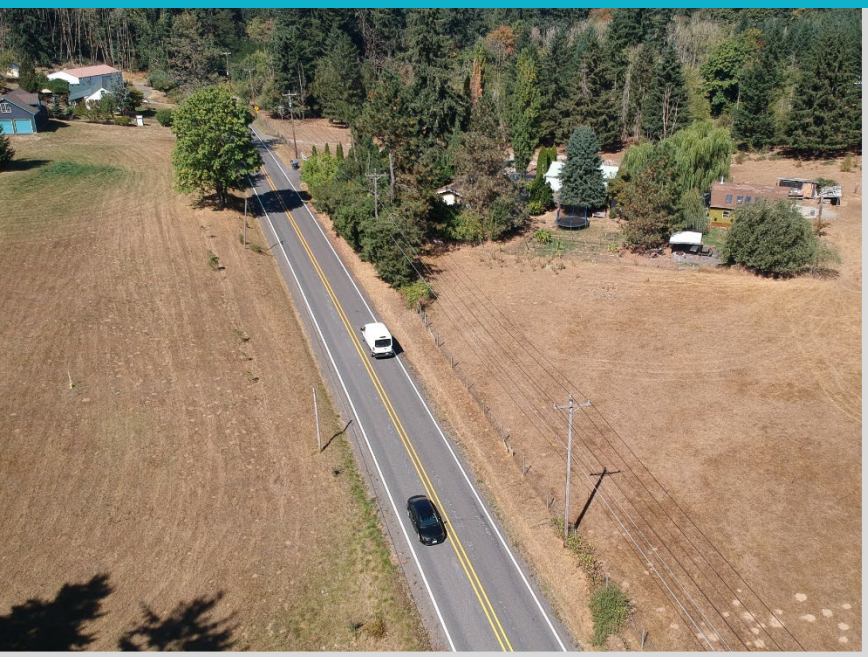

Damascus Mobility Plan

Clackamas County

May 2022

CLACKAMAS COUNTY

KITTELSON & ASSOCIATES

Damascus Mobility Plan

Clackamas County

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Special thanks to these individuals, as well as the community members who provided comments and input through the Plan's public engagement process.

***Note**: The purpose of this plan is to identify potential property and environmental impacts, design and construction costs, and feasibility of the improvements. Actual impacts, further refinements, discussion with property owners, and timing of improvements will be subject to future funding availability and addressed during the project delivery phase.*
Projects on state facilities (i.e. OR 212) will require coordination with ODOT and approval from the State or Regional Traffic Engineer. Inclusion of an improvement in the Plan does not represent a commitment by ODOT to fund, allow, or construct the project.

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B. Memorandum #2: Public Involvement Program
C. Memorandum #3: Damascus Mobility Plan Transportation Planning Framework
D. Summary of Public Involvement
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H. Updated Materials for Clackamas County Transportation System Plan

SE 242nd Avenue &
SE Bohna Park Road

EXECUTIVE SUMMARY

Executive Summary

The Damascus Mobility Plan provides a long-term roadway network for the Damascus-area that meets projected mobility and safety needs. While this project focuses on road improvements, the recently adopted Clackamas County Transit Development Plan identified transit improvements for the Damascus area, and the Clackamas County Bike Walk Plan will provide recommendations for active transportation improvements in Damascus.

Clackamas County updates its Transportation System Plan (TSP) for unincorporated areas of the county approximately every decade. When the last update took place, in 2013, Damascus was a city, so the area was not included in the county plan. Since then, the city was disincorporated in 2016 and lawsuits related to that action ended in 2020. As a result, the study area's land use and transportation system are governed by the County's Comprehensive Plan and 2013 Transportation System Plan, which are based on a more rural context than the urban context that had been contemplated by the former city.

This Damascus Mobility Plan provides transportation planning for the area formerly in the city boundaries. It is the result of a multiyear effort, including extensive involvement of staff from Clackamas County, the Oregon Department of Transportation (ODOT), and the City of Happy Valley, as well as engagement with the community. The plan will be incorporated into the Clackamas County TSP.

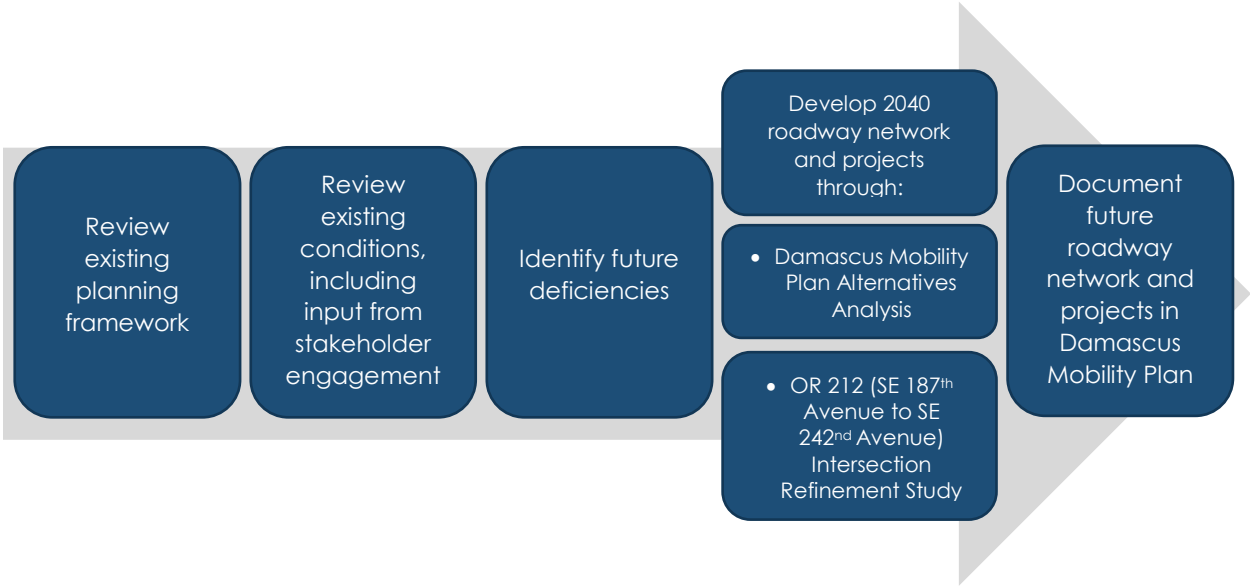
As evidenced through the operational assessment conducted for existing and future conditions, County intersections within the Damascus area are projected to continue to operate within the County's delay-based standards, with generally low levels of congestion and delays. Therefore, most projects recommended focus on safety improvements and upgrades to provide shoulders. As part of this plan, intersections on OR 212 between SE 187th Avenue and SE 242nd Avenue were more closely studied, given capacity needs on this corridor. Improvements were identified and are included in this Plan, to be coordinated with ODOT. Clackamas County will also continue to coordinate with the City of Happy Valley, who served as a key partner in developing this Plan. The City of Happy Valley is engaged in a concurrent effort to plan for the Pleasant Valley/North Carver area, which includes westerly areas of the previous City of Damascus that are now in the process of being annexed into Happy Valley. Projects in this area are important to how the system functions in Damascus, especially the planned 172nd-190th Connector and Sunnyside extension to Foster. A full list of the proposed projects is included in *Section 6: Mobility Plan*.

This document includes the following sections:

1. **Introduction:** Why the Damascus Mobility Plan is needed, related planning efforts, and Plan goals
2. **Public Engagement:** Key sources of feedback throughout the plan development
3. **Existing Conditions:** Current roadway characteristics, intersection operations, safety conditions, and transit system
4. **Future Conditions:** How traffic will function in 2040 on the current Damascus road network
5. **Project Development:** Efforts undertaken to identify projects to address existing and future mobility and safety needs
6. **Mobility Plan:** Prioritized projects and studies, and the future 2040 roadway network
7. **Next Steps:** Process to incorporate the Damascus Mobility Plan into the Clackamas County Transportation System Plan (TSP)

Figure 1 provides an overview of the tasks that contributed to development of the plan.

Figure 1. Damascus Mobility Plan Development



Key outcomes from the plan include:

- A prioritized list of projects in the Damascus Mobility Plan Study Area that addresses mobility and safety needs
- A refined improvement package recommended for OR 212 between SE 187th Avenue and SE 242nd Avenue, including concept sketches for intersection improvements
- A 2040 Roadway Network that includes proposed network changes throughout the study area
- A process for incorporating the Damascus Mobility Plan into the Clackamas County TSP

SE Tillstrom Road

1. INTRODUCTION

1. Introduction

The Damascus Mobility Plan outlines the street system needed through the year 2040 for passenger cars and freight. The plan reflects a vision expressed by the community and affected stakeholders and was developed through close coordination between Clackamas County, the Oregon Department of Transportation (ODOT), and the City of Happy Valley, with input from the public.

The plan is intended to:

- Address gaps in the 2013 Clackamas County Transportation System Plan (TSP) as the land in the study area was within the then-City of Damascus in 2013 when the county TSP was last updated. The city never adopted a transportation plan, and the area reverted to the county's planning responsibility when the city disincorporated in 2016. As a result, there is no transportation plan for the area of the former city.
- Identify street and intersection changes needed to address near- and long-term vehicular and freight congestion and safety needs. These changes reflect traffic growth associated with land development consistent with the County Comprehensive Plan as well as overall regional growth.
- Address vehicular congestion and identified safety issues at key intersections along the OR 212 corridor between SE 187th Avenue and SE 242nd Avenue.
- Coordinate with other County planning efforts for the area that identify the needs of people walking, riding bikes and taking transit. Two key plans supporting this plan are the County's Transit Development Plan (complete) and Walk Bike Clackamas Plan (in-progress).

BACKGROUND

The Clackamas County Transportation System Plan (TSP) was updated in 2013, with a focus on unincorporated areas of the County. The TSP deferred to each city's plans for County facilities within the boundaries of incorporated lands. At the time the TSP was updated, Damascus was incorporated and had developed a draft TSP for the area within the city's Urban Growth Boundary (UGB). When Damascus disincorporated in July 2016, all City of Damascus plans became void and it became necessary for Clackamas County to develop and adopt plans. The Damascus Mobility Plan presents street system changes needed within the area of the former city's UGB to support existing land use and regional growth through the 2040 planning horizon. When complete, this plan will be fully integrated into the Clackamas County TSP.

