at the Tualatin Park & Ride.*
- Line 154 provides weekday service between West Linn's Willamette neighborhood and the Oregon City Transit Center via Willamette Falls Drive from 6:33 a.m. to 7:09 p.m. on approximately 70 minute headways. *Line 154 connects to CAT at the Oregon City Transit Center.*



- Bus Stops
- Route Number
- Park & Ride

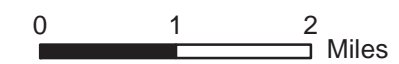
Transit Providers

- Tri-Met
- SAM
- SCTD
- CAT
- MXT
- SMART

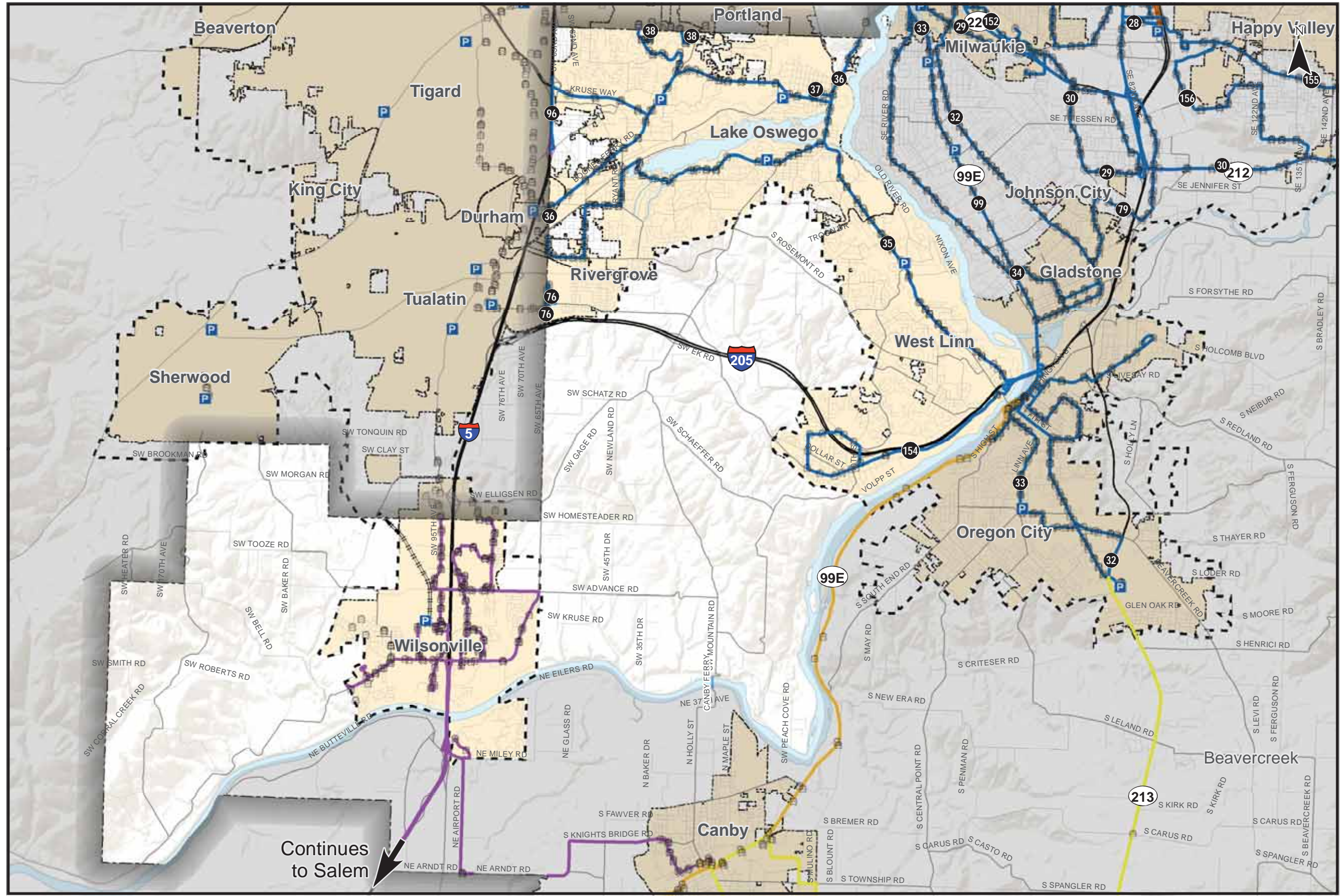
Tri-Met Rails

- MAX
- WES

- Incorporated Areas
- County Boundary
- UGB



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center



Continues to Salem

**Transit Service
Northwest County**

Figure
NW 20

- The WES Commuter rail provides weekday service between SMART Central and the Beaverton Transit Center via the Tualatin Park & Ride and the Tigard Transit Center during the morning peak period from 5:21 a.m. to 9:18 a.m. and the evening peak period from 3:28 p.m. to 7:25 p.m. on approximately 30 minute headways.

South Metro Area Regional Transit

South Metro Area Regional Transit (SMART) provides fixed-route and dial-a-ride services within the City of Wilsonville and the surrounding areas. SMART operates seven fixed-route bus lines within the Northwest County area, including Line 1X, 2X, 3, 4, 5, 6, and V. All routes begin and end at SMART Central in Wilsonville where they connect with TriMet's WES Commuter Train.

- Line 1X provides weekday rush-hour service between SMART Central and the Salem Transit Center via I-5 from 4:32 a.m. to 7:52 p.m. on approximately 30-60 minute headways.
- Line 2X provides weekday service between SMART Central and the Barbur Boulevard Transit Center via Parkway Avenue, Canyon Creek Road, and I-5 from 5:05 a.m. to 7:25 p.m. on approximately 30 minute headways during the morning and evening peak periods and on 60 minute headways during the mid-day peak period. *Line 2X connects to TriMet at the Tualatin Park/Ride and the Barbur Transit Center.*
- Line 3 provides weekday rush-hour service between SMART Central and the Canby Transit Center via Boones Ferry Road, I-5, and Airport Road from 6:30 a.m. to 6:58 p.m. on approximately 60 minute headways during the morning and evening peak periods. *Line 3 connects to CAT's Orange Line and SCTD's Molalla to Canby Line at the Canby Transit Center.*
- Line 4 provides weekday service between Boulder Creek and Boones Ferry Primary School via Smart Central from 4:57 a.m. to 7:42 p.m. on approximately 30 minute headways during the morning and evening peak periods and on 60 minute headways during the mid-day peak period. During the morning and evening peak periods, Line 4 continues south along Wilsonville Road to Graham Oak Nature Park.
- Line 5 provides weekday rush-hour service between SMART Central and Commerce Circle via SW 95th Avenue from 5:25 a.m. to 7:14 p.m. on approximately 30 minute headways during the morning and evening peak periods.
- Line 6 provides weekday service between SMART Central and Argyle Square via Canyon Creek Road from 6:29 a.m. to 7:39 p.m. on approximately 30 minute headways during the morning and evening peak periods.
- Line V provides weekday rush-hour service between SMART Central and Villebois via Kinsman, Wilsonville, and Brown Road four times per day; twice during the morning peak period and twice during the evening peak period.

Dial-A-Ride Service

TriMet's LIFT Paratransit Program provides dial-a-ride service to residents who are unable to use regular fixed-route services due to disabilities or disabling health conditions. The service is offered within three-

fourths of a mile beyond the outermost portions of TriMet’s bus and light-rail lines. Service is not offered outside TriMet’s service district. This service is available 4:30 a.m. to 2:30 a.m. seven days a week. *Effective September 2012 the LIFT service area and hours of service will match fixed route availability.*

SMART provides dial-a-ride service to Wilsonville residents who are unable to use fixed-route services. Service is offered Monday through Friday from 5:30 a.m. to 7:15 p.m., with limited service on Saturdays.

Transit Level-of-Service

The transit level-of-service analysis provided below is based on the methodology described in *TCRP Report 100: Transit Capacity and Quality of Service Manual*. Refer to the Methodology/Approach section for additional information about the level-of-service measures included in the analysis.

Service Frequency

Service frequencies differ by service provider and by route. Table NW 5 summarizes the transit level-of-service analysis results for service frequency. As shown, a majority of existing services currently at LOS D or below throughout the day.

Table NW 5 Service Frequency Level-of-Service Analysis – Northwest County

Provider	Routes	Service Frequency	LOS
TriMet	Line 36	30-90 minutes ²	D-F
TriMet	Line 37	90 minutes ²	F
TriMet	Line 38	30-60 minutes ²	D-E
TriMet	Line 78	30 minutes	D
TriMet	Line 96	10-30 minutes	A-D
TriMet	Line 154	70 minutes	F
TriMet	WES	30 minutes ²	D
SMART	Line 1X	30-60 minutes ²	D-E
SMART	Line 2X	30-60 minutes ²	D-E
SMART	Line 3	60 minutes ²	E
SMART	Line 4	30-60 minutes ²	D-E
SMART	Line 5	30 minutes ²	D
SMART	Line 6	30 minutes ²	D
SMART	Line V	40 minutes ²	E

1. Service is less frequent on Saturday or Sunday.
2. No service is provided on Saturday or Sunday.

Hours of Service

The total number of hours transit service is provided differs by service provider and by route. Table NW 6 summarizes the transit level-of-service analysis results for hours of service. As shown, a majority of existing services currently operate at LOS D or below throughout the day.

Table NW 6 Hours of Service Level-of-Service Analysis – Northwest County

Provider	Routes	Hours of Service	LOS
TriMet	Line 36	12 hours ²	D
TriMet	Line 37	11 hours ²	D
TriMet	Line 38	6 hours ²	E
TriMet	Line 78	19 hours ¹	A
TriMet	Line 96	11 hours ²	D
TriMet	Line 154	12 hours ²	D
TriMet	WES	8 hours ²	E
SMART	Line 1X	15 hours ²	C
SMART	Line 2X	15 hours ¹	C
SMART	Line 3	13 hours	D
SMART	Line 4	15 hours ¹	C
SMART	Line 5	8 hours ²	E
SMART	Line 6	8 hours ²	E
SMART	Line V	13 hours ²	D

1. Service is less frequent on Saturday or Sunday.
2. No service is provided on Saturday or Sunday.

Service Coverage

Figure NW 21 displays the transit level-of-service analysis results for service coverage. Areas defined as transit supportive that have service are shown in blue. Areas defined as transit supportive that are lacking service are shown in red. Areas that have transit service, but do not qualify as a TSA, are shown in orange. A majority of the areas shown in red would require additional transit routes or the development of new pathway connections (to increase the area within a ¼ mile walk) to existing transit routes in order to be served.

The percentage of TSA’s served and the corresponding level of service has been identified using the Transit Level of Service (TLOS) methodology. As shown in Table NW 7, the percent of transit supportive population areas served is 51 percent and the percent of transit supportive employment areas served is 54 percent. The corresponding LOS is E.

Table NW 7 Service Coverage Analysis – Northwest County

Area Type	Population	Employment
Transit Supportive Area (TSA) ¹	30,934	23,713
Transit Supportive Areas Served ²	15,740	12,846
Percent TSA Served by Transit	51%	54%
Level of Service	LOS E	LOS E
Transit Supportive Areas without service	15,194	10,867
Transit Area Served ³	34,372	18,610
Additional Areas Served	18,632	5,764

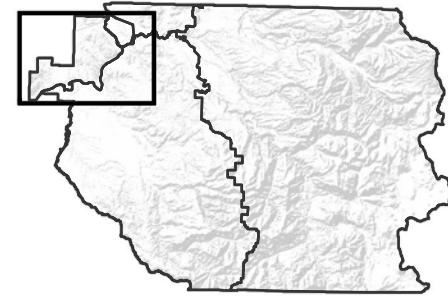
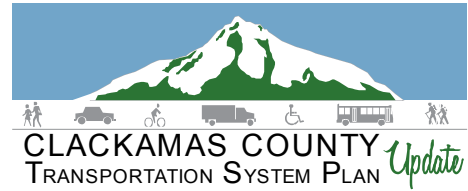
1. Area shown in blue and red in Figure NW 21.
2. Area shown in blue in Figure NW 21.
3. Area shown in blue and orange in Figure NW 21.

As shown in Table NW 7, 15,194 people and 10,867 jobs are located within TSA's that do not have transit service. These areas currently have a population and/or employment density that can support transit service and therefore should be included in future efforts to improve service routes and stop locations. As shown in Table NW 7, 34,372 people are currently served by transit. Of the total area served, 18,632 people and 5,764 jobs are located within areas that have transit service, but currently do not have the population and/or job density necessary to economically support transit service.

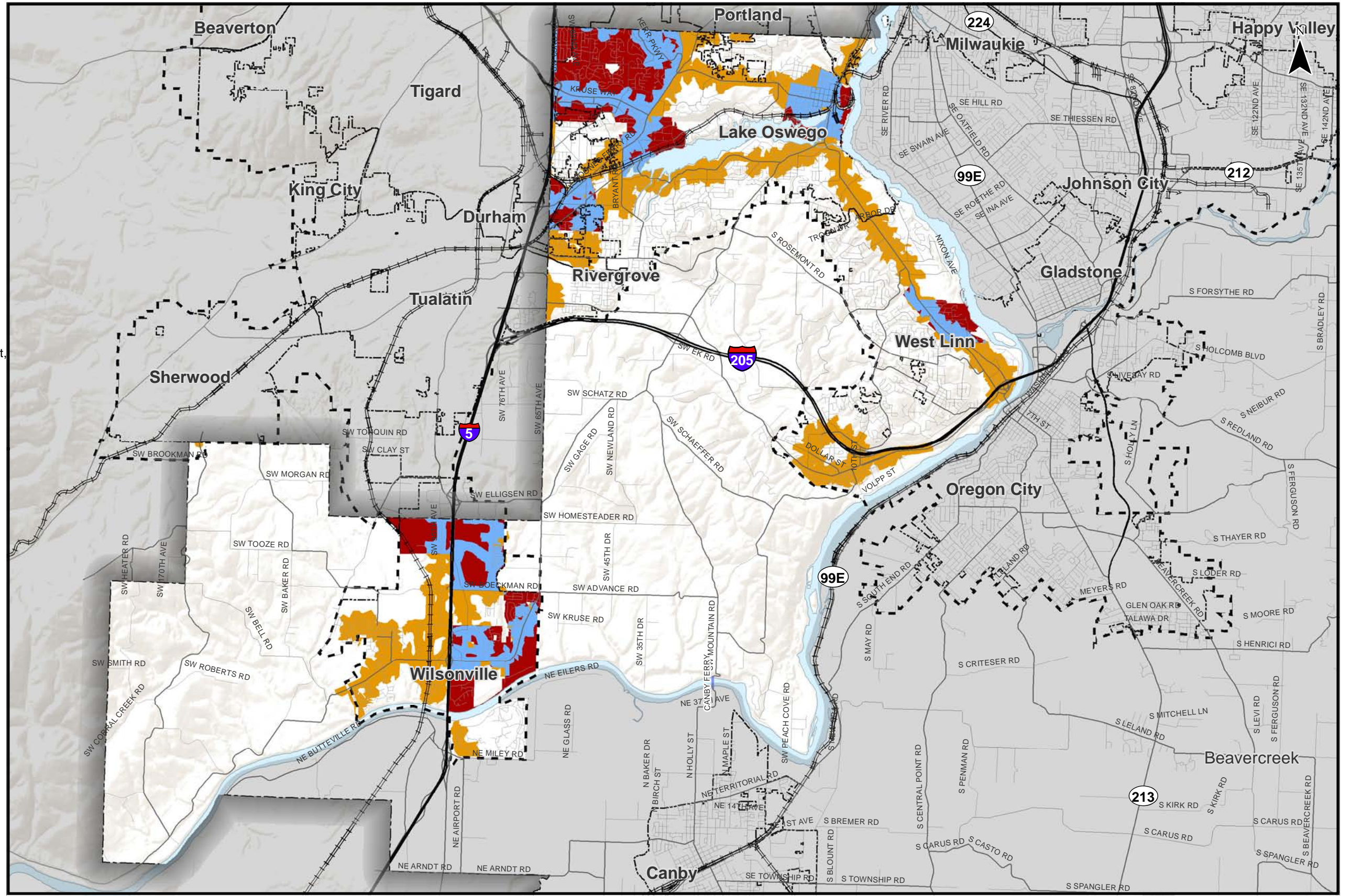
A few of the areas in Wilsonville and Lake Oswego along S Country Club Road, however, are shown in Figure NW 9 as containing a large portion of the transportation disadvantaged population in the Northwest County area and therefore the service provided in these areas is an important consideration.

