Section 7
Greater Clackamas Regional Center/Industrial Area

OVERVIEW OF KEY FINDINGS – CLACKAMAS REGIONAL CENTER/INDUSTRIAL AREA

Below is a summary of the major findings of the existing and future conditions operational analysis in the Greater Clackamas Regional Center/Industrial Area. Further analysis of the existing conditions and future base conditions follows.

Existing Conditions:

Transportation Disadvantaged Populations

- This area has the highest population densities in unincorporated Clackamas County with the highest density areas located along SE King Road. Nearly all of the unincorporated areas in the area are identified as Transportation "Disadvantaged" or "Most Disadvantaged" areas.

Roadways

- Three of the 65 study intersections are operating at volume-to-capacity ratios that do not meet performance standards under existing conditions.
    - SE Johnson Creek Boulevard/80th Avenue
    - OR 212/I-205 SB Ramps
    - OR 224/SE Hubbard Road/135th Avenue
- Roadway segments within the area (excluding I-205) are primarily categorized as less congested during the weekday evening peak hour under existing conditions. Relatively short segments of OR 212 and SE Sunnyside Road are estimated to approach congestion during the weekend evening peak hour.

Pedestrian System

- There are sidewalks along many key facilities; however, there are also still significant gaps, particularly farther away from the Clackamas Regional Center.
- Sidewalks are required on all roadways in the County's urban areas and the Essential Pedestrian Network in the County's Comprehensive Plan (see *Appendix 5*) provides guidance on which local roadways are critical parts of the pedestrian network. It also includes all collectors and arterials in the subarea.
- Existing gaps in the pedestrian network include all roadways identified on the Essential Pedestrian Network that do not have an existing sidewalk facility.
- The County's Pedestrian Master Plan identifies priorities for filling in the pedestrian network gaps.

Bicycle System

- A significant portion of the unincorporated area of this area has bicycle lanes.

- Bicycle facilities should be provided on all roadways designated as collectors or higher. The County's Comprehensive Plan identifies all collector and arterial roadways in this Area as part of the Bicycle Network.
- Existing gaps in the network include all roadways identified on the Bicycle Network (nearly all collectors and arterials) that do not have an existing bicycle facility.
- The County's Bike Master Plan identifies priorities for filling in the bicycle network gaps.

Safety Corridors

- The following candidate road safety audit corridors (listed in no particular order) were identified based on the crash data review and analysis:
  - SE 82nd Avenue from SE Luther Road to SE Sunnybrook Boulevard
  - SE Johnson Creek Boulevard from SE 55th Avenue to I-205
  - SE Sunnyside Road from SE 93rd Avenue to SE 126th Avenue
  - SE 122nd Avenue from SE 172nd Avenue to SE Hubbard Road
  - OR 212 from I-205 to OR 224

Transit

- Transit Service Frequency: A majority of the services provided in the Area currently operate at LOS D or below throughout the day. Although the service is typical of most urban or suburban areas, if headways are decreased (and buses come more frequently), service will become more appealing to a broader range of users, and ridership should increase.
- Transit Hours of Service: The services provided in the area currently vary widely throughout the day from LOS A to LOS E depending on the bus route. Increasing the hours of service on the routes that operate at LOS C or below will make bus service usable for a broader range of trip purposes.
- Transit Service Coverage: The current population and employment service coverage is LOS D. Some of the transit supportive areas not currently served by transit may require additional transit routes or new connections to existing transit routes in order to be served.
- The number of transit supportive areas is expected to increase significantly throughout most of the area 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:

- Twelve of the 65 study intersections operate at volume-to-capacity ratios in excess of performance standards under both the low build and full build future conditions:
  - SE Johnson Creek Boulevard /80th Avenue
  - OR 213 (SE 82nd Avenue)/SE Johnson Creek Boulevard
  - SE Lake Road /SE International Way

  - SE Harmony Road /SE Linwood Avenue
  - OR 213 (SE 82nd Avenue)/SE Sunnybrook Boulevard
  - OR 224/SE Rusk Road
  - OR 224/SE Lake Road /SE Webster Road
  - OR 224/SE Johnson Road
  - OR 212/I-205 SB Ramps
  - OR 224/SE Hubbard Road /135th Avenue
  - OR 212/SE 172nd Avenue
  - OR 224/Springwater Road

- Of the 12 intersections that do not meet performance standards under full build future conditions, six are impacted by full build projects:
  - SE Johnson Creek Boulevard /80th Avenue
  - OR 213 (SE 82nd Avenue)/SE Johnson Creek Boulevard
  - SE Lake Road /SE International Way
  - SE Harmony Road /SE Linwood Avenue
  - OR 213 (SE 82nd Avenue)/SE Sunnybrook Boulevard
  - OR 224/Springwater Road
- Nine of the 65 study intersections were found to operate at volume-to-capacity ratios in excess of performance standards under the low build scenario, but meet performance standards under the full build future conditions:
  - SE King Road /SE Fuller Road
  - SE Sunnyside Road /I-205 SB Ramps
  - SE Sunnyside Road /I-205 NB Ramps
  - SE Sunnybrook Boulevard /I-205 NB Ramps
  - SE Sunnyside Rd/SE Sunnybrook Blvd
  - SE Sunnyside Road /SE 122nd Avenue
  - SE Sunnyside Road /SE 142nd Avenue
  - OR 224/SE 142nd Avenue
  - OR 212/OR 224
- Under the Low Build Scenario, higher levels of congestion are anticipated on eastern portions of OR 212 and OR 224, southern portions of I-205, and eastern portions of SE Sunnyside Road.
- Demand for travel is highest along OR 212, SE Sunnyside Road, SE 82nd Avenue, SE Harmony Road, SE Johnson Creek Boulevard, and SE Linwood Avenue under both the low build and full

build future conditions. The Sunrise Expressway Mainline is projected to serve a relatively high volume of traffic.

- Under the Full Build Scenario, the highest levels of congestion are anticipated on I-205, OR 224, and SE Tong Road. The projects included in the Full Build Scenario, specifically the Sunrise Expressway Mainline project, help alleviate congestion on SE Sunnyside Road and OR 212. Portions of other regional roadways also experience reduced congestion such as SE Monterey Avenue and SE Idleman Road.
- Overall, significant growth is forecast for the study roadways.

EXISTING CONDITIONS – GREATER CLACKAMAS REGIONAL CENTER/INDUSTRIAL AREA

INTRODUCTION

The Greater Clackamas Regional Center/Industrial Area is located in the northernmost section of the County, extending from Milwaukie east to Damascus, inside the Metro urban growth boundary (UGB). This area includes large sections of OR 224, OR 212, OR 213 N and I-205. The incorporated communities of Milwaukie, Happy Valley, and Damascus are located here, as well as large unincorporated areas on both sides of I-205. The extent of the Greater Clackamas Regional Center/Industrial Area is illustrated in Figure C 1.

LAND USE AND POPULATION

This section provides a general overview of existing land uses and population patterns in the area. 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

Throughout the area there are several destinations that attract people and therefore generate travel by vehicle, bicycle and by foot. These uses attract visitors from outside the County and Clackamas County residents. Major activity centers including libraries, park/ride stops, shopping centers, schools and parks are illustrated in Figure C 2. The activity areas shown indicate the many areas where activity occurs in the area; it is not intended to be an exhaustive inventory. As the TSP update completes the existing and future conditions analyses, the location of activity centers will be integrated into considerations to improve access to these destinations.

The Greater Clackamas Regional Center/Industrial Area includes the Clackamas Town Center, Clackamas Industrial Area, North Clackamas Revitalization Area, and the Fuller Road Station Area.

- The Clackamas Town Center is located west of I-205 near SE Sunnyside Road; it was originally formed in 1980. The 819-acre regional business center, which was designated as an urban renewal district in 1980, includes retail, office, hotel, and residential development. It is the fastest growing business center within the County. It established a nexus for other relatively large employers and services to enter the Great Clackamas Regional Center including the Oregon Institute of Technology (OIT), Clackamas Community College and Kaiser Permanente. OIT has a campus southwest of the OR 213/SE Harmony Road. The Kaiser Permanente Sunnyside Medical Center is located east of I-205. The area is also served by the Green Line (TriMet Light Rail) providing connections to the greater Portland Metropolitan Area. More information can be found here: http://www.clackamas.us/transportation/renewal/ctc.htm.
- The Clackamas Industrial Area, located along OR 212 east of I-205, is approximately 1,187 acres. The area was designated as an urban renewal district in 1984 to reduce traffic congestion, control flooding and drainage to promote economic development and create new jobs for local residents.

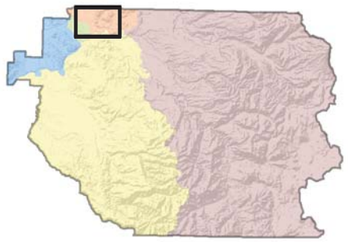
The Clackamas Industrial Area is a regional distribution, warehousing and wholesale trade center. More information can be found here: http://www.clackamas.us/transportation/renewal/cia.htm.

- The North Clackamas Revitalization Area Urban Renewal District, which was formed in 2006, encompasses approximately 1,008 acres in unincorporated Clackamas County between Milwaukie and Happy Valley bounded by the Clackamas County/Multnomah County boundary. The purpose of establishing the urban renewal area was to support development. To facilitate this purpose, the County developed with community members the North Clackamas Revitalization Area Plan. The plan includes projects to improve the livability of the area including streetscaping, sidewalk improvements, as well as improvements to parks and open spaces. More information can be found here: http://www.clackamas.us/transportation/renewal/northclack.htm.
- The Fuller Road Station Area is located north of the Clackamas Town Center, south of SE Johnson Creek Boulevard, east of SE 82nd Avenue and west of I-205. The County completed a plan in collaboration with community members in 2007 outlining desired locations for corridor commercial development, mixed use development, proposed street connections, and street cross-sections.

Another recent planning activity within the Greater Clackamas Regional Center/Industrial Area is Harmony Road Visioning. In collaboration with Clackamas Community College, OIT and the community, the County completed a visioning project in 2008 that identified guiding principles for desired redevelopment in the area and roadway improvements related to Harmony Road and Sunnybrook Boulevard.

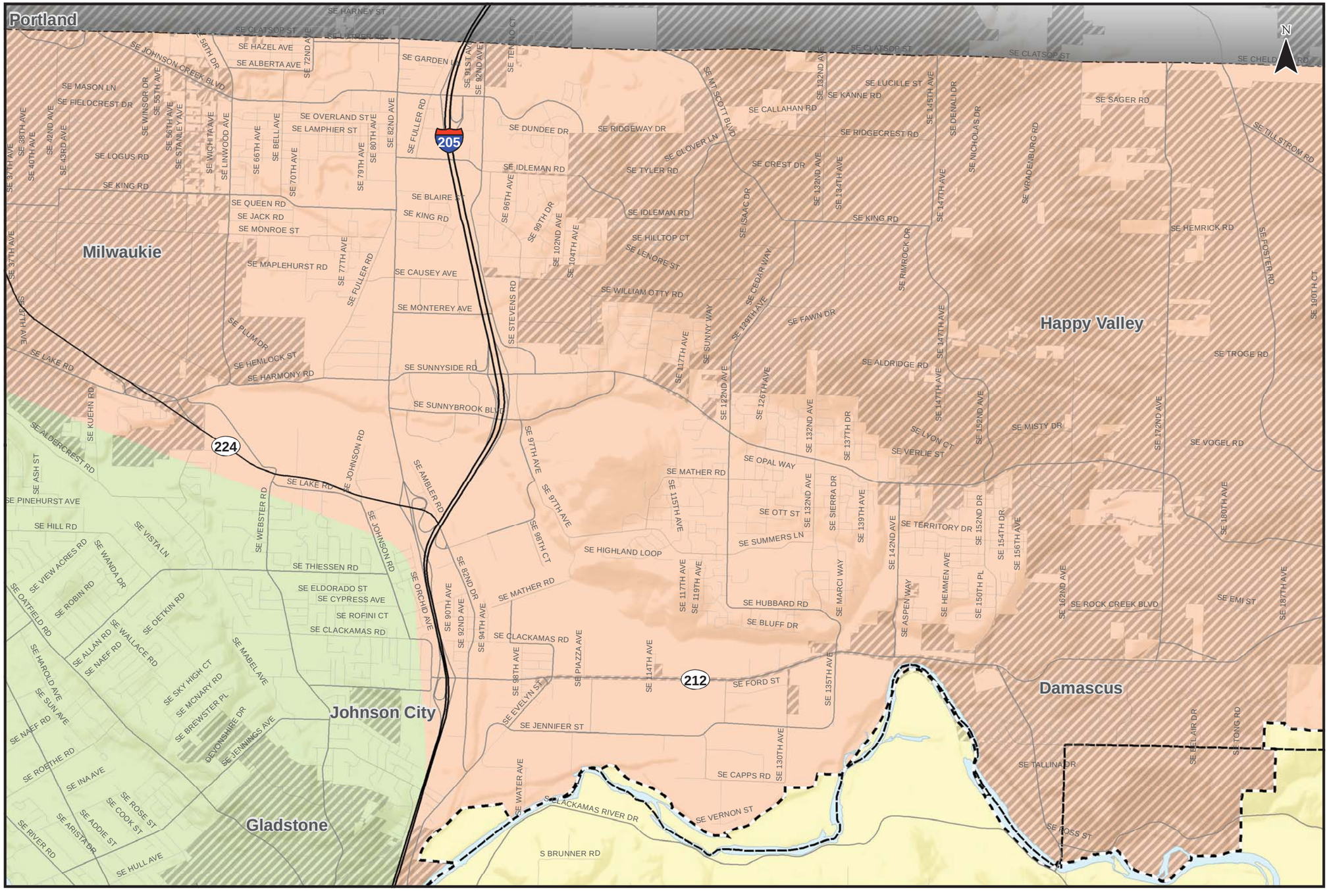
Other activity centers in the area include the McLoughlin industrial area, located adjacent to OR 99E, and the Milwaukie Business-Industrial area, located north of OR 224. Both of these areas are served by ODOT and Country Freight Routes, as well as several rail lines. In additional to the light rail stations at Clackamas Town Center and on Fuller Road with park/ride facilities, there are several park/ride locations in the area that allow travelers to park for free and provide bus or light rail service into Portland. The location of these activity centers, as well as concentrations of commercial, employment, and residential uses, will be considered when making recommendations for enhancing access for multiple transportation modes.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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



0 1 Miles

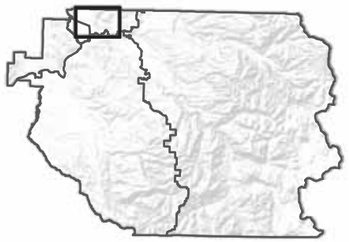
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Greater Clackamas Regional Center / Industrial Area Geographic Analysis Sub Areas

Figure
C 1

H:\proffile\l1732 - Clackamas County TSP\gis\11x17 Maps\01 Geographic Analysis Sub Areas.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- 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 Miles

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

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\02 Activity Centers.mxd

Activity Centers
Greater Clackamas Regional Center / Industrial Area

Figure
C 2

Land Use and Zoning

Figure C 3 illustrates the current basic land use zoning designations throughout the Greater Clackamas Regional Center/Industrial 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, Damascus is zoned a combination of Exclusive Farm Use, Timber District, Rural Center, and Rural Residential. Large portions of Milwaukie and Happy Valley are zoned for urban low density residential development. The area surrounding OR 213 N, OR 213 N/82nd Avenue is zoned for commercial, high density residential, and planned mix uses. OR 212 is bordered by industrial areas to the north and south near I-205.

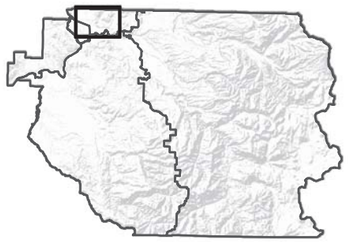
Population Inventory

Figure C 4 illustrates the population density within the Greater Clackamas Regional Center/Industrial Area by census tract. From this figure, it is evident that the highest population density is in the northwestern part of the area, particularly in the vicinity of SE King Road. Other dense areas are along SE Sunnyside Road. The population density of Damascus and Happy Valley is mainly 5 people or less per acre. Figures C 5 through C 8 illustrate demographic information about the households within the area. 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 within Clackamas County.

Figure C 9 illustrates the location of transportation disadvantaged populations in the area. 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. The western part of the Greater Clackamas Regional Center/Industrial Area, particularly in the vicinity of SE King Road, has a high portion of transportation disadvantaged areas. Nearly all of the unincorporated areas are identified as transportation "disadvantaged" or "most disadvantaged". The incorporated areas of Damascus and Happy Valley have relatively low densities and are the areas with the least transportation disadvantaged populations.

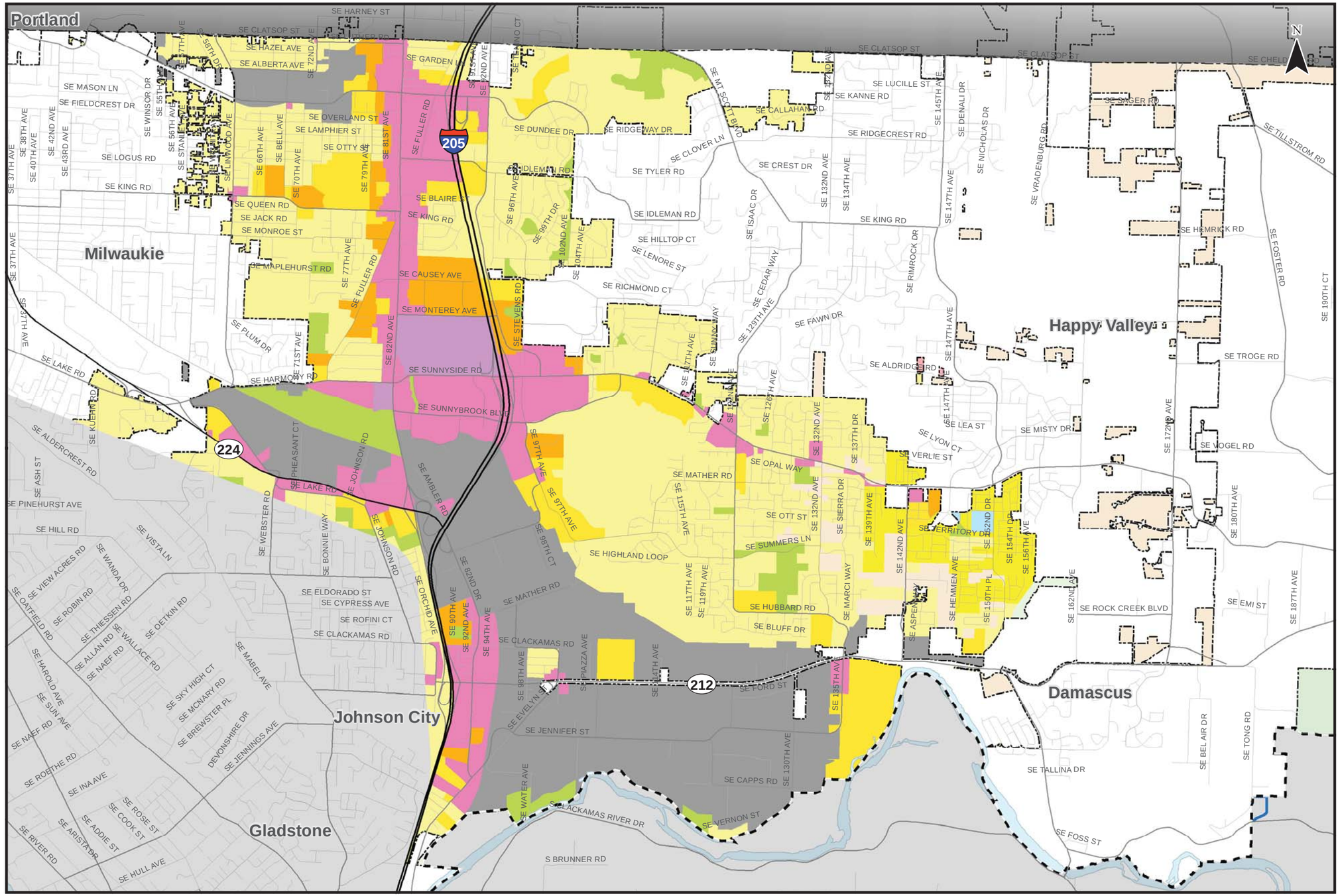
The purpose of mapping this information is to be aware of where this population is living while considering their needs to access different destinations. Population density and the location of disadvantaged populations will both be considered when identifying transportation projects to include in the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

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN 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



0 1 Miles

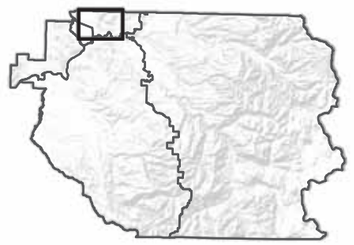
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Land Use Zoning Designations
Greater Clackamas Regional Center / Industrial Area

Figure
C 3

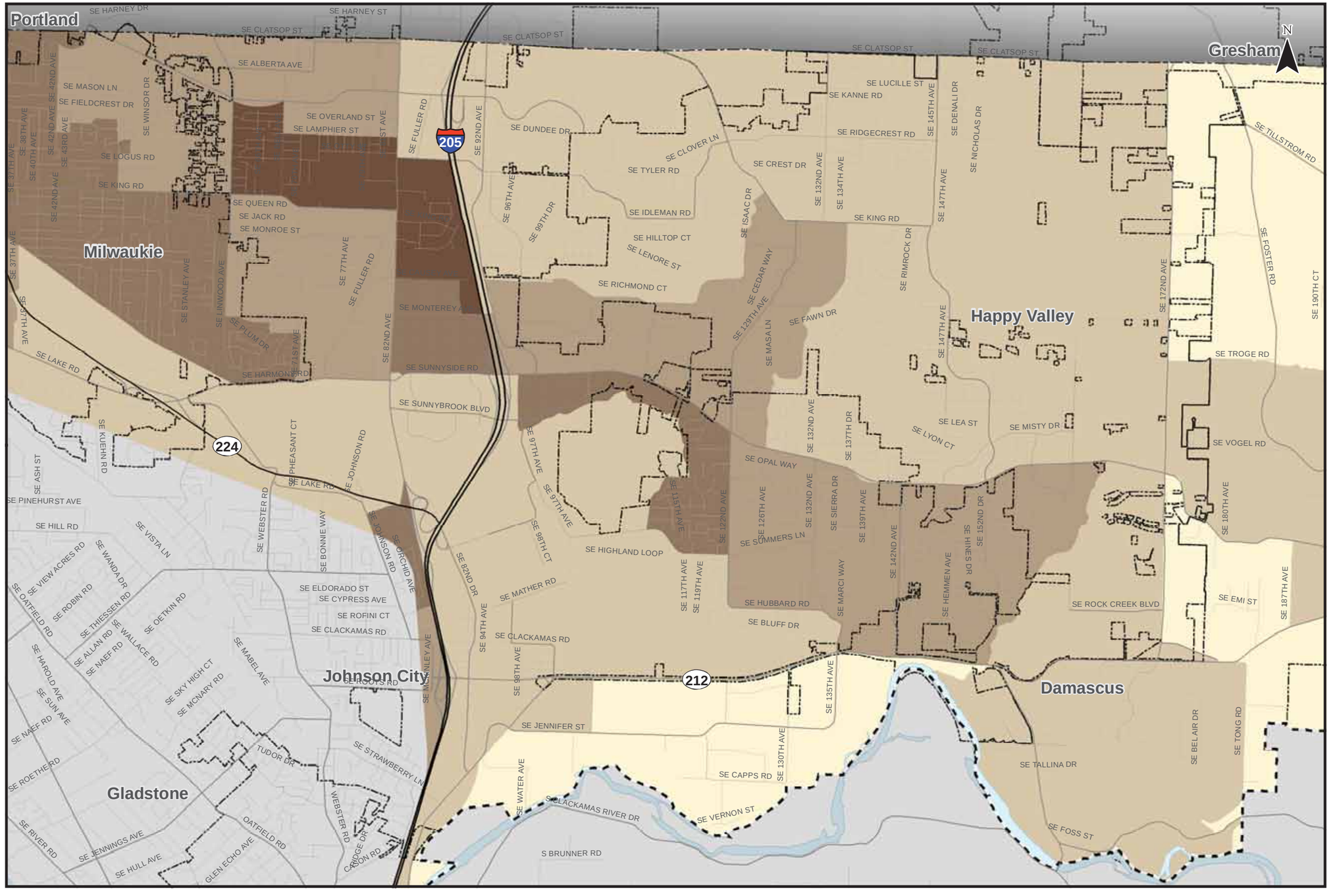
H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\03 Land Use Zoning Designations.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



People Per Acre

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



0 1 Miles

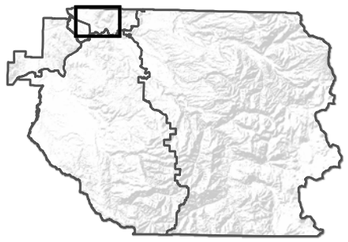
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\04 Population Density by Census Tract.mxd

Population Density by Census Tract
Greater Clackamas Regional Center / Industrial Area

Figure
C 4

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Population Age 65 and Older

- 0% - 6%
- 6% - 15%
- 15% - 30%
- 30% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 Miles

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

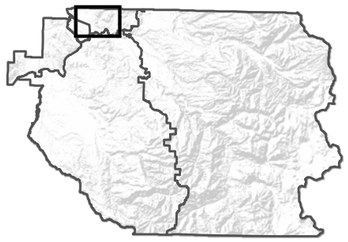
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

H:\proj\file\117732 - Clackamas County TSP\gis\11x17 Maps\05 Elderly Population by Census Block.mxd

Elderly Population by Census Block
Greater Clackamas Regional Center / Industrial Area

Figure
C 5

CLACKAMAS COUNTY Transportation System Plan Update



Population Under Age 18

- 0% - 10%
- 10% - 25%
- 25% - 33%
- 33% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 Miles

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

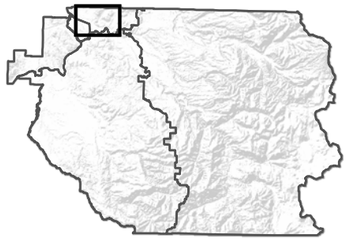
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\06 Youth Population by Census Block.mxd

Youth Population by Census Block
Greater Clackamas Regional Center / Industrial Area

Figure
C 6

CLACKAMAS COUNTY Transportation System Plan Update



Population Under 200% Poverty

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

0 1 Miles

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

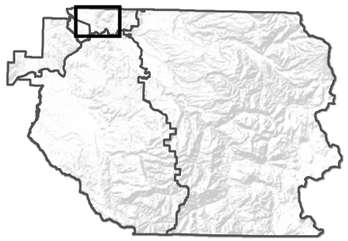
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\07 Low Income Population by Census Block.mxd

Low Income Population by Census Block
Greater Clackamas Regional Center / Industrial Area

Figure
C 7

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Households with Less Than Two Vehicles

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

0 1 Miles

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

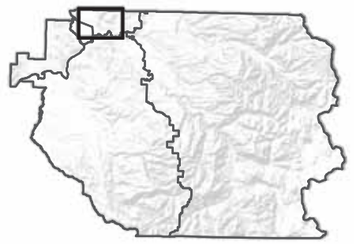
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\08 Vehicle Ownership by Census Block.mxd

Vehicle Ownership by Census Block
Greater Clackamas Regional Center / Industrial Area

Figure
C 8

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN



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.

0 1 Miles

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

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 Resouce Center

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\09 Transportation Disadvantaged Populations by Census Block.mxd

Transportation Disadvantaged Populations by Census Block
Greater Clackamas Regional Center / Industrial Area

Figure
C 9

TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

This section summarizes the existing transportation system operations within the Greater Clackamas Regional Center/Industrial 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 C 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.

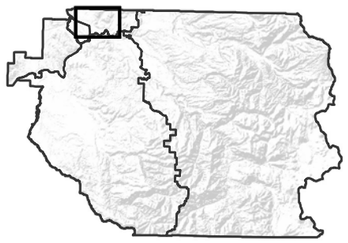
Figure C 11 illustrates existing signal locations and notes which roadways are maintained by the County. As seen, most signalized intersections are on OR 224, SE 82nd Avenue, OR 212, and SE Sunnyside Road. The County does not maintain most roadways in Milwaukie, Happy Valley, or Damascus. There are also several state highways maintained by ODOT, including I-205, OR 212, OR 224, and OR 213 N.

Figure C 12 maps at-grade railroad crossing locations. There are several railroad crossings along the Portland/Western rail line on the southwest edge of Milwaukie. There is also a railroad crossing in east Gladstone along the Union Pacific rail line.

