ORDINANCE NO. 1672

AN ORDINANCE ADOPTING THE CITY OF CANBY TRANSPORTATION SYSTEM PLAN

WHEREAS, City has completed extensive community outreach over three years for The City of Canby Transportation System Plan including a community vision;

WHEREAS, the transportation system plan is consistent with City code and other adopted plans;

WHEREAS, the transportation system plan reflects the goals and objectives of the community over the next 20-years; and

WHEREAS, the planning commission recommended unanimous approval of the transportation system plan during their March 23, 2026, hearing.

THEREFORE, THE CITY OF CANBY, OREGON, ORDAINS AS FOLLOWS:

The City Council hereby adopts The City of Canby Transportation System Plan.

SUBMITTED to the Canby City Council and read the first time at a regular meeting therefore on Wednesday, May 6, 2026, ordered posted as required by the Canby City Charter; and scheduled for second reading on Wednesday, May 20, 2026, commencing at the hour of 7:00 PM in the Council Chambers located at 222 NE 2nd Avenue, 1st Floor Canby, Oregon.

Maya Benham
Maya Benham, CMC
City Recorder

PASSED on second and final reading by the Canby City Council at a regular meeting thereof on the 20th day of May, by the following vote:

YEAS 4 NAYS 0

T Hensley
Traci Hensley
Council President

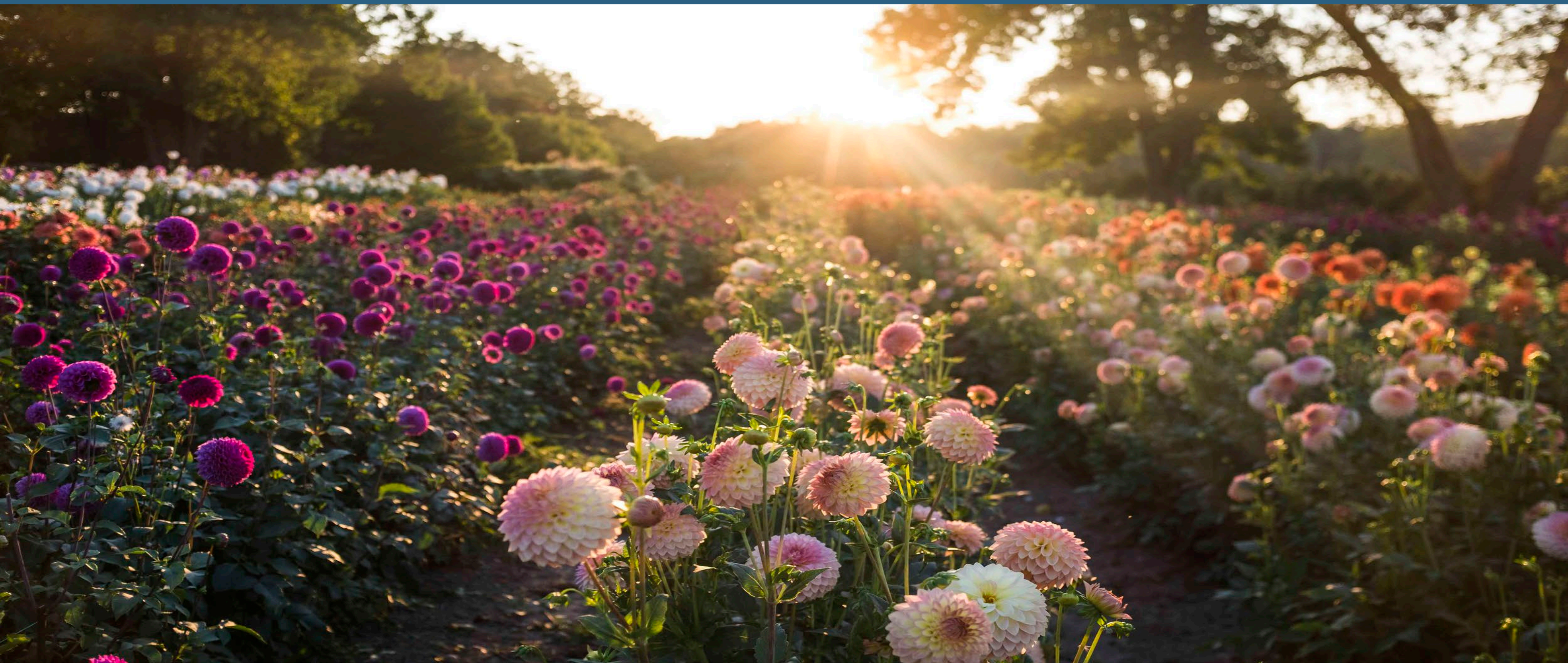
ATTEST:

Maya Benham
Maya Benham, CMC
City Recorder

City of Canby

TRANSPORTATION SYSTEM PLAN – VOLUME 1

FEBRUARY 2026 DRAFT



Cultivating CANBY
Blooming with Possibility

ACKNOWLEDGMENTS

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VOLUME 1 CONTENTS

VOLUME 2

Volume 2 of the Canby Transportation System Plan includes all background memoranda, and technical data that were the basis for its development. The contents of Volume 2 represent an iterative process in the development of the TSP. Refinements to various plan elements occurred throughout the process as new information was obtained. In all cases, the contents of Volume 1 supersede those in Volume 2.

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CHAPTER 1.

Context for the Plan

This chapter introduces Canby and describes what a Transportation System Plan (TSP) is, and how it was developed. The process involved a formal decision-making structure, community engagement, and a structured technical analysis.

INTRODUCTION

Located in the Willamette Valley, Canby is a growing community with small-town charm, offering an abundance of unique and family-friendly neighborhoods and a diverse and thriving local economy. Canby is easily accessible with Interstate 5 (I-5), Highway 99E (OR 99E) and Interstate 205 (I-205) nearby, making it an attractive place for new households and employers. It is expected to add nearly 6,000 new residents and thousands of jobs over the next 20 years. This growth has a corresponding impact on transportation demands in Canby. This TSP establishes a host of policies and programs that will guide the City of Canby to a safer and more efficient multi-modal transportation network. The challenge ahead for the city is to take steps to address the system needs identified in this TSP and to make strategic investments to prepare for growth in the decades to come.

PLANNING AREA

Beyond the current City limits, is the Urban Growth Boundary (UGB) for Canby. The UGB is a land use planning tool designed to control urban expansion and promote the efficient use of land, public facilities, and services. Land inside the UGB is intended for urban development that is supported by urban services such as roads, water and sewer systems, parks, schools and fire and police protection. This boundary also supports 20-years' worth of population and employment growth, of which cities must plan for urban services within their designated planning boundary.

Canby is responsible for planning transportation infrastructure for all modes within its designated boundary, hereby referred to as "planning area", with the TSP being the City's tool for this effort. The City's planning area extends from the Molalla River to Haines Road and Mulino Road, and to Territorial Road and the Willamette River.

PURPOSE OF THE TSP

The Canby TSP is a long-range plan to guide transportation investments within the City's planning area through the future horizon year of 2043. These transportation system improvements address current deficiencies and serve future local and regional needs, and align with the community's goals, objectives, and vision for the future. This TSP was developed through community and stakeholder input and is based on the City's transportation system needs, opportunities, and anticipated available funding. The state requirements of the TSP are summarized in Figure 1.

In compliance with these state requirements, Canby's TSP will be used to make strategic decisions about transportation system investments, to support grant applications to fund future projects, and to ensure that projects are built in coordination with land use actions and future development.

FIGURE 1: STATE REQUIREMENTS OF A TRANSPORTATION SYSTEM PLAN

REQUIREMENTS OF A TRANSPORTATION SYSTEM PLAN

A TSP IS REQUIRED BY THE STATE OF OREGON TRANSPORTATION PLANNING RULE (TPR). OREGON ADMINISTRATIVE RULE 660-012-0015 DEFINES THE PRIMARY ELEMENTS OF A TSP. THE TPR REQUIRES THAT A CITY TSP INCLUDES THE FOLLOWING COMPONENTS:

1. Comprehensive understanding of the existing multimodal transportation system that serves the city and how well that system performs its expected function today
2. Reasonable basis for estimating how the city and the surrounding region might grow in its population and employment over the next 20 or more years
3. Evaluation of how the expected growth could change system performance
4. Goals, policies and transportation system improvements that address community multimodal transportation needs
5. Understanding of the on-going funding required to build and maintain the transportation system as the city grows

SETTING DIRECTION FOR THE PLAN

A community vision, along with a set of goals, objectives, and performance measures (see Figure 2) were used to guide the project team in the development, evaluation, and prioritization of solutions that best fit the community and provided the basis for policies to support Plan implementation. They were established with guidance from the Project Advisory Committee (PAC), Technical Advisory Committee (TAC) and the public.

Collectively, the transportation-related goals, objectives, and performance measures describe what the community wants the transportation system to do in the future, as summarized by a **vision statement**. A vision statement generally consists of an imaginative description of the desired condition in the future. It is important that the vision statement for transportation align with the community's core values. The TSP is based on the community vision identified in the Canby Comprehensive Plan.

Goals and objectives create manageable stepping stones through which the broad vision statement can be achieved. **Goals** are the first step down from the broader vision. They are broad statements that should focus on outcomes, describing a desired end state. Goals should be challenging, but not unreasonable.

Each goal is supported by more finite **objectives**. In contrast to goals, objectives should be specific and measurable. Where feasible, providing a targeted time period helps with objective prioritization and achievement. When developing objectives, it is helpful to identify key issues or concerns that are related to the attainment of the goal.

The solutions recommended through the TSP must be consistent with the goals and objectives. To accomplish this, **performance measures** were developed based on the goals and objectives. For the Canby TSP, they were used in two ways:

1) **Project Prioritization**: To inform the selection and prioritization of projects and policies for the plan by describing how well they support the goals and objectives of the city.
2) **System Performance**: To evaluate and monitor the performance of the transportation system towards attainment of the long-term goals and objectives of the city.

FIGURE 2: DIRECTION FOR THE PLAN

GOALS AND OBJECTIVES FOR THE PLAN

The Canby TSP goals and objectives are documented below.

GOAL 1

ACCESSIBLE AND CONNECTED

THE TRANSPORTATION SYSTEM IS CONVENIENT, ACCESSIBLE, RELIABLE AND CONNECTS PEOPLE TO DESTINATIONS THROUGHOUT THE CITY AND BEYOND.

Objective a. Provide direct, continuous, and connected transportation facilities to minimize out-of-direction travel and decrease travel times for all users.

Objective b. Increase the proportion of trips made by walking, bicycling, transit and carpooling.

Objective c. Complete all gaps in the bicycle and pedestrian networks, including trails.

Objective d. Increase household and job access to transit.

Objective e. Increase household and job access to low stress bike and walk networks.

Objective f. Increase travel options that serve popular destinations, such as schools, services, and parks.

GOAL 2

SAFE AND SECURE

THE TRANSPORTATION SYSTEM IS SAFE AND SECURE FOR PEOPLE OF ALL AGES AND ABILITIES.

Objective a. Reduce fatal and serious injury crashes for all modes of travel.

Objective b. Reduce crashes involving pedestrians and bicyclists by improving conditions along and across streets and at other conflict points with motor vehicles.

Objective c. Ensure the pedestrian and bike thoroughways are well maintained and clear of debris, obstacles, and obstructions.

Objective d. Provide attractive streetscapes that encourage active transportation, appropriate traffic volumes, vehicle speeds, and safety for all users.

Objective e. Reduce the transportation system's vulnerability to natural disasters and climate change. traffic volumes, vehicle speeds, and safety for all users.

GOAL 3

HEALTHY PEOPLE AND ENVIRONMENT

THE TRANSPORTATION SYSTEM PROTECTS THE NATURAL, CULTURAL, AND DEVELOPED ENVIRONMENTS AND ENCOURAGES HEALTHY AND ACTIVE LIVING FOR ALL THROUGH COMFORTABLE AND CONVENIENT LOWER-POLLUTING TRANSPORTATION ALTERNATIVES.

Objective a. Reduce vehicle miles traveled per capita.

Objective b. Improve public health by promoting and providing safe, comfortable, and convenient active transportation options to meet daily needs and access services.

Objective c. Design all transportation facilities to be welcoming and attractive for all people walking and bicycling, including the provision of street trees and buffering from vehicles..

Objective d. Increase household access to parks, open spaces, and natural areas, including street tree and tree canopy preservation.

Objective e. Use sensitive design and mitigation approaches to natural, cultural, and developed resources.

Objective f. Reduce transportation-related air pollutants.

GOAL 4

COMPREHENSIVE AND AFFORDABLE

THE TRANSPORTATION SYSTEM ELIMINATES TRANSPORTATION-RELATED DISPARITIES AND BARRIERS AND IS AFFORDABLE FOR ALL USERS.

Objective a. Reduce household transportation costs by providing walkable neighborhoods, active transportation options, and reduced reliance on motor vehicle travel.

Objective b. Develop a multimodal transportation system that allows all users to access employment, education, and services.

Objective c. Develop a low stress bike and walk network for users of all ages and abilities.

Objective d. Promote transportation investments that offer system connectivity and efficiency benefits and avoid, minimize, and mitigate negative impacts.

Objective e. Prioritize infrastructure investments that serve those with the least access to transportation resources and with the greatest mobility needs.

GOAL 5

RELIABLE AND EFFICIENT

MANAGE AND OPTIMIZE THE TRANSPORTATION SYSTEM TO EASE CONGESTION SO PEOPLE AND GOODS CAN AFFORDABLY, RELIABLY, AND EFFICIENTLY REACH THEIR DESTINATIONS.

Objective a. Build an integrated and connected system of roadways, freight routes, transit and bicycle and pedestrian facilities.

Objective b. Build infrastructure and capacity to support electric vehicles and other emerging technologies to increase travel options.

Objective c. Leverage technological advances to increase efficiency of travel across all modes for all road users.

Objective d. Increase the number of people and businesses with access to travel information.

Objective e. Increase the number of households and businesses with access to outreach, education, incentives, and other tools that increase shared trips and use of travel options.

GOAL 6

FISCALLY RESPONSIBLE

STRATEGICALLY DESIGN, OPERATE AND MAINTAIN THE TRANSPORTATION SYSTEM TO MAXIMIZE ASSETS, MINIMIZE COSTS, AND ENHANCE THE SURROUNDING COMMUNITY THROUGH RIGHT-SIZED INFRASTRUCTURE.

Objective a. Preserve and maintain transportation system assets to maximize their useful life and minimize project construction and maintenance costs.

Objective b. Build transportation infrastructure that is sized appropriately and that encourages economical operation and maintenance.

Objective c. Align the function of transportation facilities with evolving character and design of the cross-section to enhance the adjacent land uses through right sized infrastructure including parking for all users.

Objective d. Develop new revenue sources to prepare for increased travel demand, that balance fairness and equity across the community.

Objective e. Coordinate with ODOT and their State Transportation Improvement Plan for OR 99E to understand road improvement plans and timelines for the state controlled highway.

GOAL 7

COLLABORATIVE

TRANSPORTATION SYSTEM DECISIONS ARE MADE IN A TRANSPARENT AND COLLABORATIVE MANNER, AND THE BENEFITS AND BURDENS OF INVESTMENTS ARE DISTRIBUTED EQUALLY AMONG ALL USERS.

Objective a. Create a multimodal transportation system that seamlessly connects to existing and planned infrastructure in surrounding communities.

Objective b. Make transportation investment decisions using a performance-based planning and programming framework that is aligned with the local goals and supported by meaningful public engagement, multimodal data, and analysis.

Objective c. Improve coordination and cooperation among the owners and operators of the transportation system to enhance the efficiency of roadways and multimodal facilities and encourage improved transit service.

Objective d. Engage a wider diversity of people to provide input at all stages of developing and maintaining the transportation system and services.

PERFORMANCE BASED PLANNING PROCESS

The TSP utilizes a performance-based planning process. The community vision is distilled into the measurable goals and supporting objectives. These goals and objectives were used to identify performance measures to help evaluate potential projects to enhance transportation system performance, and to measure long-term alignment between Canby's transportation system and the community's vision, goals, and objectives. The plan process is illustrated below in Figure 3, along with the key questions that were considered during three development stages of the TSP.

FIGURE 3: PERFORMANCE BASED PLANNING PROCESS

DECISION MAKING STRUCTURE

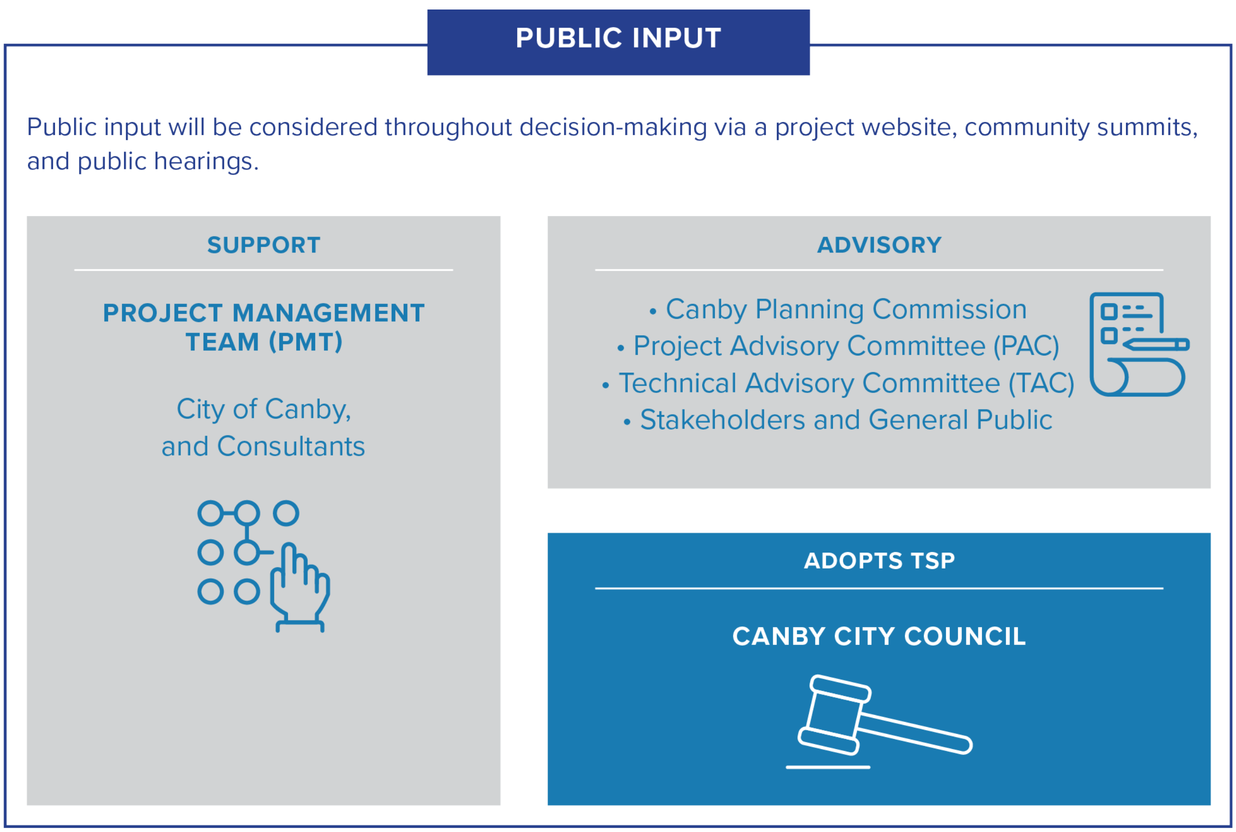
The decision-making structure for this TSP was developed to establish clear roles and responsibilities throughout the project. The decision-making structure (Figure 4) established a framework for broad-based community engagement for the project.

As the TSP was developed, the Project Management Team (PMT) worked with a Project Advisory Committee (PAC) that included local business and community representatives covering a variety of interests such as schools, pedestrian and bicycle mobility, traffic safety, parks, freight mobility and community development, and a Technical Advisory Committee (TAC) that included emergency service and transit providers, and agency staff members from the City of Canby, Clackamas County, the Oregon Department of Transportation, and the Oregon Department of Land Conservation and Development.

The PAC and TAC were formed to provide community-based recommendations, and informed and guided the plan by reviewing draft deliverables, providing insight into community perspectives, commenting on technical and regulatory issues, and providing recommendations for the TSP.

The City Council and Planning Commission for Canby were briefed during the development of this plan throughout the process. The PMT made recommendations to the City Council based on technical analysis and community input. The City Council made all final decisions pertaining to this TSP, including its adoption.

FIGURE 4: CANBY TSP ROLES AND RESPONSIBILITIES

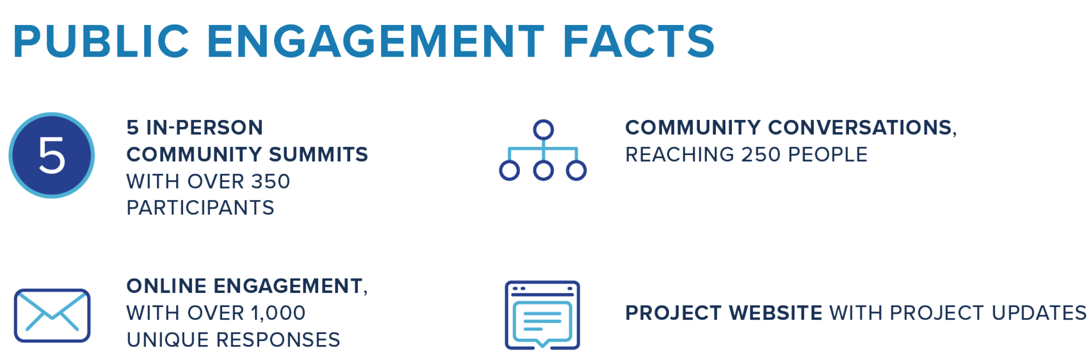


PUBLIC ENGAGEMENT

Public outreach was conducted to share information about the TSP project. Community members, stakeholders, and other interested parties were invited to share their ideas and feedback about how people currently get around, what can be improved, and potential transportation projects. This feedback was instrumental in guiding the development of the TSP, including a list of transportation projects.

The Public Engagement Plan for the TSP, included in the Appendix, considered the demographic makeup of Canby to inform outreach activities. Several engagement opportunities were adapted (virtual, in-person and by mail) to enable community members to participate and provide meaningful input. Approximately 350 people attended community summits and over 250 people participated through a variety of online outreach opportunities summarized in Figure 5. These engagement opportunities were promoted through updates on the project website, emails sent to interested parties, stakeholders, and community organizations, and press releases.

FIGURE 5: PUBLIC ENGAGEMENT FACTS



SUMMARY OF COMMUNITY FEEDBACK

Overall, participants expressed satisfaction with the City’s transportation network, particularly the street, walking, and biking networks. Most participants indicated that they predominantly use a car to get around, so there were relatively few comments regarding transit service. A complete summary of the outreach efforts can be found in the Appendix.

Common themes:

- **Traffic and potential impacts to neighborhoods.** Many residents expressed concerns with expected population growth and the potential impact it could have on the level of traffic on existing streets. Congestion on OR 99E in downtown Canby and potential I-205 tolling could also increase traffic on local routes.
- **Connections across the Molalla River.** Many expressed a desire for improved connectivity across the Molalla River and for improved travel routes to I-5.
- **Vehicles travelling unsafe speeds**. Many noted that speeding was already a problem and were worried it would get worse with increased vehicular traffic.

- **Delay at rail crossings**. Many residents were concerned that the at-grade rail crossings fragment the city, delay people and emergency response, and limit efficient circulation.
- **Safety of pedestrians and bicyclists.** Many expressed a desire to see more walking and biking trails throughout the City, preferably separated from vehicle traffic.

TECHNICAL DEVELOPMENT

Figure 6 illustrates the technical tasks involved in creating the TSP. These are categorized in three major stages: the first to understand system needs and constraints, the second to develop solutions, and the third to prepare and adopt the plan. Community input guided the TSP development through all stages.

FIGURE 6: CANBY TSP DEVELOPMENT TECHNICAL TASKS

UNDERSTAND	EVALUATE	RECOMMEND / ADOPT
• Discuss community values and transportation goals • Evaluate funding for transportation improvements • Evaluate existing conditions and future growth trends • Coordinate with state and county plans	• Develop draft solutions: projects, programs, and standards for all modes of travel • Evaluate and refine draft solutions through community outreach	• Prepare Draft Transportation System Plan • Public Adoption Hearings (TSP) • Publish Adopted Plan

CHAPTER 2.

Canby Transportation System Today & Tomorrow

This chapter describes the transportation system as it exists and operates today and in the future. The assessment is used to identify community transportation needs and determine where the transportation system can be improved to better accommodate them. Needs were determined based on a comprehensive multimodal existing conditions analysis and projecting future conditions through the planning horizon (2043) based on assumed growth in households and employment, and the transportation standards from Chapter 3.

FACTORS IMPACTING TRAVEL DECISIONS

Travelers often weigh a variety of factors when deciding how to commute to or from their destination. Whether the trip will be via motor vehicle, walking, bicycle, public transportation, golf cart, scooter or other mode, the choice is often a balance between ease and convenience of travel, travel cost, and travel time.

LAND USE AND KEY DESTINATIONS

Land use is a key component of transportation system planning. Where people live and where they go to work, shop, or access services and the distance between these key destinations has a big impact on how they get around and the demands they place on the transportation system. Downtown Canby and the commercial areas along OR 99E, in addition to the industrial uses within the Pioneer Industrial Park on the east side of the planning area will be the biggest employment centers in Canby, while residential land uses will be located between these employment areas.

Many trips also occur between community amenities within the City’s planning area, including parks, civic (e.g., schools, libraries, community centers), essential retail and services (e.g., grocery stores, pharmacies), and medical uses. These amenities are primarily located in Downtown Canby, to the north of OR 99E. In addition, the planning area includes an abundance of parks and schools that are dispersed throughout it. Future community amenities will also likely be built as new development occurs.

Those destined for a park or school generally have a higher likelihood to walk or bicycle than those going to work or shopping. The distance of that destination also plays a role in mode choice. Trips that are shorter generally present a better opportunity to walk or bicycle, and longer distance trips more often are conducive to transit or motor vehicle modes. Residents in the City’s planning area who work outside of it (as well as people who work in the City’s planning area but live elsewhere) are likely to commute by motor vehicle due to travel distance, commute time, and/or lack of adequate facilities. However, some commuters may choose bicycling or transit if the regional transportation system offers convenient and comfortable biking facilities or transit services between destinations.

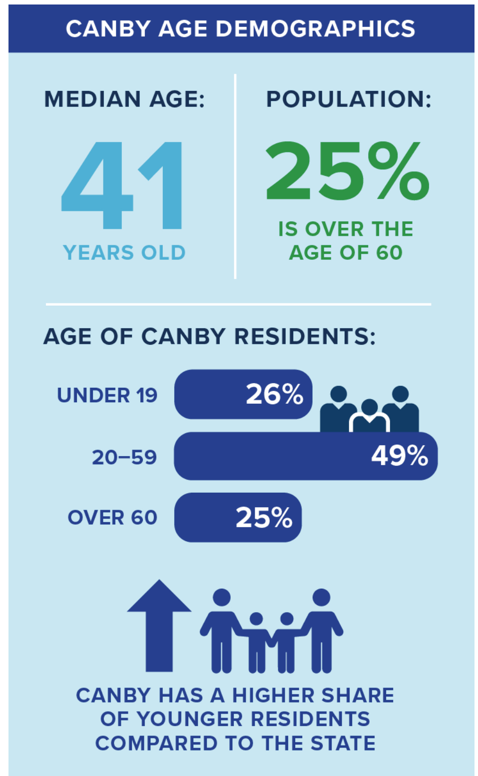
QUALITY AND AVAILABILITY OF FACILITIES

The availability of sidewalks, shared-use paths, curb ramps to provide wheelchair access, crosswalks, and bicycle facilities increases the comfort and access of those walking and biking. The lack of or poor quality of these facilities, particularly along or across higher volume or higher speed roadways, discourages people from utilizing non-motorized vehicle modes of transportation.

For transit, the distance to bus stops, frequency of service, route coverage, connections to other transportation modes, and amenities at stops are some of the factors that play a role in a user's decision to utilize it.

DEMOGRAPHICS

FIGURE 7: KEY DEMOGRAPHICS



As shown in Figure 7, residents of Canby have a median age of 41, with about 26 percent of all residents within the school age range (i.e., under the age of 19) and about 25 percent of the population over the age of 60. Both age demographics are similar to those of the county and state, although the City accounts for about a 3 percent larger share of residents aged under 19.

As growth continues in the City it will likely continue to attract younger families, although the City will always have a significant share of older residents given the community origins and the amenities it offers. With these age demographics, the City will continue to see people of all ages and abilities walking, biking, and using transit.

POPULATION AND EMPLOYMENT GROWTH

As growth occurs to the year 2043, the demands on the City's transportation system will be influenced by changes in population, housing, and employment. These changes in travel demands will require better ways to manage the system, more choices for getting around, and targeted improvements to make the system safer and more efficient.

The Canby planning area is growing, and it is estimated that about 5,931 more people will live here by 2043. Coupled with the current estimated population of 18,655 for the Canby planning area, the population in 2043 will be about 24,586. This includes an estimated 2,286 new households by 2043, for a total of 9,475 [1].

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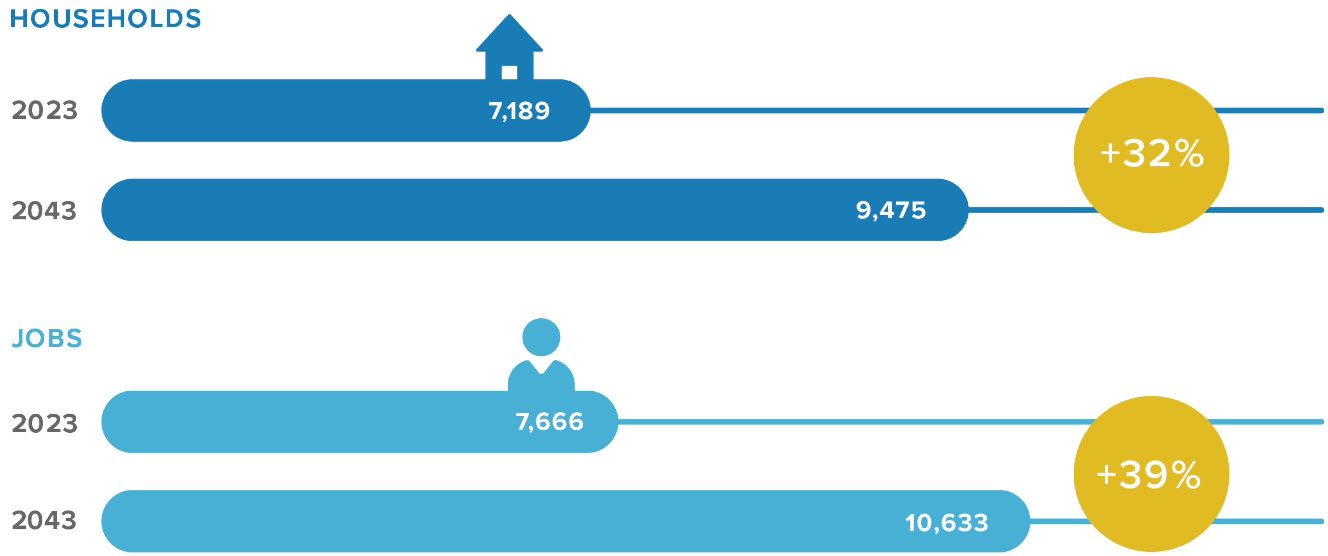
[1] The land use assumptions (population, household and jobs) for all planning area Transportation Analysis Zones (TAZs) were updated based on growth reflected in the City of Canby Housing Needs Analysis (HNA) and City of Canby Economic Opportunities Analysis (EOA). This TSP includes all household growth from the HNA, including the portion that will be accommodated in UGB expansion areas. However, the TSP includes only the job growth from the EOA that can be accommodated in the current UGB.

There are currently about 7,666 jobs in Canby's planning area, and that total is estimated to increase to 10,633, with 2,967 more people working in the City's planning area by 2043 (see Figure 8).

FIGURE 8. CANBY PLANNING AREA POPULATION AND JOB GROWTH TRENDS



TRAVEL DEMANDS AND CHARACTERISTICS

The number of people who choose to walk, bike, ride transit, or drive along with the distances they travel is important for assessing how well existing transportation facilities serve the needs of users. Available data on travel demand, travel mode choice, and trip length are used to better understand travel behavior in the community and inform the needs analysis for the transportation system. This data is largely derived from the Canby Travel Demand Model and the US Census Bureau. The following sections provide a summary of travel demands and characteristics in the City's planning area.

DAILY PERSON TRIPS

The increase in the number of residents and jobs in the Canby planning area increases the overall number of person trips generated. Table 1 summarizes the total person trips (i.e., drive alone, transit, walk, and bike trips) during an average weekday in the Canby planning area for year 2023 and 2043. The transportation network in the planning area accommodates nearly 122,000 person trips during an average weekday as of 2023, and that number is estimated to increase by over 41,000 through 2043, to 163,929 daily person trips if the land develops according to the land use assumptions during an average weekday. Of these daily person trips in 2023, over 18,000 were bike, walk, or transit trips, and that amount is expected to increase by nearly 43 percent through 2043, to 26,989 daily trips. Drive trips (i.e., single occupant vehicle or shared rides) are expected to increase by over 33,000 through 2043 during an average weekday, but this represents the smallest growth rate of all modes, at 33 percent. This is representative of the increase in jobs available in the planning area, and corresponding increase in retail or other destinations in closer proximity to households.

TABLE 1: PERSON TRIPS IN CANBY PLANNING AREA

AVERAGE WEEKDAY PERSON TRIPS BY MODE	2023 DAILY PERSON TRIPS	2043 DAILY PERSON TRIPS	DAILY GROWTH (2023-2043)	DAILY GROWTH RATE (2023-2043)
DRIVE TRIPS	103,240	136,940	33,700	33%
TRANSIT TRIPS	3,777	5,398	1,621	43%
WALK TRIPS	12,590	17,993	5,403	43%
BIKE TRIPS	2,518	3,599	1,081	43%
TOTAL PERSON TRIPS	**122,125**	**163,929**	**41,804**	**34%**
TOTAL BIKE, WALK, TRANSIT TRIPS	**18,885**	**26,989**	**8,104**	**43%**

Source: 2022 ACS data, Daily Household Travel Survey (ODOT, 2019) and the Canby travel demand model.

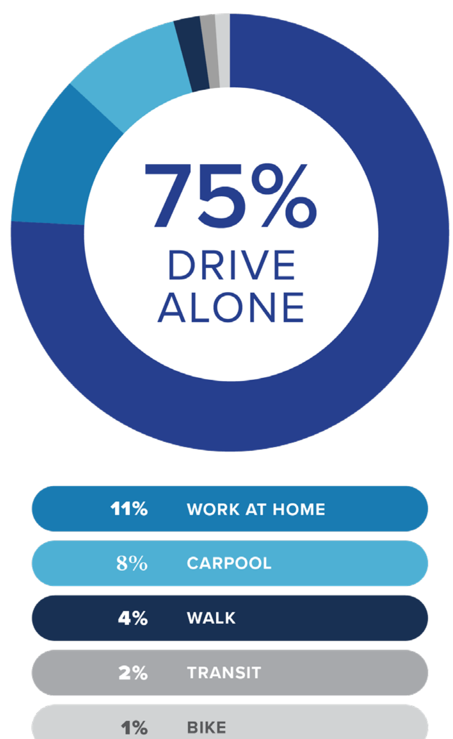
COMMUTER TRIPS

Much of the traffic in the Canby planning area, especially during the more congested weekday peak periods, is related to employment. Residents in the Canby planning area who are employed overwhelmingly commute to work outside of the planning area (85 percent), while jobs in the planning area are overwhelmingly filled by people who live outside of the planning area (82 percent)[2].

On average, almost 75 percent of employed residents in the Canby planning area commute to work using single-occupant motor vehicles. About 8 percent of residents carpool to work and the remaining 17 percent work from home, walk, bike, take transit, or use some other means of travel (see Figure 9).

About 11 percent of employed residents in the Canby planning area worked from home. It seems likely that a higher percentage of workers will continue teleworking, at least part time. Any increase in the remote work share will change the demand on streets, including when and how they travel.

FIGURE 9: CANBY PLANNING AREA COMMUTER MODE SHARE



Source: US Census Bureau, 2022 American Community Survey

[2] US Census Bureau, OnTheMap. Home/Work Distance/Direction Analysis, 2020.

QUALITY AND AVAILABILITY OF FACILITIES

To address changing transportation needs within the City's planning area though 2043, the existing and future travel conditions must be considered. The transportation system review documented the existing pedestrian, bicycle, transit, and motor vehicle infrastructure. It also identified shortfalls and limitations regarding how people can travel within the City (such as lack of bike lanes or sidewalks). Solutions are identified in Chapter 5 for transportation infrastructure that is determined to not maintain acceptable service levels for residents.

STREET NETWORK PERFORMANCE ASSESSMENT

Congestion and safety for all modes was reviewed at intersections and streets in the City's planning area. This assessment shows how safe and efficient the street system is and provided information to identify needed improvements for the TSP.

Street Network Congestion

This assessment identified locations on the roadway network that operate above thresholds for congestion under current and future conditions. These are locations where motorists experience significant delay. These thresholds, identified in Chapter 3, provide a metric for assessing the impacts of new development on the transportation system and for identifying where capacity improvements may be needed. They are the basis for requiring improvements needed to sustain the transportation system as growth and development occur.

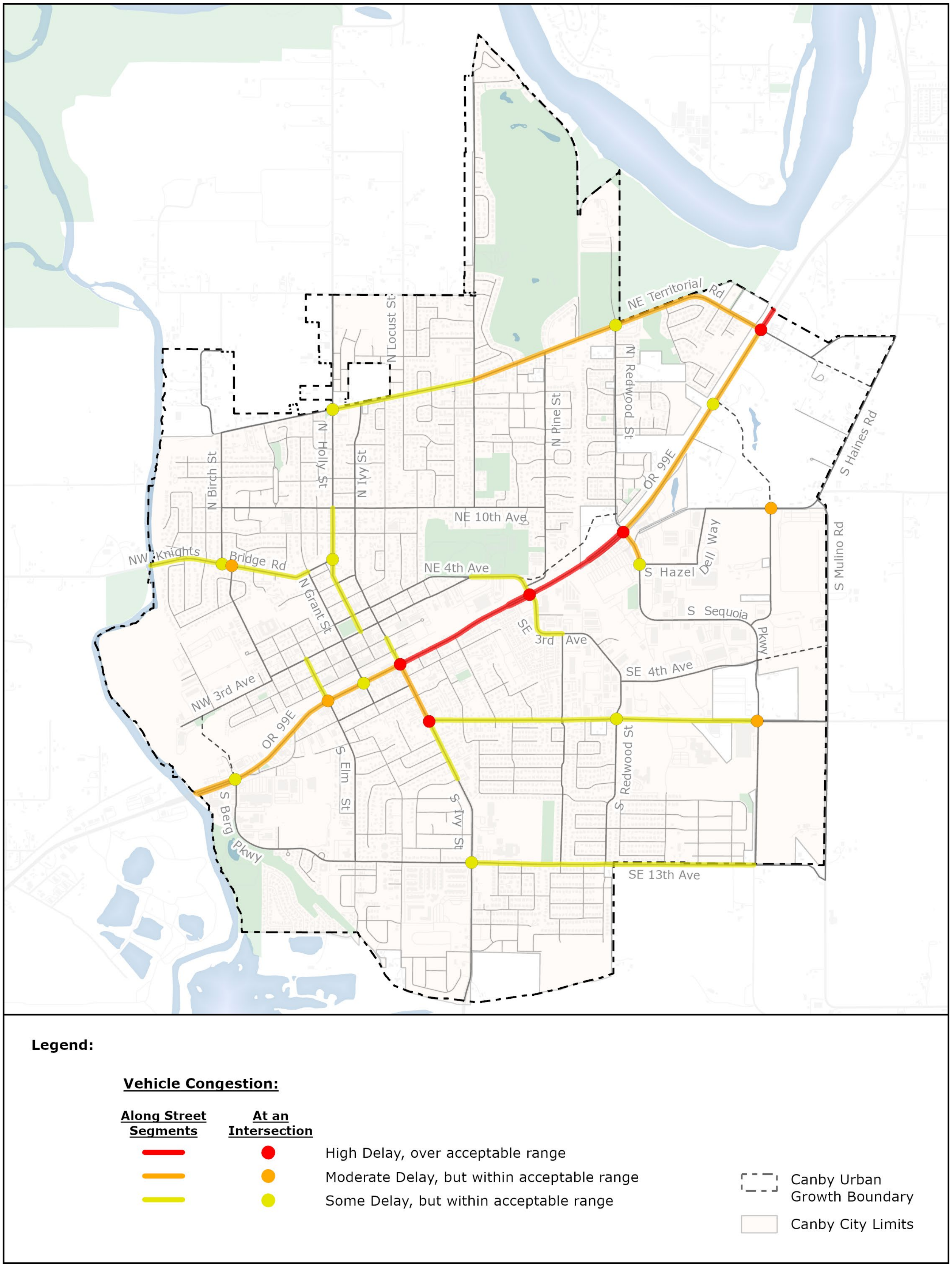
Figure 10 displays the results of the congestion analysis. The displayed conditions assume no improvements to the current street network. As shown, several street segments and intersections are expected to experience high or moderate delay by 2043 during the weekday p.m. peak hour. This includes OR 99E, Territorial Road, Sequoia Parkway and Ivy Street in the planning area where high traffic volume growth is expected through 2043.

Delay for pedestrian and bicycle users at intersections has also been identified as a significant constraint for these users through field observations and public input. High delay occurs at OR 99E intersections at traffic signals, and delay occurs at many unsignalized intersections along Territorial Road and Ivy Street through the planning area. Out of direct travel delay also occurs for these users to reach a legal or controlled crossing, specifically along OR 99E.

The TSP includes conceptual intersection enhancements, and locations of future Collector and Neighborhood Routes that will help to provide additional travel routes through the planning area and alleviate some of the local traffic from these major streets.

Most new Local streets will be built by new private development. When a private development project is approved, the builder or developer is required to provide a street network that complies with the standards included in Chapter 3. The connectivity standards require streets to be provided at a minimum spacing of 530 feet in most cases. These Local streets occur at more frequent intervals and are spaced closer than the larger streets (i.e., Arterial or Collector streets).

FIGURE 10: STREET NETWORK CONGESTION (2043)

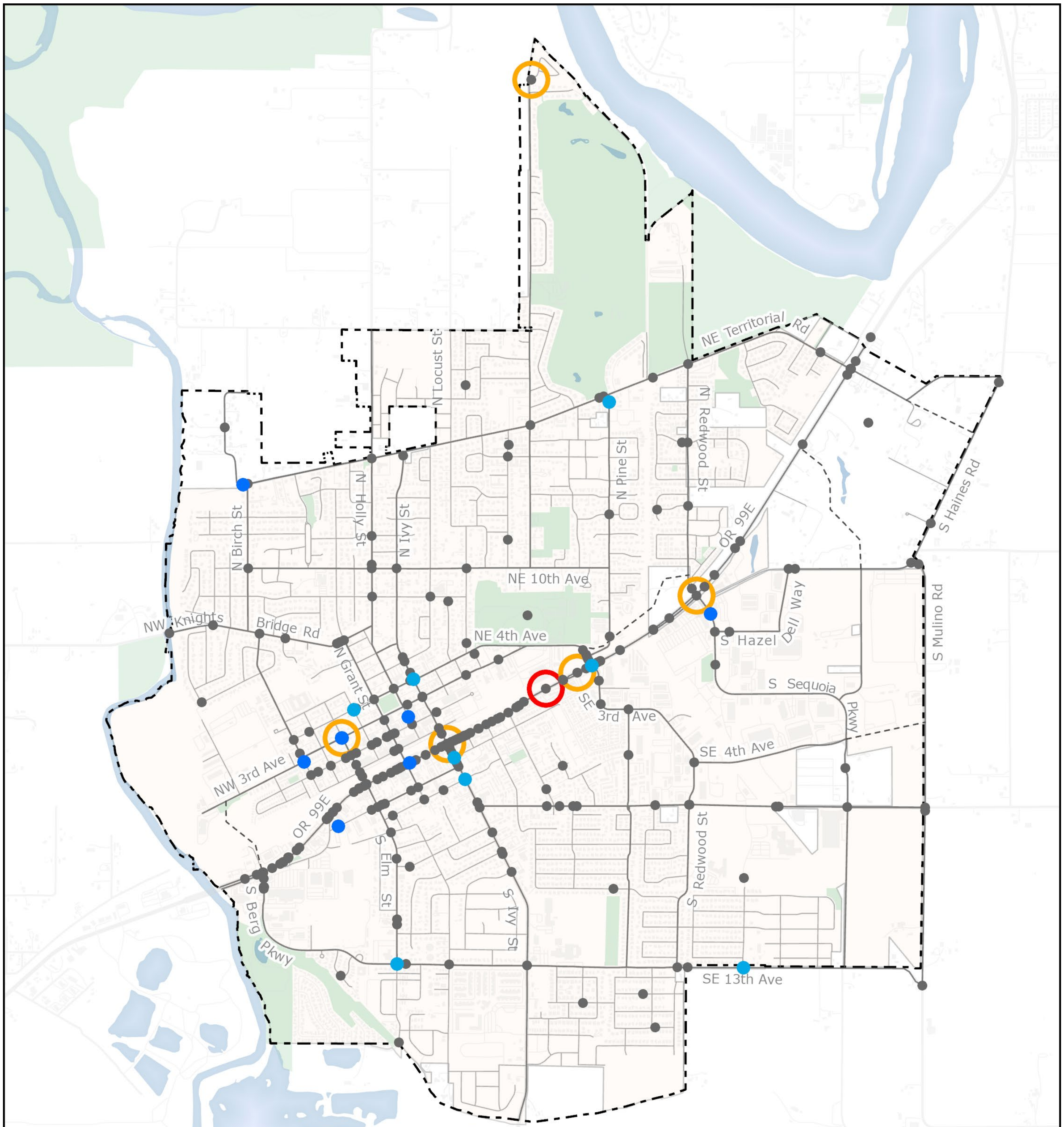


STREET NETWORK SAFETY

This assessment monitors the safety of travel in the planning area. It was used to track collision data over a 5-year period to provide trends related to total vehicle, pedestrian, and bicyclist collisions, fatal and severe injury collisions and total fatalities and severe injuries. Figure 11 shows data for the 5-year period between 2017 and 2021, with 458 collisions occurring in the City's planning area. Of these collisions, nine involved a pedestrian, eight involved a bicyclist, and 441 involved a vehicle or multiple vehicles. There was one fatality along OR 99E between Locust Street and Pine Street, and five severe injuries, one of which was a pedestrian. In addition, two incidents occurred at the Union Pacific rail crossing at Ivy Street. Both incidents included a train striking a pedestrian and resulting in fatalities.

In addition, a safety analysis was evaluated for streets in the planning area. This included an analysis of collision rates at intersections and along street segments, and an identification of any top 10 percent ODOT Safety Priority Index System (SPIS) sites in the planning area. This analysis revealed that three segments of OR 99E through the planning area exceeded the statewide collision rate for similar facilities, including Elm Street to Grant Street, Grant Street to Ivy Street and Ivy Street to Pine Street. The safety analysis also identified the OR 99E intersections with Berg Parkway, Ivy Street and Sequoia Parkway, and the NW 3rd Avenue intersection with N Cedar Street as safety focus areas.

FIGURE 11: STREET NETWORK SAFETY



Legend:

Collisions (2017 to 2021):

- Collision involving a Pedestrian (9)
- Collision involving a Bicyclist (8)
- Collision involving a Vehicle (441)

Collision Severity (2017 to 2021):

- Collision with Fatal Injury (1)
- Collision with Serious Injury (5)

Canby Urban Growth Boundary

Canby City Limits

WALKING NETWORK

Walking supports healthy lifestyles, is an easy and economical way to travel, and is well suited for people of all ages and abilities. In this plan, "walking" and "pedestrian" are terms that include people who walk independently or use canes, wheelchairs, other walking aids, or strollers. Approximately four percent of commuters in the City walk to work, with two percent utilizing public transportation, which often includes walking at the beginning or end of the trip[3]. In addition to the work commute trips, walking trips are made to and from recreational areas, shopping areas, schools, or other key destinations in the City's planning area. Continuous and direct sidewalk connections to all key destinations and along all streets, in addition to safe crossing opportunities along major roadways, are essential to encourage walking and transit use.

PEDESTRIAN FACILITY GAPS

The pedestrian network is relatively complete within the current City limits, with most residential development having a full sidewalk system with relatively few gaps. However, the pedestrian network in the planning area beyond the current City limits is less developed due to the rural nature of most existing land use. Critical gaps in the planning area occur along a few segments of OR 99E, Territorial Road, N Pine Street, N Holly Street and S Ivy Street. Some gaps also occur along low volume and low speed local streets throughout the planning area, although in many cases this condition is acceptable, and is less critical than the gaps along the major streets.

Of the 222 miles of potential sidewalks along streets in the City's planning area today, currently 145 miles of them have a sidewalk, and 77 miles or about 35 percent do not have a sidewalk (see Figure 12). This analysis assumes all streets should have sidewalks on both sides, but in some cases low volume and speed streets may be suitable without a sidewalk or with a sidewalk on only one side.

Many of the sidewalk gaps along these streets will be completed once projects within the TSP are completed with new development. The TSP also includes projects to complete the sidewalk gaps or improve existing sidewalk corridors along streets within the planning area.

FIGURE 12: CANBY SIDEWALK COVERAGE

[3] US Census Bureau, 2022 American Community Survey

Sidewalk Coverage Near Transit and Community Amenities

One-quarter mile walking distance has become an accepted distance for gauging a transit stop's walkable area. This distance is based on the distance people are typically willing to walk to transit. Transit access coverage is estimated based on the actual street network surrounding the stops as-the-crow-flies. Of the streets within one-quarter mile of existing transit service, about 11 of the total 55 street miles lack a sidewalk (or 20 percent of the street miles). Most of the sidewalk gaps are located along Local Streets, which are streets with the lowest motor vehicle volumes and travel speeds.

Sidewalk gaps near community amenities were also evaluated, including schools, parks, and libraries. The following analysis is based on a half-mile distance to these destinations. The TSP identified about 33 miles of sidewalk gaps near these community amenities, or about 21 percent of all potential sidewalks in these areas (see Figure 13).

FIGURE 13: SIDEWALK COVERAGE NEAR COMMUNITY AMENITIES

PEDESTRIAN LEVEL OF TRAFFIC STRESS

The pedestrian level of traffic stress (LTS) evaluation provides a metric to understand a multimodal user's perception of the safety and comfort of the transportation network. This method was used to understand key gaps and barriers to walking to be addressed through targeted improvements.

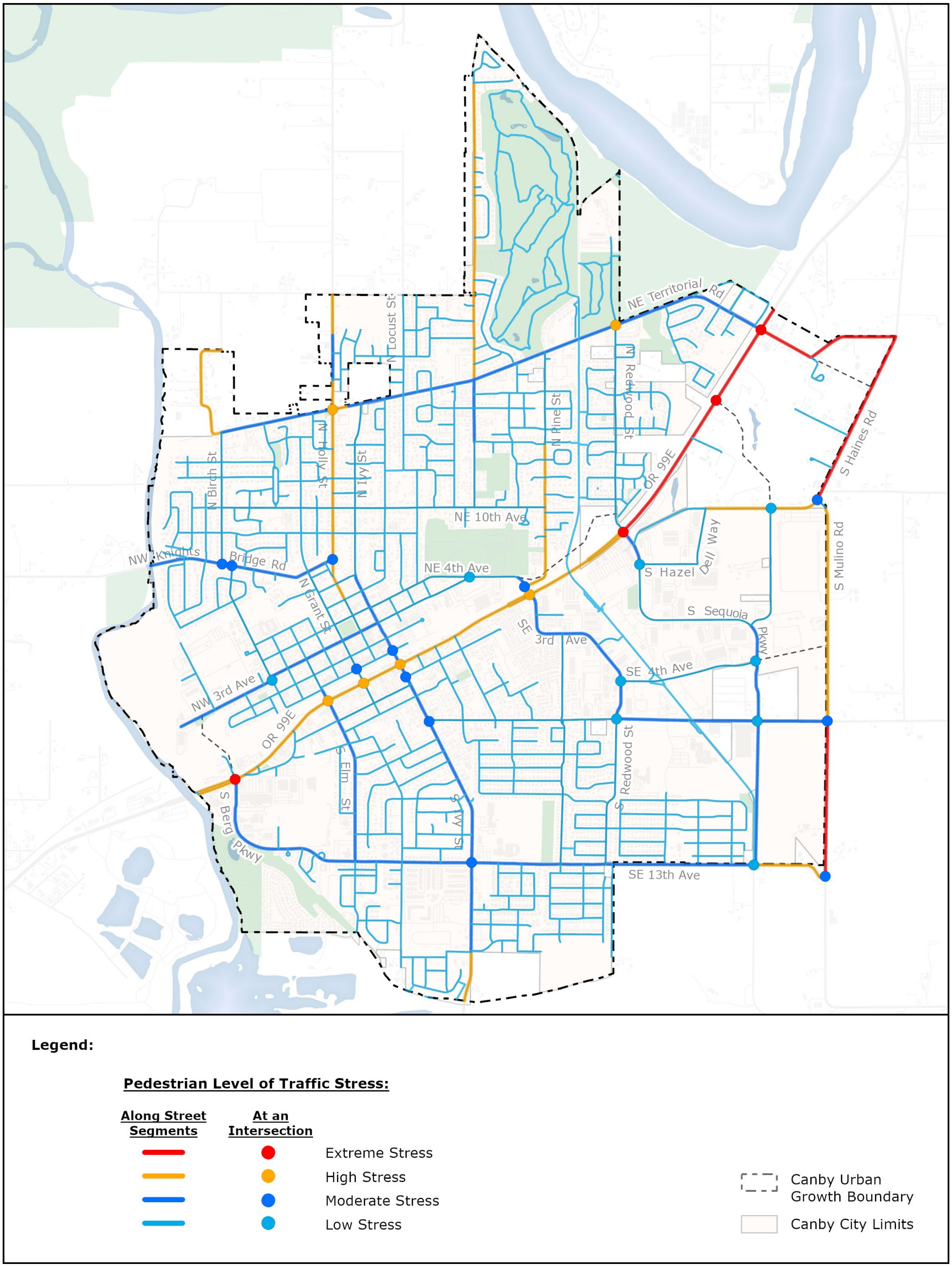
The LTS evaluation generates a ranking (i.e., low, moderate, high, or extreme stress) of the relative safety and comfort of a segment or intersection for pedestrians based on roadway and intersection characteristics (e.g., land use context, number of lanes, travel speed and volume, intersection control, type and width of buffer, and the presence and condition of any bicycle or pedestrian facilities). The LTS rating scale recognizes that as vehicle speeds and volumes increase, enhanced pedestrian facilities are needed to maintain a system that is accessible and comfortable for all users.

Results of the pedestrian LTS evaluation are summarized in Figure 14. A pedestrian walking along roughly 88 percent of streets within the City's planning area will experience a low or moderate level of stress. This is generally representative of the many low volume and speed streets. Extreme or high level of stress is experienced along 11 percent of streets, mainly those with the highest speeds and traffic volumes. This includes parts of OR 99E, 13th Avenue, Mulino Road, and Haines Road. These streets are important for pedestrian travel, so this TSP places a higher priority for improvement projects along them.

As redevelopment and frontage improvements occur through 2043, streets will be built to align with the standards outlined in Chapter 3. These standards require high-quality facilities, and an emphasis on safe, convenient, and comfortable travel in alignment with the multimodal level of traffic stress targets outlined in Chapter 3 to contribute towards a network wide lower stress pedestrian experience.

Equally important is the pedestrian experience while crossing streets. These locations are often when a pedestrian experiences some of the highest amount of stress and delay, particularly along major streets with high travel speeds and traffic volumes. Not surprisingly, many intersections along the busiest streets (i.e., OR 99E, Territorial Road and Ivy Street) have a pedestrian stress level of extreme or high, while most intersections along less busy streets have a low or moderate level of stress for pedestrians (see Figure 14). This TSP includes targeted locations that are identified for enhanced or improved crossings (see Chapter 4).

FIGURE 14: PEDESTRIAN LEVEL OF TRAFFIC STRESS



BIKING NETWORK

Bicycling is important for both transportation and recreation in the Canby planning area. This includes people who bike to work and school, recreation, or running errands. Riding bicycles also plays a key role in the transportation system's ability to support healthy and active lifestyles and provide a viable alternative to the automobile. While walking tends to be a competitive choice for trips under half a mile, bicycling tends to be suited for longer trips of three miles or longer. Canby's relatively compact size makes biking a great choice for many trips, with local jobs and housing typically in bikeable proximity.

This TSP includes projects to provide continuous bicycle connections between all key destinations that are essential for safe and attractive non-motorized travel options. It includes bicycle infrastructure that appeals to a wider range of people, both in age and ability. Many people want to bike, but they find riding near traffic in standard bike lanes stressful and unpleasant. This TSP includes a bicycle network of streets with facility standards designed to minimize interactions between people on bikes and car traffic (see Chapter 3 for more information). The network is designed so that everyone is within a quarter mile of one.

BICYCLE FACILITY GAPS

Of the 69 miles of potential bikeways along arterial or collector streets in the City's planning area today, currently 25 miles of them have bike facilities, and 44 miles or about 64 percent do not have bike facilities (see Figure 15). These gaps are most notable along OR 99E, and in unincorporated areas within the planning area.

FIGURE 15: CANBY BICYCLE FACILITY COVERAGE

69 TOTAL MILES

OF POTENTIAL BIKEWAYS ALONG ARTERIAL OR COLLECTOR STREETS

Many of the bikeway gaps along these streets will be completed once projects within this TSP are completed with new development. This TSP also includes projects to complete the bicycle facility gaps or improve existing bike facilities along streets within the planning area (see Chapter 4).

Bicycle Facility Coverage Near Transit and Community Amenities

Two to three miles is typically an accepted distance for gauging a transit stop's bikeable area. This distance is loosely based on the amount people who are willing to bike to transit or community amenities. Given this distance covers most of the City's planning area, a shorter distance of one-half mile was used to identify bicycle facility coverage nearest transit stops and community amenities based on the actual arterial or collector street network as-the-crow-flies. Of the arterial or collector streets within one-half mile of existing transit service and community amenities, about 17 of the total 31 street miles lack any type of bike facility (or 55 percent of the street miles). Most of these gaps are along OR 99E, as well as NW 3rd Avenue.

BICYCLE LEVEL OF TRAFFIC STRESS

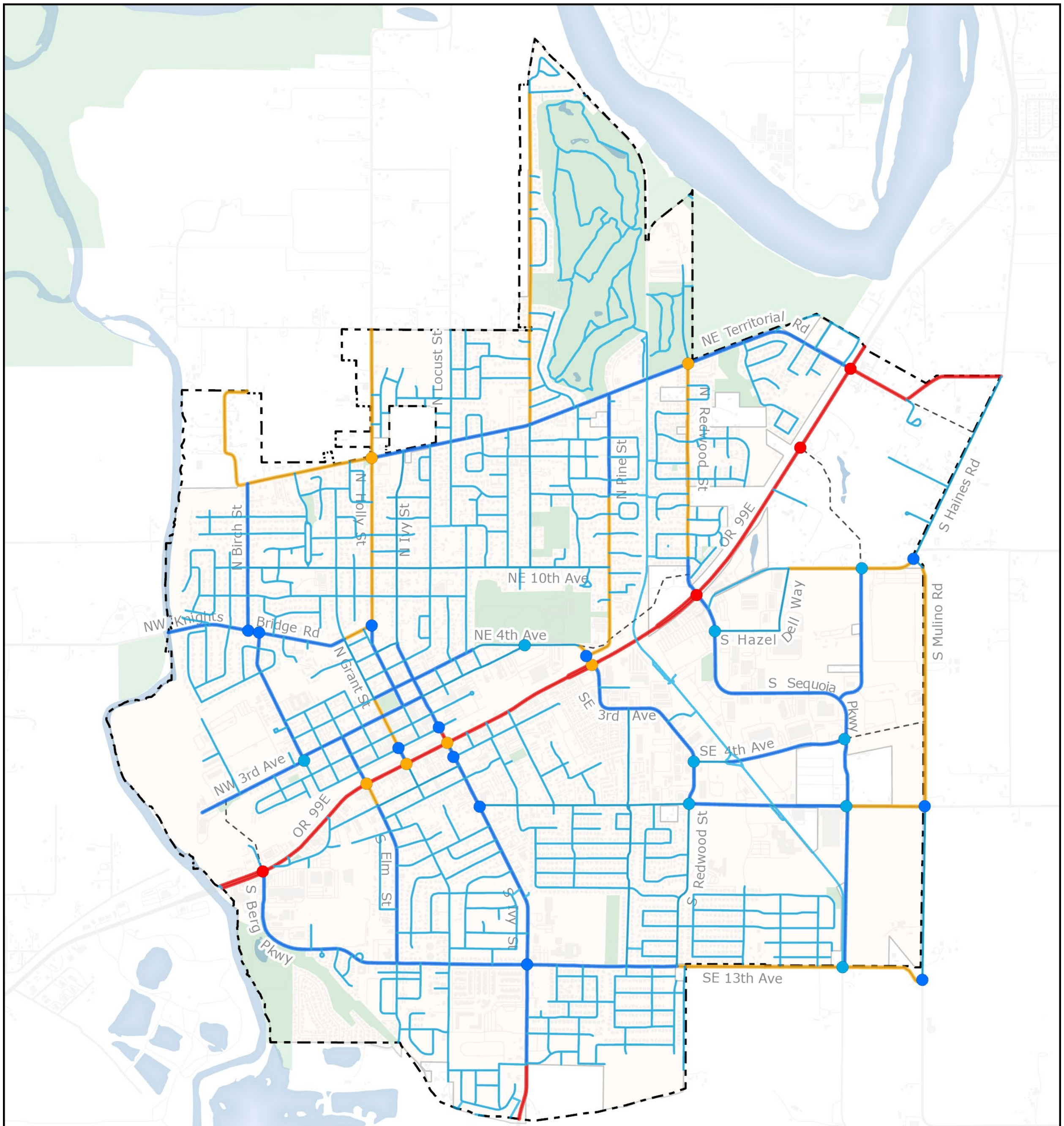
The bicycle level of traffic stress (LTS) evaluation provides a metric to understand a cyclist's perception of the safety and comfort of the transportation network. This method was used to understand key gaps and barriers to biking to be addressed through targeted improvements.

The LTS evaluation generates a ranking (i.e., low, moderate, high, or extreme stress) of the relative safety and comfort of a segment or intersection for bicyclists based on roadway and intersection characteristics (e.g., land use context, number of lanes, travel speed and volume, intersection control, type and width of buffer, and the presence and condition of any bicycle or pedestrian facilities). The LTS rating scale recognizes that as vehicle speeds and volumes increase, enhanced bicycle facilities are needed to maintain a system that is accessible and comfortable for all users.

Results of the bicycle LTS evaluation are summarized in Figure 16. A bicyclist riding along roughly 87 percent of the streets within the City's planning area will experience a low or moderate level of stress. This is generally representative of the many low volume and speed local streets, which are reasonably comfortable for bicycling today. In contrast, an extreme or high level of stress is experienced along 13 percent of streets, mainly arterial and collector streets with the highest speeds and traffic volumes. This includes the extent of OR 99E, Haines Road, Mulino Road, Holly Street, and segments of Elm Street, Grant Street, Ivy Street and 13th Avenue. These streets are important for bicycle travel, so this TSP places a higher priority for improvement projects along them.

As redevelopment and frontage improvements occur through 2043, streets will be built to align with the standards outlined in Chapter 3. These standards require high-quality facilities, and an emphasis on safe, convenient, and comfortable travel, and align with the multimodal level of traffic stress targets outlined in Chapter 3 to contribute towards a network wide lower stress bicycle experience.

FIGURE 16: BICYCLING LEVEL OF TRAFFIC STRESS



Legend:

Bicycle Level of Traffic Stress:

Along Street Segments	At an Intersection	
red line	red dot	Extreme Stress
orange line	orange dot	High Stress
blue line	blue dot	Moderate Stress
light blue line	light blue dot	Low Stress

Canby Urban Growth Boundary

Canby City Limits

TRANSIT

Transit service is provided in the planning area by Canby Area Transit (CAT), via two fixed bus routes, and an Americans with Disabilities Act (ADA) paratransit service. The South Clackamas Transportation District (SCTD) and South Metro Area Regional Transit (SMART) also provide additional fixed-route bus service. The City's main transit facility is the Canby Transit Center, which is located on NW 1st Avenue between N Grant Street and N Ivy Street.

FIXED BUS ROUTES

CAT operates two fixed-route bus line in Canby. Route 99X, which runs between Oregon City and Woodburn via Canby. Stops in Canby are at:

- OR 99E and SW Berg Parkway
- Canby Transit Center
- OR 99E and S Locust Street
- OR 99E and S Sequoia Parkway
- OR 99E near Haines Road

CAT's other fixed-route bus line is the Canby Loop, which is free to ride. The service operates Monday-Saturday as of Fall 2023 and includes 32 stops throughout Canby. The line operates Monday through Friday, 6:00 a.m. to 7:41 p.m., and on Saturday, 8:00 a.m. to 9:46 p.m. The Canby Loop service is funded from a combination of state grants and financial support from local businesses. Figure 17 shows the existing CAT bus stops and routes in Canby.

South Clackamas Transportation District also operates its Molalla to Canby route between those two cities, with stops in Canby at the Canby Transit Center and the Canby Market/Fred Meyer on Sequoia Parkway. This route runs between 6:30 a.m. and 6:15 p.m. on weekdays with 60-minute headways[4].

South Metro Area Regional Transit (SMART)'s 3x line connects Canby with Wilsonville. This route has stops at the Canby Transit Center and the N Cedar St and NW 2nd Avenue intersection near Downtown Canby. Service on this line is Monday-Friday between 5:30 a.m. and 6:54 p.m., with 30- to 66-minute headways[5].

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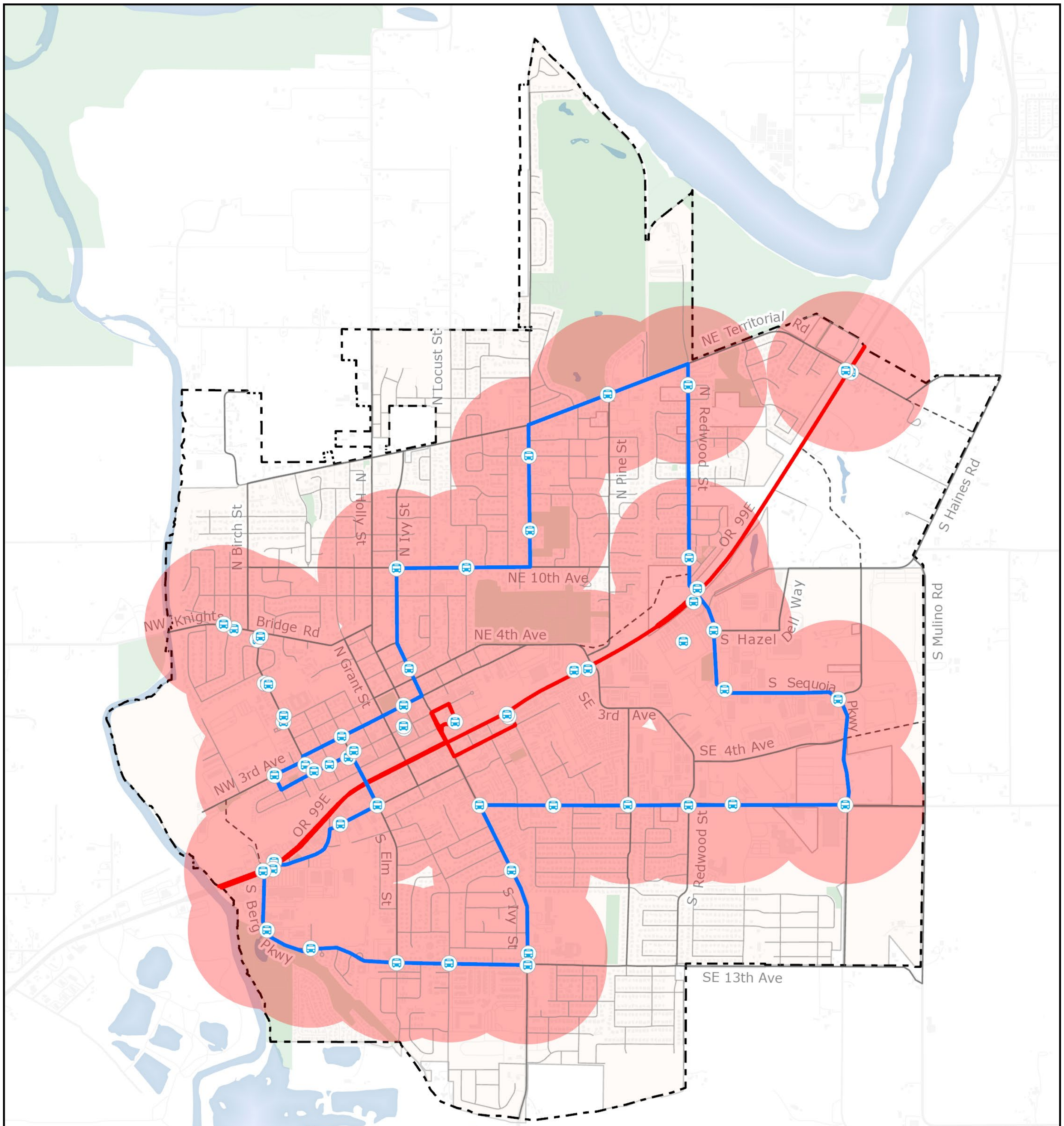
[4] https://www.sctd.org/canby

[5] https://www.ridesmart.com/transit/page/3x-canby

FIGURE 17: CANBY TRANSIT ROUTES



Legend:

Existing Transit Routes:

CAT Route 99X

CAT Canby Loop

Area within 1/2 mile of Existing Transit

Bus Stop

Canby Urban Growth Boundary

Canby City Limits

CHAPTER 3.

Facility and Performance Standards

Canby applies transportation standards and regulations to the construction of new transportation facilities and to the operation of all facilities to ensure they are designed appropriately, and the system functions as intended. These standards enable consistent future actions that reflect the goals and objectives of the City.

STREET JURISDICTION

Roadway ownership and maintenance responsibilities depend on the roadway authority. In addition, required design and operation standards for each street and intersection vary by agency. Streets in the planning area are under the jurisdiction of Canby, Clackamas County, or ODOT. OR 99E is and will remain under ODOT jurisdiction.

Streets that are expected to be under the jurisdiction of Clackamas County include portions of Haines Road, Mulino Road and other streets in unincorporated areas of the City's planning area currently under County jurisdiction that are assumed to become City streets as the areas are incorporated. All other existing or planned streets are assumed under the jurisdiction of Canby.

NETWORK CLASSIFICATIONS AND ROUTE DESIGNATIONS

All streets in the TSP planning area include classifications and route designations to help support the movement of all people and help to ensure the transportation system is comfortable, convenient, safe and well connected for all users. These include functional classifications for vehicle, pedestrian and bicycle travel and route designations for truck travel. The classifications and route designations combine to determine the minimum acceptable facility type and design requirements of different elements for each mode.

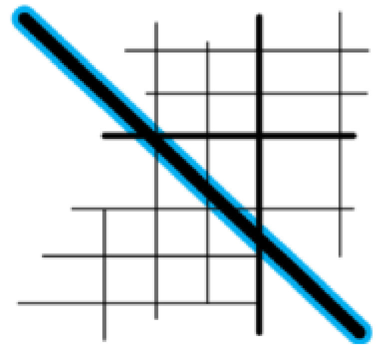
Although guidance is provided for the City's preferred classification and route designations along OR 99E and street segments in unincorporated areas of the planning area, these streets are under state or Clackamas County jurisdiction and subject to the classifications of these agencies.

STREET FUNCTIONAL CLASSIFICATIONS

Functional classification for streets helps support the movement of people and is an important tool for managing the roadway network. The street functional classification system recognizes that individual streets do not act independently of one another but instead form a network that serves travel needs on a regional, citywide, neighborhood, and local level. By designating the management and design requirements for each roadway classification, this hierarchal system supports a network of streets that perform as desired.