Future Transit Service Coverage

The future transit level-of-service analysis assumes that existing service frequencies, service hours, and service coverage is the same in the future. The only difference is the population and employment growth assumptions included in the regional traffic model and the resulting transit supportive areas. Figure NW 22 displays the future transit level-of-service analysis results for service coverage. As shown, the number of transit supportive areas is expected to increase significantly throughout most of Northwest County. While many of these areas are expected to be served by existing transit services, the remaining areas will require additional service routes or connections to existing routes in order to be served.



- Areas with Density to Support Transit and Served by Transit
- Areas with Density to Support Transit, but Not Served by Transit
- Areas without Sufficient Density to Support Transit
- Incorporated Areas
- County Boundary
- UGB



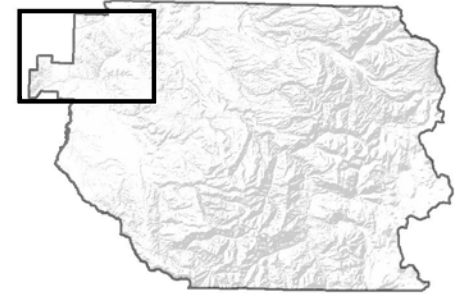
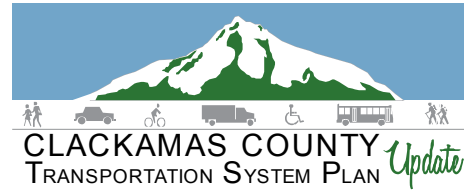
0 1 2 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

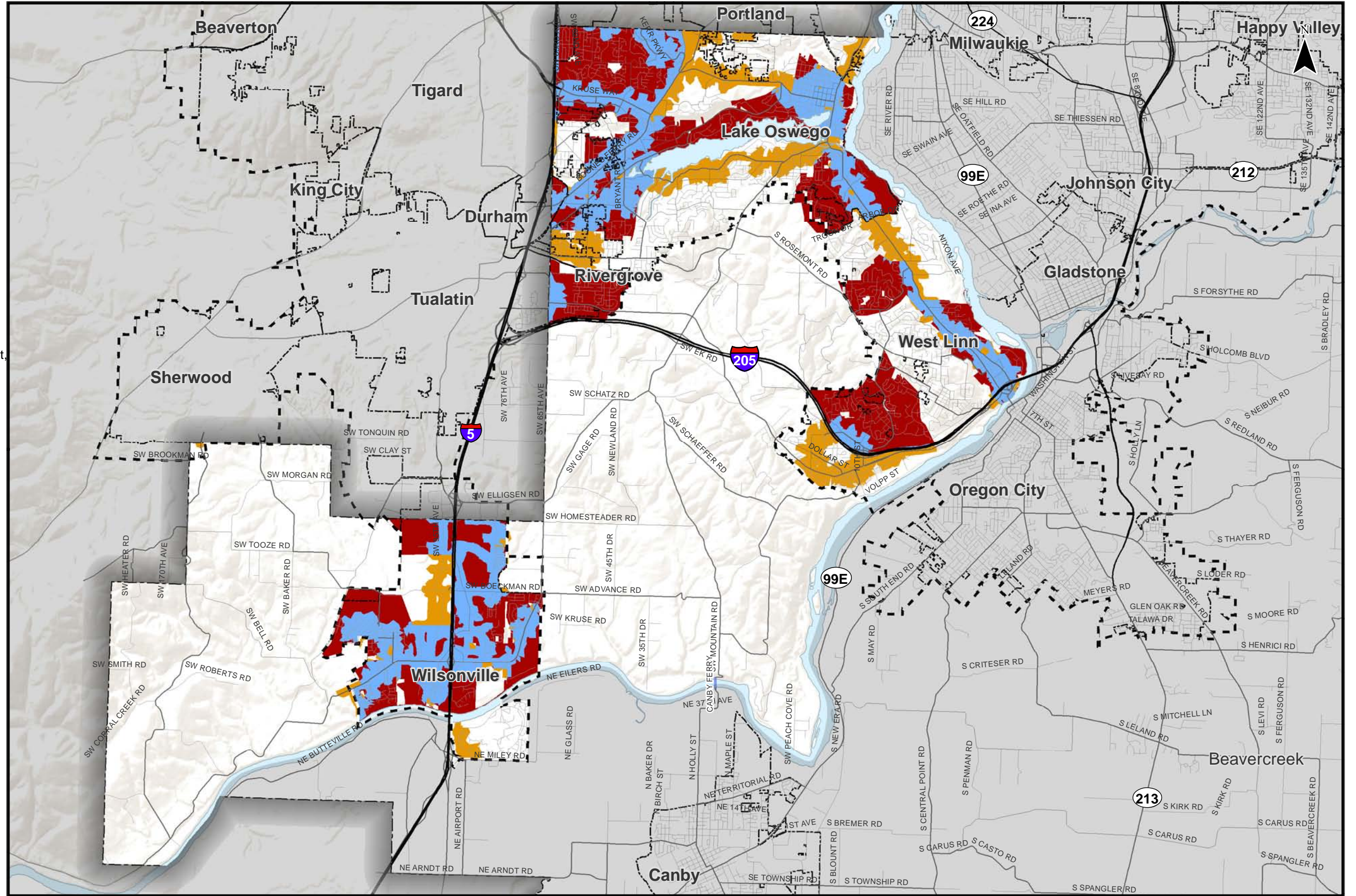
**Existing Transit Supportive Areas
Northwest County**

Figure
NW 21

H:\profile11732 - Clackamas County TSP\gis\11x17 Maps\21 Existing Transit Supportive Areas.mxd



- Areas with Density to Support Transit and Served by Transit
- Areas with Density to Support Transit, but Not Served by Transit
- Areas without Sufficient Density to Support Transit
- Incorporated Areas
- County Boundary
- UGB



0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

**Future Transit Supportive Areas
Northwest County**

Figure
NW 22

H:\profile11732 - Clackamas County TSP\gis11x17 Maps\22 Future Transit Supportive Areas.mxd

CRASH ANALYSIS

The existing conditions crash analysis considered:

- 1) Locations within the County identified as safety priorities by the Oregon Department of Transportation;
- 2) Primary crash types contributing to the majority of serious injury and fatal crashes in the County; and
- 3) Specific safety focus intersections County staff has identified.

See *Section 3 Assumptions and Methods* for a description of the crash analysis methodology.

Figure NW 23 illustrates the reported crashes in the Northwest County area from 2007 through 2010. The following sub-sections take a closer look at the reported crash data to identify the historic trends and patterns that have contributed to the majority of fatal and serious injury crashes.

Statewide Safety Priority Locations

ODOT identifies top safety priority locations annually using a Statewide Priority Index System (SPIS). The locations in the top 5% and 10% are those that have historically experienced a higher number and/or higher severity of crashes. These locations are referred to as SPIS locations or SPIS sites. Clackamas County applies the same methodology as ODOT to County roadways to identify the top 20 to 25 locations on which to focus safety reviews and improvements.

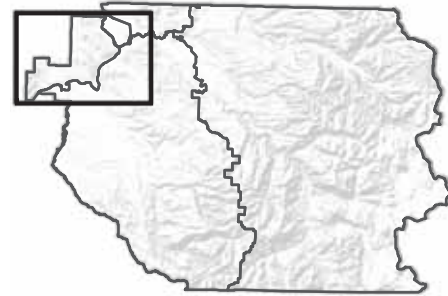
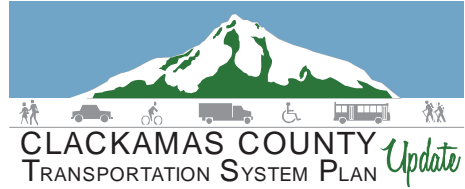
Figure NW 24 illustrates the SPIS locations within the Northwest County area. There are two SPIS locations identified by ODOT; however both are located within incorporated areas of the County. Therefore, those respective cities are expected to consider and evaluate those locations within their transportation system plans.

Primary Crash Types Contributing to Serious Injury and Fatal Crashes

The following sub-sections and figures display the locations of the crash types that historically have led to the majority of serious injury and fatal crashes in the County as discussed in *Section 3 Methodology & Approach*:

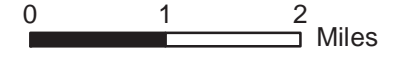
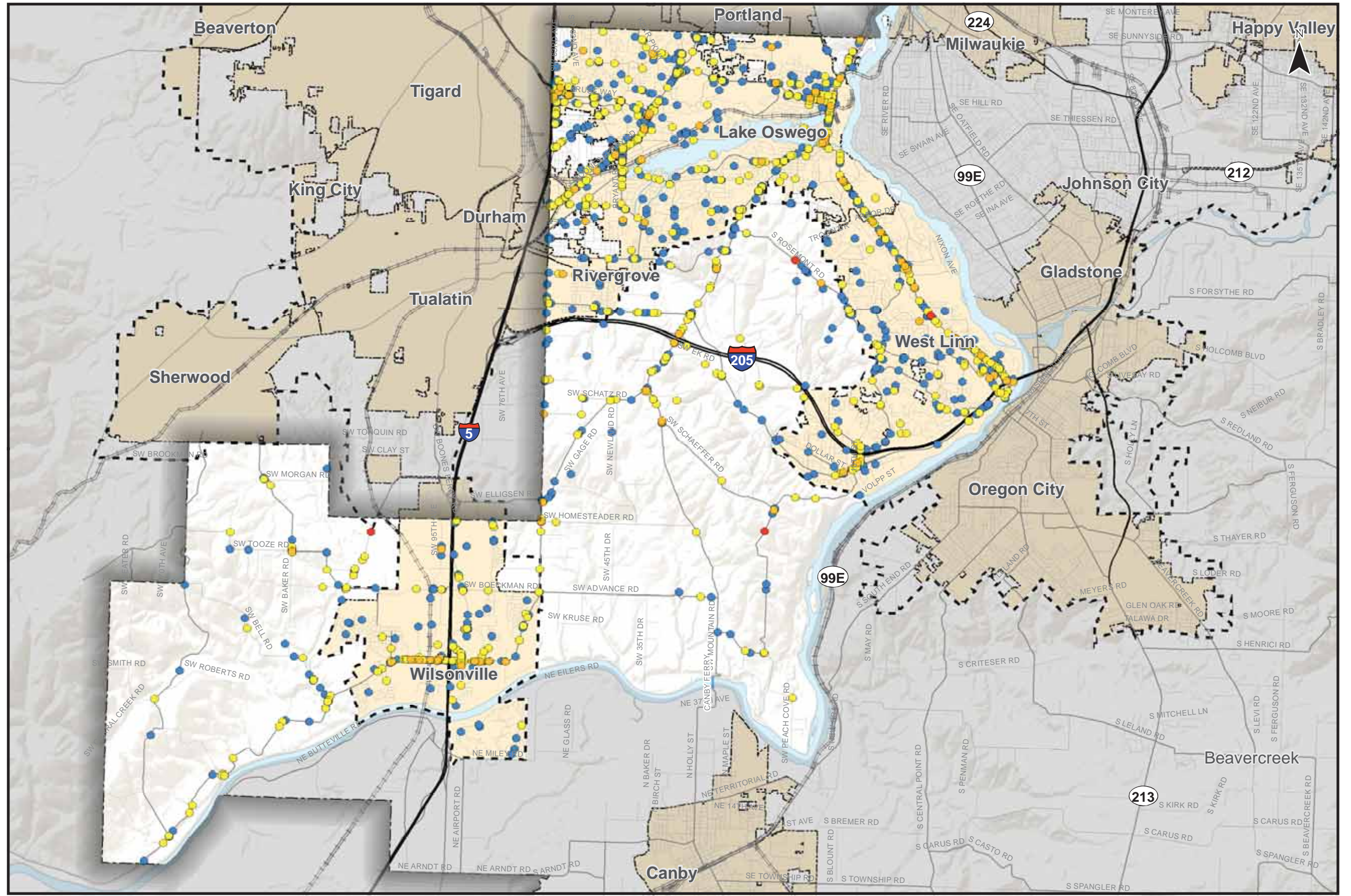
- Roadway Departure Crashes ;
- Crashes Involving Young Drivers (ages 15 through 25 years old; and
- Crashes Involving Aggressive Driving (driving too fast, following too close).

Roadway departure crashes, crashes involving young drivers and crashes involving aggressive driving are not mutually exclusive categories. This means one crash could involve a young driver who ran off the road; this crash would be mapped as a roadway departure crash and as a crash involving a young driver. In addition to the three crash types above, crashes involving pedestrians and bicyclists are also mapped below. While the overall occurrence of crashes involving pedestrians and bicyclists may not be as high as other crash types, when those crashes do occur they often result in serious injuries or fatalities because pedestrians and bicyclists are more vulnerable than people traveling in motorized vehicles.



**Reported Crashes
2007 Through 2010**

- Fatal Crash
 - Serious Injury Crash
 - Minor Injury Crash
 - Property Damage Only Crash
- Incorporated Areas
 - County Boundary
 - UGB

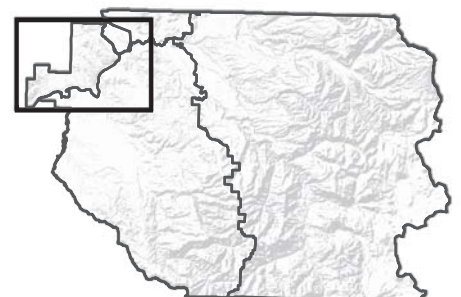
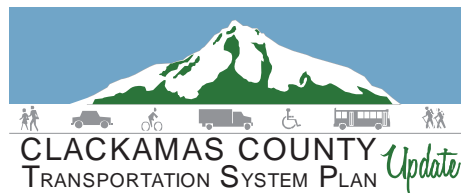


Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation

**Reported Crashes 2007-2010
Northwest County**

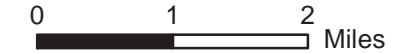
Figure
NW 23

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\23 Reported Crashes 2007-2010.mxd

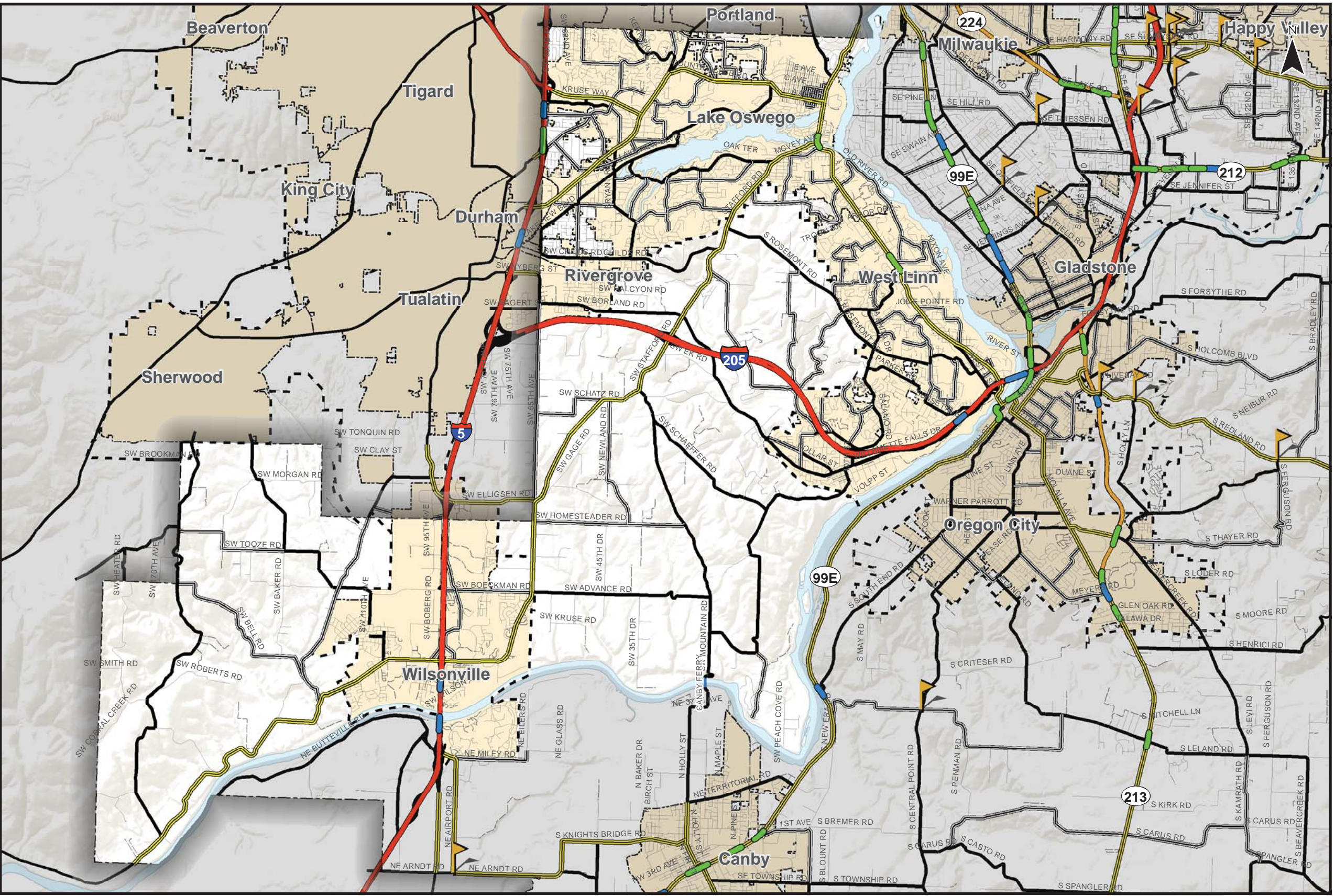


- County SPIS Sites
- ODOT SPIS Sites**
 - 5% Site
 - 10% Site
- Functional Classifications**
 - Freeway
 - Expressway
 - Major Arterial
 - Minor Arterial
 - Collector
 - Connector
 - Local
 - Forest Service Paved
 - Forest Aggregate Road
 - General dirt, road or trail
 - Other
 - Railroad
 - Incorporated Areas
 - County Boundary
 - UGB

On an annual basis, the Oregon Department of Transportation identifies safety priority locations through their Statewide Priority Index System (SPIS). The SPIS process identifies locations for review and potential improvements based on their crash history. SPIS locations listed in the top 5% and top 10% represent locations that have historically experienced a higher number and/or higher severity of crashes than other locations in the state.