GOALS

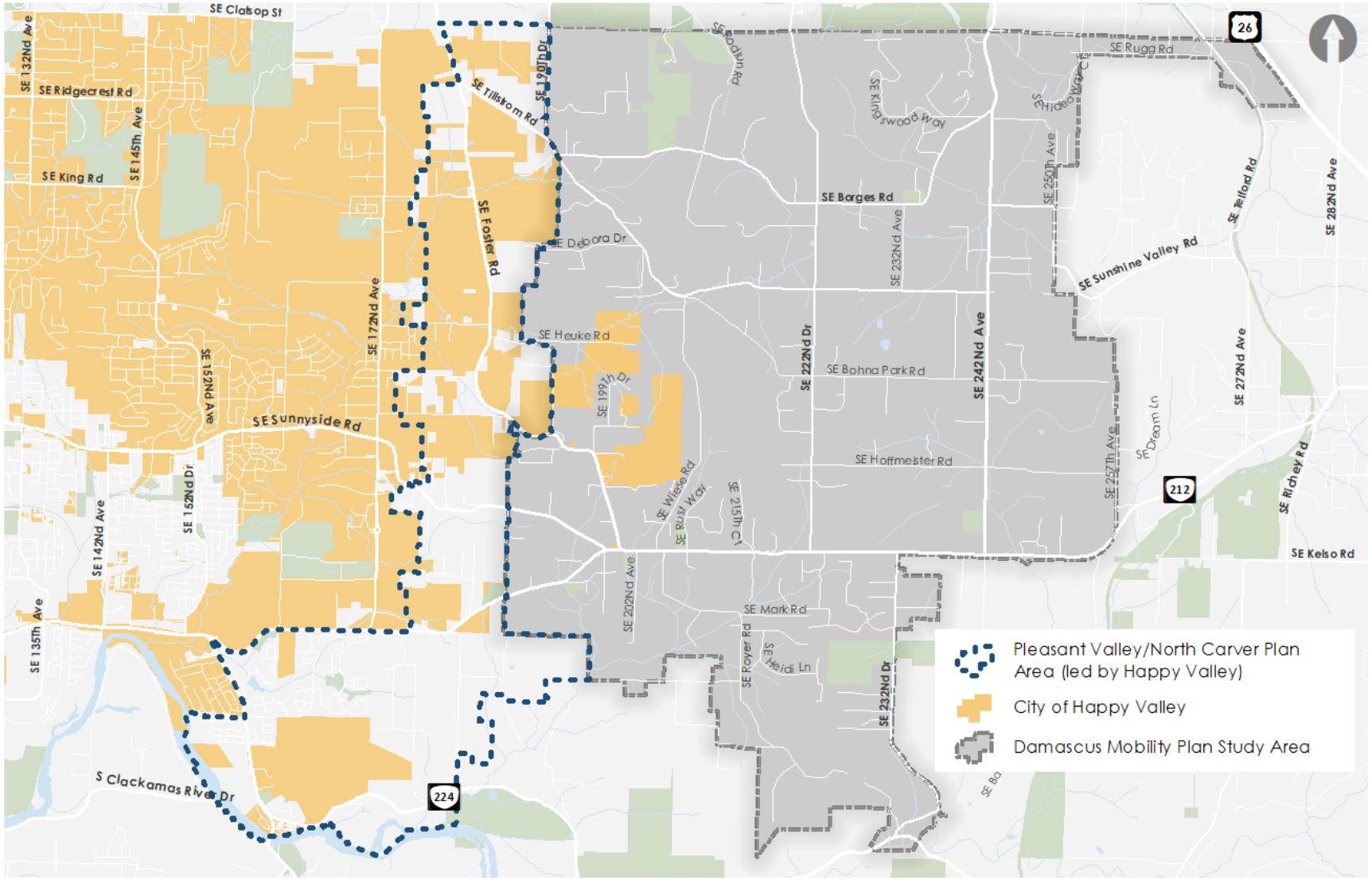
This plan applies the adopted 2013 Clackamas County TSP goals process for evaluating and prioritizing projects. The TSP identifies the following goals:

- **Goal 1: Sustainability** – Provide a transportation system that optimizes benefits to the environment, the economy and the community.
- **Goal 2: Local Businesses and Jobs** – Plan the transportation system to create a prosperous and adaptable economy and further the economic well-being of businesses and residents of the County.
- **Goal 3: Livable and Local** – Tailor transportation solutions to suit the diversity of local communities.
- **Goal 4: Safety and Health** – Promote a transportation system that maintains or improves our safety, health, and security.
- **Goal 5: Equity** – Provide an equitable transportation system.
- **Goal 6: Fiscally Responsible** – Promote a fiscally responsible approach to protect and improve the existing transportation system and implement a cost-effective system to meet future needs.

DAMASCUS PLANNING AREA

The geographic area covered by this plan is illustrated in Figure 2. The area includes most of the former City of Damascus planning area within the Portland Metropolitan UGB; however, properties and roadways generally west of SE 190th Drive are now being planned and guided by the City of Happy Valley through the Pleasant Valley/North Carver (PV/NC) Comprehensive Plan. Additional changes to the OR 212 corridor are included in this plan that go beyond those documented in the PV/NC Plan. These changes will be incorporated into the County TSP's by updating the previously adopted project lists and maps.

Figure 2. Project Study Area



RELATED PLANNING EFFORTS

This plan incorporates past and ongoing planning efforts in and near the study area. An overview of other related planning efforts is provided in Table 1.

Table 1. Relevant Planning Documents and Key Applications

Document	Key Applications for the Damascus Area
Clackamas County Transportation System Plan (TSP)	Does not specifically address roadways within Damascus, but does provide a framework for identifying and evaluating projects. The TSP is Chapter 5 of the County's Comprehensive Plan.
Clackamas County Comprehensive Plan (2005)	Addresses a density of development within the Damascus area that is significantly lower than development assumptions for the area when it was part of an incorporated city.
Clackamas County Active Transportation Plan (ATP)	Identifies key walking and cycling routes to connect people within Clackamas County; ATP recommends a project that connects people between Happy Valley, the Clackamas Regional Center, and the Damascus Area.
Clackamas County Transit Development Plan (TDP)	Includes near-term recommendation for new transit service on OR 224 and medium- and long-term recommendations for service within the Damascus area on Sunnyside Road and OR 212.
SE 172nd Avenue/190th Drive Corridor Management Plan	Provides a vision for the SE 172nd Avenue/SE 190th Drive Corridor just west of the project study area.
Sunrise Project Final Environmental Impact Statement (FEIS)	Analyzes environmental impacts that can be expected due to development of the Sunrise Expressway (OR224) between I-205 and SE 172nd Ave.
City of Damascus Transportation System Plan (unadopted)	A draft TSP was developed for the City of Damascus in 2013 before the City was unincorporated. Although never adopted, this plan provided a thorough analysis of roadways within the study area and identified a number of projects that were considered for inclusion in the Damascus Mobility Plan.
Metro: 2018 Regional Transportation Plan (RTP)	Includes "financially constrained" projects along the SE 172nd Avenue/SE 190th Drive Corridor as well as a project to widen the OR 212 corridor.
East Metro Connections Project	Recommends transportation investments in Happy Valley and on the SE 182ndAvenue/SE 190th Drive corridor north of the study area.
Pleasant Valley/North Carver (PV/NC) Comprehensive Plan	The PV/NC area immediately west of the study area will be annexed into Happy Valley in the future. The Damascus Mobility Plan incorporates the street network developed in PV/NC.

Document	Key Applications for the Damascus Area
Clackamas to Columbia (C2C) Corridor Plan	Includes projects on the SE 181st/182nd/190th/172nd Avenue corridors through Gresham and Happy Valley, as well as projects to support broader connectivity in the area. Several projects are located partially within the Damascus Mobility Plan study area.
Walk Bike Clackamas Plan	The County is currently preparing to update the pedestrian and bicycle elements of the TSP in 2023. This will include recommendations for improvements to the Damascus area pedestrian and bicycle network.
Drive to Zero Safety Action Plan	The County's safety action plan identifies location-specific safety programs, systemic safety programs, and non-infrastructure programs for investments in transportation safety. While no projects are identified for the Damascus study area, this planning framework can help frame future safety investments.

SE 202nd Avenue & SE Tillstrom Road

2. PUBLIC ENGAGEMENT

2. Public Engagement

Extensive public outreach and engagement activities shaped the plan's priorities, needs, vision and project recommendations. Key components of these activities include:

- **Project mailings and notifications**, including information mailed twice during the plan preparation to all residents and businesses within the study area. An example of the postcard for the first mailing is shown in Figure 3.

Figure 3. First Postcard Sent to Residents

- **Project website**, hosted by the County to provide project background, opportunities for involvement, and key project materials.
- **Virtual open house #1** was held online from August 23 to September 3, 2021 and gathered feedback about existing conditions in the study area. An interactive map was used to gather comments on concerns by mode. Feedback received is summarized on the following page.
- **Virtual open house #2** was held online from February 28 to March 13, 2022 and presented the future conditions assessment and draft County and Regional projects that addressed identified deficiences. An interactive map was used to gather input on the draft project prioritization, which influenced the ultimate project list presented in *Section 6: Mobility Plan*. Feedback received is summarized on the following page.
- **Planning Commission and Board of County Commissioner hearings**, held in 2022, presented the Damascus Mobility Plan for adoption.
- A **Technical Advisory Committee (TAC)** comprised of staff from the County, ODOT, and City of Happy Valley provided technical review and feedback during the development of the final draft plan.

PUBLIC ENGAGEMENT FEEDBACK

Public engagement helped identify issues to be addressed, and then helped determine if the planned investments for the Damascus Mobility Plan were appropriate.