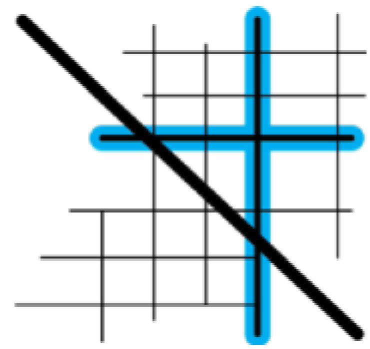
The street functional classification system for roadways in the City's planning area is described below. From highest to lowest intended use, the classifications are Arterial, Collector, Neighborhood Route, and Local Streets. The functional classification map (Figure 18) shows the designated classification for all roadways in the City's planning area, including new street extensions proposed as part of this plan. These classifications are determined based on the intended function they serve for motor vehicles within the planning area, consistent with the definitions presented earlier in this chapter.

Arterial Street



Arterial Streets are primarily intended to serve regional and citywide traffic movement. Arterials provide the primary connection to other Arterial Streets or Collector Streets. They are typically spaced about one mile apart to assure accessibility and reduce the occurrence of through traffic using collectors or local streets in lieu of a well-placed arterial street. Where an Arterial Street intersects with a Neighborhood or Local Street, access management and/or turn restrictions may be employed to reduce traffic delay, while not adversely impacting safety and convenience for other modes. They often serve high volumes of traffic (>10,000 daily vehicles) over long distances and minimize direct access to adjacent land to support the safe and efficient movement of people and goods.

Collector Street



Collector Streets are intended to distribute traffic from Arterials Streets to streets of the same or lower classification. They provide both access and circulation within and between residential and non-residential areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as much access control compared to arterials, and they serve residential neighborhoods, distributing trips from the neighborhood and local street system.

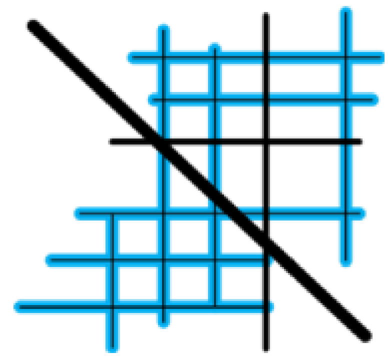
Collectors generally support traffic volumes typically ranging from 5,000 to 10,000 daily vehicles and speeds often managed between 25 mph and 35 mph.

Neighborhood Route

Neighborhood routes provide connectivity between local streets and collectors or arterials. Because neighborhood routes connect local street networks with collector and arterial streets, they generally have more traffic than local streets and are typically used by residents to get into and out of the neighborhood. A neighborhood route is not intended to serve citywide/large area circulation. Neighborhood routes should maintain slow vehicle operating speeds to accommodate safe use by all modes and through vehicle traffic without an origin or destination in the immediate area should be discouraged.

Neighborhood routes generally support traffic volumes ranging from 1,500 to 5,000 daily vehicles, with vehicular speeds typically managed to no more than 25 mph.

Local Street



All streets not classified as Arterial, Collector, or Neighborhood Routes are classified as Local streets. Local streets prioritize providing immediate access to adjacent land and often function as through routes for pedestrians and bicyclists. These streets should be designed to enhance the livability of neighborhoods and can generally accommodate up to 1,500 vehicles per day. A well-connected grid system of relatively short blocks can minimize excessive volumes of motor vehicles, limit out-of-direction travel, and encourage walking and biking. They should be provided at a maximum spacing of 530 feet in most cases. Speeds are not normally posted, with a statutory 25 mph speed limit in effect. Local streets are not intended to support long distance vehicular travel and are often designed to discourage through traffic without an origin or destination in the immediate area.

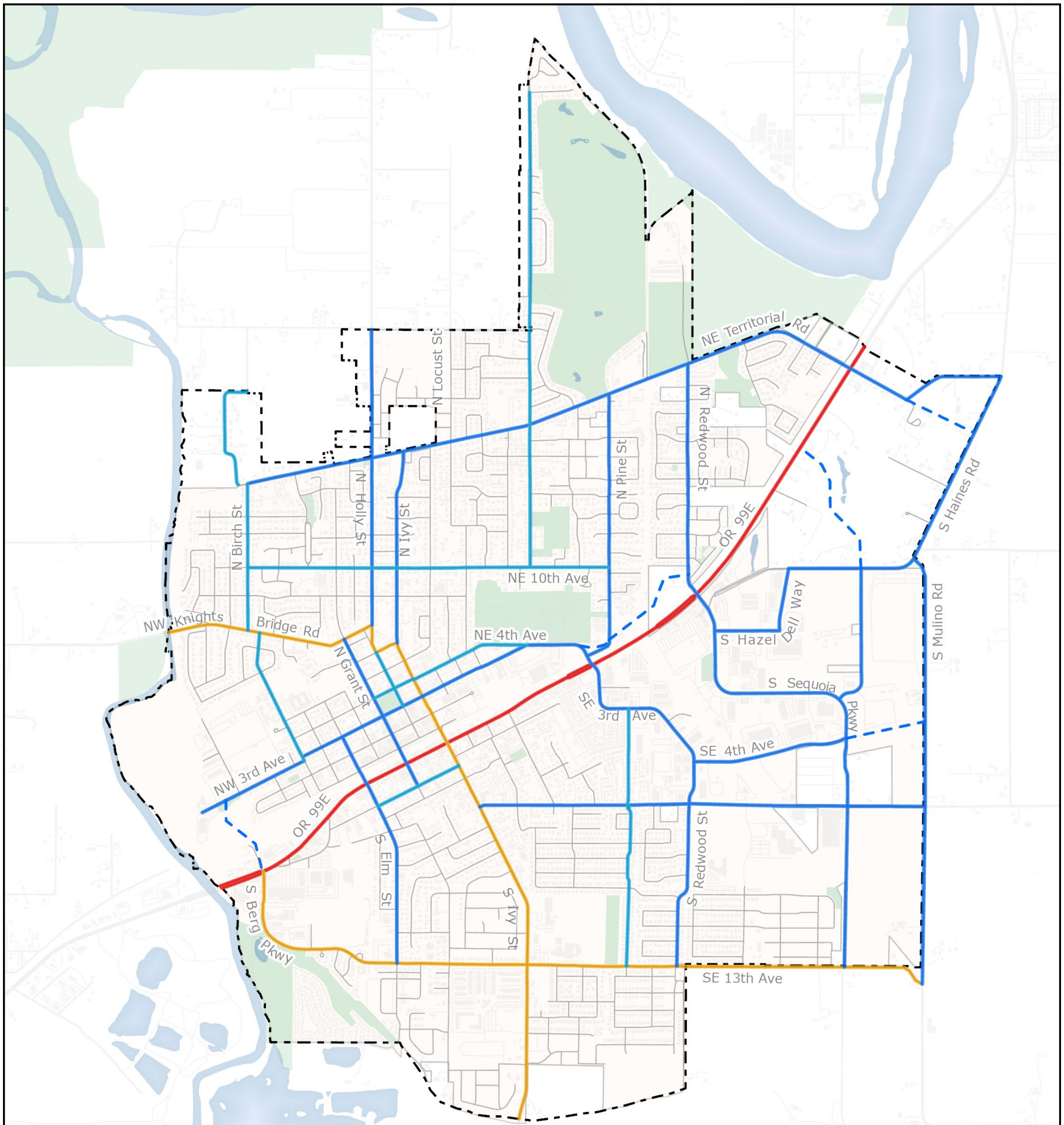
TRUCK ROUTE DESIGNATIONS

To complement the street functional classifications, routes are identified for truck travel. The truck route designations help maintain a system of streets that support existing and future truck travel through Canby. Figure 19 shows streets that include the truck route designations, which apply to all streets in the Pioneer Industrial Park and along streets in this TSP identified as key links to service commercial and industrial uses in the planning area.

The truck routes include OR 99E and portions of Sequoia Parkway, S Redwood Street, SE 4th Avenue, Township Road, Mulino Road, Walnut Street, SE 1st Avenue, Territorial Road, Holly Street, Knights Bridge Road, NW 3rd Avenue and N Elm Street.

The applicable State and County design standards for these facilities have already accounted for the accommodation of trucks. Each of these routes plays a vital role in the economical movement of raw materials and finished products, while keeping trucks along these routes helps maintain neighborhood livability, public safety, and minimizes maintenance costs of the street system.

FIGURE 18: STREET FUNCTIONAL CLASSIFICATIONS



Legend:

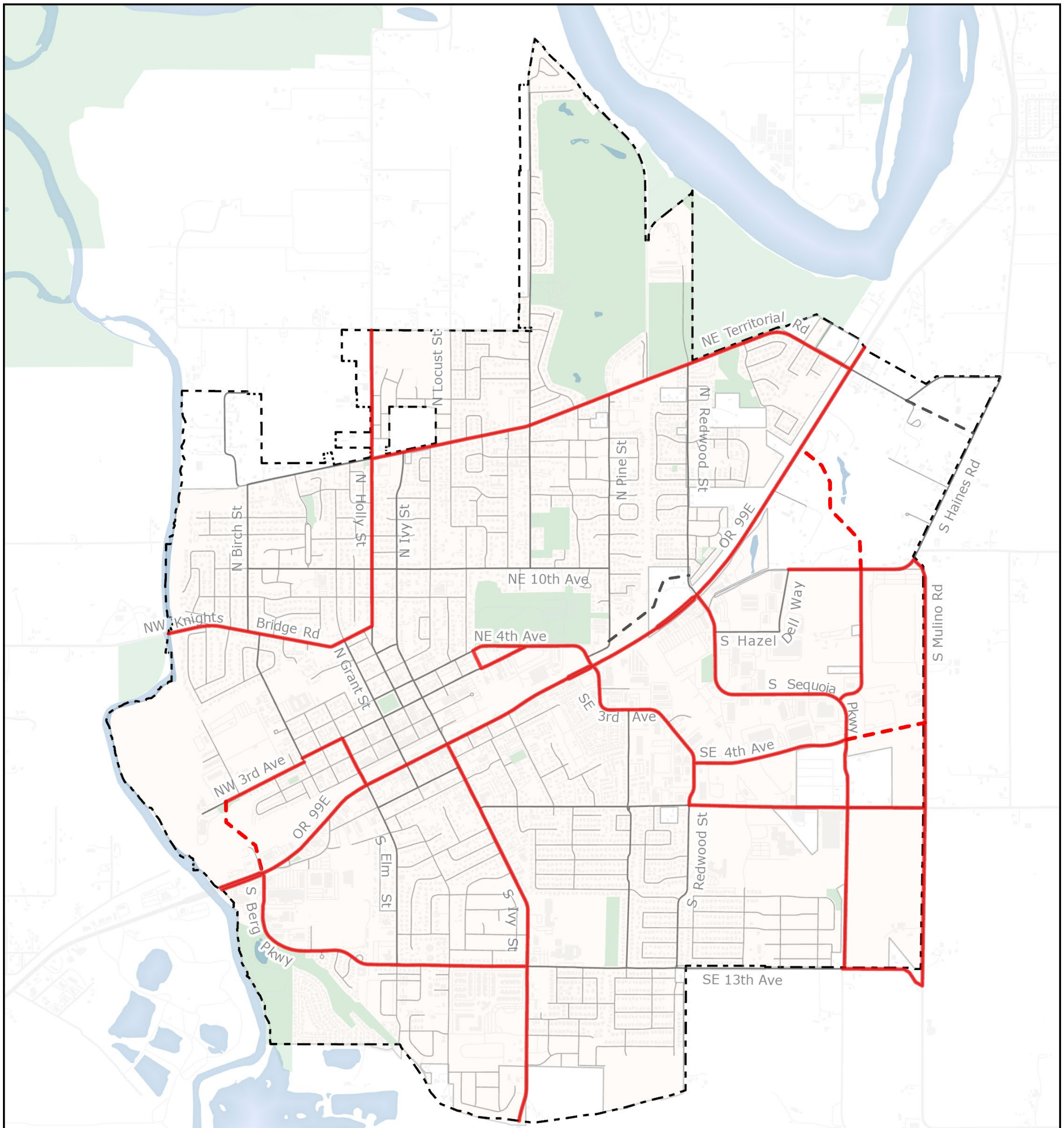
Functional Classification:

Existing Streets	Planned Streets (Conceptual Alignments)	
		Highway
		Arterial Street
		Collector Street
		Neighborhood Route
		Local Street

Canby Urban Growth Boundary

Canby City Limits

FIGURE 19: TRUCK ROUTE DESIGNATIONS



Legend:

Truck Routes:

Existing Streets | **Planned Streets (Conceptual Alignments)**

Truck Route Designation

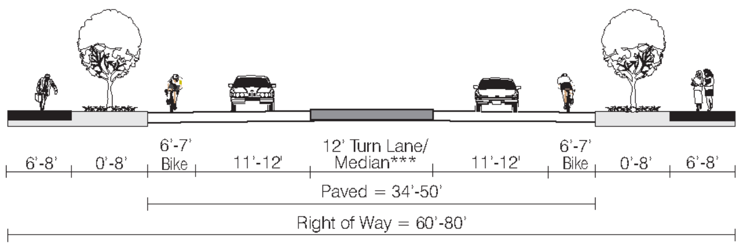
Canby Urban Growth Boundary

Canby City Limits

TYPICAL STREET CROSS-SECTIONS

The design of the streets in the City's planning area is based on the functional classifications and truck route designation. All streets in the planning area are multimodal and include travel lanes and on-street parking for vehicles, sidewalks for pedestrians, and on-street or separated facilities for bicyclists. Accommodating these modes varies by the functional classification and truck route designation. These cross-section standards identify the design characteristics needed to meet the function and demand for each facility type for streets in the City's planning area. Since the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, this system allows standardization of key characteristics to provide consistency. Several typical cross-sections have been highlighted below in Figure 20 to Figure 23.

FIGURE 20: TYPICAL CITY ARTERIAL STREET CROSS-SECTION



Notes:

* On-Street Parking is only allowed on arterial roadways within downtown commercial district. Diagonal or parallel parking may be provided on one or both sides interchangeably.

** When on-street parking is provided, bike lanes should only be provided adjacent to parallel parking (not head-in diagonal parking). If diagonal parking is provided on both sides and speeds are 25 miles per hour or less, then bike lanes are not required.

*** Turn Lane/Median section is optional and may consist of one of the following:

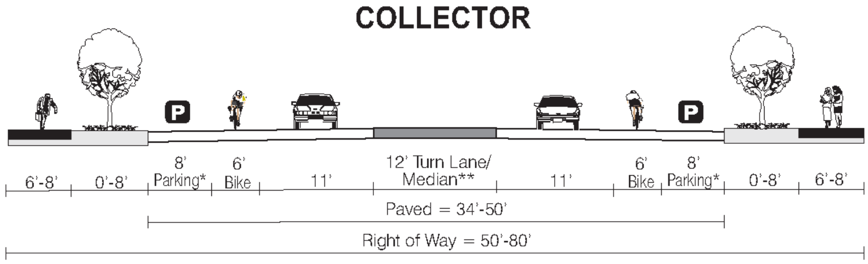
A. 12' Left-Turn Lane or Two-Way Left-Turn Lane with No Raised Median
B. 10' Raised, Landscaped Median with 1' Shy Distance on Either Side
C. 10' Pedestrian Refuge (Level with Roadway) with 1' Shy Distance on Either Side

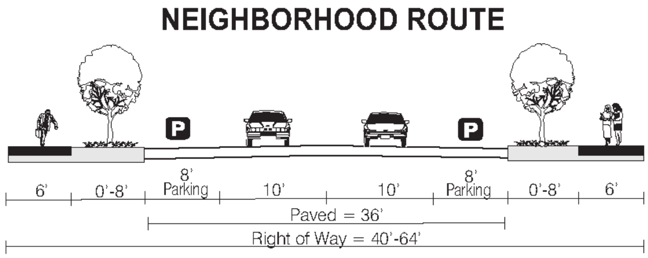
Low Impact Street Design Characteristics

Characteristic	Arterials (One-Way)	Arterials (Two-Way)
Vehicle Lane Widths	11 ft.	11 ft.
On-Street Parking	8 ft.- Only in downtown	8 ft.- Only in downtown
Bicycle Lanes (minimum)	5-6 ft. - Right side or road	5-6 ft.
Sidewalks (minimum)	6-8 ft.	6 ft.
Buffer/Planter Strip	0-8 ft	0-8 ft
Turn Lane/Median	12 ft.- Optional	12 ft. - Optional
Neighborhood Traffic Management (NTM)	Under Special Conditions	Under Special Conditions
Transit	As appropriate	As appropriate
Turn Lanes	When Warranted	When Warranted

"Low Impact" standards require demonstration of hardship or other exceptional circumstances resulting from conditions of the adjacent properties and must be approved by City Staff.

FIGURE 21: TYPICAL CITY COLLECTOR STREET AND NEIGHBORHOOD ROUTE CROSS-SECTION





Notes:

* On-Street Parking may be provided on neither, one, or both sides. Where turn lanes are provided, on-street parking should not be allowed.

** Turn Lane/Median section is optional and may consist of one of the following:

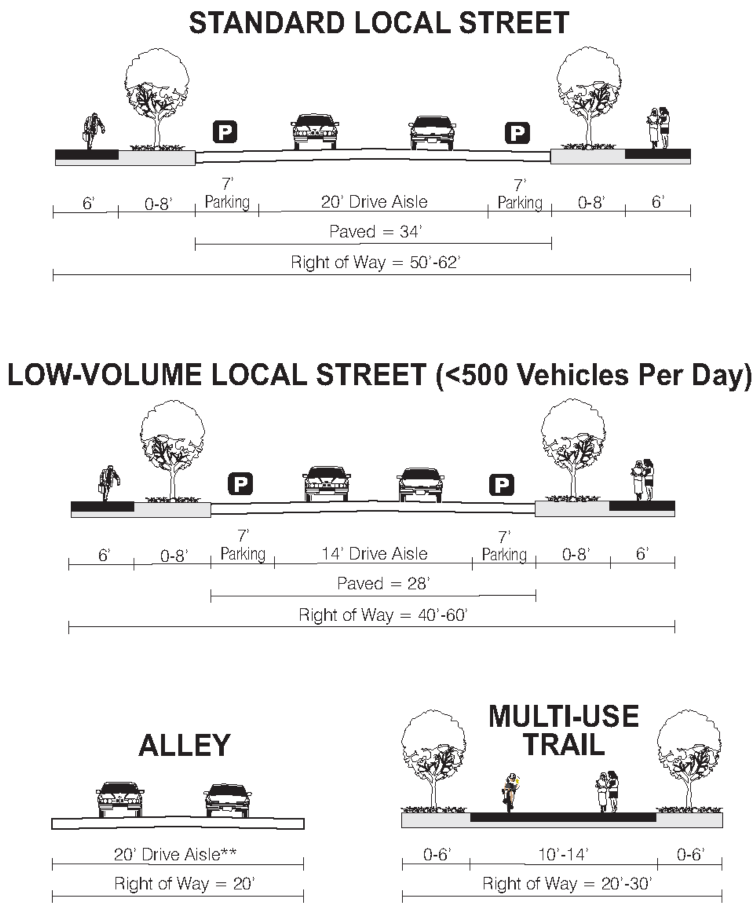
A. 12' Left-Turn Lane or Two-Way Left-Turn Lane with No Raised Median
B. 10' Raised, Landscaped Median with 1' Shy Distance on Either Side
C. 10' Pedestrian Refuge (Level with Roadway) with 1' Shy Distance on Either Side

Low Impact Street Design Characteristics

Characteristic	*Collectors*	*Neighborhood Routes*
Vehicle Lane Widths	*10-11 ft.*	*10 ft.*
On-Street Parking	*8 ft.-Optional*	*8 ft.- At least one side*
Bicycle Lanes (minimum)	*5-6 ft.*	*None*
Sidewalks (minimum)	*6-8 ft.*	*6 ft.*
Buffer/Planter Strip	*0-8 ft*	*0-8 ft*
Turn Lane/Median	*12 ft.-Optional*	*None*
Neighborhood Traffic Management (NTM)	*Under Special Conditions*	*Under Special Conditions*
Transit	*As appropriate*	*As appropriate*
Turn Lanes	*When Warranted*	*When Warranted*

"Low Impact" standards require demonstration of hardship or other exceptional circumstances resulting from conditions of the adjacent properties and must be approved by City Staff.

FIGURE 22: TYPICAL CITY LOCAL STREET CROSS-SECTION



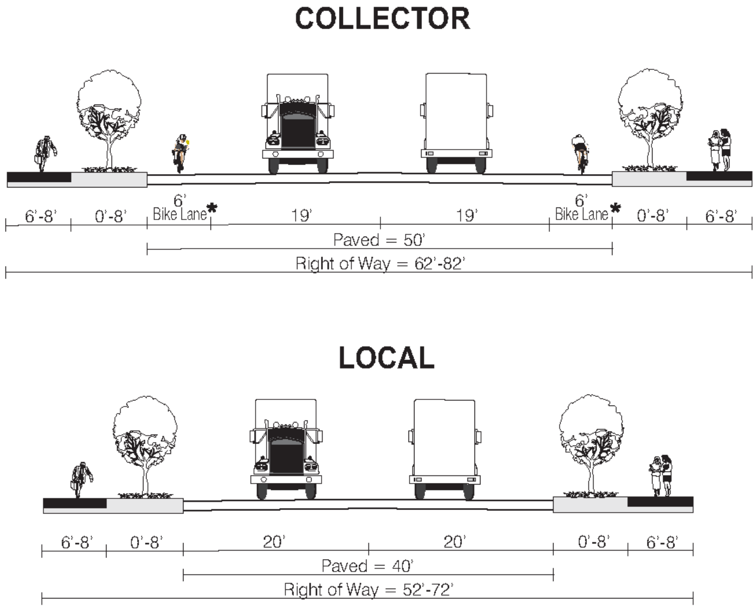
Notes:
** On-Street Parking prohibited.

Low Impact Street Design Characteristics

Characteristic	Local
Drive Aisle	*14 ft.*
On-Street Parking	*7 ft.- Both sides required*
Bicycle Lanes (minimum)	*None*
Sidewalks (minimum)	*6 ft.*
Buffer/Planter Strip	*0-8 ft*
Turn Lane/Median	*None*
Neighborhood Traffic Management (NTM)	*Under Special Conditions*
Transit	*Should not be used*
Turn Lanes	*None*

"Low Impact" standards require demonstration of hardship, other exceptional circumstances resulting from conditions of the adjacent properties and must be approved by City Staff.

FIGURE 23: TYPICAL CITY TRUCK ROUTE CROSS-SECTION



Note:
*Adjacent to intersections, bike lane stripes should be dotted instead of solid within the turning maneuver area of the trucks.

Low Impact Street Design Characteristics

Characteristic	*Collector*	*Local*
Paved Width	*46 ft.*	*32 ft.*
On-Street Parking	*None*	*None*
Bicycle Lane	*5 ft.*	*None*
Sidewalks	*6 ft.*	*6 ft.*
Buffer/Planter Strip	*0-8 ft*	*0-8 ft*
Turn Lane/Median	*12 ft.*	*None*
Neighborhood Traffic Management (NTM)	*None*	*None*

"Low Impact" standards require demonstration of hardship or other exceptional circumstances resulting from conditions of the adjacent properties and must be approved by City Staff.

PERFORMANCE STANDARDS

Performance standards are applied to the operation and design of transportation facilities to ensure that the network functions as intended. In Canby, this includes performance standards for vehicles, pedestrians, bicyclists, and overall system connectivity.

VEHICLE CONGESTION THRESHOLDS

Mobility targets for streets and intersections in Canby provide a metric for assessing the impacts of new development on the existing transportation system and for identifying where capacity improvements may be needed. They are the basis for requiring improvements needed to sustain the transportation system as growth and development occur. Two methods used to gauge operational conditions for motor vehicles include volume-to-capacity (v/c) ratios and level of service (LOS).

- Volume-to-capacity (v/c) ratio: A v/c ratio is a decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00 (generally above 0.70), congestion noticeably increases, and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

- Level of service (LOS): LOS is a "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay is excessive and demand exceeds capacity, typically resulting in long queues and delays.

This TSP includes performance standards for motor vehicles that apply to City streets and intersections during the highest one-hour period of the day. A level of service "D" or better and a v/c ratio of 0.85 or less applies at signalized, all-way stop, and roundabout controlled intersections. At two-way stop and yield controlled intersections, a level of service "E" or better and a v/c ratio of 0.90 or less must be maintained. Mobility standards do not apply to approaches at stop-controlled intersections serving 10 vehicles or fewer during the peak hour[6]. This mobility standard allows more flexibility in the tension between larger intersection and street designs that are sometimes needed to accommodate peak vehicle demands, and the desire to maintain smaller designs that encourage slower vehicle speeds and tend to be more accommodating to pedestrian and bicycle users.

[6] When a low number of vehicles approach a stop-controlled intersection (i.e., 10 or fewer), particularly at those with high volumes on the uncontrolled major street, long delays for vehicles often result during peak periods. This can cause the intersection to operate with a peak hour v/c ratio that exceeds the adopted intersection mobility standard and can necessitate the need to expand the intersection. Therefore, stop controlled approaches with a low volume of traffic are commonly excluded from agency mobility standards.

MULTIMODAL LEVEL OF TRAFFIC STRESS TARGETS

Pedestrian and bicycle level of traffic stress (LTS) evaluations provide a metric to understand a multimodal user's perception of the safety and comfort of the transportation network. This method can be used to understand key gaps and barriers to walking and bicycling which can then be addressed through targeted improvements.

The LTS evaluation generates a ranking between 1 and 4 of the relative safety and comfort of a segment or intersection for bicyclists or pedestrians based on roadway and intersection characteristics (e.g., land use context, number of lanes, travel speed and volume, intersection control, type and width of buffer, and the presence and condition of any bicycle or pedestrian facilities). The LTS rating scale recognizes that as vehicle speeds and volumes increase, enhanced pedestrian and bicycle facilities are needed to maintain a system that is accessible and comfortable for all users. The following summarizes the LTS rankings:

- Low Stress (LTS 1) – represents little traffic stress and requires less attention, so is suitable for all cyclists or pedestrians of all ages and abilities. Traffic speeds are low (i.e., 25 mph) and there is no more than one lane in each direction. Intersections are easily crossed by children and adults. Typical locations include residential local streets, separated bike paths/cycle tracks, and sidewalks/shared use paths with a buffer between vehicles and cyclists or pedestrians.
- Moderate Stress (LTS 2) – represents little traffic stress but requires more attention than can be expected of young children and is more suitable for teen and adult pedestrians or cyclists with adequate bike handling skills. Traffic speeds are slightly higher (i.e., up to 35 mph), but speed differentials are still low, and roadways can be up to three lanes wide. Intersections are not difficult to cross for most teenagers and adults. Typical locations include collector-level streets with bike lanes or a central business district. Sidewalks are generally in good condition with limited impediments for mobility device users (i.e., adequate sidewalk widths and ramps in most locations).
- High Stress (LTS 3) – represents moderate stress and is suitable only for the most observant adult cyclists or pedestrians. Traffic speeds are moderate (i.e., 35 to 40 mph) but can be on roadways up to five lanes wide, and there can be limited buffers between travel lanes and the sidewalk. Intersections are still perceived to be safe by most adults. Typical locations include lower-speed (i.e., 35 mph) arterials with bike lanes or moderate speed (i.e., 40 mph) collectors up to three lanes wide. Select segments of these roadways may be impassable to pedestrians who require a mobility device.
- Extreme Stress (LTS 4) – represents high stress and only marginally suitable for experienced and skilled cyclists or able-bodied adult pedestrians. Traffic speeds are moderate to high (i.e., 40 mph or more) and can be on roadways from two to over five lanes wide with limited or no pedestrian or bicycle facilities. Intersections can be complex, wide, and or high volume/speed that can be perceived as unsafe by adults and are difficult and/or dangerous to cross. Typical locations include high-speed or multilane roadways with narrow or no bike lanes and sidewalks. Roadways without sidewalks are also included in this category.

All streets should target a low to moderate stress (LTS 1 or 2) rating. While it may not be possible to achieve the target rating along all streets due to a variety of factors, these performance targets represent overall guidance in monitoring the level and quality of facility provided for pedestrian and bicycle travel and working towards the objectives of the TSP.

MULTIMODAL CONNECTIVITY

Transportation facility and access spacing standards include a broad set of techniques that balance the need to provide for efficient, safe, and timely multimodal travel with the ability to allow access to individual destinations. These standards help create a system of direct, continuous, and connected transportation facilities to minimize out-of-direction travel and decrease travel times for all users, while enhancing safety for people walking, biking, and driving by reducing conflict points.

Table 2 identifies maximum and minimum public roadway intersection, minimum private access, and maximum pedestrian and bicycle accessway spacing standards for streets in Canby. New streets or redeveloping properties must comply with these standards to the extent practical, as determined by the City Engineer or City Engineer designee. As the opportunity arises through redevelopment, strategies could be implemented along streets or at driveways not complying with these standards, such as shared access points, access restrictions (using a median or channelization islands), or closure of unnecessary access points, as feasible.

Street connectivity must be reviewed with all traffic studies associated with new development in the City's planning area to ensure that the multimodal objectives of the TSP are followed. Applicants will be required to provide a proposed street map as part of the development approval process.

TABLE 2: TRANSPORTATION FACILITY AND ACCESS SPACING STANDARDS

	FUNCTIONAL CLASSIFICATION			
	ARTERIAL STREET	COLLECTOR STREET	NEIGHBORHOOD ROUTE	LOCAL STREET
MAXIMUM BLOCK SIZE (PUBLIC STREET TO PUBLIC STREET)	1,000 ft.	600 ft.	600 ft.	600 ft.
MINIMUM BLOCK SIZE (PUBLIC STREET TO PUBLIC STREET)	660 ft.	250 ft.	150 ft.	150 ft.
MINIMUM DRIVEWAY SPACING (DRIVEWAY TO DRIVEWAY)	330 ft.	100 ft.	25 ft.	10 ft.
MINIMUM FULL-ACCESS DRIVEWAY SETBACK FROM INTERSECTION				
WITH ARTERIAL OR COLLECTOR STREET	150 ft.	100 ft.	50 ft.	25 ft.
WITH NEIGHBORHOOD ROUTE OR LOCAL	100 ft.	50 ft.	25 ft.	10 ft.
MAXIMUM DISTANCE BETWEEN PEDESTRIAN/ BICYCLE ACCESSWAYS (PUBLIC STREET TO ACCESSWAY OR ACCESSWAY TO ACCESSWAY) *	300 ft.	300 ft.	300 ft.	300 ft.

Note: All distances measured from the edge of adjacent approaches. All properties are allowed one driveway, which must take access from the lowest classified street.

* Mid-block pedestrian and bicycle accessways on public easements or rights-of-way must be provided at spacing of no more than 300 feet if full-street connections cannot be provided, unless the connection is impractical due to topography, natural areas, inadequate sight distance, lack of supporting land use or other factors that may prevent safe connection, as determined by the City Engineer or City Engineer Designee.

TRANSPORTATION IMPACT STUDY (TIS) GUIDELINES

Transportation impact studies (TIS) implement Sections 660-012-0045(2)(b) and -0045(2)(e) of the State Transportation Planning Rule (TPR), which require the City to adopt performance standards and a process to apply conditions to land use proposals in order to minimize impacts on and protect transportation facilities.

The preparation of the TIS report is the responsibility of the landowner or applicant and must be completed by a qualified professional engineer. Canby assumes no liability for any costs or time delays (either direct or inconsequential) associated with the TIS report preparation and review. All TIS reports shall be reviewed by the City Engineer or City Engineer Designee. It is the responsibility of the applicant to coordinate with ODOT or Clackamas County for any potential impact to their facilities.

STREET CROSSINGS

Streets with high traffic volumes and/or speeds and in areas with trail crossings, or nearby transit stops, residential uses, schools, parks, shopping, and employment destinations generally require enhanced street crossings with treatments, such as marked crosswalks, high visibility crossings, and curb extensions to improve safety and convenience. Crossing locations with higher volumes of pedestrians (either observed or projected) are also candidate locations for rectangular rapid flashing beacons or pedestrian hybrid beacons, which increase the visibility of the crossing for drivers.

Crossing opportunities along City streets should also align, where practical, with the transportation facility spacing standards shown in earlier in this chapter to ensure pedestrian and bicycle accessways are connected and continuous across streets. Exceptions include where the connection is impractical due to topography, inadequate sight distance, high vehicle travel speeds, lack of supporting land use, or other factors that may prevent safe crossing, as determined by the City Engineer or City Engineer Designee. All crossings on OR 99E require review and approval by ODOT.

Locations of enhanced pedestrian and bicycle crossing treatments along City streets should be determined using the National Cooperative Highway Research Program (NCHRP) Report 562, Improving Pedestrian Safety at Unsignalized Intersections[7]. These guidelines for pedestrian and bicycle crossing treatments are based on vehicle speed on the major street, pedestrian crossing distance, peak hour pedestrian volume, peak hour vehicle volume, and local parameters such as motorist compliance, pedestrian walking speed, and pedestrian start-up and clearance time. NCHRP Report 562 includes worksheets for inputting the variables above and identifying the appropriate treatment type. These guidelines should be reviewed with all traffic studies for any potential street crossing associated with new development in the City's planning area. Table 3 summarizes potential crossing treatments at intersections and mid-block locations for pedestrians and bicyclists.

[7] http://www.trb.org/Publications/Blurbs/157723.aspx

TABLE 3: CROSSING TREATMENTS FOR PEDESTRIANS AND BICYCLISTS

CROSSING TREATMENTS		CROSSING LOCATION	
		Intersection	Midblock
RECTANGULAR FLASHING BEACON (RRFB)			✓
CONVENTIONAL CROSSWALK		✓	✓
BULB OUT		✓	
MEDIAN REFUGE		✓	✓
INTERSECTION CROSSING MARKINGS		✓	
BIKE BOXES		✓	
TWO STAGE QUEUE BOXES		✓	

VOLUME AND SPEED MANAGEMENT TOOLS

Volume and speed management refers to street design techniques that slow traffic and make streets safer and more pleasant for pedestrian and bicycle users and adjoining land uses without significantly changing their vehicle capacity. These design techniques encourage a more inviting environment for pedestrians and bicyclists, particularly along streets designed for shared bicycle travel.

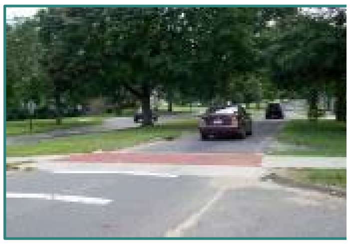
Table 4 shows common traffic calming applications and suggests which devices may be appropriate for streets in the Canby planning area. Volume and speed management measures must balance vehicle speeds and volumes with the mobility and circulation needs of service providers, such as emergency responders. Any traffic calming project should include coordination with emergency service providers to ensure the project does not impede response times. Any measures on OR 99E require review and approval by ODOT.

Volume and speed management influences driver behavior through physical and psychological means, by using one or more of the following:

- **Horizontal impediments** designed to make a driver turn the wheel and reduce the sight lines of unending pavement, which usually results in slower speeds. Examples include chicanes, roundabouts, and mini roundabouts.
- **Road narrowing** via striping, parking, or curb to reduce the drive lane widths, which slightly lower speeds. These treatments have the additional benefit of shortening pedestrian crossings, which lead to a safer multi-modal environment. Examples include curb extensions or bulbouts, or mid-block pedestrian refuge islands.
- **Closing the through road partially or fully** to disrupt travel patterns. These treatments alone may not change vehicle speeds but are effective at lowering volumes along certain streets.

TABLE 4: VOLUME AND SPEED MANAGEMENT TOOLS

TOOLS *		USE BY VEHICLE FUNCTIONAL CLASSIFICATION			IMPACT	
		Arterial Street	Collector Street	Neighborhood Route or Local Street	Speed Reduction	Traffic Diversion
NARROWING TRAVEL LANES		✓	✓	✓	✓	
PLACING BUILDINGS, ON-STREET PARKING, AND LANDSCAPING CLOSER TO THE STREET		✓	✓	✓	✓	
CURB EXTENSIONS OR BULBOUTS		✓	✓	✓	✓	
ROUNDABOUTS		✓	✓	✓	✓	
MINI-ROUNDABOUTS			✓	✓	✓	
MEDIANS AND PEDESTRIAN ISLANDS		✓	✓	✓	✓	

TOOLS *		USE BY VEHICLE FUNCTIONAL CLASSIFICATION			IMPACT	
		Arterial Street	Collector Street	Neighborhood Route or Local Street	Speed Reduction	Traffic Diversion
PAVEMENT TEXTURE		✓	✓	✓	✓	
RAISED INTERSECTION OR CROSSWALK				✓	✓	✓
CHOKER				✓	✓	✓
CHICANES				✓	✓	✓
DIVERTERS (WITH EMERGENCY VEHICLE PASS-THROUGH)			✓	✓	✓	✓

Note: * Any traffic calming project should include coordination with emergency service providers to ensure the project does not impede response times. Any measures on OR 99E require review and approval by ODOT.

CHAPTER 4.

Projects and Priorities

This chapter describes the transportation system improvement projects identified to address the system needs discussed in Chapter 2.

PROCESS FOR DEVELOPING PROJECTS

The project team developed the recommended transportation solutions using guidance provided by the project goals and with input from three main sources:

- Stakeholders (via committee meetings, in-person events, and project website comments and mail-in survey responses)
- Previous Plans (such as the 2010 Canby TSP, Canby OR 99E Corridor and Gateway Plan and Canby Walnut Street Extension)
- Independent Project Team Evaluation (Existing and Future Multimodal Transportation Conditions and Needs Evaluation)

The full list of projects in this TSP are referred to as Aspirational Projects. Aspirational projects include all identified projects for improving the transportation network along major streets in the City's planning area, regardless of their priority or their likelihood to be funded. This TSP focuses on streets in the planning area with a vehicle functional classification of Neighborhood Route or higher, and with a pedestrian or bicycle route designation of Neighborhood or higher. Additional improvements will occur with private development in the City's planning area, including the build out of the local street network consistent with the standards in Chapter 3.

The TSP planning process screens candidate projects to set aside those that may not be feasible due to environmental or existing development limitations. The remaining projects are a combination of new and previous ideas for the transportation system that seek to address the gaps and deficiencies in the City.

PROJECT FUNDING

Each project was reviewed to consider how it might be funded during the next 20 years. All projects were assigned a primary funding agency which include Canby, Canby Area Transit (CAT), Clackamas County and ODOT. In general, the primary funding agency was assumed to be the current or future facility owner, as they are responsible to oversee construction and long-term maintenance. In some cases, funding partnerships were identified for projects that were expected to provide mutual benefits between agencies or where there were opportunities to accelerate projects to completion. Each project was also assigned an assumed funding source, which included the City Street Fund (i.e., State Highway Trust Fund, Local Gas Tax, County Vehicle Registration Fee and Street Maintenance Fee revenues, etc.), the City Transportation System Development Charge (TSDC) revenues, or partner agency funds (i.e., ODOT, CAT). It is important to note that these funding assumptions do not obligate any agency to commit to these projects or fund them in this manner.

This TSP presents the high priority City projects that are constrained to a level of funding that is expected to be available for the next 20 years. In addition, the TSP identifies priority projects that the City could use to inform its decisions for applying the Transportation System Development

Charge revenues it receives. While there may be other partnering opportunities with ODOT and Clackamas County, these decisions are ultimately up to those agencies. Private development projects will likely also be built in coordination with land use actions and future development in the planning area, with much of the private development share likely included in the system development charge for transportation.

Approximately $13.95 million is estimated to be available for locally funded improvements over the next 20 years. About $31.6 million of the total project costs are assumed to be City responsibility (see Table 5). This TSP has identified about $138.7 million worth of needed investments that are assumed to be TSDC eligible improvements, and it assumes that the TSDC project list and associated rate will be updated to align with the transportation needs established in the TSP. Revenue from the City TSDC will be expected to provide $10.98 million for eligible projects over the next 20 years based on the current TSDC fee, and this TSP assumes increased revenue from the City TSDC will provide an additional $27 million through 2043 (see the "Potential Additional Funding Sources" section in the Appendix). The TSP has also identified projects estimated at over $25 million for other partner agencies, and while there may be opportunities with other agencies to jointly fund projects, no additional funding was assumed as these decisions are ultimately up to those agencies. Refer to the Appendix for more information on the expected transportation revenue and expenditures.

TABLE 5: ASPIRATIONAL PROJECT FUNDING (2025 DOLLARS)

FUNDING SOURCE	TOTAL FUNDING NEED	ESTIMATED FUNDING AVAILABLE THROUGH 2043
CANBY STREET FUND	$31,600,000	$13,950,000
CANBY TRANSPORTATION SYSTEM DEVELOPMENT CHARGE – CURRENT TSDC RATE	$138,700,000	$10,980,000
CANBY TRANSPORTATION SYSTEM DEVELOPMENT CHARGE –POTENTIAL INCREASED TSDC RATE		$27,000,000
PARTNER AGENCY	$25,275,000	$0 *
TOTAL	**$195,575,000**	**$51,930,000**

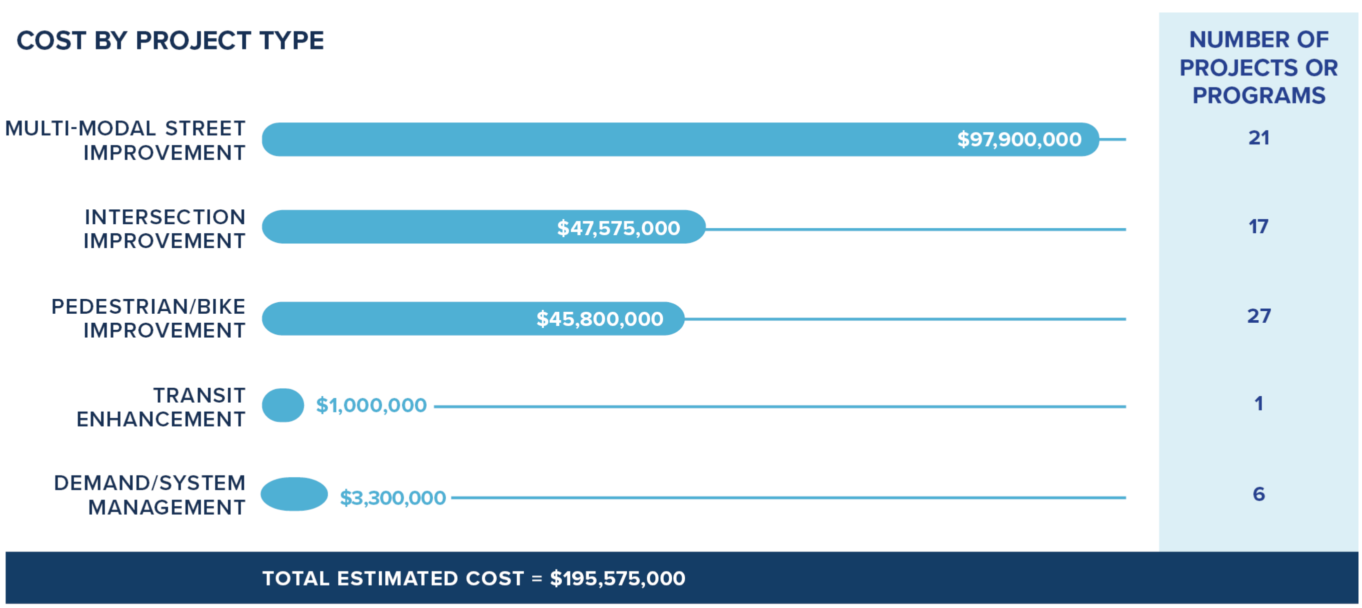
Notes: * While there may be opportunities with other agencies to jointly fund projects, no additional funding beyond the revenue from the Canby Street Fund was assumed as these decisions are ultimately up to those agencies.

ASPIRATIONAL PROJECTS

The full aspirational list includes 72 projects totaling about $195 million in total investments (see Figure 24). For the purposes of cost estimates, project design elements are identified, however, the actual design elements for any project are subject to change and will ultimately be determined through a preliminary and final design process and are subject to City, ODOT, Clackamas County, and/or other partner agency approval. The Aspirational projects were assigned to one of several categories:

- **Multi-Modal Street Improvement** – these projects will improve or construct new multi-modal streets throughout the planning area, each with facilities for motorists, pedestrians, and bicyclists. A total of 21 projects are identified that, as of 2025, will cost an estimated $97.9 million to complete.
- **Intersection Improvement** – these projects will improve safety and mobility at intersections throughout the planning area. A total of 17 projects were identified to construct new or improve existing intersections that, as of 2025, will cost an estimated $47.5 million to complete.
- **Pedestrian/ Bike Improvement** – these projects include stand-alone sidewalk, path and roadway crossing improvements, and an integrated network of bicycle lanes, marked on-street routes and shared-use paths to facilitate safe and convenient travel citywide. A total of 27 pedestrian and bicycle projects were identified that, as of 2025, will cost an estimated $45.8 million to complete.
- **Transit Enhancement** – this will enhance the quality and convenience for transit passengers. One transit project was identified that, as of 2025, will cost an estimated $1 million.
- **Demand/ System Management** – this includes future studies and other improvements that will encourage more efficient usage of the transportation system. A total of 6 projects were identified that, as of 2025, will cost an estimated $3.3 million to complete.

FIGURE 24: LEVEL OF INVESTMENT BY MODE OF TRAVEL



PRIORITIZING ASPIRATIONAL PROJECTS

Unless the City expands its funding options, many of the Aspirational projects identified are not reasonably likely to be funded by 2043 (as shown in Table 6). For this reason, projects from the Aspirational list were evaluated and ranked using a set of measurable evaluation criteria that reflect how well they achieve the transportation goals and objectives described in Chapter 2. The prioritization score was calculated for each project using the criteria associated with each TSP goal.

The projects were initially scored on the seven criteria from 1 (low) to 10 (high). The criteria were weighted equally, resulting in overall possible scores ranging from 7 to 70. An evaluation ranking of "high" was assigned for projects with the highest total scores, "medium" for the middle one-third of project scores, and "low" for projects with the lowest total scores. The methodology for calculating the scores for each criterion can be found in the Transportation Performance Measures and Project Prioritization Framework in the Appendix.

The final priority ranks listed in Table 6 were used to divide projects from the Aspirational project list into two improvement packages, referred to as Financially Constrained and Unconstrained. The project priority rankings do not create an obligation to construct projects in any order and it is recognized that these priorities may change over time. The City of Canby will use the priorities listed in this TSP to guide investment decisions but will also regularly reassess local priorities to leverage new opportunities and reflect evolving community interests.

The City is not required to implement projects identified on the Financially Constrained list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free to pursue any of these opportunities at any time.

The purpose of the Financially Constrained project list is to establish reasonable expectations for the level of improvements that will occur and give the City initial direction on where funds should be allocated. During the short-term, most of the City's investments will occur within the current City limits. As annexation occurs over time, other projects will have the potential to be funded by the City or through private development as a condition of approval.

FINANCIALLY CONSTRAINED PROJECTS

While all TSP projects will be beneficial, the Financially Constrained projects are the most valued, in terms of how they meet critical needs and how well they work to deliver on community goals. Projects in this group have a total construction budget that is similar to the reasonably available funding over the planning horizon, meaning the $13.95 million likely to be available through existing City funding sources and $37.98 million from the City TSDC. The projects included in the Financially Constrained list (shown in Table 6 and Figure 25) were recommended within several different priority horizons, based on the project evaluation score:

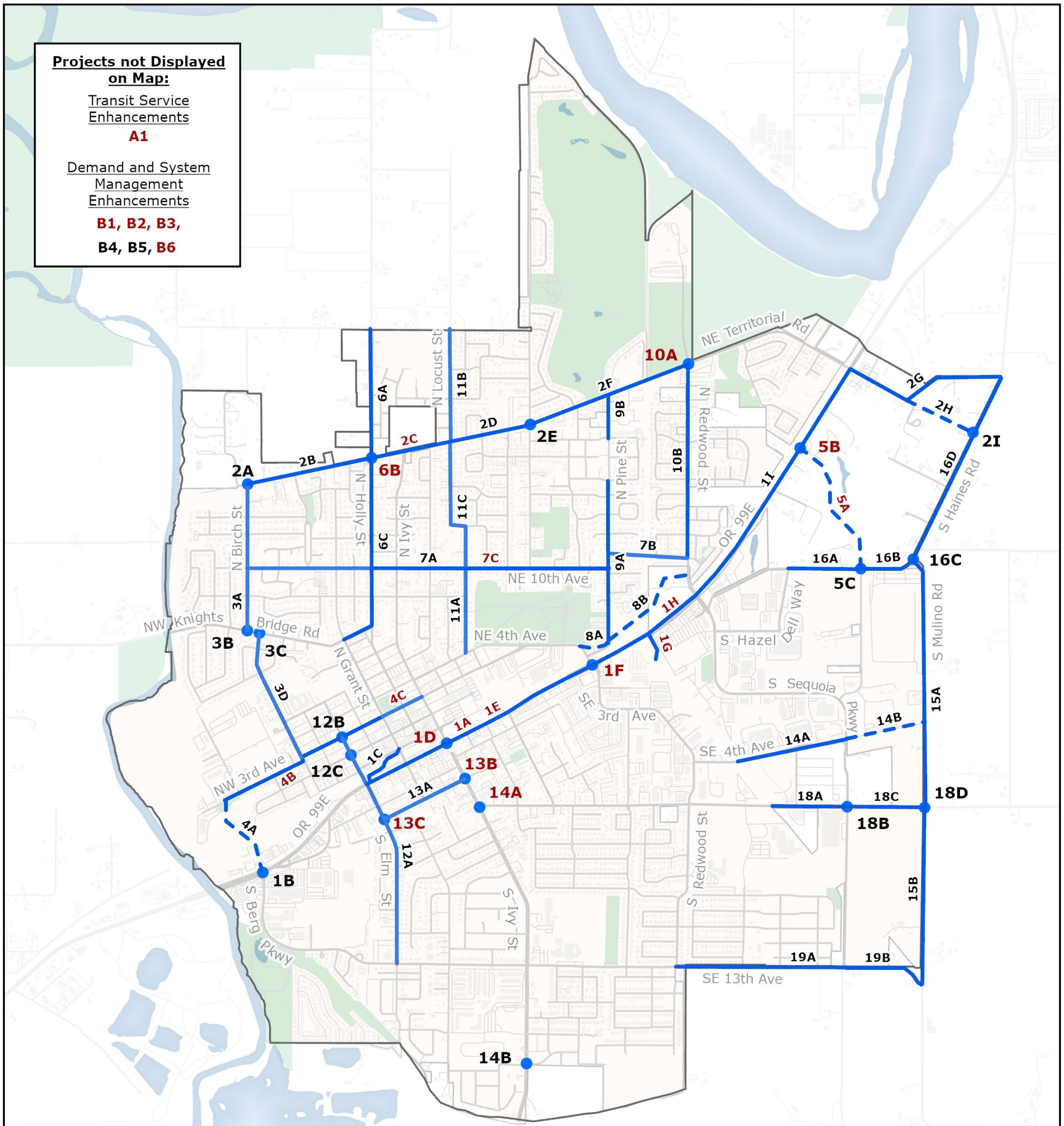
- **Tier 1:** Projects recommended for implementation within 1 to 5 years.
- **Tier 2:** Projects recommended for implementation within 5 to 10 years.
- **Tier 3:** Projects likely to be implemented beyond 10 years.

UNCONSTRAINED PROJECTS

Unconstrained projects are those remaining from the Aspirational list that likely will not receive funding by 2043. These projects (shown in Table 6 and Figure 25) are recommended within the following priority horizons, based on the project evaluation score:

- **Unconstrained Tier 1:** Projects with the highest priority for implementation beyond the projects included on the Financially Constrained list, should additional funding become available.
- **Unconstrained Tier 2:** Projects with the next highest priority for implementation beyond the projects included on the Financially Constrained list, should additional funding become available.
- **Unconstrained Tier 3:** The last phase of projects to be implemented, should additional funding become available.

FIGURE 25: ASPIRATIONAL PROJECTS



Transportation Network Improvements:

Along Existing Corridors	Along Planned Corridors (Conceptual Alignments)	
(solid line)	(dashed line)	Vehicle, Pedestrian and/or Bike Corridor Improvements
	(dot)	Intersection Improvements

\# Project Included in the Financially Constrained Package

\# Project Included in the Unconstrained Package

Canby Urban Growth Boundary

Canby City Limits

TABLE 6: ASPIRATIONAL PROJECTS

PROJECT ID	PROJECT LOCATION	PROJECT DESCRIPTION	PROJECT CATEGORY	ESTIMATED PROJECT COST (2025 DOLLARS)	POTENTIAL FUNDING SOURCE	POTENTIAL AGENCY PARTNER *	PROJECT EVALUATION SCORE **	PACKAGE ***	PRIORITY HORIZON
	OR 99E (Corridor #1) Improvements from SW Berg Parkway to Territorial Road								
1a	OR 99E between Elm Street and Pine Street	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$10,100,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
1b	OR 99E/SW Berg Parkway intersection	Enhance Safety at Existing Intersection. Cost assumes replacing the incandescent traffic signal bulbs with light emitting diodes (LEDs), providing overhead lane-use signs and signal pole modifications.	Intersection Improvement	$750,000	State Funds	ODOT	Medium	Unconstrained	Unconstrained Tier 2
1c	Downtown Canby between OR 99E to NW 1st Avenue	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path with an overcrossing of the railroad in Downtown Canby, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$8,600,000	State Funds / City Transportation System Development Charge	ODOT	High	Unconstrained	Unconstrained Tier 1
1d	OR 99E/Ivy Street intersection	Widening at Existing Intersection. Cost assumes widening of the Ivy Street approaches to include a separate left-turn lane, through lane, and right-turn lane, and traffic signal and railroad crossing modifications. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Intersection Improvement	$9,650,000	State Funds	ODOT	Medium	Financially Constrained	Tier 3
1e	OR 99E from Knott Street to Locust Street	Minor Upgrade to Pedestrian Facilities. Cost assumes installation of sidewalks on the north side.	Pedestrian/ Bike Improvement	$950,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
1f	OR 99E/Pine Street intersection	Widening at Existing Intersection. Cost assumes conversion of the southbound approach to include a left-turn lane and a shared through-right turn lane and widening of the northbound approach to include a left-turn lane, through lane, and right-turn lane, and traffic signal modification. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Intersection Improvement	$5,550,000	State Funds / City Transportation System Development Charge	ODOT	Medium	Financially Constrained	Tier 3
1g	OR 99E between the Logging Road Trail and the sidewalks on south side of OR 99E	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path.	Pedestrian/ Bike Improvement	Funded/ Under Construction	Funded/ Under Construction	ODOT	High	Financially Constrained	Tier 1
1h	OR 99E between Pine Street, the Logging Road Trail and N Redwood Street	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$5,750,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 3
1i	OR 99E between N Redwood Street/Sequoia Parkway and Territorial Road	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$11,250,000	State Funds / City Transportation System Development Charge	ODOT	Medium	Unconstrained	Unconstrained Tier 1
	Territorial Road (Corridor #2) Improvements from N Birch Street to Haines Road								
2a	Territorial Road/N Birch Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2b	Territorial Road from N Birch Street to N Holly Street	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2c	Territorial Road from N Holly Street to N Locust Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on both sides.	Pedestrian/ Bike Improvement	$1,900,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3
2d	Territorial Road from N Locust Street to N Maple Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$750,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
2e	Territorial Road/N Maple Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2

PROJECT ID	PROJECT LOCATION	PROJECT DESCRIPTION	PROJECT CATEGORY	ESTIMATED PROJECT COST (2025 DOLLARS)	POTENTIAL FUNDING SOURCE	POTENTIAL AGENCY PARTNER *	PROJECT EVALUATION SCORE **	PACKAGE ***	PRIORITY HORIZON
2f	Territorial Road from N Maple Street to N Redwood Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$2,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
2g	Territorial Road from OR 99E to Haines Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,800,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
2h	Territorial Road from OR 99E to Haines Road	New 2-lane Collector. Cost assumes realignment of Territorial Road to the south and east as a 2-lane street with sidewalks and bike lanes on each side, to connect with Haines Road at a new 3-leg intersection.	Multi-modal Street Improvement	$2,150,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2i	Territorial Road/Haines Road intersection	Traffic Control Improvement at New Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	N Birch Street and N Cedar Street (Corridor #3) Improvements from Territorial Road to 3rd Avenue								
3a	N Birch Street from Territorial Road to Knights Bridge Road	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
3b	N Birch Street/Knights Bridge Road intersection	New Turn Lane at Existing Intersection. Cost assumes restriping the N Birch Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
3c	N Cedar Street/Knights Bridge Road intersection	New Turn Lane at Existing Intersection. Cost assumes restriping the N Cedar Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
3d	N Cedar Street from Knights Bridge Road to 3rd Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
	SW Berg Parkway and 3rd Avenue (Corridor #4) Improvements from OR 99E to N Ivy Street								
4a	SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad	New 2-lane Collector with a Truck Route Designation. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side. Project B2 is a Phase 1 study for this project, and this Phase 2 will be based on the outcome of Project B2. Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Multi-modal Street Improvement	$17,950,000	City Transportation System Development Charge		High	Unconstrained	Unconstrained Tier 1
4b	3rd Avenue from the Berg Parkway extension to N Grant Street	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of 3rd Avenue to provide bike lanes on both sides.	Pedestrian/ Bike Improvement	$200,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
4c	3rd Avenue from N Grant Street to N Ivy Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
	Walnut Street (Corridor #5) Improvements from OR 99E to 1st Avenue								
5a	Walnut Street from OR 99E to 1st Avenue	New 3-lane Collector with a Truck Route Designation. Cost assumes a 3-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$6,400,000	City Transportation System Development Charge		High	Financially Constrained	Tier 1
5b	OR 99E/Walnut Street intersection	Traffic Control Improvement at New Intersection. Cost assumes a new traffic signal.	Intersection Improvement	$3,000,000	City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
5c	Walnut Street/1st Avenue intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
	Holly Street (Corridor #6) Improvements from 22nd Avenue to Knights Bridge Road								
6a	Holly Street from 22nd Avenue to Territorial Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,850,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
6b	Holly Street/Territorial Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Financially Constrained	Tier 3
6c	Holly Street from Territorial Road to Knights Bridge Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side and on-street parking on one-side.	Multi-modal Street Improvement	$4,700,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
	10th Avenue/11th Avenue (Corridor #7) Improvements from N Birch Street to N Redwood Street								

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7a	10th Avenue from N Birch Street to N Pine Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
7b	11th Place/11th Avenue from N Pine Street to N Redwood Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
7c	10th Avenue from N Holly Street to N Pine Street	Major Upgrade to Pedestrian Facilities. Cost assumes sidewalks on each side.	Pedestrian/ Bike Improvement	Funded/ Under Construction	Funded/ Under Construction		High	Financially Constrained	Tier 1
	4th Avenue (Corridor #8) Improvements from Pine Street to N Redwood Street								
8a	N Pine Street/NE 4th Avenue intersection	New 2-lane Collector. Cost assumes realignment of N Pine Street to the north away from the railroad crossing to align with 4th Avenue at a new 3-leg intersection, as a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,650,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
8b	4th Avenue from the N Pine Street realignment to N Redwood Street	New 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side. Project B3 is a Phase 1 study for this project, and this Phase 2 will be based on the outcome of Project B3.	Multi-modal Street Improvement	$7,150,000	City Transportation System Development Charge		Medium	Unconstrained	Unconstrained Tier 1
	N Pine Street (Corridor #9) Improvements from 4th Avenue to Territorial Road								
9a	N Pine Street from the 4th Avenue extension to 15th Avenue	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,350,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
9b	N Pine Street from 17th Avenue to Territorial Road	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of N Pine Street to provide bike lanes on each side.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
	N Redwood Street (Corridor #10) Improvements from 11th Avenue to Territorial Road								
10a	N Redwood Street/Territorial Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds		Medium	Financially Constrained	Tier 3
10b	N Redwood Street from 11th Avenue to Territorial Road	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of N Redwood Street to provide bike lanes on each side.	Pedestrian/ Bike Improvement	$200,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
	N Locust Street (Corridor #11) Improvements from N Birch Street to N Redwood Street								
11a	N Locust Street from NE 4th Avenue to NE 10th Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
11b	N Locust Street from NE Territorial Road to 22nd Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
11c	N Locust Street from NE 10th Avenue to NE Territorial Road	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
	Elm Street (Corridor #12) Improvements from NW 3rd Avenue to SW 13th Avenue								
12a	Elm Street from NW 3rd Avenue to SW 13th Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$350,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
12b	Elm Street/NW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing ramps, and curb extensions on the north leg of Elm Street and east leg of NW 3rd Avenue	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
12c	Elm Street/NW 2nd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing a diverter on west leg of SW 2nd Avenue to limit the west leg to right-in, right-out only and installing ramps, and curb extensions.	Pedestrian/ Bike Improvement	$300,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
	SW 3rd Avenue (Corridor #13) Improvements from Elm Street to Ivy Street								
13a	SW 3rd Avenue from Elm Street to Ivy Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
13b	Ivy Street/SW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing a partial diverter on west leg of SW 3rd Avenue to close westbound receiving lane and installing crosswalk, ramps, and pedestrian refuge island on Ivy Street (remove crosswalk striping on north leg).	Pedestrian/ Bike Improvement	$300,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3

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13c	Elm Street/SW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing crosswalk, ramps, and curb extensions on Elm Street.	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
	S Ivy Street (Corridor #14) Improvements from Township Road to SE 18th Avenue								
14a	Township Road/S Ivy Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes conversion of flashing yellow light to traffic signal when traffic volumes meet warrants.	Intersection Improvement	$175,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3
14b	Ivy Street/SE 18th Avenue intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
	Mulino Road (Corridor #15) Improvements from 1st Avenue to 13th Avenue								
15a	Mulino Road from 1st Avenue to Township Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$6,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
15b	Mulino Road from Township Road to 13th Avenue	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	SE 1st Avenue and Haines Road (Corridor #16) Improvements from SE Hazeldell Way to Territorial Road								
16a	SE 1st Avenue from SE Hazeldell Way to Walnut Street	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,450,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
16b	SE 1st Avenue from Walnut Street to Mulino Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
16c	SE 1st Avenue/Mulino Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,800,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Medium	Unconstrained	Unconstrained Tier 1
16d	Haines Road from Mulino Road to Territorial Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,550,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Medium	Unconstrained	Unconstrained Tier 2
	SE 4th Avenue (Corridor #17) Improvements from the Logging Road Trail to Mulino Road								
17a	SE 4th Avenue from the Logging Road Trail to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,700,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
17b	SE 4th Avenue from Sequoia Parkway to Mulino Road	New 2-lane Collector with a Truck Route Designation. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,250,000	City Transportation System Development Charge		Low	Unconstrained	Unconstrained Tier 3
	Township Road (Corridor #18) Improvements from Ivy Street to Mulino Road								
18a	Township Road from the Logging Road Trail to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,400,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
18b	Township Road/Sequoia Parkway intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
18c	Township Road from the Sequoia Parkway to Mulino Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,550,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
18d	Township Road/Mulino Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	13th Avenue (Corridor #19) Improvements from Redwood Street to Mulino Road								
19a	13th Avenue from Redwood Street to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3

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19b	13th Avenue from Sequoia Parkway to Mulino Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	Transit Service Enhancements								
A1	New Transit Amenities	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, sidewalk connections, bicycle parking and lighting.	Transit Enhancement	$1,000,000	City Transit Funds	CAT	High	Financially Constrained	Tier 3
	Demand and System Management Enhancements								
B1	New Bike Parking	Install new bike parking throughout the City. Standard rack parking should be provided in areas where users park for less than two hours. Long-term parking that is secure and weather-protected should be provided in areas where users park for more than two hours.	Demand/ System Management	$50,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B2	Future Roadway Feasibility Study of extending SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad (Project 4a)	Study the feasibility of extending SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad (Project 4a). This study will evaluate connectivity and how a potential overcrossing of the railroad could be built in the future. Extending SW Berg Parkway or another roadway in Downtown Canby would create the City's first overcrossing of the railroad, closing a critical gap in the street system and improving emergency vehicle and freight truck access. This new crossing would also help relieve congestion on city streets.	Demand/ System Management	$500,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B3	Future Roadway Feasibility Study of extending 4th Avenue from N Pine Street to N Redwood Street (Project 8b)	Study the feasibility of extending 4th Avenue from N Pine Street to N Redwood Street (Project 8b). This study will evaluate connectivity and how a potential street extension could be built in the future, including how it interacts with the Logging Road Trail and where it might connect to N Redwood Street. Extending 4th Avenue would create a new Collector north of OR 99E, closing a critical gap in the street system and helping to relieve congestion on OR 99E through downtown Canby.	Demand/ System Management	$250,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B4	Future Roadway Feasibility Study of an additional bridge crossing of the Molalla River	Provide an additional bridge crossing of the Molalla River. While this project is unlikely to be constructed in the 20-year TSP horizon, it is included since providing a new bridge crossing and improving the connection between Interstate 5 and the City is a high priority for residents and commerce, helping to relieve congestion on OR 99E through the City and improving freight truck access. Phase 1 of this project will study the feasibility of a new bridge and identify how it could be built in the future. This study will evaluate connectivity and identify system improvements that may be needed to support a future bridge crossing and associated roadway connections. This project will identify critical environmental and other considerations associated with the potential alignment(s) traveling through rural areas of the County. Phase 2 construction of this project will be based on the outcome of Phase 1.	Demand/ System Management	$1,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	High	Unconstrained	Unconstrained Tier 1
B5	Future Roadway Feasibility Study of a parallel arterial route to OR 99E through the City from west of Berg Parkway to east of Territorial Road	Provide a parallel arterial route to OR 99E through the City from west of Berg Parkway to east of Territorial Road. While this project is unlikely to be constructed in the 20-year TSP horizon, it is included since providing an alternative route for traffic is a high priority for residents and commerce, helping to relieve congestion on OR 99E through the City and improving freight truck access. Phase 1 of this project will study the feasibility of a roadway and identify how it could be built in the future. This study will evaluate connectivity and identify system improvements that may be needed to support it. This project will identify critical environmental and other considerations associated with the potential alignment(s). Phase 2 construction of this project will be based on the outcome of Phase 1.	Demand/ System Management	$1,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	High	Unconstrained	Unconstrained Tier 1
B6	Future Study of the OR 99E Corridor through Canby to develop a corridor-wide improvement plan	Study the OR 99E Corridor through Canby to develop a corridor-wide improvement plan to align the highway with the context zone from the ODOT Highway Design Manual. Critical focus areas in Canby are new, expanded, and improved pedestrian and bicycle crossings, expanded pedestrian facilities and buffer from the vehicle travel way, protected and separated bicycle facilities, and improved traffic flow for vehicles and freight.	Demand/ System Management	$500,000	State Funds / City Street Funds	ODOT	High	Financially Constrained	Tier 2

Notes: * While there may be opportunities with other agencies to jointly fund projects, no additional funding beyond the revenue from the Canby Street Fund was assumed as these decisions are ultimately up to those agencies.
** The project priority rankings do not create an obligation to construct projects in any order and it is recognized that these priorities may change over time. The City of Canby will use the priorities listed in this TSP to guide investment decisions but will also regularly reassess local priorities to leverage new opportunities and reflect evolving community interests.
*** The City is not required to implement projects identified on the Financially Constrained list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free to pursue any of these opportunities at any time.

CHAPTER 5.

Implementation and On-Going Strategies

The following chapter summarizes system performance outcomes and provides transportation strategies and policy considerations for plan implementation and monitoring. Some are emerging issues to be monitored, and others are ongoing but need greater emphasis or attention. Addressing these will take the City time to evaluate, and they may require future decisions from the City Council.

Furthermore, it is recognized that there are on-going community issues related to general transportation needs that will continue to evolve after the TSP process and outcomes. These issues are acknowledged in the final section along with a summary of their status and the expected path forward.

SYSTEM PERFORMANCE OUTCOMES

This TSP uses system performance measures to support the City’s transportation planning and decision-making process. The performance measures serve as the link between TSP goals and plan implementation by enabling the City to measure the degree to which the TSP investments support City-wide priorities through 2043. While the performance assessment does not represent the complete picture, it does offer a baseline against which to assess how the policies, investments, and planning decisions made in this plan may affect the future.

The six TSP performance measures (shown in Table 7) include: 1) System Completeness; 2) Miles Traveled; 3) Mode Share; 4) Multimodal Level of Traffic Stress; 5) Congestion; and 6) Safety. Each performance measure includes a target to make progress towards through plan implementation (see Table 7). The system performance evaluation process will be used during subsequent TSP updates, which typically occurs every 5 to 10 years, depending on funding availability and evolving citywide and regional transportation needs and priorities. The current TSP system performance assessment highlights changes between current conditions and the 2043 planning horizon for the transportation projects identified in the Aspirational project list (Chapter 4).

TABLE 7: SYSTEM PERFORMANCE MEASURES, TARGETS AND CONNECTION TO TSP GOALS

SYSTEM PERFORMANCE MEASURE	TSP GOALS							
	Accessible and Connected	Safe and Secure	Healthy People and Environment	Comprehensive and Affordable	Reliable and Efficient	Fiscal Responsible	Collaboration	Expected Outcome through 2043
AVAILABILITY OF TRAVEL IN THE CITY								
SYSTEM COMPLETENESS: Completeness of sidewalks, bikeways, and trails. **Target:** Increase the completeness of the sidewalk, bikeway, and trail networks through the planning horizon year.	●	●	●	●	●	◒	◒	+
VEHICLE MILES TRAVELED: System-wide number of miles traveled (total and per capita). **Target:** Reduce vehicle miles traveled per person through the planning horizon year.	●		●	◒	●	●	◒	−
MODE SHARE: Percent of non-drive alone trips (walking, bicycling, transit, and shared ride trips). **Target:** Increase the share of non-drive alone trips through the planning horizon year.	●		●	●	◒	●	◒	+
QUALITY OF TRAVEL IN THE CITY								
MULTIMODAL LEVEL OF TRAFFIC STRESS: Locations on the roadway network that operate with an extreme or high multimodal level of traffic stress. **Target:** Decrease the miles of facilities that operate with an extreme or high multimodal level of traffic stress through the planning horizon year.	●	●	●	●	◒	◒	◒	+
CONGESTION: Locations on the roadway network that operate above thresholds for congestion. **Target:** Decrease the amount of congested and severely congested lane miles through the planning horizon year.	◒	◒	◒	◒	●		◒	+
SAFETY: Transportation related collisions. **Target:** Reduce transportation related fatalities and serious injuries for all users through the planning horizon year.	◒	●		◒	◒	◒	◒	+

Notes: ● = Measure highly connected with achieving goal ◒ = Measure somewhat connected with achieving goal; + = Plan meets Target − = Plan does not meet Target

STEPS TO SUPPORT PLAN IMPLEMENTATION

Chapter 3 of the TSP includes several updated transportation standards and regulations. These apply to the construction of new transportation facilities and to the operation of all facilities to ensure they are designed appropriately, and that the system functions as intended. These standards and regulations will need to be added by reference or incorporated into the City's Municipal Code and/or Development Code:

ACTION: Amend the Canby Development Code to:

- Update references to adopted vehicle functional classifications, as well as truck route designations, consistent with the TSP.
- Update references to minimum street cross-section and facility widths, consistent with the TSP.
- Update references to vehicle mobility standards and new pedestrian and bicycle level of traffic stress targets for City streets, consistent with the TSP.
- Update references for transportation facility and access spacing standards identified the TSP for City streets.
- Incorporate City transportation impact study trigger guidelines from the TSP, and develop study requirements, including a requirement to review pedestrian crossing treatments using NCHRP Report 562, as documented in Chapter 3.
- Introduce bicycle parking facility standards surrounding transit transfer stations and park-and-ride lots.
- Require new large developments with planned designated employee parking to provide preferential parking for employee carpools and vanpools (based on a threshold of minimum number of employees or number of parking spaces).

ON-GOING ISSUES AND AREAS OF EMPHASIS

There are a host of on-going community issues related to general transportation needs that may not be resolved by the TSP and its outcomes, and further studies may be required to help inform how to best respond to each of those situations.

LONG-TERM FEASIBILITY PROJECTS

The TSP includes four long-term feasibility projects that are unlikely to be constructed in the 20-year TSP horizon but reflect high priorities for the City to close critical gaps in the street system, improve emergency vehicle and freight truck access and help relieve congestion.

These projects show the intention of the City in the TSP and represent priorities identified through the community engagement process and system analysis. These ideas require more extensive study to better understand the complexity of the issues, coordinate with agency partners, analyze potential alternatives and help advance the ideas should a feasible solution be identified in the future.

ACTION: Work with ODOT and Clackamas County to better understand and advance the ideas, considering all opportunities and shortfalls of feasible alternatives.