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center



**Statewide Priority Index System Locations
Northwest County**

Figure
NW 24

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The purpose of this assessment is to identify candidate road safety audit corridors for the County to study and evaluate in greater detail. A candidate safety corridor is a series of roadway segments and intersections that have experienced higher frequencies of roadway departure crashes, crashes involving young drivers, and crashes involving aggressive driving. Separate from the TSP update activities, the County will review the crash data for these corridors in greater detail, assess the existing physical features of the corridor (e.g., shoulder width, signs, pavement markings) and identify improvements to reduce crashes. Improvements would range from lower cost signing or pavement marking treatments to road reconstruction. Potential improvements include updating and/or installing new signs, new or enhanced pavement markings (e.g., STOP AHEAD pavement markings), moving roadside fixed objects, and adjusting roadside vegetation. Further study of the candidate road safety audit corridors and improvements to them will be addressed programmatically. This enables the County to assess each corridor in more detail on a case by case basis, identify cost-effective solutions and determine if other corridors within the County would also benefit from similar improvements.

From the analysis presented below, one corridor was identified in the Northwest County area: Stafford Road from S Rosemont Road to SW Mountain Road. The other potential corridors within the Northwest County area are within incorporated areas and therefore fall within the given jurisdiction's responsibility. Figure NW 25 illustrates the location of the candidate road safety audit corridor.

Roadway Departure Crashes, Crashes Involving Young Drivers, and Crashes Involving Aggressive Driving

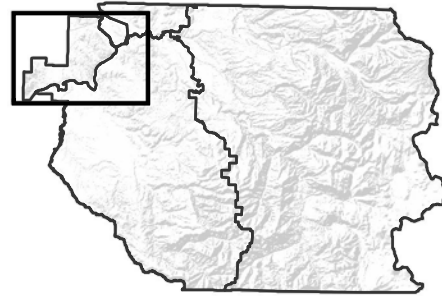
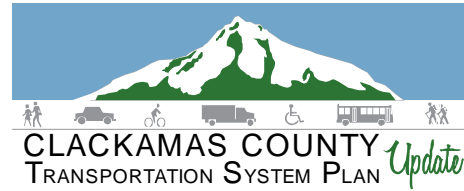
Roadway departure crashes, crashes involving young drivers and crashes involving aggressive driving were mapped in two ways. First, each crash type was mapped and assessed separately to identify corridors where each crash type has occurred. Second, the serious injury and fatal crashes for each of those crash types were also mapped together to consider where the crash types overlap and focus attention on serious injury and fatal crashes. The results of both mapping exercises informed the candidate road safety audit corridors listed above.

Figure NW 26 illustrates the roadway departure crashes. The roadway departure crashes have primarily occurred along Stafford Road.

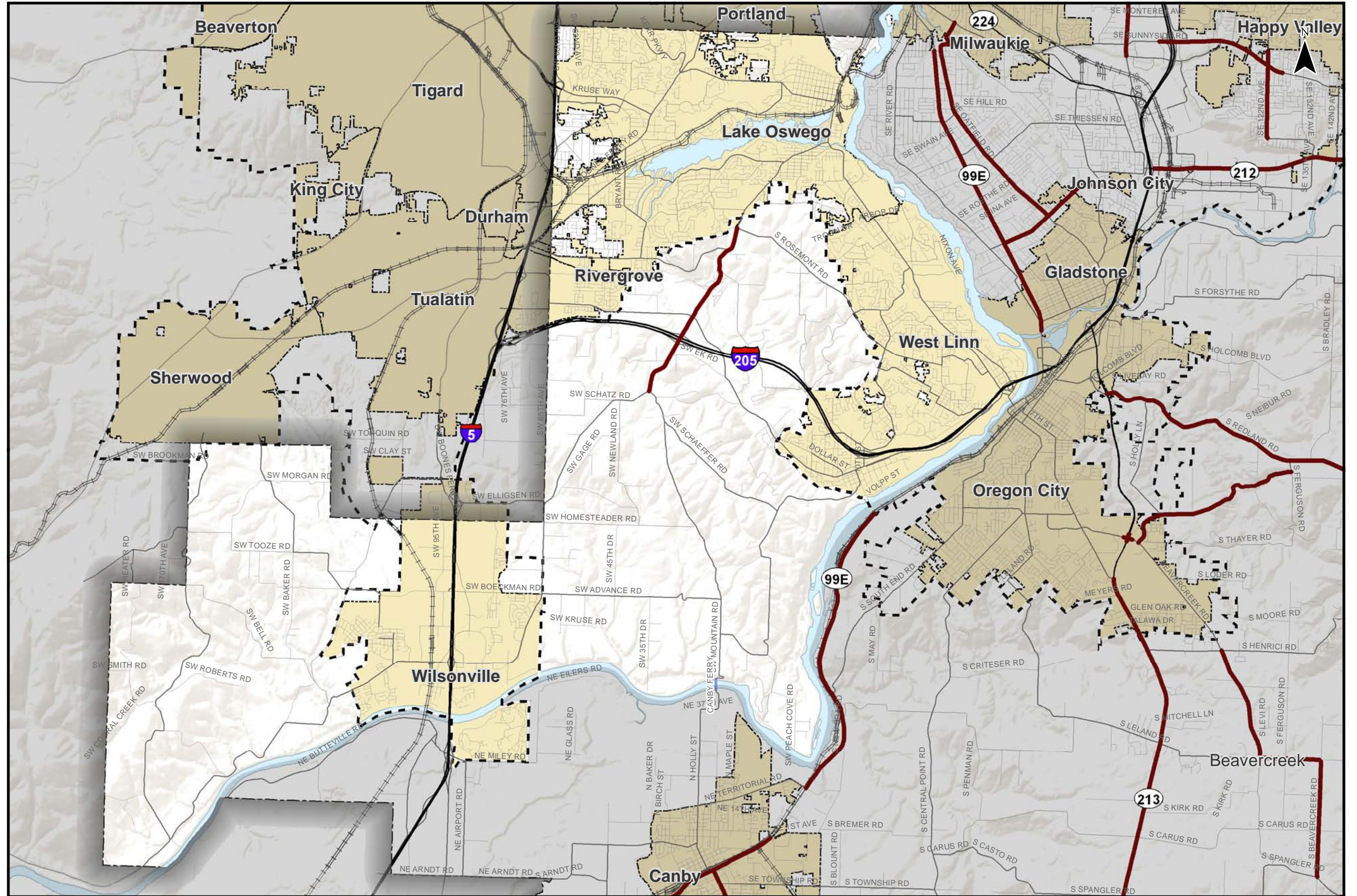
Figure NW 27 illustrates the crashes involving young drivers. Young drivers are defined as drivers age 15 through 25 years old. The location of these crashes reinforces the candidate road safety audit corridors identified for Stafford Road.

Figure NW 28 illustrates crashes involving aggressive driving. Aggressive driving includes vehicles traveling too fast for conditions, exceeding the posted speed, and following too closely. The locations of crashes involving aggressive driving also reinforces the candidate road safety audit corridors identified for Stafford Road.

Figure NW 29 illustrates serious injury and fatal crashes that were roadway departure crashes, involved young drivers, and/or involved aggressive driving. The purpose of this figure is to help focus on the corridors where serious injury and fatal crashes have occurred. However, there are relatively few serious injury and fatal crashes in the unincorporated areas of Northwest County. The Stafford Road candidate safety corridor was identified primarily based on the total number of roadway departure, young driver, and aggressive driving crashes that have occurred along it.



- Candidate Road Safety Audit Corridors
- Incorporated Areas
- County Boundary
- UGB

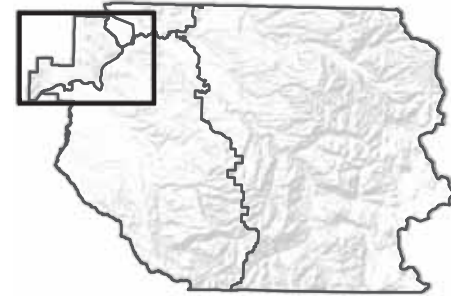
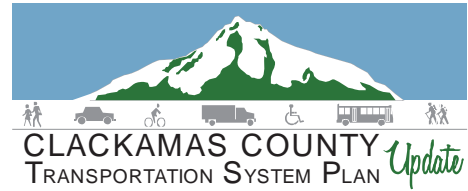


**Candidate Road Safety Audit Corridors
Northwest County**

Figure
NW 25

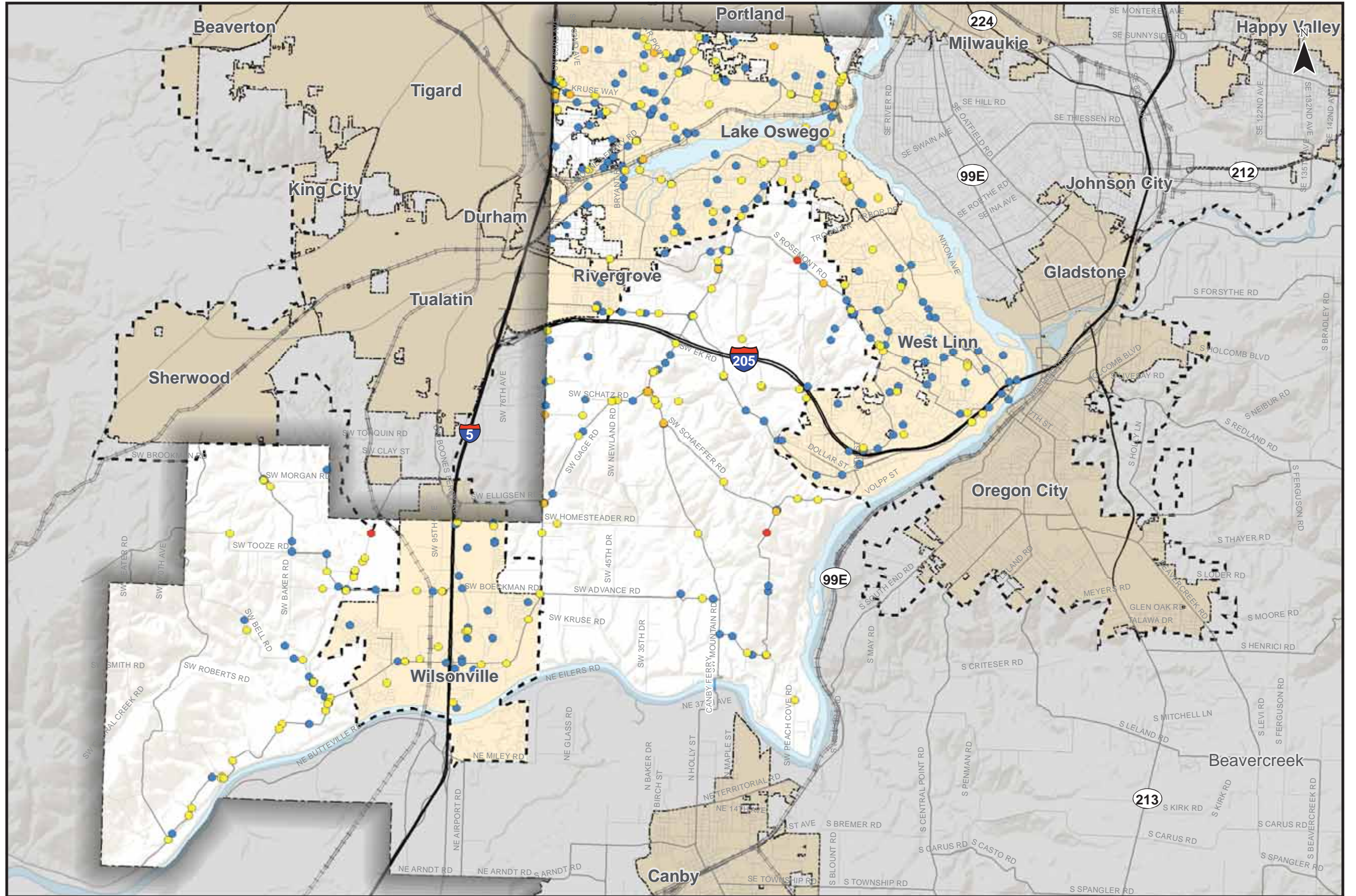
0 1 2
Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- Property Damage Only Crash
- Incorporated Areas
- County Boundary
- UGB

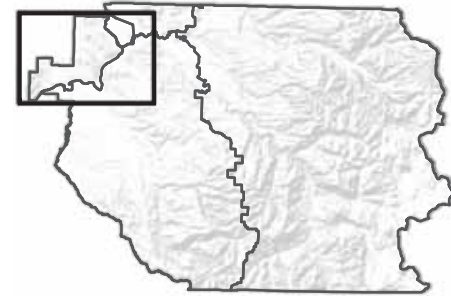
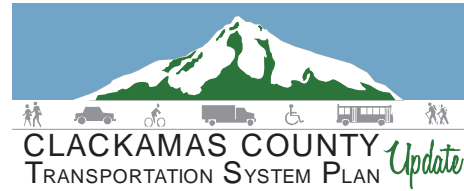