Intersection and Road System Operations Analysis

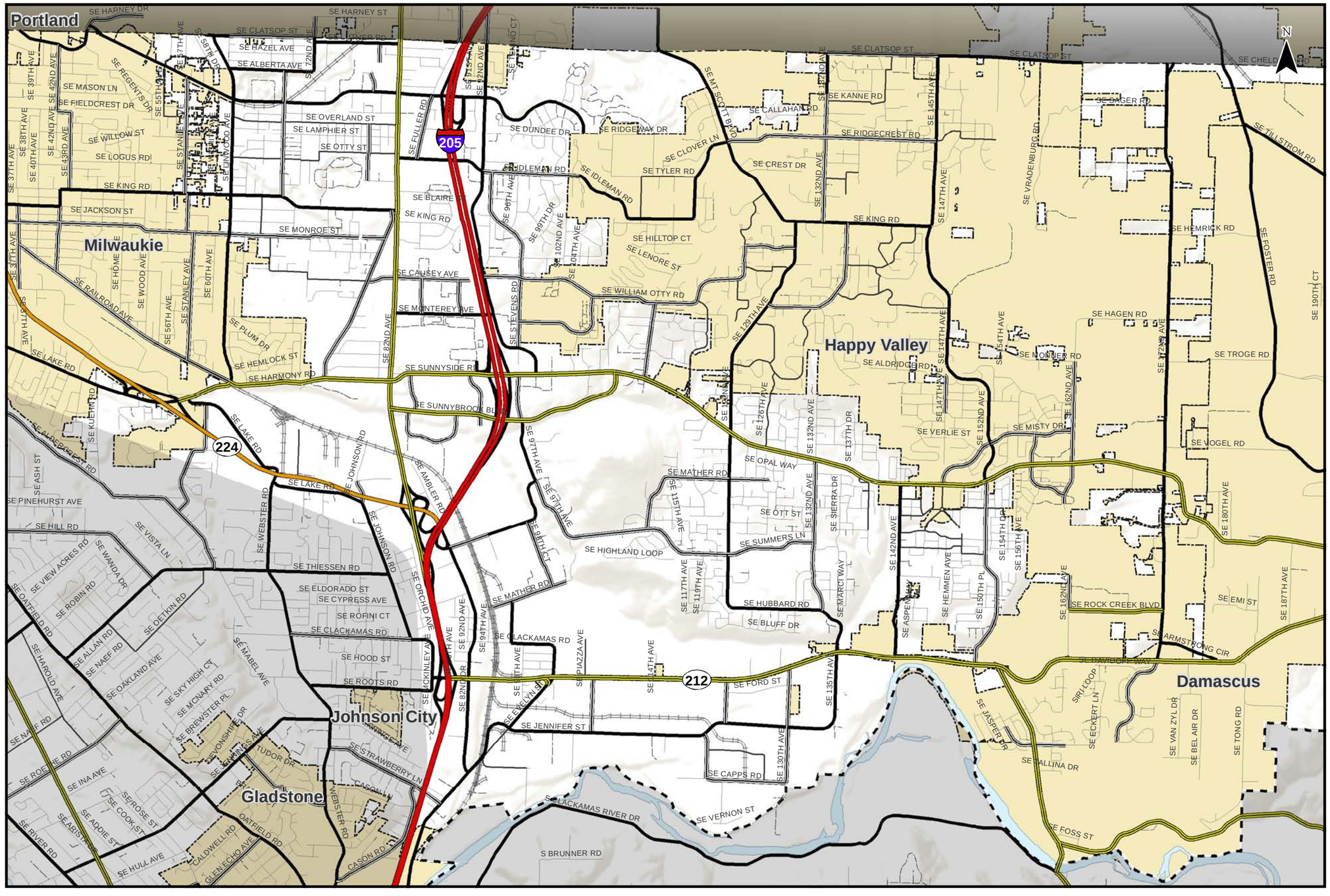
This section summarizes the analysis and findings related to existing traffic operations with a focus on auto transportation modes. Operations were analyzed at key study intersections and roadway segments.

CLACKAMAS COUNTY Transportation System Plan Update



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



0 1 Miles

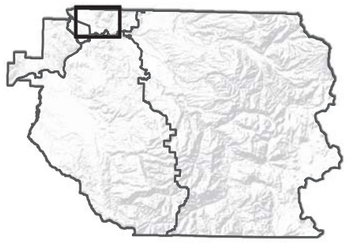
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Roadway Functional Classifications
Greater Clackamas Regional Center / Industrial Area

Figure
C 10

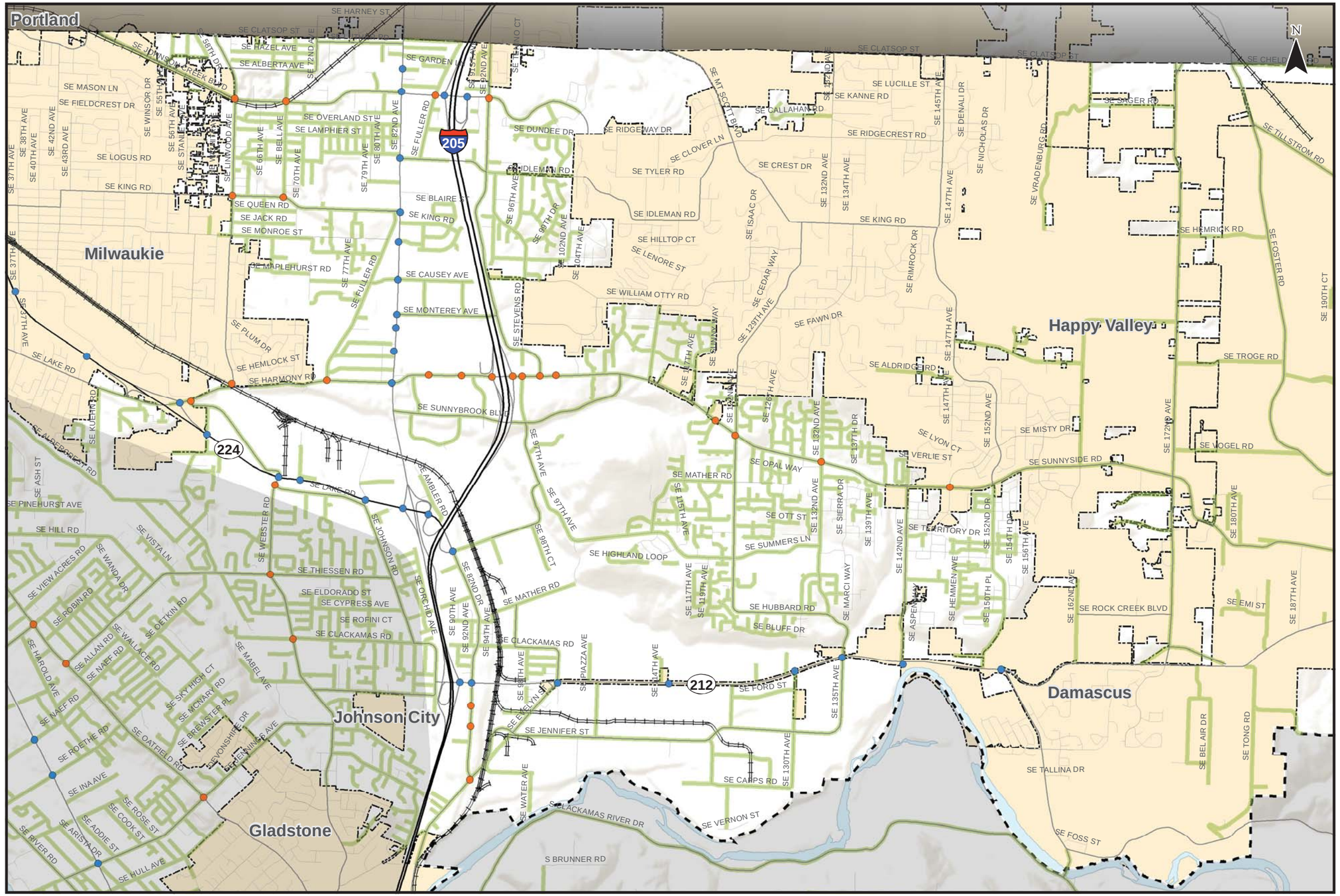
H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\10 Roadway Functional Classifications.mxd

CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN *Update*



Existing Traffic Signals

- ● County Owned
- ● ODOT Owned
- ◆ Ped Crossing Flasher
- ▬ County Maintained Roads
- ▨ Incorporated Areas
- ┅ County Boundary
- ▪ UGB



0 1 Miles

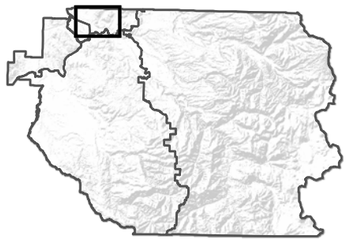
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Existing Signal Locations
Greater Clackamas Regional Center / Industrial Area

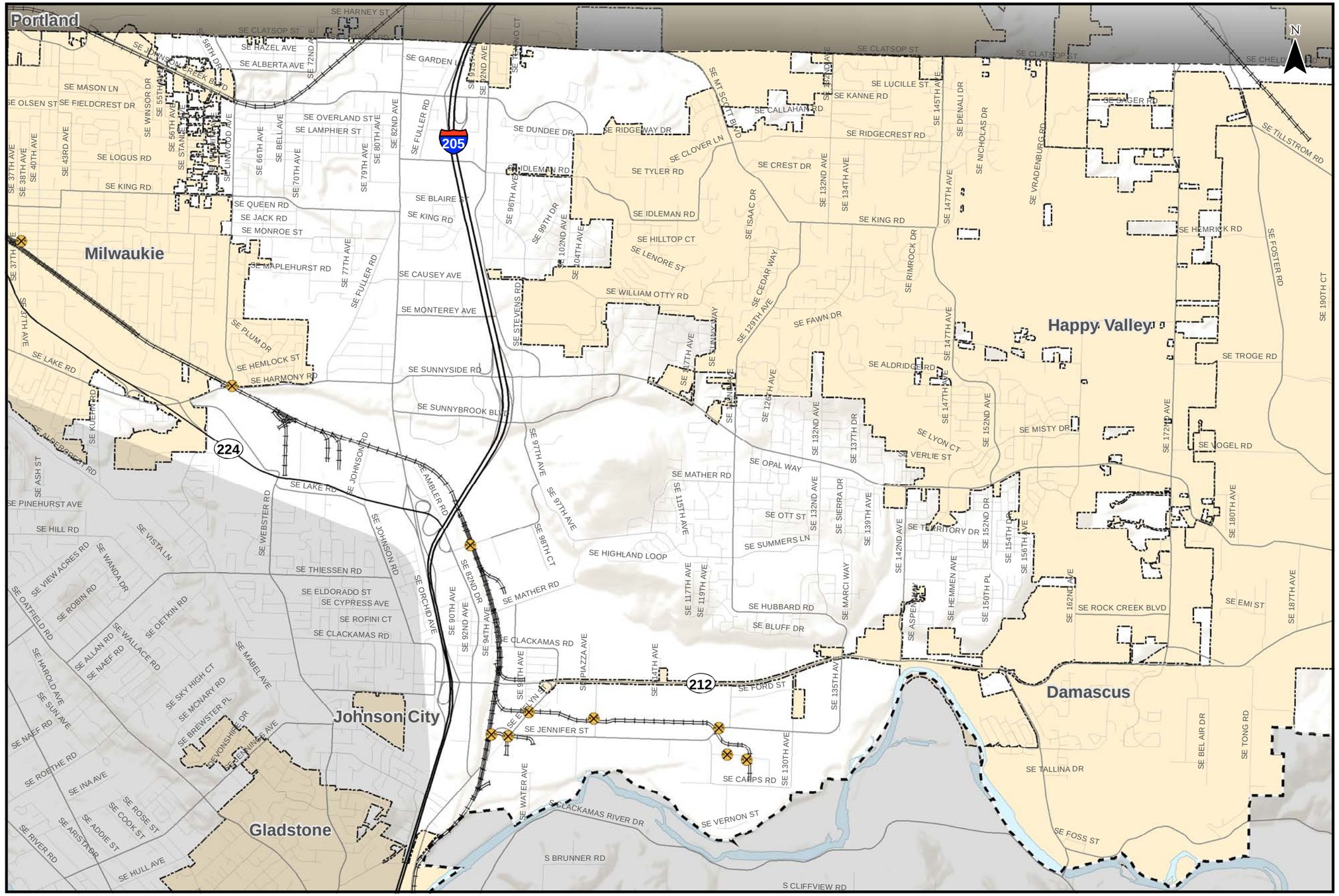
Figure
C 11

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\11 Existing Signal Locations.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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



0 1 Miles

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

At-Grade Railroad Crossing Locations
Greater Clackamas Regional Center / Industrial Area

Figure
C 12

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\12 At-Grade Railroad Crossing Locations.mxd

Study Intersection Traffic Operations Analysis

TSP study intersections in the Greater Clackamas Regional Center/Industrial Area were selected based on input from ODOT, City, and County staff. Figure C 13 shows the location of each of these study intersections and notes whether intersections fall under the County's jurisdiction or the Oregon Department of Transportation's (ODOT) jurisdiction. There are a total of 65 study intersections, 29 of which are located on ODOT facilities. Several intersections along 82nd Avenue, OR 212, and Sunnyside Road, and at the I-205 Ramps were selected for analysis. Figure C 14 shows the existing lane configurations and traffic control devices at each location. A majority of the study intersections are signalized.

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. The process used to evaluate the traffic operations is more extensively described in Section 2 of this report. The results are shown in Table C 1 and Figure C 15, with intersections that are operating below performance standards noted.

Table C 1 Traffic Operations Analysis Results at Study Intersections in the Greater Clackamas Regional Center/Industrial Area

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard?
101	SE Johnson Creek Blvd/SE Flavel Dr	County	v/c = 0.99	Yes
102	SE Johnson Creek Blvd/SE Bell Ave	County	v/c = 0.99	Yes
103	SE Johnson Creek Blvd/SE 79th Pla	County	v/c = 0.99	NA[1]
104	SE Johnson Creek Blvd/80th Ave	County	v/c = 0.99	No (v/c=1.02)
105	OR 213 (SE 82nd Ave)/SE Johnson Creek Blvd	ODOT	v/c = 0.99	Yes
106	SE Johnson Creek Blvd/SE Fuller Rd	County	v/c = 0.99	Yes
107	SE Johnson Creek Blvd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes
108	SE Johnson Creek Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes
109	SE Johnson Creek Blvd/SE 92nd Ave	County	v/c = 0.99	Yes
110	OR 213 (SE 82nd Ave)/SE Overland Street	ODOT	v/c = 0.99	Yes
111	OR 213 (SE 82nd Ave)/SE Otty Road	ODOT	v/c = 0.99	Yes
112	SE Otty Road/SE Fuller Rd	County	v/c = 1.1	Yes
113	SE Otty Road/SE 92nd Ave	County	v/c = 1.1	Yes
114	OR 213 (SE 82nd Ave)/SE Glencoe Rd	ODOT	v/c = 0.99	NA[1]
115	SE King Rd/SE Bell Ave	County	v/c = 0.99	Yes
116	SE King Rd/SE Fuller Rd	County	v/c = 0.99	Yes
117	OR 213 (SE 82nd Ave)/SE King Rd	ODOT	v/c = 0.99	NA[1]
118	OR 213 (SE 82nd Ave)/SE Boyer	ODOT	v/c = 0.99	Yes
119	OR 213 (SE 82nd Ave)/SE Causey Ave	ODOT	v/c = 1.1	Yes
120	OR 213 (SE 82nd Ave)/SE Monterey Ave	ODOT	v/c = 1.1	Yes
121	SE Monterey Ave/SE Bob Schumacher Rd	County	v/c = 1.1	Yes
122	SE Bob Schumacher Rd/SE Stevens Rd	County	v/c = 1.1	Yes
123	SE Lake Rd/SE International Way	County	v/c = 0.99	Yes
124	SE Harmony Rd/SE Linwood Ave	County	v/c = 0.99	Yes
125	SE Harmony Rd/SE Fuller Rd	County	v/c = 1.1	Yes

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard?
126	OR 213 (SE 82nd Ave)/SE Sunnyside Rd/SE Harmony Rd	ODOT	v/c = 1.1	Yes
127	SE Sunnyside Rd/8600 Block	County	v/c = 1.1	Yes
128	SE Sunnyside Rd/9000 Block	County	v/c = 1.1	Yes
129	SE Sunnyside Rd/SE 93rd Ave	County	v/c = 1.1	Yes
130	SE Sunnyside Rd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes
131	SE Sunnyside Rd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes
132	SE Sunnyside Rd/SE Stevens Rd	County	v/c = 1.1	Yes
133	SE Sunnyside Rd/SE 101st Ave	County	v/c = 1.1	Yes
134	SE Sunnyside Rd/SE Sunnybrook Blvd	County	v/c = 0.99	Yes
135	SE Sunnyside Rd/SE Valley View Terrace	County	v/c = 0.99	Yes
136	OR 213 (SE 82nd Ave)/SE Sunnybrook Blvd	ODOT	v/c = 1.1	Yes
137	SE Sunnybrook Blvd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes
138	SE Sunnybrook Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes
139	SE Sunnybrook Blvd/97th Ave	County	v/c = 1.1	Yes
140	OR 224/SE Rusk Rd	ODOT	v/c = 0.99	Yes
141	OR 224/SE Lake Rd/SE Webster Rd	ODOT	v/c = 0.99	Yes
142	SE Lake Rd/SE Webster Rd	County	v/c = 0.99	Yes
143	OR 224/SE Johnson Rd	ODOT	v/c = 0.99	Yes
144	SE Sunnyside Rd/SE 122nd Ave	County	v/c = 0.99	Yes
145	SE Sunnyside Rd/SE 132nd Ave	County	v/c = 0.99	Yes
146	SE Sunnyside Rd/SE 142nd Ave	County	v/c = 0.99	Yes
147	SE Sunnyside Rd/SE 152nd Ave	County	v/c = 0.99	Yes
148	SE Sunnyside Rd/SE 162nd Ave	County	v/c = 0.99	Yes
149	SE Sunnyside Rd/SE 172nd Ave	County	v/c = 0.99	Yes
150	SE Mather Rd/SE 122nd Ave	County	v/c = 0.99	Yes
151	SE Summers Lane/SE 122nd Ave	County	v/c = 0.99	Yes
152	SE Hubbard Rd/SE 132nd Ave	County	v/c = 0.99	Yes
153	OR 212/I-205 SB Ramps	ODOT	v/c = 0.85	No (v/c=1.07)
154	OR 212/I-205 NB Ramps	ODOT	v/c = 0.85	Yes
155	OR 212/SE 82nd Dr	ODOT	v/c = 0.99	Yes
156	OR 212/224/SE 102nd Ave	ODOT	v/c = 0.99	Yes
157	OR 224/SE Hubbard Rd/135th Ave	ODOT	v/c = 0.99	No (v/c=1.70)
158	OR 224/SE 142nd Ave	ODOT	v/c = 0.99	Yes
159	OR 212/OR 224	ODOT	v/c = 0.99	Yes
160	OR 212/SE 162nd Ave	ODOT	v/c = 0.99	Yes
161	OR 212/SE 172nd Ave	ODOT	v/c = 0.99	Yes
162	SE Jennifer St/SE Evelyn St	County	v/c = 0.99	Yes
163	SE 82nd Dr/SE Jennifer Street	County	v/c = 0.99	Yes
164	SE Strawberry Lane/SE 82nd Dr	County	v/c = 0.99	Yes
165	OR 224/Springwater Rd	ODOT	v/c = 0.99	Yes

[1]: Future conditions analysis only performed

As shown, the intersections of SE Johnson Creek Boulevard/80th Avenue (104), OR 212/I-205 SB Ramps (153) and OR 224/SE Hubbard Road/SE 135th Avenue (157) do not meet standards. All other intersections operate

within the volume-to-capacity ratio standards. *Appendix 8* contains detailed traffic operations analysis results.

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 C 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, not roadway curvature. Since the roadway segment link volumes from the model are provided for roadways of generally a major collector designation or higher, traffic volume on local roads are not reflected. As shown in Figure C 16, under the existing roadway system demand for travel is highest along OR 212, SE Sunnyside Road, SE 82nd Avenue, SE Harmony Road, SE Johnson Creek Boulevard and SE Linwood Avenue.

Approximate Level of Congestion

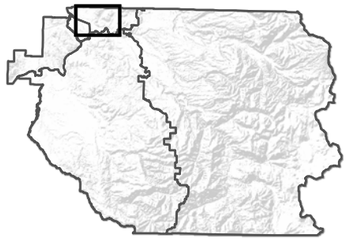
The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro base model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion. Figure C 1 summarizes the level of congestion that corresponds to different volume-to-capacity ratios.

Table C 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

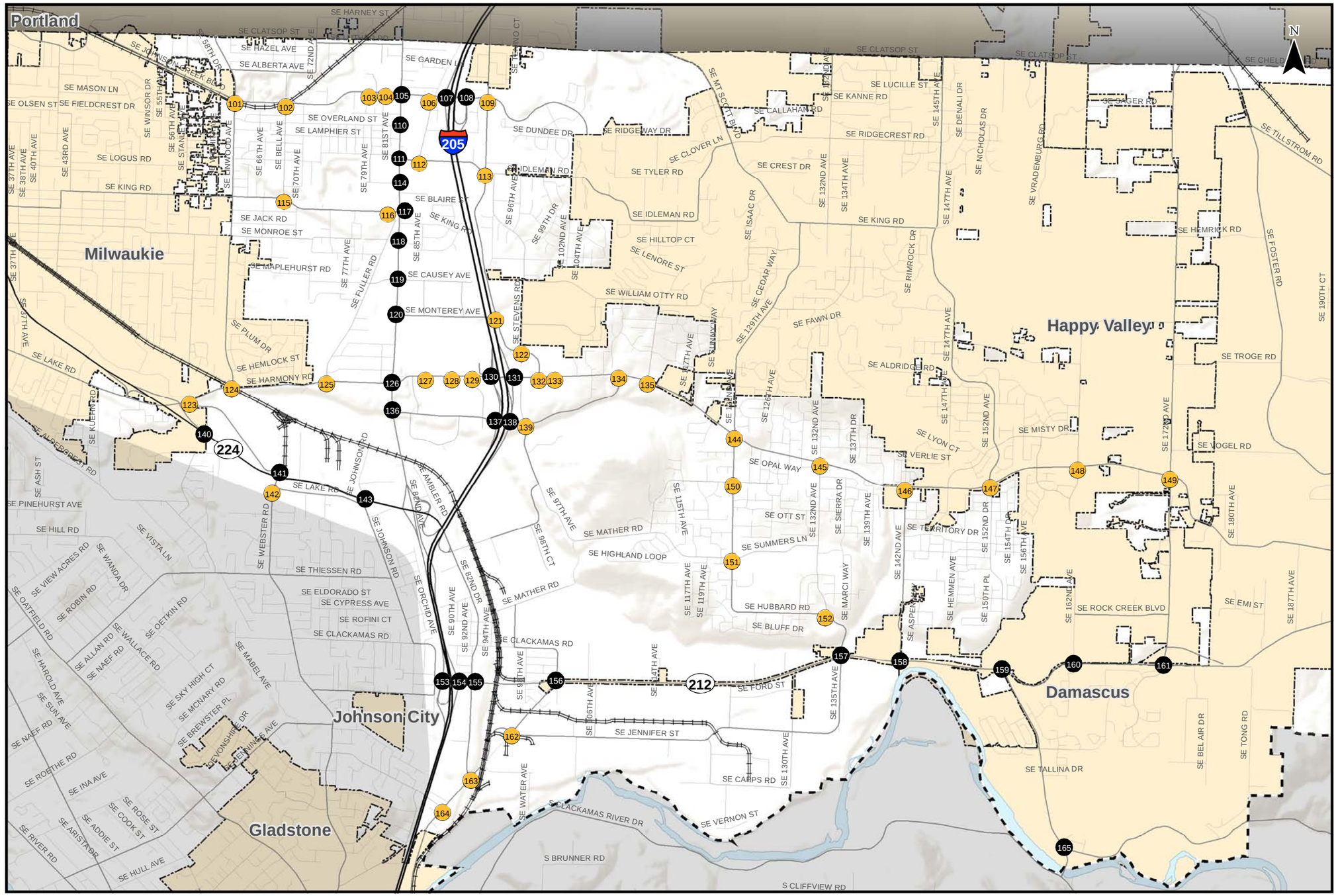
Figure C 17 illustrates the relative congestion during the weekday evening peak hours on roadways based on the estimated roadway segment volumes and capacity. It is possible for the study intersection analysis results to indicate intersections experiencing relatively high amounts of delay on roadway segments 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.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Study Intersection Jurisdiction

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



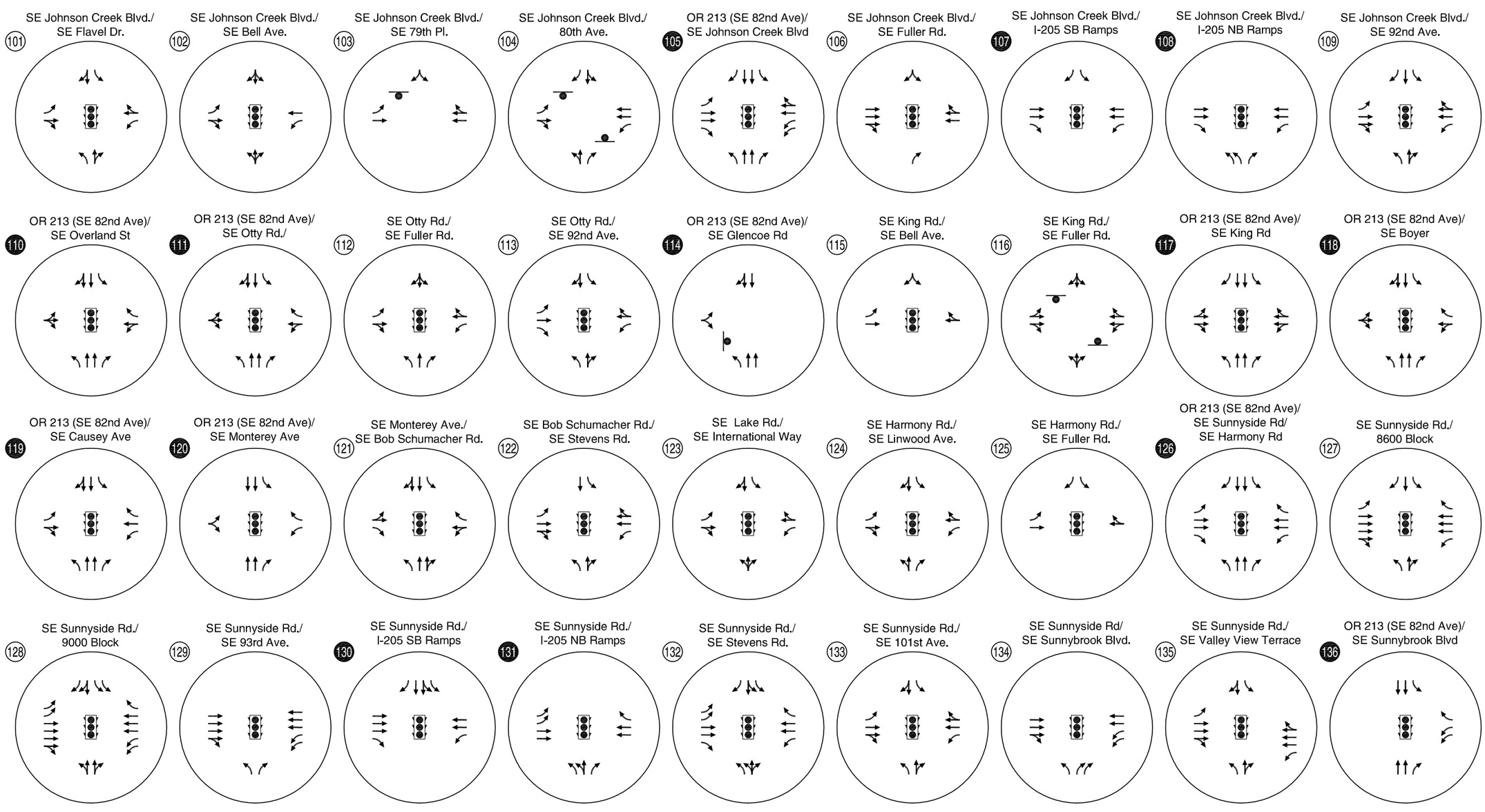
0 1 Miles

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
Greater Clackamas Regional Center / Industrial Area

Figure
C 13

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\13 Transportation System Plan Study Intersections.mxd

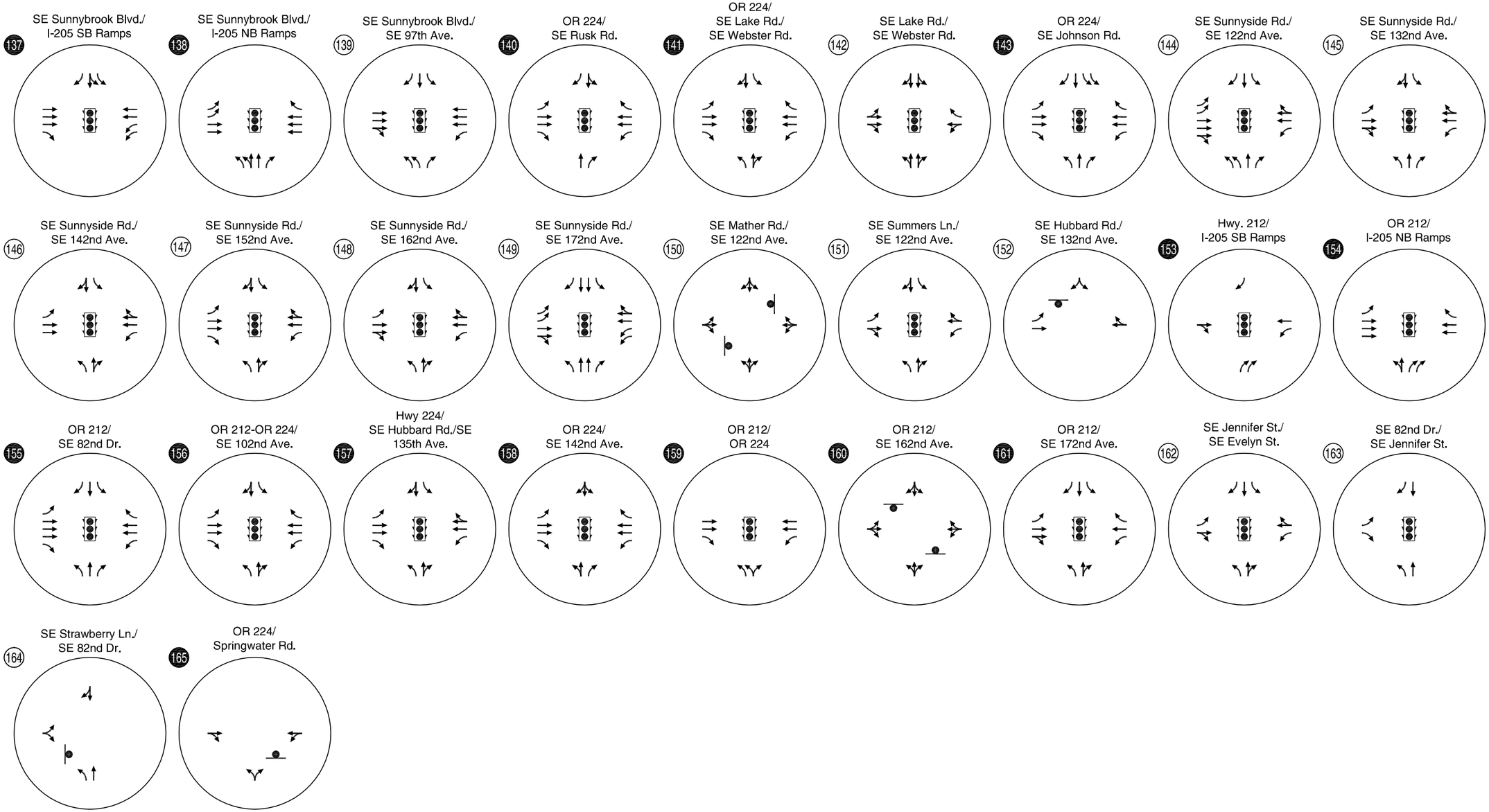


(##) - ODOT STUDY INTERSECTION
(##) - COUNTY STUDY INTERSECTION
- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT

Existing Lane Configuration and Traffic Control Devices
Greater Clackamas Regional Center/Inustrial Area - 1