OR 99E

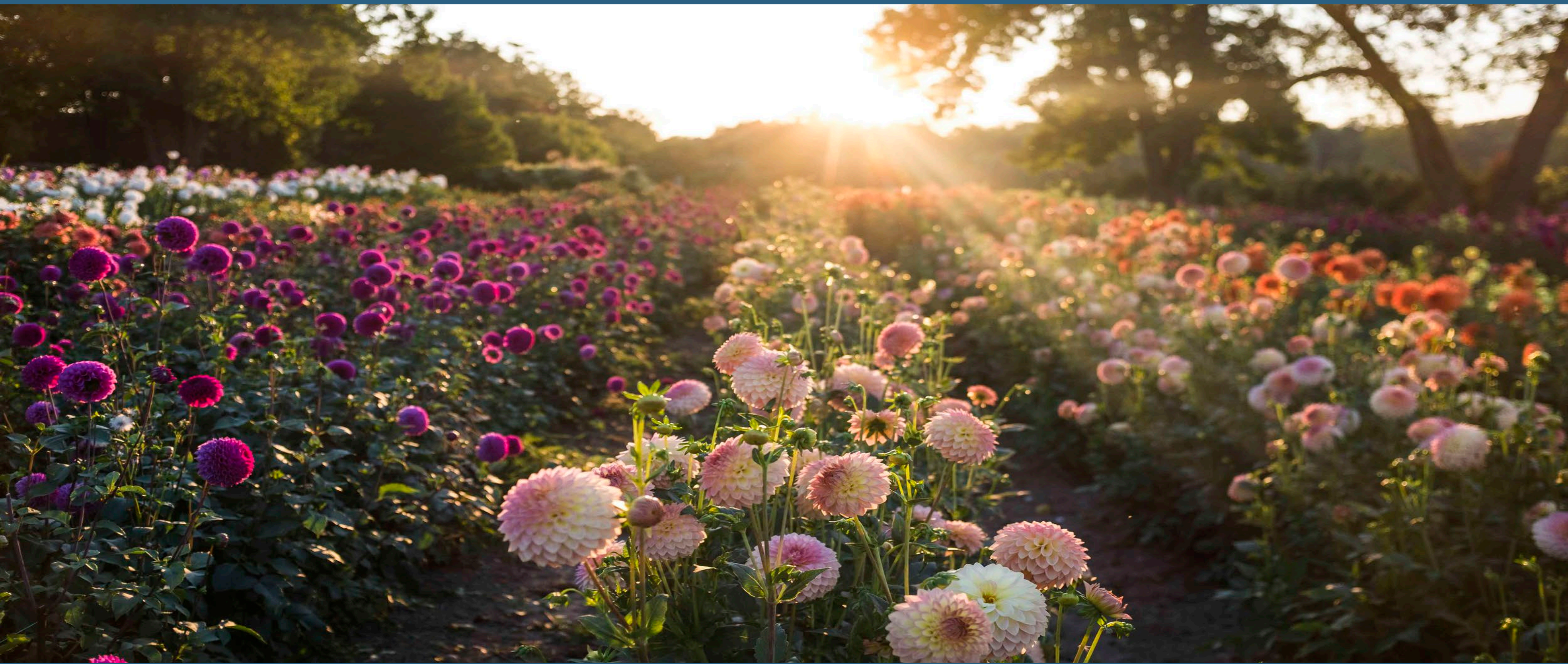
Intersections along OR 99E are expected to serve a significant amount of traffic during the p.m. peak hour by 2043. These intersections were tested with various improvements, but they only had a minimal benefit to vehicular operations. Intersection operations for vehicles can be improved by widening, but that requires a significant investment, and all possible options should be more extensively studied to ensure the needs of all users of the corridor are addressed. A detailed corridor study is proposed as part of the Financially Constrained project list (i.e., City funding contribution towards a multi-agency corridor study) to determine what improvements can be made on OR 99E or what improvements can be made on parallel facilities to reduce the demand on OR 99E and align the highway with the context zone from the ODOT Highway Design Manual. Critical OR 99E focus areas in the planning area include expanded and improved pedestrian and bicycle crossings, improved access to transit, expanded pedestrian facilities and buffer from the vehicle travel way, protected and separated bicycle facilities, and improved traffic flow for vehicles and freight. Various projects in the TSP proposed along the highway through the planning area will likely be further refined in the future corridor study.

ACTION: Work with ODOT to advance a corridor study for OR 99E.

City of Canby

TRANSPORTATION SYSTEM PLAN – VOLUME 2 APPENDIX

FEBRUARY 2026 DRAFT



Cultivating CANBY
Blooming with Possibility

TSP VOLUME 2: APPENDIX

Volume 2 of the Canby Transportation System Plan includes all background memoranda, and technical data that were the basis for its development. The contents of Volume 2 represent an iterative process in the development of the TSP. Refinements to various plan elements occurred throughout the process as new information was obtained. In all cases, the contents of Volume 1 supersede those in Volume 2.

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APPENDIX A. POLICY AND PLAN INVESTIGATION

TECHNICAL MEMORANDUM #2: POLICY AND PLAN INVESTIGATION

DATE: May 2, 2023

TO: Don Hardy | City of Canby

FROM: Reah Flisakowski, PE; Kevin Chewuk, PTP; Anders Hart | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update Project #: 23023-000

This memorandum summarizes planning documents, policies, and regulations that will apply to the Canby Transportation System Plan (TSP) update. The primary documents that guide TSP development are:

1. The Transportation Planning Rule (TPR) (Oregon Administrative Rule (OAR) 660-012),
2. The Oregon Transportation Plan (OTP) and State Modal Plans,
3. Local TSPs and other planning documents (the Clackamas County TSP will provide guidance to Canby)

As solutions and strategies for addressing transportation needs in Canby are proposed in later work tasks, a cross-check will be required to ensure compliance and coordination with these plans, policies, and regulations.

TRANSPORTATION SYSTEM PLANNING IN OREGON

Transportation system planning in Oregon is required by Statewide Planning Goal 12 – Transportation[1]. The Transportation Planning Rule (TPR), OAR 660-012, describes how to

[1] Statewide Planning Goals: https://www.oregon.gov/lcd/OP/Pages/Goals.aspx

implement Statewide Planning Goal 12[2]. By implementing Statewide Planning Goal 12 (Transportation), the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile. Key elements include direction for preparing TSPs under OAR 660-012-0015 through 0040.

OAR 660-012-0035 describes the evaluation and selection of transportation system alternatives in the TSP. OAR 660-012-0045 describes implementation of the TSP. It includes the requirement for each local government to amend its land use regulations to implement the TSP. It also requires local government to adopt land use or subdivision ordinance regulations consistent with applicable federal and state requirements, to protect transportation facilities, corridors, and sites for their identified functions. This policy is achieved through a variety of measures, including access control measures, standards to protect future operations of roads, expanded notice requirements, and coordinated review procedures for land use applications. Measures also include a process to apply conditions of approval to development proposals, and regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP.

Specifically, the TPR requires:

1. The state to prepare a TSP, referred to as the Oregon Transportation Plan (OTP);
2. Metropolitan Planning Organizations (MPOs) to prepare a Regional Transportation Plan (RTP) that is consistent with the OTP (Canby is not in an MPO, so this requirement does not apply); and
3. Counties and Cities to prepare local TSPs that are consistent with the OTP and RTP (if applicable).

[2] Transportation Planning Rule: https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3062

As the guiding document for local TSPs, the OTP[3] establishes goals, policies, strategies, and initiatives that address the core challenges and opportunities facing transportation in Oregon. The goals and policies are further implemented by various modal plans, including the Bicycle and Pedestrian Plan, Freight Plan, Highway Plan, Public Transportation Plan, Rail Plan, Transportation Options Plan, and the Transportation Safety Action Plan. Each of the OTP's seven goals are defined by more specific policies and strategies.

CLIMATE-FRIENDLY AND EQUITABLE COMMUNITIES UPDATES TO THE TPR

In January 2023, Oregon adopted Climate Friendly and Equitable Communities (CFEC) rules. These rules are intended to reduce greenhouse gas (GHG) emissions from transportation and improve equity outcomes. While these rules do not apply to Canby because it is outside of a metropolitan area, these rules will affect land use and transportation planning throughout much of the state, and Canby can learn from the experiences of cities subject to the CFEC rules. The CFEC rules include:

- Requirements to designate "Climate-Friendly Areas" with special land-use requirements;
- Parking Reform: Reducing or eliminating parking mandates;
- Expanded requirements for metropolitan areas to plan for GHG reductions in transportation and land-use plans;
- Cities and counties subject to the rules must show that the financially constrained projects in their adopted TSP result in lower per-capita vehicle-miles traveled (VMT) in a horizon year compared to a base year[4].

The parking reform component gives cities subject to the rules two options: (1) eliminate all parking requirements or (2) implement various policies to reduce the burden of parking requirements[5]. Under option 2, cities must eliminate parking mandates:

- Within a half-mile of high-frequency transit or three-quarters mile of rail transit stops
- For dwellings of 750 square feet or smaller, affordable housing developments, childcare facilities, and other land uses.

In addition to the above requirements, OAR 660-012-0445 provides additional options for cities opting not to eliminate all parking mandates. Additional requirements apply to cities with populations over 100,000 and to cities with populations over 25,000 in the Portland Metropolitan Area.

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[3] Oregon Transportation Plan: http://www.oregon.gov/ODOT/TD/TP/OTP.shtml

[4] OAR 660-012-0160, https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3062

[5] OAR 660-012-0400, https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3062

What this means for the Canby TSP:

The TSP must address the policy and regulatory requirements included in the OTP, State Modal Plans, and TPR, as described in the ODOT TSP Guidelines and the specific policy documents. While the new Climate-Friendly and Equitable Communities rules do not apply to Canby, the City's updated TSP may choose to incorporate policy elements to further advance statewide environmental and equity goals.

DEFINING THE TRANSPORTATION SYSTEM

The following sections summarize roadway classifications and land use designations for areas of Canby derived from the identified documents. This information ultimately informs the adopted standards, regulations, and policies that apply to the multi-modal transportation system in Canby.

CANBY ROADWAY CLASSIFICATIONS

To manage the roadway network, roadways are classified based on a hierarchy according to the intended purpose of each road. From highest to lowest intended usage, the classifications are typically arterials, collectors, neighborhood routes and local streets. Roadways with a higher intended usage generally provide more efficient traffic movement (or mobility), while roadways with lower intended usage provide greater access for shorter trips to local destinations such as businesses or residences.

The existing classification of streets in Canby depends on jurisdiction and is either defined in the City's TSP or Clackamas County's TSP. The following classifications apply to Canby:

1. **Arterial roadways** are intended to serve as the main travel route through the city. These roadways serve the highest volume of motor vehicle traffic and are primarily utilized for longer-distance regional trips. Arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well-placed arterial street. In Canby, OR 99E, Ivy Street, 13th Avenue, Grant Street, and Knights Bridge Road are classified as arterial roads.
2. **Collector roadways** connect neighborhoods to arterial roadways. These roadways generally provide more direct property access than arterial roadways, while providing efficient through movement for local traffic. Several roads in Canby are classified as collectors, including Sequoia Parkway, Territorial Road and Township Road.
3. **Neighborhood Routes** (sometimes referred to as Neighborhood Collector or Minor Collector roadways) are similar to collector streets in that they provide greater accessibility to neighborhoods and provide efficient through movement for local traffic. While some may interpret the term "neighborhood" to imply residential land use, this classification refers to a level of connectivity for any land use type,

including commercial and/or industrial land uses. Some Neighborhood Routes in Canby include Cedar Street and Pine Street.

4. **Local streets** provide more direct access to residences without serving through travel. These roadways are often lined with residences and are designed to serve lower volumes of traffic at slower speeds. In Canby, any street not designated as an arterial, collector, or neighborhood route is considered a local street.

The existing Canby TSP also includes special cross-sections for streets with a "Truck Route" designation, including streets in the Canby Pioneer Industrial Area.

What this means for the Canby TSP:

The functional classification and truck route designations for the City will be revisited and revised, if necessary.

ODOT CLASSIFICATIONS FOR OR 99E

Oregon Highway Plan (OHP) Goal 1, Policy 1A (State Highway Classification System) categorizes state highways for planning and management decisions. Through Canby, OR 99E is classified as a Regional Highway. Regional Highways provide connections and links to regional centers, Statewide or interstate Highways, or economic or activity centers of regional significance. The management objective is to provide safe and efficient, high-speed, continuous-flow operation in rural areas and moderate to high-speed operations in urban and urbanizing areas. A secondary function is to serve land uses in the vicinity of these highways.

What this means for the Canby TSP:

While this policy places importance on the efficient travel of through motor vehicle trips on OR 99E, the policy must still be balanced with other goals and objectives of the Oregon Transportation Plan to ensure its multi-modal intentions are addressed.

State Highway Freight System: OHP Goal 1, Policy 1C addresses the need to balance the movement of goods and services with other uses. It states that the timeliness of freight movements should be considered when developing and implementing plans and projects on freight routes. Through Canby, OR 99E is classified as a federal truck route. This designation applies to routes meant to serve commercial truck traffic across the country but is not part of the Oregon Highway Plan freight system.

What this means for the Canby TSP:

Transportation solutions must be accommodating to the Truck Route designation. Federal Truck Routes require 12' travel lanes.

Reduction Review Routes: ORS 366.215 requires review of all potential actions that will alter, relocate, change, or realign a Reduction Review Route that could result in permanent reductions in vehicle-carrying capacity. Reduction of vehicle-carrying capacity means a permanent reduction in the horizontal or vertical clearance of a highway section, by a permanent physical obstruction to motor vehicles located on useable right-of-way subject to Commission jurisdiction, unless such changes are supported by the Stakeholder Forum. If ODOT identifies that an action may result in a reduction of vehicle-carrying capacity, a Stakeholder Forum (consisting of at a minimum, a bicycle representative, a pedestrian representative, a trucking industry representative, a mobile home manufacturing representative, an oversize load freight representative, a representative of automobile users, and a representative from any affected city, county or Metropolitan Planning Organization) will be convened to help advise ODOT regarding the effect of the proposed action on the ability to move motor vehicles through a section of highway. Through Canby, OR 99E is classified as a Reduction Review Route.

What this means for the Canby TSP:

Transportation improvements recommended on OR 99E must include a record of the proposed roadway dimensions and enough detail to allow for a review of vehicle-carrying capacity during future design.

Lifeline Routes: OHP Goal 1, Policy 1E designates routes for emergency response in the event of an earthquake, categorized as Tier 1, 2, and 3. The routes identified as Tier 1 are considered to be the most significant and necessary to ensure a functioning statewide transportation network. A functioning Tier 1 lifeline system provides traffic flow through the state and to each region. Tier 2 lifeline routes provide additional connectivity and redundancy to the Tier 1 lifeline system. The Tier 2 system allows for direct access to more locations and increased traffic volume capacity, and it provides alternate routes in high-population regions in the event of outages on the Tier 1 system. Tier 3 lifeline routes provide additional connectivity and redundancy to the lifeline systems provided by Tiers 1 and 2. Through Canby, OR 99E is classified as a Tier 2 lifeline route.

What this means for the Canby TSP:

The City could use the TSP to designate local lifeline routes, if necessary, to ensure their intended function is considered in system investment and management decisions.

Special Transportation Areas (STAs): STAs are designated districts of compact development located on a state highway within an urban growth boundary in which the need for appropriate local access outweighs the considerations of highway mobility except on designated OHP Freight

Routes where through highway mobility has greater importance[6]. OR 99E between S Elm Street and S Locust Street is designated as an STA.

What this means for the Canby TSP: While OR 99E between S Elm Street and S Locust Street is a National Network Truck Route, it is not an Oregon Highway Plan Freight Route, so the STA designation applies, and local access outweighs highway mobility considerations. However, this segment of OR 99E must balance the route's other designations and requirements listed in this section.

SUMMARY OF ODOT CLASSIFICATIONS FOR OR 99E

The TSP will support the existing classifications of OR 99E and will enhance its ability to serve the defined functions. The following summarizes the classifications:

- OR 99E (Pacific Highway East, No. 081) is classified as a Regional Highway, Federal Truck Route and a Reduction Review Route and is a Tier 2 lifeline route. It also includes an STA designation between S Elm Street and S Locust Street.

DESIGNING THE TRANSPORTATION SYSTEM

TYPICAL CROSS-SECTIONS FOR CITY STREETS

The current TSP provides typical cross-section requirements for City streets based on functional classification, including accommodations for vehicles, pedestrians, and bicyclists.

What this means for the Canby TSP:

As part of the TSP update process the typical design standards will be reviewed and potentially revised, including street cross-section standards, to ensure that they meet community needs. These standards include those related to streetscape and urban form, traffic calming measures and pedestrian safety needs, infill frontage requirements, and transit supportive development.

Additional amendments to the City's development requirements may be needed to implement the recommendations of the updated TSP and to better comply with the State's Transportation Planning Rule (see Technical Memorandum #3: Regulatory Review).

[6] Oregon Highway Plan (1999), https://www.oregon.gov/odot/Planning/Documents/OHP.pdf

DESIGN GUIDANCE FOR OR 99E

The 2023 ODOT Highway Design Manual (HDM)[7] provides standards and guidance for design of ODOT facilities and is intended for use in conjunction with other ODOT technical requirements and guidance. It has incorporated the former standalone Blueprint for Urban Design (BUD) document. This updated design guidance for ODOT facilities and projects highlights opportunities for flexibility in ODOT's design requirements. This flexibility allows practitioners to determine the effective outcomes for each facility based on the land-use context and to identify ways in which design flexibility can accommodate communities' needs. ODOT has created a set of six urban land-use contexts to describe the variety of urban areas and unincorporated communities in Oregon:

- Traditional Downtown/Central Business District
- Urban Mix
- Commercial Corridor
- Residential Corridor
- Suburban Fringe
- Rural Community

HDM design guidance includes cross sections, split into four "realms": Land Use, Pedestrian, Transition, and Travelway. The HDM includes design recommendations for cross-section elements, such as sidewalks and travel lanes, within each realm that vary by land-use context.

The majority of the BUD content is now in Part 100 (Design Policies and Procedures), Part 200 (Geometric Design and Context), Part 300 (Cross Section Elements), Part 800 (Pedestrian Design), and Part 900 (Bikeway Design) of the HDM.

For ODOT facility projects, an urban design concurrence document form is required to determine project context, define design criteria, and document design decisions. Authority for approval of the urban design concurrence document resides in the Region Technical Center. The Region Technical Center Manager provides final approval of design concurrence with collaborative input from Region Planning, Traffic, Roadway, and Maintenance. Any deviation from any HDM design standard or approved design criteria range requires design exception approval by the State Traffic-Roadway Engineer. Design exceptions require a signature by both the Engineer of Record (EOR) and the State Traffic-Roadway Engineer. Design exceptions may also require approval by the Federal Highway Administration (FHWA) for project of interest.

ODOT Canby OR 99E Corridor and Gateway Design Plan

The 2012 Canby OR 99E Corridor and Gateway Plan[8] is meant to guide future improvements on the section of OR 99E within city limits. The Plan illustrates potential highway improvements and

[7] https://www.oregon.gov/odot/Engineering/Pages/Hwy-Design-Manual.aspx

[8] https://www.oregon.gov/LCD/TGM/TGMProducts/1A-10.pdf

design concepts for four segments of the highway and three community gateways along OR 99E. Highway design elements enhance motorist awareness as they transition from rural to suburban to urban settings, support community livability, accommodate multi-modal activity, and provide statewide travel and freight movement.

The Plan supplements the existing Canby TSP in three ways: it replaces the standard cross-sections for OR 99E within Canby city limits, refines the non-capacity improvements for the designated Special Transportation Area (STA) on OR 99E between Elm and Locust Streets, and identifies additional corridor improvements outside the STA.

The cross section and gateway design improvement concepts in this plan would primarily be constructed within the OR 99E right-of-way and on public structures (such as the Molalla River Pathway Bridge and on lighting and signal poles). However, in some locations, the cross-sections for OR 99E identified in the Plan will require the purchase or dedication of additional right-of-way width (typically ranging from 11- 15 feet) to provide the full build-out of design concepts. Some of this right-of-way acquisition may include easements obtained from private property. Additional right of way may also be needed at intersections to meet standards for truck turning radii. However, to avoid impacting existing development, only partial improvements (for example, narrower sidewalks) could be provided until opportunities arise to acquire additional right-of-way through dedication at the time of site redevelopment or redevelopment.

The Corridor and Gateway Design Plan splits OR 99E between the Molalla River Pathway Bridge to Territorial Road into four segments and assigns each a recommended cross-section. Table 2 summarizes these cross-sections.

TABLE 1: OR 99 CORRIDOR AND GATEWAY DESIGN PLAN CROSS SECTIONS

SEGMENT	DESCRIPTION	CROSS SECTION ELEMENTS
1: WEST CITY LIMIT TO ELM STREET	Urban area outside the STA	Should bikeway
2: ELM STREET TO LOCUST STREET	STA through downtown	Wide sidewalks for pedestrians and cyclists
3: LOCUST STREET TO THE MOLALLA FOREST	Urban area outside the STA	Shoulder bikeway
4: MOLLA RIVER PATHWAY BRIDGE TO EAST CITY LIMIT	Rural-urban transition area	ODOT urban standard for 45 m.p.h.

The Plan also envisions three gateways to welcome visitors to Canby:

The Molalla River Pathway Bridge Gateway: The Plan calls for adding decorative fencing to the Molalla River Pathway Bridge and other aesthetic and landscaping improvements. It also envisions access improvements that include a connection between the south and north side sidewalks on OR 99E and the Molalla River Pathway.

The Downtown Gateway: This gateway, between Elm and Ivy Streets, is a continuous streetscape design within the STA segment of the highway from Elm Street to Ivy Street. Elements include:

- Distinctive gateway paving, including sidewalks and bollards (consistent with other gateways), and
- Potential arches or other vertical features

Berg Parkway Gateway: The concept for a Berg Parkway Gateway builds on an existing gateway at that location. The gateway elements would be designed to avoid impacting the OR 99E/Berg Parkway intersection, and consideration would be given to whether they would affect a planned future Berg Parkway bridge.

What this means for the Canby TSP:

The TSP should follow the design guidance in the ODOT Highway Design Manual and OR 99E Corridor Gateway and Design Plan, when designing, constructing, and maintaining existing or future transportation facilities.

MANAGING AND MONITORING THE TRANSPORTATION SYSTEM

To ensure that the transportation system maintains acceptable quality, it is monitored with a variety of measures. These measures are typically defined by the agency with maintenance responsibilities, which includes Canby, Clackamas County and ODOT in the area. OR 99E is under the jurisdiction of ODOT. Streets that are expected to be under the jurisdiction of Clackamas County include portions of Ivy Street, Pine Street, Redwood Street, Mulino Road, Haines Road, 13th Avenue and other streets outside city limits but within the city's Urban Growth Boundary. All other existing or planned streets will be assumed under the jurisdiction of Canby. Each responsible jurisdiction sets various standards for the streets to maintain its designated classifications.

MOTOR VEHICLE MOBILITY TARGETS

The state has adopted vehicle mobility targets to ensure that the transportation system will have adequate capacity to support planned growth. If changes made in the TSP would cause study intersections to exceed adopted performance measures, mitigation could be necessary before plans are approved. The intersection mobility targets vary by roadway jurisdiction. Mobility targets can be presented as a level of service (LOS) rating or volume-to-capacity ratios. The LOS is an A to F rating of the level of delay the average vehicle will experience at an intersection, similar to a report card, where LOS A indicates very little delay and LOS F indicates long delays. The v/c ratio is a proportion from zero to one that measures the approximate amount of an intersection's vehicle throughput capacity that is used. For example, a v/c ratio of 0.90 indicates that 90 percent of an intersection's capacity to move traffic is used. Intersection v/c ratios lower than the mobility standards indicate that intersections are operating at acceptable levels of mobility.

The City of Canby standards require a level of service "D" or better and a v/c ratio of 0.85 or less for signalized intersections and a level of service "E" or better and a v/c ratio of 0.90 or less be maintained for intersections with two-way stop control[9].

For Clackamas County facilities in city limits, the city's mobility standards apply. For areas outside city limits but within the city's UGB, the County's mobility target of LOS E for unsignalized intersections and v/c 0.90 for signalized intersections/roundabouts applies[10].

ODOT requires a v/c ratio between 0.70 and 1.00 along OR 99E, depending on the location and posted speed[11].

- South of the Elm Street to Molalla River (35 mph, inside UGB, no special designations): 0.90 v/c
- From Elm Street to Locust Street (35 mph, inside UGB, STA designation): 1.00 v/c
- From Locust Street to north of Redwood Street-Sequoia Parkway (35 mph, inside UGB, no special designations): 0.90 v/c
- From north of Redwood Street-Sequoia Parkway to Territorial Parkway (45 mph, inside UGB, no special designations): 0.85 v/c
- North of Territorial Parkway to Haines Road (45-55 mph, outside UGB, rural lands): 0.70 v/c

What this means for the Canby TSP:

System performance will be measured, in part, using the adopted mobility targets. The TSP can modify the current mobility targets for City streets to better evaluate performance.

MUTLIMODAL PERFORMANCE MEASURES

Canby does not currently have adopted multi-modal performance measures; however, the TSP update can consider employing a performance-based approach, focusing on measurable outcomes of investments to the transportation system. This might include performance measures for safety, network connectivity, accessibility, efficiency, reliability, equity and mobility to measure the degree to which its investments support city-wide priorities. In this manner, investment decisions could be

[9] Canby Transportation System Plan, Goal 7, Policy d, December 2010.
[10] Clackamas County Comprehensive Plan, Table 5-2b, Updated 12/9/2022.
[11] Oregon Highway Plan, Policy 1F, Table 6. Updated May 2015.

tracked and compared to a set of performance objectives, offering a baseline against which to assess how the investments and planning decisions made may affect the future.

What this means for the Canby TSP:

The traditional approach to mobility standards has changed in response to many evolving conditions such as transportation funding for projects, economic viability, livability, and funding priorities. The TSP could explore measures to evaluate multi-modal performance and offer a baseline to compare during future Transportation System Plan updates.

STREET AND DRIVEWAY SPACING STANDARDS

Access spacing along streets in Canby is managed through access spacing standards. Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Proper implementation of access management techniques will promote reduced congestion and accident rates and may lessen the need for additional street capacity.

To improve connectivity of the roadway system and support walking, bicycling and access to transit, major arterial streets should be spaced at one-mile intervals, and minor arterial or collector streets should be spaced at half-mile intervals. Canby's existing TSP includes the requirement that maximum block lengths shall not exceed 600 feet (or 1,000 feet on arterial streets) for land divisions and large site developments. It also contains the following access management standards shown in Table 2.

Additionally, collector streets within the Canby Industrial Overlay Zone require spacing of 200 feet.

TABLE 2: CANBY STREET AND DRIVING SPACING STANDARDS

STREET FACILLITY	MAXIMUM ROADWAY SPACING (FT)	MINIMUM ROADWAY SPACING (FT)	MINIMUM SPACING OF ROADWAY TO DRIVEWAY (FT)	MINIMUM DRIVEWAY-TO-DRIVEWAY SPACING (FT)
ARTERIAL	1,000	660	330	330 or combine
COLLECTOR (OUTSIDE OF INDUSTRIAL OVERLAY ZONE)	600	250	100	100 or combine
NEIGHBORHOOD/ LOCAL	600	150	50	10

OR 99E Spacing Standard

The Oregon Access Management Rule[12] (OAR 734-051) attempts to balance the safety and mobility needs of travelers along state highways with the access needs of property and business owners. ODOT's rules manage access to the state's highway facilities in order to maintain highway function, operations, safety, and the preservation of public investment consistent with the policies of the 1999 OHP. Access management rules allow ODOT to control the issuing of permits for access to state highways, state highway rights of way, and other properties under the State's jurisdiction. In addition, it sets access spacing standards, identifies the ability to close existing approaches, and establishes a formal appeals process in relation to access issues. These rules enable the State to direct location and spacing of intersections and approaches on state highways, ensuring the relevance of the functional classification system and preserving the efficient operation of state routes.

OHP Goal 3, Policy 3A, and OAR 734-051 set access spacing standards for driveways and approaches to the state highway system[13]. The standards are based on state highway classification and differ based on posted speed. OR 99E in Canby requires 350 feet of spacing between accesses between the west UGB at the Molalla River bridge and just northeast of the N Redwood Street intersection. Between that location and the UGB just northeast of Territorial Road, the required spacing increases to 500 feet.

What this means for the Canby TSP:

The functional classifications of transportation routes in the Canby will be reviewed to determine the appropriateness of the classification and to help improve system connectivity. New streets may be proposed consistent with the standards to improve street connectivity. In addition, pedestrian and bicycle connections will need to be provided if a full-street connection is not possible. Updates to current spacing standards will also be considered.

[12] Access Management Rule: https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3317

[13] Oregon Highway Plan (1999), Appendix C Table 15, https://www.oregon.gov/odot/Planning/Documents/OHP.pdf

GUIDING THE TRANSPORTATION SYSTEM

The following sections summarize additional background information or guidance documents for the development of the Canby TSP.

OREGON STATEWIDE TRANSPORTATION STRATEGY

The 2013 Oregon Statewide Transportation Strategy (STS)[14] examines ways that transportation can reduce greenhouse gas (GHG) emissions and help achieve Oregon's reduction goals. Oregon's statutory GHG emissions reduction goal, outlined in ORS 468A.205, is to reduce statewide GHG emissions by 75% from 1990 levels by 2050. The STS charts a potential broad path for reducing emissions and is comprised of transportation and land use strategies that modeling has shown to have measurable GHG reduction results.

In total, the STS contains 18 distinct strategies, with 133 potential elements that generally fall into the following categories:

Vehicle and Engine Technology Advancements - Strategies in this category increase the operating efficiency of multiple transportation modes through transition to more fuel-efficient vehicles, improvements in engine technologies, and other technological advances.

Fuel Technology Advancements - Strategies in this category increase the operating efficiency of fuel-powered transportation modes through transitions to fuels that produce fewer GHG emissions or have a lower lifecycle carbon intensity.

Enhanced System and Operations Performance - Strategies in this category improve the efficiency of the transportation system and operations through technology, infrastructure investment, and operations management.

Transportation Options - Strategies in this category increase opportunities for travelers and shippers to use transportation modes that are more energy efficient and produce fewer emissions.

Efficient Land Use - Strategies in this category promote more efficient movement throughout the transportation system by supporting compact growth and development. This development pattern reduces travel distances and increases opportunities for using lower energy and zero energy transportation modes.

Pricing and Funding Mechanisms - Strategies in this category support a transition to more sustainable funding sources to maintain and operate the transportation system, pay for environmental costs of climate change, and provide market incentives for developing and implementing efficient ways to reduce emissions.

The Systems and Operations Performance, Transportation Options, Efficient Land Use categories are especially relevant to Canby's planning efforts. While the STS is not a binding policy document

[14] https://www.oregon.gov/odot/Planning/Documents/Oregon_Statewide_Transportation_Strategy.pdf

like the TPR, it provides policy options that can reduce GHG emissions. It also supports the Oregon Transportation Plan, especially Goal 4: Sustainability.

What this means for the Canby TSP:

Canby's updated TSP should seek to implement the policy options listed in the Oregon Statewide Transportation Strategy to advance the state's GHG emissions reduction goal.

BICYCLE AND PEDESTRIAN

OREGON BICYCLE AND PEDESTRIAN PLAN

The Oregon Bicycle and Pedestrian Plan provides a decision-making framework for walking and biking efforts in the State within the context of the overall transportation system. The Plan is an element of the Oregon Transportation Plan and provides local plans guidance in its implementation. The policies and strategies in the Plan impact transportation decisions of local jurisdictions through their transportation system plans and other planning efforts, which must be consistent with statewide policy plan direction. The nine goals of the plan, described below, reflect statewide values and desired accomplishments, and refine and expand upon the broad goals of the OTP.

- **Safety-** The safety goal is written to align with "Vision Zero" and other federal and local initiatives that target the elimination of the most serious safety issues. Policies and strategies call for a multimodal look at roadway cross-sections, updating design guidance to identify the most appropriate walking or biking facility depending on context (such as physical separation), more visible pedestrian crossings, and examination and consideration of lower speeds where appropriate. They also focus on safe operations on the walking and biking system through education and encouragement, comfort, and security help to encourage more users to the system by increasing their sense of safety, and an assessment of the system to determine safety issues.
- **Accessibility and Connectivity-** This goal targets making walking and biking accessible in areas where it currently is not, filling in gaps, and connecting to other modes. Policies and strategies call for such things as system inventories to identify gaps and prioritize walking and biking needs, retrofitting existing facilities to accommodate pedestrians and cyclists, wayfinding signage, bike share, and enhancing connections to other modes, especially public transportation.
- **Mobility and Efficiency-** This focuses on assuring that pedestrians and cyclists can move freely and easily on the existing system. Policies and strategies seek to reduce physical barriers that may impede movement, address maintenance practices, seek to assure movement through or around construction zones, and reference design elements such as signal timing and bicycle detection, among other issues.
- **Community and Economic Vitality-** Both land use and tourism are included under this goal area. Specifically, the land use policy framework identifies the need for model code assistance, siting schools and government buildings so they are accessible to walking and biking, considering land use attractors to assure safe connections, bicycle parking, and prioritizing employment centers and main streets as critical connection points that serve the community

and economy. Tourism policies and strategies focus on partnerships, collaboration opportunities, and disseminating information as ways to encourage pedestrian and bicycle recreational travel.

- **Equity-** This goal focuses on making walking and biking options equally available to all. Assuring access for underserved areas and transportation disadvantaged populations is called out. The policies and strategies under this goal are designed to address issues that may prevent certain portions of the population from walking and biking, such as looking at census data, conducting research, and doing network gap analysis that looks at demographics. They also focus on integrating equity criteria and considerations into decision-making, locating, and prioritizing transportation disadvantaged populations, and helping to close the gap between areas served and not served.
- **Health-** This goal highlights the link between personal and public health. Policies and strategies call out such things as integrating health criteria in transportation decision-making, engaging health professionals, and strengthening partnerships, and improving data collection and sharing.
- **Sustainability-** This goal highlights the impacts that zero-emission modes can have on helping the state reduce Greenhouse Gas emissions, have cleaner air and water, and reduce impacts on the environment. Strategies promote encouragement, and innovations such as electric bikes or scooters, which may attract more people to use those modes.
- **Strategic Investment-** This goal highlights the contribution that walking and bicycling facilities make to the entire transportation system. A strategic approach is needed to spend existing resources on the highest need and greatest value investments, leverage what is available, and to identify additional funding sources. An investment prioritization framework lays out priorities as follows: protect the existing system (e.g., maintenance and preservation) and address significant safety issues; add critical connections; complete the system (e.g., separation, and bicycle parking); and elaborate the system.
- **Coordination, Cooperation, and Collaboration-** With an interest in creating an integrated and seamless system, this coordination, cooperation, and collaboration goal assures communication between entities in decision-making. Policies and strategies call for a checklist of communication needs, and guidance for coordination.

The Plan includes performance measures to track and monitor implementation progress. The performance measures indicate whether safety is improving, use of the system is increasing (assumed through overall improvements to the network), and that data needs are being understood and data collected for more robust performance measures in the future:

- Number of pedestrian and bicycle fatalities (five-year average)
- Number of pedestrian and bicycle serious injuries (five-year average)
- Perceived safety of walking and biking
- Utilization of walking or biking for short trips
- Identifying data needs for pedestrian and bicycle performance measures
- Pedestrian access to transit

What this means for the Canby TSP:

The Oregon Bicycle and Pedestrian Plan serves as the guiding policy for bicycle and pedestrian planning. The TSP should work to incorporate the goals and performance measures of the Plan.

CLACKAMAS COUNTY ACTIVE TRANSPORTATION PLAN

The current Clackamas County Active Transportation Plan[15] includes two projects in Canby's UGB.

The Canby to Molalla Route. This 14.8-mile proposed route consists of sidewalks, shoulder bikeways, and bicycle lanes. In the Canby area, the route runs from Canby Ferry on N Holly Street/NE 37th Avenue to NE Territorial Road and then runs on Ivy Street south to Canby's southern UGB boundary. The Plan proposes adding wayfinding signage and continuous paved shoulders or a multi-use path between Canby Ferry and NE Territorial Road. Between Ivy Street from NE Territorial Road to SE 16th Avenue, the Plan proposes adding wayfinding signage while taking advantage of existing infrastructure. South of SE 16th Avenue, the Plan proposes shoulder bikeways and wayfinding signs.

Oregon City to Canby Route: This route would connect Oregon City to Interstate 5 west of Canby. In the Canby UGB, it would run from the northeast UGB boundary on NE Territorial Road to N Holly Street, overlap with the Canby to Molalla Route described above, and run on Knights Bridge Road to the western edge of the Canby UGB. Proposed project elements in this area include completing bicycle lane gaps.

WALK BIKE CLACKAMAS PLAN

Clackamas County is developing a new active transportation plan, the Walk Bike Clackamas Plan[16]. As of February 2023, the County is conducting a public survey to gather public input. A project list for the plan is anticipated by Summer 2023, with adoption anticipated by early 2024. In addition to an updated project list, the Plan will establish updated County activity transportation policies and performance measures. The Plan will serve as the pedestrian and bicycle transportation elements of the county's adopted TSP.

CANBY TSP

Several policies in Canby's TSP relate to bicycle and pedestrian infrastructure. These policies are found in Goals 1 (Livability), 2 (Safety), 5 (Travel Choices), and 6 (Quality Design). The policies

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[15] Clackamas County Active Transportation Plan (2015), https://dochub.clackamas.us/documents/drupal/f4a1e5f7-3ee9-4d7e-9053-29fb53997463

[16] https://www.clackamas.us/engineering/bikewalk#:~:text=Contact-,Walk%20Bike%20Clackamas%20Plan%3A%20Improving%20walking%20and%20biking%20for%20everyone,they%20travel%20in%20the%20county.

seek to make active transportation safe and convenient for Canby's residents by providing appropriate infrastructure and ensuring new development promotes these travel modes.

What this means for the Canby TSP:

Canby's TSP should complement Clackamas County active transportation policies and projects, including those found in the forthcoming Walk Bike Clackamas Plan.

OREGON TRANSPORTATION OPTIONS PLAN

The Oregon Transportation Options Plan is an element of the Oregon Transportation Plan and provides policy guidance for state and local partners to enhance and expand transportation access for all while ensuring that transportation investments are efficient and support broader community goals. The Oregon Transportation Options Plan:

- Identifies opportunities to expand transportation choices.
- Looks to increase funding opportunities for transportation options programs and investments.
- Provides information to better integrate transportation options into local, regional, and state transportation planning.

Policies, strategies, and programs described in the Oregon Transportation Options Plan promote efficient use of existing transportation system investments, reducing reliance on the single-occupancy vehicle and facilitating use of walking, biking, transit, and rideshare. While transportation infrastructure and operations are critical to the success of a balanced transportation system, this Plan focuses on the programs, strategies, and investments that support the efficient use of transportation infrastructure.

The Transportation Options Plan process identifies a critical need to establish responsive and reliable funding for transportation options programs. Opportunities exist to expand funding by integrating transportation options into existing transportation planning processes and identifying and leveraging new sources of funding.

What this means for the Canby TSP:

The policies, strategies, and programs of this plan provide guidance for the TSP to support the efficient use of existing and future transportation infrastructure.

TRANSPORTATION SAFETY

OREGON TRANSPORTATION SAFETY ACTION PLAN

The Oregon Transportation Safety Action Plan is an element of the Oregon Transportation Plan and provides long-term goals, policies and strategies, and near-term actions to eliminate deaths and life-changing injuries on Oregon’s transportation system by 2035. The goals, policies, and strategies in the Plan are focused on changing safety culture and proactively planning, designing, operating, and maintaining a transportation system that eliminates fatalities and serious injuries.

The Plan includes emphasis areas to provide a framework for the near-term component. Emphasis areas are focus areas directly related to long-term goals, policies, and strategies. The emphasis areas include:

- **Risky Behaviors -** Reductions in fatalities and serious injuries can be accomplished by deterring unsafe or risky behaviors made by drivers and other transportation users. For this emphasis area, actions are identified to minimize impaired, unbelted, speeding, and distracted driving crashes.
- **Infrastructure -** Transportation facilities can be constructed or retrofitted to reduce fatal and serious injury crashes. Opportunities to do this include implementing safety treatments on a site-specific basis or implementing low-cost treatments system-wide. Actions are identified to minimize intersection and roadway departure crashes.
- **Vulnerable Users -** Vulnerable road users can be characterized by the amount of protection they have when using the transportation system – pedestrians, bicyclists, and motorcyclists are more exposed than people in vehicles, making them more susceptible to injury in the event of an incident. Older drivers and pedestrians can also be more vulnerable to severe injuries in the event of a crash because of increasing fragility and potentially longer healing times. Actions are identified to minimize pedestrian, bicycle, motorcycle, and older road user crashes.
- **Improved Systems -** Opportunities to address and improve transportation safety come in several forms. Actions have been identified to continually improve data, train and educate transportation and safety staff, support law enforcement and emergency responders, and minimize commercial vehicle crashes.

CLACKAMAS COUNTY TRANSPORTATION SAFETY ACTION PLAN

The 2019 Clackamas County Drive to Zero Safety Action Plan[17] documents the current state of transportation safety in the County, outlines potential strategies to address transportation safety issues, and identifies ways to implement these strategies. The Plan includes ongoing systemic safety programs, including upgrading push buttons, installing pedestrian countdown heads at signalized intersections, and improving non-compliant sidewalk ramps.

[17] Clackamas County Drive to Zero Safety Action Plan (2019), https://dochub.clackamas.us/documents/drupal/ae811741-789e-465c-9b79-9fba2261ccd0

What this means for the Canby TSP:

The goals, policies and strategies and near-term actions of these plans provide guidance for the TSP to support the changing of safety culture and proactively planning, designing, operating, and maintaining a transportation system that eliminates fatalities and serious injuries.

PUBLIC TRANSPORTATION

OREGON PUBLIC TRANSPORTATION PLAN

The Oregon Public Transportation Plan is an element of the Oregon Transportation Plan and strives to create a statewide public transportation network and help communities develop transit options that best meet their need. The Plan sets a path forward for maintaining and improving the public transportation system across the state. It calls for further integrating public transportation with the transportation system and for making its use a convenient, easy, and reliable choice.

CANBY AREA TRANSIT MASTER PLAN

Canby Area Transit (CAT) offers fixed-route bus service on the 99X route between the Oregon City Transit Center, the Canby Transit Center on N Ivy Street, and the Woodburn Bi-Mart. CAT is supported by state grants and a payroll tax[18]. Passengers can connect to two other regional routes at the Canby Transit Center:

- The South Metro Area Regional Transit (SMART) agency's 3X line between the Wilsonville Transit Center and the Canby Transit Center.
- The South Canby Clackamas Transportation's fixed-route bus service between the Ross Street Transit Center in Molalla.

The 2017 CAT Master Plan[19] outlines a vision for the development of Canby's transit system. It consists of two volumes. Volume 1 (the Choices Report) describes existing conditions and lays choices and priorities for the stakeholder group to consider. Volume 2 includes the plan itself and lays out a vision for future transit service in the Canby area. The Plan includes the following recommendations, listed in chronological order of implementation:

- **Phase 0**: Make dial-a-ride and ADA paratransit more efficient;
- **Phase 1**: Add frequency to Route 99 using funds saved in Phase 0. Consider adding structure to premium paratransit service between Canby and Oregon City;

[18] https://www.canbyoregon.gov/area-transit/page/canby-loop-bus-service

[19] Canby Area Transit Master Plan (2017), https://www.canbyoregon.gov/area-transit/page/transit-master-plan

- **Phase 2A**: Add Saturday trips on Route 99;
- **Phase 2B**: Add a local circulator route with Canby on weekdays.
- **Phase 3**: Add more weekend service on Route 99 (e.g., Sunday and/or holiday service) or add weekend service within Canby as a dial-a-ride or circulator service with ADA paratransit.

Since the Plan was written, Saturday service has been added to Route 99. In October 2021, Canby Area Transit added a free local circulator route that operates Monday-Friday.

What this means for the Canby TSP:

The updated TSP will support the goals, policies, and strategies in these plans to make public transit a convenient and reliable choice. The updated TSP will seek to build on recent additions to transit service.

RAIL

OREGON STATE RAIL PLAN

The Oregon Rail Plan[20], which is part of the State's Transportation Plan, provides a framework for decision-making related to Oregon's passenger and rail networks. The Plan includes the following goals:

Goal 1: Partner, collaborate and communicate with rail system operators and other stakeholders to maximize benefits, align interests, remove barriers, and bring innovative solutions to the rail system; and foster public understanding of rail's importance.

Goal 2- Promote, preserve, and enhance an efficient rail system that is accessible and integrated with Oregon's overall multimodal transportation system.

Goal 3- Enhance transportation system reliability, capacity, frequency, and travel times through investments that preserve and improve freight and passenger rail assets and infrastructure.

Goal 4- Establish funding that meets the critical needs of the rail system in Oregon and achieves the objectives of this State Rail Plan.

Goal 5- Plan, construct, operate, maintain, and coordinate the rail system in Oregon with safety and security for all users and communities as a top priority.

Goal 6- Increase use and investment in freight and passenger rail systems to conserve and improve Oregon's environment and community cohesion.

[20] Oregon Rail Plan (2020), https://www.oregon.gov/odot/Planning/Documents/Oregon%20State%20Rail%20Plan%202020.pdf

Goal 7- Increase opportunity and investment in freight and passenger rail assets to grow Oregon's economy. The following section describes how these core goals are used to inform investment decisions in Oregon.

The main railroad tracks running north-south in Canby are owned by Union Pacific and carry freight trains, as well as passenger traffic. The following passenger Amtrack routes run on these tracks through Canby:

- **The Cascades** route runs from Eugene, Oregon to Vancouver, British Columbia, with Oregon stops in Eugene, Albany, Salem, Oregon City, and Portland. It travels along the Pacific Northwest Rail Corridor (PNWRC), which is one of 11 federally designated high-speed rail (HSR) corridors.
- **The Empire Builder** route connects Chicago with Portland and Seattle, with the route splitting to serve those two cities at Spokane, Washington.
- **The Coast Starlight** route links Los Angeles to Seattle.

Oregon Pacific Railroad owns the non-Class I tracks that intersect with the Union Pacific tracks in Canby near N Pine Street and end north of Molalla. Those tracks serve freight traffic only.

At grade road crossings with this route are at the following locations in Canby:

- Elm Street
- Grant Street
- Ivy Street
- Third Avenue
- N Redwood Street
- Territorial Road

The Oregon Pacific rail lane has at-grade crossings with OR 99E near the Fred Meyer where it joins the Union Pacific tracks.

OREGON PASSENGER RAIL CORRIDOR INVESTMENT PLAN AND OREGON PASSENGER RAIL SERVICE DEVELOPMENT PLAN

On April 14, 2021, the Federal Railroad Administration (FRA), working with ODOT, issued a Record of Decision (ROD) and Final Environmental Impact Statement (FEIS) for a Corridor Investment Plan (CIP)[21]. In this process, FRA evaluated proposed alternatives for improved Amtrak Cascades intercity passenger rail service along the Pacific Northwest Rail Corridor (PNWRC) from the Eugene-Springfield urban area to the Washington State line at the Columbia River in Portland, Oregon

[21] https://railroads.dot.gov/environment/environmental-reviews/pacific-northwest-rail-corridor-program-oregon-segment

(Project). The Oregon Passenger Rail Service Development Plan (SDP) builds on this process[22]. The Selected Alternative does not involve adding a station in Canby but does include infrequency service frequency to six Amtrak Cascades train round trips and one Amtrak Coast Starlight train round trip per day by 2035, as well as supplemental thruway bus service between Portland and Eugene. Most relevant to Canby, the Selected Alternative would involve adding parallel tracks in Canby to the existing Union Pacific tracks. Potential mitigation measures could include signal and crossing upgrades. In most places, the new track for Alternative 1 would be offset 20 feet east of the existing UPRR mainline track and could require acquisition of linear strips of new ROW to the east of the existing UPRR ROW. Specifically, north of the Molalla River, the Selected Alternative would add a new main line track approximately 4.7 miles long west of the existing UPRR main line track, starting at the south end of an existing auxiliary track. The new main line track would run north through Canby, eventually shifting over to the east side and then connecting to the existing siding of Coalca, 1 mile south of Rock Island. Connections to existing industries and to the Oregon Pacific Railroad at Canby would be modified, and a new set of crossovers would be added near the mid-point of this extended siding to allow access to and from the existing main line track[23].

However, there is not currently FRA funding for approval associated with advancing the Selected Alternative toward or through final design or construction. ODOT is working with FRA to implement the Corridor Investment Plan and to take advantage of new funding opportunities from the 2021 Bipartisan Infrastructure Law (BIL). ODOT is also studying the potential to bring high-speed rail to the corridor between Vancouver, British Columbia and Eugene, Oregon[24].

What this means for the Canby TSP:

The City's TSP should anticipate potential railroad improvements outlined in the Oregon Passenger Rail Project Service Development Plan. It should seek to prevent conflicts with existing and future rail operations while promoting smooth multimodal traffic operations and safety near railroad tracks.

[22] Oregon Passenger Rail Service Development Plan (2021), https://www.oregon.gov/odot/RPTD/RPTD%20Document%20Library/Final_Oregon_Passenger_Rail_Service_Development_Plan.pdf

[23] Oregon Passenger Rail Service Development Plan (2021), https://www.oregon.gov/odot/RPTD/RPTD%20Document%20Library/Final_Oregon_Passenger_Rail_Service_Development_Plan.pdf

[24] ODOT 2023 Report on Passenger Rail Agreements, Service Performance and Finance (2023), https://www.oregon.gov/odot/About/GR/2023_Passenger_Rail_Report.pdf

CANBY PARKS AND RECREATION MASTER PLAN

The Canby 2022 Parks and Recreation Master Plan includes several goals and projects that could affect the City's TSP[25].

The Emerald Necklace plan envisions connecting new trails along the Willamette and Molalla Rivers with the existing Logging Road Trail to form a large loop around the perimeter of Canby. This concept, in combination with additional cross-town connections, should form the framework to guide future trail development. Existing on-street bike routes might be modified to create cross-town multi-use trail connections and create shorter sub-loops within the overall ring. These would also provide connections from urban neighborhoods to the more rural parts of the trail.

The plan also calls for creating a bicycle path along OR 99E to Oregon City and extending the Logging Road Trail southwest to Molalla. It also sets the goal of creating a long-term trails master plan and developing an active transportation plan to complete the Emerald Necklace.

The Plan identifies pedestrian barriers that impede access to parks and recreation areas. Some of these barriers include OR 99E, Logging Country Road and the adjacent railroad tracks, and NE Territorial Road. A walkability analysis in the plan found that most of Canby enjoys moderate to high pedestrian access to parks, but the areas east of Logging Country Road and north of NE Territorial Road have lower accessibility.

What this means for the Canby TSP:

Canby's updated TSP should work synergistically with its other adopted plans to achieve citywide goals.

OTHER PLANNED PROJECTS

ODOT PROJECTS

I-205 Toll Project Environmental Assessment (EA)

ODOT is planning to implement tolling on I-205 in conjunction with adding lanes to the freeway and completed an Environmental Assessment in February 2023 to comply with National Environmental Policy Act (NEPA) requirements[26]. ODOT expects to begin construction in late 2023 and finish in 2027 if it receives all appropriate agency approvals. The project is open to public

[25] City of Canby Parks and Recreation Master Plan (2022), https://www.canbyoregon.gov/sites/default/files/fileattachments/development_services/page/22694/city_of_canby_-_final_adopted_comprehensive_parks_and_recreation_master_plan.pdf

[26] https://www.oregon.gov/odot/tolling/Pages/I-205-Tolling-Project-Documents.aspx

comments until April 7, 2023. The I-205 Environmental Assessment compares the effects in 2045 of two alternatives[27]:

- Build Alternative, which includes building a third lane in each direction between Stafford Road and OR 43, a northbound auxiliary lane between OR 99E and OR 213, toll gantries and variable-rate pricing, and seismic bridge upgrades on I-205.
- No Build Alternative, which would have no additional improvements to I-205 and no tolls.

The EA analyzes future changes to travel time on OR 99E and near Canby. For the segment of OR 99E between Grant Street in Canby and S 2nd Street in Oregon City, it estimates that travel time between Grant Street in Canby and S 2nd Street in Oregon City will increase by up to 3 minutes in 2045 with tolling.

Additionally, the EA estimates that the OR 99E-Redwood Street intersection would experience increased delays of 15-30 seconds in the p.m. peak hour in 2027 and no change in delay relative to the No Build alternative in the a.m. peak hour in 2027 and either peak hour in 2045. Based on those results the EA determines no mitigation is required at this intersection.

At the OR 99E-Ivy Street intersection, the EA estimates no change in delay in the 2027 a.m. peak hour, 2-3 minutes increased delay in the 2027 p.m. peak hour, no change in the 2045 a.m. peak hour, and 30-60 increased delay in the 2045 p.m. peak hour. Based on these results, the EA states that 2027 mitigation is required at this intersection.

The OR 99E-Ivy Street intersection and the segment of OR 99E between Ivy Street and N Redwood Street are expected to see worse safety performance in the Build Alternative in 2027 and 2045.

The EA also estimates changes in 2045 truck freight travel times. For the segment of OR 99E between Grant Street in Canby and 2nd Street in Oregon City, it estimates that travel times will either improve or increase by up to 4% in the peak travel hours.

Based on the projected traffic and safety impacts of the Build Alternative, the EA recommends several mitigation measures in Canby on OR 99E, to be finalized in the forthcoming Revised EA[28]:

- Between N Redwood Street and SE Berg Parkway:
  - Install coordination or adaptive signal timing or urban traffic signals,
  - Install a mid-block crossing,
  - Install a speed-feedback sign,
  - Make traffic signal Improvements along signalized intersections.

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27 https://www.oregon.gov/odot/tolling/Pages/I-205-Toll-Project-Environmental-Assessment.aspx#:~:text=The%20Environmental%20Assessment%20shows%20that,levels%20in%20the%20long%20term.

28 I-205 Toll Project Environmental Assessment, Table 3-13, https://www.oregon.gov/odot/tolling/Documents/I-205%20Toll%20Project%20Environmental%20Assessment_508.pdf

- OR 99E/Ivy Street Intersection
  - Consider operational improvements at OR 99E and Pine St to facilitate more traffic use of that intersection to reach downtown Canby.
  - Provide more prominent crosswalk markings, including green bike crossing markings.
  - Consider adding a 3-inch yellow reflective sheeting to signal backplates.
  - Consider adding left-turning traffic calming treatment (e.g., hardened centerline) and traffic signal improvements.

What this means for the Canby TSP:

Tolling on I-205 is projected to affect traffic operations on OR 99E in Canby, and ODOT has proposed various projects to mitigation those impacts. The updated Canby TSP should complement those mitigation projects and enable the city to adapt to new traffic patterns resulting from tolling.

CLACKAMAS COUNTY PROJECTS

The Clackamas County Five-Year Transportation Capital Improvement Plan (CIP) includes the two projects in Canby, as well as additional longer-term projects[29], summarized in Table 3 below.

TABLE 3: CLACKAMAS COUNTY TRANSPORTATION PROJECTS IN CANBY

ID	PROJECT/LOCATION	TYPE	TREATMENT	TIMEFRAME
SW 2	S Ivy Street Pedestrian Intersection Improvements	Five-Year CIP	Construct bike lanes and sidewalks, construct a traffic signal at intersection with Township Road	Fiscal Years 2021/22-2024/25
SW 11	Molalla River (Knights Bridge Road) Bridge Rehabilitation	Five-Year CIP	Rehabilitate the bride on Knights Bridge Road	Fiscal Years 2021/22-2023/24
1109	Holly Street between Territorial Road and Canby Ferry	Twenty-Year CIP	Add paved shoulders in accordance with Active Transportation Plan	Unknown
1117	S Ivy Street between OR 99E and Macksburg Road	Twenty-Year CIP	Perform road safety audit	Unknown

[29] Clackamas County 5-Year Capital Improvement Plan (Fiscal Years 2021-2025), https://dochub.clackamas.us/documents/drupal/daebbe21-a78d-4e08-955a-d4b767230033

ID	PROJECT/LOCATION	TYPE	TREATMENT	TIMEFRAME
2038	Molalla Forest Road between Canby and Molalla	Preferred Projects	Pave to provide bicycle access in accordance with the Active Transportation Plan	Unknown
2039	Mulino Rd (13th St segment) between Canby city limits and OR 213	Preferred Projects	Add paved shoulders and turn lanes at major intersections	Unknown
3125	Molalla River (Knights Bridge Road) Bridge Replacement	Long-Term Capital Projects	Replace bridge at end of useful life	Unknown
3175	Haines Road between Bremer Road and Territorial Road	Long-Term Capital Projects	Add paved shoulders in accordance with the Active Transportation Plan	Unknown
3177	Hwy 170/Kraxberger Road between Canby city limits and Hams Road	Long-Term Capital Projects	Add paved shoulders in accordance with the Active Transportation Plan	Unknown
3181	Territorial Road between Haines Road and OR 99E	Long-Term Capital Projects	Add bikeways in accordance with the Active Transportation plan	Unknown
3182	Willamette River Greenway (Canby to Oregon City)	Long-Term Capital Projects	Construct multi-use path in accordance with the Active Transportation Plan.	Unknown
4086	OR 99E Safety Audit	Regional Capital Projects	Perform road safety audit	Unknown

CANBY FERRY ALTERNATIVES FEASIBILITY STUDY

The Canby Ferry crosses the Willamette River between Canby and Wilsonville. Since operating the ferry costs more money than it receives in revenue, in 2018 the Board of County Commissioners directed staff to evaluate the long-term financial and traffic impacts of options for crossing the river at the same location[30].

The study included projections and data on estimated costs, traffic impacts, and related issues of six options related to building, or not building, a bridge and keeping, or not keeping, the Canby Ferry. Public meetings were held to provide information about the project, gather input and share the analysis results before a final report was presented to the board in early 2019.

[30] https://www.clackamas.us/transportation/cfalternatives.html

The Canby Ferry Alternatives Feasibility Study determined that it was financially feasible to build a bridge constructed and maintained using revenues from tolls. However, in response to a negative reaction from the public on the potential traffic impacts of a bridge on surrounding communities, the board decided not to pursue the bridge option. The Board directed staff to keep the ferry operating and explore and/or implement options to decrease the funding shortfall.

What this means for the Canby TSP:

Canby TSP should create flexibility for potential road and tolling projects at or the closing of the Canby Ferry crossing.

APPENDIX B. REGULATORY REVIEW

MEMORANDUM

DATE: May 23, 2023

TO: Canby TSP Project Management Team

FROM: 3J Consulting

SUBJECT: Canby Transportation System Plan Update
Technical Memo 3 – Regulatory Review

The City of Canby is undertaking an update of its Transportation System Plan (TSP) consistent with the requirements of Statewide Planning Goal 12 - Transportation. The Transportation Planning Rule (TPR), Oregon Administrative Rule 660 Division 12, implements Goal 12. The TPR defines the necessary elements of a local Transportation System Plan (TSP) and how Goal 12 should be implemented locally. The overall purpose of the TPR is to provide and encourage a safe, convenient, and economical transportation system. The Rule also implements provisions of other statewide planning goals related to transportation planning in order to plan and develop transportation facilities and services in close coordination with urban and rural development. The TPR directs jurisdictions to integrate comprehensive land use planning with transportation needs and to promote multi-modal systems that make it more convenient for people to walk, bicycle, use transit, and drive less. Canby's TSP must be consistent with the current TPR, which was most recently amended in August 2022.

The TPR requires cities to prepare local TSPs that are consistent with the Oregon Transportation Plan (OTP); Technical Memorandum #2 (Plan Review Summary) addresses the OTP and other background documents that will be referenced in updating the Canby TSP. This memorandum will focus on the extent to which the City's policy and development requirements meet the requirements of TPR.

Canby

Canby Comprehensive Plan

Pursuant to the TPR, cities are required to adopt a local TSP as part of their comprehensive plans. The 2010 Canby TSP was adopted as part of the Canby Comprehensive Plan's Transportation Element (Chapter 5).

Comprehensive Plan Goals and Objectives related to transportation are found within the adopted TSP and are "intended to guide the development of the 2030 Transportation System Plan (TSP) and the implementing ordinances for the City's development code."

The City's transportation policies will need to be reviewed and revised to be consistent with the goals and objectives of this TSP update and its ensuing recommendations.

What this means for the Canby TSP Update: The TSP update process will provide an opportunity to review and update the Comprehensive Plan transportation element and other transportation policies, to better represent current state and local practices and objectives. Potential policy changes may reflect issues that have been evolving since the TSP was last updated, such as strategies to optimize transportation management and maximizing the efficiency of the existing transportation system, integrating alternative transportation options, balancing modal capacity of facilities, and the role the transportation system plays in human health. Towards the end of the planning process, when solutions have been identified to satisfy future needs, policy statements will be developed to help implement TSP recommendations. Updated policy statements may augment or replace adopted comprehensive plan transportation policies and will help guide future actions, including land use decisions, after the TSP is adopted. The City will amend the comprehensive plan transportation policies in adherence to Goal 12 in the updated TSP document.

Canby Land Division and Development Regulations

The Canby Municipal Code, under Title 16 Planning and Zoning, contains Division IV. Land Division and Division III. Zoning, which together controls the process of land development within the City. The City's Land Division Ordinance and Zoning Ordinance include standards for land uses, dimensions of parcels and roadways, parking and access regulations, application procedures, and other important information relevant to creating and maintaining a functioning transportation system. The TPR requires that the City evaluate development applications for their effect on the transportation system, and that the City requires consistency with its TSP from developments.

What this means for the Canby TSP Update: The TSP update will revisit transportation standards, such as those related to street functional classifications, street cross-sections, and mobility and access management. Where modifications are proposed to these standards, the City development requirements will need to be updated for consistency with the updated TSP. In addition, the Land Division Ordinance contains a number of other transportation-related development requirements (e.g., vehicular and bicycle parking, pedestrian access). Amendments to these development requirements may be needed in order to implement the recommendations of the updated TSP and to better comply with the TPR.

Table 1 describes how City land division, zoning, and development requirements meet specific TPR requirements and identifies recommended improvements where local requirements could be strengthened or modified to be more consistent with the TPR. The suggested draft code language will be prepared at the implementation phase of the TSP update that supports the policies and recommendations of the draft TSP and ensures consistency with the TPR.

Table 1. TPR Requirements and Recommendations for the Canby Development Code

TPR Requirement	Municipal Code References and Recommendations
OAR 660-012-0045 – Implementation of the Transportation System Plan	
(1) Each local government shall amend its land use regulations to implement the TSP.	
(a) The following transportation facilities, services and improvements need not be subject to land use regulations except as necessary to implement the TSP and, under ordinary circumstances do not have a significant impact on land use: *(A) Operation, maintenance, and repair of existing transportation facilities identified in the TSP, such as road, bicycle, pedestrian, port, airport and rail facilities, and major regional pipelines and terminals;* *(B) Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, where the improvements are consistent with clear and objective dimensional standards;* *(C) Uses permitted outright under ORS 215.213(1)(m) through (p) and 215.283(1)(k) through (n), consistent with the provisions of 660-012-0065; and* *(D) Changes in the frequency of transit, rail and airport services.* *(b) To the extent, if any, that a transportation facility, service, or improvement concerns the application of a comprehensive plan provision or land use regulation, it may be allowed without further land use review if it is permitted outright or if it is subject to standards that do not require interpretation or the exercise of factual, policy or legal judgment.*	The Comprehensive Plan includes policies aimed at the goal of developing and maintaining a transportation system that is safe, convenient, and economical. The first policy notes that Canby shall provide the necessary improvement to city streets and will encourage the county to make the same commitment to local county roads, in an effort to keep pace with growth. The second policy states that Canby shall work cooperatively with developers to assure that new streets are constructed in a timely fashion to meet the city's growth needs. Section 16.08.130 states that, "Pursuant to the Transportation Planning Rule, projects that are specifically identified in the Canby Transportation System Plan, for which the City has made all the required land use and goal compliance findings, are permitted outright and subject only to the standards established by the Transportation System Plan," while Section 16.49.030 exempts minor public facilities from site and design review. **Recommendation:** Consider consolidating transportation facilities from these various definitions and locations. This could be accomplished by adding "Transportation Facilities (operation, maintenance, preservation, and construction in accordance with the City's Transportation System Plan)" as a permitted use in all land use districts. Alternatively, add "Basic Utilities or Roads" as an allowed use in other zoning districts.

TPR Requirement	Municipal Code References and Recommendations
(c) In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or requires interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0050. To facilitate implementation of the TSP, each local government shall amend regulations to provide for consolidated review of land use decisions required to permit a transportation project.	TPR Section -0050 addresses project development and implementation - how a transportation facility or improvement authorized in a TSP is designed and constructed. Project development may or may not require land use decision-making. The TPR directs that during project development, projects authorized in an acknowledged TSP will not be subject to further justification with regard to their need, mode, function, or general location. To this end, the TPR calls for consolidated review of land use decisions and proper noticing requirements for affected transportation facilities and service providers. The City allows for consolidated review of land use and development permits under 16.88.190- Conformance with Transportation System Plan and Transportation Planning Rule. This section states, "A proposed comprehensive plan amendment, zone change or land use regulation change, whether initiated by the city or by a private interest, shall be reviewed to determine whether it significantly affects a transportation facility, in accordance with the Transportation Planning Rule (OAR 660-012-0060)." Section 16.08.150- Traffic Impact Study states that, "This section establishes the standards to determine when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Study must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities." **This TPR provision is met.**

TPR Requirement	Municipal Code References and Recommendations
(2) Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities corridors and sites for their identified functions. Such regulations shall include:	
(a) Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities;	Chapter 16.10 addresses off-street parking and loading and it requires driveway widths and driveway spacing based on street classification. Access spacing standards for roadways are provided in Section 16.46.030- Access Connection. Section 16.88.190- Conformance with Transportation System Plan and Transportation Planning Rule states, "Amendments to the comprehensive plan and land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the function, capacity, and performance standards (e.g., level of service, volume to capacity ratio, etc.) of the facility identified in the Transportation System Plan." **Recommendation:** Update Chapter 16 to include access control measures that are consistent with the functional classification system recommended by the TSP update. Whether spacing standards are ultimately located within the development code or are referenced in the TSP will be discussed in the implementation phase of this process.
(b) Standards to protect the future operations of roads, transitways and major transit corridors	Section 16.08.150 addresses Traffic Impact Study (TIS) regulations. A TIS is required by the city to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This TIS is intended to ensure that operations of transportation facilities are maintained through individual land use decisions.

TPR Requirement	Municipal Code References and Recommendations
	Recommendation: This TPR provision is met. However, the TSP update provides an ideal opportunity to revisit the thresholds that trigger a TIS, as well as the process and requirements. Any recommended changes resulting from this review may necessitate updates to Division III.
(c) Measures to protect public use airports by controlling land uses within airport noise corridors and imaginary surfaces, and by limiting physical hazards to air navigation;	This section is not applicable. Canby does not have an airport within city limits. **This TPR provision is met.**
(d) A process for coordinated review of future land use decisions affecting transportation facilities, corridors, or sites;	See response to -0045(1)(c). **This TPR provision is met.**
(e) A process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities, corridors, or sites;	This rule is implemented by sections 16.08.150 (Traffic Impact Study), 16.16-41 (Conditional Uses), and 16.35.050 Development Standards). Section 16.08.150 establishes the standards for when a proposal must be reviewed for potential traffic impacts, when a TIS must be submitted with a development application, the study area, and who is qualified to prepare the analysis. 16.08.150 item J: Conditions of Approval notes that, "The city may deny, approve, or approve with appropriate conditions a development proposal in order to minimize impacts and protect transportation facilities." **This TPR provision is met.** The provisions of these sections will be revisited to ensure compliance with the updated TSP.
(f) Regulations to provide notice to public agencies providing transportation facilities and services, MPOs, and ODOT of:	Application and review procedures are detailed in Chapter 16.89 and state that

TPR Requirement	Municipal Code References and Recommendations
(A) Land use applications that require public hearings; *(B) Subdivision and partition applications;* *(C)Other applications which affect private access to roads; and* *(D)Other applications within airport noise corridor and imaginary surfaces which affect airport operations.*	notice of any new proposal that includes a new transportation facility or improvement and if these facilities or improvements impact a collector or arterial street that notice will be sent out to ODOT, Clackamas County, and any other transportation interest groups. Depending on the decision type the code language notes that, "Any application that involves access to the state highway system must be provided to the Oregon Department of Transportation for their review and comment regarding conformance with state access management standards and requirements." **This TPR provision is met.**
(g) Regulations assuring amendments to land use designations, densities, and design standards are consistent with the functions, capacities and performance standards of facilities identified in the TSP.	Section 16.88.190 A. and B. require any proposed comprehensive plan amendment, zone change, or land use regulation change shall be reviewed to determine if it affects a transportation facility, in accordance with the Transportation Planning Rule (OAR 660-012-0060). **This TPR provision is met.**
(3) Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below.	
(a) Bicycle parking facilities as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park-and-ride lots.	Bicycle parking is addressed in Section 16.10.100. Bicycle parking facilities are required as part of new multifamily residential developments of 4 units or more, as well as institutional, commercial, and industrial uses. The amount of bicycle parking required depends on the number of required vehicle parking spaces. **Recommendation:**

TPR Requirement	Municipal Code References and Recommendations
	Bicycle parking facilities should be required in the municipal code surrounding all transit transfer stations and park-and-ride lots.
(b) On-site facilities shall be provided which accommodate safe and convenient pedestrian and bicycle access from within new subdivisions, multi-family developments, planned developments, shopping centers, and commercial districts to adjacent residential areas and transit stops, and to neighborhood activity centers within one-half mile of the development. Single-family residential developments shall generally include streets and accessways. Pedestrian circulation through parking lots should generally be provided in the form of accessways. *(A) "Neighborhood activity centers" includes, but is not limited to, existing or planned schools, parks, shopping areas, transit stops or employment centers;* *(B) Bikeways shall be required along arterials and major collectors. sidewalks shall be required along arterials, collectors and most local streets in urban areas except that sidewalks are not required along controlled access roadways, such as freeways;* *(C) Cul-de-sacs and other dead-end streets may be used as part of a development plan, consistent with the purposes set forth in this section;* *(D) Local governments shall establish their own standards or criteria for providing streets and accessways consistent with the purposes of this section. Such measures may include but are not limited to: standards for spacing of streets or accessways; and standards for excessive out-of-direction travel;* *(E) Streets and accessways need not be required where one or more of the following conditions exist:* *(i) Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep slopes, wetlands or other bodies of water where a connection could not reasonably be provided;* *(ii) Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or*	**On-site circulation and connections**: Section 16.49.064 Bicycle and Pedestrian Facilities requires an internal walkway system to be extended to the boundaries of the development proposed and connect to adjoining properties that have been developed or zoned for commercial, public, or multi-family uses. Section 16.86 establishes that the Transportation System Plan is used to determine which streets are to be arterials, collectors, and neighborhood connectors. All new streets are required to comply with the roadway design standards provided in Chapter 7 of the TSP. **Parking Lots**: Chapter 16.10.070 addresses parking, loading, and access requirements. Pedestrian circulation and safety through parking lots are addressed while bicycle circulation through parking lots is not. **Bikeways and sidewalks**: Section 16.64.030 establishes pedestrian ways and standards for these ways. Pedestrian ways should not exceed 200 feet, the width should be maximized, proper illumination should be provided, proper landscaping and surveillance opportunities should be included along pedestrian ways, and adequate exits and permeable surfaces should be applied. **Street and accessway layout**: Section 16.64.020 establishes block sizes for subdivisions. Block length is restricted to 1,000 feet, and a pedestrian or bicycle way

TPR Requirement	Municipal Code References and Recommendations
(iii) Where streets or accessways would violate provisions of leases, easements, covenants, restrictions, or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.	may be required if block length exceeds that figure. **Cul-de-sacs:** Section 16.64.010 notes that cul-de-sacs are required to include pedestrian accessways. They are also limited to a length of 400 feet. **<u>Recommendations:</u>** • Include references in Divisions III and IV to adopted street standards in the updated TSP. Street standards will need to comply with the bikeway requirements within the TPR. • Evaluate the 1,000 foot block length and accessway requirements as part of the TSP update.
(c) Off-site road improvements are otherwise required as a condition of development approval, they shall include facilities accommodating convenient pedestrian and bicycle and pedestrian travel, including bicycle ways on arterials and major collectors.	Section 16.49.50 for Off-Site Improvements states that the following type of condition may be contemplated, "Improvements in public facilities, including public utilities, not located on the project site where necessary to assure adequate capacity and where service demand will be created or increased by the proposed development. The costs of such improvements may be paid for in full while allowing for recovery of costs from users on other development sites, or they may be pro-rated to the proposed development in proportion to the service demand projected to be created on increases by the project. If determined appropriate by the city based on specific site conditions, off-site roadway improvements may be required to accommodate bicycle and pedestrian travel consistent with the TSP and applicable sections of this code." **This TPR provision is met.**

TPR Requirement	Municipal Code References and Recommendations
(d) For purposes of subsection (b) "safe and convenient" means bicycle and pedestrian routes, facilities and improvements which: *(A) Are reasonably free from hazards, particularly types or levels of automobile traffic which would interfere with or discourage pedestrian or cycle travel for short trips;* *(B) Provide an accessible and reasonably direct route of travel between destinations such as between a transit stop and a store; and* *(C) Meet travel needs of cyclists and pedestrians considering destination and length of trip; and considering that the most common trip length of pedestrians is generally under one-half mile.*	Section 16.04.545 notes that the city should provide "safe and convenient" bicycle and pedestrian routes. These routes should be safe and reasonable free from hazards and should provide a reasonably direct route of travel between destinations. **This TPR provision is met.**
(e) Internal pedestrian circulation within new office parks and commercial developments shall be provided through clustering of buildings, construction of accessways, walkways and similar techniques.	Section 16.49.065 requires that within new office parks and commercial development there should be at least one sidewalk connection between the proposed development and each abutting commercial or office property, walkways shall be provided to the street for every 300 feet of developed frontage, walkways shall be direct with minimal driveway crossings, walkways should be linked to internal circulation of the building, and walkways shall be at least five feet wide and shall be raised. **This TPR provision is met.**
(4) To support transit in urban areas containing a population greater than 25,000, where the area is already served by a public transit system or where determination has been made that a public transit system is feasible, local governments shall adopt land use and subdivisions as provided in subsections (a)-(g) below.	
(a) Transit routes and transit facilities shall be designed to support transit use through provision of bus stops, pullouts and shelters, optimum road geometrics, on-road parking restrictions and similar facilities, as appropriate	The City of Canby does not have a population greater than 25,000. The community is currently served by Canby Area Transit and the updated TSP will address existing and future transit facilities and services.