**Roadway Departure Crashes 2007-2010
Northwest County**

Figure
NW 26

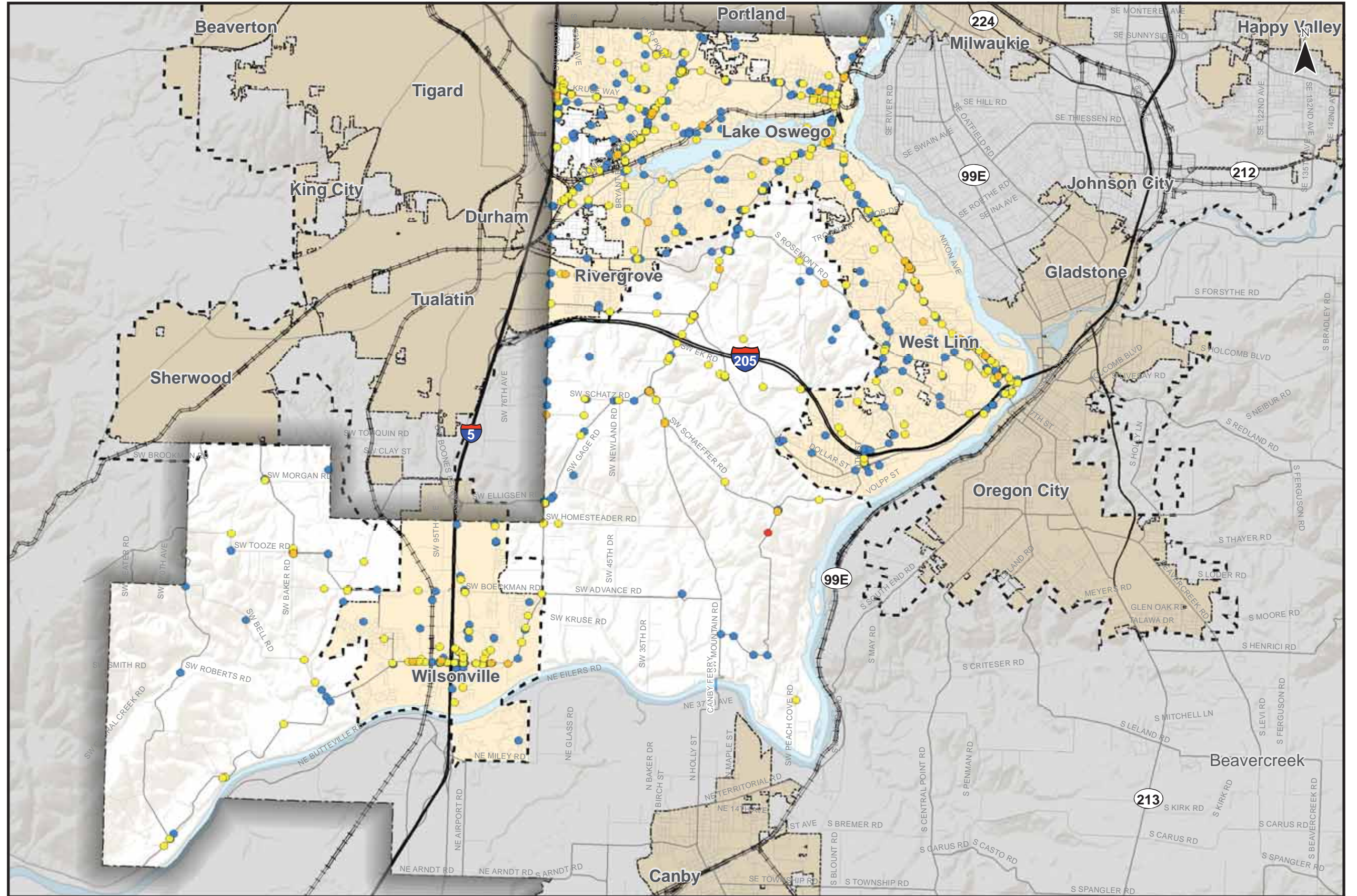
0 1 2
Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation



Crashes Involving Young Drivers (15-25 Years Old)

- Fatal Crash
 - Serious Injury Crash
 - Minor Injury Crash
 - Property Damage Only Crash
- Incorporated Areas
 - County Boundary
 - UGB

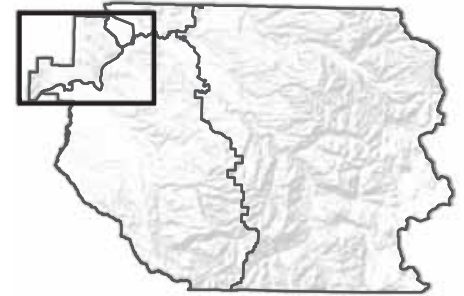
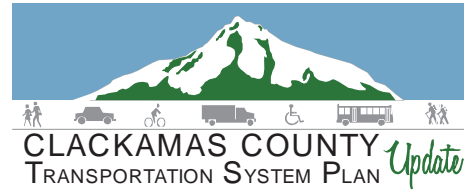


Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation

**Crashes Involving Young Drivers (15-25 Years Old) 2007-2010
Northwest County**

Figure
NW 27

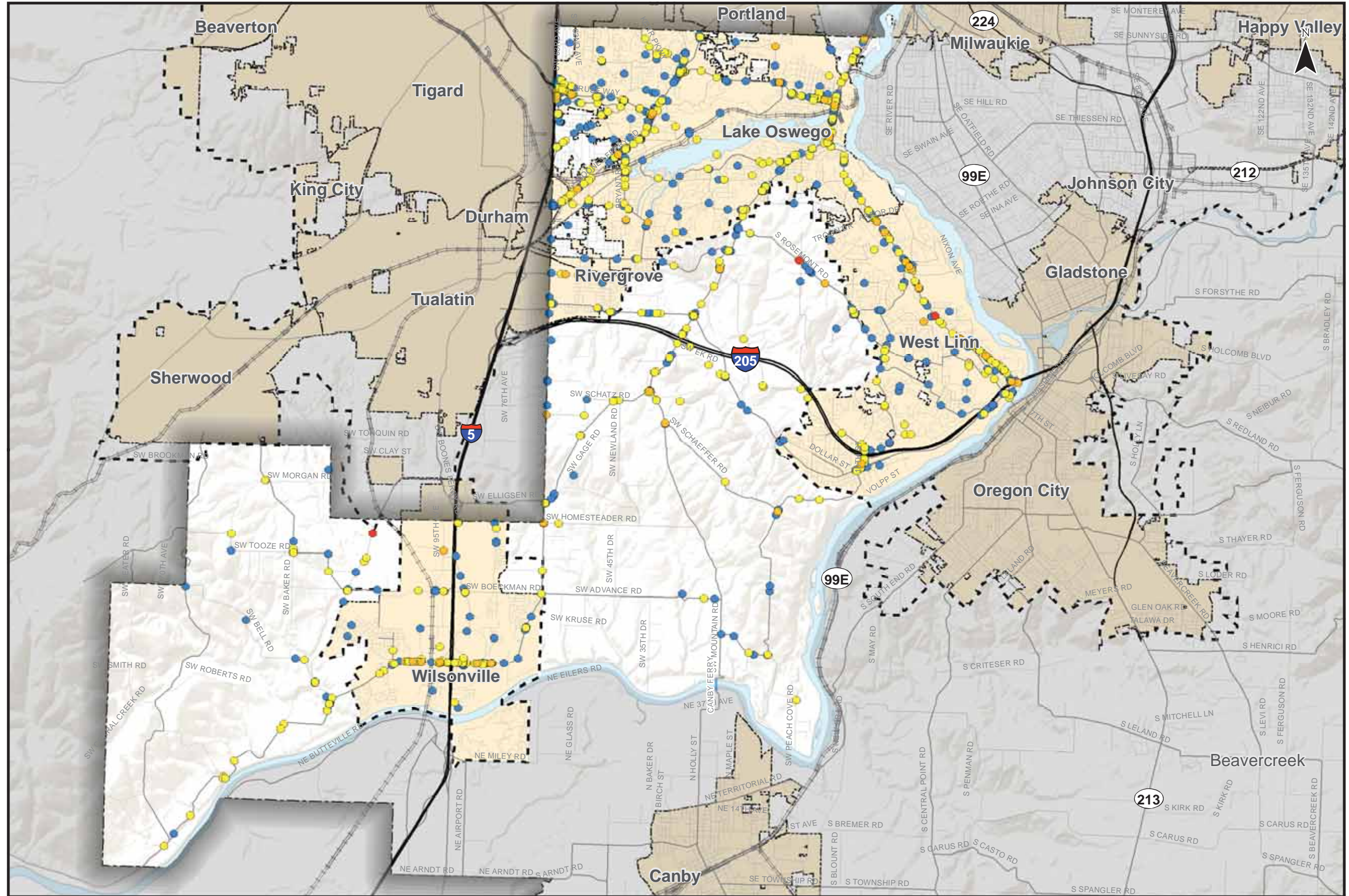
H:\profile11732 - Clackamas County TSP\gis\11x17 Maps\27 Crashes Involving Young Drivers (15-25 Years Old).mxd



Crashes Involving Aggressive Driving

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- Property Damage Only Crash

- Incorporated Areas
- County Boundary
- UGB

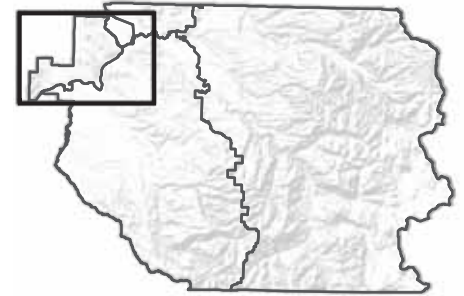
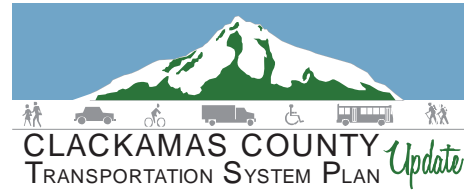


**Crashes Involving Aggressive Driving 2007-2010
Northwest County**

Figure
NW 28

0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash

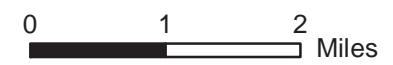
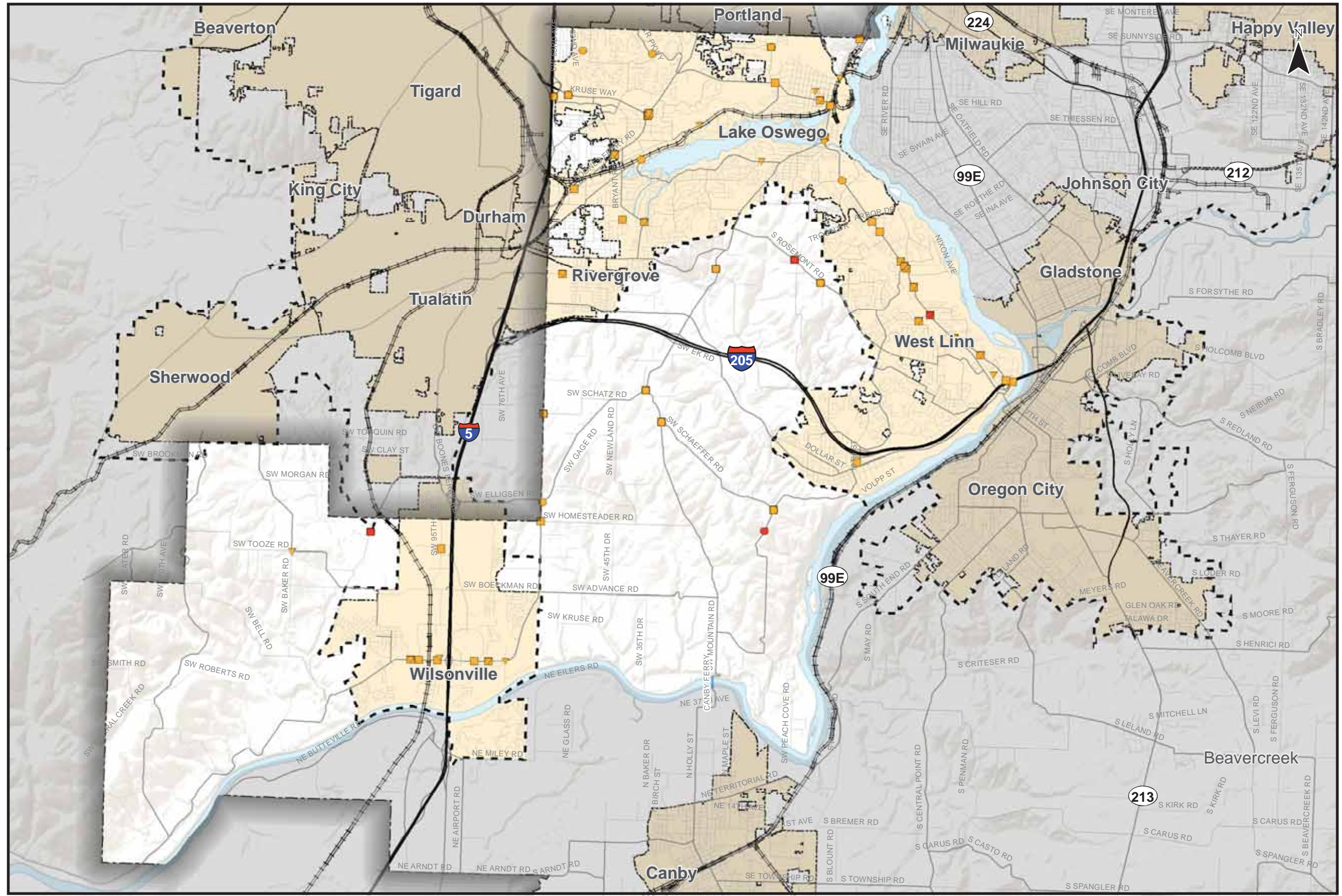
Crashes Involving Young Drivers (15-25 Years Old)

- ▼ Fatal crash
- ▼ Serious Injury Crash

Aggressive Driving Crashes

- Fatal Crash
- Severe Injury Crash

- ▭ Incorporated Areas
- ▭ County Boundary
- ▭ UGB



**Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes
Northwest County**

Figure
NW 29

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation

H:\profile11732 - Clackamas County TSP\gis11x17 Maps\29 Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes.mxd

Crashes Involving Pedestrians or Bicyclists

In rural areas, crashes involving in pedestrians and bicyclists are small proportion of total reported crashes because of the lower volumes of pedestrians and bicyclists using the roadway.

Figure NW 30 and Figure NW 31 illustrate crashes involving pedestrians and bicyclists. The pedestrian and bicycle crashes within Northwest County from 2007 through 2010 have predominately occurred in the incorporated areas of Wilsonville, West Linn, and Lake Oswego. This is consistent with what is expected given that pedestrian and bicycle activity is higher in urban areas. The two crashes involving bicyclists that occurred along Stafford Road are included in the candidate safety corridor noted above.

Specific Safety Focus Intersections

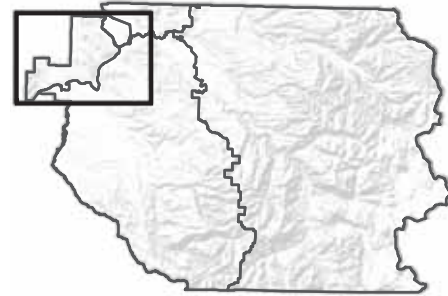
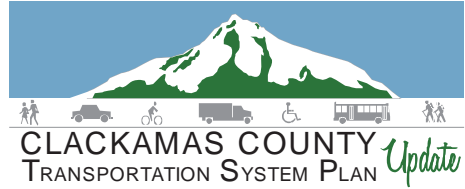
County staff identified a number of safety focus intersections for one or more of the following reasons:

- Approaching roads are offset;
- Sight distance is limited on approach to or at the intersection;
- Intersecting roads are skewed (do not intersect at 90-degrees);
- Geometry of approaching roads are challenging for motorists; and/or
- Intersection geometry or lane configuration is unconventional.

The purpose of identifying these types of intersections is to proactively consider potential improvements in advance of the intersections appearing on the County's priority location list discussed above. The basic characteristics noted above are some geometric features that may make the driving task more difficult and therefore increase the risk of crashes occurring. For example, American Association of State Highway and Transportation Officials' (AASHTO's) *Highway Safety Manual* notes skewed stop controlled intersections tend to experience more crashes than intersections with roads crossing at 90-degrees.¹

Figure NW 32 illustrates the location of these intersections. Table NW 8 summarizes the safety focus intersections.

¹ AASHTO. *1st Edition of the Highway Safety Manual*. 2010. (See Volume 3, Part D, page 14-16).