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

Figure C 14

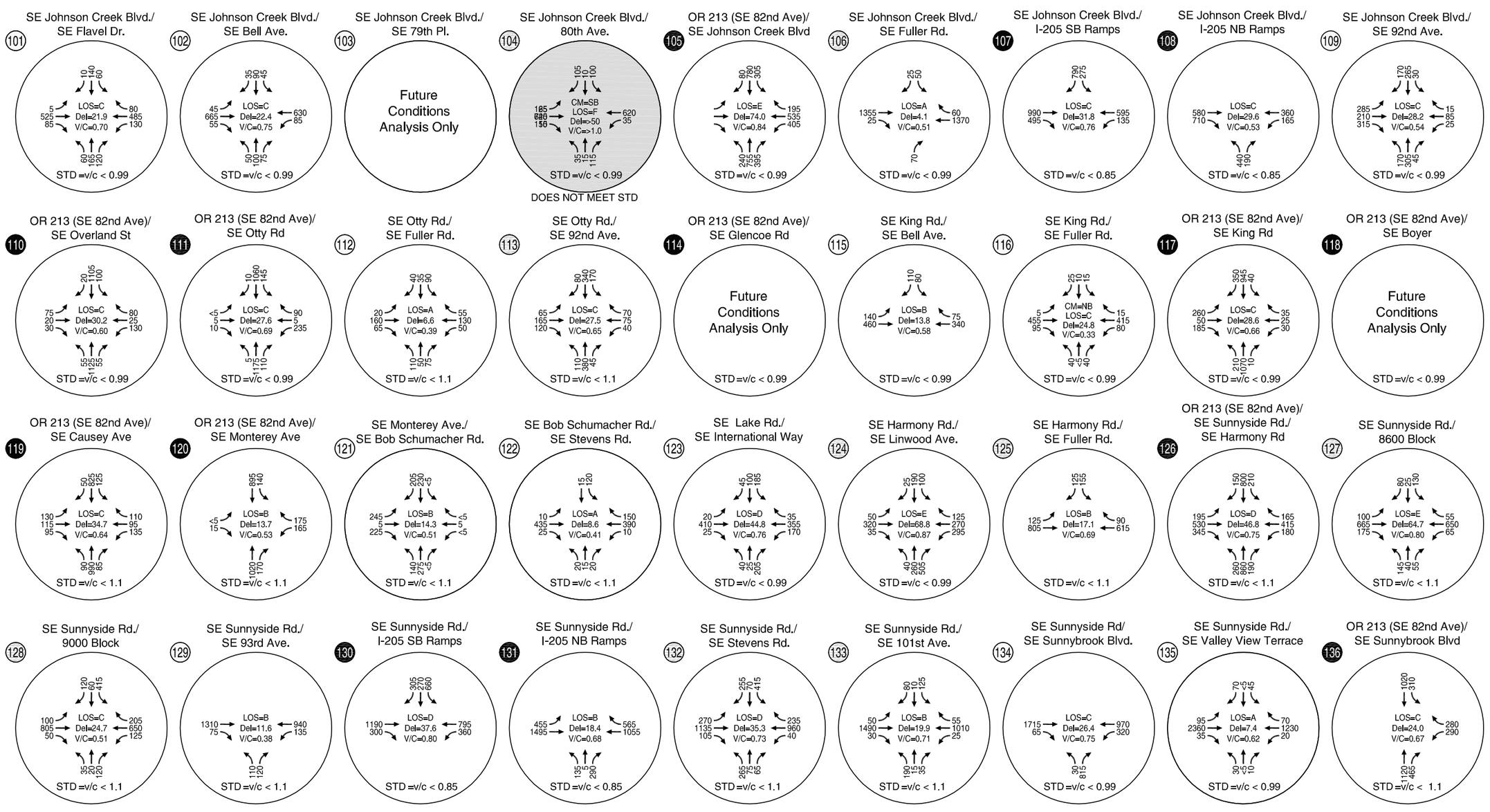


- ## - ODOT STUDY INTERSECTION
- (##) - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT

Existing Lane Configuration and Traffic Control Devices
Greater Clackamas Regional Center/Industrial Area - 2

CLACKAMAS COUNTY Transportation System Plan Update

Figure C 14



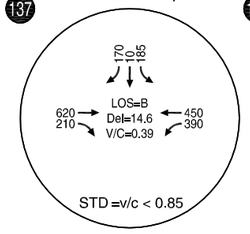
CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD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

Existing Intersection Operations
PM Peak Hour
Greater Clackamas Regional Center/Inustrial Area - 1

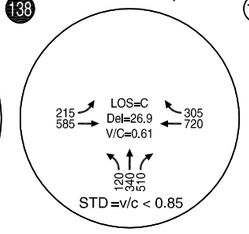
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Figure C 15

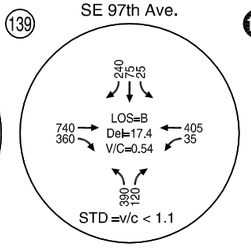
137 SE Sunnybrook Blvd./ I-205 SB Ramps



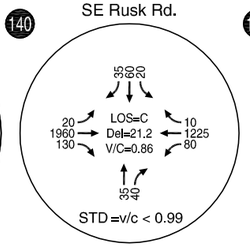
138 SE Sunnybrook Blvd./ I-205 NB Ramps



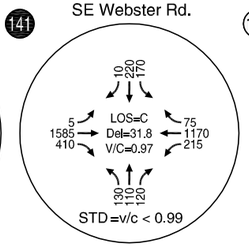
139 SE Sunnybrook Blvd./ SE 97th Ave.



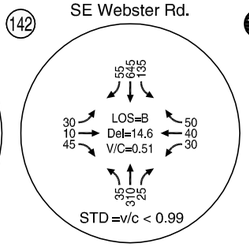
140 OR 224/ SE Rusk Rd.



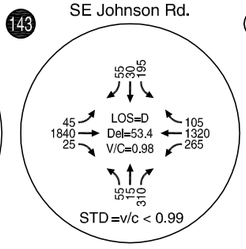
141 OR 224/ SE Lake Rd./ SE Webster Rd.



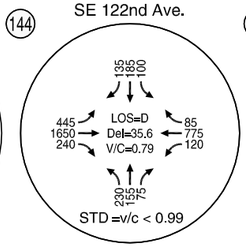
142 SE Lake Rd./ SE Webster Rd.



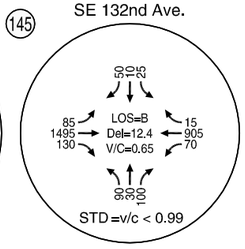
143 OR 224/ SE Johnson Rd.



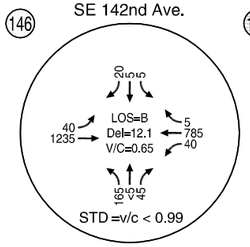
144 SE Sunnyside Rd./ SE 122nd Ave.



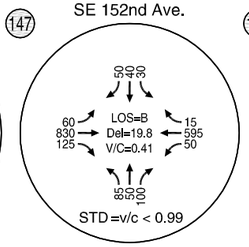
145 SE Sunnyside Rd./ SE 132nd Ave.



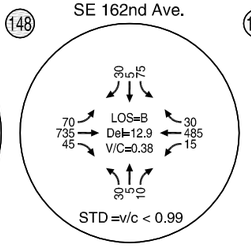
146 SE Sunnyside Rd./ SE 142nd Ave.



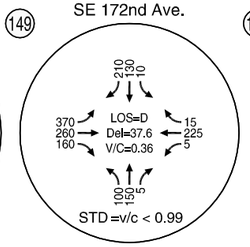
147 SE Sunnyside Rd./ SE 152nd Ave.



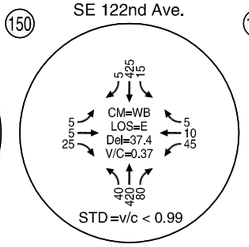
148 SE Sunnyside Rd./ SE 162nd Ave.



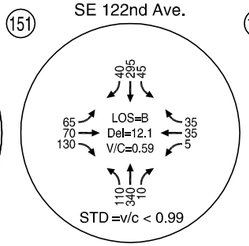
149 SE Sunnyside Rd./ SE 172nd Ave.



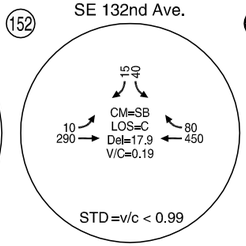
150 SE Mather Rd./ SE 122nd Ave.



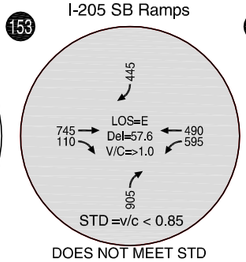
151 SE Summers Ln./ SE 122nd Ave.



152 SE Hubbard Rd./ SE 132nd Ave.

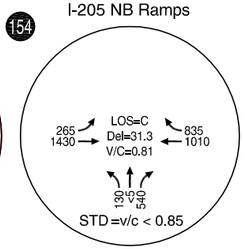


153 OR 212/ I-205 SB Ramps

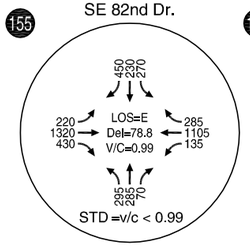


DOES NOT MEET STD

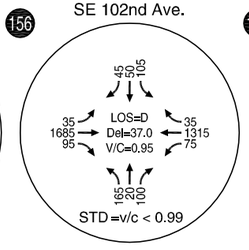
154 OR 212/ I-205 NB Ramps



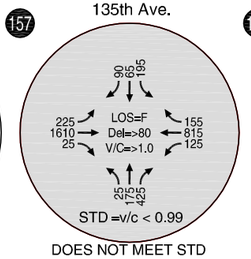
155 OR 212/ SE 82nd Dr.



156 OR 212-OR 224/ SE 102nd Ave.

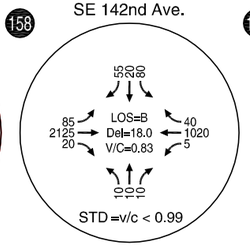


157 OR 224/ SE Hubbard Rd./SE 135th Ave.

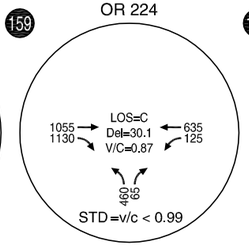


DOES NOT MEET STD

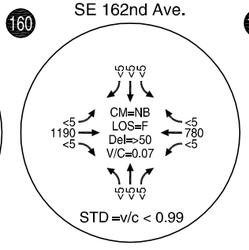
158 OR 224/ SE 142nd Ave.



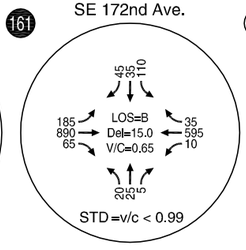
159 OR 212/ OR 224



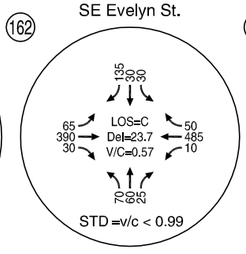
160 OR 212/ SE 162nd Ave.



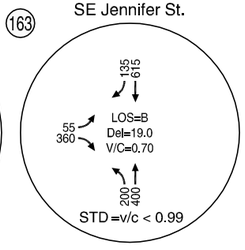
161 OR 212/ SE 172nd Ave.



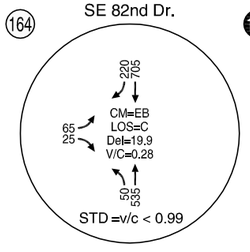
162 SE Jennifer St./ SE Evelyn St.



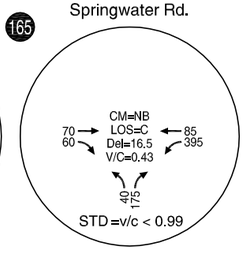
163 SE 82nd Dr./ SE Jennifer St.



164 SE Strawberry Ln./ SE 82nd Dr.



165 OR 224/ Springwater Rd.



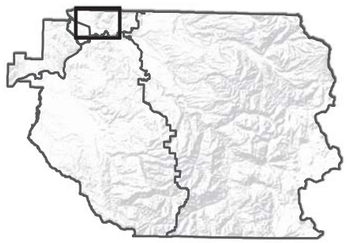
CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD

Existing Intersection Operations
PM Peak Hour
Greater Clackamas Regional Center/Industrial Area - 2

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

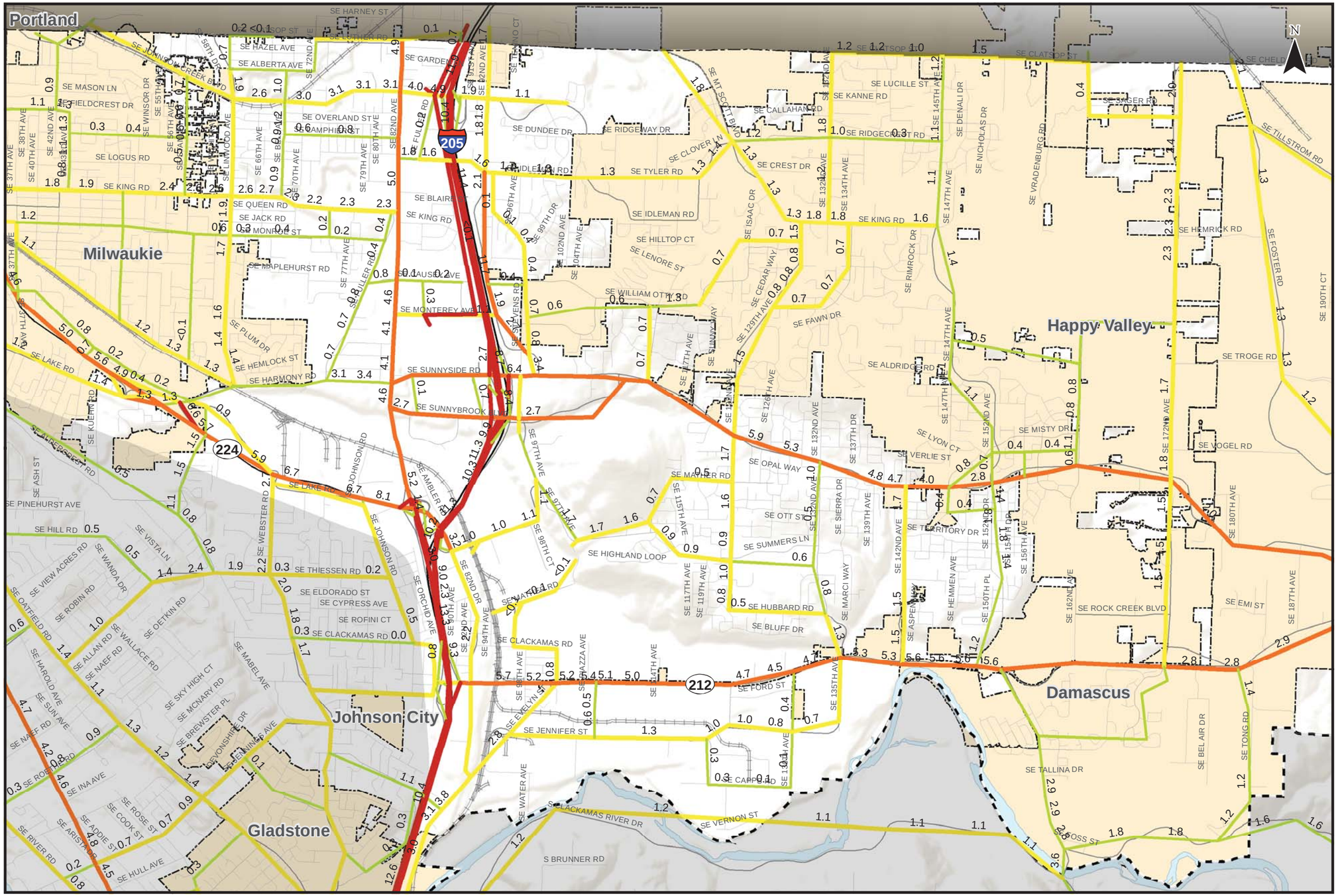
Figure C 15

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



2010 Base Volumes

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



0 1 Miles

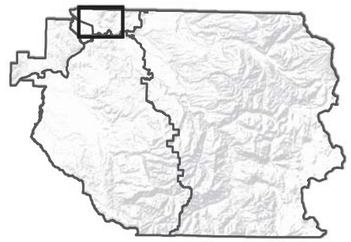
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2010 Base Year
Greater Clackamas Regional Center / Industrial Area

Figure
C 16

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\16 Evening Weekday Peak Hour Link Volumes 2010 Base Year.mxd

CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN Update



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

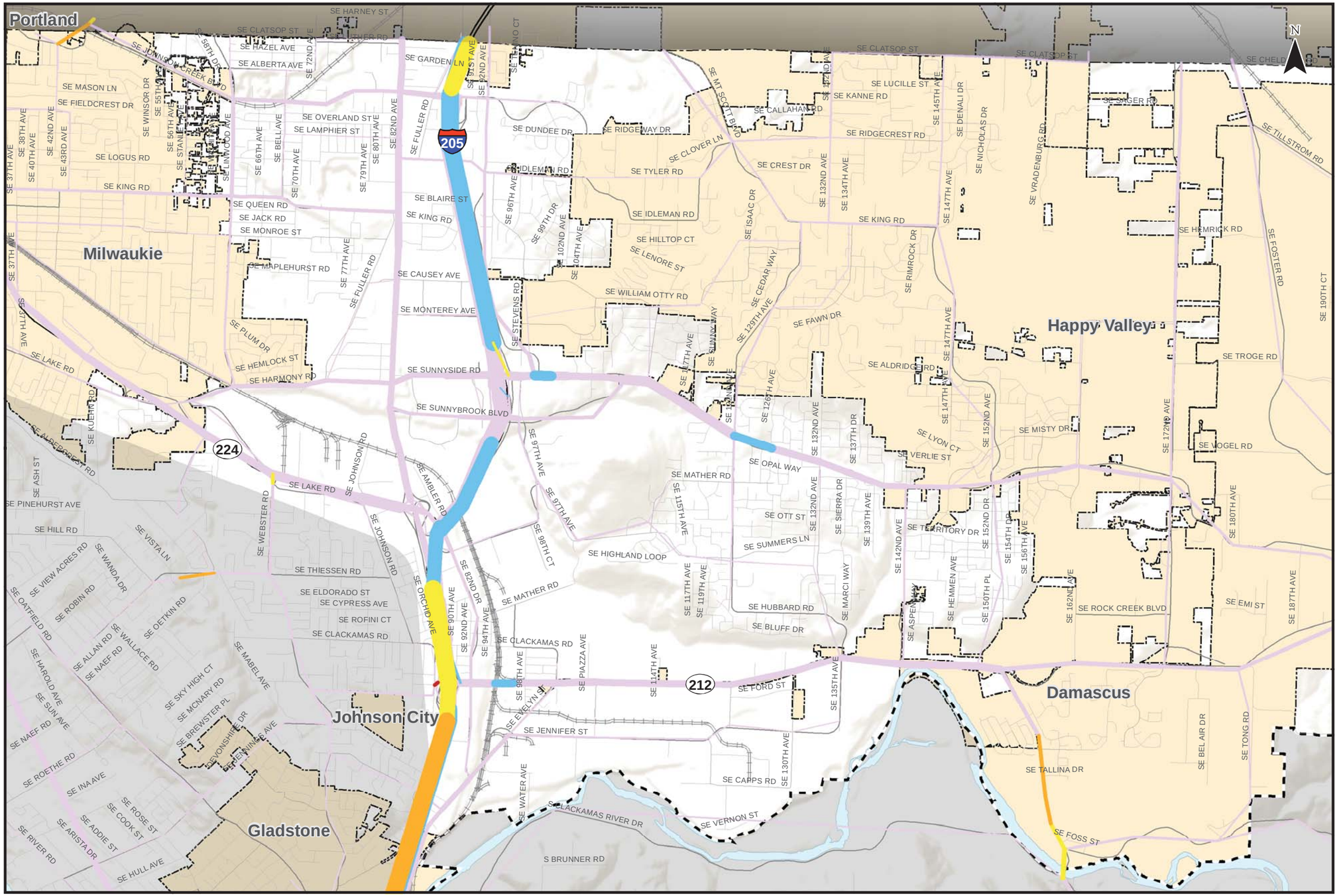
▨ Incorporated Areas

☐ County Boundary

☐ UGB

0 1 Miles

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



Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year
Greater Clackamas Regional Center / Industrial Area

Figure
C 17

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\17 Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year.mxd

Table C 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 C 3 2010 Base Year Roadway Segment Congestion in Greater Clackamas Regional Center/Industrial Area

Roadway	Segment	Level of Congestion
I-205	South of study area to County boundary, not including the section between SE Sunnybrook Blvd and SE Sunnyside Rd	Nearing Congestion to Very Congested
SE Sunnyside Rd	SE Stevens Rd to SE 104th Ct SE 122nd Ave to SE 126th Ave	Nearing Congestion
OR 212/ OR 224	SE McKinley Ave to I-205 Railroad Crossing to SE 98th Ave SE Eckert Ln to S Clackamas River Dr	Nearing Congestion to Very Congested
SE 45th Ave	SE 42nd Ave to SE Johnson Creek Blvd	Congested

As can be seen in Figure C 17, under the 2010 Base Year, the roadway segments within the Greater Clackamas Regional Center/Industrial Area (excluding I-205) are primarily categorized as less congested during the weekday evening peak hour. Relatively short segments of OR 212 and SE Sunnyside Road are estimated to approach congestion during the weekend evening peak hour. A similar analysis was conducted for two future scenarios; the results of that analysis are discussed further below in the section presenting Future Conditions for Greater Clackamas Regional Center/Industrial Area.

Pedestrian and Bicycle System

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

As shown in Figure C 18, there are numerous roadways without sidewalks or with incomplete sidewalks in the unincorporated portions of the area. There are sidewalks within the cities of Milwaukie, Happy Valley, and Damascus not shown (*note that the data shown within cities is not complete and primarily includes state and county facilities only*). Most sidewalks are located in the area around the Clackamas Town Center. According to both Metro and County standards, sidewalks should be provided on all Major Arterials, Minor Arterials, Connectors, Collectors, and Local Streets in urban areas.

While the county's standards require sidewalks on all streets in the urban area, the Essential Pedestrian Network in the County's comprehensive plan (see *Appendix 5*) provides guidance on which local roadways are critical parts of the pedestrian network. It also includes all collectors and arterials in the subarea. Existing gaps in the pedestrian network include all roadways identified on the Essential Pedestrian Network that do not have an existing sidewalk facility.

The Clackamas Regional Center Pedestrian and Bicycle Connection Project was started in February 2011 with a grant from the statewide Transportation and Growth Management (TGM) Program, through ODOT. The Project's purpose is to create safe pedestrian and bicycle connections between the Clackamas Regional Center Max Green Line station and major employers and services. It works to identify and prioritize safe

pedestrian and bicycle connections in the area and has entailed significant public involvement. The Project will ultimately develop a list of pedestrian and bicycle improvement projects for adoption, expected sometime after it is completed in June 2012. Findings will help identify projects to be considered in the TSP update.

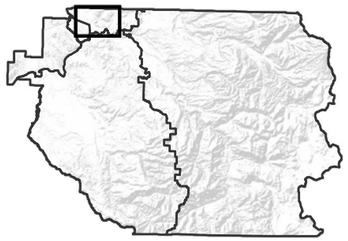
The County's Pedestrian Master Plan identifies priorities for filling in the pedestrian network gaps. Table C 4 below identifies the priority pedestrian projects from the Pedestrian Master Plan.

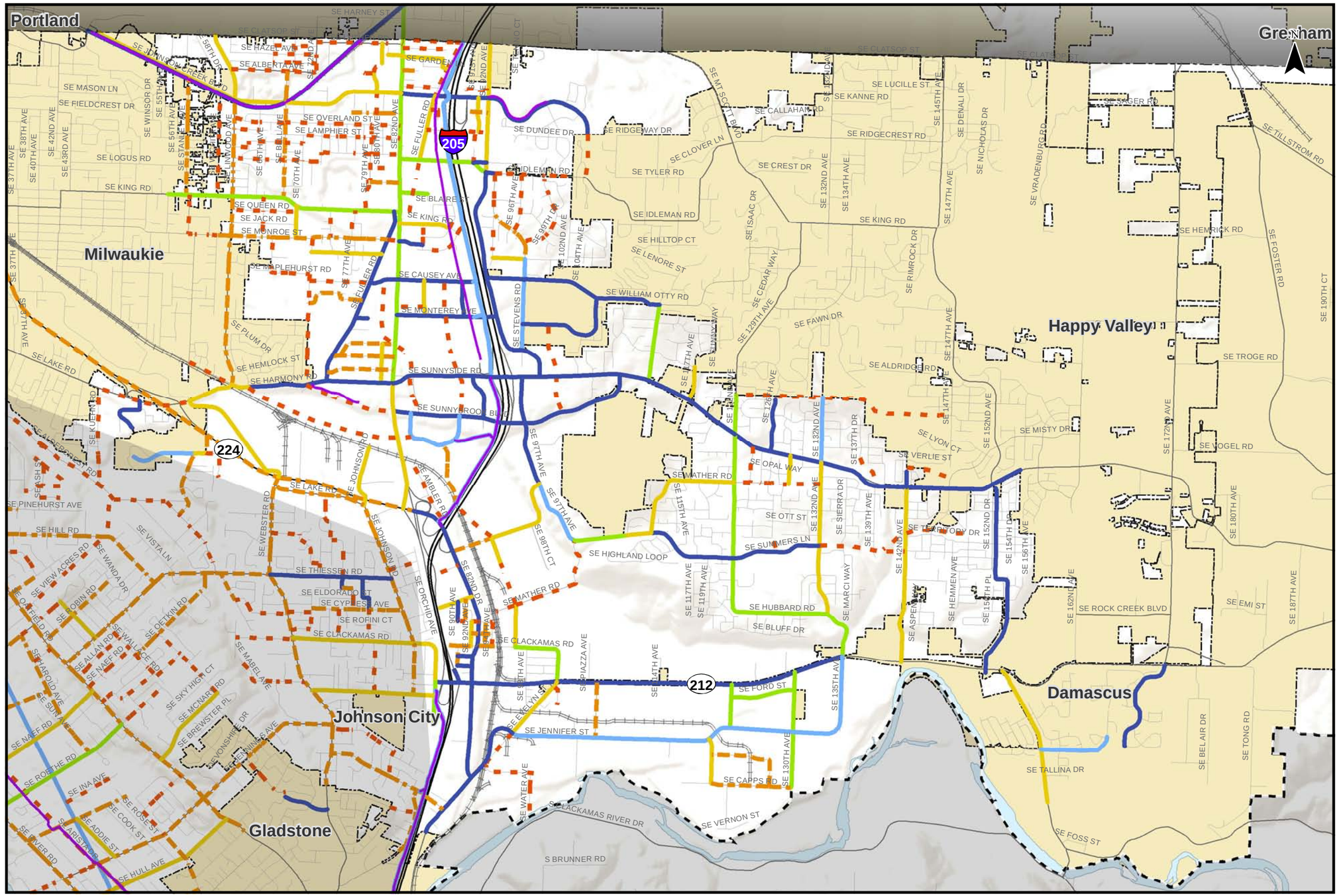
Table C 4 Pedestrian Master Plan Projects in the Greater Clackamas Regional Center/Industrial Area

Pedestrian Master Plan Project Number	Street Name	Section Description
1	106TH	Hwy 212 to Jennifer
2	122ND / 129TH	HAPPY VALLEY - Sunnyside to King
3	132ND	Sunnyside Rd South to Hubbard
4	142ND	Sunnyside south to Charjan
5	152ND	Bend in Road to Hwy 212
6	92ND	Stevens to Idleman
8	BELL	King Rd to Alberta
10	CORNWELL	82nd to Garden Lane
12	EVELYN	82nd Dr to Jennifer Ave
13	FULLER	82nd Ave North to County Line
18	HILLCREST	92nd to Stevens
19	HUBBARD	132nd Ave to Hwy 212
20	IDLEMAN	Stevens to Mt. Scott Blvd.
21	JENNIFER	82nd Dr to 135th
24	JOHNSON CREEK	Bell Ave to 92nd
26	LAWNFIELD	82nd Dr to 97th
27	LINWOOD	Harmony north to County Line
28	MATHER	Cranberry Loop to 97th
37	STANLEY	Willow to Johnson Creek Blvd.
38	STEVENS	Otty to Sunnyside Rd
41	THOMPSON / 72nd / MONROE	Linwood to Thompson
101	82ND	I-205 North to Sunnyside Road
904	INDUSTRIAL AREA	Pedestrian Connector
903	N CLACKAMAS PARK TRAIL	Trail in North Clackamas Park
902	PHILLIPS CREEK GREENWAY	Regional Center Path
905	CLACKAMAS REGIONAL CENTER PED LINKAGE	Various Ped Linkage in Clackamas Regional Center

As shown in Figure C 19, a significant portion of the unincorporated area has bicycle lanes. Bicycle facilities should be provided on all roadways designated as Collectors or higher (i.e. Major Arterials, Minor Arterials, Connectors, and Collectors). The County's Comprehensive Plan identifies all collector and arterial roadways in the Greater Clackamas Regional Center/Industrial Area 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 (nearly all collectors and arterials) that do not have an existing bicycle facility.

CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN *Update*





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
Miles

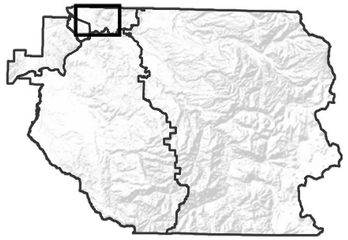
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

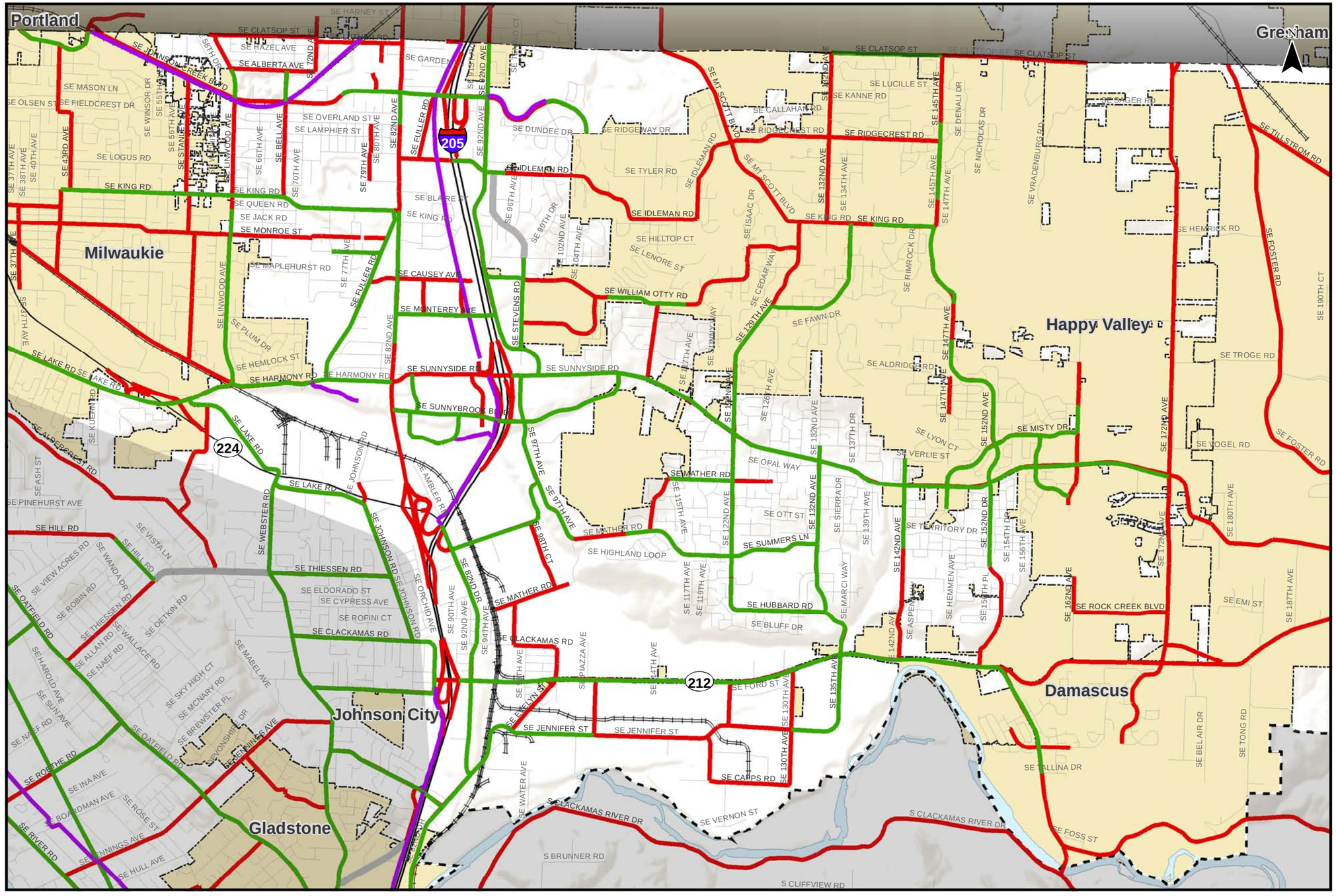
H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\18 Pedestrian Network.mxd

Essential Pedestrian Network
Greater Clackamas Regional Center / Industrial Area

Figure
C 18

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 Miles

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

Existing Bikeway Network
Greater Clackamas Regional Center / Industrial Area

Figure
C 19

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\19 Bicycle Network.mxd

The County's Bicycle Master Plan identifies priorities for filling in the bicycle network gaps. Table C 5 below identifies the priority bicycle projects from the Bicycle Master Plan in the Greater Clackamas Regional Center/Industrial Area subarea.

Table C 5 Bicycle Master Plan Projects in the Greater Clackamas Regional Center/Industrial Area

Bike Master Plan Project Number	Street Name	Section Description	Project Elements
B13	98TH / Ext of 98TH	Lawnfield to Mather Rd	Sunrise Corridor / Employment. Bike lanes, Reconstruction and Widening.
B14	ALBERTA	Linwood to 72nd Ave	Bike lanes
B17	BELL	King Rd to Johnson Creek	Bike lanes
B2	132ND	Happy Valley - King to County Line	Bike lanes, Reconstruction and Widening
B21	CAUSEY	Fuller Rd to I-205	Restripe for Bike lanes
B23	EVELYN	82nd to Managan	Bike lanes
B27	IDLEMAN	Stevens to Mt. Scott Blvd.	Bike lanes, Reconstruction and Widening
B28	JENNIFER	106th to Capps	Bike lanes
B31	JOHNSON CREEK	Bell Ave to 82nd	Bike lanes, Reconstruction and Widening
B32	JOHNSON CREEK	Extension to Idelman	New Road with Bike lanes and Sidewalks
B33	LINWOOD	King to Johnson Creek Blvd.	Bike lanes
B34	LUTHER	72nd Ave to 82nd Ave	Bike lanes
B35	MATHER	Cranberry Loop to 97th	Bike lanes, Reconstruction and Widening
B37	MATHER	97th to Industrial Area	Bike lanes, Reconstruction and Widening
B38	MONROE	Linwood to Thompson	Bike lanes
B39	MT SCOTT	Happy Valley King to County Line	Bike lanes, Reconstruction and Widening
B4	142ND	Sieben Creek Dr. to Hwy 212	Bike lanes, Reconstruction and Widening
B43	SUMMER EXT	132nd to 142nd Ave	New Road with Bike lanes and Sidewalk Need for connection.
B44	SUNNYSIDE	82nd Ave to 97th	Restripe for Bike lanes
B46	WILLAM OTTY EXT	Extension of Otty Rd	New Road with Bike lanes and Sidewalk. Need for connection.
B6	152ND	Curve in road to Hwy 212	Bike lanes
B7	162ND	Sunnyside to Monner Rd	Urban Fringe. Bike lanes, Reconstruction and Widening.
B9	90TH	Monterey Ave to Causey Ave.	Bike lanes
SB 101	82ND	Sunnyside north to County Line	Restripe for Bike lanes
SB 102	82ND	I-205 North to Sunnyside Road	Restripe for Bike lanes
SRB 502	HWY 212	Hwy 224 to Hwy 26	Widen/Shoulder Bikeways
RB 402	242ND	County Line to Hwy 212	Widen / Shoulder Bikeways
RB 435	SUNNYSIDE	172nd to Hwy 212	Widen / Shoulder Bikeways
SRB 504	HWY 224	Hwy 212 to 232nd	Bike lanes in urban area, Widen / Shoulder Bikeways in rural area
NA	145TH / 147TH	Happy Valley - 147th to County Line	Bike lanes
NA	Monroe Ave	school to Linwood	Widen, bike lanes. Connect to Linwood

B= Urban Bike Facility, RB= Rural Bikeway, SRB = State Rural Bikeway

Public Transportation System

The public transportation system in the Greater Clackamas Regional Center/Industrial Area 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 the Greater Clackamas Regional Center/Industrial Area

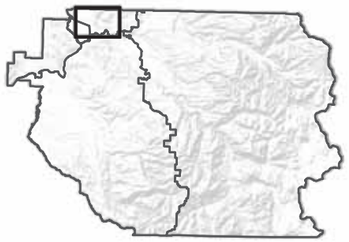
TriMet is the only transit agency that currently provides service in this area. Figure C 20 displays the fixed-route services provided by TriMet. These services are discussed in greater detail below.

Fixed Route Service

TriMet operates 10 fixed-route bus lines and one fixed-route light-rail line in the Greater Clackamas Regional Center/Industrial Area, including Lines 28, 29, 30, 31, 71, 72, 79, 152, 155,156 and the Green Line. Lines 30, 32, 33, 79, and 99 are described in previous sections; however, they are repeated here for easy reference.

- Line 28 provides weekday service between the Milwaukie City Center and the Clackamas Town Center via King Road from 6:23 a.m. to 6:33 p.m. on approximately 70-minute headways.
- Line 29 provides weekday service between the Milwaukie City Center and the Clackamas Town Center via Lake Road from 6:24 a.m. to 7:52 p.m. on approximately 70-minute headways.
- Line 30 provides weekday service between the Clackamas Town Center and the Estacada City Center from 6:00 a.m. to 8:25 p.m. on 30 minute headways during the morning and evening peak periods and 60 minute headways during non-peak periods. During peak time periods, line 30 travels through Milwaukie as Line 31 to provide service to the Portland City Center. *Line 30 connects to Sandy Area Metro's Sandy Estacada Line in Estacada.*
- Line 31 provides weekday service between the Milwaukie City Center and the Clackamas Town Center via King Road from 5:44 a.m. to 11:20 p.m. on approximately 30 minute headways. During peak time periods, Line 31 travels through Milwaukie along McLoughlin to provide service to the Portland City Center.
- Line 71 provides weekday service between the Clackamas Town Center and the Lents Town Center via the Parkrose/Sumner Transit Center from 4:42 a.m. to 12:01 a.m. on approximately 20-minute headways. *Line 71 connects to C-Tran at the ParkRos/Sumner Transit Center.*
- Line 72 provides weekday service between the Swan Island and the Clackamas Town Center via NE Killingsworth Street and NE 82nd Avenue from 5:10 a.m. to 1:43 a.m. on approximately 20-minute headways.
- Line 79 provides weekday service between the Clackamas Town Center and the Oregon City Transit Center from 5:22 a.m.to 10:28 p.m. on approximately 30-40 minute headways. *Line 79 connects with Canby Area Transit's Orange Line at the Oregon City Transit Center.*

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- Bus Stops
- ## Route Number
- P Park & Pickup

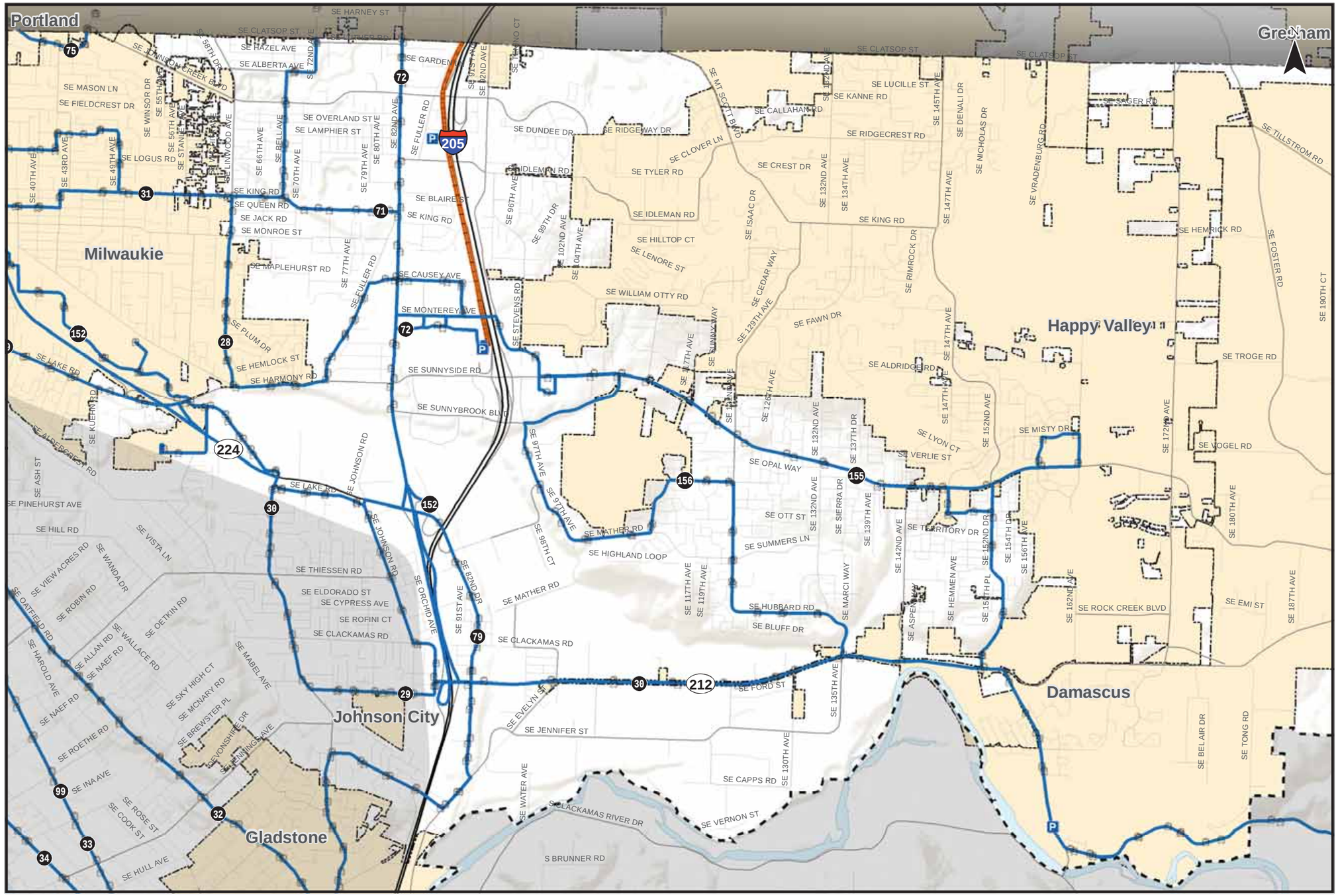
Transit Providers

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

Tri-Met Rails

- MAX
- WES

- Incorporated Areas
- County Boundary
- UGB



0 1 Miles

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

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\20 Transit Service.mxd

Transit Service
Greater Clackamas Regional Center / Industrial Area

Figure
C 20

- Line 152 provides weekday service between the Milwaukie City Center and the Clackamas Town Center via OR 224, SE International Way, SE Lake Road and SE 82nd Avenue from 6:32 a.m. to 5:25 p.m. on approximately 30 minute headways during the morning and evening peak periods and 80 minute headways during non-peak periods.
- Line 155 provides weekday service between the Clackamas Town Center and the Happy Valley Town Center via SE Sunnyside Road from 5:30 a.m. to 10:45 p.m. on approximately 40-minute headways.
- Line 156 provides weekday service between the Clackamas Town Center and the Happy Valley Town Center via SE 97th Avenue, SE Mather Road, SE 122nd Avenue, OR 212-224, and SE 152nd Avenue from 5:40 a.m. to 7:22 p.m. on approximately 80-minute headways.

Dial-A-Ride Service

TriMet 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.

Park/Ride

There are two park/rides located in the Greater Clackamas Regional Center/Industrial Area.

- The Clackamas Town Center Park/Ride located along SW Sunnyside Road provides 750 parking spaces and is served by TriMet Lines 28, 29, 30, 31, 71, 72, 79, 152, 155, and 156 as well as TriMet's MAX Green Light Rail Line.
- The SE Fuller Road Park/Ride located along SE Fuller Road between Johnson Creek Boulevard and Otty Road provides 610 parking spaces and is served by TriMet's MAX Green Light Rail Line. It is available seven days a week, 24 hours a day.

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 C 6 summarizes the transit level-of-service analysis results for service frequency. As shown, a majority of existing services are at LOS D or below throughout the day.

Table C 6 Service Frequency Level-of-Service Analysis – Greater Clackamas Regional Center/Industrial Area

Provider	Routes	Service Frequency	LOS
TriMet	Line 28	70 minutes[2]	F
TriMet	Line 29	70 minutes[2]	F
TriMet	Line 30	30-60 minutes[1]	D-F
TriMet	Line 31	30 minutes[1]	D
TriMet	Line 71	20 minutes[1]	C
TriMet	Line 72	20 minutes[1]	C
TriMet	Line 79	30-40 minutes[1]	D-E
TriMet	Line 152	30-80 minutes	D-F
TriMet	Line 155	40 minutes[1]	E
TriMet	Line 156	80 minutes[2]	F

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 C 7 summarizes the transit level-of-service analysis results for hours of service. As shown, a majority of existing services currently operate between LOS A and LOS C throughout the day.

Table C 7 Hours of Service Level-of-Service Analysis – Greater Clackamas Regional Center/Industrial Area

Provider	Routes	Hours of Service	LOS
TriMet	Line 28	12 Hours[2]	D
TriMet	Line 29	13 Hours[2]	D
TriMet	Line 30	14 Hours[1]	C
TriMet	Line 31	17 Hours[1]	B
TriMet	Line 71	10 Hours[1]	D
TriMet	Line 72	20 Hours[1]	A
TriMet	Line 79	17 Hours[1]	B
TriMet	Line 152	11 Hours[2]	D
TriMet	Line 155	17 Hours[1]	B
TriMet	Line 156	14 Hours[2]	C

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

Service Coverage

Figure C 21 displays the existing 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 but 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 accessible 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 C 8, the percent of transit supportive population areas served is 69 percent and the percent of transit supportive employment areas served is 64 percent. The corresponding LOS is D.

Table C 8 Service Coverage Analysis – Greater Clackamas Regional Center/Industrial Area

Area Type	Population	Employment
Transit Supportive Area (TSA)[1]	47,317	43,069
Transit Supportive Areas Served[2]	32,621	27,517
Percent TSA Served by Transit	69%	64%
Level of Service	LOS D	LOS D
Transit Supportive Areas without service	14,696	15,552
Transit Area Served[3]	42,490	29,790
Additional Areas Served	9,869	2,273

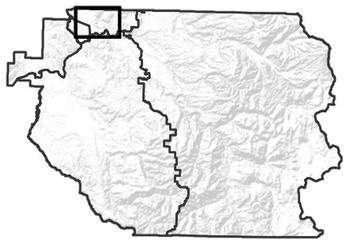
1. Area shown in blue and red in Figure C 21.
2. Area shown in blue in Figure C 21.
3. Area shown in blue and orange in Figure C 21.

As shown in Table C 8, 14,696 people and 15,552 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. Also shown, 42,490 people and 29,790 jobs within the Greater Clackamas Regional Center/Industrial Area are currently served by transit. Of the total area served, 9,869 people and 2,273 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. Many of these areas, however, are shown in Figure C 9 as containing a large portion of the transportation disadvantaged population and therefore, the service provided in these areas is an important part of the community.

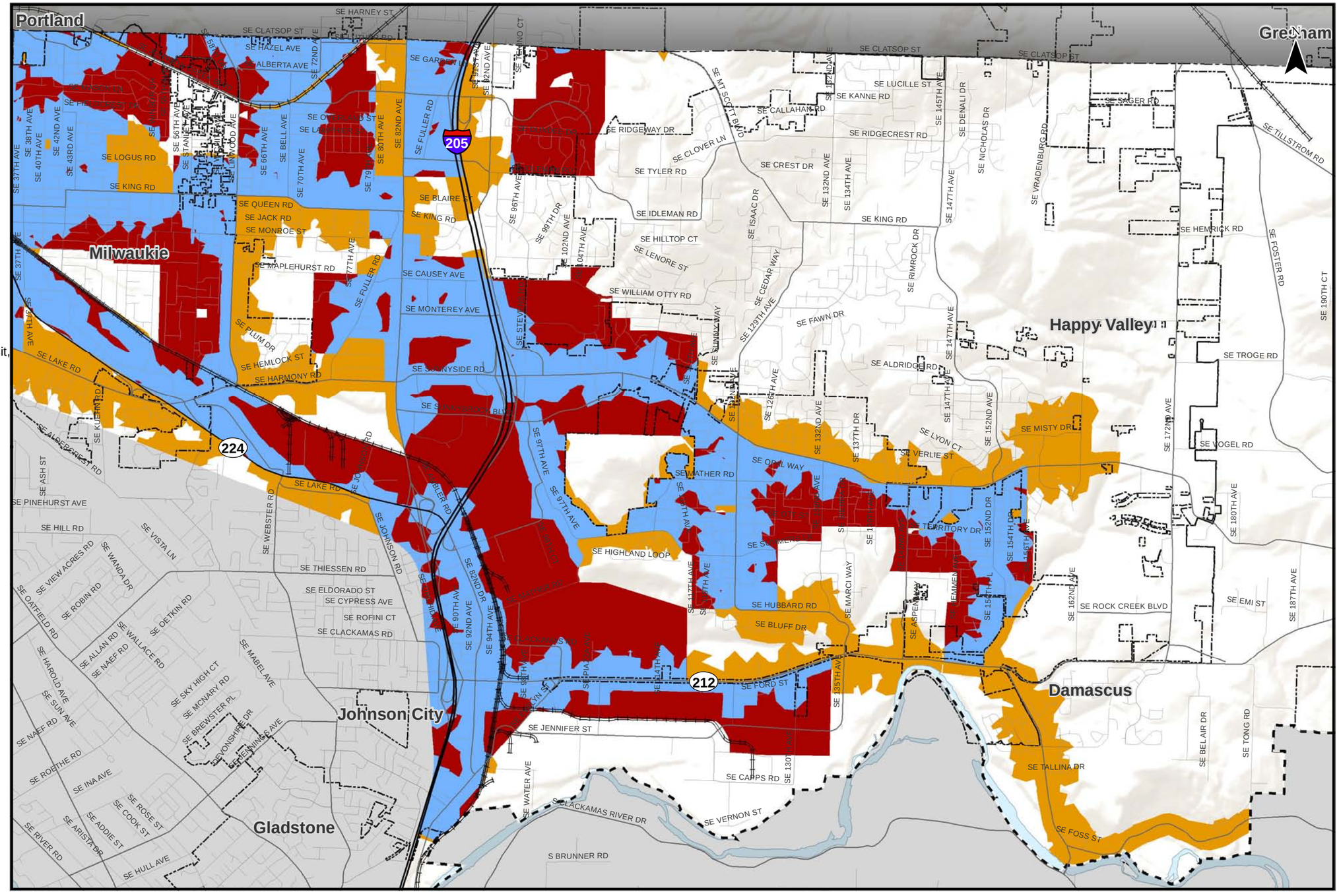
Future Transit Service Coverage

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 C 22 displays the 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 the area. 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.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- 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 Miles

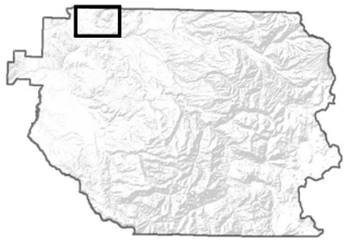
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

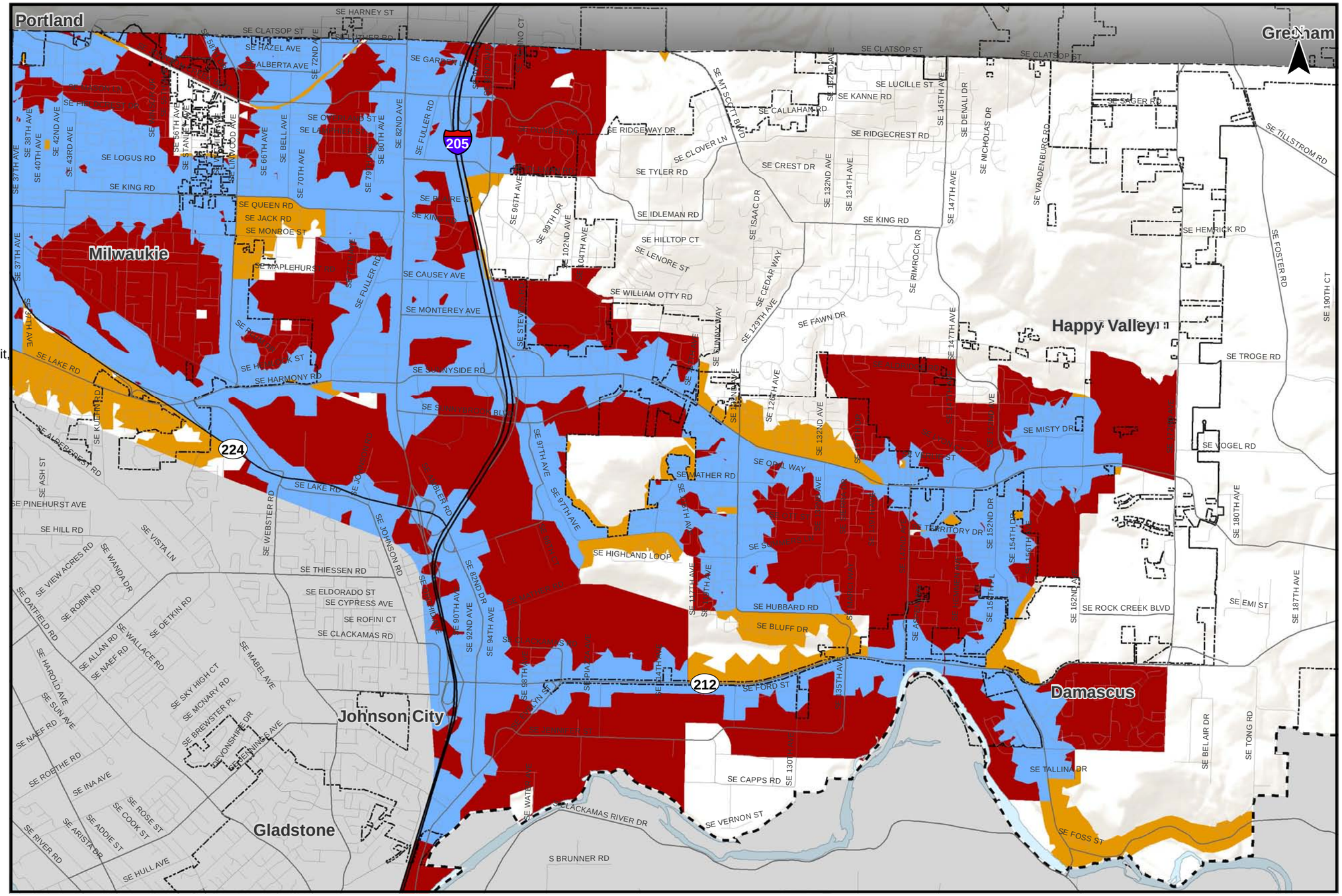
Existing Transit Supportive Areas
Greater Clackamas Regional Center / Industrial Area

Figure
C 21

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\21 Existing Transit Supportive Areas.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*





🟦 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 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
Greater Clackamas Regional Center / Industrial Area

Figure
C 22

H:\projfile\11732 - Clackamas County TSP\gis\11x17 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 (ODOT);
2) Primary crash types contributing to the majority of serious injury and fatal crashes in the County; and
3) Specific safety focus intersections identified by County staff.

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

Figure C 23 below illustrates the reported crashes in the 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 in the area.

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 C 24 identifies the SPIS locations within the Greater Clackamas Regional Center/Industrial Area. It shows there are several SPIS locations. The top 5% and 10% sties identified by ODOT are located along SE 82nd Avenue, portions of OR 212 and portions of OR 224. Forthcoming TSP update reports will explore potential projects, studies, programs and/or policies to reduce crashes at this location.

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.

The purpose of this assessment is to identify corridors for the County to study and evaluate in greater detail with regards to safety. 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, the following corridors (listed in no particular order) in the Greater Clackamas Regional Center/Industrial Area emerged as candidate road safety audit corridors:

1. SE 82nd Avenue from SE Luther Road to SE Sunnybrook Boulevard
2. SE Johnson Creek Boulevard from SE 55th Avenue to I-205
3. SE Sunnyside Road from SE 93rd Avenue to SE 126th Avenue
4. SE 122nd Avenue from SE 172nd Avenue to SE Hubbard Road
5. OR 212 from I-205 to OR 224

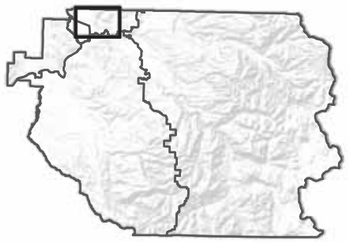
A few of the corridors identified above extend into incorporated areas; collaboration with partner agencies may be needed to study those corridors. Figure C 25 illustrates the location of these corridors.

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.