TPR Requirement	Municipal Code References and Recommendations
	Recommendation: The TSP update planning process will identify transit routes and ensure that roadway design requirements will accommodate service on existing and planned routes. Depending on the draft TSP recommendations, update development requirements as necessary to address the provision of transit amenities.
(b) New retail, office and institutional buildings at or near major transit stops shall provide for convenient pedestrian access to transit through the measures listed in (A) and (B) below. *(A) Accessible walkways shall be provided connecting building entrances and streets adjoining the site;* *(B) Accessible pedestrian facilities connecting to adjoining properties shall be provided except where such a connection is impracticable as provided for in paragraph (3)(b)(E). Pedestrian facilities shall connect the on site circulation system to existing or proposed streets, walkways, and driveways about the property. Where adjacent properties are undeveloped or have potential for redevelopment, streets, accessways and walkways on site shall be laid out or stubbed to allow for extension to the adjoining property;* *(C) In addition to (A) and (B) above, on sites at major transit stops provide the following:* *(i) Either locate buildings within 20 feet of the transit stop, a transit street or an intersecting street or provide a pedestrian plaza at the transit stop or street intersection;* *(ii) An accessible and reasonably direct pedestrian facility between the transit stop and building entrances on the site;* *(iii) A transit passenger landing pad accessible to people with disabilities;* *(iv) An easement or dedication for a passenger shelter if requested by the transit provide; and* *(v) Lighting at the transit stop.*	Access to transit is not currently addressed by the TSP in any significant way. Goal #1 within the TSP notes, "Serve the transportation needs of residents, employees, and visitors with convenient, safe, affordable and efficient transit and alternative transportation services that offer a viable alternative to the automobile and provide key connections to other regional options." Objective 2, in order to complete Goal 1, states that access to transit and other alternative transportation options must be enhanced within Canby. **Recommendation:** See response to -0045(4)(a). Update the development code based on findings regarding major transit stops once the TSP is updated.
(c) Local governments may implement paragraphs (b)(A) and (B) through the designation of pedestrian districts and adoption of appropriate implementing measures regulating development within pedestrian districts. Pedestrian districts must comply with the requirement of paragraph (b)(C).	The City can also meet the requirements of the TPR related to pedestrian connections to transit (TPR -0045(4)(b)(A) and (B)) by adopting appropriate implementing measures within a designated pedestrian

TPR Requirement	Municipal Code References and Recommendations
	district. The City of Canby currently does not have pedestrian district designations. Major transit stops are at Canby Square, Canby Transit Center, and Canby Market Square. The zoning for these major transit stops consists of Light Industrial, Commercial Manufacturing, and Downtown Commercial. Both Light Industrial and Commercial Manufacturing require 10 foot street yard setbacks and 20 foot setbacks for gas stations. Downtown Commercial zoning requires setbacks to be measured and overhangs to not exceed 2 feet. The TSP states, "Canby's downtown pedestrian system is fairly complete with sidewalks on both sides of the street at most locations. In addition, there are a variety of complementary pedestrian facilities, including aesthetic treatments at intersections, ADA-compliant curb ramps, raised sidewalks, curb-extensions, and pedestrian-scale lighting…" Within the TSP pedestrian system deficits are explained further such as a lack of landing pads, crosswalks, and pedestrian access. **Recommendation:** For the approach offered by TPR -0045(4)(c), the City would need to consider designating pedestrian districts and developing specific code language to address, among other things, "major transit stops," as defined through the TSP update.
(d) Designated employee parking areas in new developments shall provide preferential parking for carpools and vanpools *(e) Existing development shall be allowed to redevelop a portion of existing parking areas for transit-oriented uses, including bus stops and pullouts, bus shelters, park and ride stations, transit-oriented developments, and similar facilities, where appropriate;*	Chapter 16.10 addresses parking and loading generally. Parking is addressed when determining the amount of parking spaces per employee of an establishment but does not determine need for carpools, vanpools, or transit-oriented uses. **Recommendation:** The City should consider requiring that new developments with

TPR Requirement	Municipal Code References and Recommendations
(f) Road systems for new development shall be provided that can be adequately served by transit, including provision of pedestrian access to existing and identified future transit routes. This shall include, where appropriate, separate accessways to minimize travel distances; *(g) Along existing or planned transit routes, designation of types and densities of land uses adequate to support transit.*	planned designated employee parking areas provide preferential parking for employee carpools and vanpools. A typical local code requirement requires employers with more than a specific number of employees, or developments where required parking spaces exceed a specific number, to dedicate a percentage of the required parking spaces for car/vanpools.
(5) In developing a bicycle and pedestrian circulation plan as required by 660-012-0020(2)(d), local governments shall identify improvements to facilitate bicycle and pedestrian trips to meet local travel needs in developed areas. Appropriate improvements should provide for more direct, convenient, accessible, and safer bicycle or pedestrian travel within and between residential areas and neighborhood activity centers (i.e., schools, shopping, transit stops). Specific measures include, for example, constructing walkways between cul-de-sacs and adjacent roads, providing walkways between buildings, and providing direct access between adjacent uses.	The TSP update is expected to include a considerable update to the City's bicycle and pedestrian circulation plan, consistent with TPR -0020. This TPR requirement is currently implemented in City requirements as follows. A bike circulation plan and a pedestrian circulation plan are outlined in the TSP and is shown in figures 6-1 and 5-1. The TSP requires that there is a maximum 330' spacing between pedestrian and bicycle connections. The TSP also provides a maximum 300' spacing for bike and pedestrian accessways. The TSP also limits block length and perimeter and requires street connectivity for 'efficient vehicular and pedestrian circulation.' For walkways between cul-de-sacs and adjacent roads see a response and recommendations related to cul-de-sacs in Section -0045(3)(b). For walkways between buildings see a response and recommendations related to accessways in section 0045(3)(b). For access between adjacent uses see a response and recommendations related to accessways in section 0045(3)(b). **Recommendation:**

TPR Requirement	Municipal Code References and Recommendations
	This requirement will be addressed by the TSP update planning process and can be implemented locally by requiring improvements in developing areas consistent with adopted code provisions.
(6) Local governments shall establish standards for local streets and accessways that minimize pavement width and total ROW consistent with the operational needs of the facility. The intent of this requirement is that local governments consider and reduce excessive standards for local streets and accessways in order to reduce the cost of construction, provide for more efficient use of urban land, provide for emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and which accommodate convenient pedestrian and bicycle circulation. Notwithstanding section (1) or (3) of this rule, local street standards adopted to meet this requirement need not be adopted as land use regulations.	Section 16.86.020 establishes that right-of-way widths and cross section standards for new streets shall be in conformance with the Canby Transportation System Plan and Public Works Design Standards Document. Canby's Public Works Design Standards shows standards of right-of-way, pavement width, and sidewalk width based on the classification of the street. This standard for a local street meets the requirements of Canby's Public Works Design Standards as well as Oregon's Neighborhood Street Design Standards. **Recommendation:** The TSP update process provides the City with the opportunity to evaluate local streets standards to determine if modifications need to be made to both meet the current and future needs of the community and implement this TPR requirement.
OAR 660-12-0060	
(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would: *(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*	TPR compliance is addressed in Section 16.08.150 Traffic Impact Study, which provides the City a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. **This TPR provision is met.**

TPR Requirement	Municipal Code References and Recommendations
(b) Change standards implementing a functional classification system; or *(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection. If a local government is evaluating a performance standard based on projected levels of motor vehicle traffic, then the results must be based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.* *(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;* *(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or* *(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.*	

APPENDIX C. PERFORMANCE MEASURES AND PRIORITIZATION FRAMEWORK

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TECHNICAL MEMORANDUM #4: PERFORMANCE MEASURES AND PRIORITIZATION FRAMEWORK

DATE: May 24, 2023

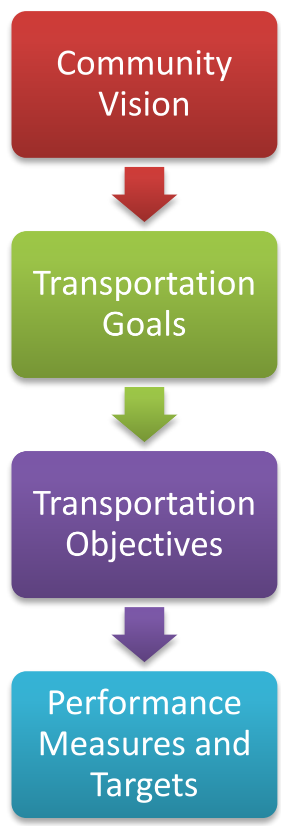
TO: Don Hardy | City of Canby

FROM: Reah Flisakowski, PE; Kevin Chewuk, PTP; Anders Hart | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update Project #: 23023-000

This memorandum provides recommended transportation goals and objectives, and also details the performance-based planning and programming framework for Canby. The goals and objectives will be tied into the framework to evaluate and monitor the performance of the transportation system investments towards attainment of the long-term goals and objectives of the city and providing a framework for prioritizing transportation projects.

SETTING DIRECTION FOR THE PLAN



A community vision (developed as part of the Comprehensive Plan Update), along with a set of goals, objectives, and performance measures will be used to guide the project team in the development, evaluation, and prioritization of solutions that best fit the community and will provide the basis for policies to support Plan implementation.

Collectively, the transportation-related goals, objectives, and performance measures describe what the community wants the transportation system to do in the future, as summarized by a **vision statement**. A vision statement generally consists of an imaginative description of the desired condition in the future. It is important that the vision statement for the transportation system aligns with the community's core values.

Goals and objectives create manageable stepping stones through which the broad vision statement can be achieved. **Goals** are the first step down from the broader vision. They are broad statements that should focus on outcomes, describing a desired end state. Goals should be challenging, but not unreasonable.

Each goal must be supported by more finite **objectives**. In contrast to goals, objectives should be specific and measurable. Where feasible, providing a targeted time period helps with objective prioritization and achievement. When developing objectives, it is helpful to identify key issues or concerns that are related to the attainment of the goal.

The solutions recommended through the TSP must be consistent with the goals and objectives. To accomplish this, **performance measures** based on the goals and objectives will be developed. For the Canby TSP, they will be used in two ways:

1) **Project Prioritization**: To inform the selection and prioritization of projects and policies for the plan by describing how well they support the goals and objectives of the city.
2) **System Performance**: To evaluate and monitor the performance of the transportation system towards attainment of the long-term goals and objectives of the city.

RECOMMENDED TRANSPORTATION GOALS AND OBJECTIVES

The recommended goals and objectives provided in the following sections, may be modified, removed, or added to through the planning process, shaped by input received from the project team, advisory committees, and the general public. This feedback process will be used to develop a final set of goals and objectives for the Transportation System Plan (TSP).

ACCESSIBILITY AND CONNECTIVITY

The transportation system is convenient and accessible and connects people to destinations throughout the city and beyond.

OBJECTIVES FOR CONSIDERATION

- Provide direct, continuous, and connected transportation facilities to minimize out-of-direction travel and decrease travel times for all users.
- Increase the proportion of trips made by walking, bicycling, transit and carpooling.
- Complete all gaps in the bicycle and pedestrian networks, including trails.
- Increase household and job access to transit.
- Increase household and job access to low stress bike and walk networks.
- Increase travel options that serve popular destinations, such as schools, services, and parks.

SAFETY AND SECURITY

The transportation system is safe and secure for people of all ages and abilities.

OBJECTIVES FOR CONSIDERATION

- Reduce fatal and serious injury crashes for all modes of travel.
- Reduce crashes involving pedestrians and bicyclists by improving conditions along and across streets and at other conflict points with motor vehicles.
- Ensure the pedestrian and bike throughways are well maintained and clear of debris, obstacles, and obstructions.
- Provide attractive streetscapes that encourage active transportation, appropriate traffic volumes, vehicle speeds, and safety for all users.
- Reduce the transportation system's vulnerability to natural disasters and climate change.

HEALTHY PEOPLE AND ENVIRONMENT

The transportation system protects the natural, cultural, and developed environments and encourages healthy and active living for all through comfortable and convenient lower-polluting transportation alternatives.

OBJECTIVES FOR CONSIDERATION

- Reduce vehicle miles traveled per capita.
- Improve public health by promoting and providing safe, comfortable, and convenient active transportation options to meet daily needs and access services.
- Design all transportation facilities to be welcoming and attractive for all people walking and bicycling.
- Increase household access to parks, open spaces, and natural areas.
- Use sensitive design and mitigation approaches to natural, cultural, and developed resources.
- Reduce transportation-related air pollutants.

EQUITY

The transportation system eliminates transportation related disparities and barriers and is affordable for all users.

OBJECTIVES FOR CONSIDERATION

- Reduce household transportation costs by providing walkable neighborhoods, active transportation options, and reduced reliance on motor vehicle travel.
- Develop a multimodal transportation system that allows all users to access employment, education, and services.
- Develop a low stress bike and walk network for users of all ages and abilities.

- Promote transportation investments that offer system connectivity and efficiency benefits and avoid, minimize, and mitigate negative impacts.
- Prioritize infrastructure investments that serve those with the least access to transportation resources and with the greatest mobility needs.

RELIABILITY AND EFFICIENCY

Manage and optimize the transportation system to ease congestion so people and goods can affordably, reliably, and efficiently reach their destinations.

OBJECTIVES FOR CONSIDERATION

- Build an integrated and connected system of roadways, freight routes, transit and bicycle and pedestrian facilities.
- Build infrastructure and capacity to support electric vehicles and other emerging technologies to increase travel options.
- Leverage technological advances to increase efficiency of travel across all modes for all road users.
- Increase the number of people and businesses with access to travel information.
- Increase the number of households and businesses with access to outreach, education, incentives, and other tools that increase shared trips and use of travel options.

FISCAL RESPONSIBILITY

Strategically design, operate and maintain the transportation system to maximize assets, minimize costs, and enhance the surrounding community through right sized infrastructure.

OBJECTIVES FOR CONSIDERATION

- Preserve and maintain transportation system assets to maximize their useful life and minimize project construction and maintenance costs.
- Build transportation infrastructure that is sized appropriately and that encourages economical operation and maintenance.
- Align the function of transportation facilities with evolving character and design of the cross-section to enhance the adjacent land uses through right sized infrastructure.
- Develop new revenue sources to prepare for increased travel demand, that balance fairness and equity across the community.

COLLABORATION

The transportation system decisions are made in a transparent and collaborative manner, and the benefits and burdens of investments are distributed equally among all users.

OBJECTIVES FOR CONSIDERATION

- Create a multimodal transportation system that seamlessly connects to existing and planned infrastructure in surrounding communities.
- Make transportation investment decisions using a performance-based planning and programming framework that is aligned with the local goals and supported by meaningful public engagement, multimodal data, and analysis.
- Improve coordination and cooperation among the owners and operators of the transportation system to enhance the efficiency of roadways and multimodal facilities and encourage improved transit service.
- Engage a wider diversity of people to provide input at all stages of developing and maintaining the transportation system and services.

PERFORMANCE BASED PLANNING PROCESS

The TSP will utilize a performance-based planning process. The community vision is distilled into measurable goals and supporting objectives. Performance measures for these goals and objectives will be used to help assess potential projects to enhance transportation system performance, and to measure long-term alignment between Canby's transportation system and the community's vision, goals, and objectives. The plan process is illustrated below in Figure 1, along with the key questions that will be considered during three development stages of the TSP.

FIGURE 1: PERFORMANCE BASED PLANNING PROCESS

RECOMMENDED PROJECT PRIORITIZATION FRAMEWORK

The proposed approach to prioritize individual transportation projects in Canby will be based on criteria associated with each TSP goal. A prioritization score will be calculated for each project using the following seven criteria (i.e., each TSP goal):

- Accessibility and Connectivity
- Safety and Security
- Healthy People and Environment
- Equity
- Reliability and Efficiency
- Fiscal Responsibility
- Collaboration

The projects will be scored on each criterion from 1 (low) to 10 (high). The criteria will be weighted equally, resulting in overall possible scores ranging from 7 to 70. The following sections describe the methodology for calculating the scores for each criterion.

ACCESSIBILITY AND CONNECTIVITY

Pedestrian, bicycle, and transit demand serves as the basis for this criterion. Projects along Major Pedestrian or Bicycle Streets, or Transit Corridors, and Neighborhood Pedestrian or Bicycle Streets will be assigned the scores shown in Table 1. Projects located in Downtown Canby have three points added to their respective scores.

TABLE 1: PROPOSED PRIORITIZATION APPROACH FOR ACCESSIBILITY AND CONNECTIVITY CRITERIA

ROUTE DESIGNATION	SCORE IN DOWNTOWN CANBY	SCORE OUTSIDE OF DOWNTOWN CANBY
Major Pedestrian Street, Major Bicycle Street, or Transit Corridor	10	7
Neighborhood Pedestrian Street or Neighborhood Bicycle Street	7	4
Other Street	4	1

SAFETY AND SECURITY

This criterion is intended to account for both crash history and crash risk factors. The following factors will be scored for prioritization as shown in Table 2:

- Locations along the low stress pedestrian and bicycle network (i.e. Major Pedestrian Street, Major Bicycle Street, or Transit Corridor).
- Locations with pedestrian or bicyclist collisions.
- Streets with three or more travel lanes.
- Locations with posted speeds of 30 mph or higher.

TABLE 2: PROPOSED PRIORITIZATION APPROACH FOR SAFETY AND SECURITY CRITERIA

CONDITION	SCORE
Locations along the low stress pedestrian and bicycle network	4
Locations with pedestrian or bicyclist collisions	2
Locations with three or more travel lanes	2
Locations with posted speeds of 30 mph or higher	2
None	1

HEALTHY PEOPLE AND ENVIRONMENT

A project's distance from community amenities (i.e., education, critical services, parks, open spaces, and natural areas) serves as the basis for this criterion. Scores will be assigned based on the location of a project as shown in Table 3.

TABLE 2: PROPOSED PRIORITIZATION APPROACH FOR HEALTHY PEOPLE AND ENVIRONMENT CRITERIA

LOCATION	SCORE
Located within 1/4 mile from a school	4
Located within 1/4 mile of Downtown Canby or commercial corridor	4
Located within 1/4 mile from a park, open space, or natural area	2
None	1

EQUITY

The demographic variables of income and age will be used to evaluate the equity implications of project needs. To calculate the scores, Census Block Groups in Canby will be given scores for income and age from 1 to 5, as shown in Table 4. For each demographic variable, '5' equals the top grouping in the city (i.e., lowest median income or highest share of the youngest and oldest aged residents), '3' the citywide average, and '1' the bottom grouping in the city (i.e., highest median income or lowest share of the youngest and oldest aged residents). The scores for each demographic variable will be totaled and applied for each project in that block group. The block group with the lowest total will receive a score of '1', regardless of the total.

TABLE 3: PROPOSED PRIORITIZATION APPROACH FOR EQUITY CRITERIA

LOCATION	SCORE
Census Block Group with lowest median income	5
Census Block Group with median income	3
Census Block Group with highest median income	1
Census Block Group with highest share of residents with the youngest and oldest ages	5
Census Block Group with the median share of residents with the youngest and oldest ages	3
Census Block Group with lowest share of residents with the youngest and oldest ages	1
Census Block Group with lowest combined score of the income and age variables	1

RELIABILITY AND EFFICIENCY

A project's impact on the movement of people and goods serves as the basis for this criterion. Scores will be assigned based on the location of projects as shown in Table 5.

TABLE 4: PROPOSED PRIORITIZATION APPROACH FOR RELIABILITY AND EFFICIENCY CRITERIA

LOCATION	SCORE
Location of significant delay for people	4
Location along a freight route	4
Location along the arterial and collector roadway network	2
None	1

FISCAL RESPONSIBILITY

The total estimated construction and maintenance cost will be used to evaluate the fiscal responsibility of projects. To calculate the scores, each project will be given scores for construction and maintenance costs from 1 to 5, as shown in Table 6. For each cost variable, '5' equals the lowest cost, '3' the average cost, and '1' the highest cost. The scores for each cost variable will be totaled and applied for each project. Any project with a total cost variable score of '2' (i.e., projects with both the highest planning level construction and assumed maintenance costs) will receive a score of '1', regardless of the total.

TABLE 5: PROPOSED PRIORITIZATION APPROACH FOR FISCAL RESPONSIBILITY CRITERIA

LOCATION	SCORE
Lowest planning level construction cost	5
Median planning level construction cost	3
Highest planning level construction cost	1
Lowest assumed maintenance cost	5
Median assumed maintenance cost	3
Highest assumed maintenance cost	1
Any project with total cost variable score of '2', regardless of total	1

COLLABORATION

This criterion is intended to capture how well a project is aligned with the six system performance measures. Each project will be given a value from 1 to 10 for how well it is perceived to work towards the outcome of each system performance measure. For each system performance measure, '10' equals significant progress towards the outcome, '5' indicates some progress towards the outcome, and '1' indicates no progress towards the outcome. The values for each project will be totaled and compared to the highest possible value of '60'. That ratio will be applied to the highest criterion score of '10' to determine the final project score, ranging from 1 to 10.

TABLE 6: PROPOSED PRIORITIZATION APPROACH FOR COLLABORATION CRITERIA

LOCATION	SCORE
Significant progress towards the outcome of system performance measures	10
Some progress towards the outcome of system performance measures	5
No progress towards the outcome of system performance measures	1

RECOMMENDED SYSTEM PERFORMANCE FRAMEWORK

System performance measures will be used to support the City's transportation planning and decision-making process. The performance measures serve as the link between TSP goals and plan implementation by enabling the city to measure the degree to which the TSP investments support city-wide priorities through the TSP horizon year. While the performance assessment does not represent the complete picture, it does offer a baseline against which to assess how the policies, investments, and planning decisions made in this plan may affect the future.

The six proposed system performance measures (shown in Table 8) include: 1) Miles Traveled; 2) Mode Share; 3) Multimodal Level of Traffic Stress; 4) Congestion; 5) System Completeness; and 6) Safety. Each performance measure includes a target to make progress towards through plan implementation (see Table 8).

The system performance evaluation process will be used during subsequent TSP updates, which typically occurs every 5 to 10 years, depending on funding availability and evolving citywide and state transportation needs and priorities. The system performance assessment will highlight changes between current conditions and the future planning horizon and help answer the following questions:

- How do people travel in the city?
- How easily, comfortably, and directly can people travel in the city?
- How safe is travel in the city?

TABLE 7: RECOMMENDED SYSTEM PERFORMANCE MEASURES, TARGETS AND CONNECTION TO TSP GOALS

SYSTEM PERFORMANCE MEASURE	TSP GOALS						
	Accessibility and Connectivity	Safety and Security	Healthy People and Environment	Equity	Reliability and Efficiency	Fiscal Responsibility	Collaboration
How do people travel in the city?							
VEHICLE MILES TRAVELED: System-wide number of miles traveled (total and per capita).	●		●	◒	●	●	◒
Target: Reduce vehicle miles traveled per person through the planning horizon year.							
MODE SHARE: Percent of non-drive alone trips (walking, bicycling, transit, and shared ride trips).	●		●	●	◒	●	◒
Target: Increase the share of non-drive alone trips through the planning horizon year.							
How easily, comfortably, and directly can people travel in the city?							
MULTIMODAL LEVEL OF TRAFFIC STRESS: Locations on the roadway network that operate with an extreme or high multimodal level of traffic stress.	●	●	●	●	◒	◒	◒
Target: Decrease the miles of facilities that operate with an extreme or high multimodal level of traffic stress through the planning horizon year.							
CONGESTION: Locations on the roadway network that operate above thresholds for congestion.	◒	◒	◒	◒	●		◒
Target: Decrease the amount of congested and severely congested lane miles through the planning horizon year.							
SYSTEM COMPLETENESS: Completeness of sidewalks, bikeways, and trails.	●	●	●	●	●	◒	◒
Target: Increase the completeness of the sidewalk, bikeway, and trail networks through the planning horizon year.							
How safe is travel in the city?							
SAFETY: Transportation related collisions.	◒	●		◒	◒	◒	◒
Target: Reduce transportation related fatalities and serious injuries for all users through the planning horizon year.							

Notes: ● = Measure highly connected with achieving goal ◒ = Measure somewhat connected with achieving goal

APPENDIX D. EVALUATION METHODOLOGY AND ASSUMPTIONS

DKS 1050 SW 6TH AVENUE, SUITE 600 • PORTLAND, OR 97204 • 503.243.3500 • DKSASSOCIATES.COM

TM #6: EVALUATION METHODOLOGY AND ASSUMPTIONS

DATE: July 2023

TO: Project Management Team

FROM: Eileen Chai, Dock Rosenthal, Kevin Chewuk | DKS Associates

SUBJECT: City of Canby Comprehensive Plan and Transportation System Plan Update

This memorandum documents the methodology and key assumptions to be used to develop the existing and future conditions transportation analysis for the City of Canby Transportation System Plan (TSP) Update. This includes:

- Motor Vehicle analysis
  - Study intersections
  - Traffic operation analysis methodology
  - Future traffic volume development methodology
- Safety analysis methodology
- Multimodal analysis methodology

MOTOR VEHICLE ANALYSIS

STUDY INTERSECTIONS

The study intersections include most of the intersections that were studied for the 2011 City of Canby Transportation System Plan along with 2 additional intersections in the potential Urban Growth Boundary (UGB) expansion areas added for this update. The study intersections with detailed characteristics, including control type, applicable standards, and mobility standards, are summarized in Table 1 and shown in Figure 1.

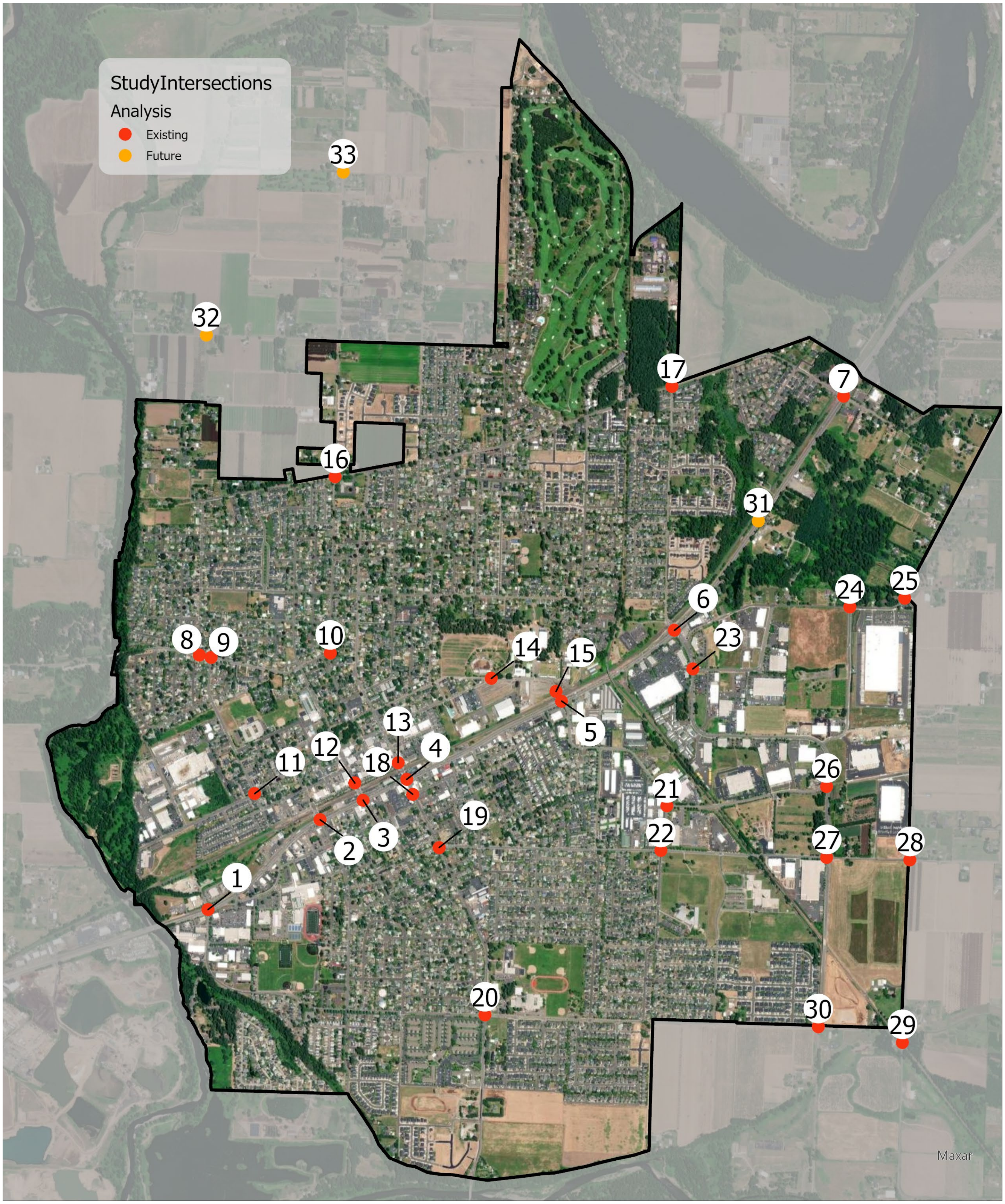


FIGURE 1. IDENTIFIED STUDY INTERSECTIONS

INTERSECTION MOBILITY TARGETS

The mobility targets or operating standards for each study intersection are determined based on jurisdictional ownership.

- The intersections under Oregon Department of Transportation (ODOT) jurisdiction must comply with the volume to capacity (V/C) ratios in the Oregon Highway Plan (OHP)[1] based on the roadway classification, designation, and posted speed limits.
- The intersections under Clackamas County must comply with motor vehicle capacity evaluation standards in the Clackamas County Comprehensive Plan[2]. The City of Canby is classified as a rural area under county standards and county roadways and intersections inside of cities will use the City's standards for the evaluations.
- The City of Canby uses LOS mobility standard on City roadways and defines LOS D as the minimum acceptable design standard.

TABLE 1. STUDY INTERSECTION MOBILITY TARGETS

APPLICABLE STANDARD	#	STUDY INTERSECTION	CONTROL	MOBILITY STANDARD
ODOT	1	OR 99E & Berg Parkway	Signal	0.90
	2	OR 99E & Elm Street	Signal	0.90
	3	OR 99E & Grant Street	Signal	1.0 (STA)
	4	OR 99E & Ivy Street	Signal	1.0 (STA)
	5	OR 99E & Pine Street	Signal	0.90
	6	OR 99E & Sequoia Parkway	Signal	0.90
	7	OR 99E & Territorial Road	Signal	0.85
CITY OF CANBY	8	Knights Bridge Road & N Birch Street	Two-way Stop	LOS D
	9	Knights Bridge Road & N Cedar Street	Two-way Stop	LOS D
	10	Knights Bridge Road & N Holly Street	Two-way Stop	LOS D
	11	NW 3rd Avenue & N Cedar Street	Two-way Stop	LOS D
	12	NW 1st Avenue & N Grant Street	All-way Stop	LOS D

[1] 1999 Oregon Highway Plan – Amendment, Oregon Department of Transportation, December 2015

[2] Clackamas County Comprehensive Plan, Latest text version on December 2022; Chapter 5

APPLICABLE STANDARD	#	STUDY INTERSECTION	CONTROL	MOBILITY STANDARD
	13	NW 1st Avenue & N Ivy Street	All-way Stop	LOS D
	14	NE 3rd Avenue & NE 4th Avenue	Two-way Stop	LOS D
	15	NE 4th Avenue & N Pine Street	Two-way Stop	LOS D
	16	NE Territorial Road & N Holly Street	All-way Stop	LOS D
	17	NE Territorial Road & N Redwood Street	Two-way Stop	LOS D
	18	SE 2nd Avenue & S Ivy Street [A]	Two-way Stop	LOS D
	19	S Township Road & S Ivy Street [A]	Two-way Stop	LOS D
	20	SE 13th Avenue & S Ivy Street [A]	Signal	LOS D
	21	SE 4th Avenue & S Redwood Street	Two-way Stop	LOS D
	22	S Township Road & S Redwood Street	All-way Stop	LOS D
	23	Sequoia Parkway & Hazel Dell Way	Two-way Stop	LOS D
	24	SE 1st Avenue & S Walnut Street	Two-way Stop	LOS D
	25	SE 1st Avenue & S Mulino Road [A]	Two-way Stop	LOS D
	26	SE 4th Avenue & S Walnut Road	All-way Stop	LOS D
	27	S Township Road & Sequoia Parkway	All-way Stop	LOS D
	28	S Township Road & S Mulino Street [A]	All-way Stop	LOS D
	29	SE 13th Avenue & S Mulino Road [A]	All-way Stop	LOS D
	30	SE 13th Avenue & Sequoia Parkway	All-way Stop	LOS D
		FUTURE YEAR STUDY INTERSECTIONS		
ODOT	31	OR 99E & Walnut Street	Signal	0.85
CITY OF CANBY	32	NW 22nd Avenue & N Birch Street	Two-way Stop	LOS D
	33	NW 31st Avenue & N Holly Street	Two-way Stop	LOS D

[A] Clackamas County's roadways/intersections using City's evaluation standards.

TRAFFIC ANALYSIS VOLUME DEVELOPMENT

Traffic operations at the study intersections will be analyzed using the estimated 30th highest annual hour traffic volume (30 HV) consistent with methodology outlined in the Oregon Department of Transportation *Analysis Procedure Manual (APM)*. Based on preliminary analysis of nearby Automatic Traffic Recorder (ATR) data the seasonal peak occurs in July or August. Traffic counts will be collected in June to minimize the necessary seasonal adjustment.

Traffic operations will be analyzed for a single peak hour. The PM peak hour is the higher peak and will be analyzed with counts collected from 4 to 6 PM.

PEAK HOUR SELECTION

Weekday traffic counts from Oregon Traffic Monitoring System (MS2), Replica Data, and recent turning movement counts were reviewed to determine the peak hour. These sources determined that the PM peak hour is higher than the AM peak hour and the peak period is expected to occur between 4 PM to 6 PM. The system peak hour will be determined based off the collected traffic count data.

SEASONAL FACTORS

The data collection period was determined based on seasonal conditions that occur along the highway in the City of Canby using methodology from ODOT APM. Since there is not an Automatic Traffic Recorder (ATR) on OR 99E near the study area an alternate ATR location was used to apply the preferred On-Site ATR analysis method. OR 99E has a *commuter* seasonal trend and within the City is classified as a *small urban*. An ATR in Klamath Falls (18-018) has similar general characteristics to OR 99E in Canby but the station is located in a very different geographical and urban environment compared to the City of Canby.

Instead, an ATR location along OR 99E Business (ATR 24-022) is proposed as representative of the City of Canby based on the Annual Average Daily Traffic (AADT) and proximity to the study area (24 miles south of the City of Canby). The traffic volumes along OR 99E in Canby range from 21,600 to 24,000 vehicles and are within 10 percent of the ATR location which has AADT of 23,500 vehicles[3]. Table 1 lists the relative peak AADT percentage and the corresponding month from the ATR summaries in the Traffic Volume Tables (TVT) over the past five years. As shown in the table, seasonal conditions will likely occur in June and/or July along the highway in the City of Canby.

[3] ODOT TransGIS, https://gis.odot.state.or.us/transgis/

TABLE 1. STATION PERCENT AADT AND PEAK MONTH OVER THE PAST FIVE YEARS

	2017	2018	2019	2020[A]	2021
PERCENT AADT	111	111	110	129	116
PEAK MONTH	June	June	May	February	July

Grey cells represent highest and lowest data and were excluded from the analysis.

[A] Data affected by COVID-19

Traffic counts will be collected in July therefore no seasonal adjustment will be applied to the traffic volumes.

TRAFFIC ANALYSIS

Traffic operations (delay, LOS, and V/C) will be analyzed using PTV Vistro traffic software for all study intersections under existing (2023) and future (2043) conditions. The Highway Capacity Manual (HCM) 7th Edition methodology will be used for signalized and unsignalized intersection analyses. HCM reports will be post-processed for signalized intersections to obtain intersection average V/C ratios. If HCM 7th Edition results cannot be reported due to intersection geometry or other limitations, the capacity results will be based on HCM 2000.

Future (2043) travel demand in the City of Canby will be estimated using a small community travel demand model tool developed specifically for the City that reflects local land use patterns and the transportation network. The existing small community travel demand model tool will be updated to the latest version of PTV Visum and provide a basis for the new model. Volumes from the 2043 City of Canby travel demand model will be post-processed using methods consistent with the APM. This approach is derived from the methodologies outlined in the National Cooperative Highway Research Program (NCHRP) Report 765 *Analytical Travel Forecasting Approaches for Project-Level Planning and Design.*

TRAVEL DEMAND MODEL ANALYSIS SCENARIOS

Existing PM Peak (2023)

The Existing (2023) PM Peak Hour Scenario will be calibrated to the seasonally adjusted PM peak counts to be collected in June 2023. Trip generation for this model will be based on existing land use with the City of Canby.

Future (2043) Baseline Scenario Land Use Assumptions

A Future Baseline (No-Build) scenario will use the 2043 land use assumptions developed for the most recent City of Canby Comprehensive Plan update. The scenario will be used as the basis to estimate year 2043 traffic growth at all study intersections, using the calibrated base year (2023) model and 2043 scenario. The Future Baseline scenario network will be based on financially constrained and funded projects listed in the City of Canby Comprehensive Plan specifically the Walnut Street extension project and any other mitigations generated by the draft I-205 Toll Project Transportation Technical Report.

Other Future Scenarios

- Build Scenario – this scenario will include all capacity related projects proposed in the TSP update.
- Financially Constrained Scenario – this scenario will include all proposed projects that are reasonably likely to be funded within the 20 horizon.
- Tolling Impacts – impacts from tolling may be explicitly included within the Future Baseline scenario. If not, an additional scenario will be analyzed to estimate the impacts of diversion to OR 99E related to tolling on I-205.

OTHER ANALYSIS

SAFETY ANALYSIS

Collision trends will be identified by analyzing the most recent five years of available crash data, currently 2017-2021, for roadways within the City of Canby from ODOT's Crash Analysis & Reporting Unit.

Analysis will include calculation of critical crash rates and excess proportion of specific crash types at all study intersections, as outlined in ODOT APM Chapter 4. For reference populations with less than five intersections, intersection crash rates will be compared to the published 90th percentile crash rates in ODOT APM Table 4-1. Any intersection with a collision rate that exceeds its critical crash rate or the 90th percentile crash rate will be flagged for future review. Special consideration will be given to potential collisions causes at location with high bicycle or pedestrian crash frequencies. ODOT's State Highway Crash Rate Tables will be reviewed and used to identify highway segments experiencing crash rates greater than the statewide average for similar facilities. Top 10 percent ODOT Safety Priority Index System (SPIS) sites will also be identified.

The collision analysis shall be used to identify crash patterns and suggest potential countermeasures at locations that exceed the published intersection or segment crash rates, or the calculated critical crash rate, and identify low-cost systemic safety measures that could be considered to reduce fatal and serious injury crashes.

ACTIVE TRANSPORTATION ANALYSIS

The pedestrian and bicycle network will be inventoried along collector and higher facilities based on available GIS data. Any data gaps will be manually completed based on aerial photography and field work. This inventory will provide a system completeness metric for the pedestrian and bicycle system.

The level of traffic stress will be evaluated to four levels (LTS 1, LTS 2, LTS 3, LTS 4) based on the APM methodology where data is available. If the necessary attributes to evaluate LTS are not available from existing GIS data, a simplified "Low Stress" or "High Stress" evaluation will be used. This network will be used to provide a percent connected metric for transportation analysis zones (TAZ) to key amenities such as parks, schools, transit stops and commercial areas. After financially constrained projects are identified an evaluation of the future, financially constrained network will provide quantitative improvement of the accessibility for each TAZ.

SUMMARY

Parameters for the traffic analysis will be gathered using varying sources and methodologies. Table 2 lists possible sources for specific data needed for the analysis. Table 3 includes analysis metrics and analysis tools.

TABLE 2. ANALYSIS PARAMETERS AND IDENTIFIED SOURCES

PARAMETER	DESCRIPTION	SOURCE[1]
INTERSECTION/ROADWAY GEOMETRY	Number of lanes, lane configuration, cross-sectional information	Field work, aerial photos, City of Canby Comprehensive Plan, Open GIS data
OPERATIONAL DATA	Posted speeds, intersection control, signal timing	Field work, aerial photos, Open GIS data, ODOT, City of Canby
TRAFFIC VOLUMES	30 HV, Peak Hour Factor, seasonal adjustment, turning movement counts	Collected peak hour volume data, ODOT ATRs
LAND USE	Household and employment data within Canby	City of Canby
COLLISION DATA	Intersection collisions, roadway segment collision, SPIS	Oregon Transportation Safety Data Explorer, TransGIS, ODOT Crash Rate Table, ODOT Crash Rate Book
BICYCLE & PEDESTRIAN SYSTEM	Sidewalk location, width, condition; bike facility location, width, parking	Open GIS data, aerial photos

1. Bold indicates data required from agency partners

TABLE 3. ANALYSIS METRICS AND IDENTIFIED METHODOLOGY

METRIC	DESCRIPTION	METHODOLOGY
TRAFFIC OPERATIONS	V/C, LOS, Delay	HCM 7th and 2000 methodologies using PTV Vistro
TRAFFIC VOLUME FORECASTING	Traffic volume growth	PTV Visum, NCHRP 765
SYSTEMIC SAFETY	Crash rates	ODOT APM
BICYCLE AND PEDESTRIAN LTS	Level of Stress evaluation of the active transportation network	ODOT APM

APPENDIX E. EXISTING MULTIMODAL CONDITIONS

TECHNICAL MEMORANDUM #7

DATE: October 16, 2023

TO: Don Hardy | City of Canby

FROM: Reah Flisakowski, PE; Kevin Chewuk, PTP; Anders Hart; Emily D'Antonio; Eileen Chai | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update

Existing Multimodal Conditions

Project #: 23023-000

This memorandum summarizes the existing multimodal transportation conditions in the City of Canby. This summary includes information on existing facilities for walking, biking, transit, and motor vehicles. Additionally, it includes information on existing intersection operations, congestion, and safety trends. This information will serve as the basis for comparison to expected 2040 conditions outlined in future deliverables during Canby's ongoing Transportation System Plan update process.

FACTORS AFFECTING TRAVEL DECISIONS

Travelers often weigh a variety of factors when deciding how to commute to or from their destination. Whether the trip will be via motor vehicle, walking, bicycle, public transportation, scooter, or other mode, the choice is often a balance between ease and convenience of travel, travel cost, and travel time.

LAND USE AND KEY DESTINATIONS

Land use is a key component of transportation system planning. Where people live and where they go to work, shop, or access services and the distance between these key destinations has a large impact on how they get around and the demands they place on the transportation system.

Many trips also occur between community amenities within the City's planning area, including parks, civic (e.g., schools, libraries, community centers), essential retail and services (e.g., grocery stores, pharmacies), and medical uses. Several amenities are primarily located around Downtown Canby northwest of OR 99E, including the Canby Public Library, City Hall, the Thriftway grocery store, and a variety of bars and restaurants. Other major destinations include Canby High School southwest of Downtown, the Canby Adult Center at the intersection of S 13th Avenue and S Ivy Street, the Clackamas County Fairgrounds northeast of Downtown, and the Fred Meyer grocery store on OR 99E at Sequoia Parkway. Major employment centers include Downtown and the growing Pioneer Industrial Area near the Fred Meyer supermarket.

Those destined for a park or school generally have a higher likelihood to walk or bicycle than those going to work or shopping. The distance of that destination also plays a role in mode choice. Trips that are shorter generally present a better opportunity to walk or bicycle, and longer distance trips more often are conducive to transit or motor vehicle modes. Residents in the City's planning area who work outside of it (as well as people who work in the City's planning area but live elsewhere) are likely to commute by motor vehicle due to distance and/or lack of adequate facilities. However, some commuters may choose walking, bicycling, or transit if the regional transportation system offers convenient and comfortable walking/biking facilities or transit services between destinations.

QUALITY AND AVAILABILITY OF FACILITIES

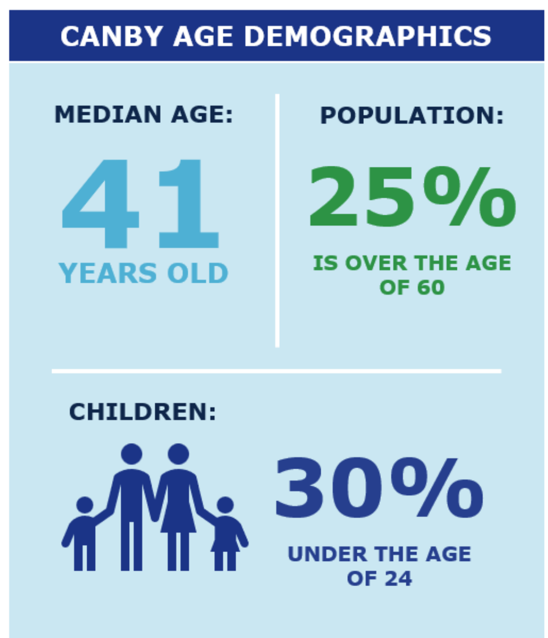
The availability of sidewalks, shared-use paths, curb ramps to provide wheelchair access, crosswalks, and bicycle facilities increases the comfort and access of those walking and biking. The lack of or poor quality of these facilities, particularly along or across higher volume or higher speed roadways, discourages people from utilizing non-motorized vehicle modes of transportation.

For transit, the distance to bus stops, frequency of service, route coverage, connections to other transportation modes, and amenities at stops are some of the factors that play a role in a user's decision to utilize it.

DEMOGRAPHICS

As shown in Table 1, residents of Canby have a median age of 41, with about 63 percent of residents 16 years or older within the civilian labor force. About 17 percent of the population is over the age of 65. Both age demographics are very similar to that of the region and state. There is a slightly larger Under 19 population compared to the county and the state.

The City is home to about 18,000 residents and will continue to see people of all ages and abilities walking, biking, and using transit[1].



[1] https://www.census.gov/quickfacts/fact/table/OR,canbycityoregon/LFE041221

TABLE 1: CANBY DEMOGRAPHICS

AGE	CANBY	CLACKAMAS COUNTY	OREGON
UNDER 19 YEARS	26%	24%	23%
20-24 YEARS	4%	5%	6%
25-44 YEARS	24%	26%	28%
44-59 YEARS	22%	20%	19%
60 YEARS AND OLDER	25%	25%	24%
MEDIAN AGE	40.8	41.6	39.6

ACS 5-Year Estimates (2021) Table S0101

POPULATION AND EMPLOYMENT GROWTH

As growth occurs to the year 2040, the demands on the City's transportation system will be influenced by changes in population, housing, and employment. These changes in travel demands will require better ways to manage the system, more choices for getting around, and targeted improvements to make the system safer and more efficient.

TRAVEL DEMANDS AND CHARACTERISTICS

The number of people who choose to walk, bike, ride transit, or drive along with the distances they travel is important for assessing how well existing transportation facilities serve the needs of users. Available data on travel demand, travel mode choice, and trip length are used to better understand travel behavior in the community and inform the needs analysis for the transportation system. The data presented in this section derives from the US Census Bureau on commuting trips. Future deliverables will include more detailed information on current and projected travel characteristics, such as total trips, mode choice, and trip growth.

DAILY PERSON TRIPS

Table 2 summarizes the total person trips (i.e., drive alone, shared ride, transit, walk, and bike trips) during an average weekday in the Canby planning area for year 2023 based on US Census Data and the 2009 travel demand model used in the previous TSP[2]. The transportation network in the planning area accommodates 15,800 daily person trips. Of these daily person trips in 2015, over 900 were bike, walk, or transit trips. Driving alone (i.e., single-occupant vehicle) is the dominant mode of transportation in Canby.

[2] Estimated from US Census American Community Survey 2021 5-Year Estimates, Table S0801 Commuting Characteristics by Sex. Note that the Census percentages are for workers over 16 commuting to work and are not estimates of total trips. People working from home were excluded from the Census commuting percentages and "taxicab, motorcycle, or other means [of transportation] were combined with "drove alone." These percentages were applied to an estimate of 2023 total person trips based on the 2009 and 2030 estimates of person trips from the travel demand model used to create Canby's current TSP.

TABLE 2: PERSON TRIPS IN CANBY PLANNING AREA

AVERAGE WEEKDAY PERSON TRIPS BY MODE	2023 DAILY PERSON TRIPS	PERCENT
DRIVE ALONE TRIPS (SOV)	13,716	87%
SHARED RIDE TRIPS	1,139	7%
TRANSIT TRIPS	315	2%
WALK TRIPS	543	3%
BIKE TRIPS	88	1%
TOTAL PERSON TRIPS	**15,800**	**100%**
TOTAL NON-SOV TRIPS	**2,084**	
TOTAL BIKE, WALK, TRANSIT TRIPS	**946**	

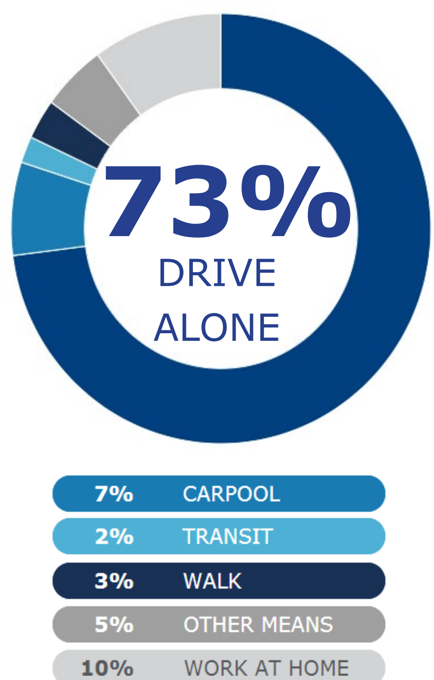
Note: The percentages in this table differ from those below because the percentage of commuters working from home was excluded from the total and "taxicab, motorcycle, or other means [of transportation] was combined with "drove alone."

COMMUTER TRIPS

Much of the traffic in the Canby planning area, especially during the more congested weekday peak periods, is related to employment. Residents in the Canby planning area who are employed predominantly commute to work outside of the planning area (85 percent), while jobs in the planning area are overwhelmingly filled by people who live outside of the planning area (82 percent)[3].

On average, about 73 percent of employed residents in the Canby planning area commute to work using single-occupant motor vehicles. About 7 percent of residents carpool to work and the remaining 20 percent work from home, walk, take transit, or use some other means of travel (see Figure 11).

About ten percent of employed residents in the Canby planning area worked from home according to the 2021 ACS 5-Year Estimates. Any increase in the remote work share will change the demand on streets, including when and how they travel.



Source: US Census Bureau, 2017-2021 American Community Survey

[3] US Census Bureau, OnTheMap. Home/Work Distance/Direction Analysis, 2020.

TRANSPORTATION SYSTEM FACTS

To address changing transportation needs within the City's planning area though 2040, the existing and future travel conditions must be considered. The transportation system review documented the existing pedestrian, bicycle, transit, and motor vehicle infrastructure. It also identified shortfalls and limitations regarding how people can travel within the City (such as lack of bike lanes or sidewalks). Solutions are identified in Chapter 5 for transportation infrastructure that is determined to not maintain acceptable service levels for residents.

TODAY THE **CANBY UGB** HAS:

- **80 LANE MILES** OF STREETS
- **46 LANE MILES** OF BIKE LANES
- **8 TRAFFIC SIGNALS**
- **100 LINEAR MILES** OF SIDEWALKS
- **2 MILES OF PAVED TRAILS** FOR WALKING AND BIKING

STREET NETWORK

KEY STREETS

Major streets within the planning area include:

- OR 99E (ODOT facility), which runs east-west through the center of the city. The road provides a major connection with Oregon City and Portland to the north, and Woodburn and Salem to the south.
- Territorial Road (Canby jurisdiction) runs east-west as a northern border for the city. It connects to OR 99E in the northeast corner of the city's boundary.
- Sequoia Parkway (Canby jurisdiction) which runs north-south connecting the Pioneer Industrial Park to OR 99E.

Key streets that connect to OR 99E and provide access to neighborhoods are Ivy Street, SW 13th Ave, Mulino Road, and Pine Street. Key streets that connect to Territorial Road include Redwood Street, Ivy Street, Maple Street and Township Road.

LOCAL STREET CONNECTIVITY

Connecting the street grid is critical to an efficient, livable transportation network. New street connections distribute traffic and provide more route options. This is important for reducing greenhouse gas emissions and improving emergency responses. Also, a grid of smaller streets and shorter blocks is especially important for making it easier to walk, bike, and get to bus stops.

Most new Local streets will be built by new private development. When a private development project is approved, the builder or developer is required to provide a street network that complies with the current City standards. The connectivity standard in the existing TSP requires streets to be provided at a minimum spacing of 600 feet in most cases (1,000 feet on arterials). These Local streets occur at more frequent intervals and are spaced closer than the larger streets (i.e., Arterial or Collector streets).

Local street connectivity in the current City limits was reviewed to identify areas that do not comply with the maximum street spacing standard of 600 feet or 1,000 feet on arterials. The major areas lacking connectivity include:

- The Clackamas County Fairgrounds--This large area limits north-south connectivity from NE 4th Avenue and N 10th Avenue and east-west connectivity from N Locust Street.
- Willamette Valley Country Club and Eco City Park--This area does not permit north-south connections from NE Territorial Road and east-west connections from N Maple Street.
- Philander Lee Elementary School--This sports complex restricts north-south and east-west connectivity north and east of SE 13th Avenue and S Ivy Street, including from S Pine Street and SE 10th Street.
- Canby High School--This campus limits local connectivity between SW Berg Parkway and SW 4th Avenue and S Douglas Street/S Elm Street.
- Maple Street Park--This park blocks east-west connectivity from N Oak Street.
- Howard Eccles Elementary School--The campus blocks north-south connections from NW 5th Avenue and east-west connections from N Cedar Street.
- Pioneer Industrial Area--Several blocks in this area are longer than 600 feet and have limited local connectivity. However, the industrial land use of this area tends to require less fine-grained connectivity than residential and commercial areas.

Should new development occur in any of these or other developed areas of the planning area, the connectivity standards should be met.

STREET NETWORK PERFORMANCE ASSESSMENT

Congestion and safety were reviewed for study intersections and streets in the City's planning area. This assessment shows how safe and efficient the street system is and provides information to identify potential improvement needs.

STUDY INTERSECTION OPERATIONS

Table 3 shows current study intersection operations[4], and the Appendix includes detailed Highway Capacity Manual reports for each intersection. Several study intersections experience some congestion during the weekday p.m. peak hours based on the study intersection operations presented in Table 3. These include the OR 99E/Ivy Street (v/c: 0.76) and OR 99E/Pine Street (v/c: 0.77) intersections. However, neither of these intersections has a v/c ratio that exceeds the respective ODOT mobility targets. Future analysis will present expected congestion traffic operations in year 2040.

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[4] Count data collected in July 2023.

TABLE 3. EXISTING (2023) TRAFFIC OPERATIONS AT STUDY INTERSECTIONS

INTERSECTION	CONTROL	MOBILITY TARGET	V/C	LOS	DELAY (SEC)
OR 99E & BERG PKWY	Signal	0.90	0.54	C	24
OR 99E & ELM ST	Signal	0.90	0.66	C	23
OR 99E & GRANT ST	Signal	1.0 (STA)	0.55	A	10
OR 99E & IVY ST	Signal	1.0 (STA)	0.76	D	39
OR 99E & PINE ST	Signal	0.90	0.77	C	31
OR 99E & SEQUOIA PKWY	Signal	0.90	0.6	C	33
OR 99E & TERRITORIAL RD	Signal	0.85	0.65	B	16
KNIGHTS BRIDGE RD & N BIRCH ST	Two-way Stop	LOS D	0.43/0.21	A/B	8/14
KNIGHTS BRIDGE RD & N CEDAR ST	Two-way Stop	LOS D	0.15/0.23	A/C	9/16
KNIGHTS BRIDGE RD & N HOLLY ST	Two-way Stop	LOS D	0.10/0.38	A/B	8/15
NW 3RD AVE & N CEDAR ST	Two-way Stop	LOS D	0.03/0.16	A/B	7/10
NW 1ST AVE & N GRANT ST	All-way Stop	LOS D	0.24	A	9
NW 1ST AVE & N IVY ST	All-way Stop	LOS D	0.47	B	12
NE 3RD AVE & NE 4TH AVE	Two-way Stop	LOS D	0.00/0.01	A/A	0/10
NE 4TH AVE & N PINE ST	Two-way Stop	LOS D	0.00/0.18	A/B	0/11
NE TERRITORIAL RD & N HOLLY ST	All-way Stop	LOS D	0.35	B	11
NE TERRITORIAL RD & N REDWOOD ST	Two-way Stop	LOS D	0.21/0.33	A/C	8/19
SE 2ND AVE & S IVY ST	Two-way Stop	LOS D	0.27/0.26	A/B	8/14
S TOWNSHIP RD & S IVY ST	Two-way Stop	LOS D	0.23/0.24	A/C	8/18
SE 13TH AVE & S IVY ST	Signal	LOS D	0.54	B	11
SE 4TH AVE & S REDWOOD ST	Two-way Stop	LOS D	0.07/0.09	A/A	8/10
S TOWNSHIP RD & S REDWOOD ST	All-way Stop	LOS D	0.21	A	9
SEQUOIA PKWY & HAZEL DELL WAY	Signal	LOS D	0.38	C	35
SE 1ST AVE & S WALNUT ST	Two-way Stop	LOS D	0.05/0.02	A/A	8/9
SE 1ST AVE & S MULINO RD	Two-way Stop	LOS D	0.12/0.07	A/A	8/9
SE 4TH AVE & S WALNUT RD	All-way Stop	LOS D	0.16	A	9

INTERSECTION	CONTROL	MOBILITY TARGET	V/C	LOS	DELAY (SEC)
S TOWNSHIP RD & SEQUOIA PKWY	All-way Stop	LOS D	0.28	B	10
S TOWNSHIP RD & S MULINO ST	All-way Stop	LOS D	0.3	A	9
SE 13TH AVE & S MULINO RD	All-way Stop	LOS D	0.12	A	8
SE 13TH AVE & SEQUOIA PKWY	All-way Stop	LOS D	0.2	A	9

STREET NETWORK CONGESTION

This assessment identified locations on the roadway network that operate with some level of congestion under current conditions. These are locations where motorists may experience delays during peak hour travel. This baseline provides a metric for assessing the impacts of new developments on the transportation system.

Figure 1 displays the results of the street network congestion analysis. The displayed conditions are based on the current street network and the mileage calculation is based on the length of the analyzed street segment associated with the point of congestion. The a.m. congestion was assessed at 8:00 a.m. on a typical Wednesday and the p.m. congestion was assessed at 4:30 p.m. on a Wednesday using Google Maps Typical Traffic. As shown, some minor congestion is expected along segments of OR 99E and along the roads that intersect with it near the intersection. There is also some delay along NW 10th Ave and SW 13th Avenue. The road segment with the largest delay is SW 4th Avenue.

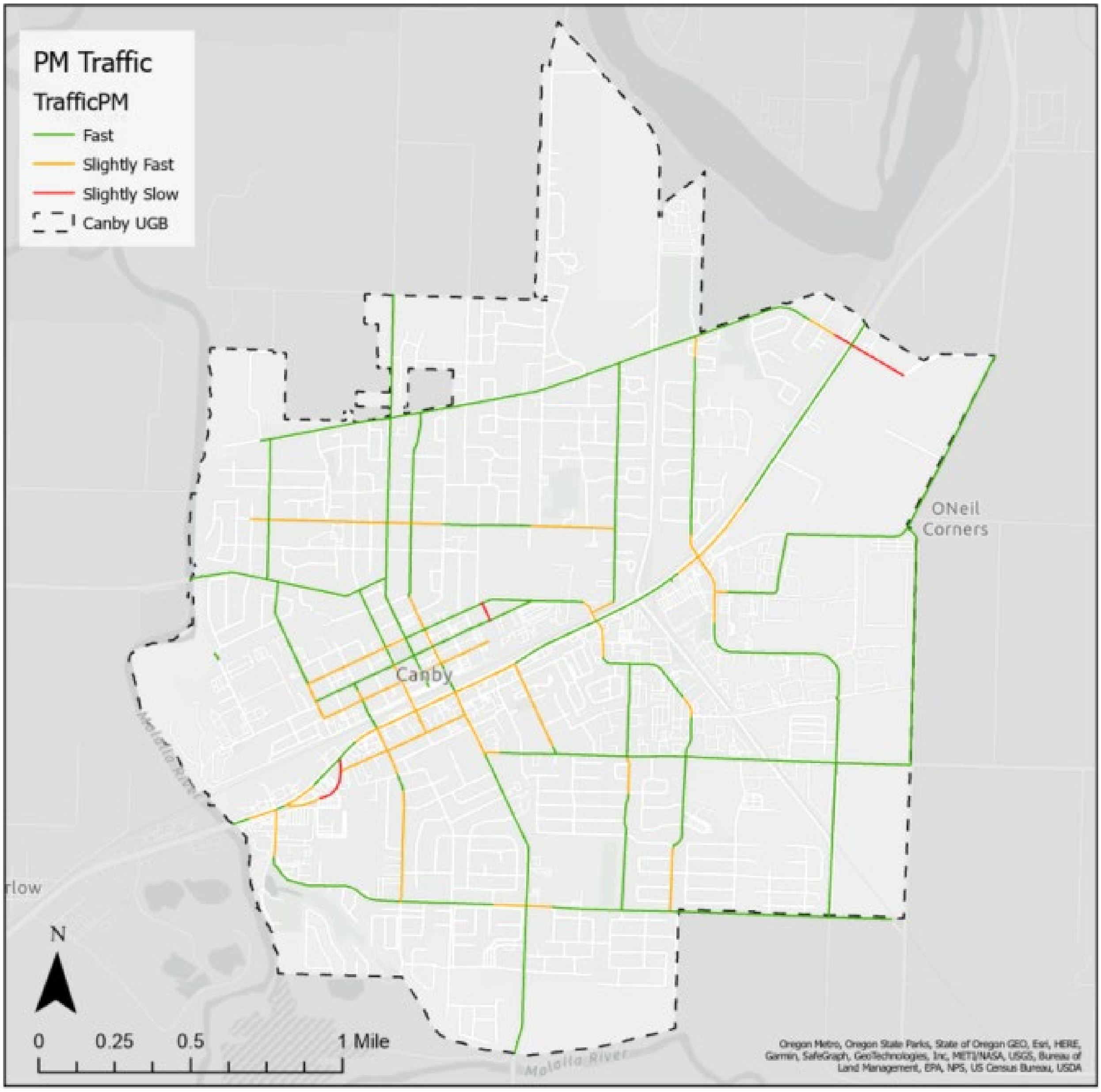


FIGURE 1: STREET NETWORK CONGESTION

STREET NETWORK SAFETY

Figure 2 and Table 4 show data for the 5-year period between 2017 and 2021, with 458 collisions occurring in the City's planning area. Of these collisions, nine involved a pedestrian, eight involved a bicyclist, and 441 involved a vehicle or multiple vehicles. Of the total collisions,

- One fatal injury collision was recorded.
  - During daytime with clear weather, a head-on collision occurred along OR 99E east of downtown Canby between S Locust Street and S Pine Street.
  - The striking driver, sustaining fatal injury, was reported to have physical illness and was suspected of marijuana use. The driver failed to maintain their lane and drove left of center on two-way road, colliding with a stationary vehicle.
- Five collisions with serious injury were recorded.
  - Three collisions occurred along OR 99E.
    - During daytime in rainy conditions, a physically ill driver veered off the roadway and struck a building at the intersection of OR 99E and S Ivy Street (study intersection #4).
    - During daytime with clear weather, an eastbound through driver failed to avoid the vehicle ahead and struck a stationary vehicle near the intersection of OR 99E and S Pine Street (study intersection #5).
    - During nighttime in wet conditions without streetlights, a westbound left turning vehicle was struck by an eastbound through vehicle at the intersection of OR 99E and Sequoia Parkway (study intersection #6).
  - A driver consumed alcohol and drove recklessly, departed the road and struck a fixed object near the intersection of N Maple Street and NE 34th Place during nighttime in wet conditions without streetlights.
  - A distracted driver driving in excess of the posted speed limit failed to yield the right-of-way to a pedestrian at the intersection of NW 3rd Avenue and N Elm Street during nighttime in rainy conditions.

Collision types[5] vary within the City of Canby, but the majority involved turning movement (149, 33 percent), rear-end (124, 27 percent), and angle (71, 15 percent) collisions, as shown in Figure 2.

- 74 percent of the turning movement crashes were due to drivers failing to yield the right-of-way. The remaining turning crashes were mainly due to the driver disregarding traffic signal, performing an improper turn, and distracted driving.
- Almost half of the angle crashes were caused by the driver failing to yield the right-of-way. The rest of angle crashes were mainly caused by drivers passing stop signs or red flashers and disregarding traffic signals.

[5] Collision Type is a one-character alphanumeric code. It refers to the angle or direction of impact between vehicles based on their intended path of travel, or to the type of first impact; Oregon Department of Transportation Crash Analysis and Coding Manual, September 2019.

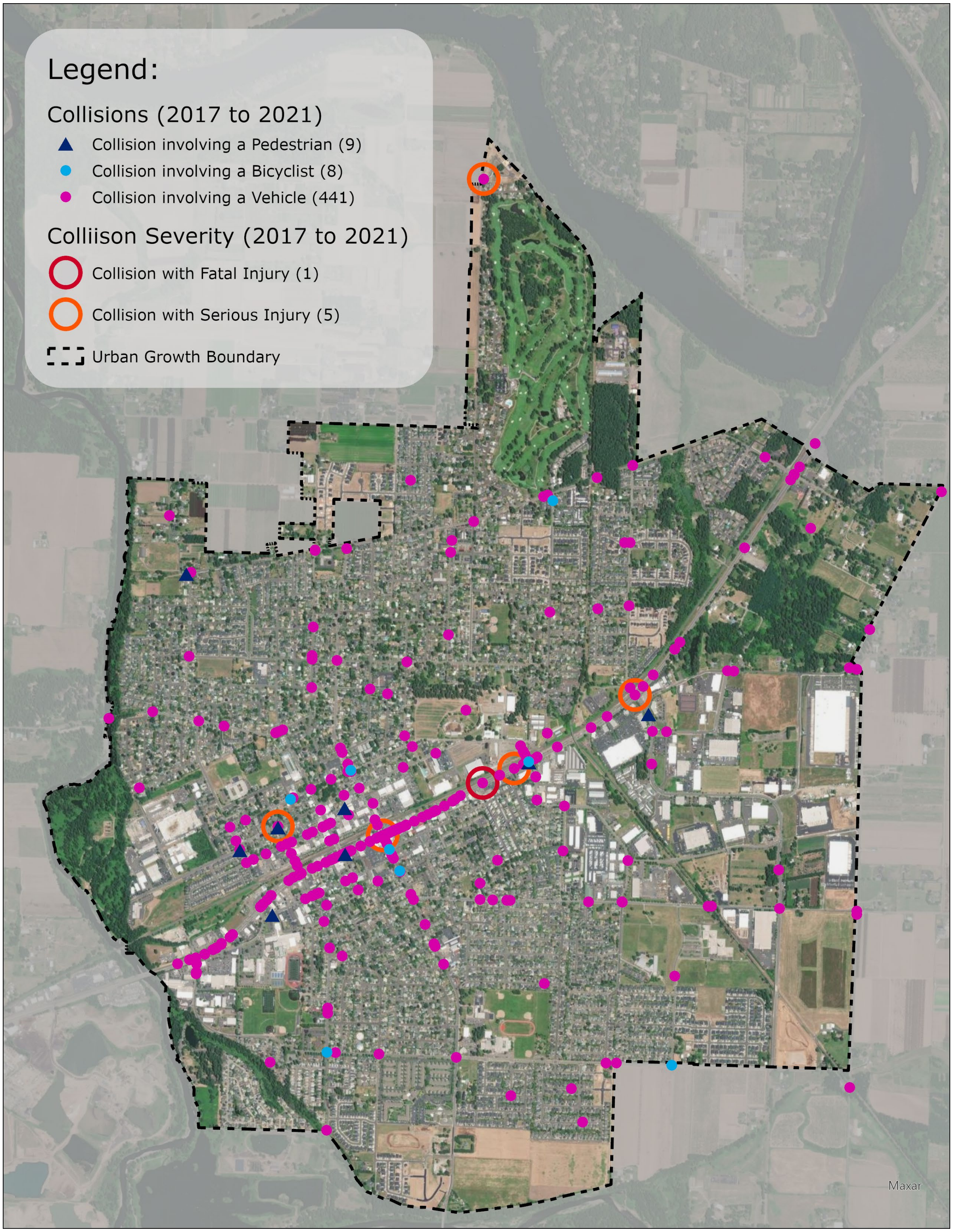


FIGURE 2. STREET NETWORK SAFETY

TABLE 4: SAFETY IN THE CANBY PLANNING AREA

	ALL COLLISIONS	COLLISIONS INVOLVING VEHICLE(S) ONLY	COLLISIONS INVOLVING PEDESTRIANS	COLLISIONS INVOLVING BICYCLISTS
TOTAL COLLISIONS (2017 TO 2021)	458	441	9	8
TOTAL COLLISIONS PER CAPITA*	0.024	0.024	0.0005	0.0004
COLLISIONS WITH FATALITIES	1	1	0	0
TOTAL FATALITIES	*1*	*1*	*0*	*0*
COLLISIONS WITH SERIOUS INJURIES	5	3	2	0
TOTAL SERIOUS INJURIES	*5*	*3*	*2*	*0*

Source: ODOT Crash Analysis and Reporting Unit. Reported collision data from 2017 to 2032 for the City of Canby planning area.

* Per capita calculations are divided by the 2021 City of Canby population estimate of 18,731 from Portland State 2022 Annual Population Report Tables, https://www.pdx.edu/population-research/population-estimate-reports.

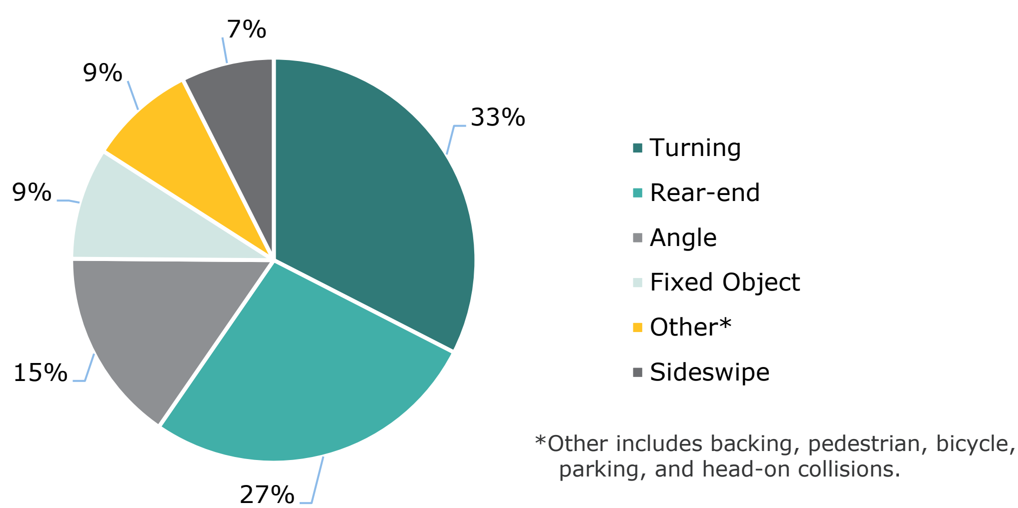


FIGURE 3. COLLISION TYPE WITHIN THE CITY OF CANBY (2017-2021)

Collision Summary at Study Intersections

The most recent five years of available collision data at the study intersections was obtained from ODOT and used to evaluate the collision history[6]. There were 138 crashes recorded at the study intersections over the five-year period (see Table 5), with the most crashes occurring at OR 99E/Ivy Street intersection.