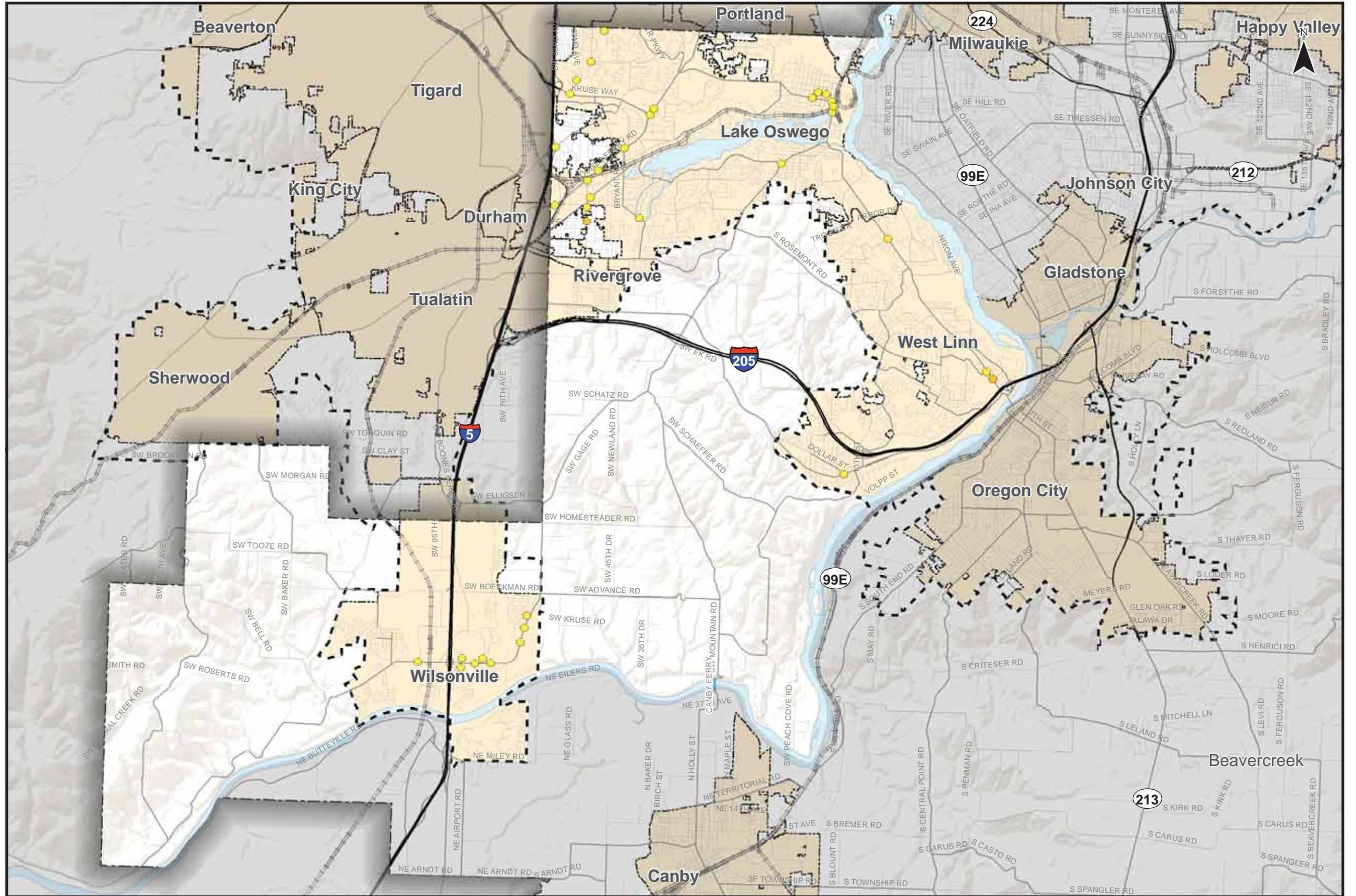
Crashes Involving Pedestrians

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- Property Damage Only Crash

— Incorporated Areas

— County Boundary

— UGB

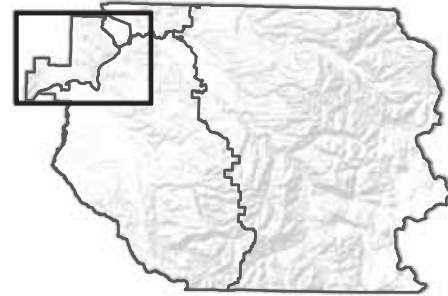
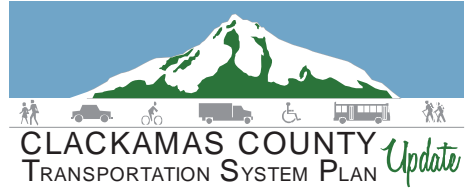


0 1 2 Miles

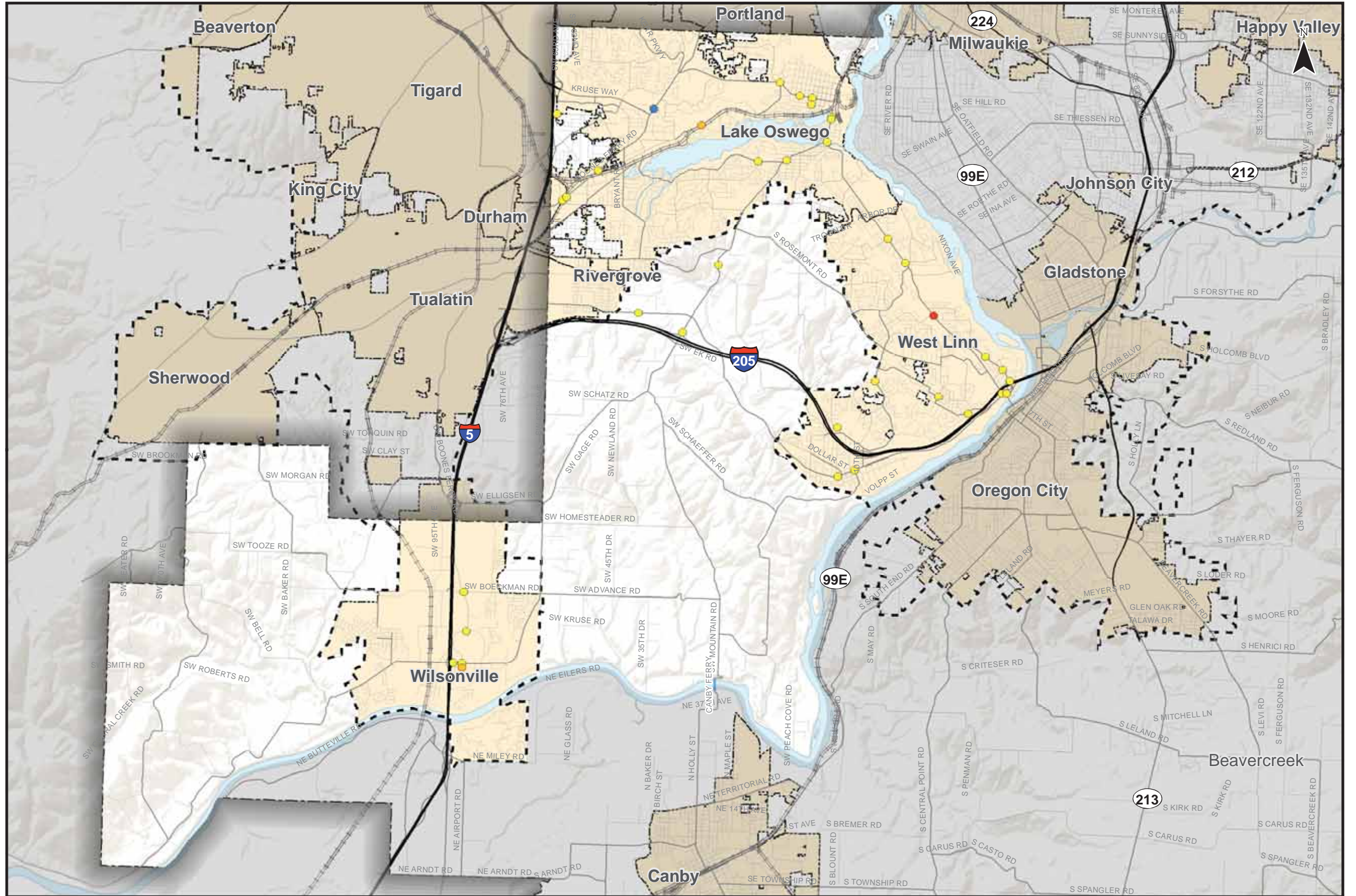
**Crashes Involving Pedestrians 2007-2010
Northwest County**

Figure
NW 30

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation



- Crashes Involving Bicycles**
- Fatal Crash
 - Serious Injury Crash
 - Minor Injury Crash
 - Property Damage Only Crash
- ▭ Incorporated Areas
- ▭ County Boundary
- ▭ UGB

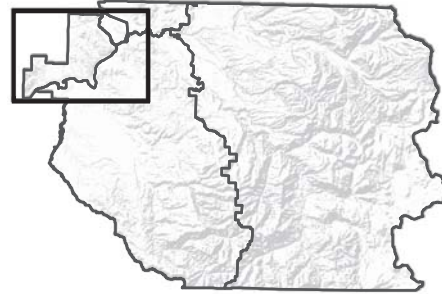
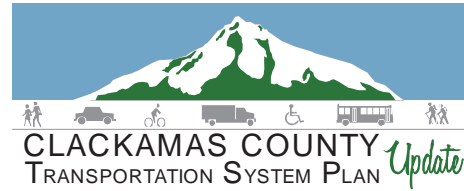


0 1 2 Miles

**Crashes Involving Bicycles 2007-2010
Northwest County**

Figure
NW 31

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resource Center,
Oregon Department of Transportation



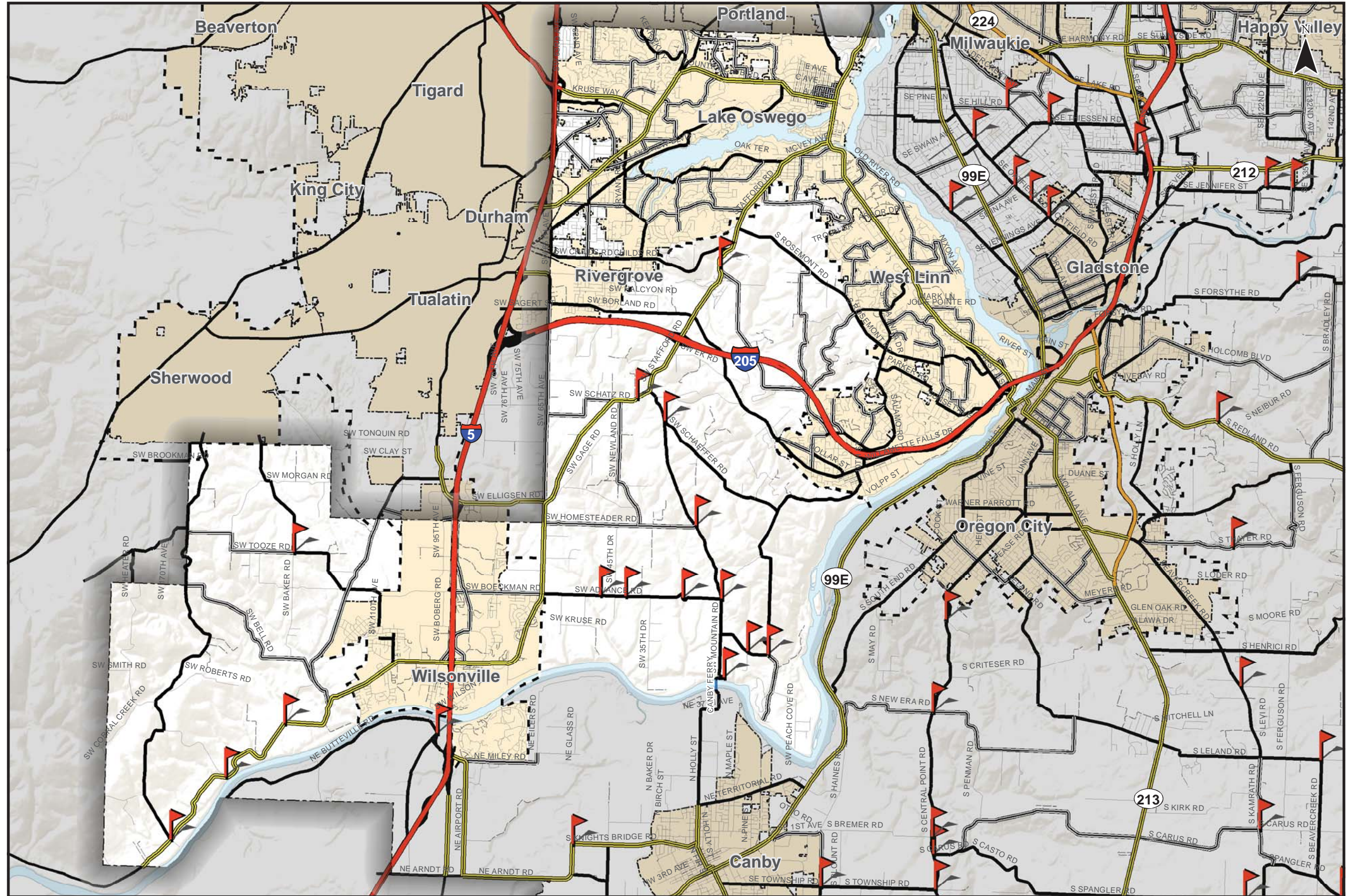
Safety Focus Intersections

Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Incorporated Areas
- County Boundary
- UGB

0 1 2 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center



**Safety Focus Intersections
Northwest County**

Figure
NW 32

FUTURE BASE CONDITIONS – NORTHWEST COUNTY

INTRODUCTION

This section summarizes the results of the future traffic conditions and analysis for the Northwest County. It evaluates the study intersections performance in the year 2035 assuming growth and development occurs and some planned modifications are made to the transportation system. Two future base scenarios were analyzed:

1. **Low Build:** Assumes that only planned transportation projects with funding currently allotted are completed.
2. **Full Build:** Assumes that all transportation projects identified in the existing TSP planned before the year 2035 are completed.

The projects included in these scenarios will be further evaluated based on criteria and measures corresponding to the County’s vision, goals and objectives in the next stage of the TSP Update. Additional new projects to address gaps and deficiencies in the transportation system will also be assessed in the alternatives analysis. The approach and methodology to the Future Base Conditions analysis is further described in *Section 3 Assumptions and Methods*. This section focuses on the results of the analysis in terms of intersection and roadway operations.

2035 LOW BUILD SCENARIO

The low-build scenario assumes the completion of transportation projects identified in the existing Clackamas County TSP and Metro Regional Transportation Plan (RTP) with funding currently allotted. The purpose of the low build scenario is to identify intersections and roadways that will not meet standards in 2035 if only the currently funded transportation projects are completed. The analysis will also indicate which projects in the low build scenario help bring the operations on intersections and roadways up to standards.

The forecast traffic volumes, roadway cross-sections, and intersection configurations were adjusted to reflect this scenario, based on the low build capacity projects in Northwest County and mapped in Figure NW 33. The projects that affect roadway or intersection capacity are listed and described in Table NW 9.

Table NW 9 Low Build Projects in Northwest County Area

Project	ID	Location	Description
Barber St. Extension from Kinsman Rd. to Villebois Village	U018	Kinsman Rd. to Villebois Village	Extend 3 lanes with sidewalks and bike lanes to reduce the need to use I-5 and OR 217 by providing needed connections to the Villebois Village housing development and employment areas in Wilsonville and with the new Commuter Rail site.
Kinsman Rd. Extension from Barber St. to Boeckman Rd.	U021	Barber St. to Boeckman Rd.	Extend 3 lanes with sidewalks and bike lanes. Provide freight access and capacity from Barber Street to Boeckman Road. A vital alternative to 110th which is being vacated. Serves as a parallel arterial to I-5.

Project	ID	Location	Description
Wilsonville Rd/1-5 Interchange Improvements	U676	Town Center Loop W to Boones Ferry Rd	Provide additional left-turn lanes, setback abutments, improve signal synchronization, fix sight distance problems, and provide for enhanced bike/pad safety.
Wilsonville Rd/I-5 Interchange Improvements	U677	N and S of interchange	Widen and lengthen on/off ramps

Study Intersection Analysis

Any low-build projects that affect lane configurations or traffic control at study intersections were accounted for and are noted in Figure NW 34. The operations at the study intersections were analyzed based on the traffic volumes forecasted under the low-build scenario and are illustrated in Table NW 10 and Figure NW 35. Intersections that do not meet standards are noted.