Feedback from virtual open house #1 included the following items:

- Improving safety across the roadway system, with comments specific to turning movements at SE Tillstrom Road & SE Borges Road, the SE Sunnyside Road-SE Anderson Road & OR 212 intersection, and increasing the stop sign visibility at SE 222nd Drive & SE Bohna Park Road.
- Reducing travel speeds, specifically along SE Wiese Road, SE Borges Road, SE 232nd Drive, and SE 242nd Avenue, as well as at the SE Bohna Park Road & SE 242nd Avenue, SE 222nd Drive & OR 212, and SE 242nd Avenue & Tillstrom Road intersections.
- Addressing congestion concerns, specifically on OR 212.
- Making it easier to walk and bike across Damascus with wider shoulders.
- Addressing access management concerns at specific locations, including the intersection of SE 242nd Avenue & SE Bohna Park Road.

Feedback from virtual open house #2 included the following items:

- Offering support for the proposed lane configuration and traffic control changes at intersections along OR 212. Suggesting the realignment of Wiese Road and Royer Road at OR 212 should be a higher-priority project.
- Seeking additional information to what is being done to address capacity constraints on OR 212 through the Damascus area.
- Supporting the new roadway configurations on Sunnyside Road and the new connection of 187th Avenue to the south.
- Seeking higher prioritization for shoulder widening on 242nd Avenue, but otherwise supportive of the intersection project at 242nd Avenue & SE Borges Road. One participant noted that a flashing yellow eastbound left-turn arrow should be studied at the SE 242nd Avenue & OR 212 intersection.
- Noting that Foster Road has several sharp turns, and while the shoulder widening is a good project, it may not address the crashes that occur on this roadway corridor.
- Dropping the shoulder widening segments on SE Tillstrom Road and SE Hoffmeister Road to Tier 3 projects.

SE Sunnyside Road-SE Anderson Road & OR 212

3. EXISTING CONDITIONS

3. Existing Conditions

The existing conditions assessment focuses on vehicular and freight operations, and refers to the recently completed Clackamas County Transit Development Plan for transit components and active transportation components that will be addressed in the Walk Bike Clackamas Plan.

ROADWAY SYSTEM

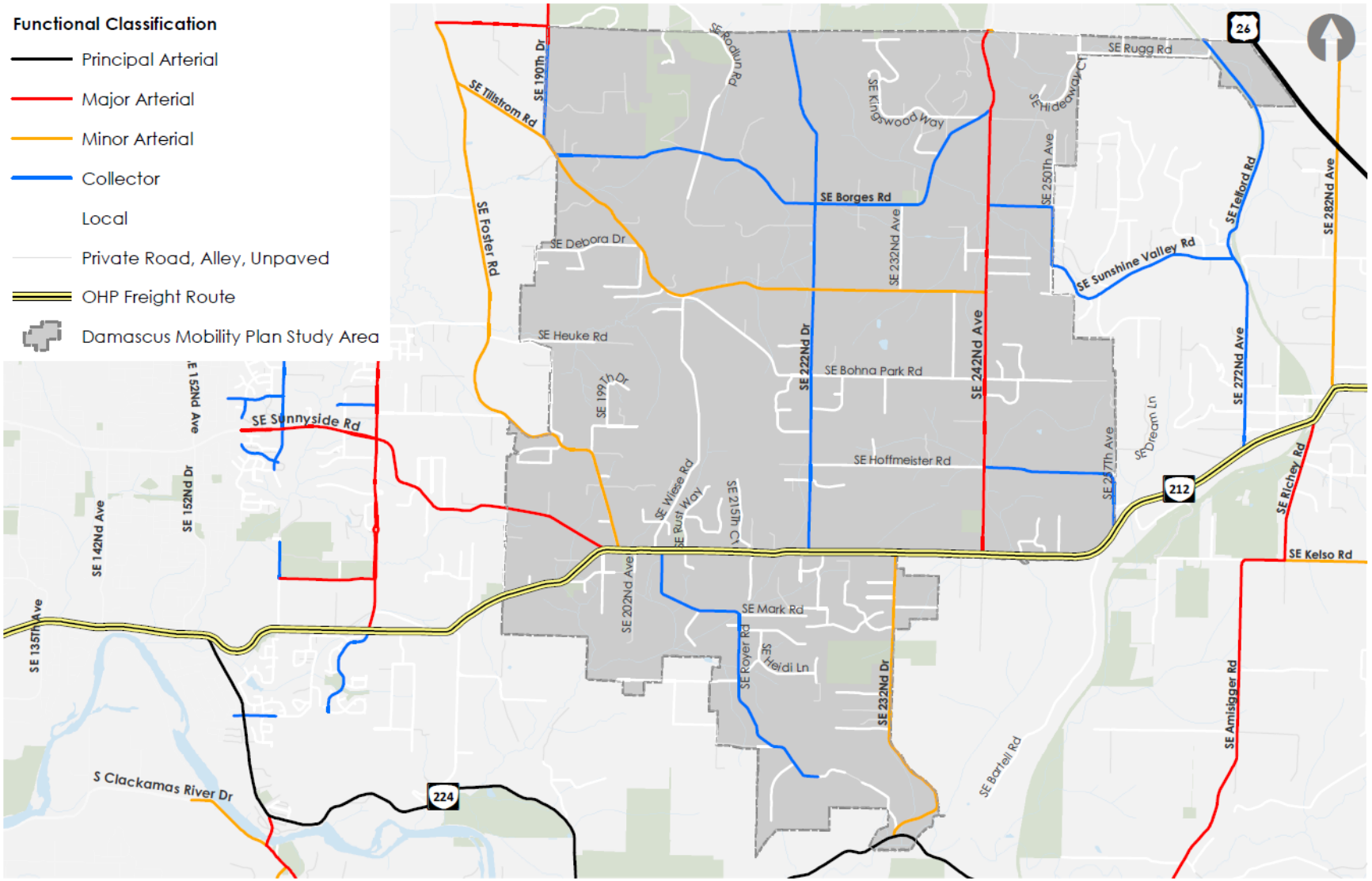
The County's functional classification system defines the intended "role" of each roadway class and how each should be designed to serve people driving, walking, riding bikes and taking transit. A roadway's functional classification informs the roadway's maintenance and design, per the County's Comprehensive Plan and Typical Cross Sections. The TSP classifies County streets based on the following definitions from the Clackamas County Comprehensive Plan:

- **Principal Arterial:** (freeway/expressway and other designated principal arterials). Serves interregional and intraregional trips and carries heavy volume at high speed. Primarily interstate freeways and state highways but also includes other roads designated as principal arterials. These roads make up the National Highway System.
- **Major Arterial:** Carries local and through traffic to and from destinations outside local communities and connects cities and rural centers. Moderate to heavy volume; moderate to high speed.
- **Minor Arterial:** Connects collectors to higher order roadways. Carries moderate volume at moderate speed.
- **Collector:** Principal traffic carrier within neighborhoods or single land use areas. Links neighborhoods with major activity centers, other neighborhoods, and arterials. Generally not for through traffic. Low to moderate volume; low to moderate speed.
- **Connector:** Collects traffic from and distributes traffic to local streets within neighborhoods or industrial districts. Usually longer than local streets. Low traffic volume and speed. Primarily serves access and local circulation functions. Not for through traffic in urban areas.
- **Local:** Provides access to abutting property and connects to higher order roads. New local roads should intersect collectors, connectors, or, if necessary, minor arterials. Not for through traffic

Section 5.O of the County's Comprehensive Plan provides Functional Classification and Design policies.

Figure 4 shows the existing roadway system in Damascus, identifying functional classification and freight routes.

Figure 4. Existing Roadway System and Classification (Source: 2012 Clackamas County TSP)



The County's roadway standards call for paved or gravel shoulders on roadways of all functional classifications, with design speed and vehicle volume determining the appropriate width. Shoulders provide space for pedestrians and bicyclists and can also provide safety benefits for vehicles. As indicated Table 2, the majority of arterials and collectors in the study area have no to minimal shoulders (less than six feet in width).

Table 2. Arterial and Collector Road Characteristics[1]

Roadway	Functional Classification	Speed Limit	Number of Lanes	Paved/Gravel Shoulders
OR 212	Principal Arterial/ State Highway	35-55 MPH	2 - 3[2]	Partial[3]
OR 224	Principal Arterial/ State Highway	45 MPH	3	Minimal
SE 190th Drive	Major Arterial	40 MPH	2	No
SE 242nd Avenue	Major Arterial	45 MPH	2	No
SE Sunnyside Road	Major Arterial	40 MPH	2	Minimal
SE 232nd Drive	Minor Arterial	45 MPH	2	No
SE Foster Road	Minor Arterial	45 MPH	2	Minimal
SE Tillstrom Road	Minor Arterial	40 MPH	2	Minimal
SE 190th Drive	Collector	45 MPH	2	No
SE 222nd Drive	Collector	45 MPH	2	No
SE 257th Avenue	Collector	45 MPH	2	No
SE Borges Road	Collector	40 MPH	2	No
SE Hoffmeister Road	Collector	45 MPH	2	No
SE Royer Road	Collector	25 MPH	2	No
SE Sunshine Valley Road	Collector	40 MPH	2	No
SE Telford Road	Collector	45 MPH	2	No

[1] Based on Google Earthy imagery from 2021 and the portions of roadways within the study area.

[2] The three-lane cross-section of OR 212 extends from SE Sunnyside Road to SE Old Barn Lane, and again from SE 215th Court to SE Hollyview Terrace.

[3] Sidewalks and marked bike lanes extend from OR 212/SE Sunnyside Road and OR 212/SE Old Barn Lane. East of SE Old Barn Lane, the shoulders remain wide enough (6+ feet wide on either side) for bicycles to ride with low levels of traffic stress. There are narrow paved shoulders west of SE Sunnyside Road.

FREIGHT SYSTEM

The Oregon Highway Plan (OHP) and Metro Regional Transportation Plan (RTP) both provide information on freight routes from a national, statewide, and regional perspective. Roadways included in one or both of these plans are noted below.

OR 212 is identified as a freight route in the OHP for its entirety between US 26 and I-205 (shown in Figure 4). It is classified as a National Highway Freight Route between the SE Foster Road/OR 212 intersection and I-205. The Metro RTP classifies OR 212 as a main roadway route, meaning it is one of the "designated freights routes that are freeways and highways that connect major activity centers in the region to other areas in Oregon or other states throughout the U.S., Mexico and Canada."