There were no fatalities at the study intersections over the five-year period, although 78 of the crashes resulted in an injury. There were four crashes involving people walking and biking at the study intersection, including two at OR 99E/Pine Street intersection, one at NW 3rd Avenue/N Cedar Street intersection, and one at SE 2nd Avenue/S Ivy Street intersection.

The most common collision types that occurred at the study intersections were turning, rear-end, and angle crashes, with many of these occurring along OR 99E signalized intersections. Many of these crashes were due to drivers failing to yield the right-of-way and disregarding traffic signal. There were 16 turning crashes at OR 99E/S Ivy Street intersection, mainly due to drivers making improper turning movement.

TABLE 5: SUMMARY OF COLLISIONS AT STUDY INTERSECTIONS

STUDY INTERSECTION	TOTAL CRASHES	COLLISION TYPE				COLLISION SEVERITY			COLLISION FLAG	
		TURNING	REAR -END	ANGLE	OTHER	FATAL	INJURY	PDO *	PED	BIKE
OR 99E/BERG PKWY	**13**	8	4	1	0	0	9	4	0	0
OR 99E & ELM ST	**19**	10	6	3	0	0	10	9	0	0
OR 99E & GRANT ST	**9**	0	7	1	1	0	5	4	0	0
OR 99E & IVY ST	**31**	16	7	3	5	0	22	9	0	0
OR 99E & PINE ST	**15**	5	4	3	3	0	9	6	1	1
OR 99E & SEQUOIA PKWY	**9**	2	6	1	0	0	5	4	0	0
OR 99E & TERRITORIAL RD	**8**	4	2	1	1	0	4	4	0	0
KNIGHTS BRIDGE RD & N BIRCH ST	**0**	0	0	0	0	0	0	0	0	0
KNIGHTS BRIDGE RD & N CEDAR ST	**1**	0	1	0	0	0	0	1	0	0
KNIGHTS BRIDGE RD & N HOLLY ST	**0**	0	0	0	0	0	0	0	0	0
NW 3RD AVE & N CEDAR ST	**2**	1	0	0	1	0	1	1	1	0
NW 1ST AVE & N GRANT ST	**1**	0	0	1	0	0	0	1	0	0

[6] ODOT reported collisions for January 1, 2017, through December 31, 2021.

STUDY INTERSECTION	TOTAL CRASHES	COLLISION TYPE				COLLISION SEVERITY			COLLISION FLAG	
		TURNING	REAR -END	ANGLE	OTHER	FATAL	INJURY	PDO *	PED	BIKE
NW 1ST AVE & N IVY ST	**3**	0	0	2	1	0	2	1	0	0
NE 3RD AVE & NE 4TH AVE	**0**	0	0	0	0	0	0	0	0	0
NE 4TH AVE & N PINE ST	**2**	1	1	0	0	0	1	1	0	0
NE TERRITORIAL RD & N HOLLY ST	**2**	2	0	0	0	0	0	2	0	0
NE TERRITORIAL RD & N REDWOOD ST	**1**	1	0	0	0	0	1	0	0	0
SE 2ND AVE & S IVY ST	**2**	0	1	0	1	0	2	0	0	1
S TOWNSHIP RD & S IVY ST	**2**	1	1	0	0	0	1	1	0	0
SE 13TH AVE & S IVY ST	**5**	1	0	4	0	0	0	5	0	0
SE 4TH AVE & S REDWOOD ST	**1**	1	0	0	0	0	1	0	0	0
S TOWNSHIP R & S REDWOOD ST	**2**	0	1	1	0	0	2	0	0	0
SEQUOIA PKWY & HAZEL DELL WY	**6**	2	2	2	0	0	1	5	0	0
SE 1ST AVE & S WALNUT ST	**0**	0	0	0	0	0	0	0	0	0
SE 1ST AVE & S MULINO RD	**0**	0	0	0	0	0	0	0	0	0
SE 4TH AVE & S WALNUT RD	**0**	0	0	0	0	0	0	0	0	0
S TOWNSHIP RD & SEQUOIA PKWY	**1**	1	0	0	0	0	0	1	0	0
S TOWNSHIP RD & S MULINO ST	**2**	0	0	2	0	0	1	1	0	0
SE 13TH AVE & S MULINO RD	**1**	1	0	0	0	0	1	0	0	0
SE 13TH AVE & SEQUOIA PKWY	**0**	0	0	0	0	0	0	0	0	0
TOTAL	**138**	**57**	**43**	**25**	**13**	**0**	**78**	**60**	**2**	**2**

Source: ODOT Crash Analysis and Reporting Unit. Reported collision data from 2017 to 2021.

* PDO = Property Damage Only

Collision Summary at Rail Crossings

In addition, the Union Pacific study rail crossings along the segment between S Elm Street and NE Territorial Road has two reported incidents in the past five years[7], one in 2018 and another in 2022 at S Ivy Street[8] crossing. Both incidents included a train striking a pedestrian and resulting in fatalities. It should be noted that the rail contains two tracks, increasing the risks associated with pedestrian crossing when two trains approach from opposite directions due to the limited visibility. Additionally, pedestrian crossings lack protection, as no gates are provided on the sidewalk to prevent people from crossing when a train is passing.

Pedestrian Safety

There were nine pedestrian-involved crashes over the past five years. Of these crashes,

- Two occurred along OR 99E near S Grant Street (study intersection #3 in the downtown area) and S Pine Street (study intersection #5).
- Two at NW 3rd Avenue and N Elm Street in the downtown area.
- One near NW 3rd Avenue and N Cedar Street (study intersection #11 near the downtown area).
- One along SW 2nd Avenue near S Birch Street.
- One along N Holly Street in between NW 2nd Street and NW 3rd Street.
- One along S Sequoia Parkway near SE 1st Avenue.
- One along NW Territorial Road near N Birch Street.

Pedestrians sustained serious injuries in one crash at NW 3rd Ave/N Elm Street intersection, as discussed under the section introduction. Minor and possible injuries to pedestrians were sustained in the rest of the crashes. Five pedestrian-involved crashes were due to drivers not yielding the right-of-way with other contributing factors including pedestrian illegally in the roadway, driver speeding, driver distracted driving, and other improper driving behavior. Time of day and lighting conditions varied across pedestrian crashes, with four crashes occurring during daylight, four occurring at night, and one occurring at dawn.

The dominant trends observed in the crash data for pedestrian-involved crashes indicate that actions aimed at improving driver yield rates for pedestrians would be valuable in reducing the number of pedestrian-involved crashes. Engineering countermeasures to achieve this include ensuring adequate signing indicating pedestrian crossing locations and state laws on yielding, providing and enhancing lighting at crossings and locations with high pedestrian traffic, modifying traffic signal phasing to reduce pedestrian conflict opportunities, or improving roadside pedestrian visibility.

The data also indicates that actions focusing on motorist behaviors may be effective, including targeted enforcement and education efforts in the downtown area and along OR 99E. These could include actions such as police enforcement of crosswalk laws through staged crossings, or efforts to increase general compliance with red lights and stop signs.

[7] Crossing Accident Report, U.S. Department of Transportation, Federal Railroad Administration. Reported collision data from 2018 to 2022.

[8] Grade Crossing ID: 760042H

Bicycle Safety

There were eight bicycle-involved crashes over the past five years. Of these crashes:

- One occurred at OR 99E and S Pine Street (study intersection #5).
- Two along S Ivy Street at SE 2nd Avenue (study intersection #18) and SE 3rd Street near the downtown area.
- Two along NW 4th Street at N Fir Street and N Ivy Street.
- Two along SW 13th Street at S Elm Street and S Teakwood Street.
- One along N Pine Street near N Territorial Road.

A cyclist sustained minor injuries in six of the crashes, while possible injuries were sustained in the rest of the crashes. Three of the crashes were due to drivers failing to maintain their lanes, other contributing factors including drivers failing to yield the right-of-way, passing the stop signs, distracted driving, and other improper driving behavior. The vast majority of bicycle crashes occurred during the day.

The dominant trends observed in the crash data for bicycle-involved crashes indicate that actions aimed at improving driver yield rates at intersections, specifically while turning, would be valuable in reducing the number of bicycle-involved crashes. Engineering countermeasures to achieve this include actions to increase the visibility of bicycling and encourage drivers to expect bikes at intersections, such as by providing highly visible space for bicycles and signing. Other engineering approaches include reducing conflict opportunities at intersections, such as through bike boxes or bike-specific signal phasing.

Ensuring a comprehensive bicycle network, including crossing opportunities, can also reduce conflicts between bicycles and motor vehicles. Effective bicycle detection at signals, and an evaluation of stop-controlled intersections along popular biking routes, may promote bicyclist adherence to traffic control devices.

The data also indicates that actions focusing on motorist and bicyclist behaviors may be effective, including targeted enforcement and education efforts in the downtown area and along OR 99E.

Intersection Collision Analysis

The observed crash rate for intersections is a function of the number of crashes and the annual average daily traffic (AADT). Each intersection is grouped into a reference population based on intersection control type and urban or rural area classification. The crash rates (crashes per million entering vehicles) for each intersection were compared to two different standards:

- A critical crash rate compares performance to other similar intersections in the study area, and
- A 90th percentile crash rate which is based on similar intersections throughout the state (obtained from the OSOT's Analysis Procedures Manual Exhibit 4-1).

The full calculations are provided in the Appendix. Table 6 shows these crash rates for study intersections where crashes were reported. Intersections that had observed crash rates greater than either the critical or 90th percentile crash rate were flagged as study focus areas for further consideration.

As shown in Table 6, crash rates calculated at most study intersections are well below this threshold, indicating the frequency of collisions is typical for the volume of traffic served. The exceptions are the intersections of OR 99E/Ivy Street and NW 3rd Avenue/N Cedar Street intersections. A summary of these intersections is provided below.

- **OR 99E/Ivy Street:** this is a signalized four-leg intersection. Most of the collisions were turning/rear-end type (23 of the 31 total collisions). 12 of the collisions were caused by drivers failing to yield the right-of-way, five were caused by driver disregarding traffic signal, five were caused by drivers failing to avoid other vehicles, four were caused by driver not paying attention, three were due to drivers making improper turns, one was caused by driver being careless, and one related to physically ill driver.
- **NW 3rd Avenue/N Cedar Street:** this is an offset four-leg intersection with stop control of the side street approaches on NW 3rd Avenue. One collision was turning type where the driver was making an improper turn and one collision involved pedestrian where the driver was failing to yield the right-of-way. The intersection serves as a truck route for accessing the industrial area located to the west, which may be a contributing factor.

TABLE 6: STUDY INTERSECTION COLLISION ANALYSIS

STUDY INTERSECTION	TOTAL COLLISIONS	OBSERVED CRASH RATE (PER MEV)	CRITICAL CRASH RATE (PER MEV)	90TH PERCENTILE CRASH RATE (PER MEV)	OVER CRITICAL CRASH RATE
OR 99E & BERG PKWY	**13**	0.28	0.43	0.86	No
OR 99E & ELM ST	**19**	0.38	0.43	0.86	No
OR 99E & GRANT ST	**9**	0.19	0.43	0.86	No
OR 99E & IVY ST	**31**	0.55	0.42	0.86	**Yes**
OR 99E & PINE ST	**15**	0.28	0.42	0.86	No
OR 99E & SEQUOIA PKWY	**9**	0.18	0.43	0.86	No
OR 99E & TERRITORIAL RD	**8**	0.16	0.43	0.86	No
KNIGHTS BRIDGE RD & N BIRCH ST	**0**	0.00	0.22	0.29	No
KNIGHTS BRIDGE RD & N CEDAR ST	**1**	0.08	0.24	0.29	No
KNIGHTS BRIDGE RD & N HOLLY ST	**0**	0.00	0.27	0.29	No
NW 3RD AVE & N CEDAR ST	**2**	0.47	0.65	0.41	**Yes**
NW 1ST AVE & N GRANT ST	**1**	0.14	0.53	0.41	No
NW 1ST AVE & N IVY ST	**3**	0.22	0.42	0.41	No
NE 3RD AVE & NE 4TH AVE	**0**	0.00	0.37	0.29	No
NE 4TH AVE & N PINE ST	**2**	0.21	0.28	0.29	No
NE TERRITORIAL RD & N HOLLY ST	**2**	0.17	0.44	0.41	No

STUDY INTERSECTION	TOTAL COLLISIONS	OBSERVED CRASH RATE (PER MEV)	CRITICAL CRASH RATE (PER MEV)	90TH PERCENTILE CRASH RATE (PER MEV)	OVER CRITICAL CRASH RATE
NE TERRITORIAL RD & N REDWOOD ST	**1**	0.07	0.41	0.41	No
SE 2ND AVE & S IVY ST	**2**	0.12	0.22	0.29	No
S TOWNSHIP RD & S IVY ST	**2**	0.11	0.21	0.29	No
SE 13TH AVE & S IVY ST	**5**	0.24	0.51	0.86	No
SE 4TH AVE & S REDWOOD ST	**1**	0.22	0.40	0.29	No
S TOWNSHIP RD & S REDWOOD ST	**2**	0.25	0.50	0.41	No
SEQUOIA PKWY & HAZEL DELL WAY	**6**	0.34	0.39	0.41	No
SE 1ST AVE & S WALNUT ST	**0**	0.00	0.50	0.29	No
SE 1ST AVE & S MULINO RD	**0**	0.00	0.36	0.29	No
SE 4TH AVE & S WALNUT RD	**0**	0.00	0.51	0.41	No
S TOWNSHIP RD & SEQUOIA PKWY	**1**	0.08	0.43	0.41	No
S TOWNSHIP RD & S MULINO ST	**2**	0.20	0.47	0.41	No
SE 13TH AVE & S MULINO RD	**1**	0.18	0.36	0.29	No
SE 13TH AVE & SEQUOIA PKWY	**0**	0.00	0.30	0.29	No

Excess Proportion of Specific Crash Type Analysis

The excess proportion of specific crash type analysis looks at the proportion of crash types (i.e., rear-end, turning movement, angle, etc.) for each intersection and compares it with the average for the reference population to determine if certain types of crashes are more prevalent than would be expected. A reference population must contain at least five intersections to be valid. In addition, at least two crashes of the same type are necessary to calculate the excess proportion for that intersection[9].

Crash types with an excess proportion greater than 0.1 were flagged as a safety focus area. Table 7 presents only the flagged study intersections and shows that rear-end and angle collisions are the most commonly overrepresented crash type at study intersections. Along OR 99 E, more rear-end collisions were observed than expected at S Berg Parkway and S Ivy Street. More angle collisions were observed at OR 99E and Sequoia Parkway.

[9] Analysis Procedures Manual Version 2, Oregon Department of Transportation

TABLE 7. SUMMARY OF STUDY INTERSECTIONS WITH EXCESS PROPORTION OF SPECIFIC CRASH TYPES (2017-2021)

#	STUDY INTERSECTION	FLAGGED	CRASH TYPE	EXCESS PRPORTION
1	OR 99E & Berg Parkway	Yes	Rear	0.43
4	OR 99E & Ivy Street	Yes	Rear	0.32
6	OR 99E & Sequoia Parkway	Yes	Angle	0.68

Note: The excess proportion of specific crash type analysis looks at the proportion of crash types for each intersection and compares it with the average for the reference population to determine if certain types of crashes are more prevalent than should be expected. For example, an excess proportion of 0.32 means that are 32 percent more observed rear-end crashes than the calculated threshold for four-leg signalized intersections in this population.

Roadway Segment Safety

In addition to individual intersections, segment crash rates along OR 99E between the major study intersections were calculated to complement the intersection-based analysis and provide a more complete picture of roadway safety. Segment crash rates are determined by dividing the number of crashes everywhere on the segment by the total vehicle traffic along the segment and are reported in crashes per million vehicle miles traveled (MVMT). The calculated crash rates were compared against the critical crash rate for other similar segments in the study area. Table 8 presents the segment crash rate results along OR 99E within the study area. Three segments were identified as having high crash rates. All segments are in the downtown area and provide five lanes with a two-way-left-turn lane, with posted speed limit of 35 miles per hour and high frequency of access. The three segments are:

- OR 99E from S Elm Street to S Grant Street: There were 13 reported crashes that occurred along the segment. Out of the 13 crashes, 62 percent involved rear-end collisions and 50 percent of the rear-end crashes were due to driving failing to avoid the vehicle ahead. The rest of the crashes involved turning movement, where driver failing to yield the right-of way when accessing the businesses.
- OR 99E from S Grant Street to S Ivy Street: There were 13 reported crashes along this segment. The majority involved rear-end (54 percent) and turning (31%) collisions, and there was one pedestrian-involved collision. Of the total crashes, 38 percent were attributed to drivers not yielding the right-of-way.
- OR 99E from S Ivy Street to Pine Street: There were 51 reported crashes along this segment. The majority of the crashes involved turning (53 percent), rear-end (24 percent), and sideswipe (14 percent) collisions. 49 percent of the total crashes were caused by drivers failing to yield the right-of-way and 12 percent were caused by driver making an improper lane change.

TABLE 8. SEGMENT CRASH RATE ALONG OR 99E WITHIN THE STUDY AREA (2017 TO 2021)

HIGHWAY (LIMITS)	DISTANCE (MILES)	TOTAL COLLISIONS (2017 TO 2021)	OBSERVED CRASH RATE (PER MVMT)	CRITICAL CRASH RATE (PER MVMT)	OVER CRITICAL CRASH RATE
OR 99E (BERG PKWY TO S ELM ST)	0.42	28	1.55	1.58	No
OR 99E (S ELM ST TO S GRANT ST)	0.13	13	2.33	1.97	**Yes**
OR 99E (S GRANT ST TO S IVY ST)	0.13	13	2.29	1.96	**Yes**
OR 99E (S IVY ST TO PINE ST)	0.51	51	2.29	1.53	**Yes**
OR 99E (PINE ST TO SEQUOIA PKWY)	0.39	6	0.37	1.60	No
OR 99E (TERRITORIAL RD)	0.83	6	0.17	1.45	No

Safety Priority Index System (SPIS) Assessment

The SPIS provides another method for identifying crash hot spots on roadways throughout Oregon. This method considers the rate, frequency, and severity of crashes to produce a rating, with the highest rates sites statewide (often those within the top 10 percent) being considered for potential safety improvements. There were three sites in the top 10 percentile of the SPIS locations for the most recent analysis (2021). The identified locations are listed and discussed below.

- OR 99 E and SW Berg Parkway: This is a signalized four-leg intersection located west of downtown Canby within the industrial zones. There were 13 crashes reported from 2017 to 2021. 62 percent of the total crashes involved turning movement and 31 percent involved rear-end collisions. 50 percent of the turning collisions were caused by drivers disregarding traffic signals. The intersection is flagged under the excess proportion analysis.
- OR 99 E and S Ivy Street: The intersection is in downtown Canby and was flagged as a high crash rate intersection. The discussion at the intersection is discussed in the above section.
- OR 99 E and S Juniper Street: This is a three-leg intersection with stop-control on the side street and located in downtown Canby. The intersection is between the segment of S Ivy Street and S Pine Street along OR 99E, which was flagged as a study focus area from the roadway segment analysis, as discussed in above section.

Summary of Findings

Based on the crash analyses documented above, Table 9 summarizes the several areas within the study area that were flagged as safety focus areas.

TABLE 9. SUMMARY OF STUDY LOCATIONS FLAGGED IN SAFETY EVALUATION

LOCATION	CRITICAL CRASH RATE	EXCESS PROPORTION	SPIS	OTHER KEY FINDINGS
STUDY INTERSECTION				
OR 99E & SW BERG PKWY		x	x	• Excess proportion of rear-end collisions.
OR 99E & S IVY ST	x	x	x	• Excess proportion of rear-end collisions. • Rail crossing west of the intersection involved two pedestrian collisions in fatalities.
OR 99E & SEQUOIA PKWY		x		• Excess proportion of angle collisions.
NW 3RD AVE & N CEDAR ST	x			• Involved one pedestrian collision.
SEGMENT ALONG OR 99E				
S ELM ST TO S GRANT ST	x			
S GRANT ST TO S IVY ST	x			• Involved one pedestrian collision
S IVY ST TO PINE ST	x		x	• SPIS at Juniper Street

Safety improvements will be evaluated within the study area and potential safety countermeasures that may reduce the likelihood of crashes regarding the types and their associated reduction factors[10] are documented in the below sections. The feasibility of these countermeasures will be further refined through further evaluations.

Several locations were flagged as safety focus areas as noted in Table 9. Turning, rear-end, and angle collisions were reported the most within the study area, where rear-end and angle collisions are the most commonly overrepresented crash type at study intersections. Potential safety countermeasures to improve safety at the study intersections and along the OR 99E corridor could include:

- Rear-end collisions were commonly represented along OR 99E at SW Berg Parkway and S Ivy Street.

[10] Crash Reduction Factor List, ODOT.

- Replacing incandescent traffic signal bulbs with light emitting diodes (LEDs) can reduce rear-end collisions by 17 percent.
- Installing actuated or coordinated flashing beacons as advance warning can reduce rear end collisions by 36 percent.
- Providing overhead lane-use signs can reduce rear-end collisions by 10 percent.

- S Ivy Street
  - 52% of the collisions at OR 99E/S Ivy Street intersection involved turning movement. Left-turning traffic calming treatments (e.g., hardened centerline) can reduce left-turning collisions by 10 percent.
  - Installing hinged pedestrian gate skirts on the sidewalks at the rail crossing can reduce descending gate violations by 78 percent and horizontal gate violations by 54 percent[11].
- Angle collisions were commonly represented at OR 99E/Sequoia Parkway. Installing advance warning signs (e.g., signal ahead) can reduce angle collisions by 35 percent.
- Collisions occurred at NW 3rd Street/N Cedar Street involved turning and pedestrian potentially due to limited visibility as an offset intersection and being as a truck route accessing an industrial area.
  - Improving intersection warning (e.g., pavement marking, striping, and signage) can reduce collisions by 20 to 30 percent.
  - Converting the intersection to an all-way stop control can reduce angle collisions by 75 percent.
  - Installing continental crosswalk markings and advance pedestrian warning signs can reduce pedestrian collisions by 15 percent.
- Installing street trees where the speed limit is less than 25 miles per hour to manage driving speed can reduce collisions by 10 percent.
- Restricting left-turning and crossing movements at a few intersections along OR 99E from S Elm Street to Pine Street by making them right-in, right-out access only. This can be accomplished by installing a pork chop island on the minor streets and/or installing raised median in the center-turn lane.

[11] USDOT FRA, Effect of Gate Skirts on Pedestrian Behavior at a Highway-Rail Grade Crossing Final Report, 2013.

WALKING NETWORK

Walking supports healthy lifestyles, is an easy and economical way to travel, and is well suited for people of many ages and abilities. In this plan, "walking" and "pedestrian" are terms that include people who walk independently or use canes, wheelchairs, other walking aids, or strollers. Approximately three percent of commuters in the City walk to work, with two percent utilizing public transportation, which often includes walking at the beginning or end of the trip[12]. In addition to the work commute trips, walking trips are made to and from recreational areas, shopping areas, schools, and other key destinations in the City's planning area. Continuous and direct sidewalk connections to all key destinations and along all streets, in addition to safe crossing opportunities along major roadways, are essential to encourage walking and transit use.

The pedestrian network in the City's planning area, shown in Figure 4, is summarized in the following sections and is composed of sidewalks and pedestrian trails and accessways. An assessment of pedestrian facility gaps is also summarized later in this chapter.

SIDEWALKS

Most sidewalks within the City are five feet and width but range between 4 feet and 8 feet. Sidewalks around major streets like OR 99E tend to be wider than those within residential streets.

TRAILS AND ACCESSWAYS

Trails or accessways can serve both recreational and transportation needs for pedestrians. Most are considered shared-use paths and are well suited for citywide pedestrian and bicycle travel, and others offer only recreational opportunities for pedestrians. They can be separated or adjacent to the streets right-of-way and provide linear park facilities for pedestrian travel. Some trails offer pedestrians shortcuts, enabling them to connect from one street to another, a park, a trail, or a major destination such as a school or shopping area.

https://www.traillink.com/trail-gallery/logging-road-trail/

There are currently about two miles of trails or accessways in the City. The major trail in the City is the Logging Road Trail or Molalla Forest Road trail. The trail is entirely paved and runs from SE 13th Ave to a little north of Territorial Road in Eco Park.

[12] US Census Bureau, 2017-2021 American Community Survey Table S0801

STREET CROSSINGS

Busy streets with fast moving traffic are a barrier to people walking or biking. Enhanced crossings are more than a crosswalk marking on the pavement. They may have traffic signals, flashing beacon systems, refuge islands, or bulb-outs. Table 10 below summarizes the marked crossings of arterial streets in Canby.

TABLE 10: MARKED CROSSINGS OF ARTERIAL STREETS

ARTERIAL	CROSS STREET	LEGS WITH MARKED CROSSING	INTERSECTION CONTROL
OR 99E	BERG PKWY	All	Signalized
	ELM ST	All	Signalized
	GRANT ST	All	Signalized
	IVY ST	All	Signalized
	PINE ST	All except east	Signalized
	SEQUOIA PKWY	All except west	Signalized
	TERRITORIAL RD	All	Signalized
IVY ST	SW 13TH AVE	All	Signalized
	SW 11TH AVE	North	Minor street stop
	SW 6TH PL	North	Minor street stop
	SE TOWNSHIP ROAD	South and East	Minor street stop
	SE 3RD AVE	North	Minor street stop
	NW 1ST AVE	All except south	Minor street stop
	NW 2ND AVE	All	Minor street stop
	NW 3RD AVE	All	Minor street stop
	NW 5TH AVE	All	Minor street stop
GRANT ST	NW 1ST AVE	All	Minor street stop
	NW 2ND AVE	All	All-way stop
	NW 3RD AVE	All	All-way stop
	NW 4TH AVE	All	All-way stop
	NW 5TH AVE	North and east	Minor street stop
	NW 6TH AVE	All (offset intersection)	Minor street stop
	N KNIGHTS BRIDGE RD	East and West	All-way stop
N KNIGHTS BRIDGE RD	N CEDAR ST	South and east	Minor street stop
SW 13TH AVE	S BIRCH CT	South and east	Minor street stop
	S ELM ST	All	All-way stop
	S FIR ST	South and east	Minor street stop

ARTERIAL	CROSS STREET	LEGS WITH MARKED CROSSING	INTERSECTION CONTROL
	S LARCH ST	South and east	Minor street stop
	S LUPINE ST	South and east	Minor street stop
	S PINE ST	All	Minor street stop
	S PONDEROSA ST	South and east	Minor street stop
	SEQUOIA PKWY	North only	All-way stop

The marked crosswalks on OR 99E at Elm, Grant, and Ivy Streets are spaced 700-750 feet apart, while the distance between the Ivy St crossing and the one at Pine St is over half a mile. The distance between that crossing at the one at Sequoia Parkway is about 2000 feet, and the distance between that crossing at the crossing at NE Territorial Road is 0.85 miles. This exceeds the commercial corridor Urban Context Design Guidance from the ODOT Highway Design Manual, which suggests spacing of 500 to 1,000 feet between crossings. These long distances between crossings make it difficult for people walking to traverse OR 99E. This spacing is also greater than the typical distance a pedestrian will walk and could result in out of direction travel for pedestrians wishing to cross OR 99E. The presence of the Union Pacific rail line contributes to the paucity of crossings of OR 99E. Additionally, many of these intersections, especially on OR 99E require people walking to cross long distances due to the width of the roadway. This condition degrades the pedestrian experience and may discourage people from walking.

CURB RAMPS AND ACCESSIBLE DEVICES

Adding curb ramps and accessible devices to intersections or pedestrian crossings helps people with disabilities get around. Curb ramps make it easier for people using walking aids to get off and on a sidewalk. Adding accessible devices to traffic signals or beacons helps people with visual or hearing disabilities know when it is safe to cross the street.

The Americans with Disabilities Act (ADA) governs how we serve people with hearing, vision, and mobility disabilities. Many intersections in older parts of the City lack ADA compliant ramps, which provide important connections between sidewalks, making it easier to cross streets and handle the vertical drop at curbs. However, new curb ramps continue to be installed with recurring maintenance along streets in the City. Many curb ramps are ADA compliant in Downtown Canby, though gaps remain. Outside of Downtown, many locations have ADA-compliant ramps, but not consistently. For example, the intersection of N Locust Street and NE 10th Avenue has ADA-compliant curb ramps on the northwest and southwest corners, but not the northeast and southeast corners, which also lack sidewalks. Another gap exists at the intersection of SE 13th Avenue and S Redwood Street, where there are an ADA-compliant curb ramp on the north corners, but not the southwest corner of the intersection, where the sidewalk on the south side of SE 13th Avenue ends.

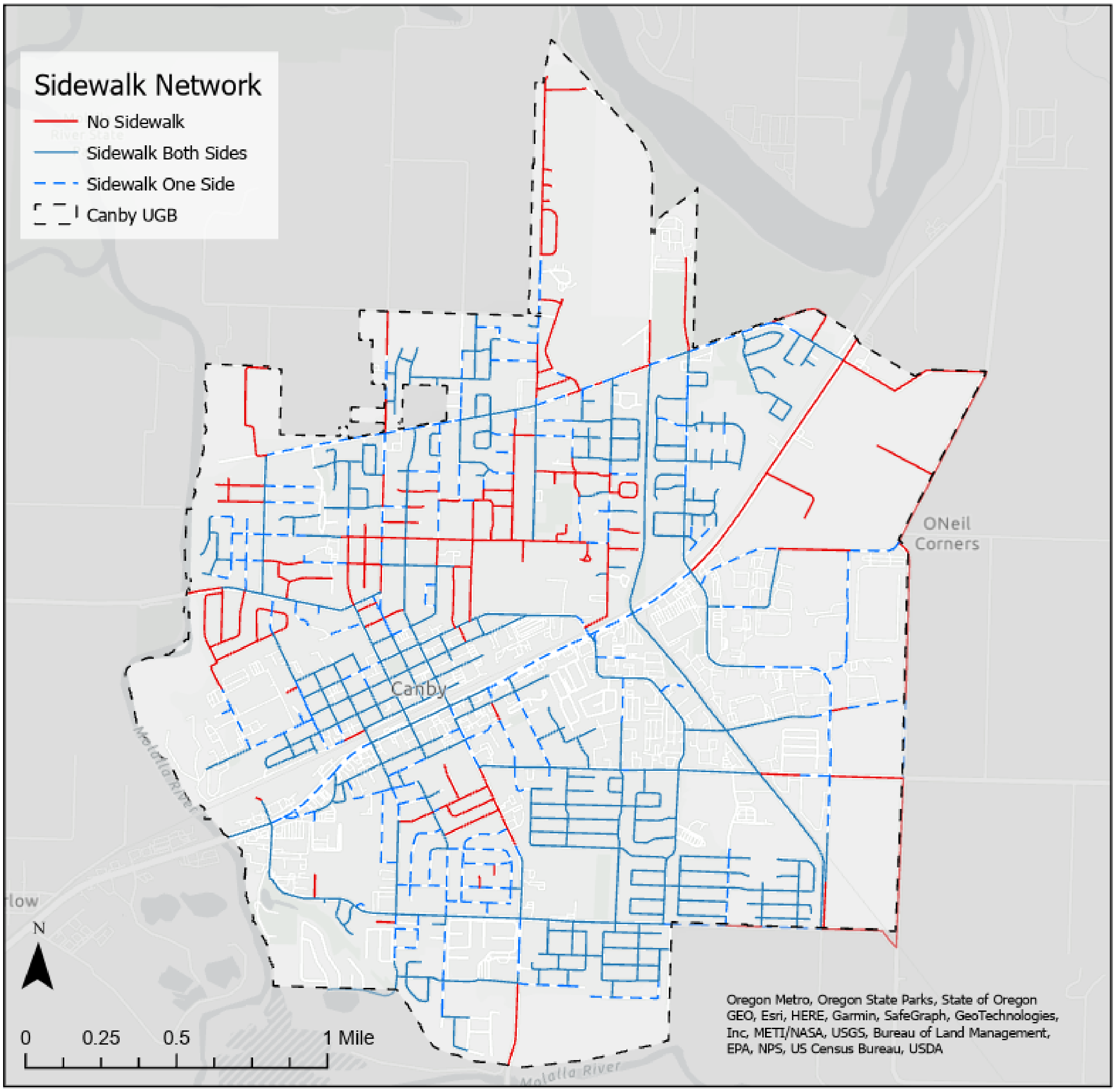


FIGURE 4: SIDEWALK NETWORK

PEDESTRIAN FACILITY GAPS

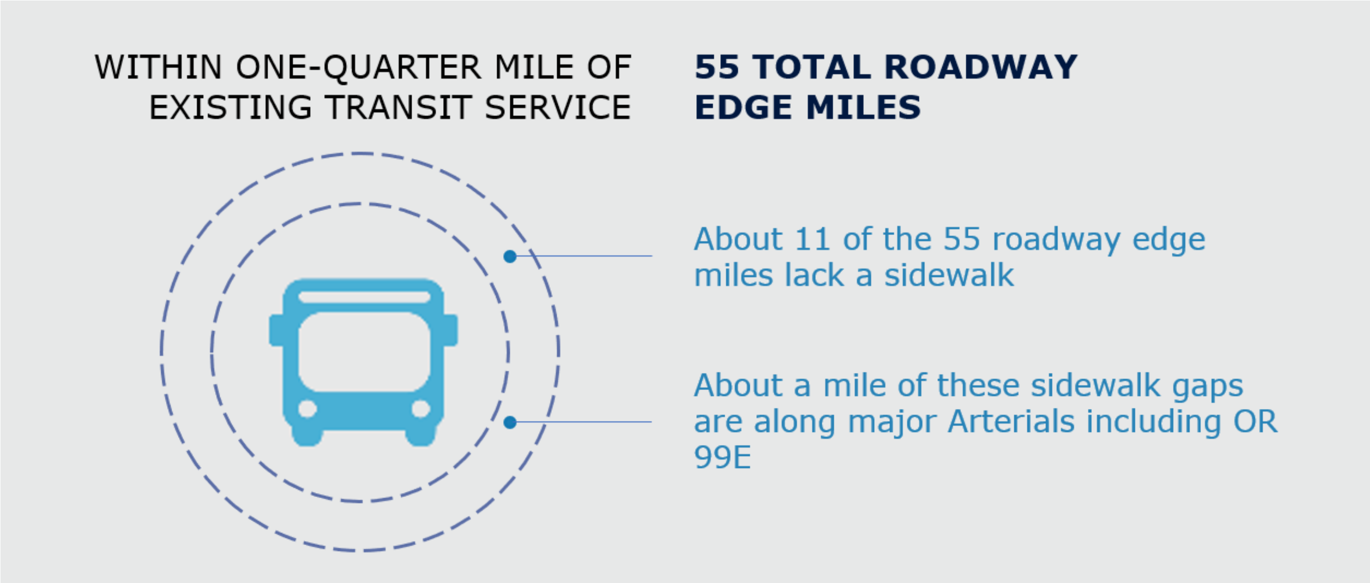
As shown in Figure 4, the pedestrian network is relatively complete within the current City limits. Most new residential developments have a full sidewalk system with relatively few gaps. There are still major gaps in the system where there are sidewalks only on one side of the road or no sidewalks at all. This is more evident in the part of the City north of OR 99E than the area south. There are also gaps in the network near the edges of the boundary especially the eastern boundary of the city along Mulino Road. Critical gaps in the planning area occur along a few segments of OR 99E. Some gaps also occur along low-volume and low-speed local streets throughout the planning area, although in many cases this condition is acceptable, and is less critical than the gaps along the major streets.

A total of 80 miles of street within the Canby UGB were analyzed for sidewalk condition. This included collectors, arterials, and connectors within the boundary. It did not include local and private roads. Of these 80 miles of roadway, 18 miles do not have a sidewalk and around 40 miles have sidewalk only on one side. This analysis assumes all streets should have sidewalks on both sides, but in some cases low volume and speed streets may be suitable without a sidewalk or with a sidewalk on only one side.

Sidewalk Coverage Near Transit

One-quarter mile walking distance is an acceptable distance for gauging a transit stop's walkable area. This distance is based on the distance people are typically willing to walk to transit. Transit access coverage is estimated based on the actual street network surrounding the stops.

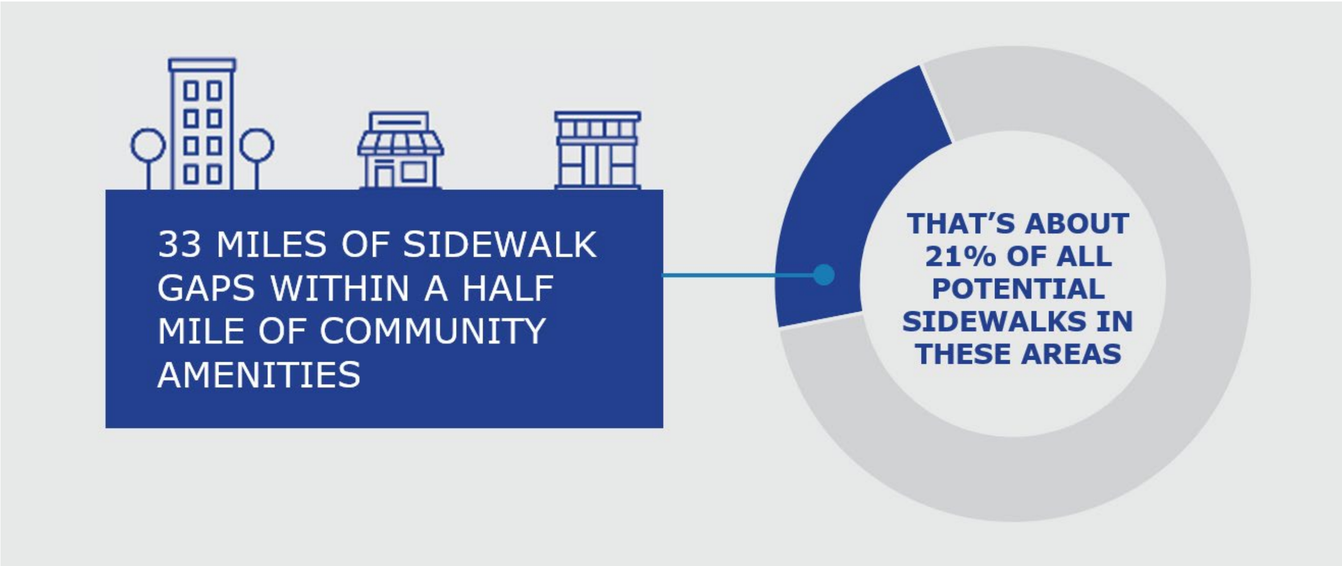
The sidewalk gaps are shown in Figure 5. Of the streets within one-quarter mile of existing transit service, about 11 of the total 55 street miles lack a sidewalk (or 20 percent of the street miles). About 1 mile of these sidewalk gaps are along arterial streets, mainly along OR 99E east of Sequoia Parkway as well as a small gap on Ivy Street South of OR 99E. Other gaps in the network exist on the streets to the south of Knights Bridge Road near the western UGB border and along NE 10th Ave. See the Pedestrian Level of Traffic Stress discussion later in this chapter for more information on the condition of these crossings.



Sidewalk Coverage Near Community Amenities

Sidewalk gaps near community amenities were also evaluated, including places of commerce, schools, parks, and libraries (see the Appendix for the location of these destinations). The following analysis is based on a half-mile distance to these destinations.

The analysis study area with a half-mile radius around all mapped community amenities covers much of the sidewalk network within the city. Of the 151 miles of potential sidewalk, there are 33 miles of missing sidewalk. There is a gap in the network near Eccles and William Knight Elementary School as well as Canby Community Preschool due to a lack of sidewalks on local roads as well as NW 10th, N Locust St, and N Grant St.



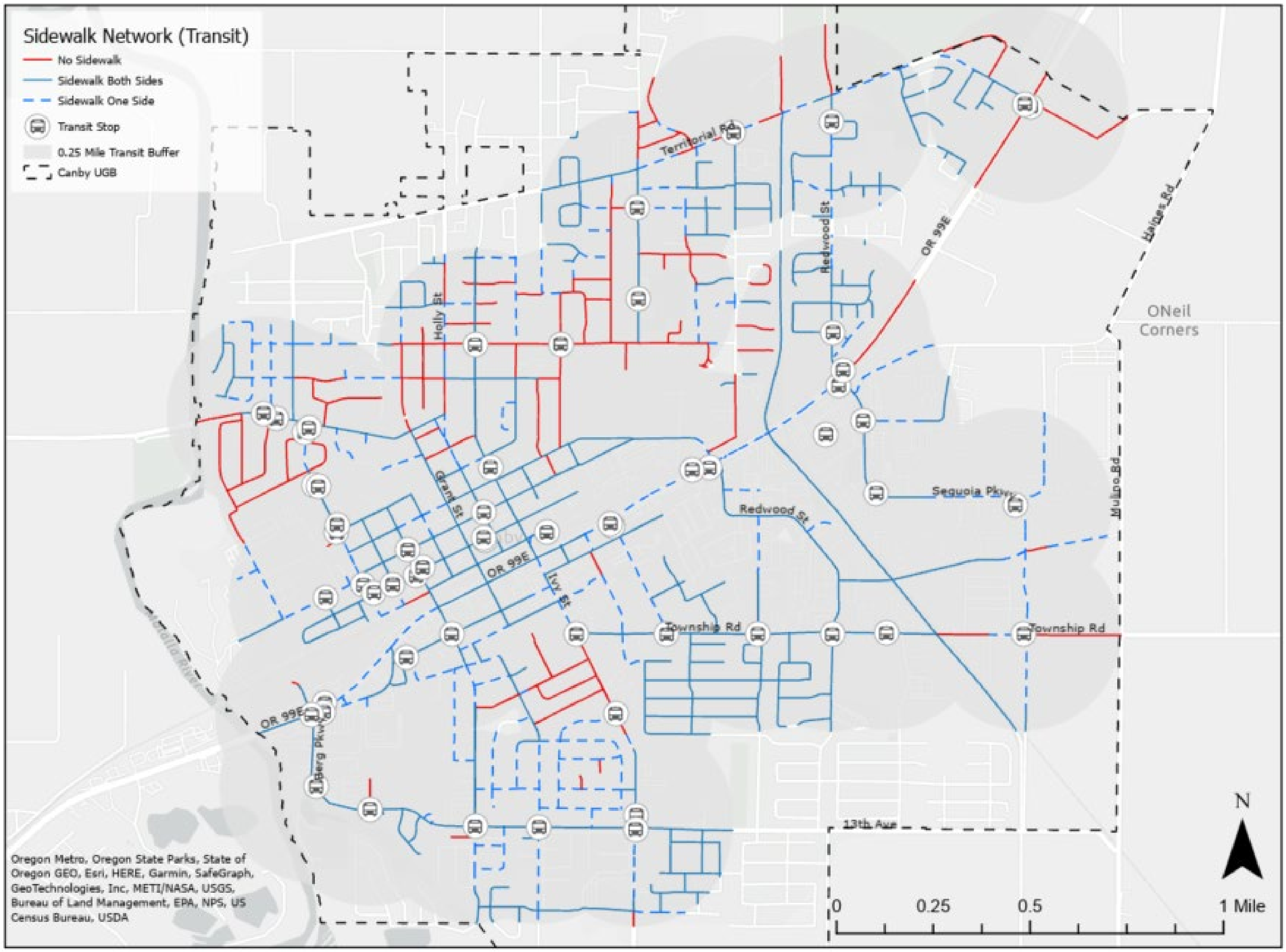


FIGURE 5: SIDEWALK GAPS NEAR TRANSIT LINES AND STOPS

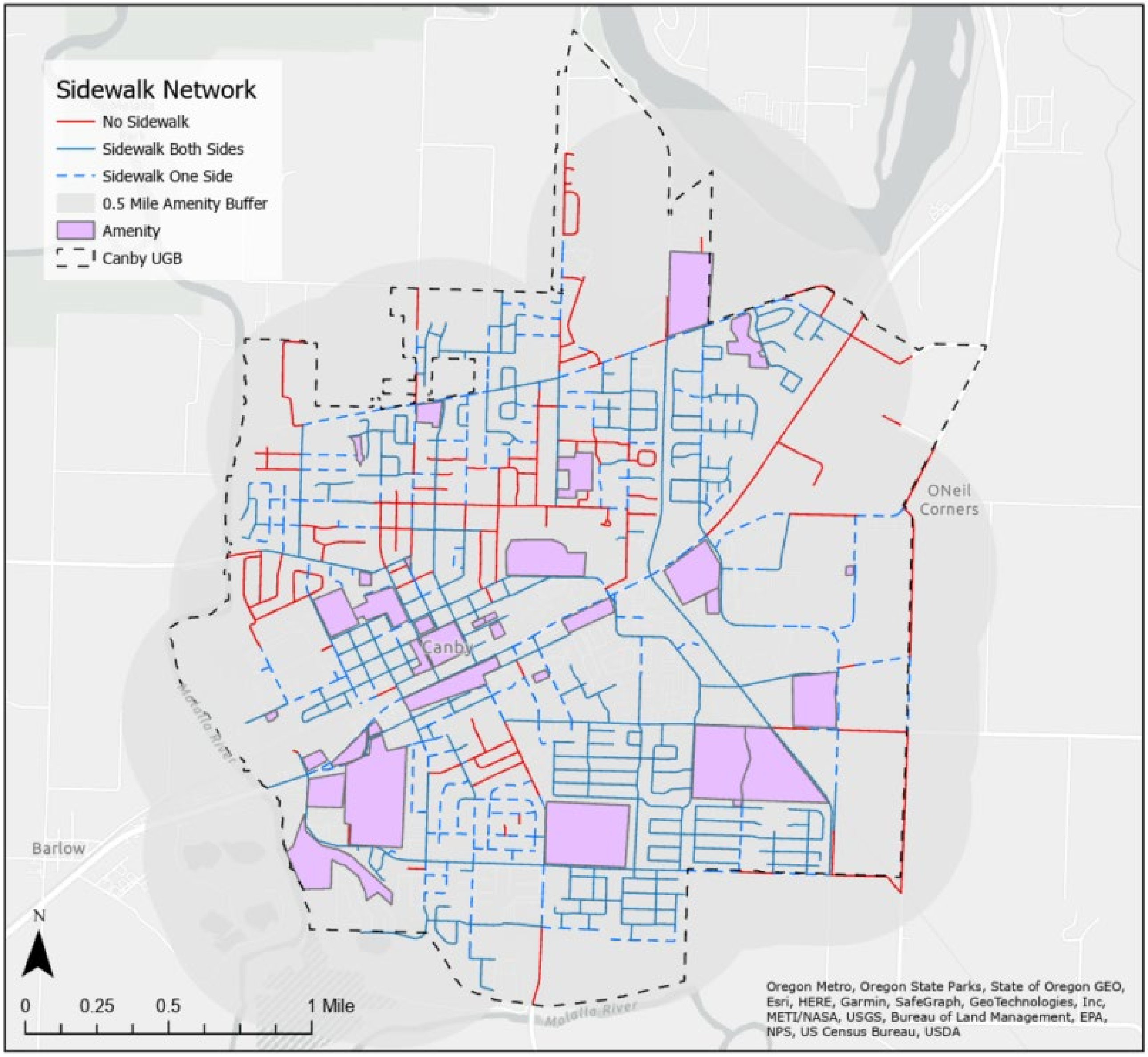


FIGURE 6: SIDEWALK NETWORK NEAR COMMUNITY AMENITIES

PEDESTRIAN LEVEL OF TRAFFIC STRESS

The pedestrian level of traffic stress (LTS) evaluation provides a metric to understand a multimodal user's perception of the safety and comfort of the transportation network. This method was used to understand key gaps and barriers to walking to be addressed through targeted improvements.

The LTS evaluation generates a ranking (i.e., low, moderate, high, or extreme stress) of the relative safety and comfort of a segment or intersection for pedestrians based on roadway and intersection characteristics (e.g., land use context, number of lanes, travel speed and volume, intersection control, type and width of buffer, and the presence and condition of any bicycle or pedestrian facilities). The LTS rating scale recognizes that as vehicle speeds and volumes increase, enhanced pedestrian facilities are needed to maintain a system that is accessible and comfortable for all users.

The results of the pedestrian LTS evaluation are summarized in Figure 7. A pedestrian walking along roughly 83 percent of streets analyzed within the City's planning area will experience a low or moderate level of stress. The analysis includes all arterial and collector streets within the Urban Growth Boundary. This is generally representative of the many low-volume and speed streets that exist in the city. Extreme or high level of stress is experienced along 17 percent of streets, mainly those with the highest speeds and traffic volumes. This includes parts of OR 99E, Mulino Road, and Township Road. These areas are predominantly in the eastern half of the city close to the UGB border.

As redevelopment and frontage improvements occur through 2040, streets will be built to align with the City standards. These standards require high-quality facilities, and an emphasis on safe, convenient, and comfortable travel in alignment with the multimodal level of traffic stress targets to contribute towards a network-wide lower-stress pedestrian experience.

Equally important is the pedestrian experience while crossing streets. These locations are often when a pedestrian experiences some of the highest levels of stress and delay, particularly along major streets with high travel speeds and traffic volumes. This memorandum does not explicityly analyze pedestiran crosssing LTS, but the Street Crossings section above describes the location of marked crossings on arterial streets.

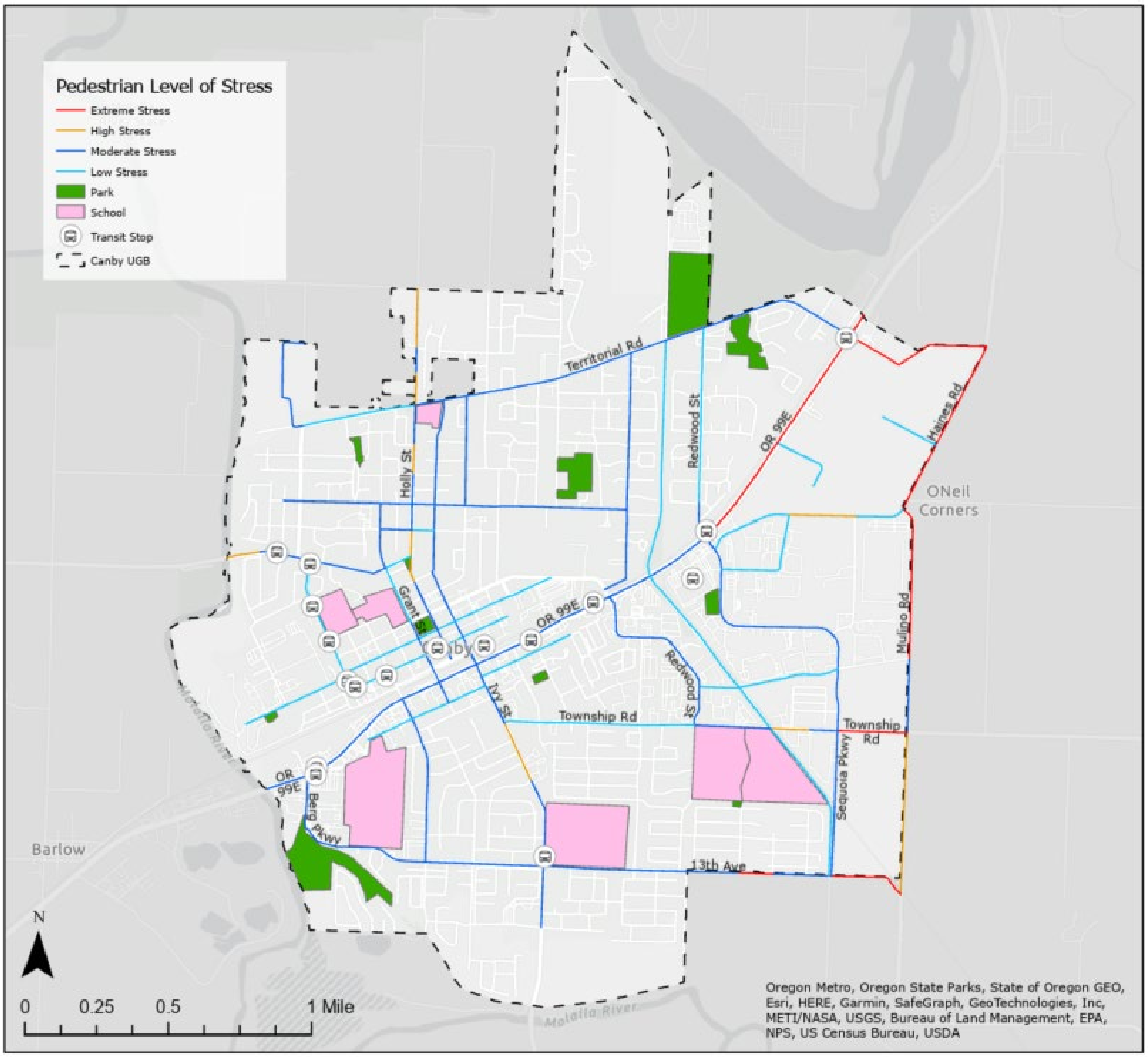


FIGURE 7: PEDESTRIAN LEVEL OF TRAFFIC STRESS

BIKING NETWORK

Bicycling is important for both transportation and recreation in the Canby planning area. This includes people who bike to work and school, recreation, or running errands. Riding bicycles also plays a key role in the transportation system's ability to support healthy and active lifestyles and provide a viable alternative to the automobile. While walking tends to be a competitive choice for trips under half a mile, bicycling tends to be suited for longer trips of three miles or longer. Canby's relatively compact size makes biking a great choice for many trips, with local jobs and housing typically in bikeable proximity.

The bicycle network in the City's planning area, shown in Figure 8, is summarized in the following sections and is composed of bike lanes, roadway shoulders, shared roadways, and bicycle paths.

BIKE FACILITIES

Within the Canby UGB there are around 35 miles of bike lanes. Ivy Street is a major north south corridor for biking within the city. For the east west connectivity there are lanes on Territorial Road, 13th Ave, and Township Rd. There are also portions of bike lane along OR 99E, though there isn't a continuous path on the entire roadway. The majority of lanes in the city range between five and six feet wide and run adjacent to the vehicle travel way. There are two stretches of enhanced bike facilities in the city, one on S Mulino Rd and SE 1st Ave. S Mulino Rd has a bike lane heading southbound with a striped buffer between S Township Road and 4th Ave. SE 1st Ave has a striped buffer lane between S Walnut Rd and S Mulino Rd.

OR 99E has a six-foot eastbound bike lane that begins about 450 feet east of the Logging Forest Road overcrossing. This lane continues to Sequoia Parkway, where it becomes a shoulder bike lane with variable width. The shoulder on the eastbound side of the road continues for a long distance, but striping indicating the presence of a bike lane (the painted cyclist symbol) ends just east of the intersection with Sequoia Parkway. In the westbound direction, OR 99E has shoulders wider than five feet for most of its lengths in Canby, though there is no striping indicating the presence of a bike lane.

The 2023 ODOT Highway Design Manual (HDM)[13] provides standards and guidance for the design of ODOT facilities. The HDM includes design recommendations for cross-section elements, such as sidewalks and travel lanes that vary by land-use context. OR 99E most closely matches the Commercial Corridor context for most of its length in Canby and transitions to the Suburban Fringe context east of Sequoia Parkway/N Redwood Street. Table 11 below presents the HDM recommendations for bicycle facilities for the Commercial Corridor and Suburban Fringe contexts.

TABLE 11: HIGHWAY DESIGN MANUAL RECOMMENDATIONS FOR BICYCLE FACILITIES

DESIGN ELEMENT	COMMERCIAL CORRIDOR WIDTH GUIDANCE	SUBURBAN FRINGE WIDTH GUIDANCE
Separated Bicycle Lane	8 to 7 ft.	Same

[13] https://www.oregon.gov/odot/Engineering/Pages/Hwy-Design-Manual.aspx

DESIGN ELEMENT	COMMERCIAL CORRIDOR WIDTH GUIDANCE	SUBURBAN FRINGE WIDTH GUIDANCE
On-Street Bicycle Lane (not including buffer)	6 to 5 ft.	6 ft.
Bicycle/Street Buffer (preferred for On-Street Lane)	5 to 2 ft.	Same
Right Side Shoulder (if travel lane adjacent to curb)	4 to 0 ft.	6 to 0 ft.
On-Street Parking	N/A	N/A

These widths and facility types do not align with the preferred bike facilities along parts of OR 99E, especially the segment north and east of Sequoia Parkway. The HDM indicates that higher-speed and volume roads require more robust separation of people biking from vehicles. This segment of OR 99E has a posted speed of 45 m.p.h. and average annual traffic volumes over 20,000, so higher levels of separation are appropriate there.

Most local streets in the City's planning area have slow speeds and few vehicles on them. When vehicular volumes and speeds are low, most people feel most comfortable bicycling in the shared roadway as they are able to maintain steady paths and riding speeds with limited pressure to move over for passing motor vehicles. Sometimes signs and pavement markings are added to these routes and the intersections with busy streets may be modified to make them easier to cross (e.g., adding all-way stop control or restricting vehicle movements).

BICYCLE PATHS

The bike network is further knit together by using new and existing shared-use paths and accessways. Shared use paths are well suited for citywide bicycle travel and can be separated or adjacent to the streets right-of-way and provide linear park facilities for bicycle travel. Accessways provide shortcuts for people biking connecting one street to another street, a park, trail, or a major destination, like a school or shopping area. Any shared use path or accessway open to bicycle travel should have at a minimum, paved surface of 10 feet to allow for shared pedestrian and bicycle travel.

There is currently a 2.5-mile paved trail within Canby called the Logging Forest Road. Vehicle traffic is not allowed on that trail.

BICYCLE PARKING

End-of-trip bicycle facilities are a fundamental component of a bicycle network. The lack of safe and secure facilities for either short-term or long-term parking can be an obstacle to promoting bicycle riding. Short-term parking accommodates visitors, customers, and others expecting to depart within two hours. It requires a standard rack, appropriate location and placement, and weather protection. Long-term parking accommodates employees, students, residents, commuters, and others who park for more than two hours. This parking requires a secure, weather-protected manner and location. Short-term bicycle parking is available at the Canby Cinema, the Canby Library, several intersections in Downtown, the Canby Transit Center, the Fredy Meyer and Safeway grocery stores, and Canby High School. Bicycle parking is required with new multi-family residential, commercial industrial, and institutional development in the City[14].

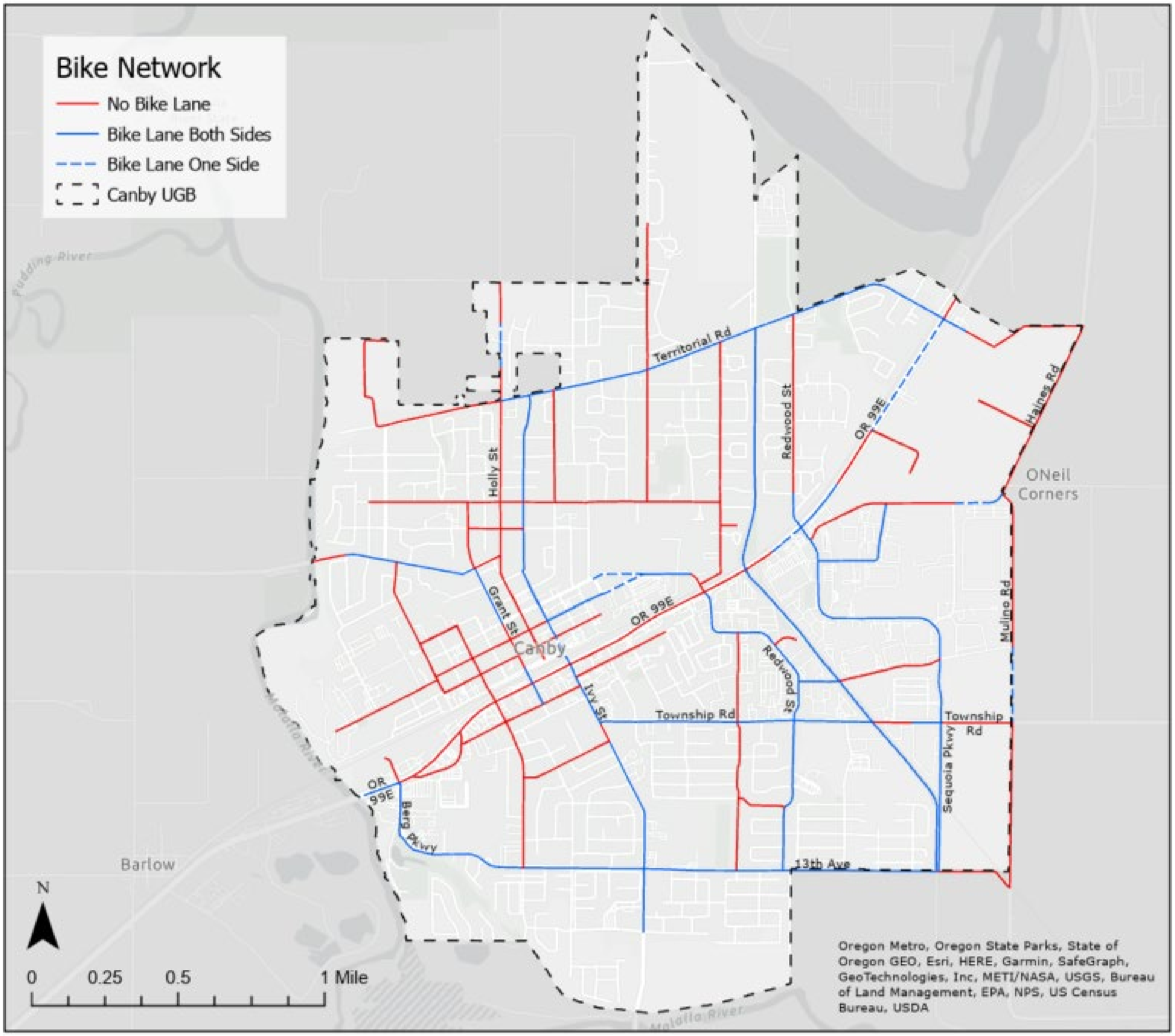


FIGURE 8: BICYCLE FACILITIES

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[14] Canby Municipal Code 16.10.100

BICYCLE NETWORK PERFORMANCE ASSESSMENT

BICYCLE FACILITY GAPS

Of the over 50 miles of potential bikeways along major arterials and collectors in the City's planning area today, there are currently 36 miles of lanes, and 8 miles or about 16 percent do not have bike facilities. The northwest part of the planning area (i.e., west of Ivy Street and north of OR 99E) has the lowest share of bikeways complete.

Bicycle Facility Coverage Near Transit

Two to three miles is typically an accepted distance for gauging a transit stop's bikeable area. This distance is loosely based on the amount people who are willing to bike to transit. Given this distance covers most of the City's planning area, a shorter distance of one-half mile was used to identify bicycle facility coverage nearest transit stops. Transit access coverage is estimated based on the same street network previously examined.

Of the streets within one-half mile of existing transit service, about 17 of the total 31 street miles lack any type of bike facility (or 55 percent of the street miles). Most of these gaps are along OR 99E as well as Cedar Street and 2nd Ave. All of these roads contain stretches with no bicycle facilities directly adjacent to transit stops.

Bike Facility Coverage Near Community Amenities

Bike facility gaps near community amenities were also evaluated, including parks, schools, and libraries (see the Appendix for the location of these destinations). The analysis uses a half mile radius around these locations based on the actual street network, though it would be easy for cyclists to travel two or three miles when thinking of a 15-minute bike shed. Similar to the transit analysis, a two- or three-mile buffer would cover the entire bicycle network.

Since the half mile buffer covers the majority of roadways previously analyzed within the UGB, the gaps in the network are the same for community amenities as it is for the entire network (see Figure 10). Major bikeway gaps in regard to access to amenities are near the commercial areas along OR 99E and Eccles and William Knight Elementary Schools.

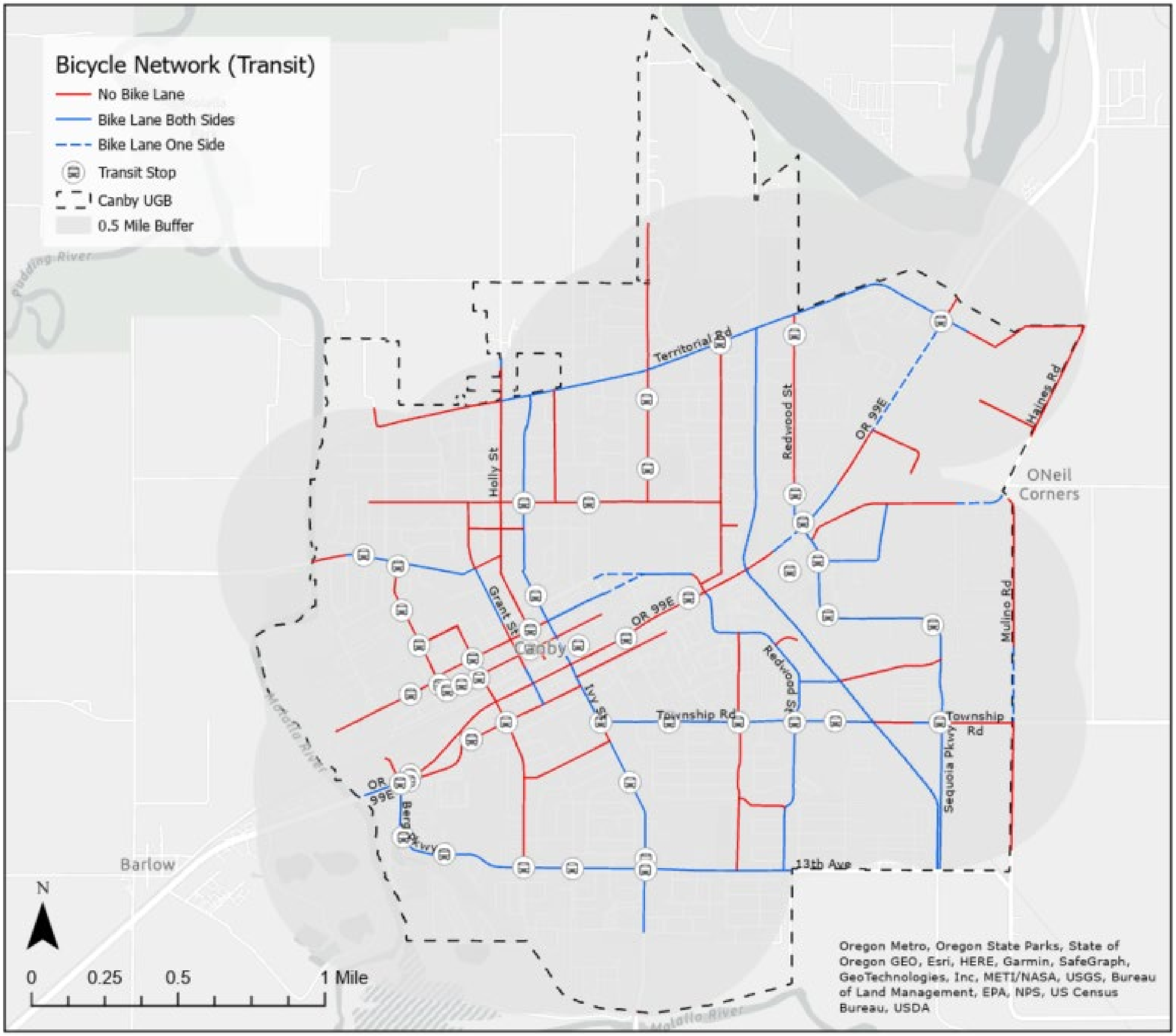

FIGURE 9: BICYCLE FACILITY GAPS NEAR EXISTING TRANSIT

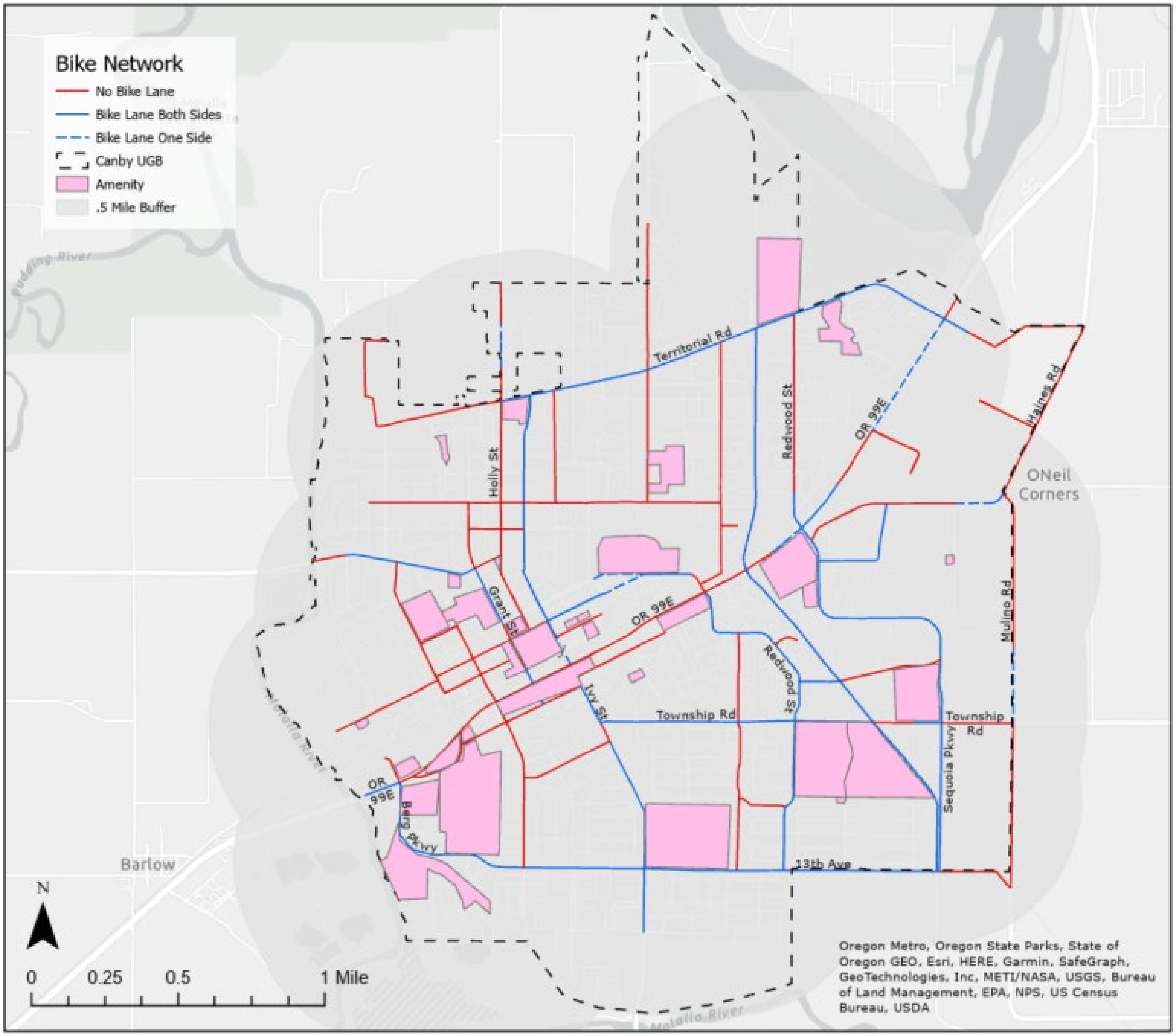

FIGURE 10: BIKE FACILITY GAPS NEAR COMMUNITY AMENITIES

BICYCLE LEVEL OF TRAFFIC STRESS

The bicycle level of traffic stress (LTS) evaluation provides a metric to understand a cyclist's perception of the safety and comfort of the transportation network. This method was used to understand key gaps and barriers to biking to be addressed through targeted improvements.

The LTS evaluation generates a ranking (i.e., low, moderate, high, or extreme stress) of the relative safety and comfort of a segment or intersection for bicyclists based on roadway and intersection characteristics (e.g., land use context, number of lanes, travel speed and volume, intersection control, type and width of buffer, and the presence and condition of any bicycle or pedestrian facilities). The LTS rating scale recognizes that as vehicle speeds and volumes increase, enhanced bicycle facilities are needed to maintain a system that is accessible and comfortable for all users.