Table NW 10 Low Build Traffic Operations Analysis Results at Study Intersections in the Northwest County Area

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard in Existing Conditions?	Low Build Project?	Meets Standard in Low Build?
301	SW Childs Rd/SW Stafford Rd	County	LOS = D	No	No	No (LOS F)
302	SW Borland Rd/SW Stafford Rd	County	LOS = D	Yes	No	No (LOS E)
303	SW Mountain Rd/SW Stafford Rd	County	LOS = D	Yes	No	No (LOS F)
304	SW Ellingson Rd/SW 65th Ave	County	LOS = D	Yes	No	No (LOS E)
305	SW 65th Ave/SW Stafford Rd	County	LOS = D	No	No	No (LOS F)

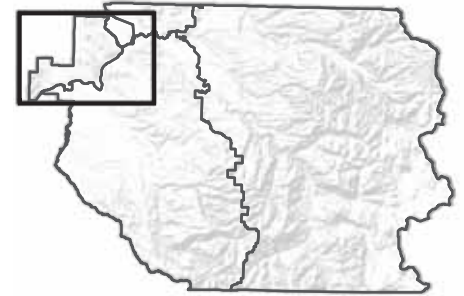
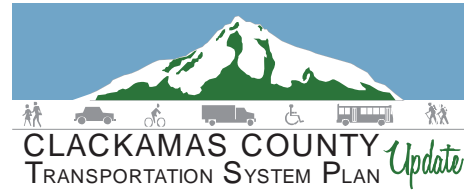
As shown, the intersections of SW Childs Road/SW Stafford Road and SW 65th Avenue/SW Stafford Road continue to not meet performance standards. The three other intersections also do not meet standards in the low-build scenario, although they meet standards under existing conditions. There are no planned and financed capacity projects at any of the study intersections. *Appendix 8* contains detailed traffic operations analysis results.

Table NW 8 Safety Focus Intersections in Northwest County Area

Major Road	Minor Road	Reason Identified	County Safety Priority Location?	Located on a Candidate Safety Corridor?
Advance Road	Mountain to Stafford	Approach Geometry	-	-
Advance/Boeckman	Mountain/35th Dr	Approach Geometry (Vertical Curve)	-	-
Advance/Boeckman	45th/53rd	Approach Geometry (Vertical Curve)	-	-
Baker Rd	Tooze Rd	Sight Distance	-	-
Hoffman Rd	Old Well Rd	Intersection Skew	-	-
Homesteader	Mountain	Intersection Skew and Sight Distance	-	-
Mountain Rd	N of Ferry	Approach Geometry	-	-
Mountain Rd	Schaeffer Rd	Intersection Skew and Sight Distance	-	-
Mountain Rd	Boeckman Rd / Advance	Approach Geometry and Sight Distance	-	-
Pete's Mountain	Peach Cove	Unconventional Geometry and Approach Geometry	-	-
Stafford Rd	Johnson	Sight Distance	-	Yes
Stafford Rd	Mountain to Newland	Intersection Crash History	-	-
Wilsonville Rd	Ladd Hill	Sight Distance	-	-
Wilsonville Rd	Grahams Ferry	Intersection Skew and Sight Distance	-	-
Wilsonville Rd	Edminston	Intersection Skew and Sight Distance	-	-

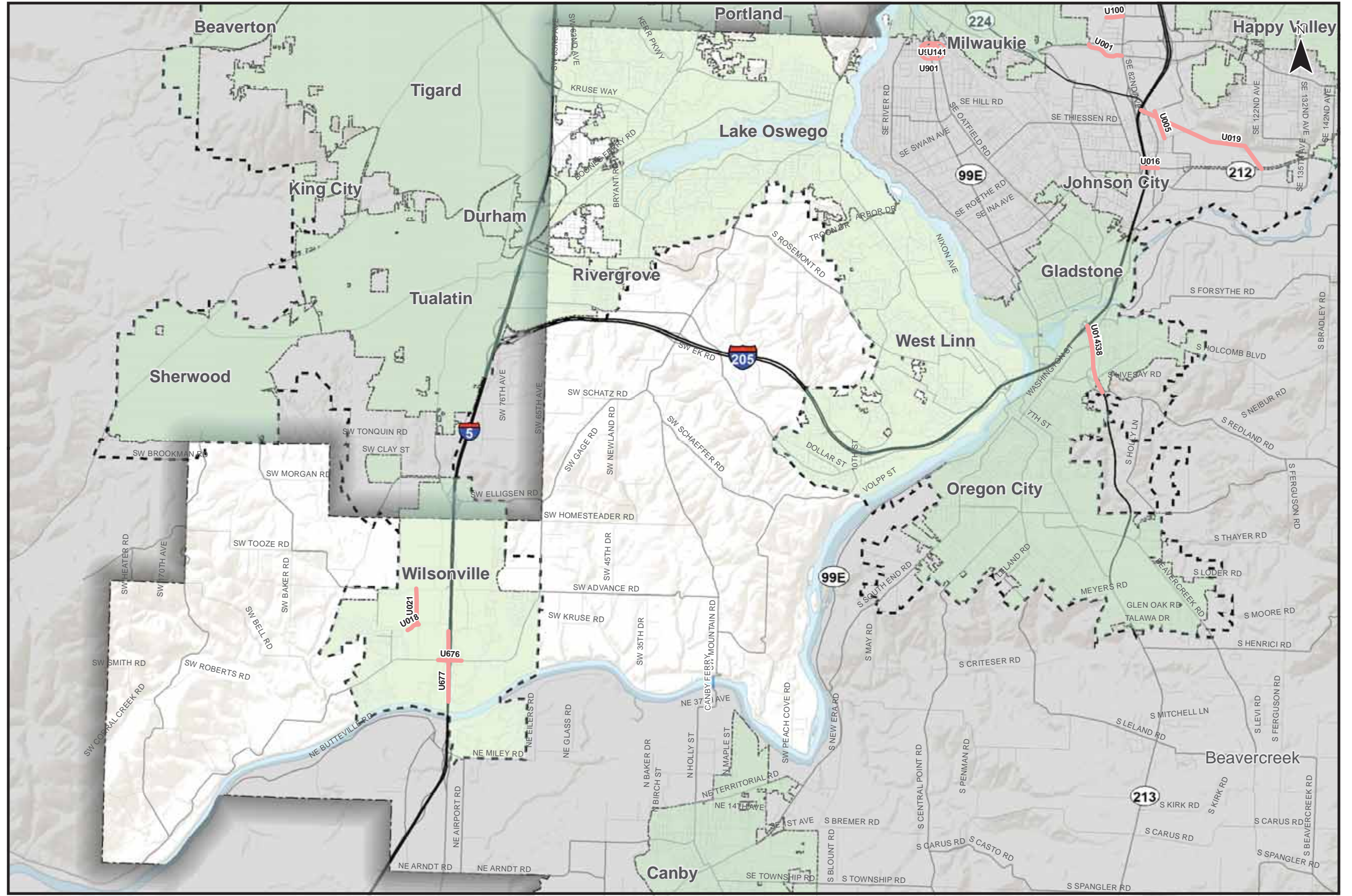
The list of safety focus intersections shown in Table NW 8 supplements the County's Safety Priority Locations and the Candidate road safety audit corridors discussed above. There is some overlap between the safety focus intersections and the previous safety locations presented. One of the safety focus intersections is located on the candidate safety corridor discussed above. The remaining intersections listed are either skewed intersection and/or have limited sight distance. These are candidate intersections for proactive improvements to help reduce the likelihood of crashes.

In a forthcoming Transportation System Plan update report, potential projects, programs, studies and/or policies to improve these locations will be discussed.

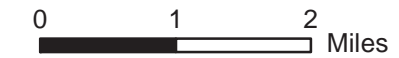


2035 Low Build Projects

- Intersection Projects
- Roadway Projects
- City
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Low Build Scenario. The 2035 Low Build Scenario assumes the transportation projects in the existing Clackamas County TSP and Metro Regional Transportation Plan (RTP) with funding currently allotted are completed by 2035. The purpose of the 2035 Low Build Scenario is to identify intersections and roadways that will not meet standards in 2035 if only the currently funded transportation projects are implemented.

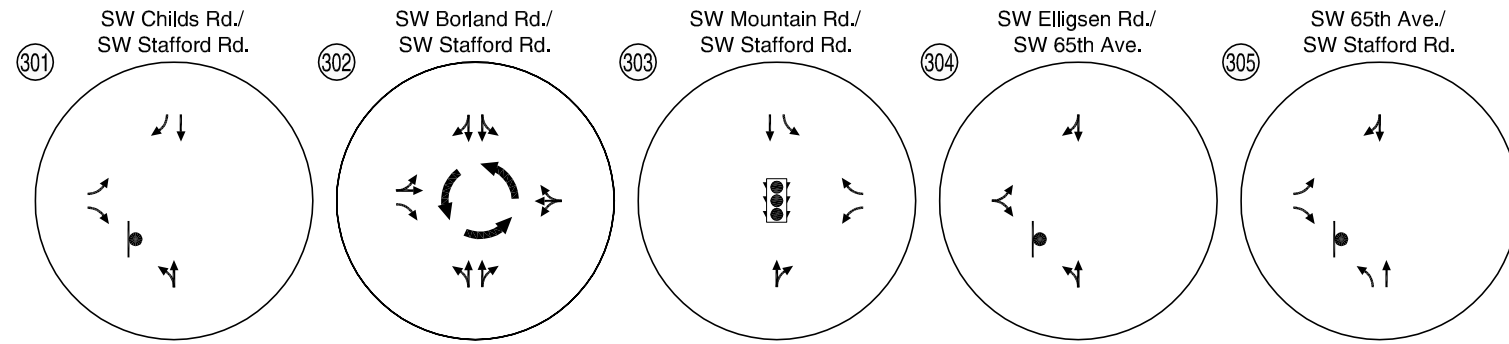


Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

**2035 Low Build Projects
Northwest County**

Figure
NW 33

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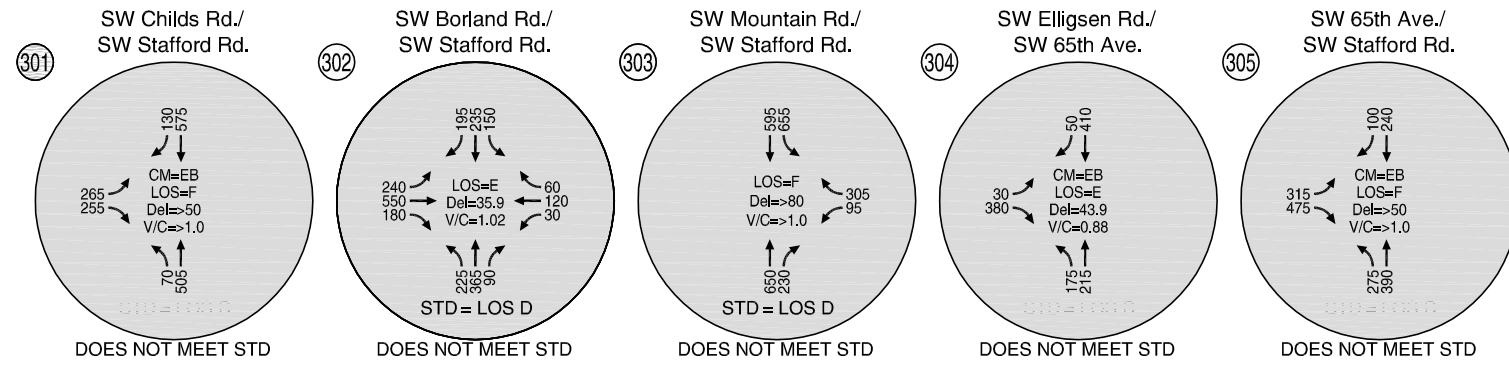
- ## - ODOT STUDY INTERSECTION
- ## - COUNTY STUDY INTERSECTION
- - STOP SIGN
- ⬆️ - TRAFFIC SIGNAL
- ⦿ - ROUNDABOUT
- ↔️ - LANE REMOVED
- ➔️ - LANE ADDED

Low Build Lane Configuration and Traffic Control Devices Northwest County



Figure NW 34

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CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 STD = OPERATIONAL STANDARD

Low Build Intersection Operations PM Peak Hour Northwest County



**Figure
 NW 35**

Roadway Segment Analysis

The roadway segment operations analysis consists of considering the roadway segment volumes and approximate level of congestion based on a comparison of the volume to the segment capacity. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure NW 36 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Low Build Scenario.

As is evident from Figure NW 36, under the 2035 Low Build Scenario demand for travel continues to be highest along Stafford Road, SW Borland Road, S Rosemont Road and SW Mountain Road.

Approximate Level of Congestion

The level of roadway segment congestion experienced for the 2035 Low Build Scenario was estimated using the roadway segment volumes from the Metro model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion.

Figure NW 37 illustrates the relative congestion during the 2035 Low Build weekday evening peak hour on roadways based on the estimated roadway segment volumes and capacity.

As can be seen in Figure NW 37, under the 2035 Low Build Scenario, portions of Stafford Road extending from S Rosemont Road to the I-205 interchange with Stafford Road are estimated to experience noticeable increases in congestion relative to the existing conditions. Congestion is also estimated to increase along S Rosemont Road and SW Childs Road. Table NW 11 lists the roadway segments that have volume-to-capacity ratios over 0.8 and describes the level of congestion as nearing congestion, some congestion, congested, or very congested.

Table NW 11 2035 Low Build Roadway Segment Congestion in Northwest County Area

Roadway	Segment	Level of Congestion
I-5	Through Wilsonville	Nearing Congestion to Very Congested
SW Wilsonville Rd	Western Wilsonville	Nearing Congestion to Congested
I-205	SW Stafford Rd to east border of area	Nearing Congestion to Very Congested
OR 43	Through Lake Oswego and portions of West Linn	Nearing Congestion to Very Congested
SW Stafford Rd	I-205 to Rosemont Rd	Nearing Congestion to Very Congested
SW Borland Rd	Through south Rivergrove	Nearing Congestion to Very Congested
SW A Ave	Through Lake Oswego	Some Congestion
SW Childs Rd	Pilkington Rd to SW Stafford Rd	Some Congestion
S Rosemont Rd	SW Stafford Rd to SW Wilda Rd	Some Congestion
Boones Ferry Rd	Kruse Way to SW County Club Rd	Some Congestion

Figure NW 36
County

Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario in Northwest

Table NW 12

Figure NW 37 Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario in Northwest County

2035 FULL BUILD SCENARIO

The full build scenario includes all of the existing planned projects in the County’s current TSP and the Metro RTP. The purpose of analyzing the full build scenario is to determine how all transportation projects that are currently planned will improve future traffic operations. This will help identify which projects are necessary to address roadway and intersection operations that are below standard and which projects are located on facilities forecast to perform above standards. In addition, the full build analysis will identify intersections and roadways that do not meet standards even with planned transportation projects.

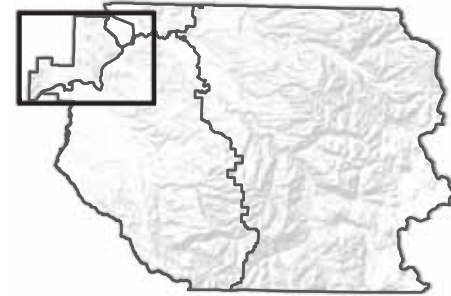
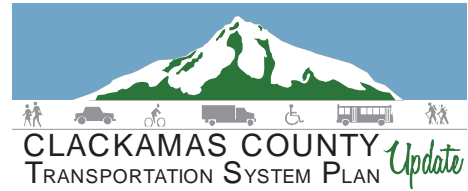
The forecast traffic volumes, roadway cross-sections, and intersection configurations were adjusted based on projects in the full build scenario that affect roadway or intersection capacity, such as the addition of turn lanes or roadway widening. The capacity full build projects are mapped in Figure NW 38 and listed and described in Table NW 13. There are several intersection and roadway projects planned. The majority of roadway projects involve reconstructing and widening rural roadways to three lanes to meet standards. There are also several signal projects planned.