OR 224 is classified as a roadway connector between OR 212 and the County boundary in the Metro RTP, meaning it is one of the "roads that connect other freight facilities, industrial areas, and 2040 centers to a main roadway route." Outside of the County, it is classified as a freight route outside the metropolitan planning area boundary.

SE 242nd Avenue is classified as a roadway connector between OR 212 and the County boundary in the Metro RTP, which identifies the industrial and employment areas along SE 242nd Avenue in this area.

Identifying these freight classifications is important for understanding how to balance regional travel needs, especially for freight, with those of local communities like Damascus.

CURRENT INTERSECTION OPERATIONS

Operations were assessed at these 17 study intersections:

1. SE 190th Drive & SE Tillstrom Road
2. SE Tillstrom Road & SE Borges Road
3. SE 242nd Avenue & SE Borges Road
4. SE 222nd Drive & SE Borges Road
5. SE 242nd Avenue & SE Sunshine Valley Road
6. SE Bohna Park Road & SE Tillstrom Road
7. SE Wiese Road & SE Bohna Park Road
8. SE 222nd Drive & SE Tillstrom Road
9. SE 242nd Avenue & SE Tillstrom Road
10. SE 242nd Avenue & SE Hoffmeister Road
11. SE Tong Road & OR 212*
12. SE Sunnyside Road-SE Anderson Road & OR 212*
13. SE Foster Road & OR 212*
14. SE 222nd Drive & OR 212*
15. SE 232nd Drive & OR 212*
16. SE 242nd Avenue & OR 212*
17. SE 232nd Drive & OR 224

**Analyzed as part of the OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study.*

Data was collected at the study intersections in April 2019 and grown to reflect traffic volumes in 2021. The analysis tool Synchro was used to assess operations at the intersections during the weekday PM peak hour, and understand current levels of delay and congestion for vehicles. Two performance metrics were reviewed:

- Level of Service (LOS): LOS is based on the delay drivers experience at an intersection and is ranked from A to F, with A representing no to insignificant delays and F representing a high level of congestion, long delays, and extension queueing. Generally, LOS C or better is considered an acceptable amount of delay, while LOS D means the intersection is starting to approach significant delays. At signalized intersections and all-way stop-controlled intersections, the LOS is based on the average delay of all vehicles at the intersection. At two-way stop-controlled intersections, through vehicles on the major street typically don't experience any delay, so looking at the average delay wouldn't be very informative. Therefore, the LOS is based on the

movement at the intersection that is most challenging to make, usually a left-turn from the minor street.

- Volume-to-Capacity (v/c) ratio: the v/c ratio measures the number of intersections using an intersection divided by the number of vehicles that could theoretically use the intersection when at capacity. Generally, intersections with a v/c ratio less than 0.85 are considered under capacity, and all demand at the intersection can be accommodated. If the v/c ratio is between 0.85 and 0.98, the intersection is considered near capacity, and delays may start to be moderate to high. If the v/c ratio is over 0.98, the intersection is considered over capacity, and delays and traffic back-ups are likely to be long.

The County and ODOT both set mobility targets for intersection operations. If these targets are not met, it is an indication that capacity improvements (like adding turn lanes, roundabouts, or traffic signals) may need to be considered. The County uses LOS for its targets, and sets a threshold for unsignalized intersections at LOS E. ODOT uses v/c ratio targets for roadways it manages, including OR 224 and 212, with the v/c target based on the roadway location and type.

All County intersections analyzed operated at a LOS C or better during the weekday PM peak hour, and meet County mobility targets. Four of the intersections on OR 212 meet ODOT's v/c targets, but operate at a LOS D or F, as shown in Table 3.

Table 3. Intersections Operating below a LOS C under Existing Conditions

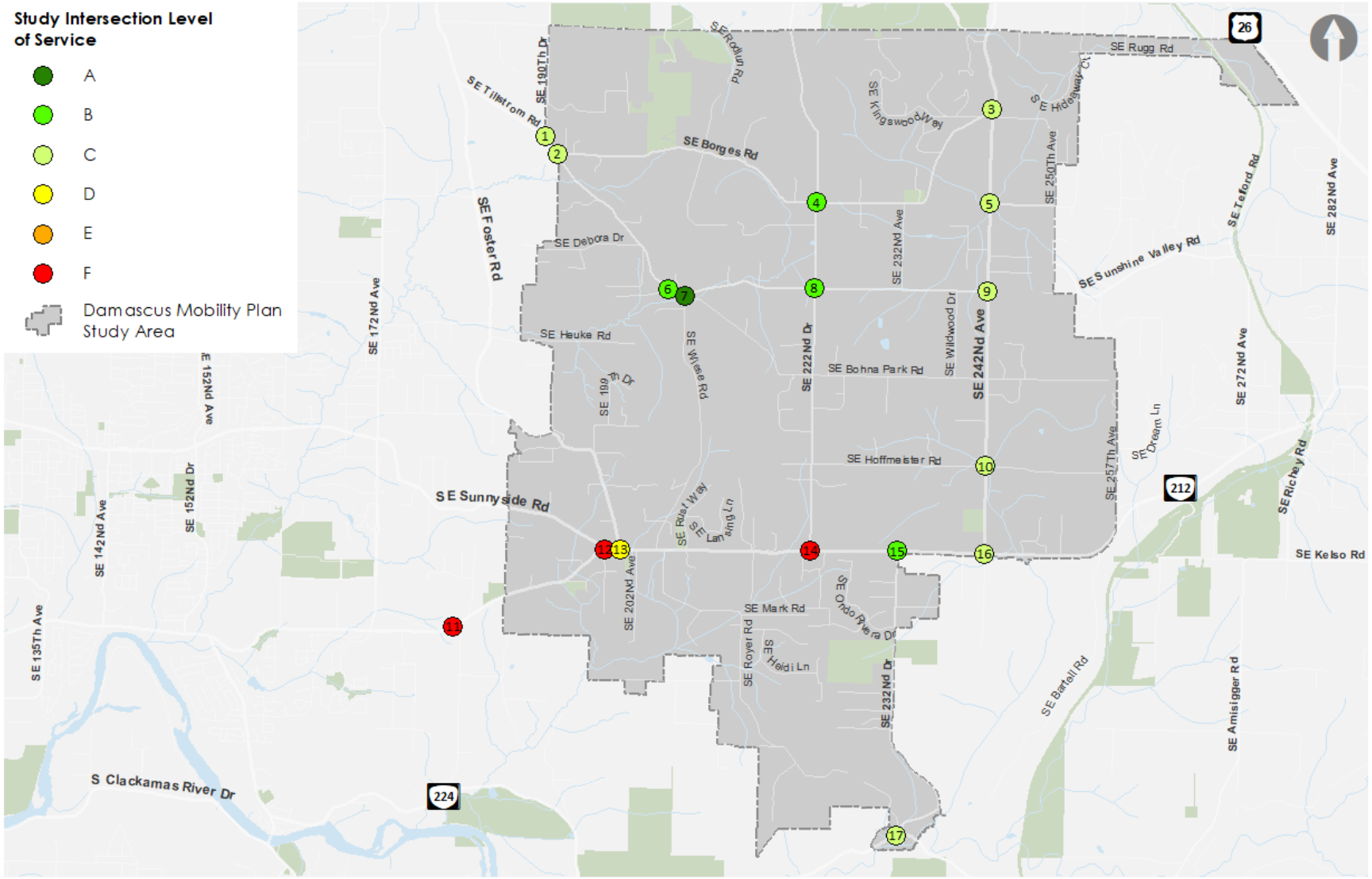
Intersection	Traffic Control	Standard	Operations
SE Tong Road & OR 212	Stop-controlled	v/c threshold of 0.99 on OR 212 approaches	LOS F (CM = NBL), OR 212 approaches meet standard
SE Sunnyside Road-SE Anderson Road & OR 212	Stop-controlled	v/c threshold of 0.99 on OR 212 approaches	LOS F (CM = NBL), OR 212 approaches meet standard
SE Foster Road & OR 212	Signalized	v/c threshold of 0.99 overall	LOS D, v/c = 0.99
SE 222nd Drive & OR 212	Stop-controlled	v/c threshold of 0.99 on OR 212 approaches	LOS F (CM = SB), OR 212 approaches meet standard

v/c = Volume to Capacity Ratio; LOS = Level of Service; CM = Critical Movement; NBL = Northbound Left Turn; SB = Southbound

The other intersections on OR 212 meet ODOT's mobility targets and operate at a LOS C or better. The one study intersection on OR 224 at SE 22nd Drive operates at a LOS C, but the delay for the southbound left-turn is within a second of the cut-off for LOS D. The intersection meets volume-based warrants in the Manual of Uniform Traffic Control Devices (MUTCD) for a traffic signal.

Figure 5 shows the LOS during the weekday PM peak hour at the study intersections.

Figure 5. Study Intersections and Existing Weekday PM Peak Hour Level of Service



SAFETY ASSESSMENT

The safety conditions of the study area were assessed based on the five most recent years of complete crash records (January 1, 2015 through December 31, 2019). The data for this analysis was provided by ODOT, the agency that collects and stores all crash data for the State of Oregon. The reported crashes by type are summarized in Table 4 and mapped in Figure 6.

Table 4. Crash Type within the Damascus Mobility Plan Study Area (2015 to 2019)

Crash Type	Number of Crashes | Percent of Total	Number of Fatal Crashes	Number of Suspected Serious Injury Crashes[1]
Rear-End	220 | 41%	-	2
Turning	112 | 21%	-	3
Fixed Object	109 | 20%	2	5
Angle	39 | 7%	1	5
Sideswipe	36 | 7%	-	1
Head-On	8 | 1%	2	3
Other	7 | 1%	-	-
Backing	4 | 1%	-	-
Pedestrian	2 | <1%	1	-
TOTAL	**537 | 100%**	**6**	**19**

[1] "Suspected Serious Injury" is the term that ODOT uses for a non-fatal injury crash that prevents the injured person from walking, driving or normally continuing the activities the person was capable of performing before the injury occurred.