The results of the bicycle LTS evaluation are summarized in Figure 11. A bicyclist riding along roughly 72 percent of the streets analyzed within the City's planning area will experience a low or moderate level of stress. This is representative of the many low-volume and speed local streets, which are reasonably comfortable for bicycling today. In contrast, an extreme or high level of stress is experienced along 28 percent of streets, mainly arterial and collector streets with the highest speeds and traffic volumes. This includes the extent of OR 99E, Haines Road, Mulino Road, Holly Street, and parts of 13th Avenue.

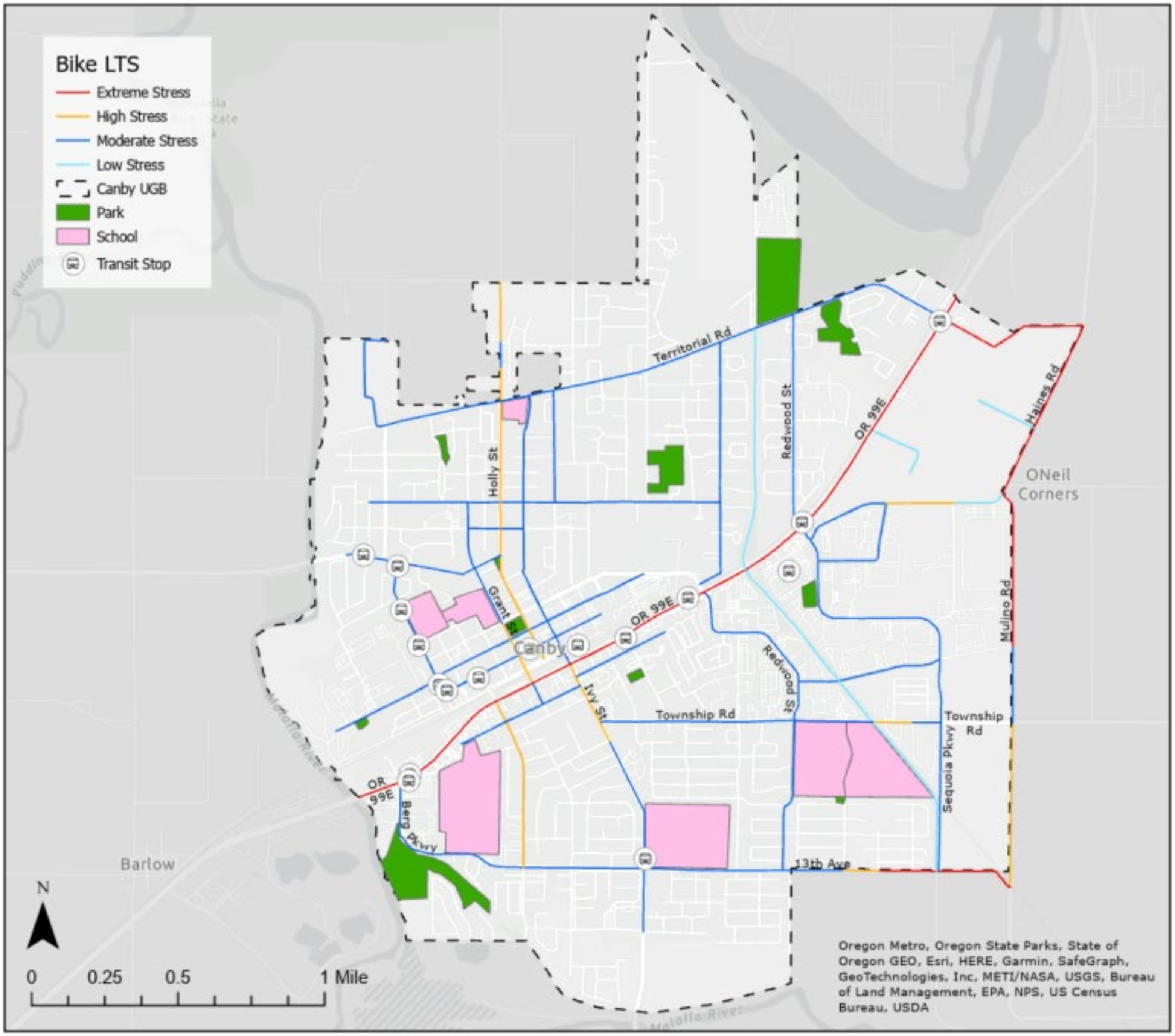

FIGURE 11: BICYCLING LEVEL OF TRAFFIC STRESS

TRANSIT

Canby Area Transit (CAT) provides fixed-route and paratransit service to Canby, while South Clackamas Transportation District (SCTD) and South Metro Area Regional Transit (SMART) provide additional fixed-route bus service as described below. The City's main transit facility is the Canby Transit Center, which is located on NW 1st Avenue between N Grant Street and N Ivy Street.

FIXED BUS ROUTES

CAT operates two fixed-route bus line in Canby. Route 99X, which runs between Oregon City and Woodburn via Canby. Stops in Canby are at:

- OR 99E and SW Berg Parkway
- Canby Transit Center
- OR 99E and S Locust Street
- OR 99E and S Sequoia Parkway
- OR 99E near Haines Road

This route features a Monday-Friday schedule with 45-minute headways between about 5:00 a.m. and 11:00 p.m. and Saturday service with 60-minute headways between 8:00 a.m. and about 6:00 p.m.

CAT's other fixed-route bus line is the Canby Loop, which is free to ride. The service operates Monday-Saturday as of Fall 2023 and includes 32 stops throughout Canby. The line operates Monday through Friday, 6:00 a.m. to 7:41 p.m., and on Saturday, 8:00 a.m. to 9:46 p.m. The Canby Loop service is funded from a combination of state grants and financial support from local businesses. Figure 12 shows the existing CAT bus stops and routes in Canby.

South Clackamas Transportation District also operates its Molalla to Canby route between those two cities, with stops in Canby at the Canby Transit Center and the Canby Market/Fred Meyer on Sequoia Parkway. This route runs between 6:30 a.m. and 6:15 p.m. on weekdays with 60-minute headways[15].

South Metro Area Regional Transit (SMART)'s 3x line connects Canby with Wilsonville. This route has stops at the Canby Transit Center and the N Cedar St and NW 2nd Avenue intersection near Downtown Canby. Service on this line is Monday-Friday between 5:30 a.m. and 6:54 p.m., with 30- to 66-minute headways[16].

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[15] https://www.sctd.org/canby

[16] https://www.ridesmart.com/transit/page/3x-canby

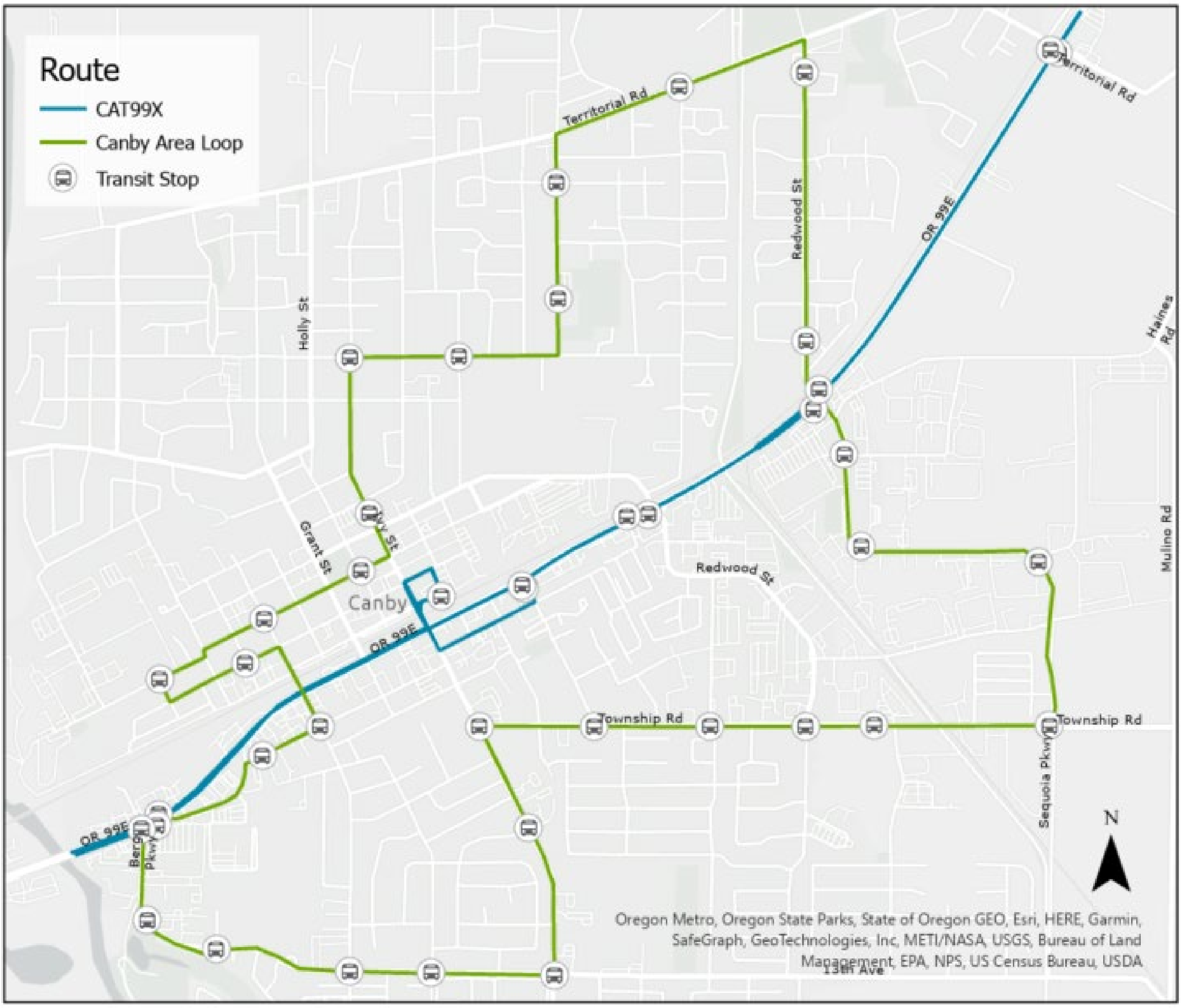

FIGURE 12: CANBY AREA LOOP AND 99X ROUTE MAP

PARATRANSIT SERVICE

CAT provides two options for curb-to-curb paratransit service[17]:

- **Complementary Paratransit (CPS)** provides Dial-A-Ride service for those with special needs who are unable to access fixed route service. CPS is a service provided in compliance with the 1990 Americans with Disabilities Act (ADA). The service operates 5:00 a.m. to 8:00 p.m., Monday through Friday and 8:00 a.m. to 6:30 p.m. on Saturday. The trip fare is $1.00 on weekdays and free on Saturday. Travel is limited to destinations within the Canby Urban Growth Boundary and for select purposes to Oregon City.

[17] https://www.canbyoregon.gov/area-transit/page/dial-ride

- **General Public (GP) Dial-a-Ride** offers limited service to anyone traveling within the Canby Urban Growth Boundary. The service operates between 8:00 a.m. to 6:00 p.m., Monday through Saturday on a first-come, first-served and space-available basis. The trip fare is $1.00 on weekdays and free on Saturdays. The General Public Dial-A-Ride service is designed to utilize unused capacity on the federally required Complementary Paratransit Service (CPS).

ACCESS TO TRANSIT

The TSP prioritizes transit access and identifies the percent of households within 1/4 mile of the bus stops along the Canby Area Transit routes (99X & Canby Loop) and areas of the planning area within 1/4 mile of the South Clackamas Transportation District and South Metro Area Regional Transit Route's as well. Figure 13 displays this analysis. Currently, about 73 percent of the total households in the planning area have access to one of these routes. Households that lack access are close to the UGB border in the northwestern portion of the planning area and the southeastern portion of the planning area. About 65 percent of households in the current City limits have access to Canby Area Transit Routes. Households west of Grant Street and north of NW 6th Ave lack access as well as households east of Pine Street and south of SE 10th Ave.

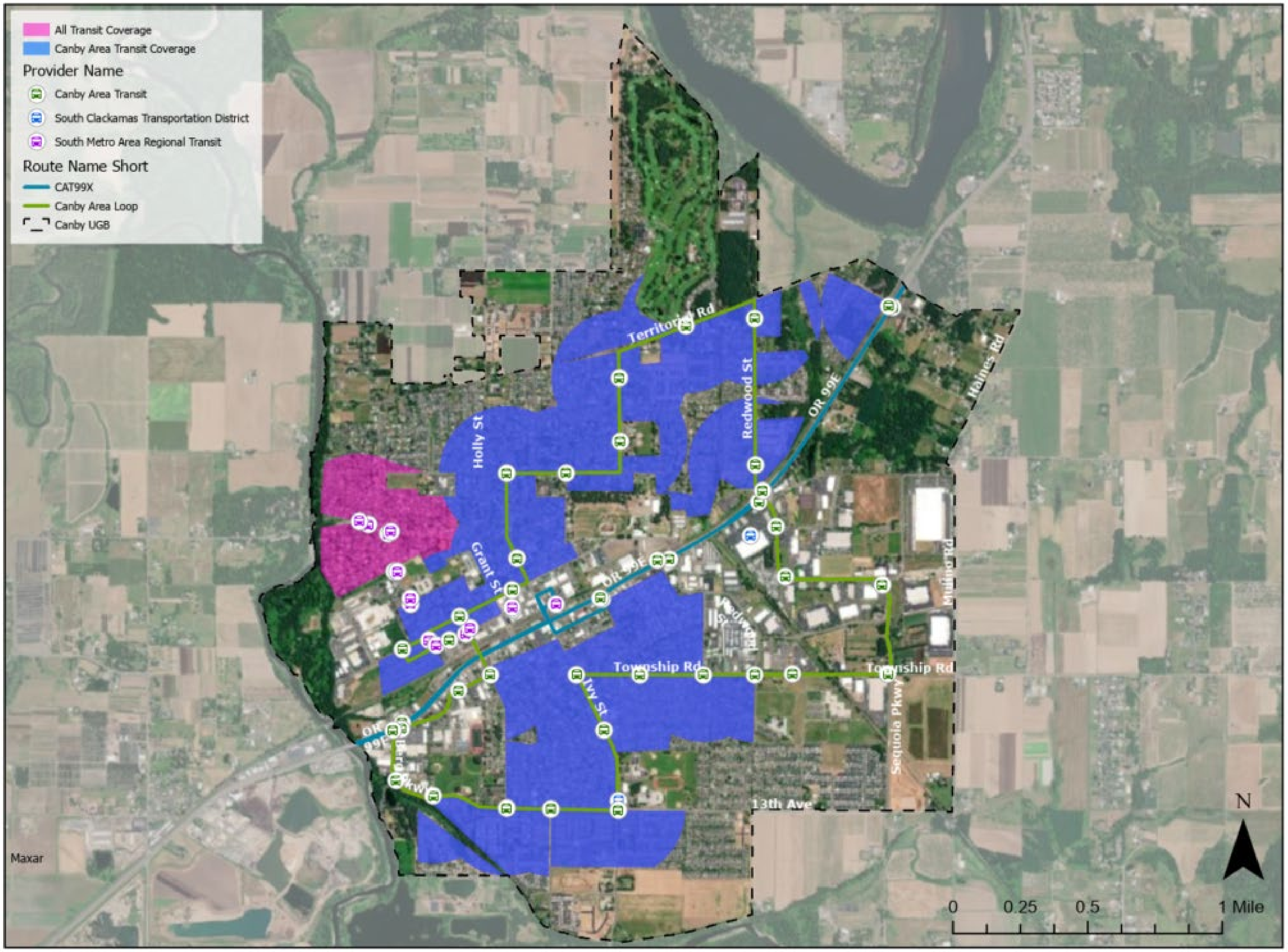

FIGURE 13: TRANSIT ACCESS FOR EXISTING TRANSIT ROUTES

RAIL NETWORK AND CROSSINGS

There are two rail lines in Canby: Union Pacific railroad tracks parallel OR 99E and the Oregon Pacific Railroad line that run southeast-northwest through Canby parallel to the Logging Road Trail. At-grade crossings of the Union Pacific line are at N Elm Street, N Grant Street, N Ivy Street, N Pine Street, N Redwood Street, and NE Territorial Road. The Oregon Pacific tracks have an at-grade crossing of OR 99E about 750 feet northeast of the OR 99E-NE Pine Street intersection and SE Township Road. All of these crossings have lights and gates that activate when trains approach, and some have additional overhead warning lights (see Table 12 for details). These crossings do not have physical barriers providing protection for people walking and biking on sidewalks and bike lanes.

Details on the rail crossings in Canby intersections are summarized in Table 12. The Union Pacific crossings typically see about 15 daily train movements[18], including 9 freight trains and 6 passenger trains each day. Half of the train movements occur during the day between 6 a.m. and 6 p.m. with the remainder occurring in the evening and night between 6 p.m. and 6 a.m. The crossings on the Oregon Pacific line typically see fewer crossings. Until recently, there was a second crossing of the Oregon Pacific Line on OR 99E, just east of the Logging Road Trail, but it has been removed as of 2023.

The long train lengths block the at-grade road, pedestrian, and bikeway crossings at times during the day, making it difficult for people to get around them and creating long delays for people. This blockage creates a barrier between the northern and southern sides of Canby, especially because there are no grade-separated crossings of the Union Pacific tracks in the City.

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[18] Crossing Inventory Report, U.S. Department of Transportation, Federal Railroad Administration; https://railroads.dot.gov/safety-data/crossing-and-inventory-data/crossing-inventory-lookup

TABLE 12: EXISTING CHARACTERISTICS AT STUDY RAIL CROSSINGS

RAIL CROSSING (USDOT CROSSING ID)	ROADWAY CROSSING PROTECTION	PEDESTRIAN CROSSING PROTECTION	TRAIN CROSSINGS PER DAY	AVERAGE TRAIN SPEED
UNION PACIFIC RAIL LINE				
BARLOW RD (760047S)	Roadway gates	None (No sidewalks)	15 9 (freight) 6 (passenger)	25-50 m.p.h.
NE ELM ST (760044W)	Roadway gates/overhead lights	None (sidewalks)		
NE GRANT ST (760043P)	Roadway gates/overhead lights	None (sidewalks both sides)		
NE IVY ST (760042H)	Roadway gates/overhead lights	None (sidewalks both sides)		
NE PINE ST (760041B)	Roadway gates/overhead lights	None (sidewalk one side only)		
NE REDWOOD ST (760039A)	Roadway gates	None (sidewalks both sides)		
PRIVATE DRIVEWAY (760038T)	Stop sign, no gates	No (No sidewalk)		
NE TERRITORIAL ROAD (760037L)	Roadway gates/overhead lights	None (sidewalks and bike lanes both sides)		
OREGON PACIFIC RAIL LINE				
OR 99E (760202U)	Roadway gates/overhead lights	None (sidewalk)	<1 (freight, 5 per week)	2-5 m.p.h.
SE TOWNSHIP RD (760205P)	Roadway gates	None	4 (freight)	1-10 m.p.h.

FREIGHT NETWORK

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Through Canby, OR 99E has various freight destinations by the State and Federal governments, as summarized below.

- **State Highway Freight System:** OHP Goal 1, Policy 1C addresses the need to balance the movement of goods and services with other uses. It states that the timeliness of freight movements should be considered when developing and implementing plans and projects on freight routes. Through Canby, OR 99E is classified as a National Freight Route.
- **Reduction Review Routes:** ORS 366.215 requires review of all potential actions that will alter, relocate, change, or realign a Reduction Review Route that could result in permanent reductions in vehicle-carrying capacity. Reduction of vehicle-carrying capacity means a permanent reduction in the horizontal or vertical clearance of a highway section, by a permanent physical obstruction to motor vehicles located on useable right-of-way subject to Commission jurisdiction, unless such changes are supported by the Stakeholder Forum. If ODOT identifies that an action may result in a reduction of vehicle-carrying capacity, a Stakeholder Forum (consisting of at a minimum, a bicycle representative, pedestrian representative, a trucking industry representative, a mobile home manufacturing representative, an oversize load freight representative, a representative of automobile users, and a representative from any affected city, county or Metropolitan Planning Organization) will be convened to help advise ODOT regarding the effect of the proposed action on the ability to move motor vehicles through a section of highway. Through Canby, OR 99E is classified as a Reduction Review Route.

The current Canby TSP also designates truck routes. These routes are:

- N Holly St north between Knights Bridge Road and the UGB boundary
- N Knights Bridge Road
- S Ivy Street south of OR 99E
- SW 13th Avenue west of S Ivy Street
- S Redwood Street north of S Township Road
- 4th Avenue east of S Redwood Street
- Sequoia Parkway between S Township Road and OR 99E
- S Mulino Road
- NE Territorial Road between N Holly Street and OR 99E
- OR 99E
- NE 4th Avenue/NE Pine Street between N Locust Street and OR 99E
- NW 3rd Avenue between N Baker Street and N Elm Street
- N Baker Street between NW 3rd Avenue and NW 6th Avenue

These routes facilitate truck traffic to and from Canby's industrial areas which include the Pioneer Industrial area on the east side of the city, as well as through freight traffic.

AIR NETWORK

The Aurora State Airport (FAA LID: UAO) is located west of Canby on the east side of the Portland-Hubbard Highway and south of I-5. This is a state-owned, public-use airport and facilitates business jet, training, and air ambulance traffic, with approximately 94,655 annual operations[19].

Regional and international air service for passengers and freight is provided via Portland International Airport (PDX). The airport is located approximately 25 miles (around 30 minutes by car) northeast of Canby and is connected via I-5, I-84 and I-205.

WATERWAY NETWORK

The Willamette River is a navigable waterway north of Canby. The Canby Ferry is a car and walk-on ferry service that provides access between Canby and Wilsonville. The service connects N Holly Street in Canby with SW Mountain Road on the Wilsonville side. The service is open between 9 a.m. and 6 p.m. (excluding holidays) and only when the river level is above 70 feet. The ferry does not have a set schedule, but rather operates on an as-needed basis[20].

There is also a boat ramp at Molalla River State Park north of Canby; this point can be accessed via River Park Place, which connects to N Holly Road.

PIPELINE NETWORK

There are no natural gas pipelines in Canby's planning area. The nearest pipeline is operated by Northwest Natural Gas and runs north-south along Barlow Road south of Barlow (west of Canby) and crosses OR 99E in Barlow[21].

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[19] https://www.oregon.gov/aviation/airports/pages/airports/uao.aspx, accessed October 2, 2023

[20] https://www.clackamas.us/roads/ferry.html, accessed October 2, 2023

[21] https://pvnpms.phmsa.dot.gov/PublicViewer/, accessed October 2, 2023

APPENDIX

CONTENTS

SECTION 1: EXISTING CONDITIONS SYNCHRO REPORTS

P.M. PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	35	24	183	28	94	22	869	166	65	908	90
Future Volume (veh/h)	71	35	24	183	28	94	22	869	166	65	908	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1709	1750	1695	1750	1695	1695	1682	1736	1709	1709	1750
Adj Flow Rate, veh/h	77	38	13	199	30	51	24	945	0	71	987	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	3	0	4	0	4	4	5	1	3	3	0
Cap, veh/h	257	239	82	282	113	192	250	2099		89	1763	48
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.15	0.66	0.00	0.05	0.55	0.54
Sat Flow, veh/h	1326	1217	416	1330	576	980	1615	3195	1471	1628	3228	88
Grp Volume(v), veh/h	77	0	51	199	0	81	24	945	0	71	496	518
Grp Sat Flow(s),veh/h/ln	1326	0	1633	1330	0	1556	1615	1598	1471	1628	1624	1693
Q Serve(g_s), s	6.8	0.0	3.4	19.0	0.0	5.7	1.7	18.7	0.0	5.6	26.0	26.0
Cycle Q Clear(g_c), s	12.5	0.0	3.4	22.3	0.0	5.7	1.7	18.7	0.0	5.6	26.0	26.0
Prop In Lane	1.00		0.25	1.00		0.63	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	257	0	320	282	0	305	250	2099		89	887	925
V/C Ratio(X)	0.30	0.00	0.16	0.71	0.00	0.27	0.10	0.45		0.80	0.56	0.56
Avail Cap(c_a), veh/h	364	0	452	389	0	431	250	2099		200	887	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.6	0.0	43.4	52.6	0.0	44.3	47.1	10.9	0.0	60.7	19.3	19.3
Incr Delay (d2), s/veh	0.5	0.0	0.2	2.7	0.0	0.3	0.1	0.7	0.0	9.6	2.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	1.4	6.6	0.0	2.3	0.7	6.1	0.0	2.5	10.1	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	43.5	55.3	0.0	44.7	47.2	11.6	0.0	70.3	21.8	21.7
LnGrp LOS	D	A	D	E	A	D	D	B		E	C	C
Approach Vol, veh/h		128			280			969			1085	
Approach Delay, s/veh		47.5			52.2			12.4			25.0	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.5	75.0		29.5	11.1	89.4		29.5
Change Period (Y+Rc), s	5.4	* 4.5		4.0	4.0	* 5.4		4.0
Max Green Setting (Gmax), s	11.0	* 71		36.0	16.0	* 65		36.0
Max Q Clear Time (g_c+I1), s	3.7	28.0		24.3	7.6	20.7		14.5
Green Ext Time (p_c), s	0.0	25.5		0.9	0.1	16.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	89	65	136	38	64	90	100	948	29	77	1062	79
Future Volume (veh/h)	89	65	136	38	64	90	100	948	29	77	1062	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1736	1750	1723	1709	1750	1695	1750	1750	1695	1736
Adj Flow Rate, veh/h	97	71	80	41	70	51	109	1030	31	84	1154	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	1	0	2	3	0	4	0	0	4	1
Cap, veh/h	118	103	116	51	90	65	348	1621	49	250	1505	108
Arrive On Green	0.07	0.14	0.14	0.03	0.10	0.10	0.05	0.51	0.50	0.06	0.99	0.98
Sat Flow, veh/h	1654	743	838	1667	918	669	1667	3193	96	1667	3047	219
Grp Volume(v), veh/h	97	0	151	41	0	121	109	520	541	84	609	628
Grp Sat Flow(s),veh/h/ln	1654	0	1581	1667	0	1586	1667	1611	1678	1667	1611	1656
Q Serve(g_s), s	7.5	0.0	11.8	3.2	0.0	9.7	4.2	30.5	30.5	0.0	2.5	2.7
Cycle Q Clear(g_c), s	7.5	0.0	11.8	3.2	0.0	9.7	4.2	30.5	30.5	0.0	2.5	2.7
Prop In Lane	1.00		0.53	1.00		0.42	1.00		0.06	1.00		0.13
Lane Grp Cap(c), veh/h	118	0	219	51	0	155	348	818	852	250	795	818
V/C Ratio(X)	0.82	0.00	0.69	0.80	0.00	0.78	0.31	0.64	0.64	0.34	0.77	0.77
Avail Cap(c_a), veh/h	178	0	341	128	0	293	424	818	852	329	795	818
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	59.6	0.0	53.4	62.6	0.0	57.3	14.9	23.3	23.3	36.5	0.4	0.5
Incr Delay (d2), s/veh	10.3	0.0	1.5	10.0	0.0	3.2	0.2	3.8	3.6	0.2	5.8	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	4.8	1.5	0.0	4.1	1.6	12.1	12.6	2.1	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.9	0.0	54.8	72.6	0.0	60.4	15.1	27.0	26.9	36.8	6.3	6.2
LnGrp LOS	E	A	D	E	A	E	B	C	C	D	A	A
Approach Vol, veh/h		248			162			1170			1321	
Approach Delay, s/veh		60.7			63.5			25.8			8.2	
Approach LOS		E			E			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	68.2	13.3	16.7	8.3	70.0	8.0	22.0
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.5	* 4.5	4.0	4.0
Max Green Setting (Gmax), s	12.0	63.5	14.0	24.0	10.0	* 66	10.0	28.0
Max Q Clear Time (g_c+I1), s	6.2	4.7	9.5	11.7	2.0	32.5	5.2	13.8
Green Ext Time (p_c), s	0.0	6.7	0.0	0.2	0.0	5.1	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	48	73	25	13	19	52	1041	34	21	1120	44
Future Volume (veh/h)	92	48	73	25	13	19	52	1041	34	21	1120	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1750	1750	1750	1750	1750	1750	1695	1627	1614	1695	1723
Adj Flow Rate, veh/h	98	51	39	27	14	9	55	1107	35	22	1191	46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	0	0	4	9	10	4	2
Cap, veh/h	118	84	64	87	70	45	660	1618	51	633	1604	62
Arrive On Green	0.07	0.09	0.09	0.05	0.07	0.07	0.45	1.00	1.00	0.45	1.00	1.00
Sat Flow, veh/h	1628	913	698	1667	977	628	1667	3187	101	1537	3159	122
Grp Volume(v), veh/h	98	0	90	27	0	23	55	559	583	22	607	630
Grp Sat Flow(s),veh/h/ln	1628	0	1611	1667	0	1605	1667	1611	1677	1537	1611	1670
Q Serve(g_s), s	7.7	0.0	7.0	2.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.7	0.0	7.0	2.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.43	1.00		0.39	1.00		0.06	1.00		0.07
Lane Grp Cap(c), veh/h	118	0	148	87	0	115	660	818	851	633	818	848
V/C Ratio(X)	0.83	0.00	0.61	0.31	0.00	0.20	0.08	0.68	0.68	0.03	0.74	0.74
Avail Cap(c_a), veh/h	138	0	322	141	0	321	660	818	851	633	818	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.81	0.81	0.81	0.65	0.65	0.65
Uniform Delay (d), s/veh	59.5	0.0	56.8	59.3	0.0	56.8	3.7	0.0	0.0	3.5	0.0	0.0
Incr Delay (d2), s/veh	25.9	0.0	1.5	0.7	0.0	0.3	0.0	3.8	3.6	0.0	4.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	2.9	0.9	0.0	0.7	0.3	0.9	0.9	0.1	0.9	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.3	0.0	58.2	60.1	0.0	57.1	3.7	3.8	3.6	3.5	4.0	3.9
LnGrp LOS	F	A	E	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		188			50			1197			1259	
Approach Delay, s/veh		72.4			58.7			3.7			3.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.2	70.0	13.4	13.3	33.2	70.0	10.8	16.0
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0
Max Green Setting (Gmax), s	11.0	65.5	11.0	26.0	11.0	65.5	11.0	26.0
Max Q Clear Time (g_c+I1), s	12.0	2.0	9.7	3.8	2.0	2.0	4.0	9.0
Green Ext Time (p_c), s	0.0	6.6	0.0	0.0	0.0	5.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	156	75	131	176	79	80	934	138	142	979	94
Future Volume (veh/h)	110	156	75	131	176	79	80	934	138	142	979	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1723	1695	1736	1709	1736	1723	1709	1682	1736	1709	1723
Adj Flow Rate, veh/h	116	164	64	138	185	70	84	983	138	149	1031	94
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	4	1	3	1	2	3	5	1	3	2
Cap, veh/h	141	198	77	161	210	80	394	1584	222	306	1340	122
Arrive On Green	0.09	0.17	0.17	0.10	0.18	0.18	0.16	0.56	0.55	0.05	0.45	0.44
Sat Flow, veh/h	1628	1164	454	1654	1167	441	1641	2850	400	1654	3002	274
Grp Volume(v), veh/h	116	0	228	138	0	255	84	560	561	149	557	568
Grp Sat Flow(s),veh/h/ln	1628	0	1618	1654	0	1608	1641	1624	1627	1654	1624	1652
Q Serve(g_s), s	9.1	0.0	17.7	10.7	0.0	20.1	0.0	30.4	30.5	5.1	37.6	37.7
Cycle Q Clear(g_c), s	9.1	0.0	17.7	10.7	0.0	20.1	0.0	30.4	30.5	5.1	37.6	37.7
Prop In Lane	1.00		0.28	1.00		0.27	1.00		0.25	1.00		0.17
Lane Grp Cap(c), veh/h	141	0	275	161	0	290	394	902	904	306	724	737
V/C Ratio(X)	0.82	0.00	0.83	0.86	0.00	0.88	0.21	0.62	0.62	0.49	0.77	0.77
Avail Cap(c_a), veh/h	238	0	311	242	0	309	394	902	904	369	724	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.85	0.85	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	52.1	57.8	0.0	51.9	36.9	19.6	19.7	16.1	30.4	30.4
Incr Delay (d2), s/veh	4.4	0.0	13.7	12.1	0.0	22.0	0.1	2.7	2.7	0.4	7.7	7.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	8.2	5.0	0.0	9.9	2.2	11.7	11.8	1.9	15.9	16.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	0.0	65.9	69.9	0.0	73.9	37.0	22.3	22.4	16.6	38.1	38.0
LnGrp LOS	E	A	E	E	A	E	D	C	C	B	D	D
Approach Vol, veh/h		344			393			1205			1274	
Approach Delay, s/veh		64.8			72.5			23.4			35.5	
Approach LOS		E			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.3	62.0	15.3	27.4	11.1	76.2	16.6	26.1				
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0				
Max Green Setting (Gmax), s	12.0	* 58	19.0	25.0	12.0	57.5	19.0	25.0				
Max Q Clear Time (g_c+I1), s	12.0	39.7	11.1	22.1	7.1	32.5	12.7	19.7				
Green Ext Time (p_c), s	0.0	4.9	0.0	0.2	0.0	5.4	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			38.6									
HCM 6th LOS			D									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	39	68	65	70	65	75	1048	62	76	1190	135
Future Volume (veh/h)	75	39	68	65	70	65	75	1048	62	76	1190	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1709	1709	1709	1668	1736	1695	1641	1709	1695	1695
Adj Flow Rate, veh/h	82	42	19	71	76	0	82	1139	65	83	1293	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	3	3	3	6	1	4	8	3	4	4
Cap, veh/h	183	84	288	111	103		381	1713	98	440	1611	182
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.00	0.15	0.55	0.55	0.15	0.55	0.55
Sat Flow, veh/h	686	421	1444	352	518	1414	1654	3092	176	1628	2908	329
Grp Volume(v), veh/h	124	0	19	147	0	0	82	593	611	83	713	727
Grp Sat Flow(s),veh/h/ln	1107	0	1444	870	0	1414	1654	1611	1658	1628	1611	1626
Q Serve(g_s), s	0.0	0.0	1.4	10.0	0.0	0.0	0.0	33.8	33.9	0.0	46.1	46.9
Cycle Q Clear(g_c), s	13.3	0.0	1.4	23.4	0.0	0.0	0.0	33.8	33.9	0.0	46.1	46.9
Prop In Lane	0.66		1.00	0.48		1.00	1.00		0.11	1.00		0.20
Lane Grp Cap(c), veh/h	267	0	288	215	0		381	892	918	440	892	901
V/C Ratio(X)	0.46	0.00	0.07	0.68	0.00		0.21	0.66	0.67	0.19	0.80	0.81
Avail Cap(c_a), veh/h	324	0	344	273	0		381	892	918	440	892	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	0.0	42.2	54.2	0.0	0.0	35.9	20.5	20.5	24.5	23.2	23.4
Incr Delay (d2), s/veh	2.7	0.0	0.2	8.6	0.0	0.0	0.2	3.9	3.8	0.1	7.4	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	0.5	5.3	0.0	0.0	2.2	13.2	13.6	1.7	18.5	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	0.0	42.4	62.9	0.0	0.0	36.1	24.4	24.3	24.6	30.7	31.1
LnGrp LOS	D	A	D	E	A		D	C	C	C	C	C
Approach Vol, veh/h		143			147			1286			1523	
Approach Delay, s/veh		48.5			62.9			25.1			30.5	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.1	76.0		29.9	24.1	76.0		29.9				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	15.0	71.5		31.0	15.0	71.5		31.0				
Max Q Clear Time (g_c+I1), s	2.0	48.9		25.4	2.0	35.9		15.3				
Green Ext Time (p_c), s	0.1	17.3		0.6	0.1	19.7		1.1				

Intersection Summary	
HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	60	47	310	80	79	81	827	118	141	992	24
Future Volume (veh/h)	6	60	47	310	80	79	81	827	118	141	992	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1723	1750	1723	1750	1750	1750	1695	1682	1709	1709	1695
Adj Flow Rate, veh/h	6	63	26	326	84	21	85	871	63	148	1044	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	0	2	0	0	0	4	5	3	3	4
Cap, veh/h	112	78	32	409	225	190	105	1338	589	415	2004	46
Arrive On Green	0.07	0.07	0.07	0.13	0.13	0.13	0.06	0.42	0.42	0.26	0.62	0.61
Sat Flow, veh/h	1667	1155	477	3183	1750	1476	1667	3221	1419	1628	3242	75
Grp Volume(v), veh/h	6	0	89	326	84	21	85	871	63	148	523	545
Grp Sat Flow(s),veh/h/ln	1667	0	1632	1591	1750	1476	1667	1611	1419	1628	1624	1693
Q Serve(g_s), s	0.4	0.0	7.0	12.9	5.7	1.6	6.5	28.2	3.5	9.7	23.6	23.6
Cycle Q Clear(g_c), s	0.4	0.0	7.0	12.9	5.7	1.6	6.5	28.2	3.5	9.7	23.6	23.6
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	112	0	110	409	225	190	105	1338	589	415	1004	1047
V/C Ratio(X)	0.05	0.00	0.81	0.80	0.37	0.11	0.81	0.65	0.11	0.36	0.52	0.52
Avail Cap(c_a), veh/h	141	0	138	857	471	397	179	1338	589	415	1004	1047
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	56.7	0.0	59.8	55.0	51.9	50.1	60.1	30.4	23.2	39.7	14.0	14.0
Incr Delay (d2), s/veh	0.1	0.0	21.4	1.8	0.5	0.1	8.7	2.5	0.4	0.3	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.6	5.3	2.6	0.6	3.0	11.2	1.2	3.8	8.4	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.9	0.0	81.2	56.8	52.4	50.2	68.8	32.9	23.6	40.0	15.7	15.6
LnGrp LOS	E	A	F	E	D	D	E	C	C	D	B	B
Approach Vol, veh/h		95			431			1019			1216	
Approach Delay, s/veh		79.7			55.6			35.3			18.6	
Approach LOS		E			E			D			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2	84.4		20.7	38.6	58.0		12.8				
Change Period (Y+Rc), s	4.0	* 5.4		4.0	5.4	* 4.5		4.0				
Max Green Setting (Gmax), s	14.0	* 53		35.0	14.0	* 54		11.0				
Max Q Clear Time (g_c+I1), s	8.5	25.6		14.9	11.7	30.2		9.0				
Green Ext Time (p_c), s	0.0	15.0		1.2	0.0	12.6		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		32.7
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	217	22	12	13	25	15	12	878	13	8	1157	291
Future Volume (veh/h)	217	22	12	13	25	15	12	878	13	8	1157	291
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1627	1409	1750	1695	1654	1750	1695	1750	1750	1682	1750
Adj Flow Rate, veh/h	226	23	4	14	26	10	12	915	13	8	1205	303
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	9	25	0	4	7	0	4	0	0	5	0
Cap, veh/h	409	272	47	220	79	30	20	1442	20	222	1805	819
Arrive On Green	0.15	0.20	0.20	0.02	0.07	0.06	0.01	0.44	0.42	0.13	0.56	0.56
Sat Flow, veh/h	1654	1350	235	1667	1160	446	1667	3252	46	1667	3195	1450
Grp Volume(v), veh/h	226	0	27	14	0	36	12	453	475	8	1205	303
Grp Sat Flow(s),veh/h/ln	1654	0	1585	1667	0	1606	1667	1611	1687	1667	1598	1450
Q Serve(g_s), s	9.4	0.0	1.1	0.6	0.0	1.7	0.6	17.2	17.2	0.3	20.8	2.7
Cycle Q Clear(g_c), s	9.4	0.0	1.1	0.6	0.0	1.7	0.6	17.2	17.2	0.3	20.8	2.7
Prop In Lane	1.00		0.15	1.00		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	409	0	319	220	0	110	20	714	748	222	1805	819
V/C Ratio(X)	0.55	0.00	0.08	0.06	0.00	0.33	0.61	0.63	0.63	0.04	0.67	0.37
Avail Cap(c_a), veh/h	532	0	421	292	0	162	126	1100	1152	222	2101	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	25.7	33.2	0.0	35.2	38.9	17.0	17.1	29.9	12.0	0.9
Incr Delay (d2), s/veh	0.9	0.0	0.1	0.1	0.0	1.3	17.6	2.4	2.3	0.0	1.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.4	0.2	0.0	0.7	0.3	6.0	6.2	0.1	6.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	0.0	25.8	33.3	0.0	36.5	56.5	19.5	19.4	29.9	13.3	1.6
LnGrp LOS	C	A	C	C	A	D	E	B	B	C	B	A
Approach Vol, veh/h		253			50			940			1516	
Approach Delay, s/veh		26.9			35.6			19.9			11.0	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	48.7	16.1	9.4	14.5	39.1	5.6	19.9
Change Period (Y+Rc), s	4.0	6.0	4.5	4.5	4.0	6.0	4.5	4.5
Max Green Setting (Gmax), s	6.0	50.0	17.5	7.5	4.0	52.0	4.5	20.5
Max Q Clear Time (g_c+I1), s	2.6	22.8	11.4	3.7	2.3	19.2	2.6	3.1
Green Ext Time (p_c), s	0.0	19.8	0.2	0.0	0.0	13.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	157	412	236	31	14	79
Future Vol, veh/h	157	412	236	31	14	79
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	3	1	0	0	1
Mvmt Flow	183	479	274	36	16	92

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	311	0	-	0	1138	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	845	-
Critical Hdwy	4.1	-	-	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.309
Pot Cap-1 Maneuver	1261	-	-	-	225	749
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	425	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1260	-	-	-	180	748
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	425	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1260	-	-	-	507
HCM Lane V/C Ratio	0.145	-	-	-	0.213
HCM Control Delay (s)	8.3	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.8

Intersection						
Int Delay, s/veh	2.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	355	71	16	199	68	17
Future Vol, veh/h	355	71	16	199	68	17
Conflicting Peds, #/hr	0	3	3	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	3	1	6	1	2	0
Mvmt Flow	403	81	18	226	77	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	487	0	709	449
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.16	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.3
Pot Cap-1 Maneuver	-	-	1056	-	401	614
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1053	-	392	611
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	1053	-
HCM Lane V/C Ratio	0.229	-	-	0.017	-
HCM Control Delay (s)	16	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	179	27	62	75	101	106
Future Vol, veh/h	179	27	62	75	101	106
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	4	2	1	1	2
Mvmt Flow	199	30	69	83	112	118

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	395	174	233	0	-	0
Stage 1	174	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Critical Hdwy	6.42	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	610	864	1335	-	-	-
Stage 1	856	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	573	862	1331	-	-	-
Mov Cap-2 Maneuver	573	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	814	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1331	-	599	-	-
HCM Lane V/C Ratio	0.052	-	0.382	-	-
HCM Control Delay (s)	7.9	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	11	47	13	11	25	1	27	22	58	1	3	15
Future Vol, veh/h	11	47	13	11	25	1	27	22	58	1	3	15
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	8	100	0	4	0	0	33	0
Mvmt Flow	14	62	17	14	33	1	36	29	76	1	4	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	34	0	0	80	0	0	174	162	72	213	170	34
Stage 1	-	-	-	-	-	-	100	100	-	62	62	-
Stage 2	-	-	-	-	-	-	74	62	-	151	108	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.1	6.83	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4.297	3.3
Pot Cap-1 Maneuver	1591	-	-	1531	-	-	793	727	996	748	670	1045
Stage 1	-	-	-	-	-	-	911	808	-	954	786	-
Stage 2	-	-	-	-	-	-	940	839	-	856	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1591	-	-	1530	-	-	763	713	995	660	657	1045
Mov Cap-2 Maneuver	-	-	-	-	-	-	763	713	-	660	657	-
Stage 1	-	-	-	-	-	-	902	800	-	945	779	-
Stage 2	-	-	-	-	-	-	909	831	-	755	743	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.2	10	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	859	1591	-	-	1530	-	-	930
HCM Lane V/C Ratio	0.164	0.009	-	-	0.009	-	-	0.027
HCM Control Delay (s)	10	7.3	0	-	7.4	0	-	9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.1

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	7	172	6	14	83	12	4	9	16	25	21	7
Future Vol, veh/h	7	172	6	14	83	12	4	9	16	25	21	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	2	0	0	3	0	0	0	6	0	0	0
Mvmt Flow	8	191	7	16	92	13	4	10	18	28	23	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8	7.6	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	4%	13%	47%
Vol Thru, %	31%	93%	76%	40%
Vol Right, %	55%	3%	11%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	185	109	53
LT Vol	4	7	14	25
Through Vol	9	172	83	21
RT Vol	16	6	12	7
Lane Flow Rate	32	206	121	59
Geometry Grp	1	1	1	1
Degree of Util (X)	0.039	0.236	0.144	0.076
Departure Headway (Hd)	4.385	4.14	4.286	4.668
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	820	853	841	771
Service Time	2.394	2.239	2.292	2.677
HCM Lane V/C Ratio	0.039	0.242	0.144	0.077
HCM Control Delay	7.6	8.5	8	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.9	0.5	0.2

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	251	12	26	241	83	6	6	33	57	9	10
Future Vol, veh/h	6	251	12	26	241	83	6	6	33	57	9	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	50	2	0	0	3	7	0	0	0	4	0	0
Mvmt Flow	6	267	13	28	256	88	6	6	35	61	10	11
Number of Lanes	0	2	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.9	11.7	8.6	9.5
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	13%	5%	0%	7%	75%
Vol Thru, %	13%	95%	91%	69%	12%
Vol Right, %	73%	0%	9%	24%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	132	138	350	76
LT Vol	6	6	0	26	57
Through Vol	6	126	126	241	9
RT Vol	33	0	12	83	10
Lane Flow Rate	48	140	146	372	81
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.068	0.234	0.208	0.472	0.126
Departure Headway (Hd)	5.126	6.019	5.112	4.559	5.612
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	691	595	698	786	634
Service Time	3.212	3.778	2.871	2.609	3.691
HCM Lane V/C Ratio	0.069	0.235	0.209	0.473	0.128
HCM Control Delay	8.6	10.6	9.2	11.7	9.5
HCM Lane LOS	A	B	A	B	A
HCM 95th-tile Q	0.2	0.9	0.8	2.6	0.4

Intersection						
Int Delay, s/veh	0.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑	↰	↱
Traffic Vol, veh/h	0	0	0	180	5	98
Future Vol, veh/h	0	0	0	180	5	98
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Free
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	0	0	3	0	0
Mvmt Flow	0	0	0	222	6	121

Major/Minor		Major2		Minor1	
Conflicting Flow All		-	-	222	-
Stage 1		-	-	0	-
Stage 2		-	-	222	-
Critical Hdwy		-	-	6.4	-
Critical Hdwy Stg 1		-	-	-	-
Critical Hdwy Stg 2		-	-	5.4	-
Follow-up Hdwy		-	-	3.5	-
Pot Cap-1 Maneuver		0	-	771	0
Stage 1		0	-	-	0
Stage 2		0	-	820	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver		-	-	771	-
Mov Cap-2 Maneuver		-	-	771	-
Stage 1		-	-	-	-
Stage 2		-	-	820	-

Approach		WB		NB
HCM Control Delay, s		0		9.7
HCM LOS				A

Minor Lane/Major Mvmt	NBLn1	NBLn2	WBT
Capacity (veh/h)	771	-	-
HCM Lane V/C Ratio	0.008	-	-
HCM Control Delay (s)	9.7	0	-
HCM Lane LOS	A	A	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	100	173	107	82	11
Future Vol, veh/h	17	100	173	107	82	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	1080311808	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	2	0	0
Mvmt Flow	19	112	194	120	92	12

Major/Minor	Minor2		Major2	
Conflicting Flow All	254	254	-	0
Stage 1	254	254	-	-
Stage 2	0	0	-	-
Critical Hdwy	6.4	6.5	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.5	4	-	-
Pot Cap-1 Maneuver	739	653	-	-
Stage 1	793	701	-	-
Stage 2	-	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	739	0	-	-
Mov Cap-2 Maneuver	739	0	-	-
Stage 1	793	0	-	-
Stage 2	-	0	-	-

Approach	EB	WB
HCM Control Delay, s	10.9	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	WBT	WBR
Capacity (veh/h)	739	-	-
HCM Lane V/C Ratio	0.178	-	-
HCM Control Delay (s)	10.9	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.6	-	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	112	2	120	79	31	5	39	159	34	60	8
Future Vol, veh/h	11	112	2	120	79	31	5	39	159	34	60	8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	1	1	0	0	3	2	3	0	0
Mvmt Flow	12	123	2	132	87	34	5	43	175	37	66	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.6	9.4	9.3
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	9%	52%	33%
Vol Thru, %	19%	90%	34%	59%
Vol Right, %	78%	2%	13%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	125	230	102
LT Vol	5	11	120	34
Through Vol	39	112	79	60
RT Vol	159	2	31	8
Lane Flow Rate	223	137	253	112
Geometry Grp	1	1	1	1
Degree of Util (X)	0.282	0.192	0.344	0.162
Departure Headway (Hd)	4.544	5.026	4.905	5.207
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	783	706	725	681
Service Time	2.618	3.115	2.985	3.295
HCM Lane V/C Ratio	0.285	0.194	0.349	0.164
HCM Control Delay	9.4	9.3	10.6	9.3
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	1.2	0.7	1.5	0.6

Intersection												
Int Delay, s/veh	3.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	2	239	95	31	299	1	101	0	17	1	0	1
Future Vol, veh/h	2	239	95	31	299	1	101	0	17	1	0	1
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	2	1	0	1	0	1	0	6	0	0	0
Mvmt Flow	2	254	101	33	318	1	107	0	18	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	319	0	0	356	0	0	695	695	309	706	745	319
Stage 1	-	-	-	-	-	-	310	310	-	385	385	-
Stage 2	-	-	-	-	-	-	385	385	-	321	360	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.11	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.509	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1252	-	-	1214	-	-	358	368	722	353	345	726
Stage 1	-	-	-	-	-	-	702	663	-	642	614	-
Stage 2	-	-	-	-	-	-	640	614	-	695	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1252	-	-	1213	-	-	348	355	719	334	333	726
Mov Cap-2 Maneuver	-	-	-	-	-	-	348	355	-	334	333	-
Stage 1	-	-	-	-	-	-	700	661	-	641	594	-
Stage 2	-	-	-	-	-	-	618	594	-	674	628	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	19.3	12.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	376	1252	-	-	1213	-	-	458
HCM Lane V/C Ratio	0.334	0.002	-	-	0.027	-	-	0.005
HCM Control Delay (s)	19.3	7.9	0	-	8.1	0	-	12.9
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	428	323	78	63	63
Future Vol, veh/h	8	428	323	78	63	63
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	3	1	2	5
Mvmt Flow	9	460	347	84	68	68

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	437	0	-	0	876	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	481	-
Critical Hdwy	4.1	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	1134	-	-	-	319	648
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	313	644
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	618	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	520
HCM Lane V/C Ratio	0.008	-	-	-	0.261
HCM Control Delay (s)	8.2	-	-	-	14.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1

Intersection						
Int Delay, s/veh	3.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	168	256	31	168	371
Future Vol, veh/h	41	168	256	31	168	371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	2	3	3	1	3
Mvmt Flow	43	177	269	33	177	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1031	286	0	0	302	0
Stage 1	286	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.45	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	255	753	-	-	1265	-
Stage 1	756	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	219	753	-	-	1265	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	399	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	323	753	1265	-
HCM Lane V/C Ratio	-	-	0.134	0.235	0.14	-
HCM Control Delay (s)	-	-	17.9	11.2	8.3	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.9	0.5	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	143	95	120	133	35	57	203	67	33	228	28
Future Volume (veh/h)	23	143	95	120	133	35	57	203	67	33	228	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1736	1682	1736	1723	1709	1682	1723	1750	1750	1709	1654
Adj Flow Rate, veh/h	26	162	78	136	151	29	65	231	62	38	259	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	1	5	1	2	3	5	2	0	0	3	7
Cap, veh/h	484	347	167	426	442	85	429	412	111	429	444	55
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.05	0.32	0.30	0.04	0.30	0.28
Sat Flow, veh/h	1222	1098	529	1148	1397	268	1602	1301	349	1667	1487	184
Grp Volume(v), veh/h	26	0	240	136	0	180	65	0	293	38	0	291
Grp Sat Flow(s),veh/h/ln	1222	0	1627	1148	0	1665	1602	0	1650	1667	0	1671
Q Serve(g_s), s	0.6	0.0	4.3	3.9	0.0	3.0	1.0	0.0	5.3	0.6	0.0	5.3
Cycle Q Clear(g_c), s	3.6	0.0	4.3	8.2	0.0	3.0	1.0	0.0	5.3	0.6	0.0	5.3
Prop In Lane	1.00		0.32	1.00		0.16	1.00		0.21	1.00		0.11
Lane Grp Cap(c), veh/h	484	0	514	426	0	526	429	0	522	429	0	499
V/C Ratio(X)	0.05	0.00	0.47	0.32	0.00	0.34	0.15	0.00	0.56	0.09	0.00	0.58
Avail Cap(c_a), veh/h	1113	0	1351	1017	0	1383	1010	0	1621	1062	0	1642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.8	0.0	9.9	13.2	0.0	9.5	8.7	0.0	10.3	8.9	0.0	10.8
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.3	0.0	0.3	0.1	0.0	1.4	0.1	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.2	0.8	0.0	0.8	0.2	0.0	1.5	0.2	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	10.4	13.5	0.0	9.8	8.8	0.0	11.7	8.9	0.0	12.4
LnGrp LOS	B	A	B	B	A	A	A	A	B	A	A	B
Approach Vol, veh/h		266			316			358			329	
Approach Delay, s/veh		10.4			11.4			11.2			12.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	14.8		15.4	5.3	15.4		15.4				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	15.0	35.0		30.0	15.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	7.3		10.2	2.6	7.3		6.3				
Green Ext Time (p_c), s	0.1	2.9		1.2	0.0	2.6		1.2				

Intersection Summary			
HCM 6th Ctrl Delay			11.3
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	2	14	31	2	32	5	52	10	23	77	3
Future Vol, veh/h	4	2	14	31	2	32	5	52	10	23	77	3
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	6	0	3	0	8	10	9	5	0
Mvmt Flow	5	2	16	36	2	37	6	60	12	27	90	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	247	234	95	234	229	67	96	0	0	73	0	0
Stage 1	149	149	-	79	79	-	-	-	-	-	-	-
Stage 2	98	85	-	155	150	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.16	6.5	6.23	4.1	-	-	4.19	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.554	4	3.327	2.2	-	-	2.281	-	-
Pot Cap-1 Maneuver	711	670	967	712	674	994	1510	-	-	1483	-	-
Stage 1	858	778	-	920	833	-	-	-	-	-	-	-
Stage 2	913	828	-	838	777	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	668	652	964	685	656	993	1506	-	-	1482	-	-
Mov Cap-2 Maneuver	668	652	-	685	656	-	-	-	-	-	-	-
Stage 1	852	761	-	915	829	-	-	-	-	-	-	-
Stage 2	873	824	-	806	760	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.9	0.6	1.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1506	-	-	848	807	1482	-	-
HCM Lane V/C Ratio	0.004	-	-	0.027	0.094	0.018	-	-
HCM Control Delay (s)	7.4	0	-	9.4	9.9	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	20	101	15	20	111	26	6	21	4	35	50	37
Future Vol, veh/h	20	101	15	20	111	26	6	21	4	35	50	37
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	2	0	5	4	6	0	5	0	6	0	3
Mvmt Flow	22	109	16	22	119	28	6	23	4	38	54	40
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	8.7	8	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	15%	13%	29%
Vol Thru, %	68%	74%	71%	41%
Vol Right, %	13%	11%	17%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	31	136	157	122
LT Vol	6	20	20	35
Through Vol	21	101	111	50
RT Vol	4	15	26	37
Lane Flow Rate	33	146	169	131
Geometry Grp	1	1	1	1
Degree of Util (X)	0.044	0.184	0.21	0.169
Departure Headway (Hd)	4.746	4.531	4.471	4.639
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	753	793	804	773
Service Time	2.783	2.557	2.495	2.669
HCM Lane V/C Ratio	0.044	0.184	0.21	0.169
HCM Control Delay	8	8.6	8.7	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.7	0.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	80	33	58	100	12	267	28	122	12	33	125
Future Volume (veh/h)	101	80	33	58	100	12	267	28	122	12	33	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1600	1627	1750	1750	1695	1750	1736	1695	1723	1750	1750	1723
Adj Flow Rate, veh/h	115	91	28	66	114	11	303	32	70	14	38	70
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	11	9	0	0	4	0	1	4	2	0	0	2
Cap, veh/h	751	956	1138	827	869	84	377	114	250	207	49	89
Arrive On Green	0.05	0.59	0.59	0.03	0.57	0.57	0.18	0.25	0.25	0.02	0.09	0.09
Sat Flow, veh/h	1524	1627	1481	1667	1522	147	1654	465	1018	1667	549	1012
Grp Volume(v), veh/h	115	91	28	66	0	125	303	0	102	14	0	108
Grp Sat Flow(s),veh/h/ln	1524	1627	1481	1667	0	1669	1654	0	1483	1667	0	1561
Q Serve(g_s), s	4.4	3.4	0.6	2.3	0.0	4.9	22.5	0.0	7.8	1.1	0.0	9.5
Cycle Q Clear(g_c), s	4.4	3.4	0.6	2.3	0.0	4.9	22.5	0.0	7.8	1.1	0.0	9.5
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.69	1.00		0.65
Lane Grp Cap(c), veh/h	751	956	1138	827	0	953	377	0	364	207	0	138
V/C Ratio(X)	0.15	0.10	0.02	0.08	0.00	0.13	0.80	0.00	0.28	0.07	0.00	0.78
Avail Cap(c_a), veh/h	790	956	1138	898	0	953	551	0	657	286	0	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	12.6	3.8	11.7	0.0	13.9	44.6	0.0	42.8	55.6	0.0	62.5
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.0	0.3	5.4	0.0	0.4	0.1	0.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.3	0.2	0.9	0.0	2.0	9.8	0.0	2.9	0.5	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	12.8	3.9	11.7	0.0	14.2	50.1	0.0	43.2	55.8	0.0	71.8
LnGrp LOS	B	B	A	B	A	B	D	A	D	E	A	E
Approach Vol, veh/h		234			191			405			122	
Approach Delay, s/veh		10.9			13.3			48.3			69.9	
Approach LOS		B			B			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	86.3	7.4	38.3	10.4	84.0	29.3	16.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	42.0	10.0	62.0	10.0	42.0	40.0	32.0
Max Q Clear Time (g_c+I1), s	4.3	5.4	3.1	9.8	6.4	6.9	24.5	11.5
Green Ext Time (p_c), s	0.1	0.6	0.0	0.7	0.1	0.8	0.8	0.5

Intersection Summary	
HCM 6th Ctrl Delay	34.9
HCM 6th LOS	C

Notes
User approved changes to right turn type.

Intersection						
Int Delay, s/veh	1.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	1	9	67	1	16
Future Vol, veh/h	76	1	9	67	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	16	0	11	8	0	0
Mvmt Flow	85	1	10	75	1	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	86	0	181	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	95	-
Critical Hdwy	-	-	4.21	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.299	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1455	-	813	978
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	934	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	807	978
Mov Cap-2 Maneuver	-	-	-	-	807	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	927	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	966	-	-	1455	-
HCM Lane V/C Ratio	0.02	-	-	0.007	-
HCM Control Delay (s)	8.8	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	49	76	16	97	69
Future Vol, veh/h	7	49	76	16	97	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	5	0	4	6
Mvmt Flow	8	56	87	18	111	79

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	96	0	0	105	0
Stage 1	96	-	-	-	-	-
Stage 2	301	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	612	966	-	-	1474	-
Stage 1	933	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	564	966	-	-	1474	-
Mov Cap-2 Maneuver	564	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	695	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	4.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	887	1474	-
HCM Lane V/C Ratio	-	-	0.073	0.076	-
HCM Control Delay (s)	-	-	9.4	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	18	0	0	0	3	102	1	0	231	42
Future Vol, veh/h	20	0	18	0	0	0	3	102	1	0	231	42
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	10	0	0	0	0	0	33	0	0	0	2	7
Mvmt Flow	23	0	20	0	0	0	3	116	1	0	263	48
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	8.5	0	8.5	10.3
HCM LOS	A	-	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	99%	0%	0%	100%	100%	85%
Vol Right, %	0%	1%	0%	100%	0%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	103	20	18	0	0	273
LT Vol	3	0	20	0	0	0	0
Through Vol	0	102	0	0	0	0	231
RT Vol	0	1	0	18	0	0	42
Lane Flow Rate	3	117	23	20	0	0	310
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.006	0.158	0.039	0.027	0	0	0.393
Departure Headway (Hd)	5.918	4.845	6.202	4.823	5.609	4.634	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	608	743	580	746	0	0	779
Service Time	3.624	2.552	3.91	2.531	3.621	2.423	2.349
HCM Lane V/C Ratio	0.005	0.157	0.04	0.027	0	0	0.398
HCM Control Delay	8.7	8.5	9.2	7.7	8.6	7.4	10.3
HCM Lane LOS	A	A	A	A	N	N	B
HCM 95th-tile Q	0	0.6	0.1	0.1	0	0	1.9

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	103	7	44	111	24	6	57	38	81	135	33
Future Vol, veh/h	25	103	7	44	111	24	6	57	38	81	135	33
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	2	4	4	0	2	3	2	1	3
Mvmt Flow	27	113	8	48	122	26	7	63	42	89	148	36
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.6	10.1	9.3	10.1
HCM LOS	A	B	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	19%	25%	100%	0%
Vol Thru, %	0%	60%	76%	62%	0%	80%
Vol Right, %	0%	40%	5%	13%	0%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	95	135	179	81	168
LT Vol	6	0	25	44	81	0
Through Vol	0	57	103	111	0	135
RT Vol	0	38	7	24	0	33
Lane Flow Rate	7	104	148	197	89	185
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.012	0.161	0.212	0.277	0.149	0.275
Departure Headway (Hd)	6.313	5.557	5.149	5.078	6.031	5.37
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	570	649	688	700	589	661
Service Time	4.013	3.257	3.244	3.166	3.826	3.164
HCM Lane V/C Ratio	0.012	0.16	0.215	0.281	0.151	0.28
HCM Control Delay	9.1	9.3	9.6	10.1	9.9	10.2
HCM Lane LOS	A	A	A	B	A	B
HCM 95th-tile Q	0	0.6	0.8	1.1	0.5	1.1

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	150	49	16	117	14	19	27	13	11	60	43
Future Vol, veh/h	23	150	49	16	117	14	19	27	13	11	60	43
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	0	4	0	5	4	0	9	0	5
Mvmt Flow	25	165	54	18	129	15	21	30	14	12	66	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	8.9	8.6	8.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	32%	10%	11%	10%
Vol Thru, %	46%	68%	80%	53%
Vol Right, %	22%	22%	10%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	222	147	114
LT Vol	19	23	16	11
Through Vol	27	150	117	60
RT Vol	13	49	14	43
Lane Flow Rate	65	244	162	125
Geometry Grp	1	1	1	1
Degree of Util (X)	0.09	0.301	0.207	0.169
Departure Headway (Hd)	5.005	4.446	4.609	4.85
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	713	807	777	737
Service Time	3.058	2.483	2.651	2.898
HCM Lane V/C Ratio	0.091	0.302	0.208	0.17
HCM Control Delay	8.6	9.4	8.9	8.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.3	0.8	0.6

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	72	42	35	71	54
Future Vol, veh/h	24	72	42	35	71	54
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	5	6	3	0
Mvmt Flow	28	83	48	40	82	62
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	8	7.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	55%	25%	0%
Vol Thru, %	45%	0%	57%
Vol Right, %	0%	75%	43%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	77	96	125
LT Vol	42	24	0
Through Vol	35	0	71
RT Vol	0	72	54
Lane Flow Rate	89	110	144
Geometry Grp	1	1	1
Degree of Util (X)	0.108	0.123	0.158
Departure Headway (Hd)	4.4	4.006	3.954
Convergence, Y/N	Yes	Yes	Yes
Cap	805	900	895
Service Time	2.477	2.006	2.029
HCM Lane V/C Ratio	0.111	0.122	0.161
HCM Control Delay	8	7.6	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.4	0.6

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	77	70	6	3	83	12	0	1	2	25	3	156
Future Vol, veh/h	77	70	6	3	83	12	0	1	2	25	3	156
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	0	0	0	1	0	0	0	0	0	0	1
Mvmt Flow	80	73	6	3	86	13	0	1	2	26	3	163
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	8.7	8.1	7.5	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	50%	3%	100%	0%
Vol Thru, %	33%	46%	85%	0%	2%
Vol Right, %	67%	4%	12%	0%	98%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	153	98	25	159
LT Vol	0	77	3	25	0
Through Vol	1	70	83	0	3
RT Vol	2	6	12	0	156
Lane Flow Rate	3	159	102	26	166
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.004	0.202	0.127	0.041	0.203
Departure Headway (Hd)	4.43	4.556	4.463	5.614	4.421
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	807	789	804	639	813
Service Time	2.463	2.578	2.486	3.336	2.143
HCM Lane V/C Ratio	0.004	0.202	0.127	0.041	0.204
HCM Control Delay	7.5	8.7	8.1	8.6	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.8	0.4	0.1	0.8

SECTION 2: SAFETY ANALYSIS

General & Site Information	
Analyst:	
Agency/Company:	DKS Associates
Date:	7/10/2023
Project Name:	Canby TSP Update

Intersection Population Type Crash Rate				
Average Crash Rate per intersection type				
Intersection Pop. Type	**Sum of Crashes**	**Sum of 5-year MEV**	**Avg Crash Rate for Ref Pop.**	**INT in Pop**
Rural 3SG	0	0		
Rural 3ST	0	0		
Rural 4SG	0	0		
Rural 4ST	0	0		
Urban 3ST	9	117	0.0767	12
Urban 3SG	0	0		
Urban 4ST	20	106	0.1880	10
Urban 4SG	109	375	0.2909	8

Critical Rate Calculation									
Intersection	**AADT Entering Intersection**	**5-year MEV**	**Crash Total**	**Intersection Population Type**	**Intersection Crash Rate**	**Reference Population Crash Rate**	**Critical Rate**	**Over Critical**	**90th Percentile Crash Rate**
OR 99E & Berg Parkway	25,550	46.6	13	Urban 4SG	0.28	0.29	0.43	Under	0.86
OR 99E & Elm Street	27,520	50.2	19	Urban 4SG	0.38	0.29	0.43	Under	0.86
OR 99E & Grant Street	25,710	46.9	9	Urban 4SG	0.19	0.29	0.43	Under	0.86
OR 99E & Ivy Street	30,940	56.5	31	Urban 4SG	0.55	0.29	0.42	**Over**	0.86
OR 99E & Pine Street	29,680	54.2	15	Urban 4SG	0.28	0.29	0.42	Under	0.86
OR 99E & Sequoia Parkway	27,650	50.5	9	Urban 4SG	0.18	0.29	0.43	Under	0.86
OR 99E & Territorial Road	26,630	48.6	8	Urban 4SG	0.16	0.29	0.43	Under	0.86
Knights Bridge Road & N Birch Street	9,170	16.7	0	Urban 3ST	0.00	0.08	0.22	Under	0.29
Knights Bridge Road & N Cedar Street	7,280	13.3	1	Urban 3ST	0.08	0.08	0.24	Under	0.29
Knights Bridge Road & N Holly Street	5,500	10.0	0	Urban 3ST	0.00	0.08	0.27	Under	0.29
NW 3rd Avenue & N Cedar Street	2,340	4.3	2	Urban 4ST	0.47	0.19	0.65	Under	0.41
NW 1st Avenue & N Grant Street	3,870	7.1	1	Urban 4ST	0.14	0.19	0.53	Under	0.41
NW 1st Avenue & N Ivy Street	7,330	13.4	3	Urban 4ST	0.22	0.19	0.42	Under	0.41
NE 3rd Avenue & NE 4th Avenue	2,830	5.2	0	Urban 3ST	0.00	0.08	0.37	Under	0.29
NE 4th Avenue & N Pine Street	5,240	9.6	2	Urban 3ST	0.21	0.08	0.28	Under	0.29
NE Territorial Road & N Holly Street	6,600	12.0	2	Urban 4ST	0.17	0.19	0.44	Under	0.41
NE Territorial Road & N Redwood Street	7,870	14.4	1	Urban 4ST	0.07	0.19	0.41	Under	0.41
SE 2nd Avenue & S Ivy Street A	9,290	17.0	2	Urban 3ST	0.12	0.08	0.22	Under	0.29
S Township Road & S Ivy Street A	10,350	18.9	2	Urban 3ST	0.11	0.08	0.21	Under	0.29
SE 13th Avenue & S Ivy Street A	11,650	21.3	5	Urban 4SG	0.24	0.29	0.51	Under	0.86
SE 4th Avenue & S Redwood Street	2,520	4.6	1	Urban 3ST	0.22	0.08	0.40	Under	0.29
S Township Road & S Redwood Street	4,370	8.0	2	Urban 4ST	0.25	0.19	0.50	Under	0.41
Sequoia Parkway & Hazel Dell Way	9,710	17.7	6	Urban 4ST	0.34	0.19	0.39	Under	0.41
SE 1st Avenue & S Walnut Street	1,700	3.1	0	Urban 3ST	0.00	0.08	0.50	Under	0.29
SE 1st Avenue & S Mulino Road A	3,030	5.5	0	Urban 3ST	0.00	0.08	0.36	Under	0.29
SE 4th Avenue & S Walnut Road	4,170	7.6	0	Urban 4ST	0.00	0.19	0.51	Under	0.41
S Township Road & Sequoia Parkway	6,650	12.1	1	Urban 4ST	0.08	0.19	0.43	Under	0.41
S Township Road & S Mulino Street A	5,370	9.8	2	Urban 4ST	0.20	0.19	0.47	Under	0.41
SE 13th Avenue & S Mulino Road A	2,990	5.5	1	Urban 3ST	0.18	0.08	0.36	Under	0.29
SE 13th Avenue & Sequoia Parkway	4,380	8.0	0	Urban 3ST	0.00	0.08	0.30	Under	0.29

General & Site Information	
Analyst:	
Agency/Company:	DKS Associates
Date:	7/10/2023
Project Name:	Canby TSP Update

Reference Population Type Crash Rates

Segment Reference Population Type	Population Type Number	No. of Segs in Reference Population	Sum of Crashes	Sum of MVMT	Avg Crash Rate for Ref Pop.
Urban Principal Arterial	1	6	117	102.8	1.14
	2				
	3				
	4				
	5				
	6				

Critical Rate Calculation

Segment	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical
1	Urban Principal Arterial	0.00	0.42	28	23498	0.42	1	18.01	1.55	1.14	1.58	Under
2	Urban Principal Arterial	0.42	0.55	13	23498	0.13	1	5.57	2.33	1.14	1.97	**Over**
3	Urban Principal Arterial	0.55	0.68	13	23965	0.13	1	5.69	2.29	1.14	1.96	**Over**
4	Urban Principal Arterial	0.68	1.19	51	23965	0.51	1	22.31	2.29	1.14	1.53	**Over**
5	Urban Principal Arterial	1.19	1.58	6	23022	0.39	1	16.39	0.37	1.14	1.60	Under
6	Urban Principal Arterial	1.58	2.41	6	23022	0.83	1	34.87	0.17	1.14	1.45	Under

General & Site Information				
Analyst:	Eileen Chai	Highway Number and Name:	81	Notes
Agency/Company:	DKS Associates	Mile Points:	Varies	
Date:	9/28/2023	Crash Years Pulled:	2017 to 2021	
Project Name:	CanbyTSPUpV3	Limiting Probability:	0.9	

Angle Crashes

Hwy	MP	RefPop	Street 1	Street 2	Probability	Excess Proportion
81	20.23	4SG	PACIFIC HY 99E	SEQUOIA PKWY	0.94	0.68

Hwy	MP	RefPop	Street 1	Street 2	Probability	Excess Proportion

Hwy	MP	RefPop	Street 1	Street 2	Probability	Excess Proportion

Rear Crashes

Hwy	MP	RefPop	Street1	Street2	Probability	Excess Proportion
81	21.86	4SG	PACIFIC HY 99E	SW BERG PKY	0.97	0.43
81	21.14	4SG	PACIFIC HY 99E	S IVY ST	0.92	0.32

APPENDIX F. FUTURE TRAFFIC FORECASTING

FUTURE TRAFFIC FORECASTING

DATE: February 14, 2025

TO: Project Management Team

FROM: Kevin Chewuk and Eileen Chai | DKS Associates

SUBJECT: Canby Transportation System Plan Update
Future Traffic Forecasting

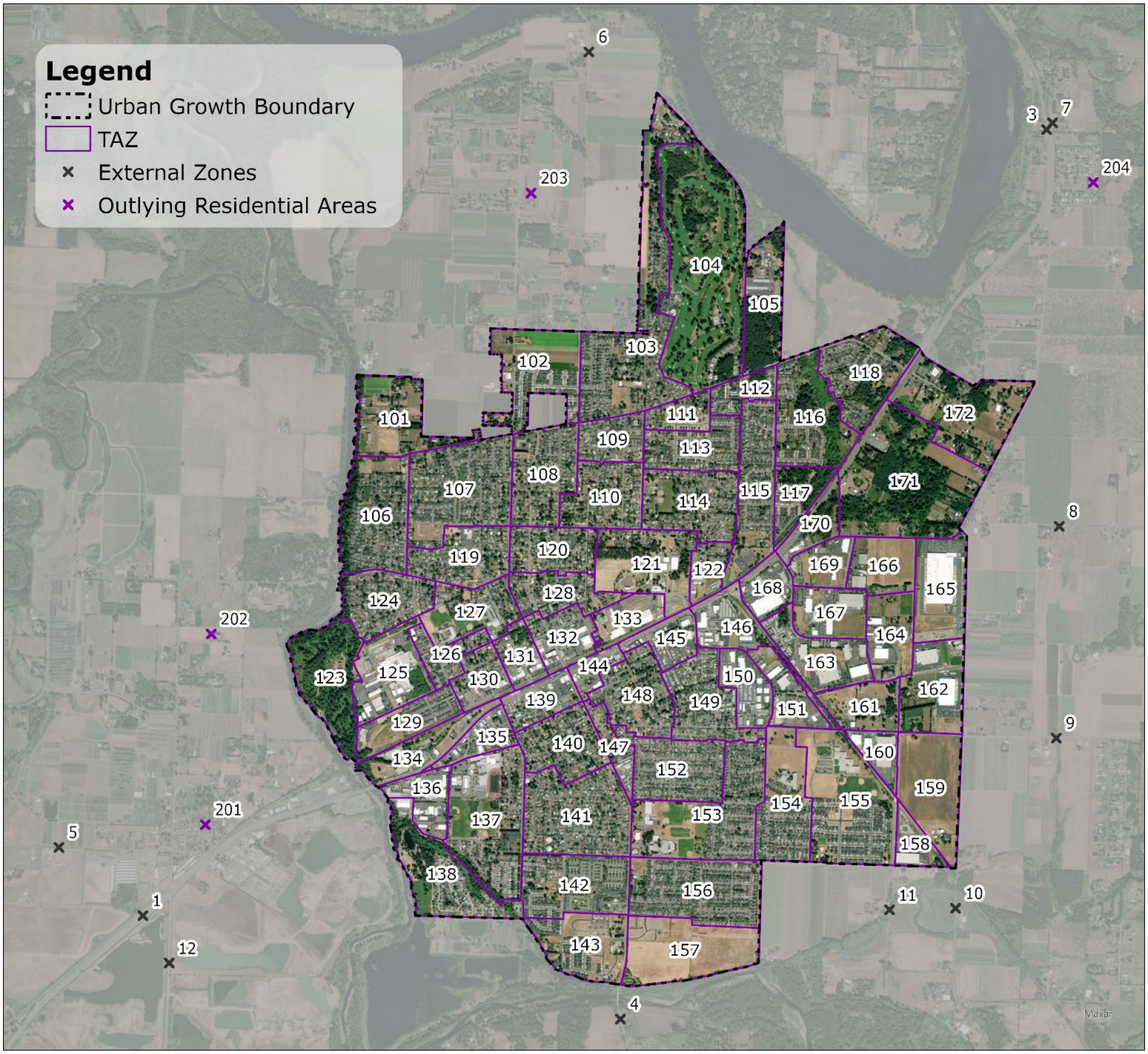
Project #23023-000

This memorandum documents updates to the future baseline conditions, incorporating land use changes in Area J, located in the northeast corner of the city. The methodology outlined in *Technical Memorandum #8: Future Traffic Forecasting* remains unchanged, and the calibrated small community Canby model from that process (Pre-Area J) serves as the starting point for this update. With the incorporation of the land use changes in Area J, the updated model (Post-Area J) will be established as the new baseline for future analyses.