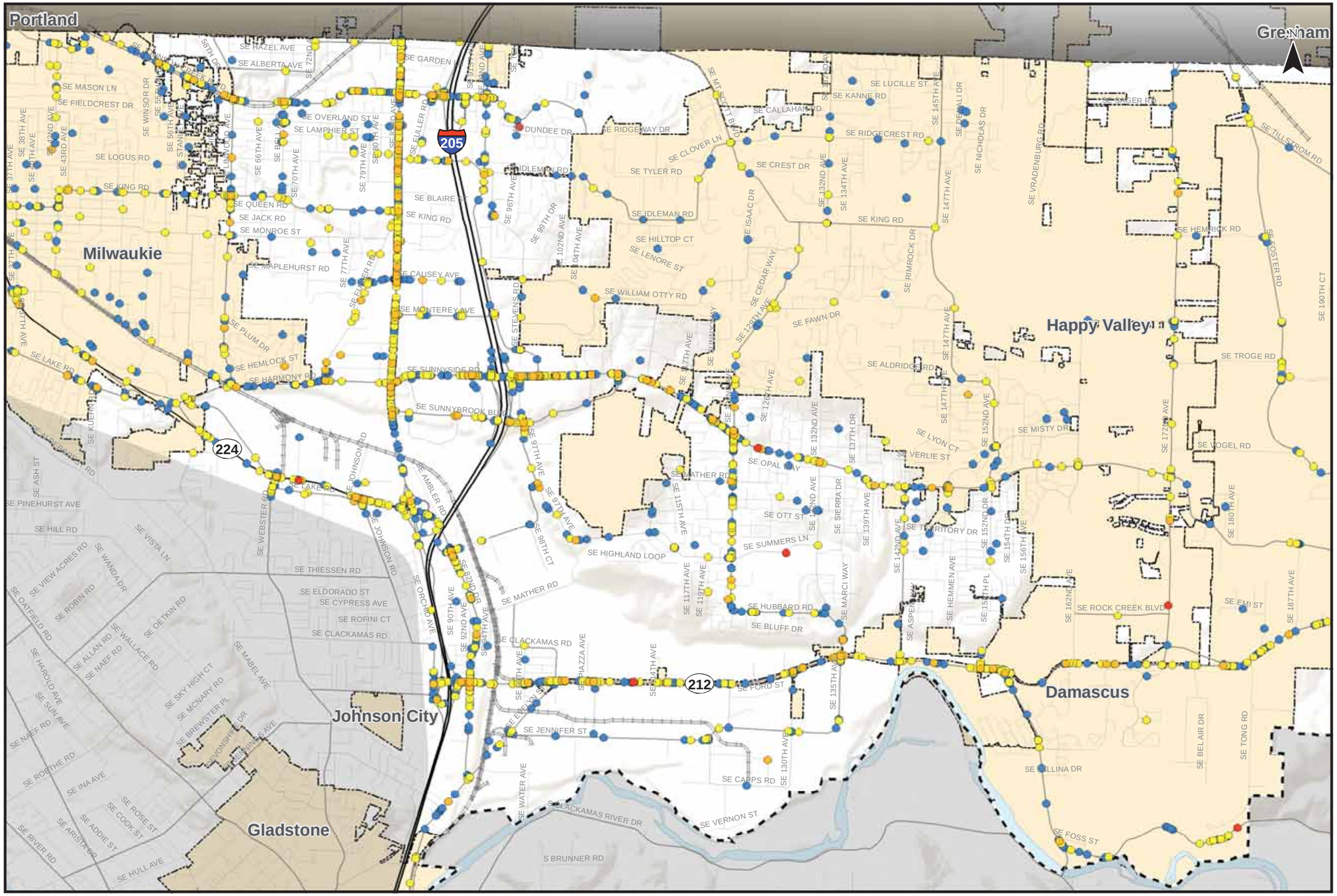
Roadway departure crashes are more common in rural areas compared to urban areas such as the Greater Clackamas Regional Center/Industrial Area. Therefore, the candidate road safety audit corridors above are based more on the frequency and location of crashes involving aggressive driving, younger drivers, pedestrians and bicyclists. The frequency and location of roadway departure crashes are presented below, but do not play as large of a role in identifying candidate corridors compared to rural areas in the County.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Reported Crashes
2007 Through 2010

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



0 1 Miles

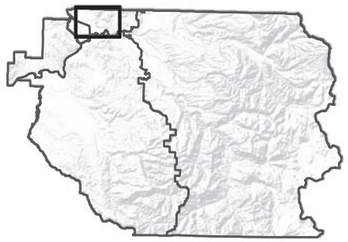
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Reported Crashes 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 23

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

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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.

0 1 Miles

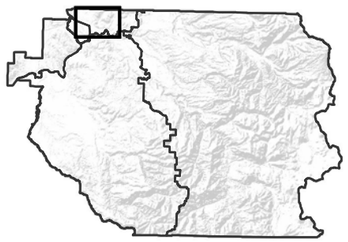
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\24 Statewide Priority Index System Locations.mxd

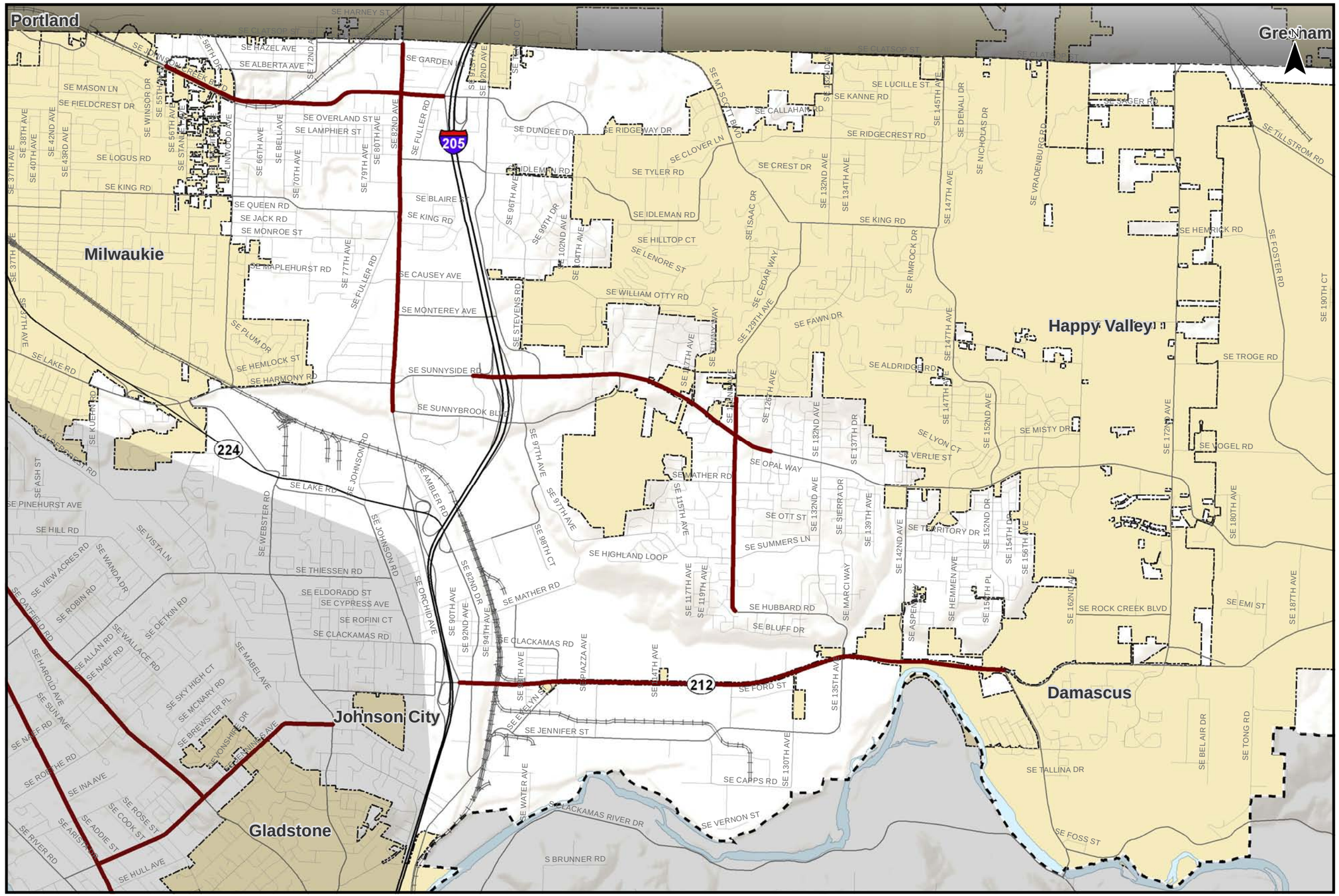
Statewide Priority Index System Locations
Greater Clackamas Regional Center / Industrial Area

Figure
C 24

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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



0 1 Miles

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

Candidate Road Safety Audit Corridors
Greater Clackamas Regional Center / Industrial Area

Figure
C 25

H:\proj\lei\11732 - Clackamas County TSP\gis\11x17 Maps\25 Candidate Safety Corridors.mxd

Figure C 26 illustrates the roadway departure crashes. There are several relatively small clusters of roadway departure crashes throughout the area, but no clear corridor trends specific to this crash type.

Figure C 27 illustrates the crashes involving young drivers, age 15 through 25 years old. The location of these crashes reinforces the candidate road safety audit corridors listed above. The areas that are most noticeable are along SE 82nd, SE Sunnyside Road, and SE 122nd Avenue.

Figure C 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 reinforce the candidate road safety audit corridors noted above particularly the SE Johnson Creek Boulevard, SE 82nd Avenue, SE Sunnyside Road, and OR 212 corridors.

Figure C 29 illustrates serious injury and fatal crashes that were roadway departure crashes, involved young drivers, and/or involved aggressive driving. The purpose of these figures is to help focus on the corridors where serious injury and fatal crashes have occurred. The previous figures reinforced the corridor selection based on the overall frequency of crashes. These figures help confirm the candidate road safety audit corridors are incorporating areas with a history of serious injury or fatal crashes.

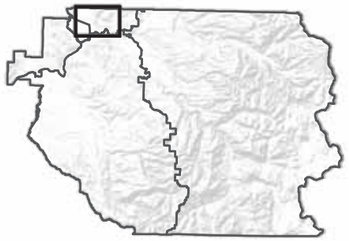
Crashes Involving Pedestrians or Bicyclists

In urban or suburban areas, crashes involving pedestrians and bicyclists tend to be a higher proportion of total reported crashes compared to rural areas because of the comparatively higher volumes of pedestrians and bicyclists using the roadway. These two crash types are considered here to confirm that the candidate road safety audit corridors incorporate areas where pedestrian and bicycle crashes have occurred.

0 and 0 illustrate crashes involving pedestrians and bicyclists.

The pedestrian and bicycle crashes from 2007 through 2010 predominately occurred along SE 82nd Avenue. This is consistent with what is expected given that the number of potential destinations along SE 82nd Avenue likely increases pedestrian and bicycle activity. Furthermore, SE 82nd Avenue carries a relatively large amount of vehicular traffic; therefore there is a higher potential for conflicts between vehicles and pedestrians or bicyclists. Although there are sidewalks on most of the corridor, there are several unmarked pedestrian crossings and numerous accesses that create potential conflicts between vehicles and pedestrians. At points along the corridor the sidewalk is narrow and directly adjacent to the roadway, creating an uncomfortable pedestrian environment. Bicycle lanes are provided on portions of the corridor, but are discontinuous. The dropping and adding of bicycle lanes, particularly at intersections and turn lanes, introduces potential conflicts between vehicles and bicyclists. The gaps in bicycle facilities can be seen on Figure C 19, which illustrates bike lanes and multi-use paths in the area.

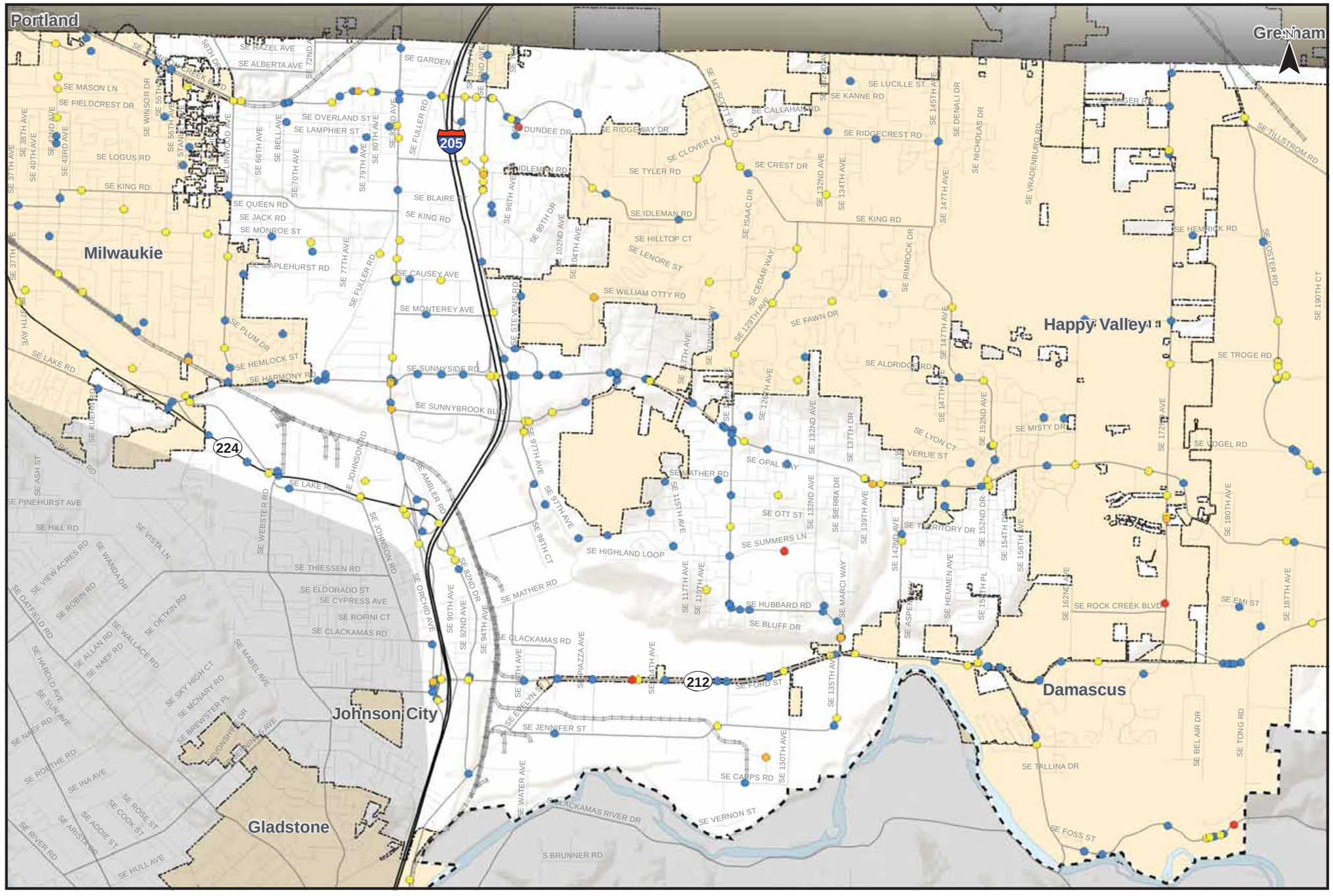
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Roadway Departure Crashes

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

- Incorporated Areas
- County Boundary
- UGB



0 1 Miles

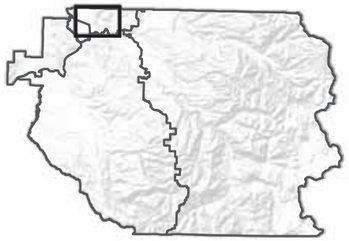
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Roadway Departure Crashes 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 26

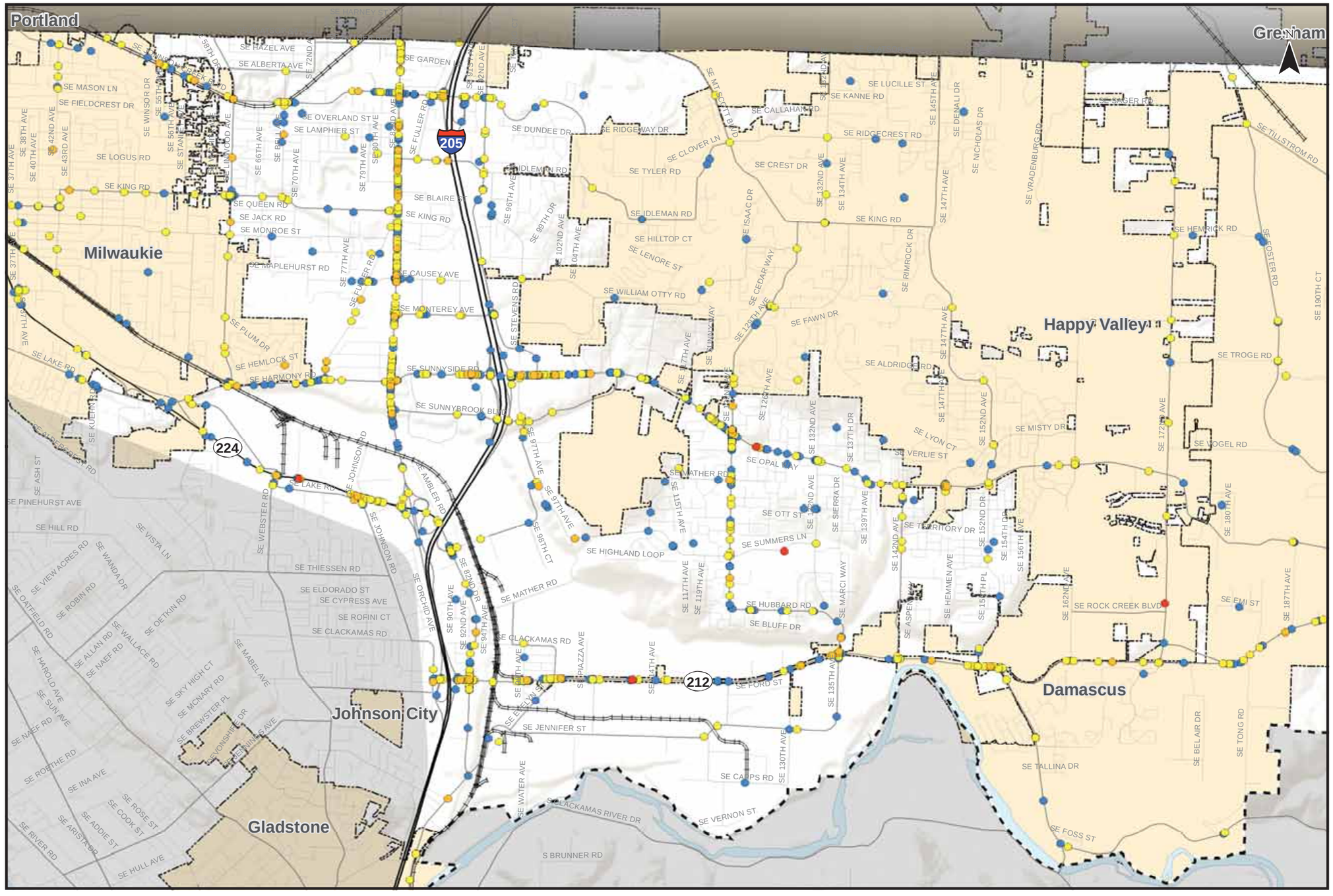
H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\26 Roadway Departure Crashes 2007-2010.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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



0 1 Miles

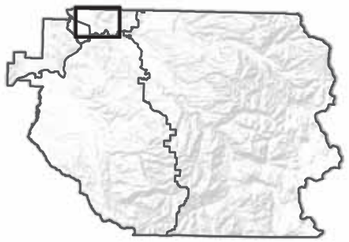
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Young Drivers (15-25 Years Old) 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 27

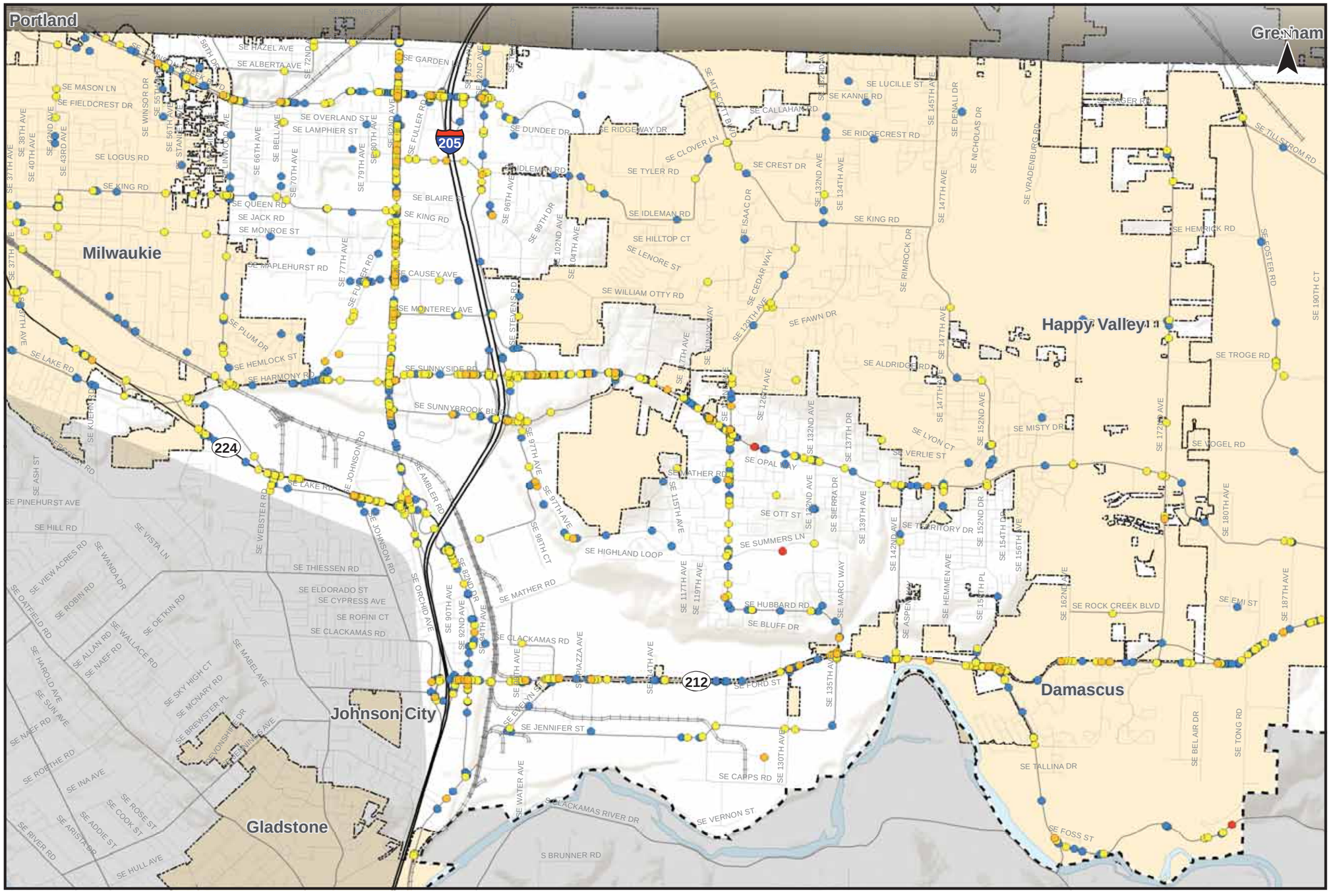
H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\27 Crashes Involving Young Drivers (15-25 Years Old).mxd

CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN
Update



Crashes Involving Aggressive Driving

- 🟥 Fatal Crash
- 🟧 Serious Injury Crash
- 🟨 Minor Injury Crash
- 🟦 Property Damage Only Crash
- ▨ Incorporated Areas
- ┅ County Boundary
- ┅ UGB



0 1 Miles

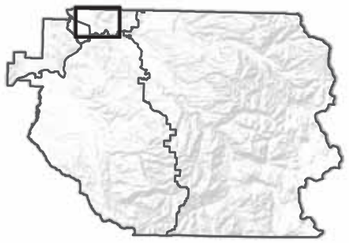
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Aggressive Driving 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 28

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\28 Crashes Involving Aggressive Driving.mxd

CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN *Update*

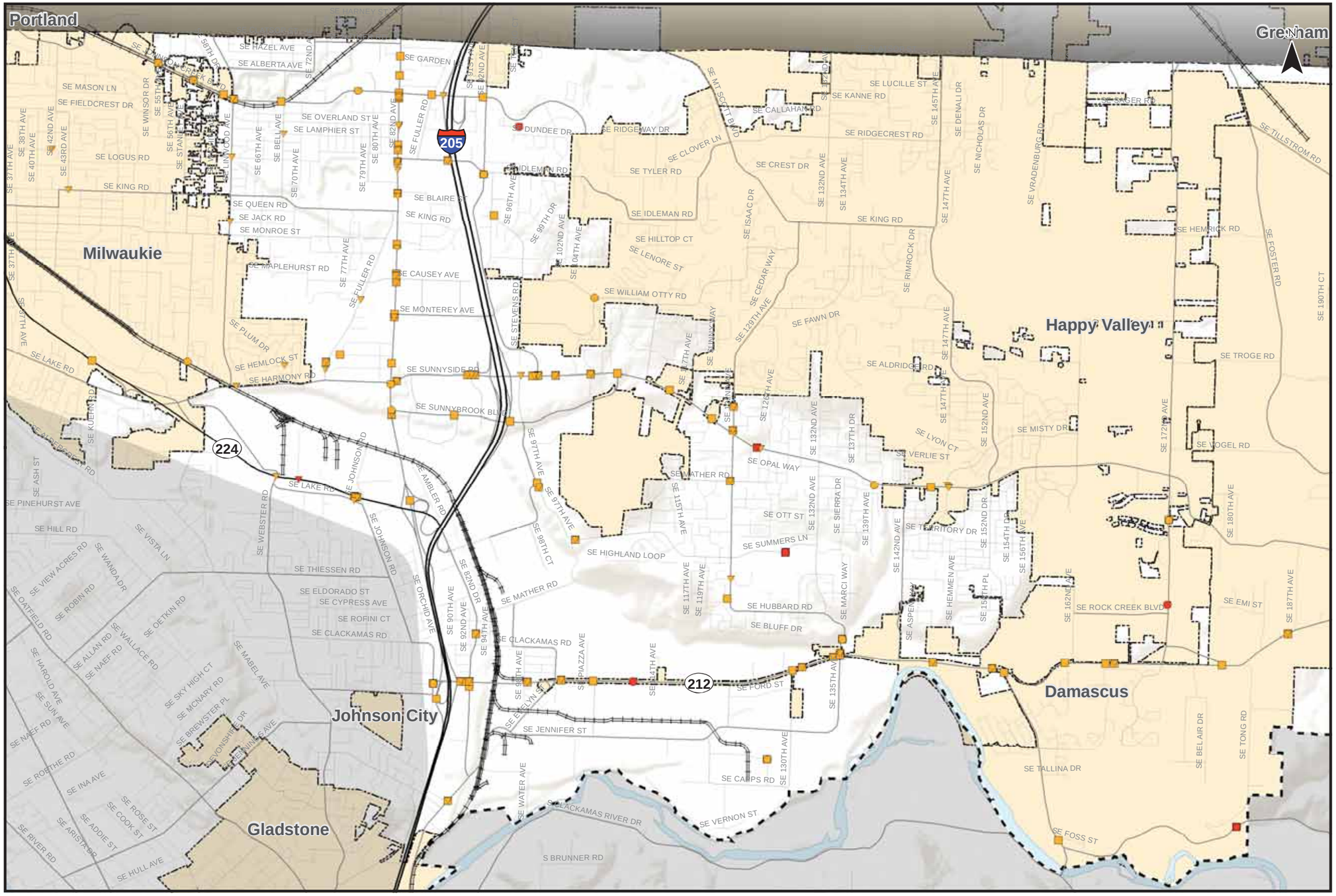


Roadway Departure Crashes
- ● Fatal Crash
- ● Serious Injury Crash

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



0 1 Miles

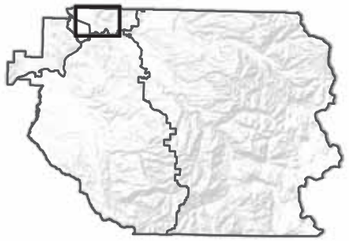
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes
Greater Clackamas Regional Center / Industrial Area

Figure
C 29

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\29 Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



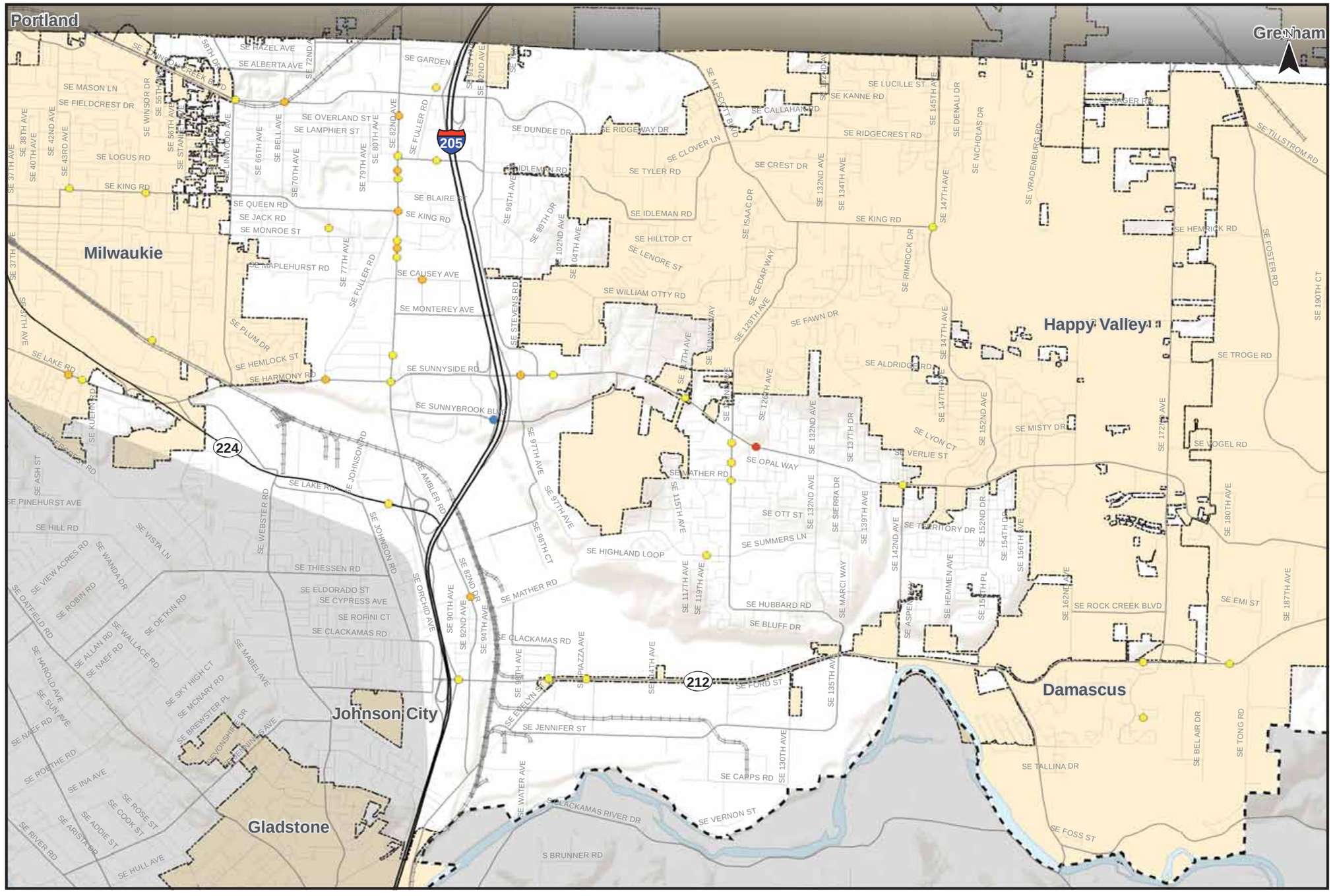
Crashes Involving Pedestrians

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

Incorporated Areas

County Boundary

UGB



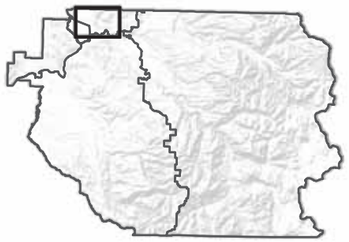
0 1 Miles

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

Crashes Involving Pedestrians 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 30

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Bicycles

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

- Incorporated Areas
- County Boundary
- UGB

0 1 Miles

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

Crashes Involving Bicycles 2007-2010
Greater Clackamas Regional Center / Industrial Area

Figure
C 31

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\31 Crashes Involving Bicyclists.mxd

Specific Safety Focus Intersections

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

- Approaching roads are offset;
- Sight distance is limited at or on approach to 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 (i.e., County SPIS locations shown in Figure C 24). 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, the 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 C 32 illustrates the location of these intersections and Table C 9 summarizes the locations.