Three crash types account for the majority of reported crashes within the study area:

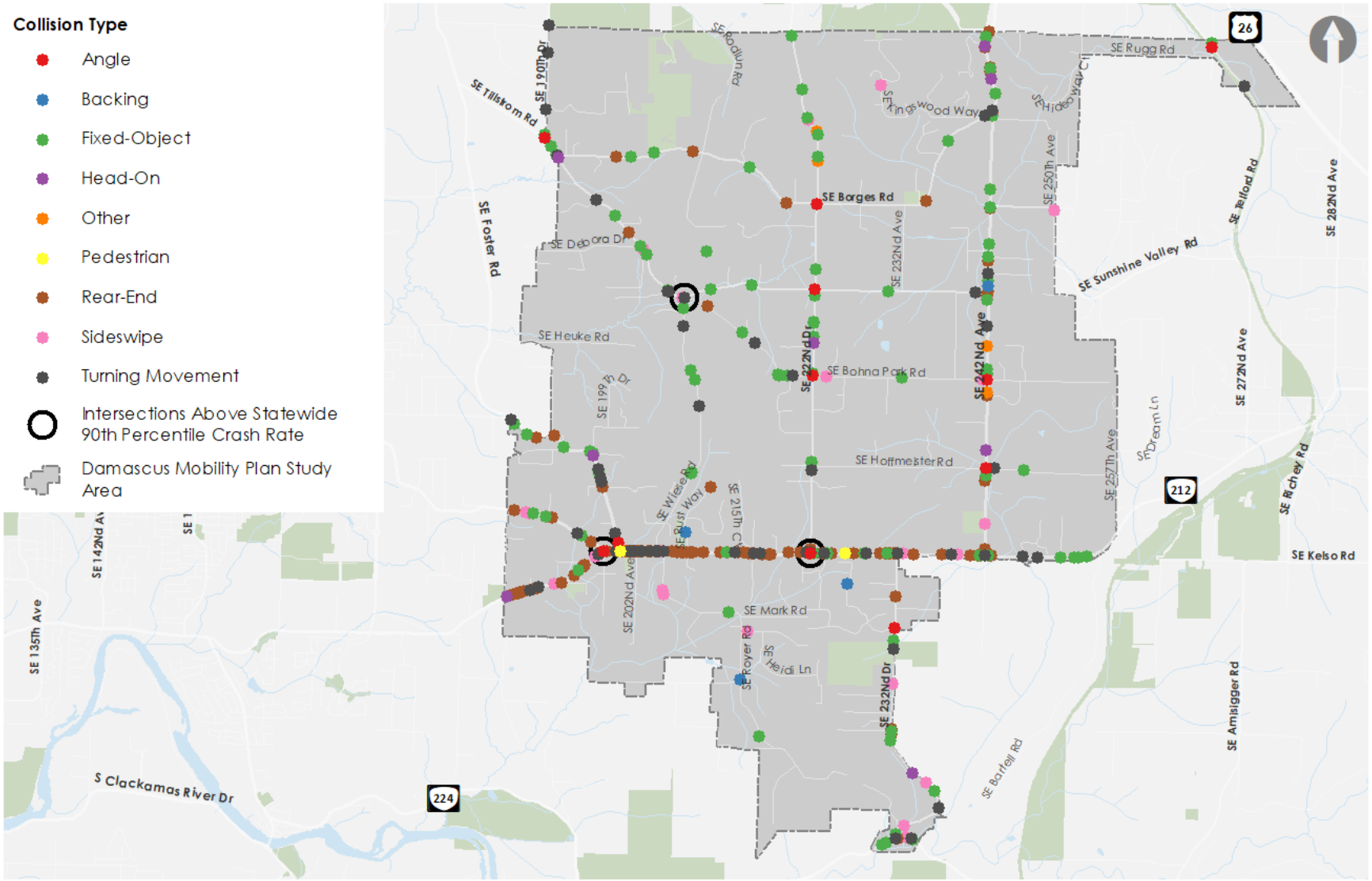
- rear-end (220 crashes, 41 percent),
- turning movement (112 crashes, 21 percent), and
- fixed object (109 crashes, 20 percent).

Of the six reported crashes that resulted in fatalities, three occurred on OR 212 and two took place on SE 232nd Drive. Three of the six fatal crashes involved speeding.

Reported crashes at the study intersections were used to develop intersection crash rates to compare to the ODOT 90th percentile crash rates identified in the Analysis Procedures Manual (APM). All study intersections have a crash rate that is below the statewide 90th percentile crash rate, except for the following:

- **SE Bohna Park Road & SE Wiese Road**. The intersection crash rate is based on three reported crashes measured at this "low volume" intersection. All three crashes involved a northbound left-turning vehicle colliding with a vehicle heading either eastbound or westbound on Bohna Park Road, where sight distance may be limited due to roadway curvature.

Figure 6. Reported Crashes (January 1, 2015 through December 31, 2019)



- **SE Sunnyside Road-SE Anderson Road & OR 212.** The intersection is stop-controlled north/south. The top two crash types were turning movement (48% of crashes) and angle (24% of crashes). Of the 21 crashes, 13 resulted in injury.
- **SE 222nd Drive & OR 212**. The intersection is three-legged, and the southbound approach is stop-controlled. The top two crash types were turning movement (67% of crashes) and rear-end (17% of crashes). Of the 24 intersection crashes, 14 resulted in injury and one in a fatality. The fatal crash was a fixed-object crash, and alcohol and speeding were involved.

TRANSIT SYSTEM

Currently, there is no fixed-route transit or paratransit service (service for seniors or people with mobility limitations) within the study area. Damascus is located outside of the TriMet service boundary.

The recently completed Clackamas County Transit Development Plan (TDP) outlines two future routes within the study area. One local route (identified as MT-9 in the TDP) would serve Damascus and Boring along OR 212 up to the SE Rock Creek Boulevard and SE 172nd Avenue area. One regional route (MT-11 in the TDP) would run between the Sandy Transit Center and Clackamas Town Center, likely to be operated by Sandy Area Metro. The planned route would follow OR 212 to SE Sunnyside Road within the study area. Additional services are available near but not inside the study area, such as Sandy Area Metro's Sandy-Gresham service.

The long-term horizon for the TDP includes additional transit service on the MT-9 and MT-11 routes in the medium term and the long term. The TDP does not provide a timeline for the introduction of "medium-term" or "long-term" service, and does not identify fiscally constrained v. unconstrained as most services are operated by transit providers separate from the County. The exact stop locations were not determined as part of this countywide TDP, but will be identified when new services are implemented.

KEY FINDINGS

Based on the existing conditions assessment, the biggest opportunities for transportation improvements include:

- Roadway upgrades to provide shoulders to accommodate pedestrians and bicyclists and improve vehicular safety
- Capacity improvements to address congestion on OR 212
- Safety improvements to address high-crash rate intersections

The next section analyzes intersection operations under future conditions to identify if there are longer-term capacity needs. *Section 5: Project Development* includes potential improvements to address existing and future needs.

SE Tillstrom Road north of SE Debora Drive

4. FUTURE CONDITIONS

4. Future Conditions

In order to identify long-term capacity needs, operations were assessed at the study intersections in the year 2040. This analysis assumed no additional improvements beyond those included in the Metro 2040 Regional Transportation Plan (RTP), and with traffic volumes and transportation projects anticipated in the 2040 Metro RTP. The Metro 2040 RTP includes several planned improvements that affect the study area, including the access-controlled and grade-separated Sunrise Corridor from SE 122nd through to SE 172nd Drive, the SE 172nd Avenue-SE 190th Avenue connector, and the SE Sunnyside Road Extension from SE 172nd Avenue to SE Foster Road. The model also assumes SE Tong Road is rerouted to intersect with OR 212 at SE 187th Avenue.

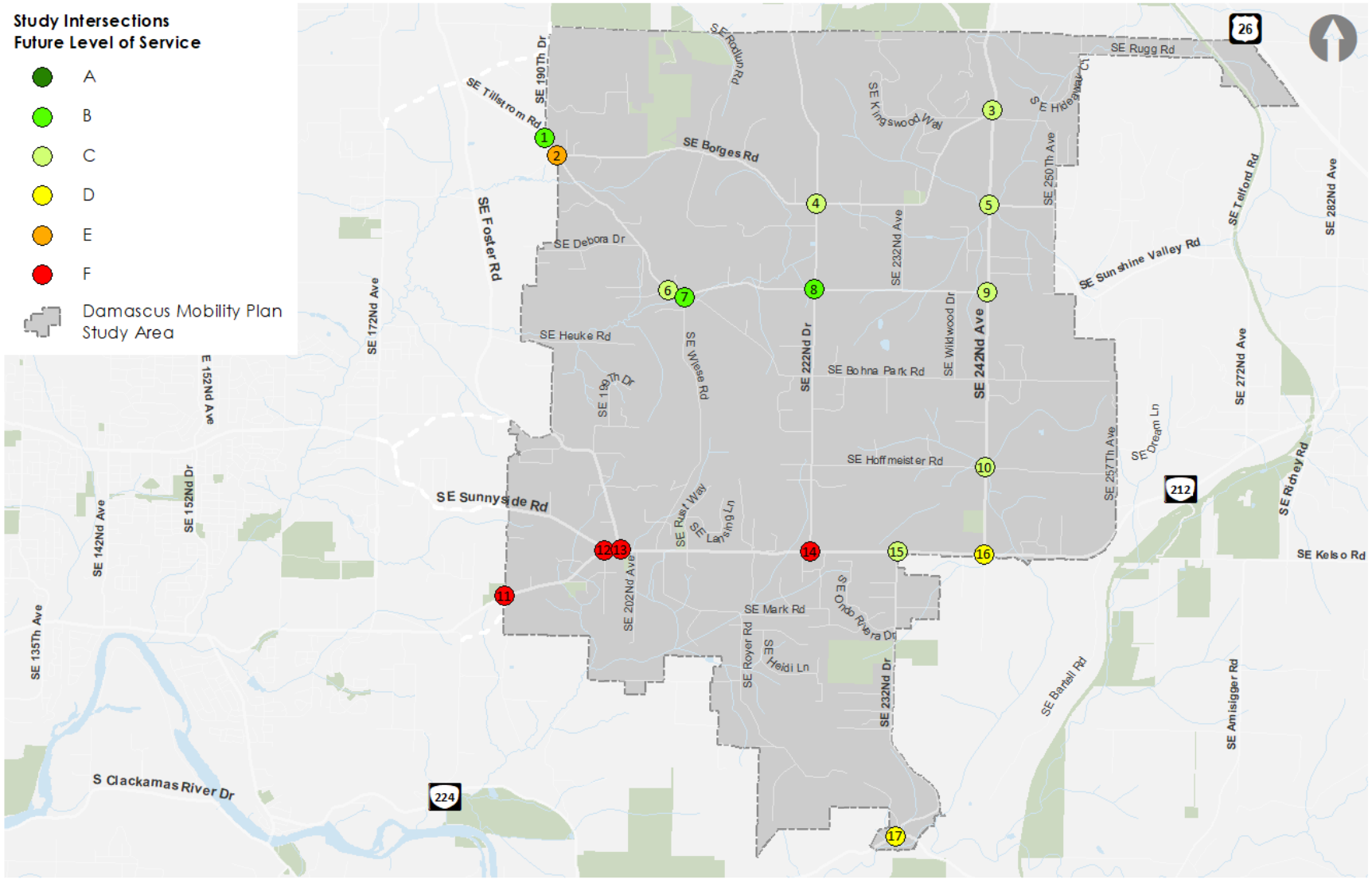
The traffic volumes in the RTP are based on the County zoning, which is lower density than the previously proposed City of Damascus zoning. Therefore, the future traffic volumes are lower than what was previously forecasted in the unadopted City of Damascus transportation system plans.