Figure 1 provides an overview of the Transportation Analysis Zone (TAZ) structure in the Canby model, which includes 72 TAZs within the Canby Urban Growth Boundary (UGB), 12 external TAZs at the key gateways into and out of the city, and four additional TAZs to represent outlying residential areas. Area J is located within TAZ 171.

The following sections discuss the land use changes in Area J, and how the changes were incorporated into the model updates.

FIGURE 1. CANBY TRANSPORTATION ANALYSIS ZONES



AREA J LAND USE MODIFICATIONS

This section outlines the land use modifications in Area J and the impacts on the Canby model land use analysis. The changes involved adjustments to land use classifications, influencing future transportation conditions.

The following subsections detail the specific land use changes and how the changes were incorporated into the Canby model.

LAND USE CHANGES IN AREA J

The land use modifications in Area J resulted in shifts in residential and commercial land allocations, affecting future development potential in the area. Specifically, the changes of UGB land need include:

- Residential
  - An increase of 8.8 acres designated for Low-Density Residential (LDR) need.
  - A reduction of 3.8 acres in Medium-Density Residential (MDR) need and a reduction of 5.0 acres in High-Density Residential (HDR) need.
  - Despite these changes, the net residential land need remains unchanged.
- Employment
  - A reduction of 7.6 acres in Commercial (COM) land use need.

These changes to UGB land needs reflect an inverse relationship with land use within the UGB, in this case, in Area J (Zone 171). Specifically, Area J will require an increase in MDR, HDR, and COM land uses and a decrease in LDR. These land use adjustments are expected to influence future transportation demand and traffic patterns. The next section discusses how these changes were incorporated into the Canby model.

MODEL LAND USE UPDATES

The land use updates in Area J apply to TAZ 171 in the Canby model. Adjustments were made to reflect household distribution and employment allocations based on the Pre- and Post-Area J conditions.

Before the Area J updates, the model did not assume multifamily housing in TAZ 171. However, the Area J modifications indicate a decrease in multifamily housing within the zone. To account for this, household shifts were made between TAZ 148 and TAZ 171. TAZ 148, located south of OR 99E in the central part of the city, was originally assumed to have over 150 multifamily housing units of growth from 2023 to 2043 in Pre-Area J conditions in a closely built-up area. To better reflect development feasibility, the growth of multifamily housing units was relocated from TAZ 148 to TAZ 171. Correspondingly, single-family housing units from TAZ 171 were shifted to TAZ 148 to maintain the acreage balance after the removal of multifamily housing. As discussed above, the total residential land need remains unchanged, this redistribution between TAZ 148 and TAZ 171 effectively reflects the updated land use allocations.

To account for the reduction in commercial land needs with Area J adjustments, additional commercial employment was allocated to TAZ 171 to align with the land use updates. The number of added commercial jobs was estimated based on the acreage size and proportionally distributed between retail and service employments, using the pre-Area J employment composition in TAZ 171 as a reference.

Table 1 presents a comparison of model land use before and after the Area J adjustments. As shown in the table, the total number of households remains unchanged in the Post-Area J condition, ensuring consistency in residential land use. Additionally, total employment increases by approximately 2 percent in the Post-Area J conditions, reflecting the additional commercial job allocations. Figures 2 and 3 present the Post-Area J household and employment growth from 2023 to 2043 by TAZ, respectively.

TABLE 1. CANBY UGB LAND USE SUMMARY WITH AREA J MODIFICATIONS

LAND USE / GROWTH CATEGORY	EXISTING 2023 QUANTITIES	PRE-AREA J FUTURE 2043 QUANTITIES	POST-AREA J FUTURE 2043 QUANTITIES	PRE/POST-AREA J DIFFERENCE
POPULATION*	18,655	24,586 (+5,931, 32%)	24,586 (+5,931, 32%)	No Change
HOUSEHOLD*				
SINGLE FAMILY DETACHED UNITS	4,907	6,074 (+1,167, 24%)	6,074 (+1,167, 24%)	No Change
SINGLE FAMILY ATTACHED UNITS	1,132	1,727 (+595, 53%)	1,727 (+595, 53%)	No Change
MULTI-FAMILY UNITS	1,150	1,674 (+524, 46%)	1,674 (+524, 46%)	No Change
TOTAL UNITS	***7,189***	***9,475 (+2,286, 32%)***	***9,475 (+2,286, 32%)***	***No Change***
EMPLOYMENT**				
RETAIL JOBS	807	964 (+157, 19%)	1,007 (+200, 25%)	+43, 4%
SERVICE JOBS	2,301	3,004 (+703, 31%)	3,197 (+896, 39%)	+193, 6%
INDUSTRIAL AND OTHER JOBS	4,012	5,858 (+1,846, 46%)	5,858 (+1,846, 46%)	No Change
EDUCATION JOBS	546	571 (+25, 5%)	571 (+25, 5%)	No Change
TOTAL JOBS	***7,666***	***10,397 (+2,731, 36%)***	***10,633 (+2,967, 39%)***	***+236, 2%***

Source: * City of Canby Housing Needs Analysis; ** City of Canby Economic Opportunities Analysis

FIGURE 2. POST-AREA J CANBY HOUSEHOLD GROWTH FROM 2023 TO 2043 BY TAZ

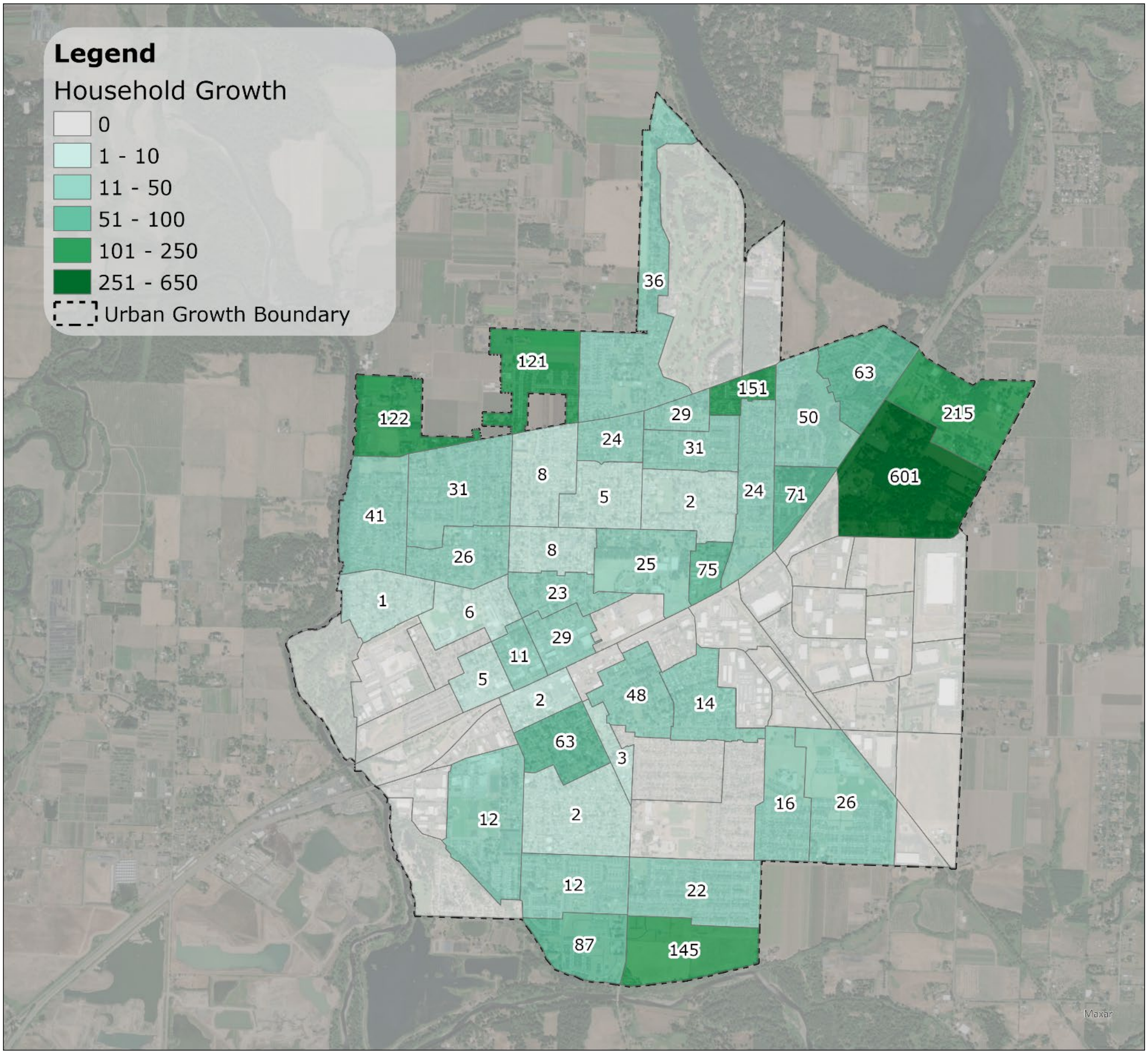
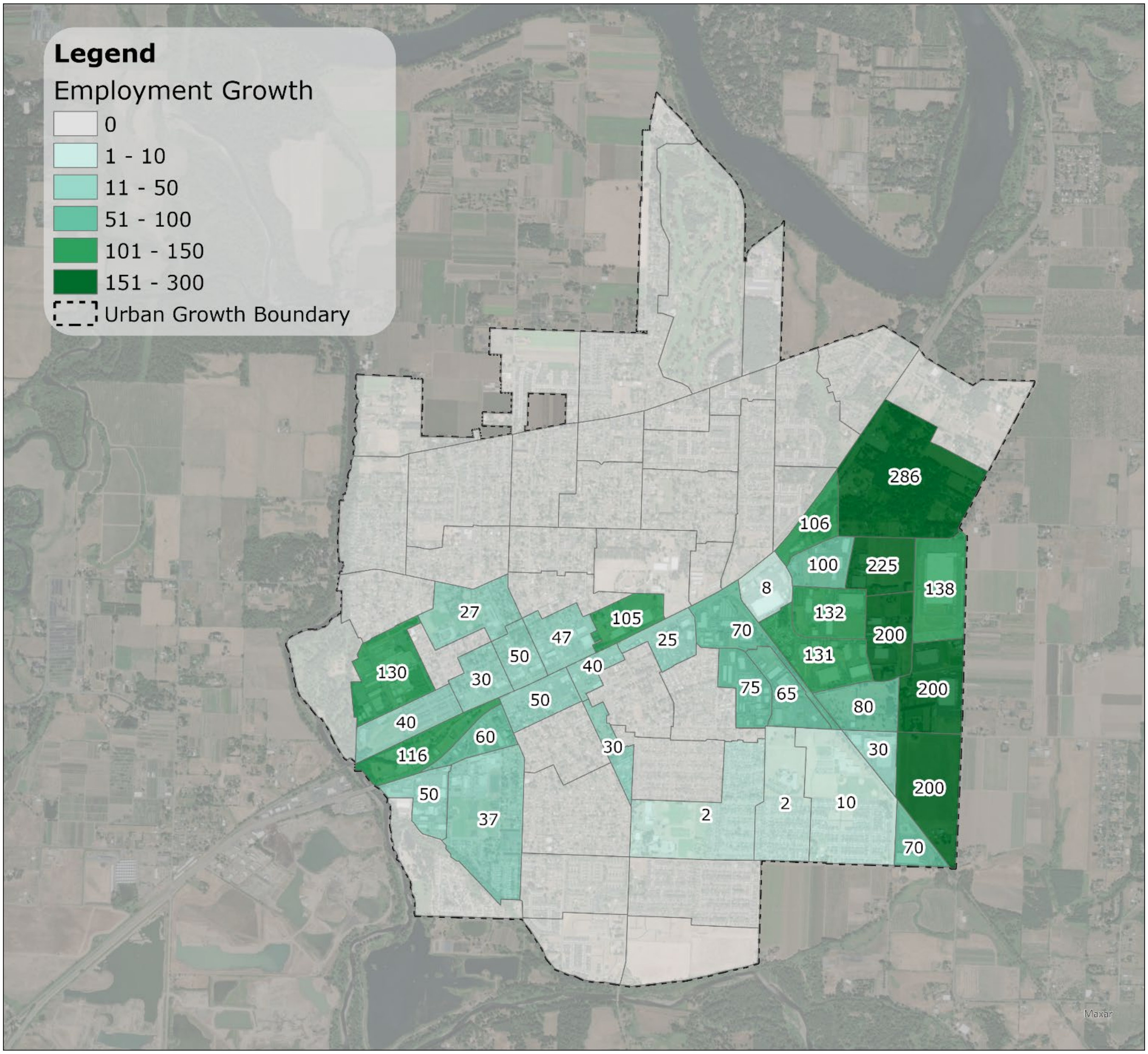


FIGURE 3. POST-AREA J CANBY EMPLOYMENT GROWTH FROM 2023 TO 2043 BY TAZ



FORECASTING TOOL VOLUMES AND POST-PROCESSING

Model (i.e., forecasting tool) output volume plots for the 2023 base year, 2043 future year, and the increment of traffic growth between 2023 and 2043 for the design hour are shown in Figure 4 to 6, respectively. As a result of the Area J land use updates, the 2043 traffic volume forecasts now reflect Post-Area J conditions. Figure 7 compares Pre-Area J and Post-Area J forecasts, presenting the impact of the land use modifications.

While the travel demand forecast tools were calibrated to local conditions and volumes, raw volumes from the tools are not used for capacity analysis. Rather, motor vehicle turn movement volume forecasts were developed using post-processing methods consistent with the ODOT APM V2. This approach follows methodologies outlined in the National Cooperative Highway Research Program (NCHRP) Report 765, *Analytical Travel Forecasting Approaches for Project-Level Planning and Design*.

The forecasting process remains unchanged, and the post-processing methodology continues to involve:

- Estimating trip growth at the intersection approach level (i.e., volume differences between base and future forecast tools).
- Scaling the growth by the number of forecast years (i.e., total forecast years divided by difference in forecast tool years).
- Adding these volumes to existing traffic counts.
- Applying engineering judgment is used as part of the post-processing methodology, with the routing decisions identified by the forecasting tool serving as a reference for making volume adjustments.

Table 2 has been updated to represent the Post-Area J 2043 traffic volume forecast, replacing the Pre-Area J forecast volumes documented in *Technical Memorandum #8*. This Post-Area J forecast will now serve as the new future base volume forecast, from which future conditions will be evaluated in subsequent memoranda.

FIGURE 4. RAW MODEL 2023 P.M. PEAK VOLUME

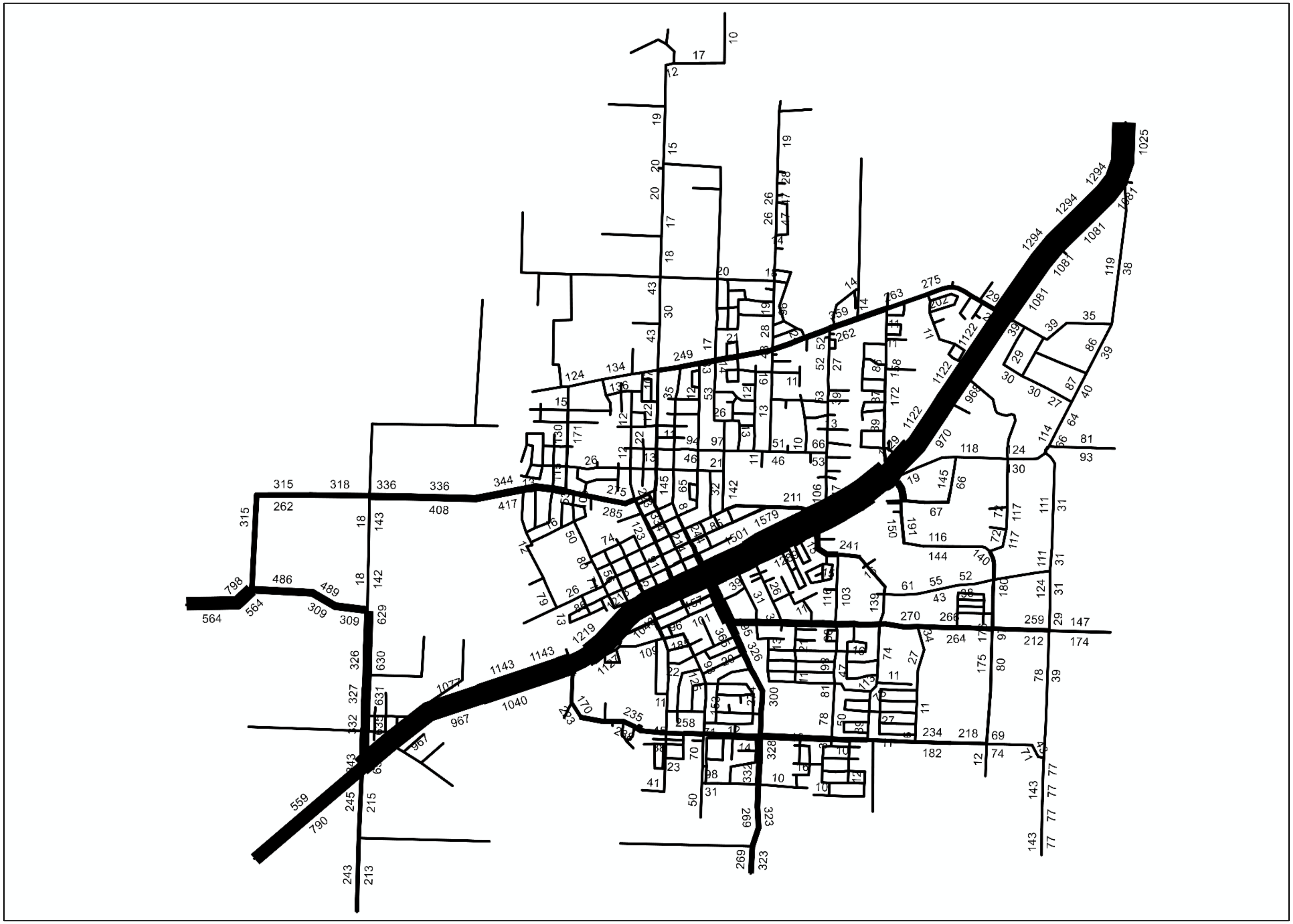


FIGURE 5. POST-AREA J RAW MODEL 2043 P.M. PEAK VOLUME

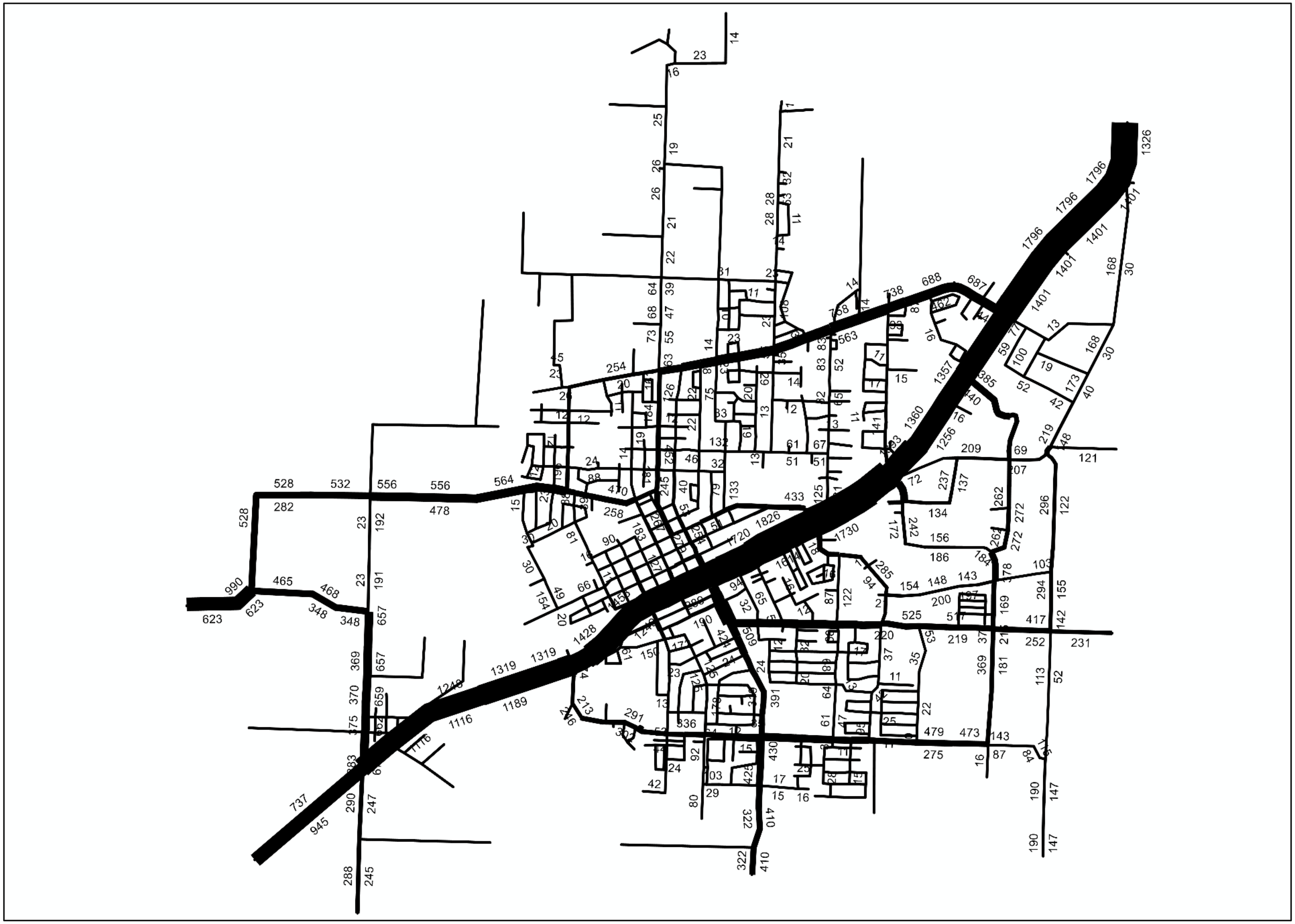


FIGURE 6. POST-AREA J RAW MODEL TRAFFIC GROWTH

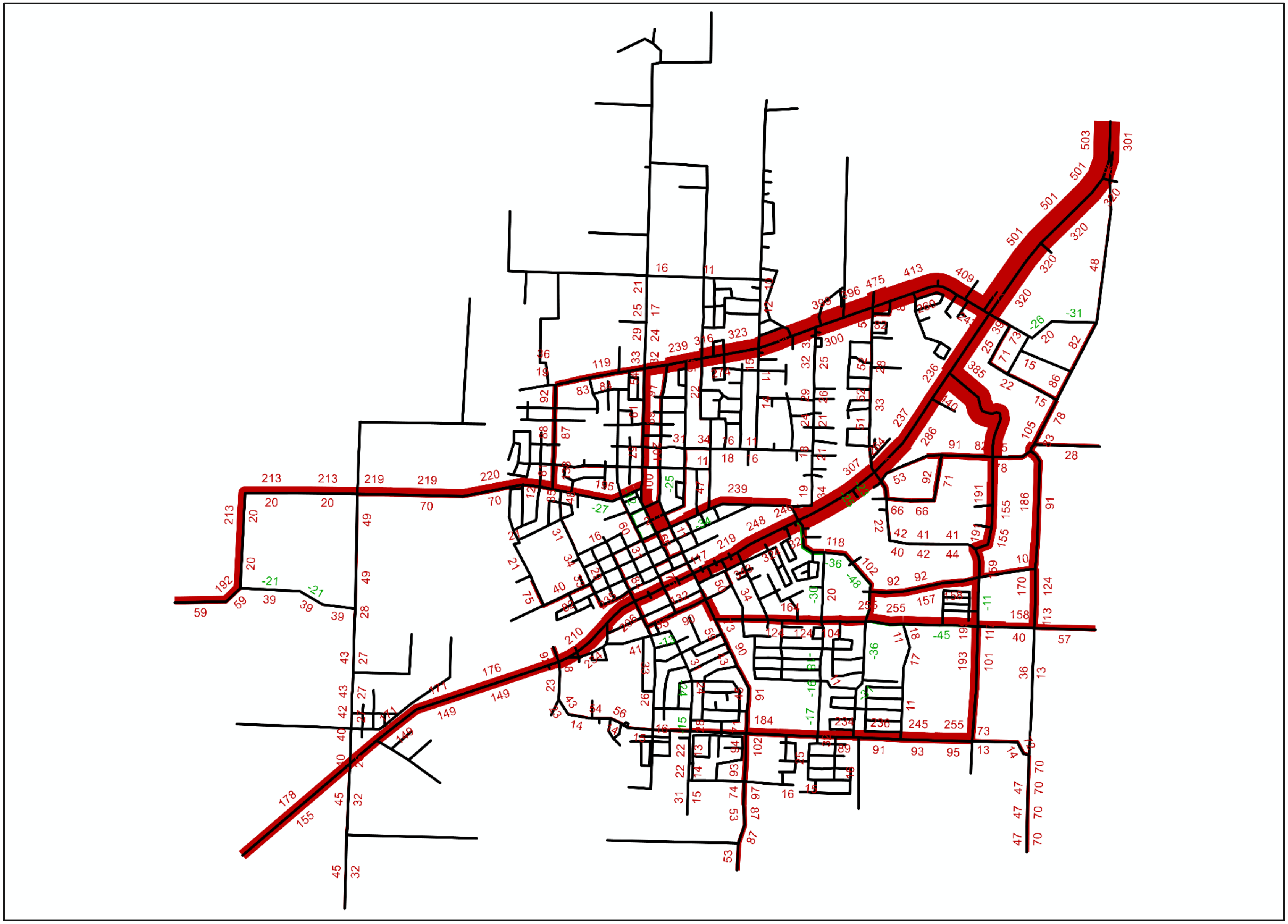


FIGURE 7. POST-AREA J DIFFERENCES COMPARED TO PRE-AREA J

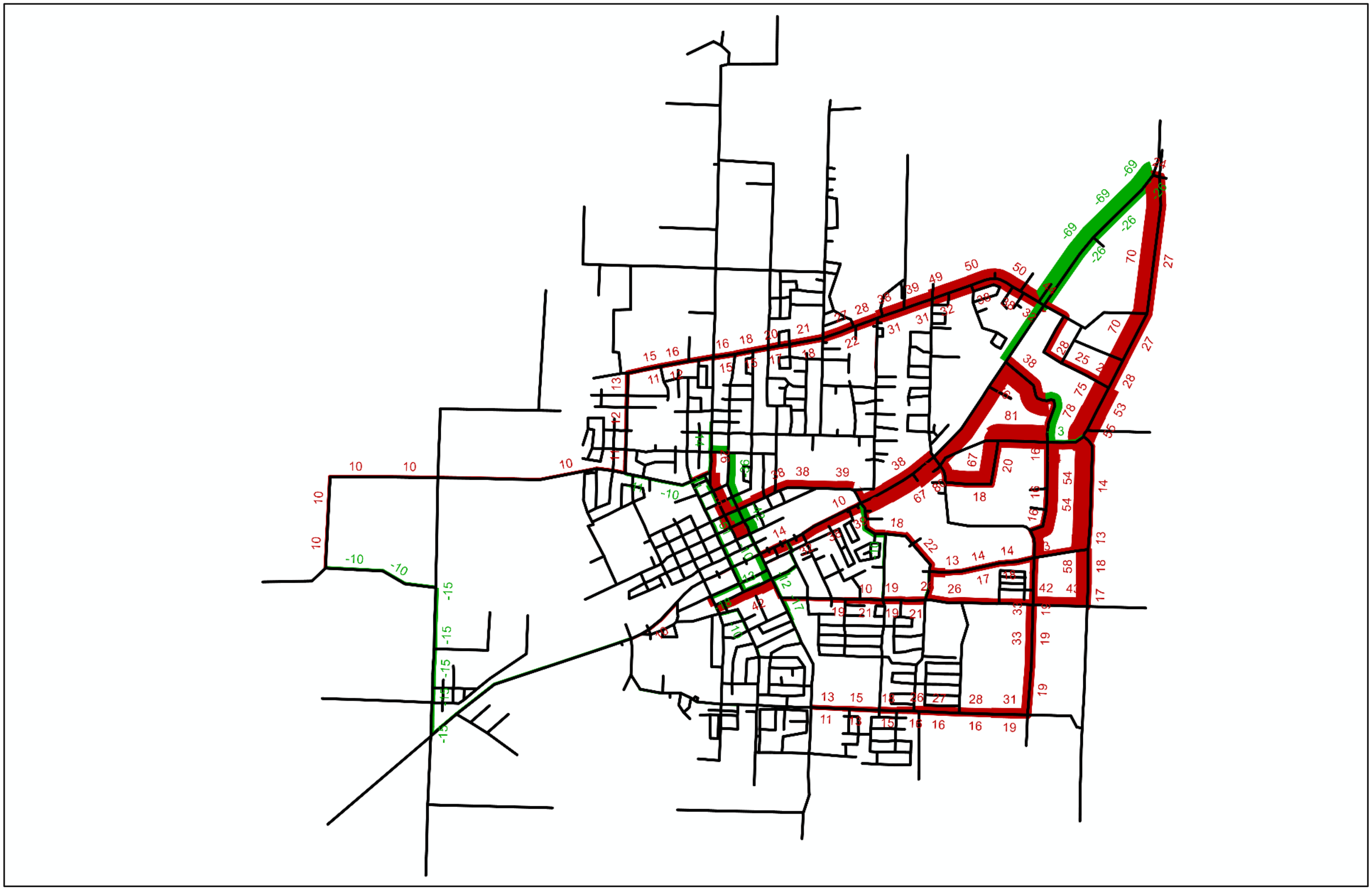


TABLE 2. POST-AREA J STUDY INTERSECTION POST PROCESSED TURN MOVEMENT VOLUMES – 2043 30 HV

ID	N/S	E/W	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
			NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Berg Pkwy	OR 99 E	230	40	110	130	60	40	35	1100	175	120	1080	145
2	Elm St	OR 99 E	60	105	135	145	90	155	130	1295	40	105	1225	120
3	Grant St	OR 99 E	45	25	60	100	40	90	75	1455	45	25	1315	130
4	Ivy St	OR 99 E	155	180	210	205	145	110	100	1255	260	185	1205	175
5	Pine St	OR 99 E	80	125	85	95	55	70	100	1460	65	95	1555	295
6	Sequoia Pkwy	OR 99 E	355	105	125	20	115	100	105	1185	260	195	1510	50
7	OR 99 E	Territorial Rd	50	1260	30	15	1675	340	255	60	60	25	50	15
8	Knight Bridge Rd	N Birch St	0	0	0	15	0	140	275	415	0	0	390	60
9	Knight Bridge Rd	N Cedar St	100	0	25	0	0	0	0	350	80	45	350	0
10	Knight Bridge Rd	N Holly St	215	145	0	0	105	135	140	0	30	0	0	0
11	N Cedar St	NW 3rd Ave	30	30	5	15	60	20	25	35	105	5	15	15
12	N Grant St	NW 1st Ave	25	160	45	15	185	10	5	20	20	25	25	10
13	N Ivy St	NW 1st Ave	15	370	70	10	335	15	20	15	65	60	10	20
14	NE 3rd Ave	NE 4th Ave	10	0	105	0	0	0	0	0	0	0	470	0
15	NE 4th Ave	N Pine St	0	390	130	25	135	0	0	0	0	85	0	25
16	N Holly St	NE Territorial Rd	25	65	210	50	75	15	15	60	5	120	160	40

ID	N/S	E/W	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
			NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
17	N Redwood St	NE Territorial Rd	70	0	20	5	0	5	5	505	145	35	550	5
18	S Ivy St	SE 2nd Ave	0	450	80	20	570	0	0	0	0	65	0	95
19	S Ivy St	S Township Rd	0	320	35	235	445	0	0	0	0	50	0	275
20	S Ivy St	SE 13th Ave	75	270	90	45	285	40	95	160	95	175	210	55
21	S Redwood St	SE 4th Ave	10	90	80	35	80	5	5	10	15	60	5	80
22	S Redwood St	S Township Rd	10	50	5	45	65	45	40	150	20	5	260	105
23	Sequoia Pkwy	Hazel Dell Wy	75	130	20	150	100	40	290	35	130	15	35	165
24	S Walnut St	SE 1st Ave	5	110	5	125	120	75	95	85	5	10	45	95
25	S Mulino Rd	SE 1st Ave	55	0	100	0	0	0	0	95	65	160	105	0
26	SE 4th Ave	S Walnut Rd	5	140	5	20	385	105	105	20	30	40	20	30
27	Sequoia Pkwy	S Township Rd	15	80	90	60	320	80	55	115	10	15	245	10
28	S Mulino Rd	S Township Rd	30	50	15	30	160	35	50	180	35	25	195	60
29	S Mulino Rd	SE 13th Ave	80	65	0	0	95	125	25	0	95	0	0	0
30	Sequoia Pkwy	SE 13th Ave	0	5	5	30	5	295	160	80	10	5	205	15
31	OR 99 E	Walnut St	0	1130	200	215	1545	0	0	0	0	210	0	210

APPENDIX G. FUTURE MULTIMODAL NEEDS

TECHNICAL MEMORANDUM #9

DATE: May 15, 2024

TO: Don Hardy | City of Canby

FROM: Reah Flisakowski, PE; Kevin Chewuk, PTP; Anders Hart; Eileen Chai | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update
Future Multimodal Needs

Project #: 23023-000

This memorandum summarizes how the multimodal transportation system in Canby is expected to operate in the future. The condition of the future transportation system depends on the growth in population and employment, future travel patterns (e.g., choice of modes, routes, and frequency of trips), and community investment decisions. Growth in population and the number of jobs is forecasted based on trends and knowledge of the city and region. Future travel patterns are more difficult to predict as the community's investment decisions and the economy can have significant effect on choice of modes and routes. The assessment is used to identify the needs of the transportation system and reflect where it can better accommodate the desired activities of the community. Needs were determined based on a comprehensive multimodal existing conditions analysis and projecting future conditions through the planning horizon (2043) based on assumed growth in households and employment, and the City transportation standards.

METHODOLOGY FOR ESTIMATING FUTURE TRAVEL

The 2043 transportation conditions in Canby were forecasted based on trips that new growth will generate, assuming no new investments in infrastructure beyond what is funded for construction already. It describes where the transportation system will perform satisfactorily and areas of the network likely to be congested or in need of investments to function adequately in the future. Subsequent memos for the TSP update will explore potential solutions for addressing future transportation system needs.

BASELINE STREET NETWORK IMPROVEMENTS

The baseline condition reflects the street network performance assuming only transportation projects with secured funding will be built. Other identified projects that are not fully funded will be evaluated as potential solutions in subsequent memos for the TSP update to validate their need in the future.

The following motor vehicle capacity projects have been completed or have funding identified in the Canby Transportation Plan study area through 2043:

- Walnut Street Extension, which will extend S Walnut Street from SE 1st Avenue to OR 99E, with a new signalized intersection at OR 99E.
- The 4th Avenue Extension, which will extend S 4th Avenue from S Mulino Road to Sequoia Parkway.
- The N Pine Street/4th Avenue project, which will realign this intersection. Figure 1 below shows the preliminary schematic of the realignment.

FUTURE ESTIMATES OF MOTOR VEHICLE TRIPS

Future land use changes and growth in population, housing, and employment within the Canby urban growth boundary (UGB) will have a significant impact on the existing transportation system and will create new travel demands. These growth projections and how they translate to new trips on the transportation network are key elements of the future conditions and performance analysis.

The Canby travel demand model is the primary tool used to determine future traffic volumes in Canby. The Canby model forecasts travel changes in response to future land use and transportation scenarios. This model translates estimated land uses into motor vehicle trips and assigns them to the roadway network. It is an informational tool to assist with decision making, providing objective and quantitative information exploring the potential impacts of alternative transportation system investments.

It should be noted that the analysis includes zone type changes in Area J, located in the northeast corner of the city within Transportation Analysis Zone (TAZ) 171. These zone type changes involved land use modifications within the impacted zones. The details of these changes are incorporated in a separate memo.

FORECASTED POPULATION AND EMPLOYMENT GROWTH

Understanding the influence of area land uses on the transportation system is a key factor in transportation system planning. The amount of land that is to be developed, the types of land uses, and their proximity to each other have a direct relationship to expected demands on the transportation system.

The Canby model includes forecasted land uses for the Canby UGB. The land uses reflect the Comprehensive Plan and growth assumptions identified for the year 2043. Complete land use data sets were developed for both the 2023 base year and 2043 future year with input from city staff. The housing and employment forecasts used for this TSP analysis relied on two key sources:

- City of Canby Housing Needs Analysis[1], which provided the population forecast data by housing type. This analysis was based on population forecasts from the Portland State University Population Research Center.

[1] City of Canby Housing Needs Analysis, November 30, 2023.

- City of Canby Economic Opportunities Analysis[2], which provided job growth by employment sector.

A summary of the existing land use estimates and future projections for the entire Canby UGB from which traffic growth estimates were made is listed in Table 1 and households and employment growth are also shown in Figure 1 and Figure 2, respectively.

The base 2023 land use inventory approximated the number of existing households by unit type (i.e., single-family detached, single-family attached and multi-family units) using data from the City of Canby Housing Needs Analysis, and the amount of existing employment by sector (i.e., retail, service, industrial and other, and educational employment) using data from the City of Canby Economic Opportunities Analysis. The existing land use corresponds to a population of 18,655 residents, and approximately 7,189 households and 7,666 jobs.

The future 2043 land use projection is an estimate of the amount of each land use (household and employment) could reasonably accommodate given market conditions and current build-out of vacant or underdeveloped lands assuming Comprehensive Plan zoning. The projected land uses correspond to a year 2043 population projection of approximately 24,586 residents, and approximately 9,475 households (32 percent growth from 2023), and 10,633 jobs (39 percent growth from 2023).

As growth occurs to the year 2043, the demands on the city's transportation system will be influenced by changes in population, housing, and employment. These changes in travel demands will require better ways to manage the system, more choices for getting around, and targeted improvements to make the system safer and more efficient.

TABLE 1. CANBY UGB LAND USE SUMMARY

LAND USE / GROWTH CATEGORY	EXISTING 2023 QUANTITIES	TOTAL GROWTH 2023 TO 2043	FUTURE 2043 QUANTITIES
POPULATION*	18,655	5,931 (+32%)	24,586
HOUSEHOLD*			
SINGLE FAMILY DETACHED UNITS	4,907	1,167 (+24%)	6,074
SINGLE FAMILY ATTACHED UNITS	1,132	595 (+53%)	1,727
MULTI-FAMILY UNITS	1,150	524 (+46%)	1,674
TOTAL UNITS	***7,189***	***2,286 (+32%)***	***9,475***
EMPLOYMENT**			
RETAIL JOBS	807	200 (+25%)	1007
SERVICE JOBS	2,301	896 (+39%)	3,197
INDUSTRIAL AND OTHER JOBS	4,012	1,846 (+46%)	5,858

[2] City of Canby Economic Opportunities Analysis, March 17, 2023 (Revised May 18, 2023), FCS Group.

LAND USE / GROWTH CATEGORY	EXISTING 2023 QUANTITIES	TOTAL GROWTH 2023 TO 2043	FUTURE 2043 QUANTITIES
EDUCATION JOBS	546	25 (+5%)	571
TOTAL JOBS	***7,666***	***2,967 (+39%)***	***10,633***

Source: * City of Canby Housing Needs Analysis; ** City of Canby Economic Opportunities Analysis

FIGURE 1. CANBY HOUSEHOLD GROWTH FROM 2023 TO 2043

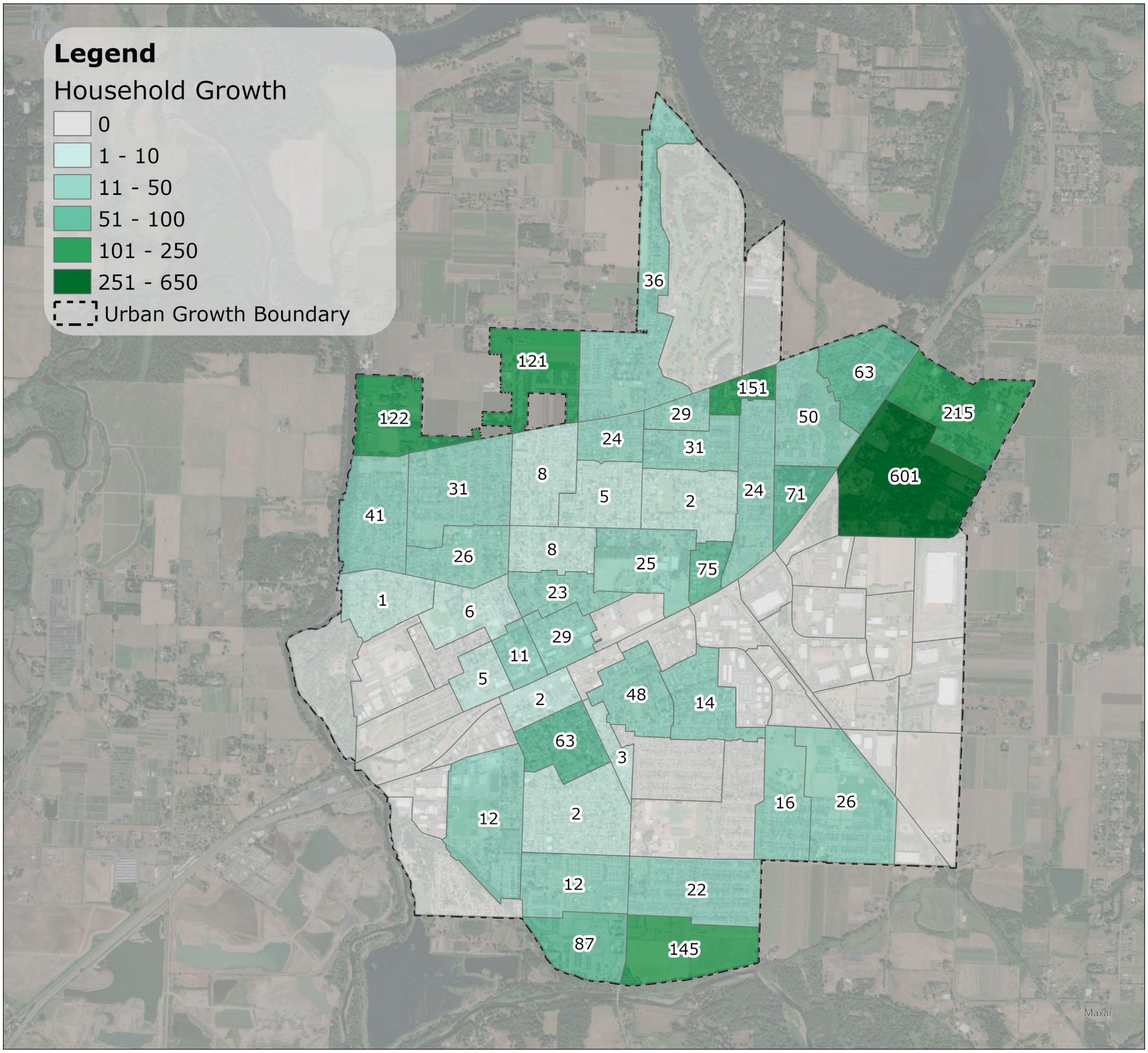
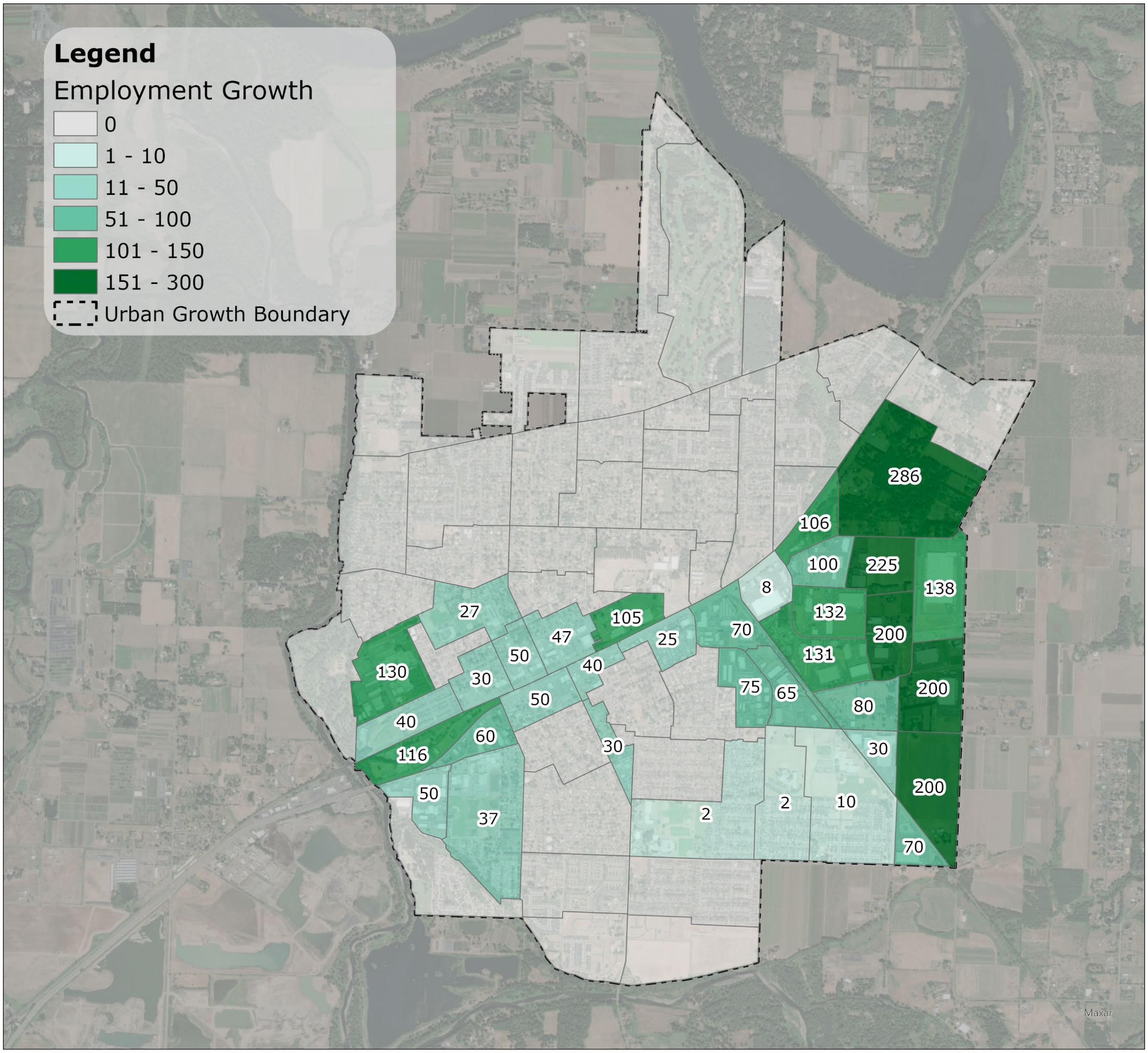


FIGURE 2. CANBY EMPLOYMENT GROWTH FROM 2023 TO 2043



TRAVEL DEMANDS AND CHARACTERISTICS

The number of people who choose to walk, bike, ride transit, or drive along with the distances they travel is important for assessing how well existing transportation facilities serve the needs of users. Available data on travel demand, travel mode choice, and trip length are used to better understand travel behavior in the community and inform the needs analysis for the transportation system. The data presented in this section derives from the US Census Bureau on commuting trips and the travel demand model used to forecast traffic volumes in Canby.

PM PEAK TRIPS

The increase in the number of residents and jobs in the Canby planning area increases the overall number of trips generated. Table 2 summarizes the total trips (i.e., drive alone, shared ride, transit, walk, and bike trips) during the p.m. peak hour of an average weekday in the Canby planning area for the years 2023 and 2043 based on US Census Data and the Canby travel demand model[3]. The transportation network in the planning area accommodates 12,213 trips during the p.m. peak hour of an average weekday as of 2023, and that number is estimated to increase by over 3,500 through 2043, to 16,199 trips if the land develops according to the land use assumptions during the p.m. peak hour of an average weekday. Of these trips, 1,889 were bike, walk, or transit trips in 2023, and that amount is expected to increase by over 600 through 2043, to 2,505 p.m. peak hour trips. Drive alone trips (i.e., single occupant vehicle) are expected to increase by over 3,000 through 2043 during the p.m. peak hour of an average weekday.

TABLE 2: AVERAGE WEEKDAY PM PEAK TRIPS IN CANBY PLANNING AREA

AVERAGE WEEKDAY TRIPS BY MODE (PM PEAK)	2023 TRIPS*	2043 TRIPS*	TRIP GROWTH (2023-2043)
DRIVE ALONE TRIPS (SOV)	9,349	12,401	3,052
SHARED RIDE TRIPS	975	1,293	318
TRANSIT TRIPS	378	501	123
WALK TRIPS	1,259	1,670	411
BIKE TRIPS	252	334	82
TOTAL TRIPS	**12,213**	16,199	3,986
TOTAL NON-SOV TRIPS	**2,864**	3,798	935
TOTAL BIKE, WALK, TRANSIT TRIPS	**1,889**	2,505	616

Source: 2022 ACS data, Daily Household Travel Survey (ODOT, 2019) and the Canby travel demand model.

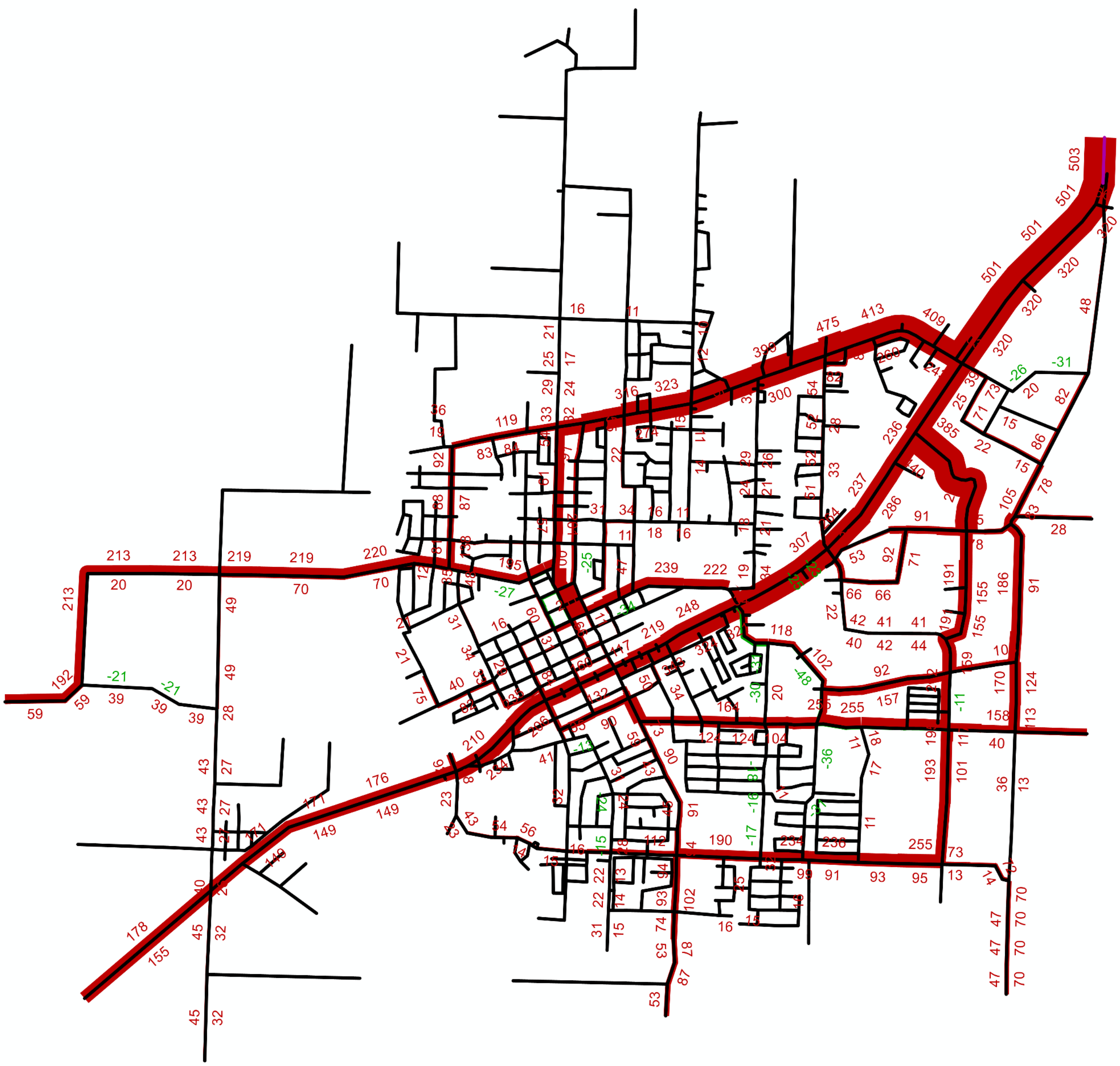
* This analysis assumes the mode split remains the same in the years 2023 and 2043.

[3] Mode shares are based on the travel mode shares for the state of Oregon in the Report "Personal Travel in Oregon, A Snapshot of Daily Household Tavel Patterns", ODOT, 2019. The mode shares were applied to the estimates of p.m. peak motor vehicle trips from Canby's travel demand model for the years 2023 and 2043.

Figure 3 below shows the increment of raw model traffic growth between 2023 and 2043 for the design hour. Overall, OR 99E, N Territorial Road, the new Walnut Street Extension (described in a subsequent section), and S 13th Avenue are expected to see some of the highest increases in traffic volumes through 2043.

While the travel demand forecast tools were calibrated to local conditions and volumes, raw volumes from the tools are not used for capacity analysis. Rather, motor vehicle turn movement volume forecasts were developed using post-processing methods consistent with the ODOT APM V2. The post-processing methodology involves estimating trip growth at the intersection approach level (i.e., volume differences between base and future forecast tools), scaling the growth by the number of forecast years (i.e., total forecast years divided by difference in forecast tool years), and adding these volumes to existing traffic counts.

FIGURE 3: RAW MODEL TRAFFIC GROWTH IN THE P.M. PEAK HOUR (2023-2043)



WHERE TRANSPORTATION IMPROVEMENTS MAY BE NEEDED

Review of the expected growth throughout the city and existing gaps and deficiencies of the transportation system identified the following locations as possible candidates for improvements.

STREET NETWORK PERFORMANCE ASSESSMENT

An increase in motor vehicle travel leads to an increase in congestion. Travel activity, as reflected by p.m. peak hour motor vehicle trips beginning or ending in Candy, is expected to increase significantly through 2043. Through trips (i.e., trips that neither begin nor end in Canby) are also expected to increase through 2043 and are generally representative of increased growth in statewide travel and in neighboring cities.

Study intersection operations were analyzed in the same manner as was done for existing conditions[4]. Forecasted intersection capacity and level of service were compared to applicable agency mobility standards to identify where significant congestion is likely to occur. Table 3 shows study intersection operations based on 2043 forecasted volumes, and the Appendix includes detailed Highway Capacity Manual reports for each intersection. Bold red text indicates intersections with v/c ratios or LOS ratings over their respective mobility targets. Several study intersections are expected to exceed their mobility during the 2043 weekday p.m. peak hour based on the operations presented in Table 3 and shown in Figure 4. These include the OR 99E/Ivy Street (v/c: 1.11),OR 99E/Pine Street (v/c: 1.16), OR 99E/Sequoia Parkway (v/c: 0.92), and OR 99E/Territorial Road (v/c: 0.88) intersections. Two stop-controlled intersections are expected to exceed their LOS mobility targets on the minor approach. There are NE Territorial Road/N Redwood Street (LOS F) and S Township Road/Ivy Street (LOS E), both of which are anticipated to experience over LOS E on their minor approaches. The intersections at Knights Bridge Road/N Holly Street, Knights Bridge Road/N Cedar Street, and S Walnut Street/SE 1st Avenue are expected to operate right at the LOS D mobility target on the minor approach as well.

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[4] Technical Memorandum #7: Existing Multimodal Conditions, October 16, 2023

TABLE 3. PM PEAK HOUR 2043 TRAFFIC OPERATIONS AT STUDY INTERSECTIONS

INTERSECTION	CONTROL	MOBILITY TARGET	V/C	LOS	DELAY (SEC)
OR 99E & BERG PKWY	Signal	0.90	0.71	C	32
OR 99E & ELM ST	Signal	0.90	0.88	C	31
OR 99E & GRANT ST	Signal	1.0 (STA)	0.71	B	11
OR 99E & IVY ST	Signal	1.0 (STA)	**1.11**	E	72
OR 99E & PINE ST	Signal	0.90	**1.16**	E	80
OR 99E & SEQUOIA PKWY	Signal	0.90	**0.92**	D	49
OR 99E & TERRITORIAL RD	Signal	0.85	**0.88**	C	27
KNIGHTS BRIDGE RD & N BIRCH ST	Two-way Stop	LOS D	0.56/0.47	A/C	10/23
KNIGHTS BRIDGE RD & N CEDAR ST	Two-way Stop	LOS D	0.28/0.44	A/D	9/25
KNIGHTS BRIDGE RD & N HOLLY ST	Two-way Stop	LOS D	0.28/0.62	A/D	8/35
NW 3RD AVE & N CEDAR ST	Two-way Stop	LOS D	0.04/0.22	A/B	7/11
NW 1ST AVE & N GRANT ST[1]	Two-way Stop	LOS D	0.14/0.14	A/B	8/14
NW 1ST AVE & N IVY ST[1]	Two-way Stop	LOS D	0.11/0.28	A/C	9/20
NE 3RD AVE & NE 4TH AVE	Two-way Stop	LOS D	0.00/0.02	A/B	0/12
NE 4TH AVE & N PINE ST	Two-way Stop	LOS D	0.13/0.33	A/C	9/19
NE TERRITORIAL RD & N HOLLY ST	All-way Stop	LOS D	0.52	B	14
NE TERRITORIAL RD & N REDWOOD ST	Two-way Stop	LOS D	0.39/0.61	**A/F**	9/59
SE 2ND AVE & S IVY ST	Two-way Stop	LOS D	0.36/0.40	A/C	9/19
S TOWNSHIP RD & S IVY ST	Two-way Stop	LOS D	0.28/0.42	**A/E**	9/48
SE 13TH AVE & S IVY ST	Signal	LOS D	0.68	B	15
SE 4TH AVE & S REDWOOD ST	Two-way Stop	LOS D	0.08/0.23	A/B	8/12
S TOWNSHIP RD & S REDWOOD ST	All-way Stop	LOS D	0.53	B	13
SEQUOIA PKWY & HAZEL DELL WAY	Signal	LOS D	0.55	C	34
SE 1ST AVE & S WALNUT ST	Two-way Stop	LOS D	0.13/0.77	A/D	8/34

INTERSECTION	CONTROL	MOBILITY TARGET	V/C	LOS	DELAY (SEC)
SE 1ST AVE & S MULINO RD	Two-way Stop	LOS D	0.20/0.28	A/B	8/13
SE 4TH AVE & SEQUOIA PKWY	All-way Stop	LOS D	0.29	B	13
S TOWNSHIP RD & SEQUOIA PKWY	All-way Stop	LOS D	0.79	C	17
S TOWNSHIP RD & S MULINO ST	All-way Stop	LOS D	0.46	B	13
SE 13TH AVE & S MULINO RD	All-way Stop	LOS D	0.22	A	9
SE 13TH AVE & SEQUOIA PKWY	All-way Stop	LOS D	0.44	B	12
OR 99E & WALNUT ST*	Signal	LOS D	0.73	B	19

*New Intersection

[1] This is a three-way stop controlled but is assumed to be a two-way stop to provide HCM analysis results. It should be noted this assumption results in higher side street delay.

STREET NETWORK CONGESTION

This assessment identified locations on the roadway network that operate with some level of congestion based on the forecasted 2043 conditions. These are locations where motorists may experience delays during the p.m. peak hour travel. This baseline provides a metric for assessing the impacts of new developments on the transportation system.

Figures 4 displays the result of the street network and study intersection congestion analysis for the p.m. peak hour in 2043. The link congestion data is from the travel demand model used to forecast future volumes and represents raw model volumes (not post-processed volumes). As shown, OR 99E is expected to experience medium to heavy congestion through Canby in the p.m. peak hour in 2043, with link-level v/c ratios over 0.75. Other street segments that experience congestion are Ivy Street between OR 99E and Township Road, Sequoia Parkway between SE 1st Avenue and SE Hazeldell Way, and NE Territorial Road between N Pine Street and OR 99E.

Table 4 summarizes the number and percentage of lane-miles in Canby experiencing congestion in 2023 and 2043. For this analysis, the following two thresholds were considered:

- **Severe congestion,** defined as streets and intersections operating with a v/c ratio over 0.99 during the p.m. peak hour.
- **Congestion,** defined as streets operating with a v/c ratio between 0.90 and 0.99 during the p.m. peak hour.

Under existing conditions, about 0.3 percent of Canby's street network experiences congestion during the p.m. peak hour. In 2043, about 4.2 percent of the network is expected to experience moderate or severe congestion, largely along OR 99E, as discussed above.

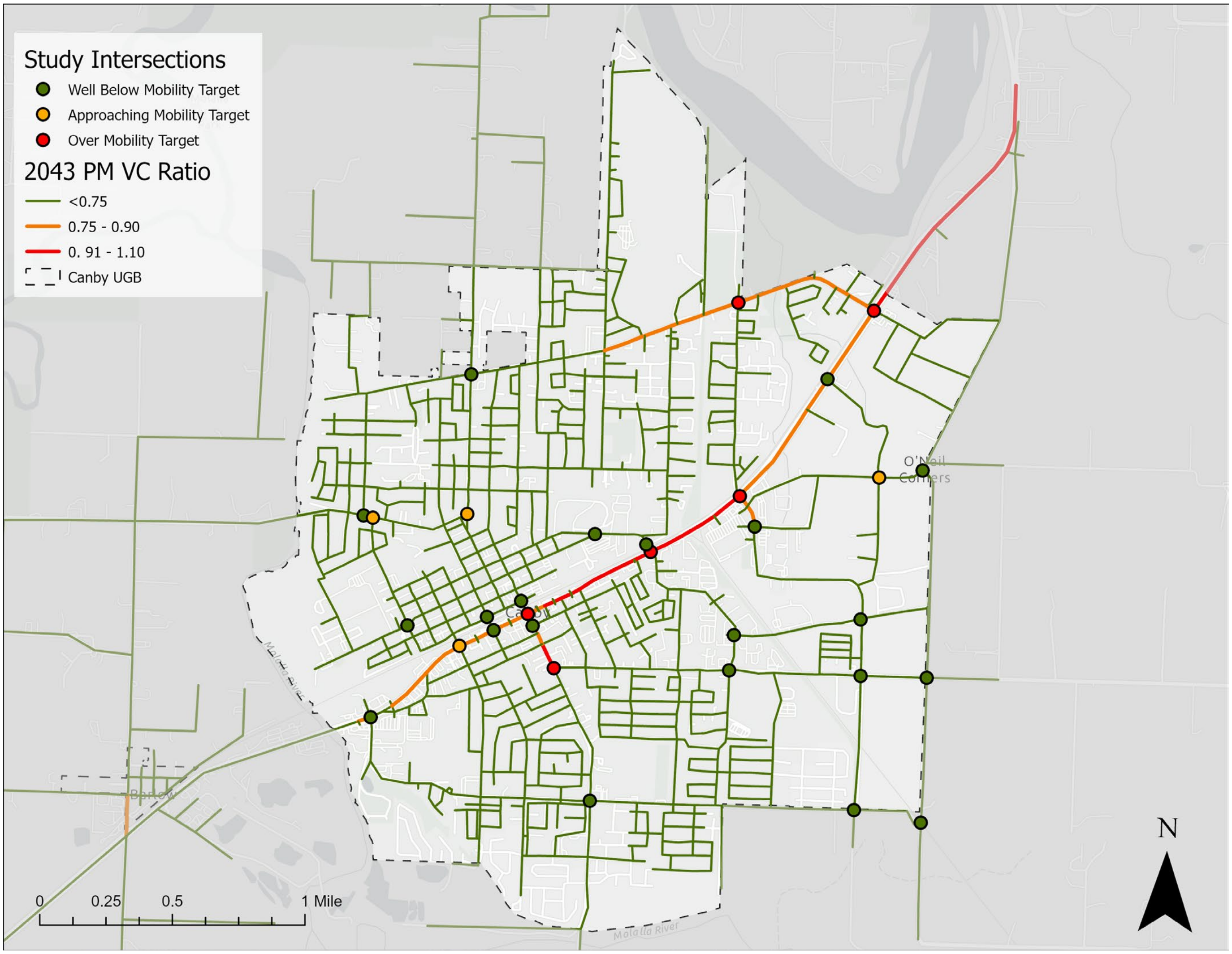
TABLE 4: VEHICLE CONGESTION IN CANBY PLANNING AREA

PM PEAK CONGESTED VEHICLE LANE MILES	2023 BASE YEAR		2043 HORIZON YEAR	
	TOTAL MILES	SHARE OF TOTAL FACILITY MILES	TOTAL MILES	SHARE OF TOTAL FACILITY MILES
TOTAL LANE MILES*	155.04	100%	199.56	100%
TOTAL CONGESTED LANE MILES	0.54	0.3%	8.37	4.2%
SEVERELY CONGESTED MILES (>0.99)	0.00	0%	7.79	3.9%
CONGESTED MILES (0.90 <= V/C <= 0.99)	0.54	0.3%	0.58	0.3%

Source: Canby Travel Demand Model (base year: 2023, future year: 2043). The mileage calculation is based on the length of the modeled network link associated with the point of congestion. It does not include the length of the queuing that may occur as a result of the congested link.

Notes: *Total lanes miles include the length of all street segments, multiplied by the number of lanes.

FIGURE 4: 2043 LINK AND STUDY INTERSECTION CONGESTION IN THE P.M. PEAK HOUR



FUTURE WALKING, BIKING, AND TRANSIT NETWORK ASSESSMENT

Methodology for determining future needs for walking, biking, and transit in Canby begins with an assessment of who is walking, biking, and taking transit now and where they are traveling. Technical Memorandum #7 (Existing Multimodal Conditions) answers these questions for pedestrians, bicyclists and transit riders and details existing conditions of the infrastructure.

The existing facilities were then compared to major growth areas of the city, and in proximity to key destinations, such as schools, parks, transit stops, shopping and employment. A review of the city shows that the walking and biking infrastructure is inadequate in some anticipated major growth areas, which mostly consist of rural unimproved streets today, and near some key destinations, which have the potential to attract significant walking and biking trips. The inadequate walking and biking infrastructure further hinders transit riders, as these users typically utilize these facilities at the beginning and end of their trip.

METHODOLOGY TO ADDRESS DEFICIENCIES

A list of potential pedestrian and bicycle network improvement projects will be developed in Technical Memorandum #9 based on streets with pedestrian deficiencies. A street is considered deficient for walking if it meets one or more of the following conditions:

- Arterial or collector street without pedestrian facilities, and/or without bicycle facilities or adjacent corridor with bicycle facilities.
- "Poor" qualitative pedestrian and/or bicycle assessment rating.
- Qualitative pedestrian and/or bicycle assessment rating less than "good" in close proximity to parks, schools, transit stops, or other important destinations.

KEY NETWORK NEEDS

Findings s from the evaluation of the existing and future no-build transportation system are summarized below. These recommendations provide guidance to help establish areas of focus for future investments to build upon the positive attributes and address the shortcomings of the baseline transportation system.

PEDESTRIAN NETWORK NEEDS

- Develop a citywide low-stress walking network that maximizes safety and access to amenities.
- Increase low-stress pedestrian facility miles, while decreasing extreme or high-stress miles through new or enhanced existing facilities.
- Install ADA compliant pedestrian curb ramps at intersections.
- Evaluate potential protected crossing opportunities along major streets, including OR 99E and collectors.
- Review locations of pedestrian collisions for potential improvements while also focusing on high-risk locations that have not yet experienced crashes.

BICYCLE NETWORK NEEDS

- Develop a citywide low-stress bicycle network that provides accessibility to destinations and enhances safety for all users.
- Increase low-stress bicycle facility miles, while decreasing Extreme or High stress miles through new or enhanced existing facilities.
- Evaluate potential protected crossing opportunities along OR 99E and collectors.
- Review locations of bicycle collisions and evaluate other high-risk locations for safety improvements.

TRANSIT NETWORK NEEDS

- Increase the completeness of pedestrian and bicycle facilities near transit stops.
- Evaluate potential enhanced crossing opportunities on OR 99E near existing transit stops.
- Consider potential alignments for transit expansion and ensure network designs that can adequately serve it.
- Focus on opportunities to improve transit stop amenities (e.g., shelters, benches).