Table NW 13 Full Build Projects in Northwest County Area

Project	ID	Location	Description
Barber St. Extension from Kinsman Rd. to Villebois Village*	U018	Kinsman Rd. to Villebois Village	Extend 3 lanes with sidewalks and bike lanes to reduce the need to use I-5 and OR 217 by providing needed connections to the Villebois Village housing development and employment areas in Wilsonville and with the new Commuter Rail site.
Kinsman Rd. Extension from Barber St. to Boeckman Rd.*	U021	Barber St. to Boeckman Rd.	Extend 3 lanes with sidewalks and bike lanes. Provide freight access and capacity from Barber Street to Boeckman Road. A vital alternative to 110th which is being vacated. Serves as a parallel arterial to I-5.
Wilsonville Rd/I-5 Interchange Improvements*	U676	Town Center Loop W to Boones Ferry Rd	Provide additional left-turn lanes, setback abutments, improve signal synchronization, fix sight distance problems, and enhance bike/pad safety.
Wilsonville Rd/I-5 Interchange Improvements*	U677	N and S of interchange	Widen and lengthen on/off ramps
Bangy Road	U161	Bangy/Meadows intersection	Install traffic signal, turn lanes
Bangy Road	U162	Bangy/Bonita intersection	Install traffic signal, turn lanes
Carman Drive	U163	I-5 to Quarry Road	Reconstruct and widen (3 lanes), add turn lanes
Carman Drive	U164	Carman/Meadows Road intersection	Install traffic signal, turn lanes
Borland Road	U167	65th Avenue to Stafford Road	4 lane widening with left-turn lanes
Stafford Road	U168	Childs Rd to Rosemont Rd	4 lane widening with SB turn lane and NB turn lane
Stafford Road	U169	Stafford/Childs Road intersection	Install traffic signal, southbound turn lane and northbound turn lane
Stafford Road	U170	Johnson Road to Childs Road	4 lane widening with left-turn lanes
Stafford Road	U171	Borland Rd to Johnson Rd	4 lane widening with left-turn lanes
Stafford Road	U172	I-205 to Borland Rd	4 lane widening with left-turn lanes
Rosemont Road	U173	Stafford Road to Parker Road	Reconstruct and widen (3 lanes)
Rosemont Road	U174	Rosemont/Parker/Day intersection	Realign intersection, add turn lanes
Stafford Road	U177	Mountain Rd to I-205	4 lane widening with left-turn lanes
Stafford Road	U178	Newland Rd to Mountain Rd	4 lane widening with left-turn lanes

Project	ID	Location	Description
Stafford Road	U179	Boeckman Rd (Advance Rd) to Newland Rd	Reconstruct and widen (rural) (3 lanes)
65th Ave/ Elligsen/Stafford Rd.	U180	Elligsen Road to Stafford Road	Realign Elligsen Road to south, install northbound right-turn and southbound left-turn lane at new Stafford Road/Elligsen Road intersection
Ladd Hill Road	U272	Wilsonville Road to Washington County Line	Reconstruct and widen (rural) (3 lanes)
Childs Road	U462	Stafford Road to 65 th Avenue	Reconstruct and widen - 2/3 lanes
Pete's Mountain Road	U466	Willamette Falls Road to Hoffman Road	Reconstruct and widen (rural) (3 lanes)
SW 65 th Ave	U489	Nyberg to Childs Rd	Extension across Tualatin River from Nyberg to Childs Road
SW 65 th Ave	U490	Sagert to Nyberg	Widen to 5 lanes from Sagert to Nyberg.
Boeckman Rd./I-5 Overcrossing Improvements	U501	Boberg Rd. to Parkway Ave.	Widen Boeckman Road bridge over I-5 to 3 lanes. Add bike/pedestrian connections to regional trail system.
OR 43 Improvements	U555	Holly St. to Arbor Dr.	Improve roadway with widening, installation of medians, turn lanes, street trees, signal interconnections, and bike lanes.
Brookman Rd	U679	OR 99W to Ladd Hill Rd	Reconstruct road to collector standards.
Ladd Hill Rd.	U680	Sunset Blvd to UGB	Upgrade street to arterial standards (4 lanes).

* Project also included in Low Build Scenario.

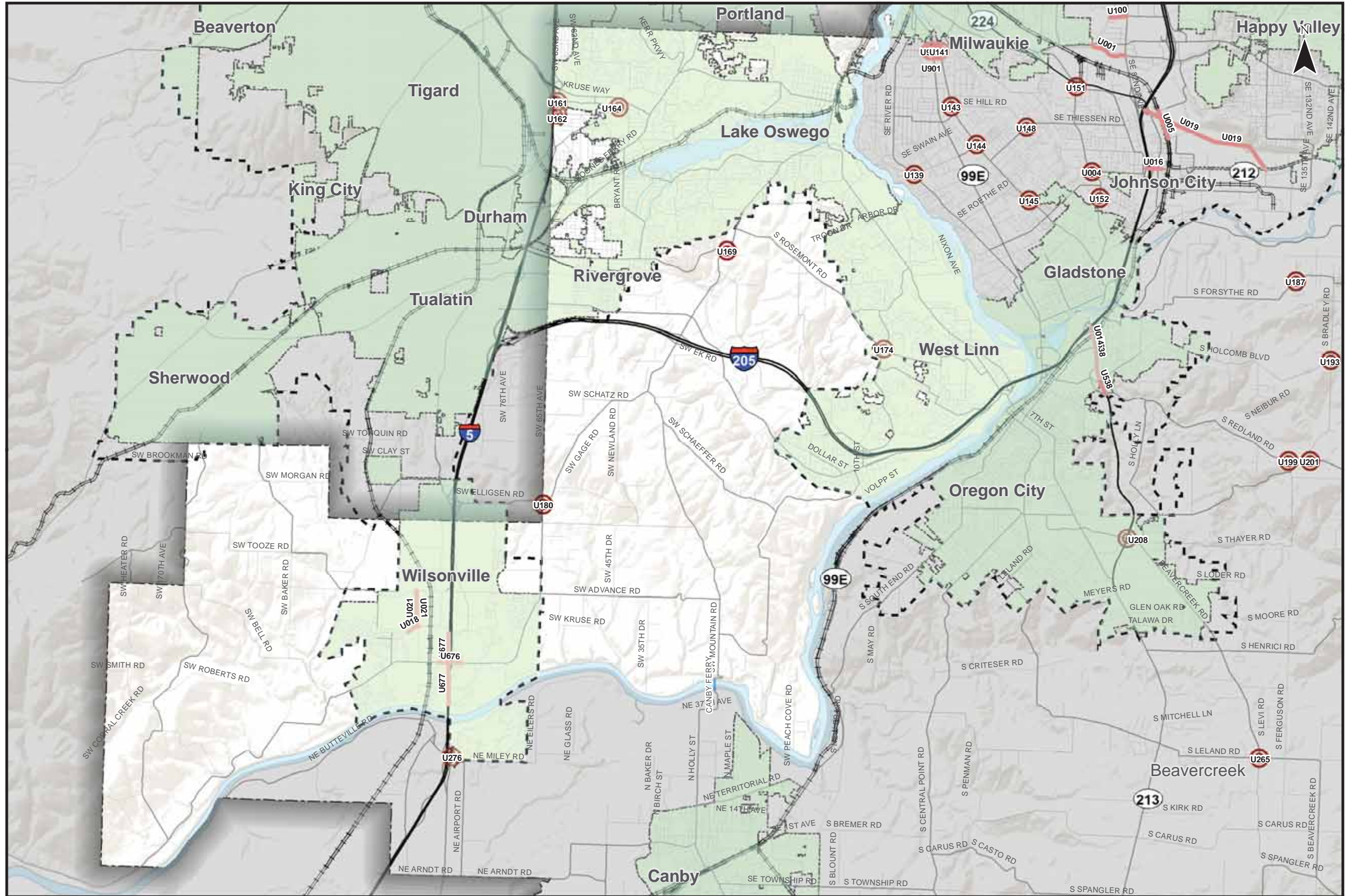


2035 Low Build Projects

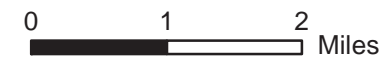
- Intersection Projects
- Roadway Projects

2035 Full Build Projects

- Intersection Projects
- Roadway Projects
- City
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Full Build Scenario. The 2035 Full Build Scenario includes the existing planned projects in the County's current TSP and the Metro RTP. The purpose of analyzing the Full Build Scenario is to determine how transportation projects that are currently planned will improve future traffic operations. This will help identify which projects are necessary to address roadway and intersection operations that are below standard and which projects are located on facilities that are forecasted to perform above standards.



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

**2035 Full Build Projects
Northwest County**

Figure
NW 38

Study Intersection Analysis

The operations at the study intersections that do not meet standards under the low build scenario were analyzed under the full build scenario using traffic volumes projected under the full build scenario. Figure NW 39 illustrates the lane configurations and traffic control devices at the study intersections. The intersections that meet standards under the low build analysis were not analyzed under the full build scenario.

The intersection operation results are shown in Table NW 14 and Figure NW 40, with intersections that do not meet standards noted. Any full build projects that affect lane configurations at study intersections were accounted for and are noted in the figure and table as well. Signal timings were adjusted as appropriate to account for changes in the forecasted traffic volumes. Intersections that do not meet standards are noted.

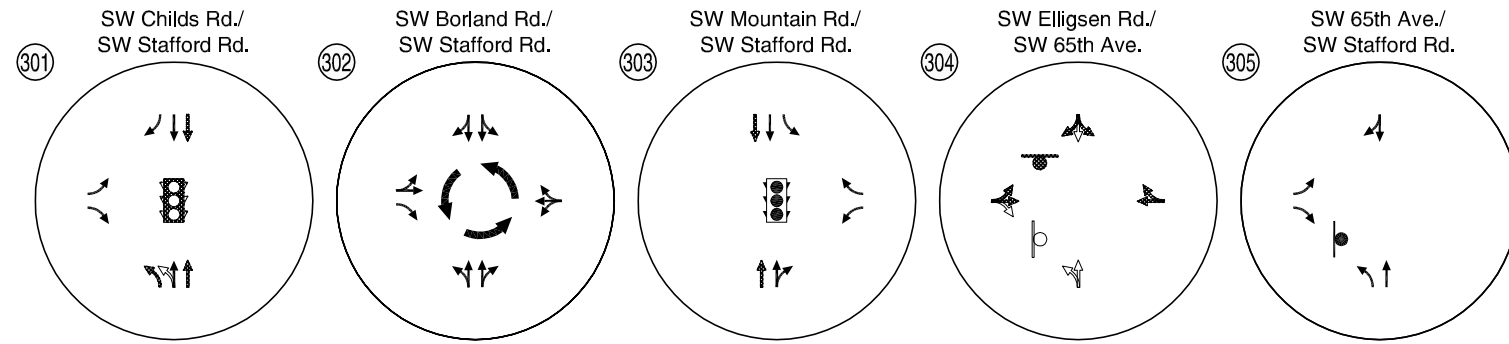
Table NW 14 2035 Full Build Traffic Operations Analysis Results at Study Intersections in Northwest County Area

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard in Low Build?	Full Build Project?	Meets Standard in Full Build?
301	SW Childs Rd/SW Stafford Rd	County	LOS = D	No	Yes (U168, U169, U170, U462)	Yes
302	SW Borland Rd/SW Stafford Rd	County	LOS = D	No	No	No (LOS=F)
303	SW Mountain Rd/SW Stafford Rd	County	LOS = D	No	Yes (U177)	Yes
304	SW Ellingson Rd/SW 65th Ave	County	LOS = D	No	Yes (U180)	No (LOS=F)
305	SW 65th Ave/SW Stafford Rd	County	LOS = D	No	Yes (U180)	No (LOS=F)

As seen in the table, two of the intersections that did not meet standards under the low build scenario do meet standards under the full build scenario.

- Operations at the intersection of SW Childs Road/SW Stafford Road (301) improve significantly with the addition of a signal, a left-turn lane on the northbound approach, and an additional through lane on SW Stafford Road.
- The intersection of SW Mountain Road/SW Stafford Road (303) also meets standards under the full build scenario due to a capacity project that adds an additional through lane to Stafford Road.

Although SW Ellingson Road/SW 65th Avenue (305) and SW 65th Avenue/SW Stafford Road (304) are both impacted by the planned realignment of SW 65th Avenue/SW Ellingson Road/SW Stafford Road, they do not meet standards under the full build scenario. The roundabout at the intersection of SW Mountain Road/SW Stafford Road (302) is not impacted by any capacity projects in the full build scenario and does not meet standards. *Appendix 8* contains detailed traffic operations analysis results.



NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

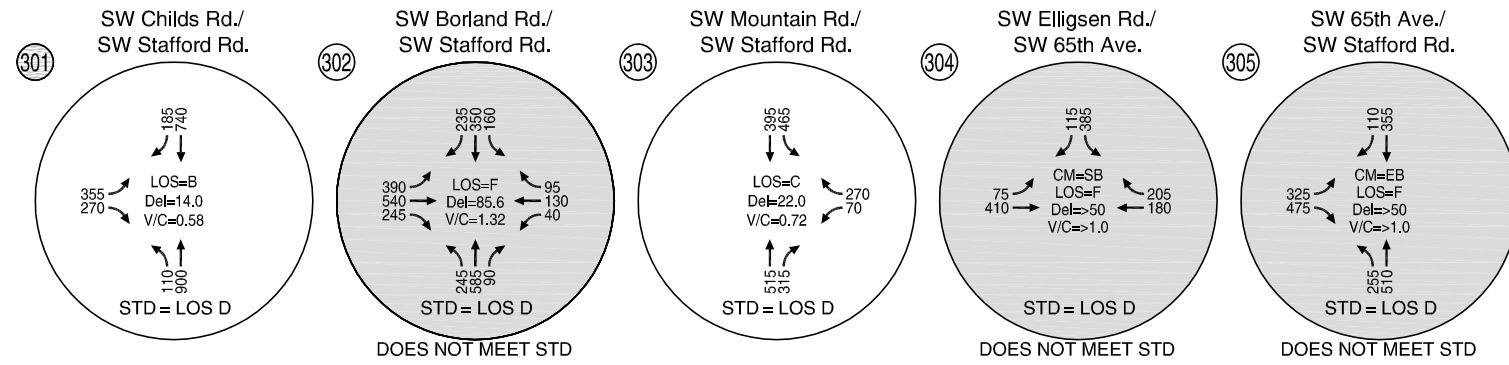
- - ODOT STUDY INTERSECTION
- ⊙ - COUNTY STUDY INTERSECTION
- ⬮ - STOP SIGN
- 🚦 - TRAFFIC SIGNAL
- ⦿ - ROUNDABOUT
- ⇨ - LANE REMOVED
- ⇩ - LANE ADDED

Full Build Lane Configuration and Traffic Control Devices Northwest County



Figure NW 39

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NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 STD = OPERATIONAL STANDARD

Full Build Intersection Operations PM Peak Hour Northwest County



**Figure
 NW 40**

Roadway Segment Analysis

The following sub-sections present the roadway segment volumes and approximate congestion for the 2035 Full Build Scenario. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure NW 41 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Full Build Scenario.

As is evident from Figure NW 41, under the 2035 Full Build Scenario demand for travel continues to be highest along Stafford Road, SW Borland Road, S Rosemont Road and SW Mountain Road.

Approximate Level of Congestion

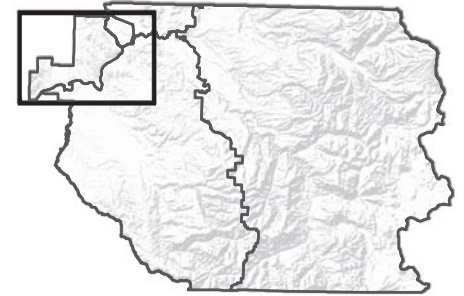
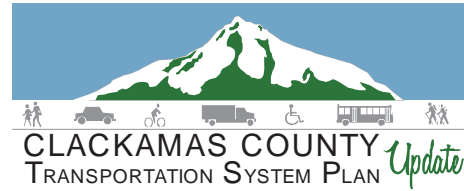
The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion.

Figure NW 42 illustrates the relative congestion during the 2035 Full Build weekday evening peak hour on roadways based on the estimated roadway segment volumes and capacity.

As can be seen in Figure NW 42, under the 2035 Full Build Scenario Stafford Road is estimated to return to a relatively uncongested state compared to the 2035 Low Build Scenario. S Rosemont Road is still estimated to experience some level of congestion under the 2035 Full Build Scenario. The remaining roadways in the Northwest County area (excluding I-205, I-5, and incorporated areas) are estimated to be uncongested. Table NW 15 lists the roadway segments that have volume-to-capacity ratios over 0.8 and describes the level of congestion as nearing congestion, some congestion, congested, or very congested.