Figure 7 illustrates level of service at the study intersections in 2040. As shown, all County intersections continue to operate at a LOS D or better, with the exception of the two-way stop-controlled intersection at SE Tillstrom Road & SE Borges Road. The eastbound approach is expected to operate at a LOS D and about seven seconds over the threshold for LOS C. All other approaches to the intersection operate at a LOS B. Several intersections along OR 212 are forecast to experience higher delays and not meet ODOT's adopted volume to capacity ratio thresholds in the year 2040, including:

- SE Tong Road-SE 187th Avenue & OR 212 (unsignalized)
- SE Sunnyside Road-SE Anderson Road & OR 212
- SE Foster Road & OR 212
- SE 222nd Drive & OR 212

The intersections along OR 212 were further studied as part of the OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study, given projected capacity needs are limited to this corridor. This study is covered in the next section, *Section 5: Project Development*. The project development for the remainder of the study area focused on safety and upgrade projects.

Figure 7. Study Intersections and Existing Weekday PM Peak Hour Level of Service



SE Borges Road & SE Tillstrom Road

5. PROJECT LIST DEVELOPMENT

5. Project List Development

Based on input from the public engagement, meetings with the Technical Advisory Committee, and existing and future conditions assessment, potential projects and studies were identified as part of two distinct efforts:

- **Damascus Mobility Plan Alternatives Analysis**, which focuses on the existing and future conditions assessment, excluding the OR 212 corridor
- **OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study**, which includes a more in-depth study of intersections on OR 212 and alternatives to addresses safety and mobility needs

When considering potential projects and studies, concurrent planning work as part of the Pleasant Valley/North Carver Comprehensive Plan and Happy Valley TSP Update was considered. These plans include projects that influence the Damascus Mobility Plan study area, such as the 172nd-190th Connector and Sunnyside Extension. These projects are listed and mapped in *Section 6: Mobility Plan*.

The key findings from the Alternatives Analysis and OR 212 Study are summarized in the following sections.

DAMASCUS MOBILITY PLAN ALTERNATIVES ANALYSIS

As shown in *Section 4: Future Conditions*, in general County intersections are projected to operate with relatively low delays and under capacity in the future. Therefore, the alternatives analysis focused on opportunities to improve mobility and safety, based on the key findings from the existing conditions assessment and comments received through the public engagement. Proposed projects focused on:

- Upgrades to widen shoulders on roadways that do not currently meet the County's standards, given feedback about a desire for shoulder space to walk and bike in the Damascus area.
- Safety improvements to address intersections with higher crash rates or where feedback was received from the public. The existing SE Wiese Road & SE Bohna Park Road intersection exceeds ODOT's 90th percentile crash rate for similar intersections.

In the short term, the County will be implementing street and intersection signage improvements at 14 locations across Damascus. These improvements, the result of a road safety audit in the area, are anticipated to be complete in 2022. These projects were not included in the project list in *Section 6: Mobility Plan* given their timeframe, but were reviewed when developing project alternatives.

Alternatives were developed, evaluated based on the Clackamas County TSP methodology, and reviewed by the Technical Advisory Committee. The recommendations resulting from this effort are shown below.

SE Tillstrom Road/SE Wiese Road/SE Bohna Park intersection area: alternatives include:

- restricting turn movements at SE Bohna Park Road/SE Tillstrom Road,
- implementing all-way stop control at SE Tillstrom Road/SE Bohna Park Road,
- rerouting SE Bohna Park Road to meet SE Delia Street, and
- establishing a new connection between SE Tillstrom Road and SE Bohna Park Road.

SE 242nd Avenue & SE Borges Road: the eastbound approach to the intersection has limited sight distance for southbound traffic. The County's preferred alternative extends SE Kingswood Way to the southeast of its existing intersection with SE Borges Road to connect with SE 242nd Avenue. The existing SE 242nd Avenue/SE Borges Road intersection will be closed, with access to the businesses at this intersection maintained via SE Borges Road. The county's current Capital Improvements Program lists this project's prospectus number as 22279.

SE 242nd Avenue & SE Bohna Park Road: community comments noted opportunities to improve access management and sight distance. Alternatives include consolidating accesses and delineating shoulders.

SE 232nd Drive & OR 224: SE 232nd Drive is stop-controlled at OR 224 and currently operates at a LOS C. Given that the intersection meets signal warrants and is expected to operate at a LOS D under future conditions, the County could consider further study of the intersection including collecting and analyzing additional volume data to assess the need for and feasibility of improvements, such as a signal or roundabout.

Shoulder widening: the County assesses the width needs for shoulders on a case-by-case basis, based on operating and safety performance. The alternatives analysis identified arterial, collector, and selected local roadway segments for potential shoulder widening.

Example of roadway without shoulders (SE Tillstrom Road at SE 222nd Avenue)

Further details on the alternatives analysis, including the cost estimates and goal ratings of the alternatives, are provided in Attachment A: Memorandum #6: Alternatives Analysis, Project List, and Cost Estimates.

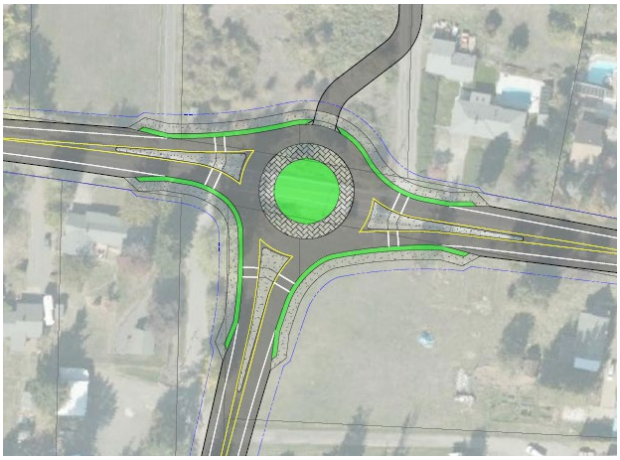
OR 212 (SE 187TH AVENUE TO SE 242ND AVENUE) INTERSECTION REFINEMENT STUDY

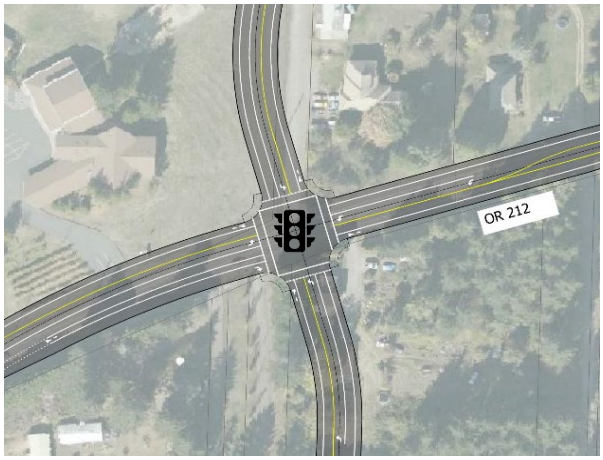
An OR 212 Refinement Study was conducted for the OR 212 corridor between SE 187th Avenue and SE 242nd Avenue to inform project needs at key intersections in the area. The study primarily focused on projects that can be implemented within the next five to ten years, especially projects that mitigate deficiencies at the intersections that constrain land development that can occur along the OR 212 corridor.

A memorandum summarizing the study is provided in Attachment A: OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study. The recommendations from this study are shown below.