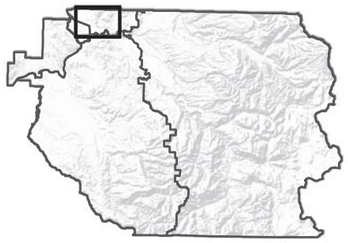
Table C 9 Safety Focus Intersections in the Greater Clackamas Regional Center/Industrial Area

Major Road	Minor Road	Reason Identified	County Safety Priority Location?	Located on a Candidate Safety Corridor?
Jennifer	130th	Higher Traffic Volumes Relative to Intersection Type	No	No
Jennifer	122nd Ave	Higher Traffic Volumes Relative to Intersection Type	No	No
King	Linwood	Frequency of Rear End Crashes	No	No
Linwood	Monroe	Intersection Skew	No	No
Telford	Rugg	Intersection Skew and Approach Geometry	No	No

The list of safety focus intersections shown in Table C 9 supplements the County's Safety Priority Locations and the Candidate road safety audit corridors discussed above. The intersections listed are primarily skewed intersections and/or have roadway curvature on approach to the intersection that may be challenging for motorists. 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.

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

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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 Miles

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

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\32 Safety Focus Intersections.mxd

Safety Focus Intersections
Greater Clackamas Regional Center / Industrial Area

Figure
C 32

FUTURE BASE CONDITIONS – GREATER CLACKAMAS REGIONAL CENTER/INDUSTRIAL AREA

INTRODUCTION

This section summarizes the results of the analysis of future traffic conditions for the Greater Clackamas Regional Center/Industrial area. 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:** The low build scenario assumes that only planned transportation projects with funding currently allotted are completed.
2. **Full Build:** The full build scenario assumes that all planned transportation projects identified in the existing TSP before the year 2035 are completed.

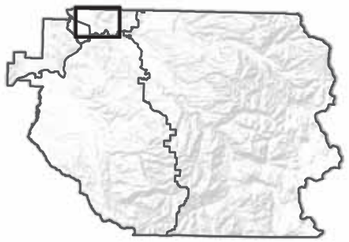
The projects included in these scenarios will be further evaluated based on criteria and measures corresponding to the County's vision, goals and objectives in the next stage of the TSP Update. Additional new projects to address gaps and deficiencies in the transportation system will also be assessed in the alternatives analysis. The approach and methodology to the Future Base Conditions analysis is further described in Section 2. 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 intersection 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 located in the Greater Clackamas Regional Center/Industrial Area and mapped in Figure C 33. The projects that affect roadway or intersection capacity are listed and described in Table C 10.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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.

0 1 Miles

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

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\33 2035 Low Build Projects.mxd

2035 Low Build Projects
Greater Clackamas Regional Center / Industrial Area

Figure
C 33

Table C 10 Low Build Projects in Greater Clackamas Regional Center/Industrial Area

Project	ID	Location	Description
Sunnybrook Rd Extension (W)	U001	82nd Avenue to Harmony Road	Extend as a minor arterial (4 lanes)
Industrial Way	U005	Lawnfield Road to Mather Road	New 3-lane collector
OR 212/224: 3rd westbound lane	U016	OR 212/224, UPRR viaduct to I-205	Restripe OR 212/224 to add 3rd WB lane (combination thru & right-turn lane @ 82nd Dr.); provide two signalized right-turn lanes to NB I-205 on-ramp; provide two right-turn lanes SB I-205 off-ramp to EB OR 212/224; install traffic signal @ I-205 SB ramp terminals to OR 212/224; re-align multi-use path from 82nd Dr. to I-205 NB on-ramp.
Sunrise Expressway Mainline	U019	I-205 to SE 122nd Ave. crossing OR 212/224	Construct 2-4 lane highway; construct new overcrossing structure over I-205 connecting 82nd Ave. and 82nd Dr.
Monterey Avenue	U100	82nd Avenue to Fuller Road	New 2-lane extension
Sager	U676	162nd to Foster	Improve to collector standards (3 lanes), and signalize Sager @172nd.

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 C 34. The operations at the study intersections were analyzed based on the traffic volumes forecast under the low-build scenario and are illustrated in Table C 11 and Figure C 35. Signal timings were adjusted as appropriate to account for changes in the forecasted traffic volumes. Intersections that do not meet standards are noted in the figure.

Table C 11 2035 Low Build Traffic Operations Analysis Results at Study Intersections in the Greater Clackamas Regional Center/Industrial Area

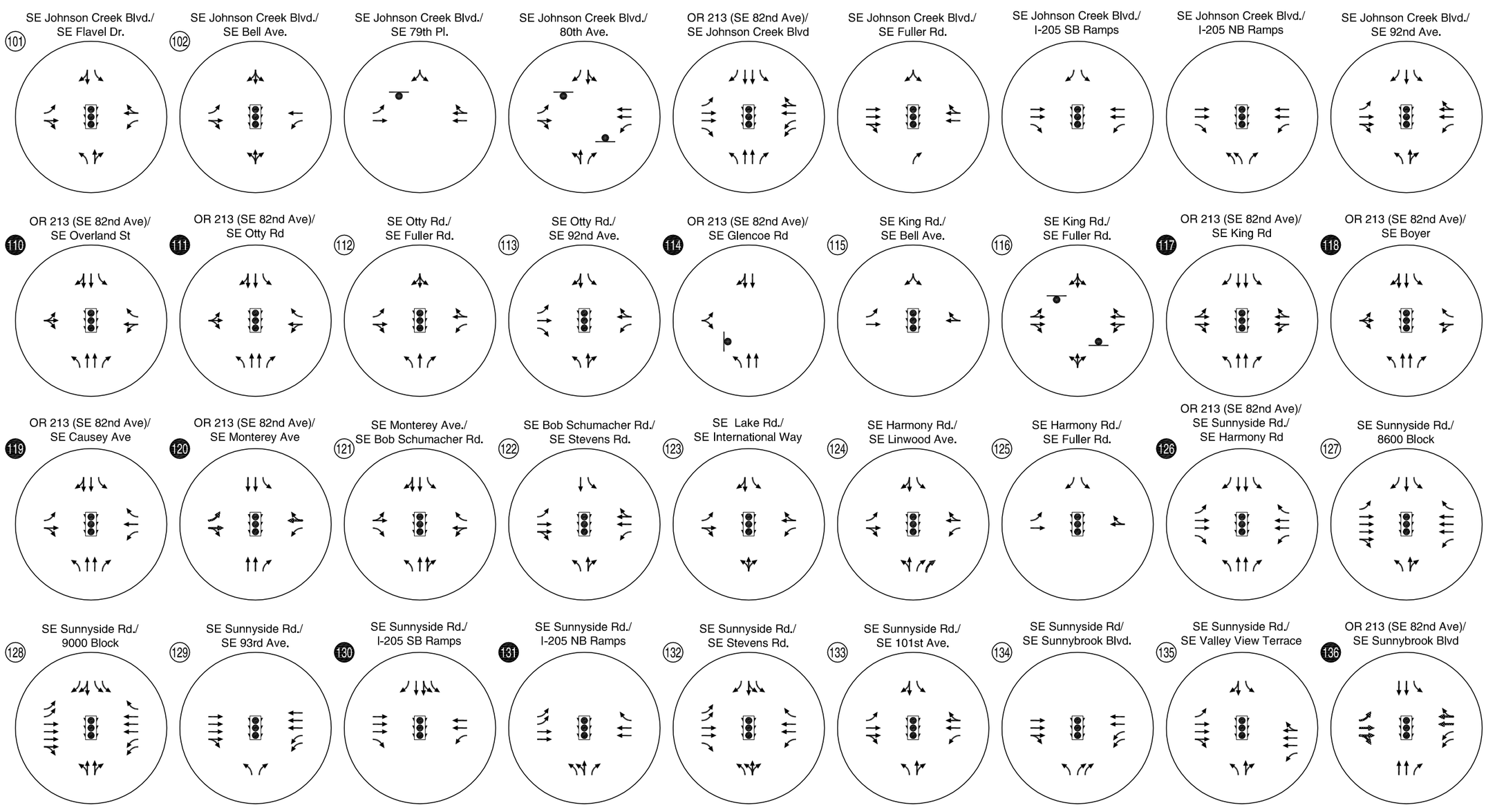
ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?
101	SE Johnson Creek Blvd/SE Flavel Dr	County	v/c = 0.99	Yes	No	Yes
102	SE Johnson Creek Blvd/SE Bell Ave	County	v/c = 0.99	Yes	No	Yes
103	SE Johnson Creek Blvd/SE 79th Pla	County	v/c = 0.99	Yes	No	Yes
104	SE Johnson Creek Blvd/80th Ave	County	v/c = 0.99	No	No	No (v/c=2.01)
105	OR 213 (SE 82nd Ave)/SE Johnson Creek Blvd	ODOT	v/c = 0.99	Yes	No	No (v/c=1.08)
106	SE Johnson Creek Blvd/SE Fuller Rd	County	v/c = 0.99	Yes	No	Yes
107	SE Johnson Creek Blvd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes	No	Yes
108	SE Johnson Creek Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	No	Yes
109	SE Johnson Creek Blvd/SE 92nd Ave	County	v/c = 0.99	Yes	No	Yes
110	OR 213 (SE 82nd Ave)/SE Overland Street	ODOT	v/c = 0.99	Yes	No	Yes
111	OR 213 (SE 82nd Ave)/SE Otty Road	ODOT	v/c = 0.99	Yes	No	Yes
112	SE Otty Road/SE Fuller Rd	County	v/c = 1.1	Yes	No	Yes
113	SE Otty Road/SE 92nd Ave	County	v/c = 1.1	Yes	No	Yes

ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?
114	OR 213 (SE 82nd Ave)/SE Glencoe Rd	ODOT	v/c = 0.99	Yes	No	Yes
115	SE King Rd/SE Bell Ave	County	v/c = 0.99	Yes	No	Yes
116	SE King Rd/SE Fuller Rd	County	v/c = 0.99	Yes	No	No (v/c=1.40)
117	OR 213 (SE 82nd Ave)/SE King Rd	ODOT	v/c = 0.99	Yes	No	Yes
118	OR 213 (SE 82nd Ave)/SE Boyer	ODOT	v/c = 0.99	Yes	No	Yes
119	OR 213 (SE 82nd Ave)/SE Causey Ave	ODOT	v/c = 1.1	Yes	No	Yes
120	OR 213 (SE 82nd Ave)/SE Monterey Ave	ODOT	v/c = 1.1	Yes	Yes (U100)	Yes
121	SE Monterey Ave/SE Bob Schumacher Rd	County	v/c = 1.1	Yes	No	Yes
122	SE Bob Schumacher Rd/SE Stevens Rd	County	v/c = 1.1	Yes	No	Yes
123	SE Lake Rd/SE International Way	County	v/c = 0.99	Yes	No	No (v/c=1.39)
124	SE Harmony Rd/SE Linwood Ave	County	v/c = 0.99	Yes	No	No (v/c=1.11)
125	SE Harmony Rd/SE Fuller Rd	County	v/c = 1.1	Yes	No	Yes
126	SE Sunnyside Rd/SE Harmony Rd/SE 82nd Ave	ODOT	v/c = 1.1	Yes	No	Yes
127	SE Sunnyside Rd/8600 Block	County	v/c = 1.1	Yes	No	Yes
128	SE Sunnyside Rd/9000 Block	County	v/c = 1.1	Yes	No	Yes
129	SE Sunnyside Rd/SE 93rd Ave	County	v/c = 1.1	Yes	No	Yes
130	SE Sunnyside Rd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes	No	No (v/c=0.98)
131	SE Sunnyside Rd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	No	No (v/c=0.88)
132	SE Sunnyside Rd/SE Stevens Rd	County	v/c = 1.1	Yes	No	Yes
133	SE Sunnyside Rd/SE 101st Ave	County	v/c = 1.1	Yes	No	Yes
134	SE Sunnyside Rd/SE Sunnybrook Blvd	County	v/c = 0.99	Yes	No	No (v/c=1.12)
135	SE Sunnyside Rd/SE Valley View Terrace	County	v/c = 0.99	Yes	No	Yes
136	OR 213 (SE 82nd Ave)/SE Sunnybrook Blvd	ODOT	v/c = 1.1	Yes	Yes (U001)	No (v/c=1.35)
137	SE Sunnybrook Blvd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes	No	Yes
138	SE Sunnybrook Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	No	No (v/c=0.89)
139	SE Sunnybrook Blvd/97th Ave	County	v/c = 1.1	Yes	No	Yes
140	OR 224/SE Rusk Rd	ODOT	v/c = 0.99	Yes	No	No (v/c=1.07)
141	OR 224/SE Lake Rd/SE Webster Rd	ODOT	v/c = 0.99	Yes	No	No (v/c=1.29)
142	SE Lake Rd/SE Webster Rd	County	v/c = 0.99	Yes	No	Yes
143	OR 224/SE Johnson Rd	ODOT	v/c = 0.99	Yes	No	No (v/c=1.60)
144	SE Sunnyside Rd/SE 122nd Ave	County	v/c = 0.99	Yes	No	No (v/c=1.03)
145	SE Sunnyside Rd/SE 132nd Ave	County	v/c = 0.99	Yes	No	Yes
146	SE Sunnyside Rd/SE 142nd Ave	County	v/c = 0.99	Yes	No	No (v/c=1.05)
147	SE Sunnyside Rd/SE 152nd Ave	County	v/c = 0.99	Yes	No	Yes
148	SE Sunnyside Rd/SE 162nd Ave	County	v/c = 0.99	Yes	No	Yes
149	SE Sunnyside Rd/SE 172nd Ave	County	v/c = 0.99	Yes	No	Yes
150	SE Mather Rd/SE 122nd Ave	County	v/c = 0.99	Yes	No	Yes
151	SE Summers Lane/SE 122nd Ave	County	v/c = 0.99	Yes	No	Yes
152	SE Hubbard Rd/SE 132nd Ave	County	v/c = 0.99	Yes	No	Yes
153	OR 212/I-205 SB Ramps	ODOT	v/c = 0.85	No	No	No (v/c=1.13)
154	OR 212/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	Yes (U156)	Yes

ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?
155	OR 212/SE 82nd Dr	ODOT	v/c = 0.99	Yes	Yes (U156)	Yes
156	OR 212/224/SE 102nd Ave	ODOT	v/c = 0.99	Yes	No	Yes
157	OR 224/SE Hubbard Rd/135th Ave	ODOT	v/c = 0.99	No	No	No (v/c=4.26)
158	OR 224/SE 142nd Ave	ODOT	v/c = 0.99	Yes	No	No (v/c=1.37)
159	OR 212/OR 224	ODOT	v/c = 0.99	Yes	No	No (v/c=1.58)
160	OR 212/SE 162nd Ave	ODOT	v/c = 0.99	Yes	No	Yes
161	OR 212/SE 172nd Ave	ODOT	v/c = 0.99	Yes	No	No (v/c=1.12)
162	SE Jennifer St/SE Evelyn St	County	v/c = 0.99	Yes	No	Yes
163	SE 82nd Dr/SE Jennifer Street	County	v/c = 0.99	Yes	No	Yes
164	SE Strawberry Lane/SE 82nd Dr	County	v/c = 0.99	Yes	No	Yes
165	OR 224/Springwater Rd	ODOT	v/c = 0.99	Yes	No	No (v/c>1.0)

As can be seen in Table C 11:

- The three study intersections that do not meet standards under the existing conditions continue to not meet standards in the low build scenario.
- An additional 18 intersections do not meet standards in the low build scenario that currently meet standards. Several of these intersections are located on OR 224 and SE Harmony Road in the vicinity of the Milwaukie Industrial area.
- Of the total 21 intersections that do not meet standards in the low-build scenario, one is impacted by a capacity project under the low build scenario. The intersection of OR 213 (SE 82nd Ave)/SE Sunnybrook Boulevard (136) is impacted by the Sunnybrook Extension between 82nd Avenue and Harmony Road. The intersection is currently a three-legged intersection, but the Sunnybrook Extension adds an eastbound approach to the intersection. The intersection does not meet standards under the low build scenario.
- The remaining 20 intersections that do not meet standards are not impacted by capacity projects under the low build scenario. While some of these intersections are operating only slightly over capacity, several have volume-to-capacity ratios far in excess of the standards. As seen in the table, the intersections of SE Johnson Creek Boulevard/80th Avenue (104), OR 224/SE Hubbard Road/135th Avenue (157), and OR 224/Springwater Road (165) are forecast to operate at volume-to-capacity ratios over 2.0. This will likely result in significant delays at these intersections for vehicles. *Appendix 8* contains detailed traffic operations analysis results.

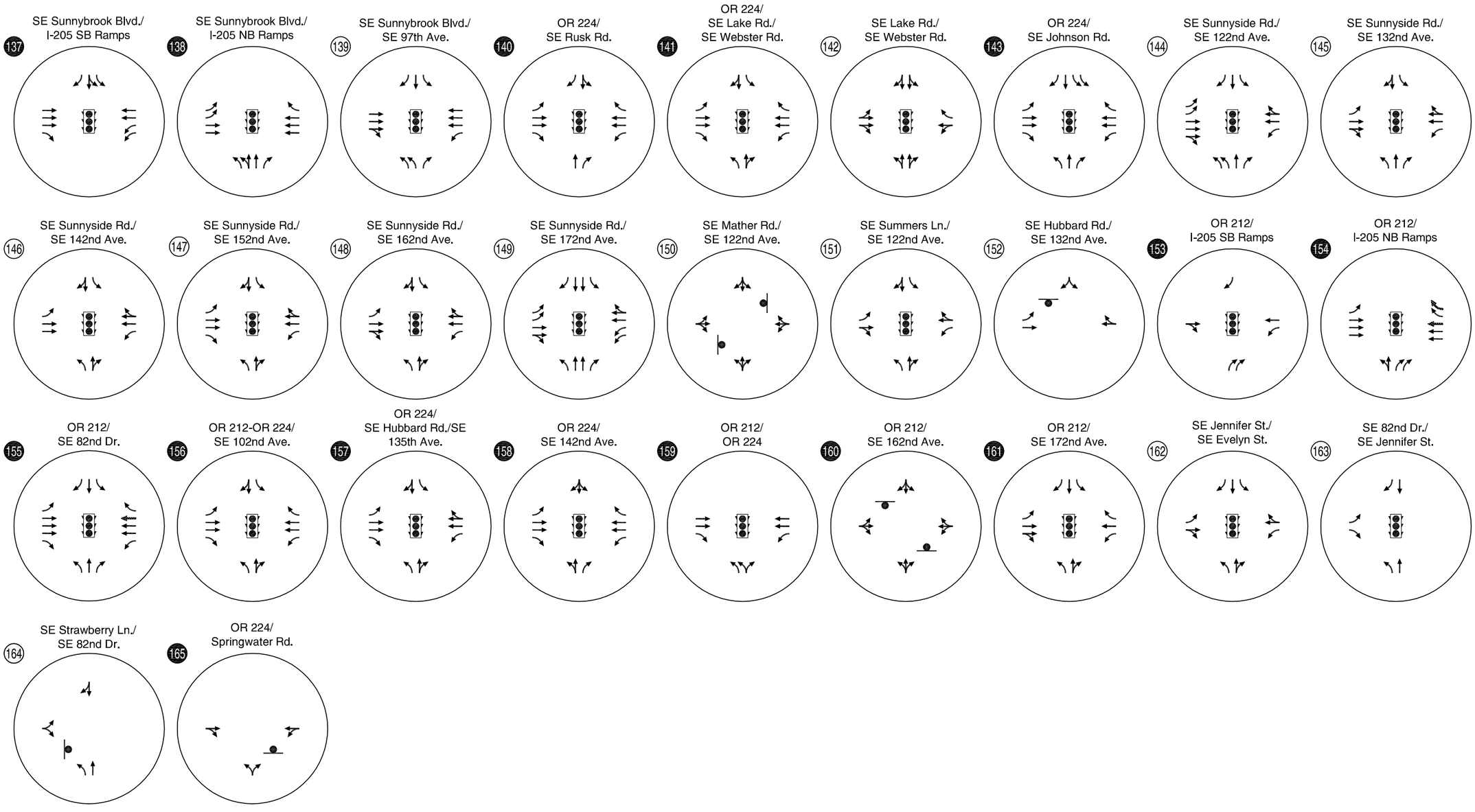


(##) - ODOT STUDY INTERSECTION
(##) - COUNTY STUDY INTERSECTION
- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT
⇨ - LANE REMOVED
→ - LANE ADDED

Low Build Lane Configuration and Traffic Control Devices
Greater Clackamas Regional Center/Industrial Area - 1

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Figure C 34



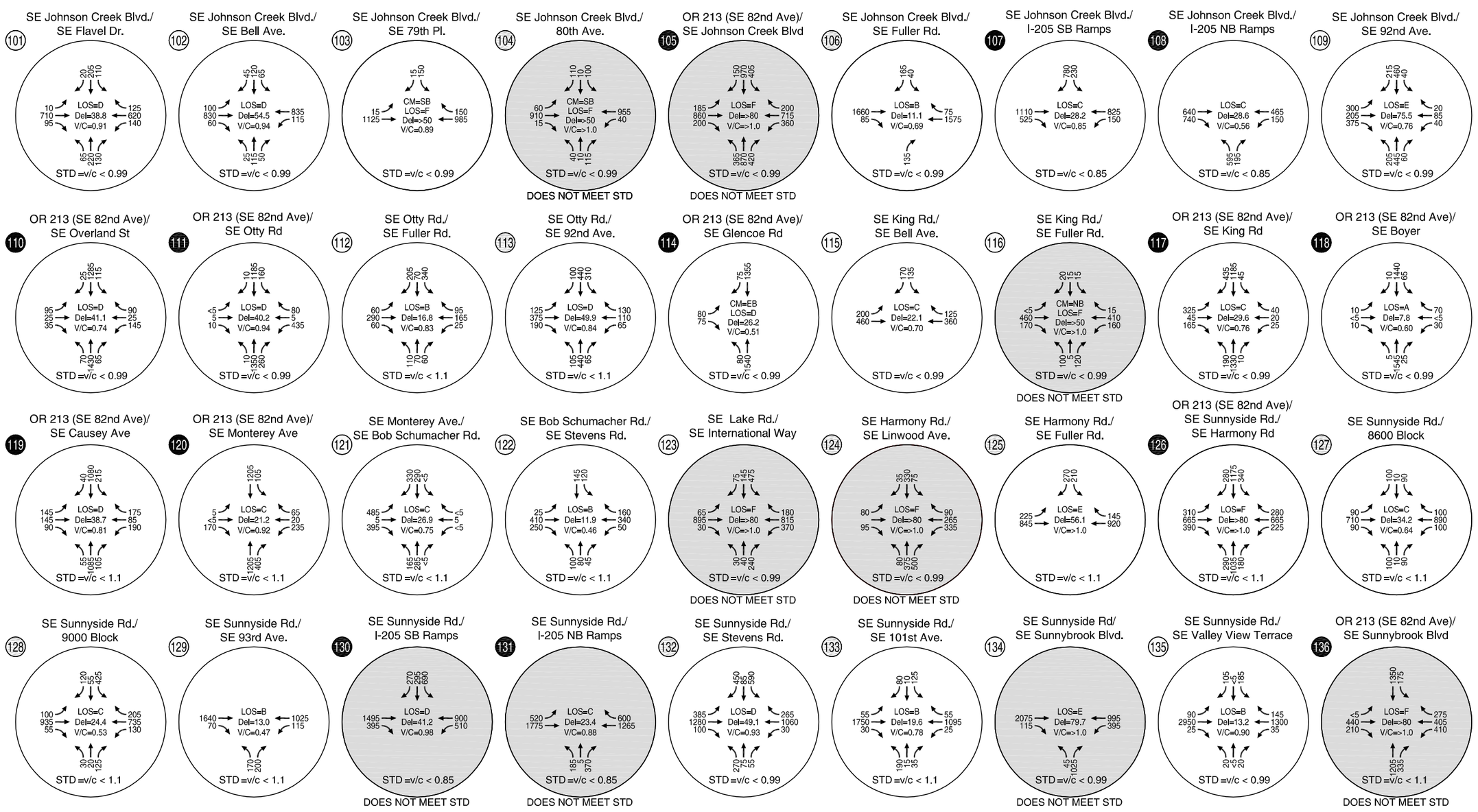
- ## - ODOT STUDY INTERSECTION
- (##) - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT
- ⇨ - LANE REMOVED
- → - LANE ADDED

Low Build Lane Configuration and Traffic Control Devices

Greater Clackamas Regional Center/Industrial Area - 2

CLACKAMAS COUNTY Transportation System Plan Update

Figure C 34

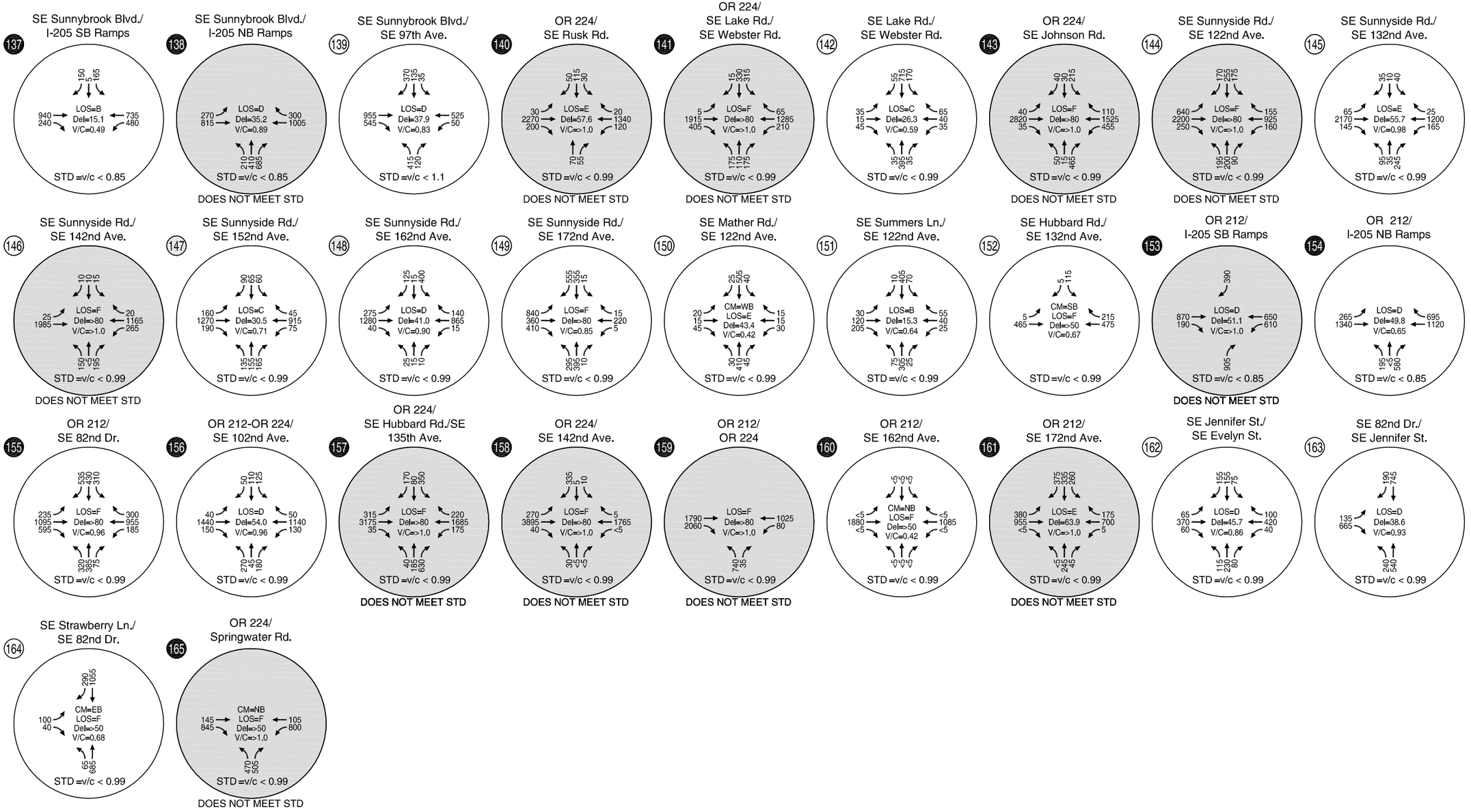


CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD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

Low Build Intersection Operations
PM Peak Hour
Greater Clackamas Regional Center/Industrial Area - 1

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Figure C 35



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
Greater Clackamas Regional Center/Industrial Area - 2

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Figure C 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 within Clackamas County. Figure C 36 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Low Build Scenario.