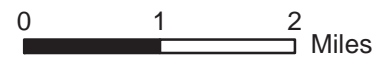
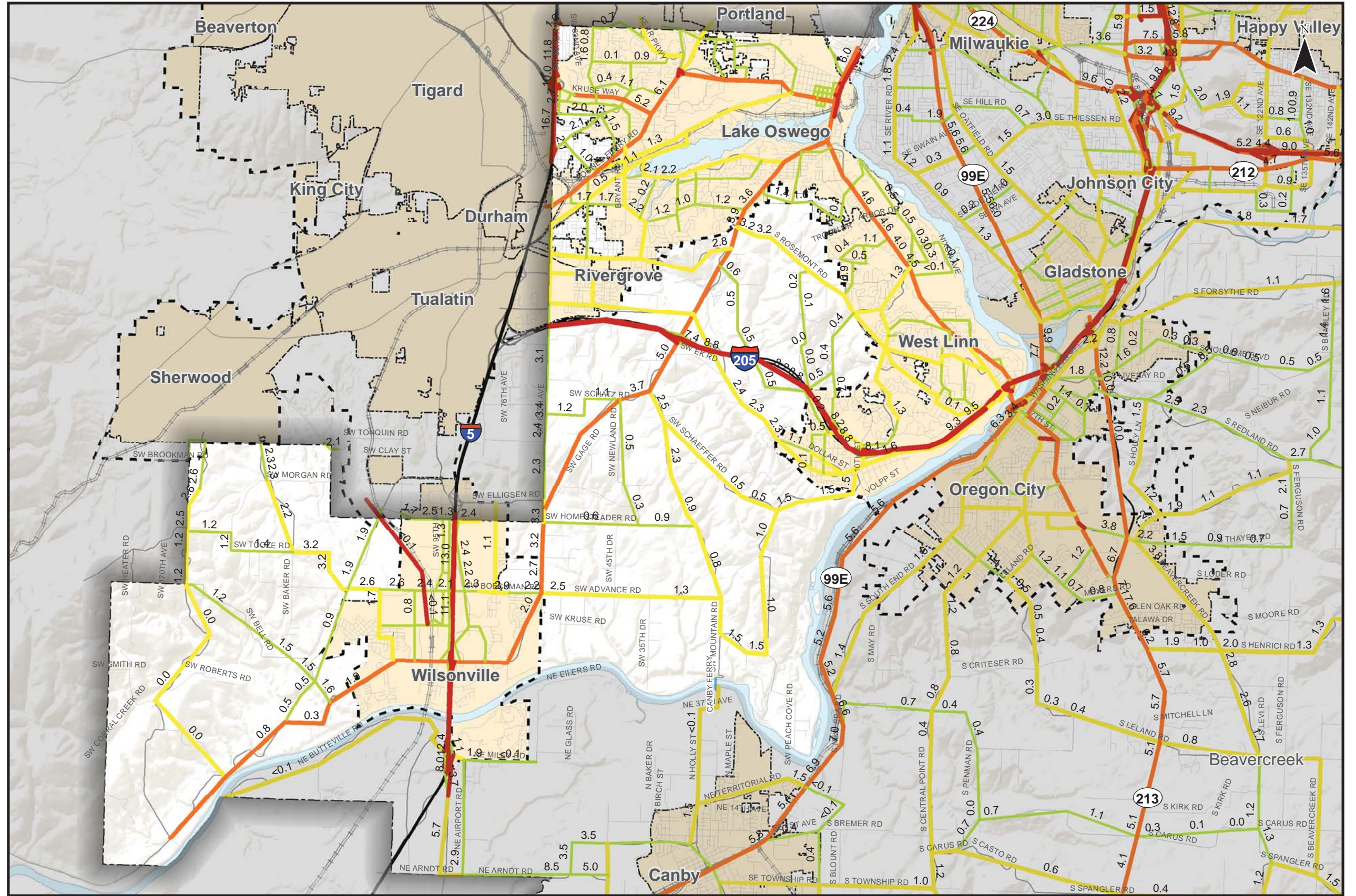
Table NW 15 2035 Low Build Roadway Segment Congestion in Northwest County

Roadway	Segment	Level of Congestion
I-5	Through Wilsonville	Congested to Very Congested
SW Wilsonville Rd	Western Wilsonville	Some Congestion to Nearing Congestion
I-205	SW Stafford Rd to east border of area	Nearing Congestion to Very Congested
OR 43	Through Lake Oswego and portions of West Linn	Nearing Congestion to Very Congested
SW Borland Rd	Through south Rivergrove	Nearing Congestion to Very Congested
SW A Ave	Through Lake Oswego	Nearing Congestion to Some Congestion
SW Childs Rd	Pilkington Rd to SW Stafford Rd	Nearing Congestion
S Rosemont Rd	SW Stafford Rd to SW Wilda Rd	Some Congestion
Boones Ferry Rd	Kruse Way to SW County Club Rd	Some Congestion



2035 Full Build Volumes

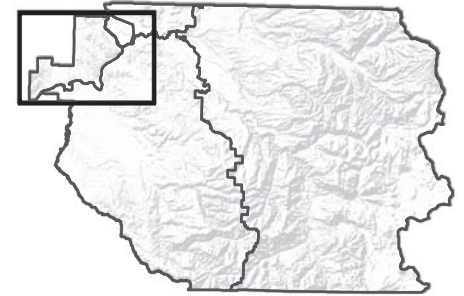
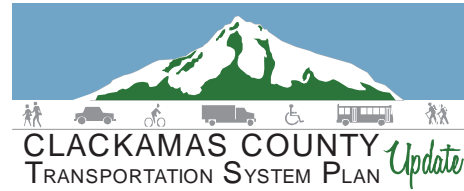
- Freeway
- Principal / Major Arterial
- Minor Arterial
- Other
- ##** PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resource Center

**Evening Weekday Peak Hour Roadway Segment Volumes 2035 Full Build
Northwest County**

Figure
NW 41



Very Congested >1.10

- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1

- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Some Congestion 0.9 - 1.0

- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

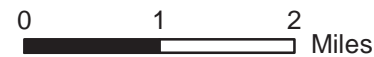
Nearing Congestion 0.8 - 0.9

- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

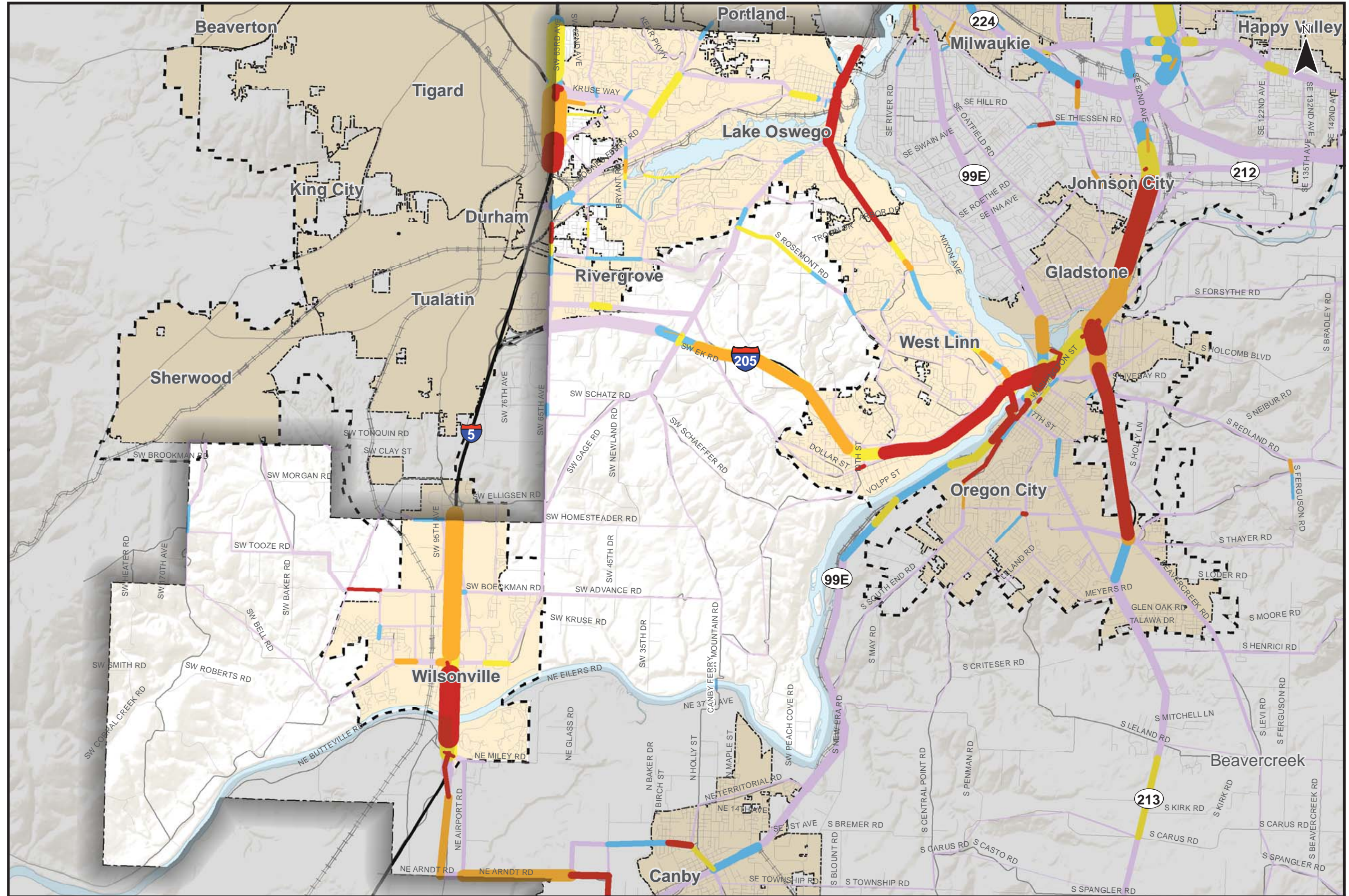
Less Congested <0.8

- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

- Incorporated Areas
- County Boundary
- UGB



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County,
Metro Data Resource Center



**Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build
Northwest County**

Figure
NW 42

COMPARISON OF EXISTING, 2035 LOW BUILD, AND 2035 FULL BUILD ANALYSIS RESULTS

Traffic volumes are forecast to increase significantly by the year 2035. The increase in traffic volumes is most significant on SW Stafford Road. There are very few transportation projects planned and financed for the Northwest County under the low build scenario. The full build scenario includes several roadway and intersection projects, mainly reconstructing and widening roadways, signaling intersections, and adding turn lanes.

Intersection Operations Analysis

Table NW 16 compares the intersection operation results for the existing, 2035 low build, and 2035 full build scenarios. The table also notes intersections that are impacted by low build and full build projects.

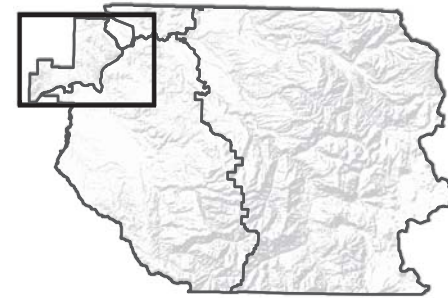
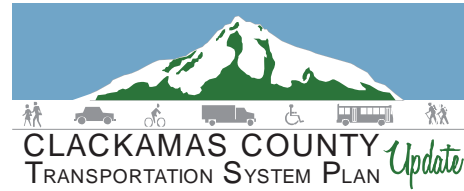
Table NW 16 Comparison of Traffic Operations Analysis Results at Study Intersections in Northwest County Area

ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?	Full Build Project?	Meets Standard in 2035 Full Build?
301	SW Childs Rd/SW Stafford Rd	County	LOS = D	No	No	No	Yes	Yes
302	SW Borland Rd/SW Stafford Rd	County	LOS = D	Yes	No	No	No	No
303	SW Mountain Rd/SW Stafford Rd	County	LOS = D	Yes	No	No	Yes	Yes
304	SW Ellingson Rd/SW 65th Ave	County	LOS = D	Yes	No	No	Yes	No
305	SW 65th Ave/SW Stafford Rd	County	LOS = D	No	No	No	Yes	No

As seen in the table, three intersections do not meet standards under the full build or low build scenario. Of these three intersections, two are impacted by full build projects.

Roadway Segment Operations Comparison

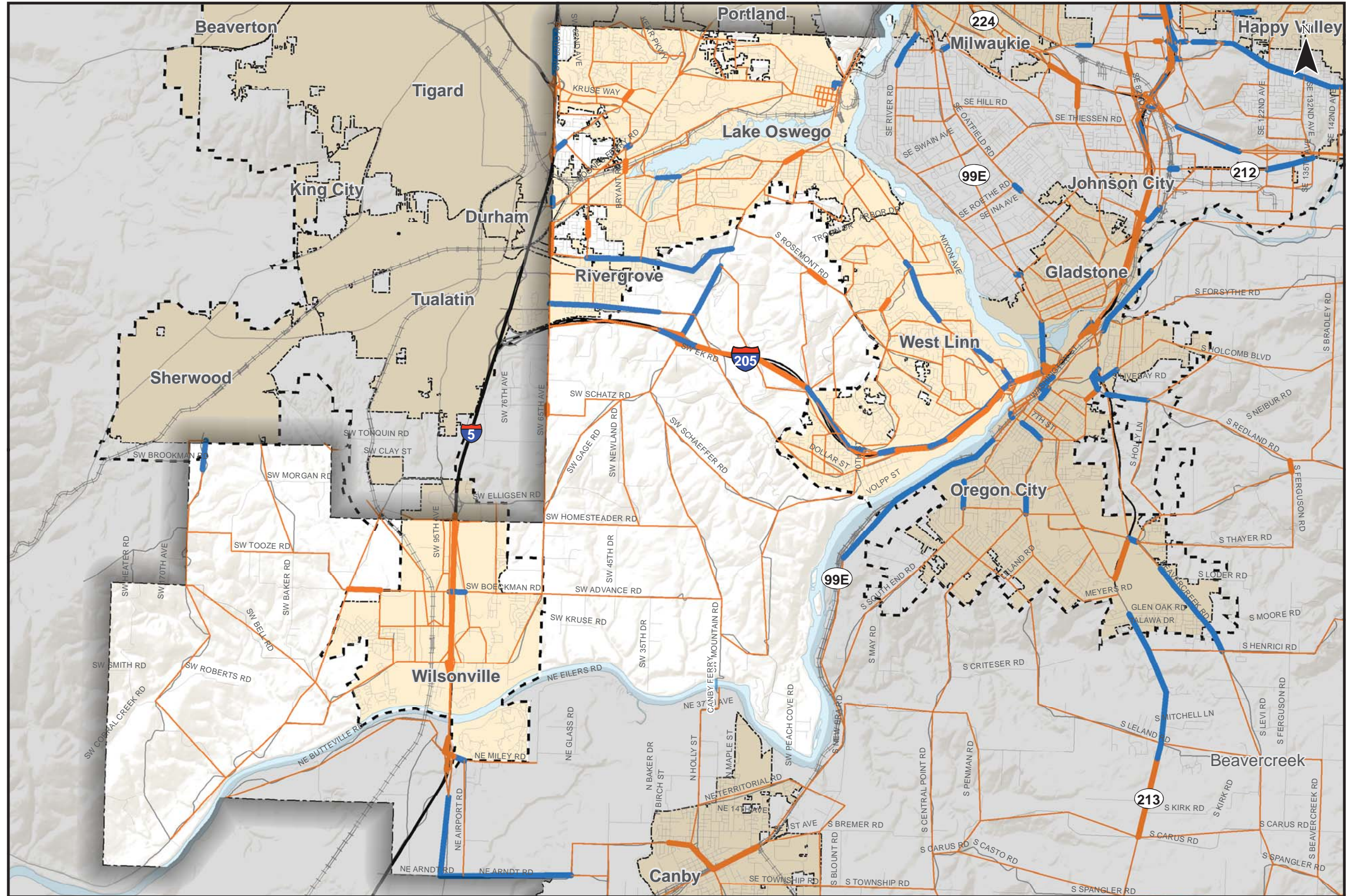
Figure NW 43 compares the approximate change in congestion between the 2035 Low Build Scenario and 2035 Full Build Scenario. As shown in Figure NW 43, implementing the full build projects decreases congestion (relative to low build scenario) most significantly on Stafford Road and NW Childs Road.



Change in Congestion

Low to Full Build

- Congestion Increases
- Minimal Change
- Congestion Decreases
- Incorporated Areas
- County Boundary
- UGB



Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resource Center

**Evening Weekday Peak Hour Roadway Segment Congestion
Comparison of 2035 Low Build vs. 2035 Full Build
Northwest County**

Figure
NW 43

H:\profile11732 - Clackamas County TSP\gis11x17 Maps\43 Evening Weekday Peak Hour Roadway Segment Congestion Comparison of 2035 Low Build vs.mxd