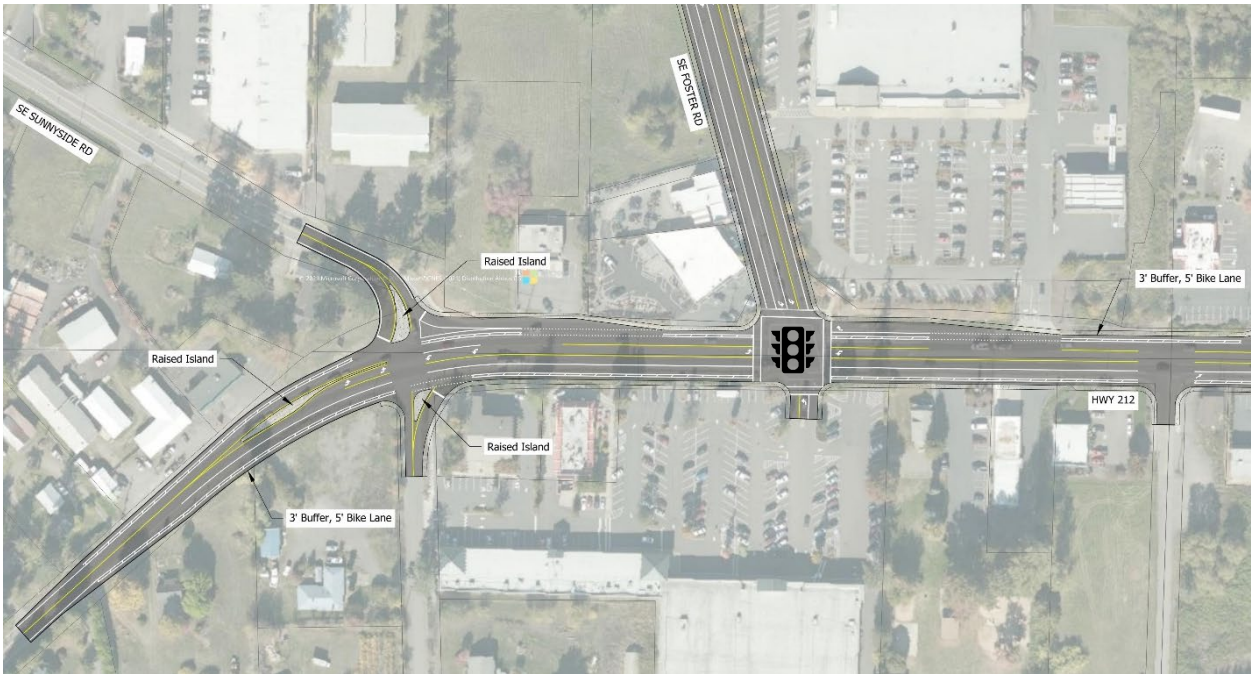
SE Tong Road: SE Tong Road currently meets OR 212 at a stop-controlled intersection with a significant skew. The PV/NC Plan includes realignment of SE Tong Road to intersection with the existing intersection of SE 187th Avenue and OR 212 (see below). This facilitates provision of a signal to serve both SE Tong Road and SE 187th Avenue and addresses the current intersection skew.

SE 187th Avenue and OR 212: The OR 212 study looked at options to accommodate future demand between on the OR 212 corridor. Widening SE 187th Avenue to a three-lane roadway provides needed north/south connectivity. With improvements on SE 187th Avenue, a roundabout at the intersection with SE Sunnyside Road and signal at the intersection with OR 212 are recommended.

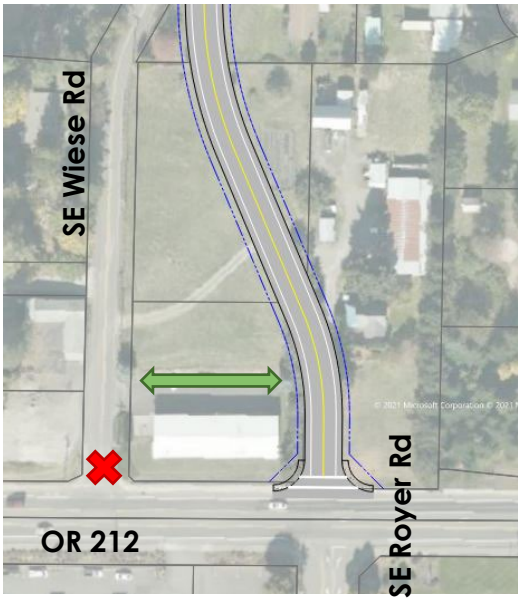




OR 212/SE Sunnyside Road-Anderson Road and OR 212/SE Foster Road Intersections: the southbound left-turn at the two-way stop-controlled intersection of OR 212/SE Sunnyside Road-Anderson Road currently operates at a LOS F and over capacity. In addition, the intersection crash rate exceeds the statewide 90th percentile crash rate, with 13 injury crashes between 2015 and 2019. In the future, neither this intersection or the adjacent intersection at OR 212/SE Foster Road are projected to meet ODOT's mobility targets. The Study recommends converting OR 212/SE Sunnyside Road-Anderson Road to right-in/right-out/left-in. At OR 212/SE Foster Road, the study recommends an additional eastbound through and southbound left-turn lane.



SE Wiese Road: given community concerns around the intersection of SE Wiese Road at OR 212, the study recommended possible long-term realignment of SE Wiese Road to intersection OR 212 opposite SE Royer Road to create a single four-legged intersection. The existing Wiese Road would be disconnected, with a backage road provided for business access.



OR 212 & SE 222nd Drive: the southbound approach to this three-legged stop-controlled intersection currently operates at a LOS F and is over capacity. In addition, the crash rate at this intersection is above the statewide 90th percentile crash rate, with 15 injury crashes reported between 2015 and 2019. To address this capacity and safety deficiency, the study recommended signalizing the intersection and providing separate left- and right-turn lanes southbound.

OR 212 & SE 242nd Drive: this intersection is projected to meet ODOT mobility targets under 2040 conditions, but if demand increases faster than projected provision of a separate southbound left-turn lane could be considered.

In addition, the following planning efforts were identified to address existing intersection deficiencies and promote cohesive planning efforts within the entire OR 212 corridor:

- **OR 212 (SE 172nd Avenue to US 26) Corridor Plan:** To establish the long-term vision, conceptual alignment, cross-section, and access locations for OR 212 between SE 172nd Avenue and US 26.
- **OR 212 (Rock Creek Junction to SE Foster Road) Alternative Mobility and Fee In Lieu Strategy:** To establish potential alternative mobility standards and funding strategy to allow near-term development and move towards long-term acceptable traffic operations at existing over-capacity intersections.

SE Foster Road & OR 212

6. MOBILITY PLAN

6. Mobility Plan

This section summarizes the projects and studies within the Damascus Mobility Plan, which were prioritized based on stakeholder and Technical Advisory Committee feedback and the Project Development Alternatives Analysis. The priorities focus on responding to existing intersection deficiencies and proposed projects that facilitate future development. The 2040 Roadway Network reflects the Metro Regional Transportation Plan (RTP) that account for anticipated fiscally-constrained road network changes.

MOBILITY PLAN PROJECTS

Since the projects developed through this plan will be incorporated into the Clackamas County TSP, a similar approach to the TSP was used for the project list format, numbering convention, and prioritization. The TSP separates projects into four groups: Tier 1, Tier 2 and Tier 3 county projects, and Regional capital projects that are the responsibility of other agencies or organizations, such as ODOT or the City of Happy Valley.

The three tiers of county projects are defined as follows:

- **Tier 1: 20-year capital projects** – Needed projects and investments matched with anticipated funding (Project ID 1000 through 1137 in CC TSP)
- **Tier 2: Preferred capital projects** – Projects and investments needed to meet population, housing, and employment projections, but that do not have identified funding at this time (Project ID 2000 through 2044 in CC TSP)
- **Tier 3: Long-term capital project needs** – Projects that would be beneficial to do if funds were available (Project ID 3000 through 3182 in CC TSP)

As with the TSP, the recommended projects do not include projects located in cities. The project list is provided in Table 5, with the following information:

- ID: the project ID follows the numbering scheme used in the Clackamas County TSP, with the first digit indicating the project tier and picking up where project list in the adopted Clackamas County TSP ended (e.g. 1138 for the first project in Tier 1, 2045 for the first project in Tier 2, 3183 for the first project in Tier 3).
- Source: indicates whether project was developed through the alternatives analysis or the OR 212 Intersection Refinement Study
- Category: uses the project categories developed as part of the Clackamas County TSP to indicate the purpose of the project
- Cost Estimate: Cost estimates were produced using 2021 costs and a 30% project contingency. Shoulder widening projects were pulled from a common cost estimate for 6 feet of shoulder widening for 1,000 feet, which was then applied to the length of any given project.

» Priority: Tier 1, 2 or 3 for County projects and high, medium or low for Regional projects

Table 5. Damascus Mobility Plan Project List

ID	Project or Street Name	Segment/Location	Description	Source	Category	Cost Estimate	Priority
Tier 1: 20 Year Capital Projects							
1138	SE 242nd Avenue	SE 242nd Avenue/SE Borges Road intersection	Extend SE Kingswood Way from SE Borges Road to SE 242nd Avenue. Close SE 242nd Avenue/SE Borges Road intersection to through traffic.	Alternatives Analysis	Safety	$1,483,000	Tier 1
1139	SE 242nd Avenue	SE 242nd Avenue/SE Bohna Park Road intersection	Access management on northwest corner; delineated shoulders on SE 242nd Avenue.	Alternatives Analysis	Safety	$210,000	Tier 1
1140	SE Foster Road	Happy Valley boundary to OR 212	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$1,230,000	Tier 1
1141	SE Sunnyside Road	SE 187th Avenue to OR 212	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$860,000	Tier 1
1142	SE Sunshine Valley Road	SE 242nd Avenue to County line	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$1,000,000	Tier 1
1143	SE Tillstrom Road	SE Foster Road to SE 242nd Avenue	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$4,275,000	Tier 1

ID	Project or Street Name	Segment/Location	Description	Source	Category	Cost Estimate	Priority
Tier 2: 20 Preferred Capital Projects							
2045	SE 190th Drive	County line to 172nd-190th Connector	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$145,000	Tier 2
2046	SE 190th Drive	172nd-190th Connector to SE Tillstrom Road	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$775,000	Tier 2
2047	SE 232nd Drive	OR 212 to OR 224	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$2,690,000	Tier 2
2048	SE 242nd Avenue	County line to OR 212	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$4,305,000	Tier 2
2049	SE Tillstrom Road	SE Tillstrom Road/SE Bohna Park Road & SE Wiese Road/SE Bohna Park Road intersections	Reroute SE Bohna Park Road to meet SE Delia Street.	Alternatives Analysis	Safety	$1,855,000	Tier 2