As is evident from Figure C 36, under the 2035 Low Build Scenario demand for travel continues to be highest along OR 212, SE Sunnyside Road, SE 82nd Avenue, SE Harmony Road, SE Johnson Creek Boulevard and SE Linwood Avenue. There is also a planned extension of OR 224 east of I-205 as part of the Sunrise Expressway Mainline project (U019) shown in the figure that would serve a relatively high volume of traffic.

Approximate Level of Congestion

The level of roadway segment congestion 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 C 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 C 37, under the 2035 Low Build Scenario, eastern portions of SE Sunnyside Road experience noticeably higher levels of congestion compared to the existing conditions extending from Sunnybrook Boulevard to incorporated areas of Happy Valley. Eastern portions of OR 212 approaching and extending into incorporated areas of Damascus are also estimated to experience noticeably higher levels of congestion compared to existing conditions. Table C 12 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 C 12 2035 Low Build Roadway Segment Congestion in Greater Clackamas Regional Center/Industrial Area

Roadway	Segment	Level of Congestion
I-205	South of study area to County boundary, not including the section between SE Sunnybrook Blvd and SE Sunnyside Rd	Nearing Congestion to Very Congested
OR 212/ OR 224	SE Lake Rd to SE Rusk Rd SE McKinley Ave to I-205 Railroad Crossing to SE 98th Ave Sunrise Expressway to Carver Hwy SE 16nd Ave to SE Tong Rd	Nearing Congestion to Very Congested
SE 132md Ave	SE Ridgecrest Rd to SE 132nd Ave	Nearing Congestion
SE 147th Ave	SE Monner Rd to SE King Rd	Nearing Congestion to Congested

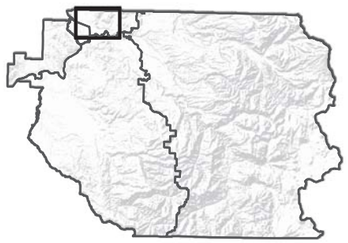
Roadway	Segment	Level of Congestion
SE 172nd Ave	Robs Way to SE Sager Rd	Very Congested
SE 45th Ave	SE 42nd Ave to SE Johnson Creek Blvd	Very Congested
SE Clatsop St	SE 132nd Ave to SE 162nd Ave	Nearing Congestion to Very Congested
SE Evelyn St	SE Strawberry Ln to SE 82nd Dr	Congested
SE Foster Rd	SE Troge Rd to SE Hemrick Rd	Nearing Congestion
SE Harmony Rd	SE Cedarcrest Dr to SE Fuller Rd	Nearing Congestion
SE King Rd	SE 129th Ave to SE 147th Ave	Nearing Congestion to Some Congestion
SE Linwood Ave	SE Johnson Creek Blvd to SE Alberta Ave	Nearing Congestion
SE Monterey Ave	SE 85th Ave to I-205	Nearing Congestion
SE Mt Scott Blvd	SE Ridgecrest Rd to SE Clatsop St	Some Congestion
SE Otty Rd/SE Idleman Rd/SE Tyler Rd	SE Fuller Rd to SE Mt Scott Blvd	Nearing Congestion to Very Congested
SE Ridgecrest Rd	SE 132nd Ave to SE Parkwood Way	Some Congestion
SE Sunnybrook Blvd	Oak Bluff Blvd to SE 97th Ave	Nearing Congestion to Some Congestion
SE Sunnyside Rd	Clackamas Town Center to SE 147th Ave	Nearing Congestion to Very Congested
SE Tong Rd	OR 212 to OR 224	Nearing Congestion to Very Congested
SE Webster Rd	SE Lake Rd to OR 224	Congested
SE Otty Rd	SE Valley View Terr to SE 117th Ave	Some Congestion
Sunrise Expressway	SE Mather Rd to OR 212	Nearing Congestion to Some Congestion

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 currently planned transportation projects 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 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.

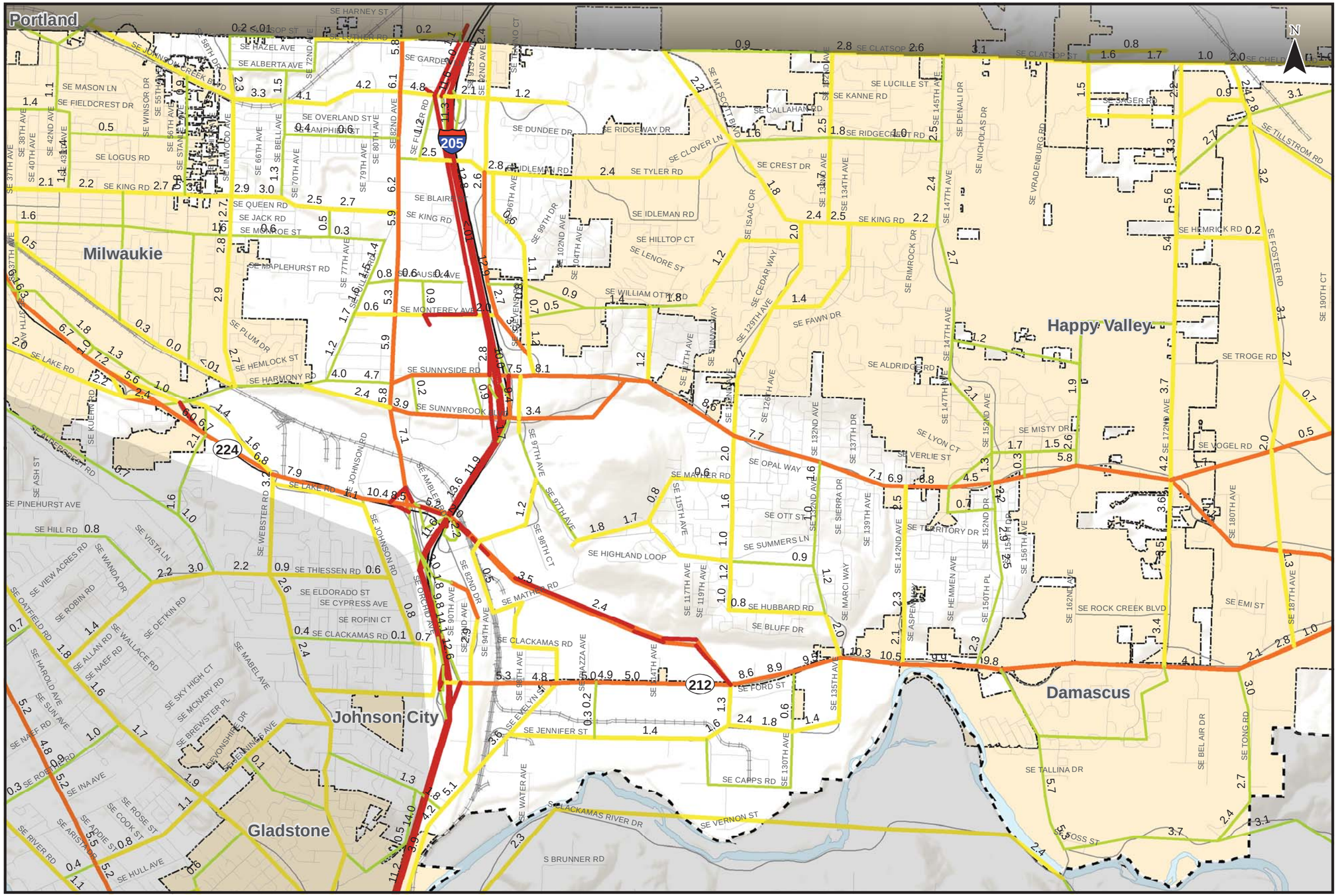
The forecast traffic volumes, roadway cross-sections, and intersection configurations were adjusted based on projects in the full build scenario that affect roadway or intersection capacity, such as adding turn lanes. The capacity full build projects are mapped in Figure C 38 and listed and described in Table C 13.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



2035 Low Build Volumes

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



0 1 Miles

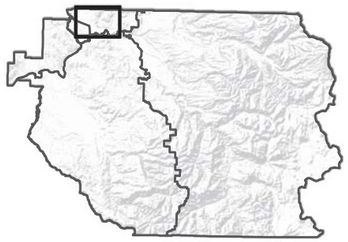
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario
Greater Clackamas Regional Center / Industrial Area

Figure
C 36

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\36 Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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 Congesion 0.8 - 0.9

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

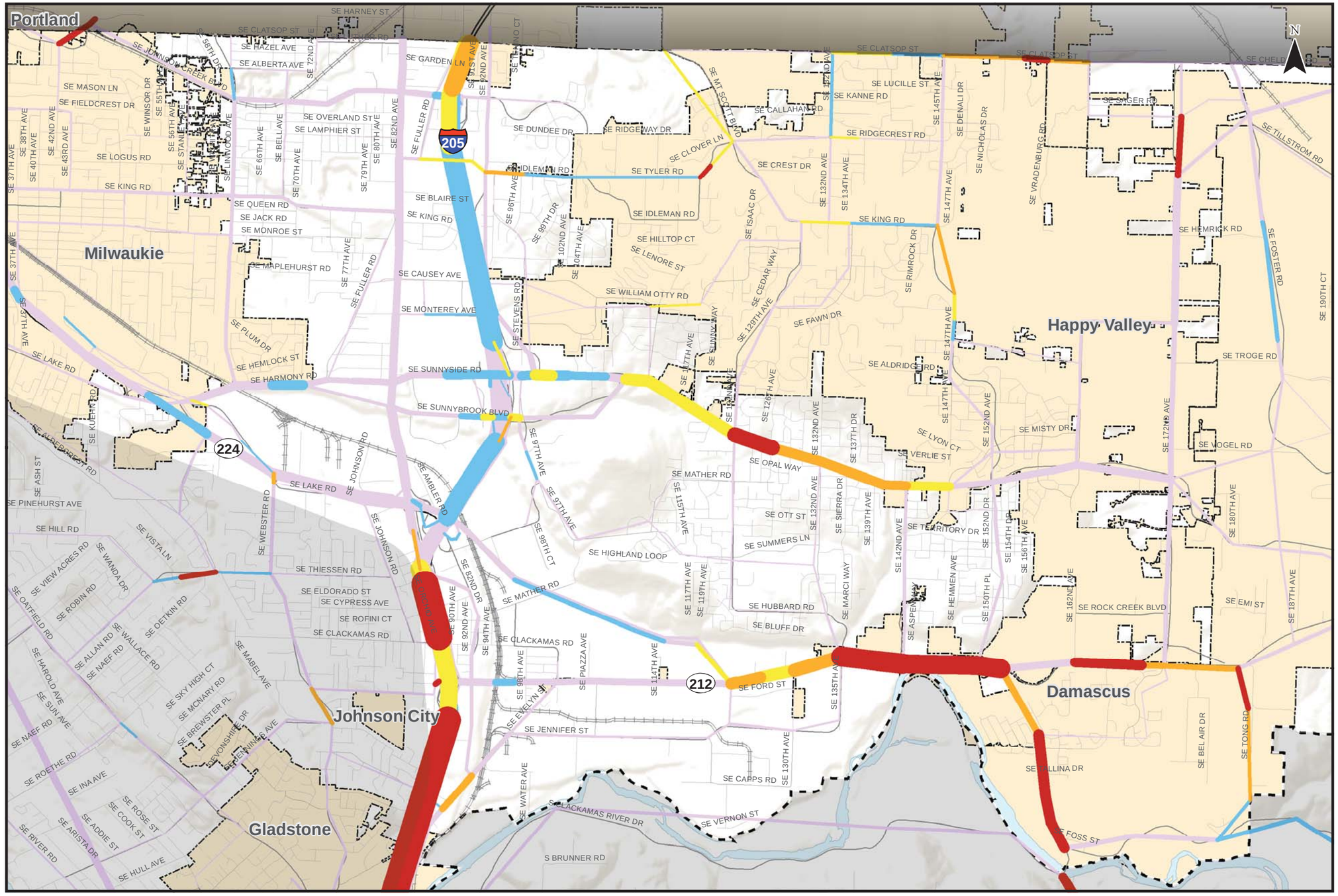
Less Congested <0.8

- 100 Vehicles
- 1,000 Vehicles
- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 Miles

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

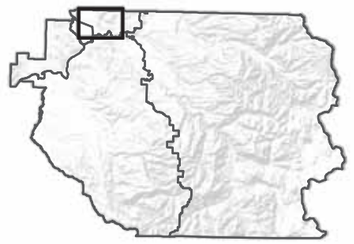
H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\37 Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario.mxd



Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario
Greater Clackamas Regional Center / Industrial Area

Figure
C 37

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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.

0 1 Miles

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

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\38 2035 Full Build Projects.mxd

2035 Full Build Projects
Greater Clackamas Regional Center / Industrial Area

Figure
C 38

Table C 13 Full Build Projects in the Greater Clackamas Regional Center/Industrial Area

Project	ID	Location	Description
Sunnybrook Rd Extension (W)*	U001	82nd Avenue to Harmony Road	Extend as a minor arterial (4 lanes)
Industrial Way*	U005	Lawnfield Road to Mather Road	New 3-lane collector
OR 212/224: 3rd westbound lane*	U016	OR 212/224, UPRR viaduct to I-205	Restripe OR 212/224 to add 3rd WB lane (combination thru & right-turn lane @ 82nd Dr.); provide two signalized right-turn lanes to NB I-205 On-ramp; provide two right-turn lanes SB I-205 Off-ramp to EB OR 212/224; install traffic signal @ I-205 SB ramp terminals to OR 212/224; re-align multi-use path from 82nd Dr. to I-205 NB On-ramp.
Sunrise Expressway Mainline*	U019	I-205 to SE 122nd Ave. crossing OR 212/224	Construct 2-4 lane highway; construct new overcrossing structure over I-205 connecting 82nd Ave. and 82nd Dr.
Monterey Avenue*	U100	82nd Avenue to Fuller Road	New 2-lane extension
Sager*	U676	162nd to Foster	Improve to collector standards (3 lanes), and signalize Sager @172nd.
Sunnyside Road	U045	Sunnyside Road/SE 172nd Ave Intersection	Install traffic signals and left-turn lanes
SE 122nd Avenue	U057	Sunnyside Road to Hubbard Road	Reconstruct and widen (3 lanes), add turn lanes
SE 132nd Avenue	U058	Sunnyside Road to Hubbard Road	Upgrade to standards (3 lanes), add sidewalks
79th Ave Extension	U066	Johnson Creek - King Rd	Build N-S collector (3 lanes) west of 82nd Ave
Johnson Creek Blvd.	U071	36th to 45th	Widen to minor arterial standards (4 lanes)
Johnson Creek Blvd.	U072	55th Avenue to Bell Avenue	Widen to 3 lanes
Johnson Creek Blvd.	U074	Bell Avenue to 82nd Avenue	Widen to 5 lanes plus bike lanes and sidewalks
Clatsop Street/Luther Road	U075	Luther - 72nd Ave. to 82nd: Clatsop, 82nd Ave. east to Fuller	Upgrade to collector standard (3 lanes) and signalize 82nd Avenue intersection
West Collector	U076	Luther Street to Johnson Creek Blvd.	Construct new collector (3 lanes)
82nd Avenue	U078	82nd Avenue/Johnson Creek Blvd. intersection	Add second southbound left-turn lane
Fuller Road extension	U079	Johnson Creek Blvd. to Hinkley Street	Extend street (2 lanes)
King Road	U080	Harrison/King/42nd intersection	Realign intersection, traffic signal
King Road	U081	King/Stanley intersection	Add turn lanes to Stanley
Linwood Avenue	U082	Linwood/Monroe intersection	Add curbs/sidewalks, improve horizontal alignments
Johnson Creek Blvd.	U087	1-205 - Johnson Creek interchange	Connect southbound off-ramp with Fuller, remove signal, upgrade with new ramps
Fuller Road	U088	Otty Street to Johnson Creek Blvd.	Widen to 3 lanes. Add turn lanes, sidewalks, on-street parking, central median, and landscaping.
Otty Street Realignment	U089	Otty Street/82nd Avenue/Otty Road	Realign Otty Street with Otty Road at 82nd Avenue
Otty Road	U090	82nd Avenue to 92nd Avenue	Improve to minor arterial standard (4 lanes). Widen street, add turn lanes, on-street parking, central median, landscaping, bike lanes and sidewalks
Fuller Road	U091	Otty to King/82nd Avenue	New 2-lane extension
Fuller Road disconnect	U092	Fuller Road/King Road intersection	Disconnect Fuller auto access to King Road
Monroe Street	U093	72nd Avenue to Fuller Road	Improve to collector standard (3 lanes)

Project	ID	Location	Description
Boyer Drive	U094	82nd Avenue to Fuller Road	New 2-lane extension
Fuller Road	U095	King Road to Harmony Road	Reconstruct and widen road to collector standards (3lanes)
Causey Avenue	U097	Fuller Road to I-205	Widen (3 lanes) and add bike lanes
SE 85th Avenue	U099	Causey Avenue to Monterey Avenue	Improve to collector standard (3 lanes) with bike lanes and sidewalks
Lake Road	U102	OR 224 west to Milwaukie city limits	Reconstruct, widen (4 lanes), turn lanes
Harmony Road	U104	82nd Avenue - OR 224	Widen to 5 lanes
82nd Avenue	U109	Sunnyside Road to Sunnybrook Road	Widen to 7 lanes with boulevard
Johnson Creek extension	U116	Altamont to Idleman Road	New 2-lane extension
Idleman Road	U117	Johnson Creek extension to Mt. Scott Blvd.	Reconstruct and widen to urban minor arterial standards (4 lanes), smooth curves
Mt. Scott Blvd.	U118	Idleman/Mt. Scott intersection	Realign and add left-turn lanes
Mt. Scott Blvd./King Road	U119	Idleman Road to 132nd Avenue	Reconstruct and widen (urban) (3 lanes). Improve grade.
King Road	U120	King Road/129th intersection	Add turn lanes, realign
SE 132nd Avenue	U121	King Road to Clatsop Street	Widen to 3 lanes
King Road	U122	132nd Avenue to 147th Avenue	Reconstruct, widen (3 lanes), turn lanes
SE 122nd/129th Avenue	U123	Sunnyside to King Road	Widen to 3 lanes
Causey extension	U124	I-205 Frontage Road to W. Otty Road	Collector (3 lanes) with bike lanes and sidewalks
William Otty Road extension	U125	Stevens Road to Valley View Terrace	New 2-lane collector
Valley View Terrace	U126	Sunnyside Road to Otty Road	Upgrade to collector (3 lanes) with bike lanes and sidewalks
Foster Road	U128	Tillstrom Road to Multnomah County Line	Four lane widening with left-turn lanes
Foster Road	U129	Foster Road/Tillstrom Road intersection	Install traffic signal, install southbound left-turn lane
Mather Road	U130	97th Avenue to 122nd Avenue	Reconstruct and widen (urban) (3 lanes).
Mather Road	U132	122nd Avenue to 132nd Avenue	New 2-lane extension
Summers Lane Ext. Phase 2	U133	122nd Avenue to 132nd Avenue	New 2-lane extension
SE 142nd Avenue	U135	Sunnyside Road to OR 212	Widen to 3 lanes
SE 152nd Avenue Phase 2	U136	Sunnyside Road to OR 212	Reconstruct and widen (urban) (3 lanes)
Webster Road	U151	Webster Road/Lake Road intersection	Add left-turn lanes
SE 82nd Drive	U156	OR 212 to Gladstone Phase 2	Widen to 5 lanes
Mather Road	U159	SE 82nd Drive to Industrial Way	Extend Mather Road across railroad to SE 82nd Drive
Mather Road	U160	Industrial Way to 98th	Widen to 3 lanes
Springwater Road	U184	OR 224 to Hattan Road	Four lane widening with left-turn lanes, widen bridge over Clack. River
Foster Road	U219	OR 212 to Troge Road	Four lane widening with left-turn lanes
Tillstrom Road	U220	SE 190th Drive to Foster Road	Remove or decrease horizontal curve along Foster Road, relocate intersection, install southbound left-

Project	ID	Location	Description
			turn lane
SE 242nd Avenue	U223	242nd/Sunshine Valley Road intersection	Install northbound right-turn lane
SE 242nd Avenue	U224	242nd/Tillstrom Road intersection	Install northbound left-turn lane and southbound right-turn lane
SE 82nd Drive	U338	OR 212 to Lawnfield Road	Widen to 5 lanes
OR-212 intersections	U423	SE 162nd to Anderson Rd.	Existing OR 212 remains two lanes with turn pockets from 162nd Ave. to Anderson Road south of limited access parkway. Include sidewalks, bike lanes, and a landscaped buffer.
OR 224	U443	Springwater Road/Hwy-224 intersection	Install traffic signal
162nd Ave. Extension South Phase 1	U464	Rock Creek Blvd. to Goose Hollow Dr.	Construct new 2 - 3 lane roadway with intersection improvements at OR-212/162nd on all 4 approaches. The second phase is Project #11346.
162nd Ave. Extension South Phase 2	U485	157th Ave. to Rock Creek Blvd.	Construct new 3 lane roadway with traffic signals and bridge over Rock Creek. The first phase is Project #10041. Improve north-south connectivity and provide congestion relief to 172nd Ave.
SE 242nd Avenue	U484	OR 212 to Multnomah County Line	Reconstruct and widen (rural) (3 lanes), add turn lanes
OR 212 widening to 5 lane blvd	U580	Sunrise Unit 1 Terminus - East Damascus limits	Widen OR 212 to a 5-lane blvd section through Damascus
Mt. Scott Blvd./King Rd. Improvements	U592	Happy Valley City limits to 145th Ave.	Widen to three lanes. Improve access to Happy Valley Town Center.
New Connection, Damascus	U595	177th to 190th	New arterial from the Rock Creek Blvd interchange. This portion is within Damascus.
Rock Creek Blvd. improvements	U608	OR 212/224 (planned Sunrise Corridor Rock Creek Interchange) to 177th Ave.	Construct new 5 lane roadway with sidewalks, bike lanes and traffic signals
SE Sunnyside Rd East Extension	U610	SE 172nd Ave. to SE 242nd Ave.	Extend Sunnyside Road east from 172nd Ave to 242nd Ave. Evaluate alignment options between Bohna Park Road and Tillstrom Road for the connection from Foster Road to 242nd Ave.
162nd Ave. Extension North	U673	Hagen Rd. to Clatsop St	Construct new 3 lane roadway with traffic signals.
Rugg Rd	U674	252nd Ave to 242nd Ave	Construct new roadway that adds E/W capacity in vicinity of Rugg Rd and connects Springwater Industrial area to Hwy 26
Cheldelin	U675	172nd to 190th	Improve to minor arterial (4 lanes) standards, signalize Cheldelin at 172nd, 182nd, and Foster.
162nd	U677	Foster to southern boundary of Pleasant Valley	Improve 162nd to collector standards (3 lanes), add signal at Foster @ 162nd.
172nd	U678	Cheldelin to south Boundary of Pleasant Valley	Improve 172nd Ave. to major arterial standards (3 lanes).
Sunrise Project:	U681	Webster Rd./OR 224 to 172nd Ave./OR 212	Acquire right-of-way: Webster Rd. to SE 172nd Ave. to accommodate six-through lane expressway, plus auxiliary lanes.
Sunrise Hwy	U682	Webster Rd./OR 224 to 172nd Ave./OR 212	Preliminary engineering and environmental impact statement (EIS) from Webster Rd. to SE 172nd.

* Project also included in Low Build Scenario.

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 C 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 C 14 and Figure C 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 forecast traffic volumes. Intersections that do not meet standards are noted.

Table C 14 2035 Full Build Traffic Operations Analysis Results at Study Intersections in Greater Clackamas Regional Center/Industrial Area

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard in Low Build?	Full Build Project?	Meets Standard in Full Build?
104	SE Johnson Creek Blvd/80th Ave	County	v/c = 0.99	No	Yes (U074)	No (v/c=1.74)
105	OR 213 (SE 82nd Ave)/SE Johnson Creek Boulevard	ODOT	v/c = 0.99	No	Yes (U078)	No (v/c=1.04)
116	SE King Rd/SE Fuller Rd	County	v/c = 0.99	No	Yes (U092)	Yes
123	SE Lake Rd/SE International Way	County	v/c = 0.99	No	Yes (U104)	No (v/c=1.11)
124	SE Harmony Rd/SE Linwood Ave	County	v/c = 0.99	No	Yes (U104)	No (v/c=1.11)
130	SE Sunnyside Rd/I-205 SB Ramps	ODOT	v/c = 0.85	No	No	Yes
131	SE Sunnyside Rd/I-205 NB Ramps	ODOT	v/c = 0.85	No	No	Yes
134	SE Sunnyside Rd/SE Sunnybrook Blvd	County	v/c = 0.99	No	No	Yes
136	OR 213 (SE 82nd Ave)/SE Sunnybrook Blvd	ODOT	v/c = 1.1	No	Yes (U001)	No (v/c= 1.68)
138	SE Sunnybrook Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	No	No	Yes
140	OR 224/SE Rusk Rd	ODOT	v/c = 0.99	No	No	No (v/c=1.13)
141	OR 224/SE Lake Rd/SE Webster Rd	ODOT	v/c = 0.99	No	No	No (v/c=2.01)
143	OR 224/SE Johnson Rd	ODOT	v/c = 0.99	No	No	No (v/c=1.73)
144	SE Sunnyside Rd/SE 122nd Ave	County	v/c = 0.99	No	No	Yes
146	SE Sunnyside Rd/SE 142nd Ave	County	v/c = 0.99	No	No	Yes
153	OR 212/I-205 SB Ramps	ODOT	v/c = 0.85	No	No	No (v/c=0.92)
157	OR 224/SE Hubbard Rd/135th Ave	ODOT	v/c = 0.99	No	No	No (v/c= 1.50)
158	OR 224/SE 142nd Ave	ODOT	v/c = 0.99	No	Yes (U135)	Yes
159	OR 212/OR 224	ODOT	v/c = 0.99	No	No	Yes
161	OR 212/SE 172nd Ave	ODOT	v/c = 0.99	No	No	No (v/c=1.54)
165	OR 224/Springwater Rd	ODOT	v/c = 0.99	No	Yes (U443)	No (v/c=4.06)

As seen in Table C 12, nine of the 21 intersections that do not meet standards in the low build scenario do meet standards in the full build scenario. The intersection of SE King Road/SE Fuller Road (116) is impacted by the Fuller Road project, which disconnects automobile access to King Road from Fuller Road. This project improves operations at the intersection so that it meets standards in the full build scenario. The widening of SE 142nd Avenue between Sunnyside Road and OR 212 improves operations at the intersection of OR 224/SE

142nd Avenue (158), so that the intersection meets standards in the full build scenario. Although there are not full build projects that directly impact the intersections at the I-205 ramps at SE Sunnyside Road and SE Sunnybrook Boulevard, SE Sunnyside Road/SE 122nd Avenue (144), SE Sunnyside Road/SE 142nd Avenue (146), or OR 212/OR 22, these intersections meet standards in the full build scenario due to traffic volume changes.

Twelve intersections do not meet standards in the full build scenario. Six of these intersections are impacted by full build projects, but continue to not meet standards. Despite the widening of SE Harmony Road planned between OR 224 and OR 213 (SE 82nd Ave) (U104), the intersections of SE Lake Road/SE International Way (123) and SE Harmony Road/SE Linwood Avenue (124) do not meet standards. The intersection of OR 224/Springwater Road (165) is signalized under the full-build scenario, but operates at a volume-to-capacity ratio over 4.0. *Appendix 8* contains detailed traffic operations analysis results.