ID	Project or Street Name	Segment/Location	Description	Source	Category	Cost Estimate	Priority
Tier 3: Long-Term Capital Project Needs							
3183	SE 187th Avenue	SE Sunnyside Road to OR 212	Improve SE 187th Avenue to three-lane roadway with sidewalks and bike lanes; construct roundabout at SE Sunnyside Road/SE 187th Avenue.	OR 212 Study	Upgrade – Vehicle Capacity & Active Transportation	$12,457,000	Tier 3
3184	SE 222nd Drive	County line to OR 212	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$4,305,000	Tier 3
3185	SE 257th Avenue	SE Hoffmeister Road to OR 212	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$385,000	Tier 3
3186	SE Bohna Park Road	SE Tillstrom Road to SE 242nd Avenue	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$2,885,000	Tier 3
3187	SE Borges Road	SE Tillstrom Road to SE 242nd Avenue	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$4,160,000	Tier 3
3188	SE Hoffmeister Road	SE 242nd Avenue to SE 257th Avenue	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$1,105,000	Tier 3
3189	SE Royer Road	OR 212 to OR 224 (gap in roadway)	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$2,690,000	Tier 3
3190	SE Telford Road	County line to County line	Widen shoulder based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$685,000	Tier 3
3191	SE Tong Road	South of OR 212/SE Tong Road intersection	Realign SE Tong Road at OR 212 to align with SE 187th Avenue to address skew.	OR 212 Study	Safety	$7,732,000	Tier 3
3192	SE Wiese Road	SE Bohna Park Road to OR 212	Widen shoulders based on operational and safety analysis during project development.	Alternatives Analysis	Upgrade – Active Transportation	$2,190,000	Tier 3
3193	SE Wiese Road Realignment	North of OR 212/SE Wiese Road	Realign SE Weise Road to intersect with OR 212 and SE Royer Road.	OR 212 Study	Safety	$2,655,000	Tier 3

ID	Project or Street Name	Segment/Location	Description	Source	Category	Cost Estimate	Priority
Regional Projects							
4097	OR 212	OR 212/SE 222nd Drive intersection	Install traffic signal and separate southbound right- and left-turn lanes.	OR 212 Study	Upgrade – Vehicle Capacity	$1,420,000	High
4098	OR 212	OR 212/SE 242nd Drive intersection	Install separate southbound left-turn.	OR 212 Study	Upgrade – Vehicle Capacity	$1,835,000	Low
4099	OR 212	OR 212/SE Sunnyside Road-Anderson Road and OR 212/SE Foster Road	Convert OR 212/SE Sunnyside Road intersection to right-in/right-out/left in; add eastbound through and southbound left-turn lane at OR 212/SE Foster Road intersection, provide pedestrian and bicycle facilities.	OR 212 Study	Upgrade – Vehicle Capacity & Safety	$8,790,000	High
4100	OR 212	OR 212/SE Tong Road/SE 187th Avenue Intersection	Signalize intersection.	OR 212 Study	Upgrade – Vehicle Capacity	$488,000	Medium
4101	OR 212 Corridor Plan	SE 172nd Avenue to US 26	Planning effort to establish the long-term vision, conceptual alignment, cross-section, and access locations for OR 212 between SE 172nd Avenue and US 26.	OR 212 Study	Study	$200,000	Medium
4102	OR 212 Alternative Mobility and Fee in Lieu Strategy	Rock Creek Junction to SE Foster Road	Planning effort to establish alternative mobility standard, acceptable traffic operations levels, improvements, and cost estimates for over-capacity intersections.	OR 212 Study	Study	$100,000	High
4103	OR 224	OR 224/SE 232nd Drive Intersection	Study to assess need for and feasibility of improvements, such as a signal or roundabout (does not include improvement design or construction).	Alternatives Analysis	Study	$30,000	Low

The projects are shown on the map in Figure 8. Figure 8 also shows critical system projects planned in the Pleasant Valley/North Carver area of the City of Happy Valley that influence the circulation and transportation system within the Damascus Mobility Plan study area. These critical system projects are described in Table 6.

Table 6. Critical Planned City of Happy Valley Pleasant Valley/North Carver Projects

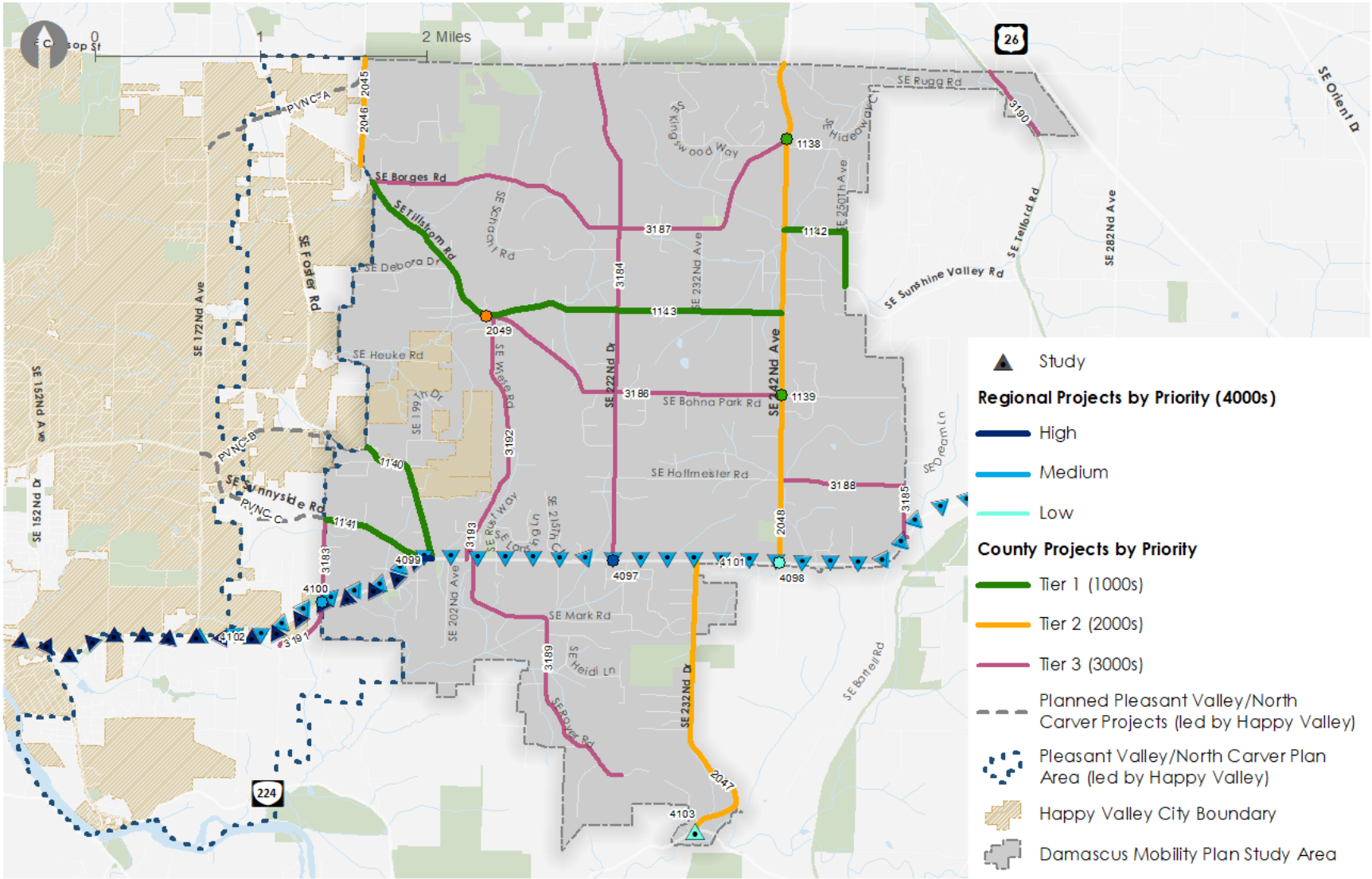
ID	Project Name	Description
PVNC-A	172nd-190th Connector	Construct a new 5-lane facility between 172nd Avenue and 190th Drive.
PVNC-B	Happy Valley Boulevard (SE Sunnyside Road Extension)	Construct a new 5-lane east-west facility from 172nd Avenue to Winston Road, realign existing Sunnyside Road to south.
PVNC-C	SE Sunnyside Road	Widen to 3-lane facility between Happy Valley Boulevard and 187th Avenue.

Note: These projects were developed as a result of the PV/NC Plan and are included in amendments to the City of Happy Valley TSP currently under review. In the November 2021 Hearing Draft of the TSP they are listed as projects R7, R16, and W16, which is where the project names and descriptions shown were pulled from.

YEAR 2040 BUILD INTERSECTION OPERATIONS

Operations at the study intersections were assessed under 2040 conditions during the weekday PM peak hour, with the improvements proposed in the project list. With these improvements, all study intersections are projected to meet the applicable County and ODOT standards.

Figure 8. Damascus Mobility Plan Projects



SE 242nd Avenue & OR 212

7. Next Steps

7. Next Steps

When this plan is finalized, it can be incorporated into the Clackamas County TSP. The incorporation would have the following impacts on the 2013 Clackamas County TSP through the following updates:

- The TSP project tables would be updated to add the Damascus Mobility Plan projects (from Table 5 of this document) at the end. The tables provide the Project ID, map the project is shown on, project name/street name, segment/location, and project description. The Clackamas County TSP includes Table 5-3a 20 Year Capital Projects, Table 5-3b Preferred Projects, Table 5-3c Long Term Capital Projects, and Table 5-3d Regional Capital Projects.
- The TSP project maps would be updated to add the Damascus Mobility Plan projects. The Damascus area is shown on Map 5-11a Capital Improvement Plan (Greater Clackamas Regional Center/Industrial Area) in the Clackamas County TSP, which would be updated to include the additional projects in Damascus. In addition, a map showing the eastern portion of the Greater Clackamas Regional Center would be created to view the full extents of the Damascus Mobility Plan area, as none of the existing maps in the TSP clearly show the project area.

SE 242nd Avenue north of SE Bohna Park Road

ATTACHMENTS

Attachments

A. Memorandum #6: Alternatives Analysis, Project List, and Cost Estimates
B. OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study

Attachment A

Memorandum #6: Alternatives Analysis, Project List, and Cost Estimates

Attachment B

OR 212 (SE 187th Avenue to SE 242nd Avenue) Intersection Refinement Study

Technical Appendix A

Memorandum #1: Project Schedule

Technical Appendix B

Memorandum #2: Public Involvement Program

Technical Appendix C

Memorandum #3: Damascus Mobility Plan Transportation Planning Framework

Technical Appendix D

Summary of Public Involvement

Technical Appendix E

Memorandum #4: Evaluation of the Damascus Mobility Plan Area Transportation System

Technical Appendix F
Memorandum #5: Future Damascus Mobility Plan Area Transportation System Conditions

Technical Appendix G

2040 Build Intersection Operations Analysis and Worksheets

Technical Appendix H

Updated Materials for Clackamas County Transportation System Plan