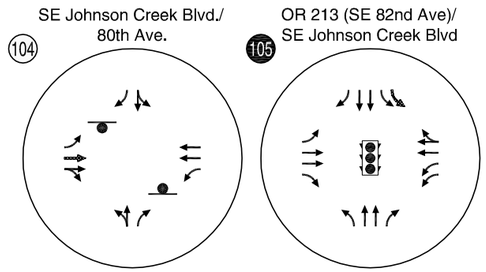
Roadway Segment Analysis

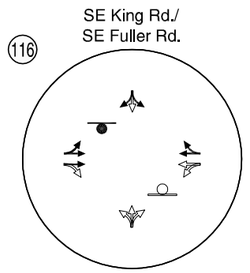
The roadway segment operations analysis consists of considering the roadway segment volumes and approximate level of congestion based on a comparison of the volume to the segment capacity. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

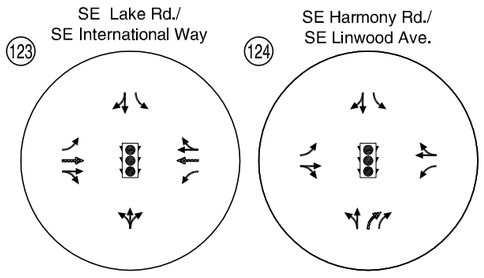
Roadway Segment Volumes

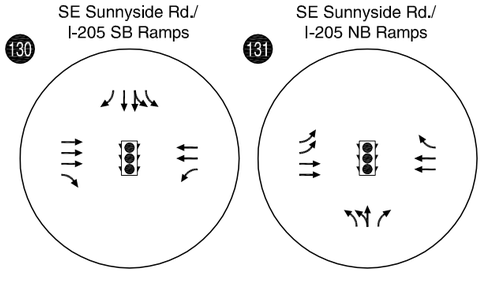
The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure C 41 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Full Build Scenario.

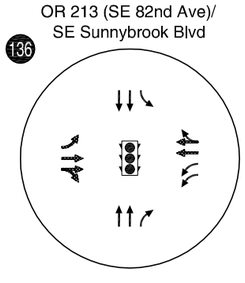
As is evident from Figure C 41, under the 2035 Full Build Scenario demand for travel continues to be highest along OR 212, SE Sunnyside Road, OR 213 (SE 82nd Avenue), SE Harmony Road, SE Johnson Creek Boulevard and SE Linwood Avenue. The planned extension further east of OR 224 east of I-205 as part of the Sunrise Expressway Mainline project (U019) under the Full Build Scenario as a freeway-type facility carries a relatively high volume of traffic.











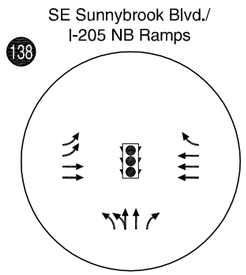
NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

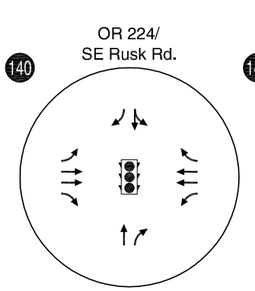
- ## - ODOT STUDY INTERSECTION
- (##) - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT
- - LANE REMOVED
- - LANE ADDED

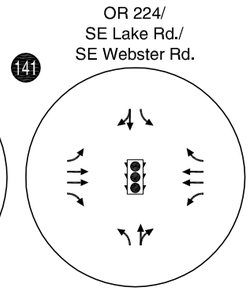
Full Build Lane Configuration and Traffic Control Devices
Greater Clackamas Regional Center/Industrial Area - 1

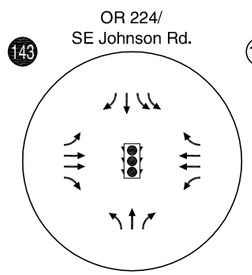
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

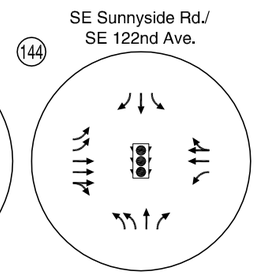
Figure C 39

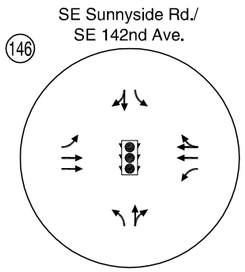


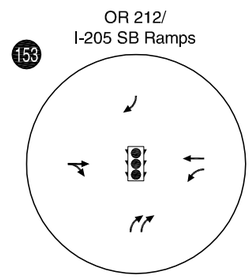


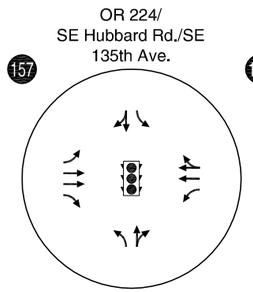


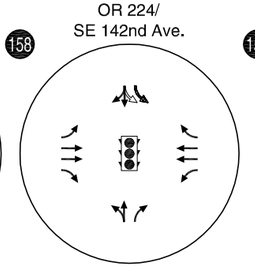


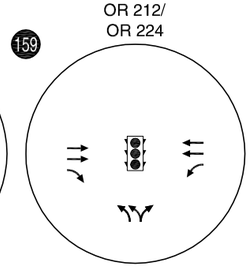


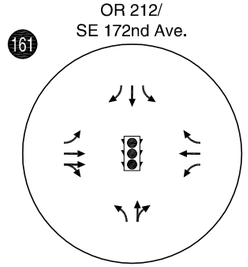


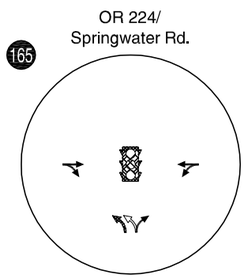












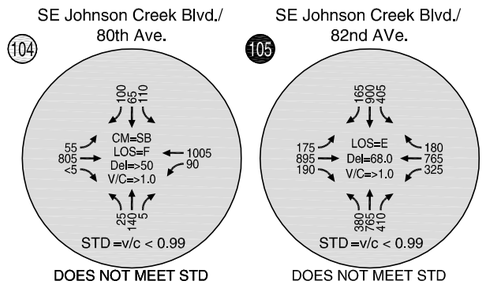
NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

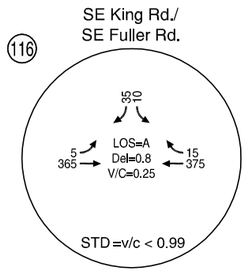
- ## - ODOT STUDY INTERSECTION
- ## - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT
- ⇨ - LANE REMOVED
- → - LANE ADDED

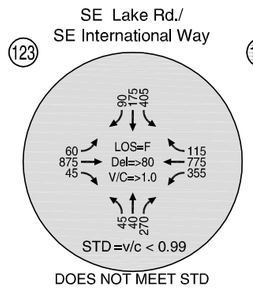
Full Build Lane Configuration and Traffic Control Devices
Greater Clackamas Regional Center/Industrial Area - 2

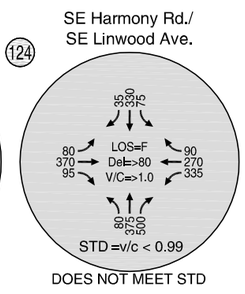
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

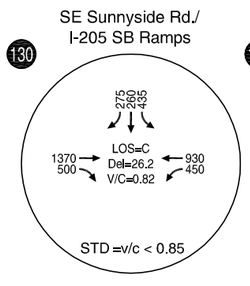
Figure C 39

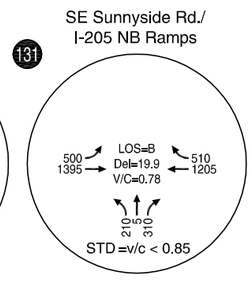


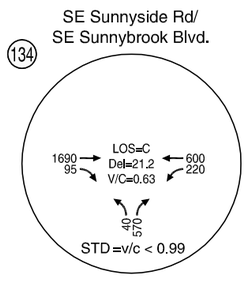


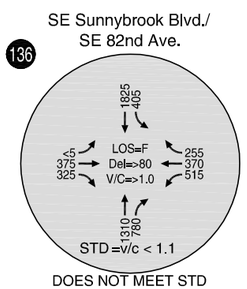












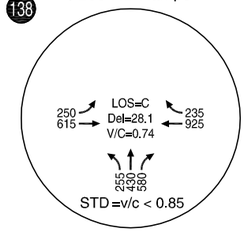
NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

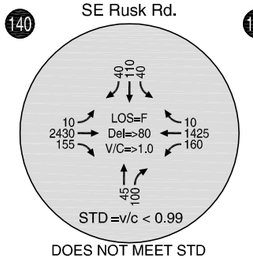
CM	=	CRITICAL MOVEMENT (UNSIGNALIZED)
LOS	=	INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del	=	INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C	=	CRITICAL VOLUME-TO-CAPACITY RATIO
STD	=	OPERATIONAL STANDARD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

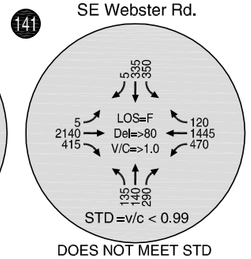
Full Build Intersection Operations
PM Peak Hour
Greater Clackamas Regional Center/Industrial Area - 1

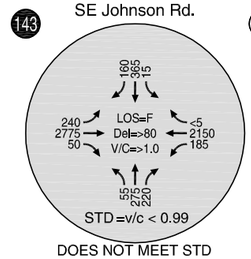
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

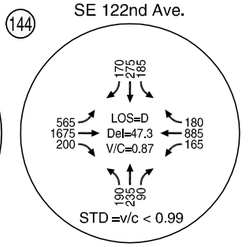
Figure C 40

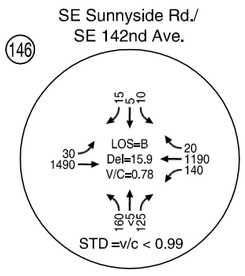


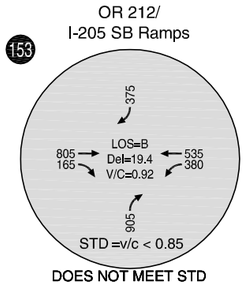


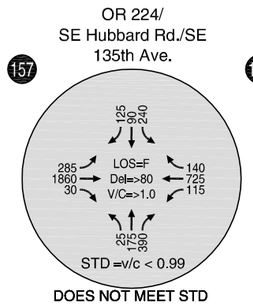


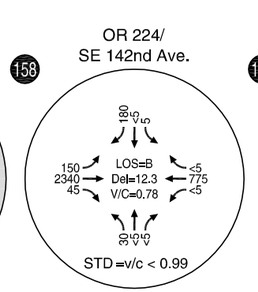


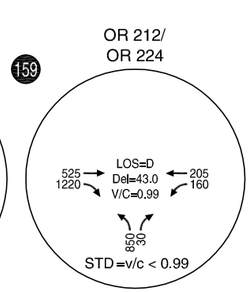


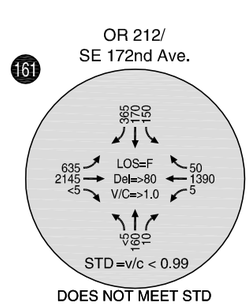


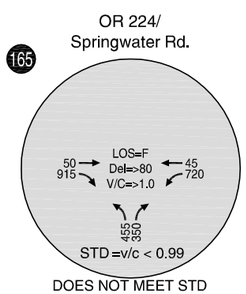












NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

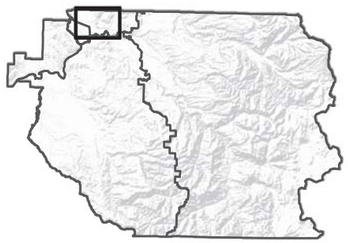
CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD

Full Build Intersection Operations
PM Peak Hour
Greater Clackamas Regional Center/Industrial Area - 2

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

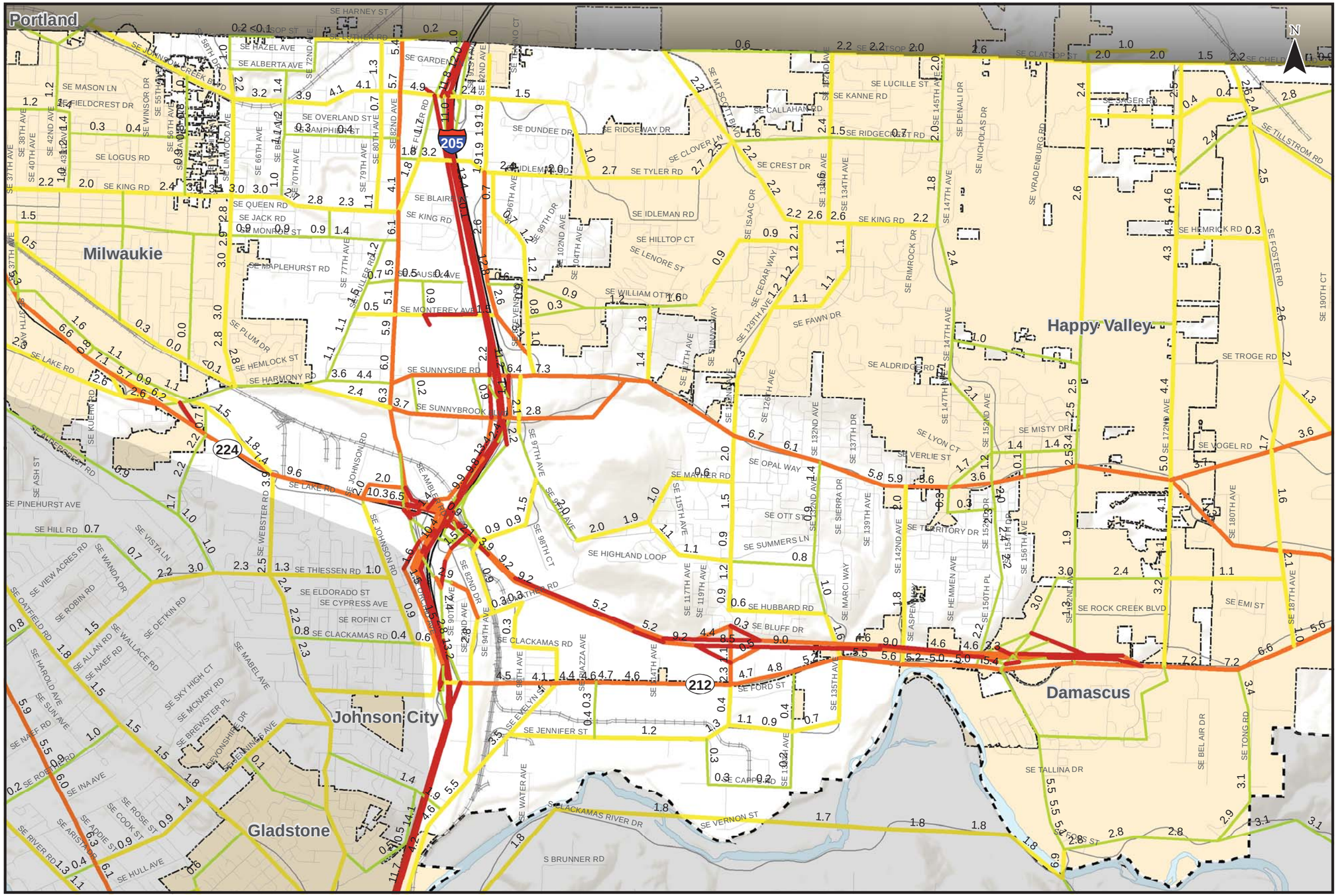
Figure C 40

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



2035 Full Build Volumes

- 🟥 Freeway
- 🟧 Principal / Major Arterial
- 🟨 Minor Arterial
- 🟩 Oher
- #.# PM Weekday Traffic Volume in Thousands
- ▨ Incorporated Areas
- ⬚ County Boundary
- ⬚ UGB



0 1 Miles

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

Evening Weekday Peak Hour Roadway Segment Volumes 2035 Full Build
Greater Clackamas Regional Center / Industrial Area

Figure
C 41

H:\projfile\11732 - Clackamas County TSP\gis\11x17 Maps\41 Evening Weekday Peak Hour Link Volumes 2035 Full Build Scenario.mxd

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.

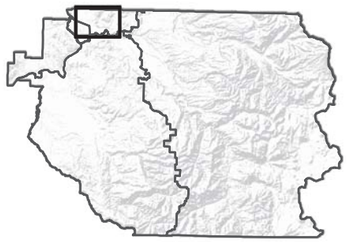
Figure C 42 illustrates the relative congestion during the 2035 Full Build weekday evening peak hour on roadways based on the estimated roadway segment volumes and capacity.

As can be seen in Figure C 42, under the 2035 Full Build Scenario many of the segments along SE Sunnyside Road and OR 212 are no longer estimated to experience the relatively high levels of congestion experienced under the 2035 Low Build Scenario. The primary difference between the two scenarios is the longer extension of OR 224 as a freeway-type facility with the Sunrise Expressway Mainline project between I-205 and SE 172nd Avenue. Providing a new parallel facility along OR 212 greatly reduces the amount of traffic OR 212 and SE Sunnyside are required to try to serve. Table C 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 C 15 2035 Full Build Roadway Segment Congestion in Greater Clackamas Regional Center/Industrial Area

Roadway	Segment	Level of Congestion
I-205	South of study area to County boundary, not including the section around OR 224 interchange and SE Sunnyside Rd	Nearing Congestion to Very Congested
OR 212/ OR 224	SE Lake Rd to SE Webster Rd OR 212 to S Clackamas River Dr SE 172nd to SE Tong Rd	Nearing Congestion to Very Congested
SE 147th Ave	SE Monner Rd to SE King Rd	Nearing Congestion to Congested
SE 162nd Ave	SE Monner Rd to SE Hagan Rd	Nearing Congestion
SE Clatsop St	SE 147th Ave to SE 162nd Ave	Nearing Congestion to Some Congestion
SE King Rd	SE 129th Ave to SE 132nd Ave	Nearing Congestion
SE Linwood Ave	SE Johnson Creek Blvd to SE Alberta Ave	Nearing Congestion
SE Idleman Rd	SE 92nd Ave to SE 96th Ave	Nearing Congestion
SE Sunnybrook Blvd	Oak Bluff Blvd to I-204	Nearing Congestion to Some Congestion
SE Sunnyside Rd	Clackamas Town Center to I-205 SE 129th Ave to SE 126th Ave	Nearing Congestion to Some Congestion
SE Tong Rd	OR 212 to OR 224	Nearing Congestion to Very Congested
SE Webster Rd	SE Wilshire St to OR 224	Congested to Very Congested
SE Otty Rd	SE Valley View Terr to SE 117th Ave	Some Congestion

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



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

0 1 Miles

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

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\42 Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build Scenario.mxd

Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build
Greater Clackamas Regional Center / Industrial Area

Figure
C 42

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

Traffic volumes are forecast to increase noticeably. There are very few transportation projects planned and financed under the low build scenario. The full build scenario includes several roadway and intersection projects, mainly reconstructing and widening roadways, signalizing intersections, and adding turn lanes.

Intersection Operations Analysis

Table C 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 C 16 Comparison of Traffic Operations Analysis Results at Study Intersections in the Greater Clackamas Regional Town Center

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?
101	SE Johnson Creek Blvd/SE Flavel Dr	County	v/c = 0.99	Yes	No	Yes	-	-
102	SE Johnson Creek Blvd/SE Bell Ave	County	v/c = 0.99	Yes	No	Yes	-	-
103	SE Johnson Creek Blvd/SE 79th Pl	County	v/c = 1.1	Yes	No	Yes	-	-
104	SE Johnson Creek Blvd/80th Ave	County	v/c = 1.1	No	No	No	Yes	No
105	SE Johnson Creek Blvd/82nd Ave	ODOT	v/c = 0.99	Yes	No	No	Yes	No
106	SE Johnson Creek Blvd/SE Fuller Rd	County	v/c = 1.1	Yes	No	Yes	-	-
107	SE Johnson Creek Blvd/I-205 SB Ramps	ODOT	v/c = 0.99	Yes	No	Yes	-	-
108	SE Johnson Creek Blvd/I-205 NB Ramps	ODOT	v/c = 0.99	Yes	No	Yes	-	-
109	SE Johnson Creek Blvd/SE 92nd Ave	County	v/c = 1.1	Yes	No	Yes	-	-
110	SE Overland Street/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
111	SE Otty Road/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
112	SE Otty Road/SE Fuller Rd	County	v/c = 1.1	Yes	No	Yes	-	-
113	SE Otty Road/SE 92nd Ave	County	v/c = 1.1	Yes	No	Yes	-	-
114	SE Glencoe Rd/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
115	SE King Rd/SE Bell Ave	County	v/c = 0.99	Yes	No	Yes	-	-
116	SE King Rd/SE Fuller Rd	County	v/c = 1.1	Yes	No	No	Yes	Yes
117	SE King Rd/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
118	SE 82nd Ave/SE Boyer	ODOT	v/c = 0.99	Yes	No	Yes	-	-
119	SE Causey Ave/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-

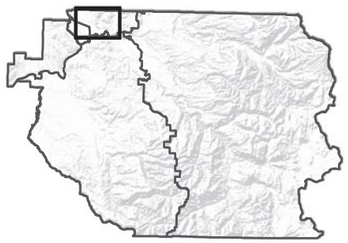
ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?	Full Build Project?	Meets Standard in 2035 Full Build?
120	SE Monterey Ave/SE 82nd Ave	ODOT	v/c = 0.99	Yes	Yes	Yes	-	-
121	SE Monterey Ave/SE Bob Schumacher Rd	County	v/c = 1.1	Yes	No	Yes	-	-
122	SE Bob Schumacher Rd/SE Stevens Rd	County	v/c = 1.1	Yes	No	Yes	-	-
123	SE Lake Rd/SE International Way	County	v/c = 0.99	Yes	No	No	Yes	No
124	SE Harmony Rd/SE Linwood Ave	County	v/c = 0.99	Yes	No	No	Yes	No
125	SE Harmony Rd/SE Fuller Rd	County	v/c = 1.1	Yes	No	Yes	-	-
126	SE Sunnyside Rd/SE Harmony Rd/SE 82nd Ave	ODOT	v/c = 0.99	Yes	No	No	No	No
127	SE Sunnyside Rd/8600 Block	County	v/c = 1.1	Yes	No	Yes	-	-
128	SE Sunnyside Rd/9000 Block	County	v/c = 1.1	Yes	No	Yes	-	-
129	SE Sunnyside Rd/SE 93rd Ave	County	v/c = 1.1	Yes	No	Yes	-	-
130	SE Sunnyside Rd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes	No	No	No	Yes
131	SE Sunnyside Rd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	No	No	No	Yes
132	SE Sunnyside Rd/SE Stevens Rd	County	v/c = 1.1	Yes	No	Yes	-	-
133	SE Sunnyside Rd/SE 101st Ave	County	v/c = 1.1	Yes	No	Yes	-	-
134	SE Sunnyside Rd/SE Sunnybrook Blvd	County	v/c = 1.1	Yes	No	No	No	Yes
135	SE Sunnyside Rd/SE Valley View Terrace	County	v/c = 1.1	Yes	No	Yes	-	-
136	SE Sunnybrook Blvd/SE 82nd Ave	ODOT	v/c = 0.99	Yes	Yes	No	No	No
137	SE Sunnybrook Blvd/I-205 SB Ramps	ODOT	v/c = 0.85	Yes	No	Yes	-	-
138	SE Sunnybrook Blvd/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	No	No	No	Yes
139	SE Sunnybrook Blvd/97th Ave	County	v/c = 1.1	Yes	No	Yes	-	-
140	OR 224/SE Rusk Rd	ODOT	v/c = 0.99	Yes	No	No	No	No
141	OR 224/SE Lake Rd/SE Webster Rd	ODOT	v/c = 0.99	Yes	No	No	No	No
142	SE Lake Rd/SE Webster Rd	County	v/c = 0.99	Yes	No	Yes	-	-
143	OR 224/SE Johnson Rd	ODOT	v/c = 0.99	Yes	No	No	No	No
144	SE Sunnyside Rd/SE 122nd Ave	County	v/c = 0.99	Yes	No	No	No	Yes
145	SE Sunnyside Rd/SE 132nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
146	SE Sunnyside Rd/SE	County	v/c = 0.99	Yes	No	No	No	Yes

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?
	142nd Ave							
147	SE Sunnyside Rd/SE 152nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
148	SE Sunnyside Rd/SE 162nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
149	SE Sunnyside Rd/SE 172nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
150	SE Mather Rd/SE 122nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
151	SE Summers Lane/SE 122nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
152	SE Hubbard Rd/SE 132nd Ave	County	v/c = 0.99	Yes	No	Yes	-	-
153	OR 212/I-205 SB Ramps	ODOT	v/c = 0.85	No	No	No	No	No
154	OR 212/I-205 NB Ramps	ODOT	v/c = 0.85	Yes	Yes	Yes	-	-
155	OR 212/SE 82nd Dr	ODOT	v/c = 0.99	Yes	Yes	Yes	-	-
156	OR 212/224/SE 102nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
157	OR 224/SE Hubbard Rd/135th Ave	ODOT	v/c = 0.99	No	No	No	No	No
158	OR 224/SE 142nd Ave	ODOT	v/c = 0.99	Yes	No	No	Yes	Yes
159	OR 212/OR 224	ODOT	v/c = 0.99	Yes	No	No	No	Yes
160	OR 212/SE 162nd Ave	ODOT	v/c = 0.99	Yes	No	Yes	-	-
161	OR 212/SE 172nd Ave	ODOT	v/c = 0.99	Yes	No	No	No	No
162	SE Jennifer St/SE Evelyn St	County	v/c = 0.99	Yes	No	Yes	-	-
163	SE 82nd Dr/SE Jennifer Street	County	v/c = 0.99	Yes	No	Yes	-	-
164	SE Strawberry Lane/SE 82nd Dr	County	v/c = 0.99	Yes	No	Yes	-	-
165	OR 224/Springwater Rd	ODOT	v/c = 0.99	Yes	No	No	Yes	No

Roadway Segment Operations Comparison

Figure C 43 compares the approximate change in congestion between the 2035 Low Build Scenario and 2035 Full Build Scenario. Implementing the full build projects decreases congestion (relative to the low build scenario) most significantly on OR 212 and SE Sunnyside Road. This is mainly due to the further extension of the Sunrise Expressway Mainline east from Webster Road to SE 172nd Avenue in the Full Build Scenario. Portions of other regional roadways also experience reduced congestion such as SE Monterey Avenue and SE Idleman Road.

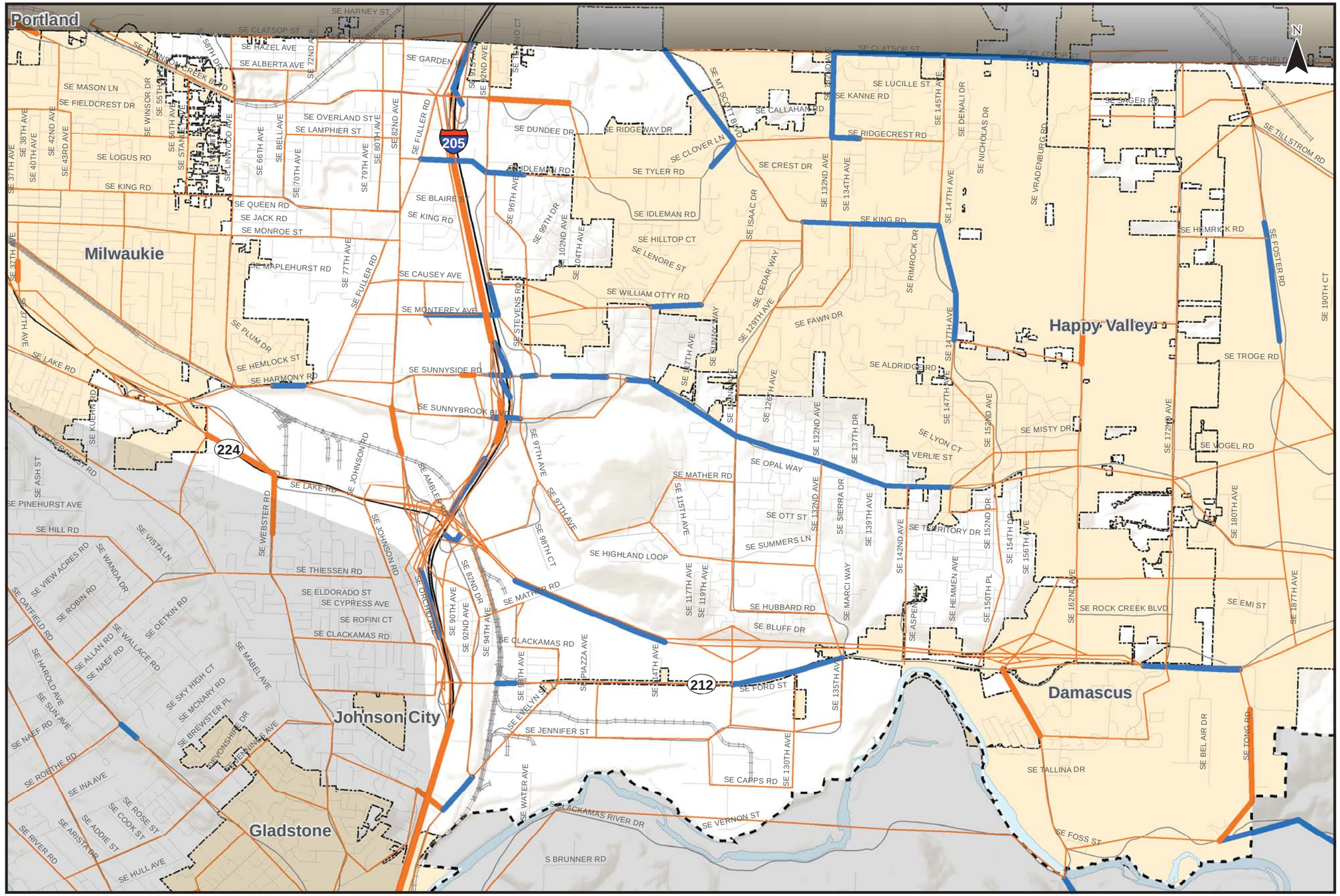
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Change in Congestion

Low to Full Build

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



0 1 Miles

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

Evening Weekday Peak Hour Roadway Segment Congestion Comparison of 2035 Low Build vs. 2035 Full Build Greater Clackamas Regional Center / Industrial Area

Figure
C 43

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\43 Evening Weekday Peak Hour Roadway Segment Congestion Comparison of 2035 Low Build vs.mxd