VEHICLE NETWORK NEEDS

- Decrease the amount of congested lane miles through strategic vehicle network improvements, and investments in non-driving modes (e.g., expanded transit service and active transportation investments).
- Explore projects at intersections along arterial streets that are expected to be severely congested.
- Explore improvements along OR 99E to address identified high-crash locations and other high-risk streets and intersections.
- Improve connectivity of streets in the City through implementation of recommended transportation facility and access spacing standards.
- Assess opportunities to support electric vehicle adoption and use (i.e., public and private charging infrastructure).

ADDITIONAL SAFETY NEEDS

- The OR 99E/Ivy Street and NW 3rd Avenue/N Cedar Street intersections experienced higher-than-expected crash rates between 2017 and 2021. On the segment level, the section of OR 99E between Elm Street and Pine Street experienced a higher-than-expected crash rate during that period. These hotspots would benefit from safety improvements. As traffic volumes increase, rear-end and angle crashes may be expected to increase in frequency.
- There were nine pedestrian-involved crashes and eight bicycle-involved crashes between 2017 and 2021, and these figures are likely to increase as the City's population increases. Building out Canby's low-stress walking and biking networks will enhance safety and help prevent future crashes involving vulnerable road users, including people walking and biking.
- Assess railroad crossings for multimodal safety enhancements.
- Addressing the impacts of evolving vehicle technologies (i.e., autonomous and connected vehicles (CAVs), city fleet safety upgrades) and proactively identifying high-risk characteristics of the street network, including at locations that have not yet experienced crashes.

APPENDIX

CONTENTS

SECTION 1: EXISTING CONDITIONS SYNCHRO REPORTS

P.M. PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	35	24	183	28	94	22	869	166	65	908	90
Future Volume (veh/h)	71	35	24	183	28	94	22	869	166	65	908	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1709	1750	1695	1750	1695	1695	1682	1736	1709	1709	1750
Adj Flow Rate, veh/h	77	38	13	199	30	51	24	945	0	71	987	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	3	0	4	0	4	4	5	1	3	3	0
Cap, veh/h	257	239	82	282	113	192	250	2099		89	1763	48
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.15	0.66	0.00	0.05	0.55	0.54
Sat Flow, veh/h	1326	1217	416	1330	576	980	1615	3195	1471	1628	3228	88
Grp Volume(v), veh/h	77	0	51	199	0	81	24	945	0	71	496	518
Grp Sat Flow(s),veh/h/ln	1326	0	1633	1330	0	1556	1615	1598	1471	1628	1624	1693
Q Serve(g_s), s	6.8	0.0	3.4	19.0	0.0	5.7	1.7	18.7	0.0	5.6	26.0	26.0
Cycle Q Clear(g_c), s	12.5	0.0	3.4	22.3	0.0	5.7	1.7	18.7	0.0	5.6	26.0	26.0
Prop In Lane	1.00		0.25	1.00		0.63	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	257	0	320	282	0	305	250	2099		89	887	925
V/C Ratio(X)	0.30	0.00	0.16	0.71	0.00	0.27	0.10	0.45		0.80	0.56	0.56
Avail Cap(c_a), veh/h	364	0	452	389	0	431	250	2099		200	887	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.6	0.0	43.4	52.6	0.0	44.3	47.1	10.9	0.0	60.7	19.3	19.3
Incr Delay (d2), s/veh	0.5	0.0	0.2	2.7	0.0	0.3	0.1	0.7	0.0	9.6	2.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	1.4	6.6	0.0	2.3	0.7	6.1	0.0	2.5	10.1	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	43.5	55.3	0.0	44.7	47.2	11.6	0.0	70.3	21.8	21.7
LnGrp LOS	D	A	D	E	A	D	D	B		E	C	C
Approach Vol, veh/h		128			280			969			1085	
Approach Delay, s/veh		47.5			52.2			12.4			25.0	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.5	75.0		29.5	11.1	89.4		29.5
Change Period (Y+Rc), s	5.4	* 4.5		4.0	4.0	* 5.4		4.0
Max Green Setting (Gmax), s	11.0	* 71		36.0	16.0	* 65		36.0
Max Q Clear Time (g_c+I1), s	3.7	28.0		24.3	7.6	20.7		14.5
Green Ext Time (p_c), s	0.0	25.5		0.9	0.1	16.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	65	136	38	64	90	100	948	29	77	1062	79
Future Volume (veh/h)	89	65	136	38	64	90	100	948	29	77	1062	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1736	1750	1723	1709	1750	1695	1750	1750	1695	1736
Adj Flow Rate, veh/h	97	71	80	41	70	51	109	1030	31	84	1154	83
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	1	0	2	3	0	4	0	0	4	1
Cap, veh/h	118	103	116	51	90	65	348	1621	49	250	1505	108
Arrive On Green	0.07	0.14	0.14	0.03	0.10	0.10	0.05	0.51	0.50	0.06	0.99	0.98
Sat Flow, veh/h	1654	743	838	1667	918	669	1667	3193	96	1667	3047	219
Grp Volume(v), veh/h	97	0	151	41	0	121	109	520	541	84	609	628
Grp Sat Flow(s),veh/h/ln	1654	0	1581	1667	0	1586	1667	1611	1678	1667	1611	1656
Q Serve(g_s), s	7.5	0.0	11.8	3.2	0.0	9.7	4.2	30.5	30.5	0.0	2.5	2.7
Cycle Q Clear(g_c), s	7.5	0.0	11.8	3.2	0.0	9.7	4.2	30.5	30.5	0.0	2.5	2.7
Prop In Lane	1.00		0.53	1.00		0.42	1.00		0.06	1.00		0.13
Lane Grp Cap(c), veh/h	118	0	219	51	0	155	348	818	852	250	795	818
V/C Ratio(X)	0.82	0.00	0.69	0.80	0.00	0.78	0.31	0.64	0.64	0.34	0.77	0.77
Avail Cap(c_a), veh/h	178	0	341	128	0	293	424	818	852	329	795	818
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	59.6	0.0	53.4	62.6	0.0	57.3	14.9	23.3	23.3	36.5	0.4	0.5
Incr Delay (d2), s/veh	10.3	0.0	1.5	10.0	0.0	3.2	0.2	3.8	3.6	0.2	5.8	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	4.8	1.5	0.0	4.1	1.6	12.1	12.6	2.1	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.9	0.0	54.8	72.6	0.0	60.4	15.1	27.0	26.9	36.8	6.3	6.2
LnGrp LOS	E	A	D	E	A	E	B	C	C	D	A	A
Approach Vol, veh/h		248			162			1170			1321	
Approach Delay, s/veh		60.7			63.5			25.8			8.2	
Approach LOS		E			E			C			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	68.2	13.3	16.7	8.3	70.0	8.0	22.0
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.5	* 4.5	4.0	4.0
Max Green Setting (Gmax), s	12.0	63.5	14.0	24.0	10.0	* 66	10.0	28.0
Max Q Clear Time (g_c+I1), s	6.2	4.7	9.5	11.7	2.0	32.5	5.2	13.8
Green Ext Time (p_c), s	0.0	6.7	0.0	0.2	0.0	5.1	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	48	73	25	13	19	52	1041	34	21	1120	44
Future Volume (veh/h)	92	48	73	25	13	19	52	1041	34	21	1120	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1750	1750	1750	1750	1750	1750	1695	1627	1614	1695	1723
Adj Flow Rate, veh/h	98	51	39	27	14	9	55	1107	35	22	1191	46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	0	0	4	9	10	4	2
Cap, veh/h	118	84	64	87	70	45	660	1618	51	633	1604	62
Arrive On Green	0.07	0.09	0.09	0.05	0.07	0.07	0.45	1.00	1.00	0.45	1.00	1.00
Sat Flow, veh/h	1628	913	698	1667	977	628	1667	3187	101	1537	3159	122
Grp Volume(v), veh/h	98	0	90	27	0	23	55	559	583	22	607	630
Grp Sat Flow(s),veh/h/ln	1628	0	1611	1667	0	1605	1667	1611	1677	1537	1611	1670
Q Serve(g_s), s	7.7	0.0	7.0	2.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.7	0.0	7.0	2.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.43	1.00		0.39	1.00		0.06	1.00		0.07
Lane Grp Cap(c), veh/h	118	0	148	87	0	115	660	818	851	633	818	848
V/C Ratio(X)	0.83	0.00	0.61	0.31	0.00	0.20	0.08	0.68	0.68	0.03	0.74	0.74
Avail Cap(c_a), veh/h	138	0	322	141	0	321	660	818	851	633	818	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.81	0.81	0.81	0.65	0.65	0.65
Uniform Delay (d), s/veh	59.5	0.0	56.8	59.3	0.0	56.8	3.7	0.0	0.0	3.5	0.0	0.0
Incr Delay (d2), s/veh	25.9	0.0	1.5	0.7	0.0	0.3	0.0	3.8	3.6	0.0	4.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	2.9	0.9	0.0	0.7	0.3	0.9	0.9	0.1	0.9	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.3	0.0	58.2	60.1	0.0	57.1	3.7	3.8	3.6	3.5	4.0	3.9
LnGrp LOS	F	A	E	E	A	E	A	A	A	A	A	A
Approach Vol, veh/h		188			50			1197			1259	
Approach Delay, s/veh		72.4			58.7			3.7			3.9	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.2	70.0	13.4	13.3	33.2	70.0	10.8	16.0
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0
Max Green Setting (Gmax), s	11.0	65.5	11.0	26.0	11.0	65.5	11.0	26.0
Max Q Clear Time (g_c+I1), s	2.0	2.0	9.7	3.8	2.0	2.0	4.0	9.0
Green Ext Time (p_c), s	0.0	6.6	0.0	0.0	0.0	5.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	110	156	75	131	176	79	80	934	138	142	979	94
Future Volume (veh/h)	110	156	75	131	176	79	80	934	138	142	979	94
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1723	1695	1736	1709	1736	1723	1709	1682	1736	1709	1723
Adj Flow Rate, veh/h	116	164	64	138	185	70	84	983	138	149	1031	94
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	4	1	3	1	2	3	5	1	3	2
Cap, veh/h	141	198	77	161	210	80	394	1584	222	306	1340	122
Arrive On Green	0.09	0.17	0.17	0.10	0.18	0.18	0.16	0.56	0.55	0.05	0.45	0.44
Sat Flow, veh/h	1628	1164	454	1654	1167	441	1641	2850	400	1654	3002	274
Grp Volume(v), veh/h	116	0	228	138	0	255	84	560	561	149	557	568
Grp Sat Flow(s),veh/h/ln	1628	0	1618	1654	0	1608	1641	1624	1627	1654	1624	1652
Q Serve(g_s), s	9.1	0.0	17.7	10.7	0.0	20.1	0.0	30.4	30.5	5.1	37.6	37.7
Cycle Q Clear(g_c), s	9.1	0.0	17.7	10.7	0.0	20.1	0.0	30.4	30.5	5.1	37.6	37.7
Prop In Lane	1.00		0.28	1.00		0.27	1.00		0.25	1.00		0.17
Lane Grp Cap(c), veh/h	141	0	275	161	0	290	394	902	904	306	724	737
V/C Ratio(X)	0.82	0.00	0.83	0.86	0.00	0.88	0.21	0.62	0.62	0.49	0.77	0.77
Avail Cap(c_a), veh/h	238	0	311	242	0	309	394	902	904	369	724	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.85	0.85	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	52.1	57.8	0.0	51.9	36.9	19.6	19.7	16.1	30.4	30.4
Incr Delay (d2), s/veh	4.4	0.0	13.7	12.1	0.0	22.0	0.1	2.7	2.7	0.4	7.7	7.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	8.2	5.0	0.0	9.9	2.2	11.7	11.8	1.9	15.9	16.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	0.0	65.9	69.9	0.0	73.9	37.0	22.3	22.4	16.6	38.1	38.0
LnGrp LOS	E	A	E	E	A	E	D	C	C	B	D	D
Approach Vol, veh/h		344			393			1205			1274	
Approach Delay, s/veh		64.8			72.5			23.4			35.5	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.3	62.0	15.3	27.4	11.1	76.2	16.6	26.1
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0
Max Green Setting (Gmax), s	12.0	* 58	19.0	25.0	12.0	57.5	19.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	39.7	11.1	22.1	7.1	32.5	12.7	19.7
Green Ext Time (p_c), s	0.0	4.9	0.0	0.2	0.0	5.4	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	38.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	39	68	65	70	65	75	1048	62	76	1190	135
Future Volume (veh/h)	75	39	68	65	70	65	75	1048	62	76	1190	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1709	1709	1709	1668	1736	1695	1641	1709	1695	1695
Adj Flow Rate, veh/h	82	42	19	71	76	0	82	1139	65	83	1293	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	3	3	3	6	1	4	8	3	4	4
Cap, veh/h	183	84	288	111	103		381	1713	98	440	1611	182
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.00	0.15	0.55	0.55	0.15	0.55	0.55
Sat Flow, veh/h	686	421	1444	352	518	1414	1654	3092	176	1628	2908	329
Grp Volume(v), veh/h	124	0	19	147	0	0	82	593	611	83	713	727
Grp Sat Flow(s),veh/h/ln	1107	0	1444	870	0	1414	1654	1611	1658	1628	1611	1626
Q Serve(g_s), s	0.0	0.0	1.4	10.0	0.0	0.0	0.0	33.8	33.9	0.0	46.1	46.9
Cycle Q Clear(g_c), s	13.3	0.0	1.4	23.4	0.0	0.0	0.0	33.8	33.9	0.0	46.1	46.9
Prop In Lane	0.66		1.00	0.48		1.00	1.00		0.11	1.00		0.20
Lane Grp Cap(c), veh/h	267	0	288	215	0		381	892	918	440	892	901
V/C Ratio(X)	0.46	0.00	0.07	0.68	0.00		0.21	0.66	0.67	0.19	0.80	0.81
Avail Cap(c_a), veh/h	324	0	344	273	0		381	892	918	440	892	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	0.0	42.2	54.2	0.0	0.0	35.9	20.5	20.5	24.5	23.2	23.4
Incr Delay (d2), s/veh	2.7	0.0	0.2	8.6	0.0	0.0	0.2	3.9	3.8	0.1	7.4	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	0.5	5.3	0.0	0.0	2.2	13.2	13.6	1.7	18.5	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	0.0	42.4	62.9	0.0	0.0	36.1	24.4	24.3	24.6	30.7	31.1
LnGrp LOS	D	A	D	E	A		D	C	C	C	C	C
Approach Vol, veh/h		143			147			1286			1523	
Approach Delay, s/veh		48.5			62.9			25.1			30.5	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	24.1	76.0		29.9	24.1	76.0		29.9
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	15.0	71.5		31.0	15.0	71.5		31.0
Max Q Clear Time (g_c+I1), s	2.0	48.9		25.4	2.0	35.9		15.3
Green Ext Time (p_c), s	0.1	17.3		0.6	0.1	19.7		1.1

Intersection Summary	
HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	60	47	310	80	79	81	827	118	141	992	24
Future Volume (veh/h)	6	60	47	310	80	79	81	827	118	141	992	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1723	1750	1723	1750	1750	1750	1695	1682	1709	1709	1695
Adj Flow Rate, veh/h	6	63	26	326	84	21	85	871	63	148	1044	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	0	2	0	0	0	4	5	3	3	4
Cap, veh/h	112	78	32	409	225	190	105	1338	589	415	2004	46
Arrive On Green	0.07	0.07	0.07	0.13	0.13	0.13	0.06	0.42	0.42	0.26	0.62	0.61
Sat Flow, veh/h	1667	1155	477	3183	1750	1476	1667	3221	1419	1628	3242	75
Grp Volume(v), veh/h	6	0	89	326	84	21	85	871	63	148	523	545
Grp Sat Flow(s),veh/h/ln	1667	0	1632	1591	1750	1476	1667	1611	1419	1628	1624	1693
Q Serve(g_s), s	0.4	0.0	7.0	12.9	5.7	1.6	6.5	28.2	3.5	9.7	23.6	23.6
Cycle Q Clear(g_c), s	0.4	0.0	7.0	12.9	5.7	1.6	6.5	28.2	3.5	9.7	23.6	23.6
Prop In Lane	1.00		0.29	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	112	0	110	409	225	190	105	1338	589	415	1004	1047
V/C Ratio(X)	0.05	0.00	0.81	0.80	0.37	0.11	0.81	0.65	0.11	0.36	0.52	0.52
Avail Cap(c_a), veh/h	141	0	138	857	471	397	179	1338	589	415	1004	1047
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.81	0.81	0.81	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	56.7	0.0	59.8	55.0	51.9	50.1	60.1	30.4	23.2	39.7	14.0	14.0
Incr Delay (d2), s/veh	0.1	0.0	21.4	1.8	0.5	0.1	8.7	2.5	0.4	0.3	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.6	5.3	2.6	0.6	3.0	11.2	1.2	3.8	8.4	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.9	0.0	81.2	56.8	52.4	50.2	68.8	32.9	23.6	40.0	15.7	15.6
LnGrp LOS	E	A	F	E	D	D	E	C	C	D	B	B
Approach Vol, veh/h		95			431			1019			1216	
Approach Delay, s/veh		79.7			55.6			35.3			18.6	
Approach LOS		E			E			D			B	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	12.2	84.4	20.7	38.6	58.0	12.8
Change Period (Y+Rc), s	4.0	* 5.4	4.0	5.4	* 4.5	4.0
Max Green Setting (Gmax), s	14.0	* 53	35.0	14.0	* 54	11.0
Max Q Clear Time (g_c+I1), s	8.5	25.6	14.9	11.7	30.2	9.0
Green Ext Time (p_c), s	0.0	15.0	1.2	0.0	12.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	32.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	217	22	12	13	25	15	12	878	13	8	1157	291
Future Volume (veh/h)	217	22	12	13	25	15	12	878	13	8	1157	291
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1627	1409	1750	1695	1654	1750	1695	1750	1750	1682	1750
Adj Flow Rate, veh/h	226	23	4	14	26	10	12	915	13	8	1205	303
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	9	25	0	4	7	0	4	0	0	5	0
Cap, veh/h	409	272	47	220	79	30	20	1442	20	222	1805	819
Arrive On Green	0.15	0.20	0.20	0.02	0.07	0.06	0.01	0.44	0.42	0.13	0.56	0.56
Sat Flow, veh/h	1654	1350	235	1667	1160	446	1667	3252	46	1667	3195	1450
Grp Volume(v), veh/h	226	0	27	14	0	36	12	453	475	8	1205	303
Grp Sat Flow(s),veh/h/ln	1654	0	1585	1667	0	1606	1667	1611	1687	1667	1598	1450
Q Serve(g_s), s	9.4	0.0	1.1	0.6	0.0	1.7	0.6	17.2	17.2	0.3	20.8	2.7
Cycle Q Clear(g_c), s	9.4	0.0	1.1	0.6	0.0	1.7	0.6	17.2	17.2	0.3	20.8	2.7
Prop In Lane	1.00		0.15	1.00		0.28	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	409	0	319	220	0	110	20	714	748	222	1805	819
V/C Ratio(X)	0.55	0.00	0.08	0.06	0.00	0.33	0.61	0.63	0.63	0.04	0.67	0.37
Avail Cap(c_a), veh/h	532	0	421	292	0	162	126	1100	1152	222	2101	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	25.7	33.2	0.0	35.2	38.9	17.0	17.1	29.9	12.0	0.9
Incr Delay (d2), s/veh	0.9	0.0	0.1	0.1	0.0	1.3	17.6	2.4	2.3	0.0	1.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.4	0.2	0.0	0.7	0.3	6.0	6.2	0.1	6.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	0.0	25.8	33.3	0.0	36.5	56.5	19.5	19.4	29.9	13.3	1.6
LnGrp LOS	C	A	C	C	A	D	E	B	B	C	B	A
Approach Vol, veh/h		253			50			940			1516	
Approach Delay, s/veh		26.9			35.6			19.9			11.0	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	48.7	16.1	9.4	14.5	39.1	5.6	19.9
Change Period (Y+Rc), s	4.0	6.0	4.5	4.5	4.0	6.0	4.5	4.5
Max Green Setting (Gmax), s	6.0	50.0	17.5	7.5	4.0	52.0	4.5	20.5
Max Q Clear Time (g_c+I1), s	2.3	22.8	11.4	3.7	2.3	19.2	2.6	3.1
Green Ext Time (p_c), s	0.0	19.8	0.2	0.0	0.0	13.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	157	412	236	31	14	79
Future Vol, veh/h	157	412	236	31	14	79
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	3	1	0	0	1
Mvmt Flow	183	479	274	36	16	92

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	311	0	-	0	1138	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	845	-
Critical Hdwy	4.1	-	-	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.309
Pot Cap-1 Maneuver	1261	-	-	-	225	749
Stage 1	-	-	-	-	762	-
Stage 2	-	-	-	-	425	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1260	-	-	-	180	748
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	425	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1260	-	-	-	507
HCM Lane V/C Ratio	0.145	-	-	-	0.213
HCM Control Delay (s)	8.3	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.8

Intersection						
Int Delay, s/veh	2.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	355	71	16	199	68	17
Future Vol, veh/h	355	71	16	199	68	17
Conflicting Peds, #/hr	0	3	3	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	3	1	6	1	2	0
Mvmt Flow	403	81	18	226	77	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	487	0	709	449
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.16	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.3
Pot Cap-1 Maneuver	-	-	1056	-	401	614
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	782	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1053	-	392	611
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	766	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	1053	-
HCM Lane V/C Ratio	0.229	-	-	0.017	-
HCM Control Delay (s)	16	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection						
Int Delay, s/veh	6.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	179	27	62	75	101	106
Future Vol, veh/h	179	27	62	75	101	106
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	4	2	1	1	2
Mvmt Flow	199	30	69	83	112	118

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	395	174	233	0	-	0
Stage 1	174	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Critical Hdwy	6.42	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	610	864	1335	-	-	-
Stage 1	856	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	573	862	1331	-	-	-
Mov Cap-2 Maneuver	573	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	814	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	3.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1331	-	599	-	-
HCM Lane V/C Ratio	0.052	-	0.382	-	-
HCM Control Delay (s)	7.9	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.8	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	11	47	13	11	25	1	27	22	58	1	3	15
Future Vol, veh/h	11	47	13	11	25	1	27	22	58	1	3	15
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	8	100	0	4	0	0	33	0
Mvmt Flow	14	62	17	14	33	1	36	29	76	1	4	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	34	0	0	80	0	0	174	162	72	213	170	34
Stage 1	-	-	-	-	-	-	100	100	-	62	62	-
Stage 2	-	-	-	-	-	-	74	62	-	151	108	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.1	6.83	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4.297	3.3
Pot Cap-1 Maneuver	1591	-	-	1531	-	-	793	727	996	748	670	1045
Stage 1	-	-	-	-	-	-	911	808	-	954	786	-
Stage 2	-	-	-	-	-	-	940	839	-	856	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1591	-	-	1530	-	-	763	713	995	660	657	1045
Mov Cap-2 Maneuver	-	-	-	-	-	-	763	713	-	660	657	-
Stage 1	-	-	-	-	-	-	902	800	-	945	779	-
Stage 2	-	-	-	-	-	-	909	831	-	755	743	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	2.2	10	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	859	1591	-	-	1530	-	-	930
HCM Lane V/C Ratio	0.164	0.009	-	-	0.009	-	-	0.027
HCM Control Delay (s)	10	7.3	0	-	7.4	0	-	9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.1

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	172	6	14	83	12	4	9	16	25	21	7
Future Vol, veh/h	7	172	6	14	83	12	4	9	16	25	21	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	2	0	0	3	0	0	0	6	0	0	0
Mvmt Flow	8	191	7	16	92	13	4	10	18	28	23	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8	7.6	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	4%	13%	47%
Vol Thru, %	31%	93%	76%	40%
Vol Right, %	55%	3%	11%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	185	109	53
LT Vol	4	7	14	25
Through Vol	9	172	83	21
RT Vol	16	6	12	7
Lane Flow Rate	32	206	121	59
Geometry Grp	1	1	1	1
Degree of Util (X)	0.039	0.236	0.144	0.076
Departure Headway (Hd)	4.385	4.14	4.286	4.668
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	820	853	841	771
Service Time	2.394	2.239	2.292	2.677
HCM Lane V/C Ratio	0.039	0.242	0.144	0.077
HCM Control Delay	7.6	8.5	8	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.9	0.5	0.2

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	251	12	26	241	83	6	6	33	57	9	10
Future Vol, veh/h	6	251	12	26	241	83	6	6	33	57	9	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	50	2	0	0	3	7	0	0	0	4	0	0
Mvmt Flow	6	267	13	28	256	88	6	6	35	61	10	11
Number of Lanes	0	2	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.9	11.7	8.6	9.5
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	13%	5%	0%	7%	75%
Vol Thru, %	13%	95%	91%	69%	12%
Vol Right, %	73%	0%	9%	24%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	132	138	350	76
LT Vol	6	6	0	26	57
Through Vol	6	126	126	241	9
RT Vol	33	0	12	83	10
Lane Flow Rate	48	140	146	372	81
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.068	0.234	0.208	0.472	0.126
Departure Headway (Hd)	5.126	6.019	5.112	4.559	5.612
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	691	595	698	786	634
Service Time	3.212	3.778	2.871	2.609	3.691
HCM Lane V/C Ratio	0.069	0.235	0.209	0.473	0.128
HCM Control Delay	8.6	10.6	9.2	11.7	9.5
HCM Lane LOS	A	B	A	B	A
HCM 95th-tile Q	0.2	0.9	0.8	2.6	0.4

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	180	5	98
Future Vol, veh/h	0	0	0	180	5	98
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Free
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	0	0	0	3	0	0
Mvmt Flow	0	0	0	222	6	121

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	222	-
Stage 1	-	-	0	-
Stage 2	-	-	222	-
Critical Hdwy	-	-	6.4	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.4	-
Follow-up Hdwy	-	-	3.5	-
Pot Cap-1 Maneuver	0	-	771	0
Stage 1	0	-	-	0
Stage 2	0	-	820	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	771	-
Mov Cap-2 Maneuver	-	-	771	-
Stage 1	-	-	-	-
Stage 2	-	-	820	-

Approach	WB	NB
HCM Control Delay, s	0	9.7
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	NBLn2	WBT
Capacity (veh/h)	771	-	-
HCM Lane V/C Ratio	0.008	-	-
HCM Control Delay (s)	9.7	0	-
HCM Lane LOS	A	A	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	17	100	82	11	0	173	0	107	0	0	0
Future Vol, veh/h	0	17	100	82	11	0	173	0	107	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	89	89	89	89	92	89	92	89	92	92	92
Heavy Vehicles, %	2	0	0	0	0	2	4	2	2	2	2	2
Mvmt Flow	0	19	112	92	12	0	194	0	120	0	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	509	1	515	449	-	1	0	0	-	-	0
Stage 1	-	1	-	448	448	-	-	-	-	-	-	-
Stage 2	-	508	-	67	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.5	6.2	7.1	6.5	-	4.14	-	-	-	-	-
Critical Hdwy Stg 1	-	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	0	470	1090	474	508	0	1609	-	-	0	-	0
Stage 1	0	899	-	594	576	0	-	-	-	0	-	0
Stage 2	0	542	-	948	899	0	-	-	-	0	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	408	1090	369	441	-	1609	-	-	-	-	-
Mov Cap-2 Maneuver	-	408	-	369	441	-	-	-	-	-	-	-
Stage 1	-	899	-	516	501	-	-	-	-	-	-	-
Stage 2	-	471	-	832	899	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	18.2	4.7	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBT
Capacity (veh/h)	1609	-	-	877	376	-
HCM Lane V/C Ratio	0.121	-	-	0.15	0.278	-
HCM Control Delay (s)	7.5	0	-	9.8	18.2	-
HCM Lane LOS	A	A	-	A	C	-
HCM 95th %tile Q(veh)	0.4	-	-	0.5	1.1	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	11	112	2	120	79	31	5	39	159	34	60	8
Future Vol, veh/h	11	112	2	120	79	31	5	39	159	34	60	8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	1	1	0	0	3	2	3	0	0
Mvmt Flow	12	123	2	132	87	34	5	43	175	37	66	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.6	9.4	9.3
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	9%	52%	33%
Vol Thru, %	19%	90%	34%	59%
Vol Right, %	78%	2%	13%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	125	230	102
LT Vol	5	11	120	34
Through Vol	39	112	79	60
RT Vol	159	2	31	8
Lane Flow Rate	223	137	253	112
Geometry Grp	1	1	1	1
Degree of Util (X)	0.282	0.192	0.344	0.162
Departure Headway (Hd)	4.544	5.026	4.905	5.207
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	783	706	725	681
Service Time	2.618	3.115	2.985	3.295
HCM Lane V/C Ratio	0.285	0.194	0.349	0.164
HCM Control Delay	9.4	9.3	10.6	9.3
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	1.2	0.7	1.5	0.6

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	239	95	31	299	1	101	0	17	1	0	1
Future Vol, veh/h	2	239	95	31	299	1	101	0	17	1	0	1
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	2	1	0	1	0	1	0	6	0	0	0
Mvmt Flow	2	254	101	33	318	1	107	0	18	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	319	0	0	356	0	0	695	695	309	706	745	319
Stage 1	-	-	-	-	-	-	310	310	-	385	385	-
Stage 2	-	-	-	-	-	-	385	385	-	321	360	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.11	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.509	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1252	-	-	1214	-	-	358	368	722	353	345	726
Stage 1	-	-	-	-	-	-	702	663	-	642	614	-
Stage 2	-	-	-	-	-	-	640	614	-	695	630	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1252	-	-	1213	-	-	348	355	719	334	333	726
Mov Cap-2 Maneuver	-	-	-	-	-	-	348	355	-	334	333	-
Stage 1	-	-	-	-	-	-	700	661	-	641	594	-
Stage 2	-	-	-	-	-	-	618	594	-	674	628	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	19.3	12.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	376	1252	-	-	1213	-	-	458
HCM Lane V/C Ratio	0.334	0.002	-	-	0.027	-	-	0.005
HCM Control Delay (s)	19.3	7.9	0	-	8.1	0	-	12.9
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0

Intersection						
Int Delay, s/veh	2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	428	323	78	63	63
Future Vol, veh/h	8	428	323	78	63	63
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	3	1	2	5
Mvmt Flow	9	460	347	84	68	68

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	437	0	-	0	876	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	481	-
Critical Hdwy	4.1	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	1134	-	-	-	319	648
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	313	644
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	618	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	520
HCM Lane V/C Ratio	0.008	-	-	-	0.261
HCM Control Delay (s)	8.2	-	-	-	14.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	1

Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	168	256	31	168	371
Future Vol, veh/h	41	168	256	31	168	371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	2	3	3	1	3
Mvmt Flow	43	177	269	33	177	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1031	286	0	0	302	0
Stage 1	286	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Critical Hdwy	6.45	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	255	753	-	-	1265	-
Stage 1	756	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	219	753	-	-	1265	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	399	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	323	753	1265	-
HCM Lane V/C Ratio	-	-	0.134	0.235	0.14	-
HCM Control Delay (s)	-	-	17.9	11.2	8.3	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.9	0.5	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	143	95	120	133	35	57	203	67	33	228	28
Future Volume (veh/h)	23	143	95	120	133	35	57	203	67	33	228	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1736	1682	1736	1723	1709	1682	1723	1750	1750	1709	1654
Adj Flow Rate, veh/h	26	162	78	136	151	29	65	231	62	38	259	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	1	5	1	2	3	5	2	0	0	3	7
Cap, veh/h	484	347	167	426	442	85	429	412	111	429	444	55
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.05	0.32	0.30	0.04	0.30	0.28
Sat Flow, veh/h	1222	1098	529	1148	1397	268	1602	1301	349	1667	1487	184
Grp Volume(v), veh/h	26	0	240	136	0	180	65	0	293	38	0	291
Grp Sat Flow(s),veh/h/ln	1222	0	1627	1148	0	1665	1602	0	1650	1667	0	1671
Q Serve(g_s), s	0.6	0.0	4.3	3.9	0.0	3.0	1.0	0.0	5.3	0.6	0.0	5.3
Cycle Q Clear(g_c), s	3.6	0.0	4.3	8.2	0.0	3.0	1.0	0.0	5.3	0.6	0.0	5.3
Prop In Lane	1.00		0.32	1.00		0.16	1.00		0.21	1.00		0.11
Lane Grp Cap(c), veh/h	484	0	514	426	0	526	429	0	522	429	0	499
V/C Ratio(X)	0.05	0.00	0.47	0.32	0.00	0.34	0.15	0.00	0.56	0.09	0.00	0.58
Avail Cap(c_a), veh/h	1113	0	1351	1017	0	1383	1010	0	1621	1062	0	1642
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.8	0.0	9.9	13.2	0.0	9.5	8.7	0.0	10.3	8.9	0.0	10.8
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.3	0.0	0.3	0.1	0.0	1.4	0.1	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.2	0.8	0.0	0.8	0.2	0.0	1.5	0.2	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	10.4	13.5	0.0	9.8	8.8	0.0	11.7	8.9	0.0	12.4
LnGrp LOS	B	A	B	B	A	A	A	A	B	A	A	B
Approach Vol, veh/h		266			316			358			329	
Approach Delay, s/veh		10.4			11.4			11.2			12.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	14.8		15.4	5.3	15.4		15.4				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	15.0	35.0		30.0	15.0	35.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	7.3		10.2	2.6	7.3		6.3				
Green Ext Time (p_c), s	0.1	2.9		1.2	0.0	2.6		1.2				
Intersection Summary												
HCM 6th Ctrl Delay			11.3									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	2	14	31	2	32	5	52	10	23	77	3
Future Vol, veh/h	4	2	14	31	2	32	5	52	10	23	77	3
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	6	0	3	0	8	10	9	5	0
Mvmt Flow	5	2	16	36	2	37	6	60	12	27	90	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	247	234	95	234	229	67	96	0	0	73	0	0
Stage 1	149	149	-	79	79	-	-	-	-	-	-	-
Stage 2	98	85	-	155	150	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.16	6.5	6.23	4.1	-	-	4.19	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.554	4	3.327	2.2	-	-	2.281	-	-
Pot Cap-1 Maneuver	711	670	967	712	674	994	1510	-	-	1483	-	-
Stage 1	858	778	-	920	833	-	-	-	-	-	-	-
Stage 2	913	828	-	838	777	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	668	652	964	685	656	993	1506	-	-	1482	-	-
Mov Cap-2 Maneuver	668	652	-	685	656	-	-	-	-	-	-	-
Stage 1	852	761	-	915	829	-	-	-	-	-	-	-
Stage 2	873	824	-	806	760	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.9	0.6	1.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1506	-	-	848	807	1482	-	-
HCM Lane V/C Ratio	0.004	-	-	0.027	0.094	0.018	-	-
HCM Control Delay (s)	7.4	0	-	9.4	9.9	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	-	-

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	20	101	15	20	111	26	6	21	4	35	50	37
Future Vol, veh/h	20	101	15	20	111	26	6	21	4	35	50	37
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	2	0	5	4	6	0	5	0	6	0	3
Mvmt Flow	22	109	16	22	119	28	6	23	4	38	54	40
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	8.7	8	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	15%	13%	29%
Vol Thru, %	68%	74%	71%	41%
Vol Right, %	13%	11%	17%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	31	136	157	122
LT Vol	6	20	20	35
Through Vol	21	101	111	50
RT Vol	4	15	26	37
Lane Flow Rate	33	146	169	131
Geometry Grp	1	1	1	1
Degree of Util (X)	0.044	0.184	0.21	0.169
Departure Headway (Hd)	4.746	4.531	4.471	4.639
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	753	793	804	773
Service Time	2.783	2.557	2.495	2.669
HCM Lane V/C Ratio	0.044	0.184	0.21	0.169
HCM Control Delay	8	8.6	8.7	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.7	0.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	80	33	58	100	12	267	28	122	12	33	125
Future Volume (veh/h)	101	80	33	58	100	12	267	28	122	12	33	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1600	1627	1750	1750	1695	1750	1736	1695	1723	1750	1750	1723
Adj Flow Rate, veh/h	115	91	28	66	114	11	303	32	70	14	38	70
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	11	9	0	0	4	0	1	4	2	0	0	2
Cap, veh/h	751	956	1138	827	869	84	377	114	250	207	49	89
Arrive On Green	0.05	0.59	0.59	0.03	0.57	0.57	0.18	0.25	0.25	0.02	0.09	0.09
Sat Flow, veh/h	1524	1627	1481	1667	1522	147	1654	465	1018	1667	549	1012
Grp Volume(v), veh/h	115	91	28	66	0	125	303	0	102	14	0	108
Grp Sat Flow(s),veh/h/ln	1524	1627	1481	1667	0	1669	1654	0	1483	1667	0	1561
Q Serve(g_s), s	4.4	3.4	0.6	2.3	0.0	4.9	22.5	0.0	7.8	1.1	0.0	9.5
Cycle Q Clear(g_c), s	4.4	3.4	0.6	2.3	0.0	4.9	22.5	0.0	7.8	1.1	0.0	9.5
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.69	1.00		0.65
Lane Grp Cap(c), veh/h	751	956	1138	827	0	953	377	0	364	207	0	138
V/C Ratio(X)	0.15	0.10	0.02	0.08	0.00	0.13	0.80	0.00	0.28	0.07	0.00	0.78
Avail Cap(c_a), veh/h	790	956	1138	898	0	953	551	0	657	286	0	357
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	12.6	3.8	11.7	0.0	13.9	44.6	0.0	42.8	55.6	0.0	62.5
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.0	0.0	0.3	5.4	0.0	0.4	0.1	0.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.3	0.2	0.9	0.0	2.0	9.8	0.0	2.9	0.5	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	12.8	3.9	11.7	0.0	14.2	50.1	0.0	43.2	55.8	0.0	71.8
LnGrp LOS	B	B	A	B	A	B	D	A	D	E	A	E
Approach Vol, veh/h		234			191			405			122	
Approach Delay, s/veh		10.9			13.3			48.3			69.9	
Approach LOS		B			B			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	86.3	7.4	38.3	10.4	84.0	29.3	16.4				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	10.0	42.0	10.0	62.0	10.0	42.0	40.0	32.0				
Max Q Clear Time (g_c+I1), s	4.3	5.4	3.1	9.8	6.4	6.9	24.5	11.5				
Green Ext Time (p_c), s	0.1	0.6	0.0	0.7	0.1	0.8	0.8	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			34.9									
HCM 6th LOS			C									
Notes												

User approved changes to right turn type.

Intersection						
Int Delay, s/veh	1.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	1	9	67	1	16
Future Vol, veh/h	76	1	9	67	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	16	0	11	8	0	0
Mvmt Flow	85	1	10	75	1	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	86	0	181	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	95	-
Critical Hdwy	-	-	4.21	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.299	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1455	-	813	978
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	934	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	807	978
Mov Cap-2 Maneuver	-	-	-	-	807	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	927	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	966	-	-	1455	-
HCM Lane V/C Ratio	0.02	-	-	0.007	-
HCM Control Delay (s)	8.8	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	4.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	49	76	16	97	69
Future Vol, veh/h	7	49	76	16	97	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	5	0	4	6
Mvmt Flow	8	56	87	18	111	79

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	96	0	0	105	0
Stage 1	96	-	-	-	-	-
Stage 2	301	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	612	966	-	-	1474	-
Stage 1	933	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	564	966	-	-	1474	-
Mov Cap-2 Maneuver	564	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	695	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	4.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	887	1474	-
HCM Lane V/C Ratio	-	-	0.073	0.076	-
HCM Control Delay (s)	-	-	9.4	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	18	0	0	0	3	102	1	0	231	42
Future Vol, veh/h	20	0	18	0	0	0	3	102	1	0	231	42
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	10	0	0	0	0	0	33	0	0	0	2	7
Mvmt Flow	23	0	20	0	0	0	3	116	1	0	263	48
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay	8.5	0	8.5	10.3
HCM LOS	A	-	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	99%	0%	0%	100%	100%	85%
Vol Right, %	0%	1%	0%	100%	0%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	103	20	18	0	0	273
LT Vol	3	0	20	0	0	0	0
Through Vol	0	102	0	0	0	0	231
RT Vol	0	1	0	18	0	0	42
Lane Flow Rate	3	117	23	20	0	0	310
Geometry Grp	7	7	7	7	6	7	7
Degree of Util (X)	0.006	0.158	0.039	0.027	0	0	0.393
Departure Headway (Hd)	5.918	4.845	6.202	4.823	5.609	4.634	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	608	743	580	746	0	0	779
Service Time	3.624	2.552	3.91	2.531	3.621	2.423	2.349
HCM Lane V/C Ratio	0.005	0.157	0.04	0.027	0	0	0.398
HCM Control Delay	8.7	8.5	9.2	7.7	8.6	7.4	10.3
HCM Lane LOS	A	A	A	A	N	N	B
HCM 95th-tile Q	0	0.6	0.1	0.1	0	0	1.9

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	103	7	44	111	24	6	57	38	81	135	33
Future Vol, veh/h	25	103	7	44	111	24	6	57	38	81	135	33
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	2	4	4	0	2	3	2	1	3
Mvmt Flow	27	113	8	48	122	26	7	63	42	89	148	36
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.6	10.1	9.3	10.1
HCM LOS	A	B	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	19%	25%	100%	0%
Vol Thru, %	0%	60%	76%	62%	0%	80%
Vol Right, %	0%	40%	5%	13%	0%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	95	135	179	81	168
LT Vol	6	0	25	44	81	0
Through Vol	0	57	103	111	0	135
RT Vol	0	38	7	24	0	33
Lane Flow Rate	7	104	148	197	89	185
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.012	0.161	0.212	0.277	0.149	0.275
Departure Headway (Hd)	6.313	5.557	5.149	5.078	6.031	5.37
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	570	649	688	700	589	661
Service Time	4.013	3.257	3.244	3.166	3.826	3.164
HCM Lane V/C Ratio	0.012	0.16	0.215	0.281	0.151	0.28
HCM Control Delay	9.1	9.3	9.6	10.1	9.9	10.2
HCM Lane LOS	A	A	A	B	A	B
HCM 95th-tile Q	0	0.6	0.8	1.1	0.5	1.1

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	23	150	49	16	117	14	19	27	13	11	60	43
Future Vol, veh/h	23	150	49	16	117	14	19	27	13	11	60	43
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	0	4	0	5	4	0	9	0	5
Mvmt Flow	25	165	54	18	129	15	21	30	14	12	66	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	8.9	8.6	8.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	32%	10%	11%	10%
Vol Thru, %	46%	68%	80%	53%
Vol Right, %	22%	22%	10%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	222	147	114
LT Vol	19	23	16	11
Through Vol	27	150	117	60
RT Vol	13	49	14	43
Lane Flow Rate	65	244	162	125
Geometry Grp	1	1	1	1
Degree of Util (X)	0.09	0.301	0.207	0.169
Departure Headway (Hd)	5.005	4.446	4.609	4.85
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	713	807	777	737
Service Time	3.058	2.483	2.651	2.898
HCM Lane V/C Ratio	0.091	0.302	0.208	0.17
HCM Control Delay	8.6	9.4	8.9	8.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	1.3	0.8	0.6

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	72	42	35	71	54
Future Vol, veh/h	24	72	42	35	71	54
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	5	6	3	0
Mvmt Flow	28	83	48	40	82	62
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	8	7.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	55%	25%	0%
Vol Thru, %	45%	0%	57%
Vol Right, %	0%	75%	43%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	77	96	125
LT Vol	42	24	0
Through Vol	35	0	71
RT Vol	0	72	54
Lane Flow Rate	89	110	144
Geometry Grp	1	1	1
Degree of Util (X)	0.108	0.123	0.158
Departure Headway (Hd)	4.4	4.006	3.954
Convergence, Y/N	Yes	Yes	Yes
Cap	805	900	895
Service Time	2.477	2.006	2.029
HCM Lane V/C Ratio	0.111	0.122	0.161
HCM Control Delay	8	7.6	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0.4	0.6

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	77	70	6	3	83	12	0	1	2	25	3	156
Future Vol, veh/h	77	70	6	3	83	12	0	1	2	25	3	156
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	0	0	0	1	0	0	0	0	0	0	1
Mvmt Flow	80	73	6	3	86	13	0	1	2	26	3	163
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	8.7	8.1	7.5	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	50%	3%	100%	0%
Vol Thru, %	33%	46%	85%	0%	2%
Vol Right, %	67%	4%	12%	0%	98%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	153	98	25	159
LT Vol	0	77	3	25	0
Through Vol	1	70	83	0	3
RT Vol	2	6	12	0	156
Lane Flow Rate	3	159	102	26	166
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.004	0.202	0.127	0.041	0.203
Departure Headway (Hd)	4.43	4.556	4.463	5.614	4.421
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	807	789	804	639	813
Service Time	2.463	2.578	2.486	3.336	2.143
HCM Lane V/C Ratio	0.004	0.202	0.127	0.041	0.204
HCM Control Delay	7.5	8.7	8.1	8.6	8.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.8	0.4	0.1	0.8

SECTION 2: FUTURE (2043) CONDITIONS SYNCHRO REPORTS

P.M. PEAK HOUR

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	60	40	230	40	110	35	1100	175	120	1080	145
Future Volume (veh/h)	130	60	40	230	40	110	35	1100	175	120	1080	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1709	1750	1695	1750	1695	1695	1682	1736	1709	1709	1750
Adj Flow Rate, veh/h	141	65	21	250	43	60	38	1196	0	130	1174	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	3	0	4	0	4	4	5	1	3	3	0
Cap, veh/h	318	315	102	330	167	233	156	1787		153	1582	202
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.10	0.56	0.00	0.09	0.55	0.54
Sat Flow, veh/h	1300	1237	400	1289	655	915	1615	3195	1471	1628	2897	369
Grp Volume(v), veh/h	141	0	86	250	0	103	38	1196	0	130	656	668
Grp Sat Flow(s),veh/h/ln	1300	0	1637	1289	0	1570	1615	1598	1471	1628	1624	1643
Q Serve(g_s), s	12.6	0.0	5.4	24.6	0.0	6.8	2.8	34.3	0.0	10.2	40.0	40.4
Cycle Q Clear(g_c), s	19.4	0.0	5.4	30.0	0.0	6.8	2.8	34.3	0.0	10.2	40.0	40.4
Prop In Lane	1.00		0.24	1.00		0.58	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	318	0	416	330	0	400	156	1787		153	887	897
V/C Ratio(X)	0.44	0.00	0.21	0.76	0.00	0.26	0.24	0.67		0.85	0.74	0.74
Avail Cap(c_a), veh/h	397	0	516	409	0	495	156	1787		200	887	897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	0.0	38.1	49.9	0.0	38.7	54.4	20.2	0.0	58.0	22.5	22.6
Incr Delay (d2), s/veh	0.7	0.0	0.2	5.6	0.0	0.3	0.5	2.0	0.0	20.0	5.5	5.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	2.2	8.5	0.0	2.7	1.2	12.3	0.0	5.0	16.0	16.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.1	0.0	38.3	55.6	0.0	38.9	54.9	22.2	0.0	78.0	28.0	28.2
LnGrp LOS	D		D	E		D	D	C		E	C	C
Approach Vol, veh/h		227			353			1234			1454	
Approach Delay, s/veh		43.8			50.7			23.2			32.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	75.0		37.1	16.2	76.7		37.1				
Change Period (Y+Rc), s	5.4	* 4.5		4.0	4.0	5.4		4.0				
Max Green Setting (Gmax), s	6.0	* 71		41.0	16.0	59.6		41.0				
Max Q Clear Time (g_c+I1), s	4.8	42.4		32.0	12.2	36.3		21.4				
Green Ext Time (p_c), s	0.0	23.6		1.1	0.1	15.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay, s/veh			31.8									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	90	155	60	105	135	130	1295	40	105	1225	120
Future Volume (veh/h)	145	90	155	60	105	135	130	1295	40	105	1225	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1750	1736	1750	1723	1709	1750	1695	1750	1750	1695	1736
Adj Flow Rate, veh/h	158	98	116	65	114	107	141	1408	42	114	1332	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	1	0	2	3	0	4	0	0	4	1
Cap, veh/h	178	157	186	81	128	120	337	1671	50	181	1537	141
Arrive On Green	0.11	0.22	0.22	0.05	0.16	0.16	0.06	0.52	0.52	0.09	1.00	1.00
Sat Flow, veh/h	1654	723	856	1667	810	760	1667	3194	95	1667	2982	274
Grp Volume(v), veh/h	158	0	214	65	0	221	141	709	741	114	717	738
Grp Sat Flow(s),veh/h/ln	1654	0	1580	1667	0	1570	1667	1611	1678	1667	1611	1646
Q Serve(g_s), s	12.3	0.0	16.0	5.0	0.0	17.9	5.2	48.8	49.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.3	0.0	16.0	5.0	0.0	17.9	5.2	48.8	49.0	0.0	0.0	0.0
Prop In Lane	1.00		0.54	1.00		0.48	1.00		0.06	1.00		0.17
Lane Grp Cap(c), veh/h	178	0	342	81	0	248	337	842	878	181	830	848
V/C Ratio(X)	0.89	0.00	0.63	0.80	0.00	0.89	0.42	0.84	0.84	0.63	0.86	0.87
Avail Cap(c_a), veh/h	178	0	377	103	0	302	348	842	878	198	830	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.63	0.63	0.63
Uniform Delay (d), s/veh	57.2	0.0	46.1	61.2	0.0	53.7	13.3	26.4	26.5	52.4	0.0	0.0
Incr Delay (d2), s/veh	36.6	0.0	1.8	22.8	0.0	21.1	0.3	10.0	9.7	2.3	7.7	7.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	6.5	2.7	0.0	8.6	2.0	20.2	21.1	3.5	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	93.8	0.0	47.9	84.0	0.0	74.8	13.6	36.4	36.2	54.7	7.7	7.9
LnGrp LOS	F		D	F		E	B	D	D	D	A	A
Approach Vol, veh/h		372			286			1591			1569	
Approach Delay, s/veh		67.4			76.9			34.3			11.2	
Approach LOS		E			E			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	71.0	18.0	24.5	10.2	72.0	10.3	32.2
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.5	* 4.5	4.0	4.0
Max Green Setting (Gmax), s	8.0	66.5	14.0	25.0	7.0	* 68	8.0	31.0
Max Q Clear Time (g_c+I1), s	7.2	2.0	14.3	19.9	2.0	51.0	7.0	18.0
Green Ext Time (p_c), s	0.0	8.9	0.0	0.2	0.0	6.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	31.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	40	90	45	25	60	75	1425	75	25	1315	130
Future Volume (veh/h)	100	40	90	45	25	60	75	1425	75	25	1315	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1750	1750	1750	1750	1750	1750	1695	1627	1614	1695	1723
Adj Flow Rate, veh/h	106	43	48	48	27	32	80	1516	79	27	1399	134
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	0	0	4	9	10	4	2
Cap, veh/h	125	70	78	105	57	67	532	1725	90	476	1619	154
Arrive On Green	0.08	0.09	0.09	0.06	0.08	0.08	0.35	1.00	1.00	0.33	1.00	1.00
Sat Flow, veh/h	1628	748	835	1667	713	845	1667	3115	162	1537	2965	282
Grp Volume(v), veh/h	106	0	91	48	0	59	80	781	814	27	756	777
Grp Sat Flow(s),veh/h/ln	1628	0	1584	1667	0	1558	1667	1611	1666	1537	1611	1637
Q Serve(g_s), s	8.4	0.0	7.2	3.6	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.4	0.0	7.2	3.6	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.53	1.00		0.54	1.00		0.10	1.00		0.17
Lane Grp Cap(c), veh/h	125	0	148	105	0	124	532	892	923	476	880	894
V/C Ratio(X)	0.85	0.00	0.61	0.46	0.00	0.47	0.15	0.88	0.88	0.06	0.86	0.87
Avail Cap(c_a), veh/h	125	0	353	115	0	336	532	892	923	476	880	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.44	0.44	0.44	0.36	0.36	0.36
Uniform Delay (d), s/veh	59.2	0.0	56.7	58.7	0.0	57.2	5.1	0.0	0.0	4.5	0.0	0.0
Incr Delay (d2), s/veh	37.1	0.0	1.5	1.1	0.0	1.0	0.0	5.7	5.8	0.0	4.2	4.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	3.0	1.6	0.0	1.9	0.6	1.4	1.5	0.2	1.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	96.3	0.0	58.2	59.9	0.0	58.3	5.1	5.7	5.8	4.5	4.2	4.5
LnGrp LOS	F		E	E		E	A	A	A	A	A	A
Approach Vol, veh/h		197			107			1675			1560	
Approach Delay, s/veh		78.7			59.0			5.7			4.4	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.6	75.0	14.0	14.4	25.6	76.0	12.2	16.2
Change Period (Y+Rc), s	4.0	4.5	4.0	4.0	4.0	4.5	4.0	4.0
Max Green Setting (Gmax), s	5.0	70.5	10.0	28.0	4.0	71.5	9.0	29.0
Max Q Clear Time (g_c+I1), s	12.0	2.0	10.4	6.7	2.0	2.0	5.6	9.2
Green Ext Time (p_c), s	0.0	10.0	0.0	0.1	0.0	10.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	10.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	145	110	155	180	210	100	1255	230	185	1205	175
Future Volume (veh/h)	175	145	110	155	180	210	100	1255	230	185	1205	175
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1723	1695	1736	1709	1736	1723	1709	1682	1736	1709	1723
Adj Flow Rate, veh/h	184	153	94	163	189	187	105	1321	227	195	1268	175
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	4	1	3	1	2	3	5	1	3	2
Cap, veh/h	175	176	108	239	167	165	164	1298	220	195	1452	199
Arrive On Green	0.11	0.18	0.18	0.14	0.22	0.22	0.04	0.47	0.47	0.08	0.51	0.50
Sat Flow, veh/h	1628	982	603	1654	773	765	1641	2766	470	1654	2859	392
Grp Volume(v), veh/h	184	0	247	163	0	376	105	769	779	195	717	726
Grp Sat Flow(s),veh/h/ln	1628	0	1585	1654	0	1538	1641	1624	1612	1654	1624	1628
Q Serve(g_s), s	14.0	0.0	19.7	12.2	0.0	28.0	0.5	61.0	61.0	11.0	50.6	51.6
Cycle Q Clear(g_c), s	14.0	0.0	19.7	12.2	0.0	28.0	0.5	61.0	61.0	11.0	50.6	51.6
Prop In Lane	1.00		0.38	1.00		0.50	1.00		0.29	1.00		0.24
Lane Grp Cap(c), veh/h	175	0	283	239	0	331	164	762	757	195	824	826
V/C Ratio(X)	1.05	0.00	0.87	0.68	0.00	1.13	0.64	1.01	1.03	1.00	0.87	0.88
Avail Cap(c_a), veh/h	175	0	317	239	0	331	171	762	757	195	824	826
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.62	0.62	0.62	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.0	0.0	51.9	52.8	0.0	51.0	57.0	34.5	34.6	41.3	28.2	28.5
Incr Delay (d2), s/veh	81.7	0.0	19.2	6.5	0.0	91.2	3.4	28.0	33.7	63.9	12.1	12.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	0.0	9.3	5.5	0.0	19.1	3.5	28.9	30.0	6.4	21.6	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	139.7	0.0	71.2	59.3	0.0	142.2	60.5	62.5	68.3	105.2	40.2	41.3
LnGrp LOS	F		E	E		F	E	F	F	F	D	D
Approach Vol, veh/h		431			539			1653			1638	
Approach Delay, s/veh		100.4			117.1			65.1			48.5	
Approach LOS		F			F			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	70.0	18.0	32.0	15.0	65.0	22.8	27.2
Change Period (Y+Rc), s	4.5	* 4.5	4.0	4.0	4.0	4.5	4.0	4.0
Max Green Setting (Gmax), s	6.0	* 66	14.0	28.0	11.0	60.5	16.0	26.0
Max Q Clear Time (g_c+I1), s	12.5	53.6	16.0	30.0	13.0	63.0	14.2	21.7
Green Ext Time (p_c), s	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	68.8
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	1460	65	95	1555	295	80	125	85	125	55	70
Future Volume (veh/h)	100	1460	65	95	1555	295	80	125	85	125	55	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1695	1641	1709	1695	1695	1709	1709	1668	1750	1750	1709
Adj Flow Rate, veh/h	109	1587	68	103	1690	308	87	136	0	136	60	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	4	8	3	4	4	3	3	6	0	0	3
Cap, veh/h	119	1668	71	156	1489	262	112	156		235	92	467
Arrive On Green	0.04	0.53	0.53	0.05	0.55	0.54	0.32	0.32	0.00	0.32	0.32	0.32
Sat Flow, veh/h	1654	3144	134	1628	2726	479	228	484	1414	581	284	1446
Grp Volume(v), veh/h	109	810	845	103	973	1025	223	0	0	196	0	38
Grp Sat Flow(s),veh/h/ln	1654	1611	1667	1628	1611	1595	712	0	1414	865	0	1446
Q Serve(g_s), s	4.2	61.7	62.7	2.5	71.0	71.0	15.5	0.0	0.0	0.0	0.0	2.4
Cycle Q Clear(g_c), s	4.2	61.7	62.7	2.5	71.0	71.0	41.3	0.0	0.0	25.8	0.0	2.4
Prop In Lane	1.00		0.08	1.00		0.30	0.39		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	119	855	885	156	880	871	268	0		326	0	467
V/C Ratio(X)	0.92	0.95	0.96	0.66	1.11	1.18	0.83	0.00		0.60	0.00	0.08
Avail Cap(c_a), veh/h	119	855	885	156	880	871	268	0		326	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	61.0	28.8	29.0	58.2	29.5	29.6	50.7	0.0	0.0	38.2	0.0	30.6
Incr Delay (d2), s/veh	56.5	20.4	21.2	8.6	63.9	91.4	21.1	0.0	0.0	4.6	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	27.4	28.9	3.6	41.3	47.6	8.9	0.0	0.0	5.9	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	117.5	49.2	50.2	66.8	93.4	121.0	71.8	0.0	0.0	42.8	0.0	30.7
LnGrp LOS	F	D	D	E	F	F	E			D		C
Approach Vol, veh/h		1764			2101			223			234	
Approach Delay, s/veh		53.9			105.6			71.8			40.9	
Approach LOS		D			F			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	75.0		46.0	11.0	73.0		46.0				
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0				
Max Green Setting (Gmax), s	5.0	70.5		42.0	7.0	68.5		42.0				
Max Q Clear Time (g_c+I1), s	6.2	73.0		43.3	4.5	64.7		27.8				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	3.5		1.9				

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		79.2
HCM 6th LOS		E

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	115	100	355	105	125	105	1185	260	195	1510	50
Future Volume (veh/h)	20	115	100	355	105	125	105	1185	260	195	1510	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1723	1750	1723	1750	1750	1750	1695	1682	1709	1709	1695
Adj Flow Rate, veh/h	21	121	83	374	111	33	111	1247	116	205	1589	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	0	2	0	0	0	4	5	3	3	4
Cap, veh/h	154	88	60	458	252	213	254	1667	735	200	1555	50
Arrive On Green	0.09	0.09	0.09	0.14	0.14	0.14	0.15	0.52	0.52	0.25	0.97	0.95
Sat Flow, veh/h	1667	949	651	3183	1750	1477	1667	3221	1420	1628	3208	103
Grp Volume(v), veh/h	21	0	204	374	111	33	111	1247	116	205	802	838
Grp Sat Flow(s),veh/h/ln	1667	0	1600	1591	1750	1477	1667	1611	1420	1628	1624	1687
Q Serve(g_s), s	1.5	0.0	12.0	14.8	7.5	2.5	7.9	39.6	5.6	16.0	63.0	63.0
Cycle Q Clear(g_c), s	1.5	0.0	12.0	14.8	7.5	2.5	7.9	39.6	5.6	16.0	63.0	63.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	154	0	148	458	252	213	254	1667	735	200	787	818
V/C Ratio(X)	0.14	0.00	1.38	0.82	0.44	0.16	0.44	0.75	0.16	1.02	1.02	1.03
Avail Cap(c_a), veh/h	154	0	148	808	444	375	254	1667	735	200	787	818
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00	0.65	0.65	0.65
Uniform Delay (d), s/veh	54.2	0.0	59.0	54.0	50.9	48.7	50.1	24.7	16.5	49.0	2.0	2.1
Incr Delay (d2), s/veh	0.2	0.0	207.8	1.8	0.6	0.2	0.7	3.1	0.5	57.4	30.7	32.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	13.4	6.1	3.4	1.0	3.3	15.3	1.9	8.6	7.4	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	54.5	0.0	266.8	55.8	51.4	48.9	50.8	27.8	16.9	106.4	32.7	34.1
LnGrp LOS	D		F	E	D	D	D	C	B	F	F	F
Approach Vol, veh/h		225			518			1474			1845	
Approach Delay, s/veh		247.0			54.4			28.7			41.5	
Approach LOS		F			D			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	24.3	67.0		22.7	20.0	71.3		16.0
Change Period (Y+Rc), s	4.5	* 5.4		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	6.0	* 62		33.0	16.0	52.5		12.0
Max Q Clear Time (g_c+I1), s	9.9	65.0		16.8	18.0	41.6		14.0
Green Ext Time (p_c), s	0.0	0.0		1.4	0.0	9.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	49.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	255	60	60	25	50	15	50	1260	30	15	1675	340
Future Volume (veh/h)	255	60	60	25	50	15	50	1260	30	15	1675	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1627	1409	1750	1695	1654	1750	1695	1750	1750	1682	1750
Adj Flow Rate, veh/h	266	63	49	26	52	9	52	1312	30	16	1745	222
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	9	25	0	4	7	0	4	0	0	5	0
Cap, veh/h	345	166	129	154	73	13	85	2090	48	23	1920	872
Arrive On Green	0.16	0.20	0.20	0.02	0.05	0.05	0.05	0.65	0.64	0.01	0.60	0.60
Sat Flow, veh/h	1654	848	660	1667	1403	243	1667	3219	74	1667	3195	1451
Grp Volume(v), veh/h	266	0	112	26	0	61	52	656	686	16	1745	222
Grp Sat Flow(s),veh/h/ln	1654	0	1508	1667	0	1646	1667	1611	1682	1667	1598	1451
Q Serve(g_s), s	19.2	0.0	8.4	1.9	0.0	4.7	4.0	31.3	31.4	1.2	62.4	3.6
Cycle Q Clear(g_c), s	19.2	0.0	8.4	1.9	0.0	4.7	4.0	31.3	31.4	1.2	62.4	3.6
Prop In Lane	1.00		0.44	1.00		0.15	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	345	0	295	154	0	85	85	1046	1092	23	1920	872
V/C Ratio(X)	0.77	0.00	0.38	0.17	0.00	0.71	0.61	0.63	0.63	0.71	0.91	0.25
Avail Cap(c_a), veh/h	345	0	295	181	0	99	90	1046	1092	64	1920	872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	0.0	45.4	57.0	0.0	60.7	60.4	13.5	13.5	63.9	22.8	1.8
Incr Delay (d2), s/veh	9.4	0.0	0.3	0.2	0.0	14.1	5.1	2.0	1.9	14.2	7.9	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	3.2	0.8	0.0	2.3	1.8	10.7	11.2	0.6	23.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.6	0.0	45.7	57.2	0.0	74.8	65.5	15.5	15.5	78.1	30.7	2.5
LnGrp LOS	E		D	E		E	E	B	B	E	C	A
Approach Vol, veh/h		378			87			1394			1983	
Approach Delay, s/veh		52.7			69.5			17.3			27.9	
Approach LOS		D			E			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	82.1	25.1	10.7	5.8	88.4	6.4	29.4
Change Period (Y+Rc), s	5.4	* 5.4	4.0	4.0	4.0	5.4	4.0	4.0
Max Green Setting (Gmax), s	7.0	* 77	21.1	7.8	5.0	78.7	4.5	24.4
Max Q Clear Time (g_c+I1), s	6.0	64.4	21.2	6.7	3.2	33.4	3.9	10.4
Green Ext Time (p_c), s	0.0	7.4	0.0	0.0	0.0	6.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	27.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	275	415	390	60	15	140
Future Vol, veh/h	275	415	390	60	15	140
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	3	1	0	0	1
Mvmt Flow	306	461	433	67	17	156

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	501	0	-	0	1541	468
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	1073	-
Critical Hdwy	4.1	-	-	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.309
Pot Cap-1 Maneuver	1074	-	-	-	128	597
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	331	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1073	-	-	-	79	596
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	331	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	3.9	0	23.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1073	-	-	-	365
HCM Lane V/C Ratio	0.285	-	-	-	0.472
HCM Ctrl Dly (s/v)	9.7	0	-	-	23.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q (veh)	1.2	-	-	-	2.4

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	350	80	45	350	100	25
Future Vol, veh/h	350	80	45	350	100	25
Conflicting Peds, #/hr	0	3	3	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	1	6	1	2	0
Mvmt Flow	389	89	50	389	111	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	481	0	926	439
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	489	-
Critical Hdwy	-	-	4.16	-	6.42	6.2
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.3
Pot Cap-1 Maneuver	-	-	1061	-	298	622
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1058	-	279	619
Mov Cap-2 Maneuver	-	-	-	-	279	-
Stage 1	-	-	-	-	649	-
Stage 2	-	-	-	-	579	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1	25.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	313	-	-	1058	-
HCM Lane V/C Ratio	0.444	-	-	0.047	-
HCM Ctrl Dly (s/v)	25.4	-	-	8.6	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q (veh)	2.2	-	-	0.1	-

Intersection						
Int Delay, s/veh	9.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	30	215	145	105	135
Future Vol, veh/h	140	30	215	145	105	135
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	4	2	1	1	2
Mvmt Flow	156	33	239	161	117	150

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	834	195	270	0	-	0
Stage 1	195	-	-	-	-	-
Stage 2	639	-	-	-	-	-
Critical Hdwy	6.42	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	338	841	1293	-	-	-
Stage 1	838	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	268	839	1289	-	-	-
Mov Cap-2 Maneuver	268	-	-	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	526	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	34.2	5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1289	-	305	-	-
HCM Lane V/C Ratio	0.185	-	0.619	-	-
HCM Ctrl Dly (s/v)	8.4	0	34.2	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q (veh)	0.7	-	3.9	-	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	60	20	30	30	5	25	35	105	5	15	15
Future Vol, veh/h	15	60	20	30	30	5	25	35	105	5	15	15
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	8	100	0	4	0	0	33	0
Mvmt Flow	17	67	22	33	33	6	28	39	117	6	17	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	39	0	0	90	0	0	232	218	79	292	226	36
Stage 1	-	-	-	-	-	-	113	113	-	102	102	-
Stage 2	-	-	-	-	-	-	119	105	-	190	124	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.54	6.2	7.1	6.83	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.54	-	6.1	5.83	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.036	3.3	3.5	4.297	3.3
Pot Cap-1 Maneuver	1584	-	-	1518	-	-	727	677	987	664	623	1042
Stage 1	-	-	-	-	-	-	897	798	-	909	754	-
Stage 2	-	-	-	-	-	-	890	804	-	816	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1584	-	-	1517	-	-	682	654	986	545	602	1042
Mov Cap-2 Maneuver	-	-	-	-	-	-	682	654	-	545	602	-
Stage 1	-	-	-	-	-	-	886	788	-	899	737	-
Stage 2	-	-	-	-	-	-	837	786	-	676	728	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1.2	3.4	10.5	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	839	1584	-	-	1517	-	-	722
HCM Lane V/C Ratio	0.219	0.011	-	-	0.022	-	-	0.054
HCM Ctrl Dly (s/v)	10.5	7.3	0	-	7.4	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q (veh)	0.8	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	185	10	25	160	45	5	20	20	25	25	10
Future Vol, veh/h	15	185	10	25	160	45	5	20	20	25	25	10
Conflicting Peds, #/hr	0	0	1	1	0	0	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	3	0	0	0	6	0	0	0
Mvmt Flow	17	206	11	28	178	50	6	22	22	28	28	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	228	0	0	218	0	0	530	531	215	529	511	207
Stage 1	-	-	-	-	-	-	247	247	-	259	259	-
Stage 2	-	-	-	-	-	-	283	284	-	270	252	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1352	-	-	1364	-	-	463	457	815	463	469	839
Stage 1	-	-	-	-	-	-	761	706	-	750	697	-
Stage 2	-	-	-	-	-	-	728	680	-	740	702	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1352	-	-	1363	-	-	421	439	813	420	451	836
Mov Cap-2 Maneuver	-	-	-	-	-	-	421	439	-	420	451	-
Stage 1	-	-	-	-	-	-	750	695	-	740	680	-
Stage 2	-	-	-	-	-	-	670	664	-	686	691	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.5	0.8	12.2	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	549	1352	-	-	1363	-	-	473
HCM Lane V/C Ratio	0.091	0.012	-	-	0.02	-	-	0.141
HCM Ctrl Dly (s/v)	12.2	7.7	0	-	7.7	0	-	13.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q (veh)	0.3	0	-	-	0.1	-	-	0.5

Intersection												
Int Delay, s/veh	3.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	305	15	15	370	70	20	15	65	60	10	20
Future Vol, veh/h	10	305	15	15	370	70	20	15	65	60	10	20
Conflicting Peds, #/hr	8	0	1	1	0	8	4	0	1	1	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	50	2	0	0	3	7	0	0	0	4	0	0
Mvmt Flow	11	324	16	16	394	74	21	16	69	64	11	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	341	0	0	838	863	172	664	834	443
Stage 1	-	-	-	-	-	-	355	355	-	471	471	-
Stage 2	-	-	-	-	-	-	483	508	-	193	363	-
Critical Hdwy	4.85	-	-	4.1	-	-	7.3	6.5	6.9	7.36	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.16	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.56	5.5	-
Follow-up Hdwy	2.675	-	-	2.2	-	-	3.5	4	3.3	3.538	4	3.3
Pot Cap-1 Maneuver	841	-	-	1229	-	-	275	295	848	356	306	619
Stage 1	-	-	-	-	-	-	641	633	-	568	563	-
Stage 2	-	-	-	-	-	-	569	542	-	786	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	835	-	-	1228	-	-	250	283	846	302	293	612
Mov Cap-2 Maneuver	-	-	-	-	-	-	250	283	-	302	293	-
Stage 1	-	-	-	-	-	-	630	622	-	555	548	-
Stage 2	-	-	-	-	-	-	527	528	-	691	617	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.4	0.3	14.7	19.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	477	835	-	-	1228	-	-	339
HCM Lane V/C Ratio	0.223	0.013	-	-	0.013	-	-	0.282
HCM Ctrl Dly (s/v)	14.7	9.4	0.1	-	8	0	-	19.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q (veh)	0.8	0	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑	↰	↱
Traffic Vol, veh/h	0	0	0	470	10	135
Future Vol, veh/h	0	0	0	470	10	135
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Free
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	3	0	0
Mvmt Flow	0	0	0	522	11	150

Major/Minor		Major2		Minor1	
Conflicting Flow All		-	-	522	-
Stage 1		-	-	0	-
Stage 2		-	-	522	-
Critical Hdwy		-	-	6.4	-
Critical Hdwy Stg 1		-	-	-	-
Critical Hdwy Stg 2		-	-	5.4	-
Follow-up Hdwy		-	-	3.5	-
Pot Cap-1 Maneuver		0	-	519	0
Stage 1		0	-	-	0
Stage 2		0	-	599	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver		-	-	519	-
Mov Cap-2 Maneuver		-	-	519	-
Stage 1		-	-	-	-
Stage 2		-	-	599	-

Approach	WB	NB
HCM Ctrl Dly, s/v	0	12.1
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	NBLn2	WBT
Capacity (veh/h)	519	-	-
HCM Lane V/C Ratio	0.021	-	-
HCM Ctrl Dly (s/v)	12.1	0	-
HCM Lane LOS	B	A	-
HCM 95th %tile Q (veh)	0.1	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	85	0	25	0	390	130	25	165	0
Future Vol, veh/h	0	0	0	85	0	25	0	390	130	25	165	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	90	92	92	92
Heavy Vehicles, %	2	0	0	0	0	2	4	2	2	2	2	2
Mvmt Flow	0	0	0	92	0	27	0	424	144	27	179	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	801	-	729	729	496	-	0	0	568	0	0
Stage 1	-	233	-	496	496	-	-	-	-	-	-	-
Stage 2	-	568	-	233	233	-	-	-	-	-	-	-
Critical Hdwy	-	6.5	-	7.1	6.5	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	-	4	-	3.5	4	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	320	0	341	352	574	0	-	-	1004	-	0
Stage 1	0	716	0	559	549	-	0	-	-	-	-	0
Stage 2	0	510	0	775	716	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	310	-	333	341	574	-	-	-	1004	-	-
Mov Cap-2 Maneuver	-	310	-	333	341	-	-	-	-	-	-	-
Stage 1	-	695	-	559	549	-	-	-	-	-	-	-
Stage 2	-	510	-	752	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	19.4	0	1.1
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	368	1004	-
HCM Lane V/C Ratio	-	-	-	0.325	0.027	-
HCM Ctrl Dly (s/v)	-	-	0	19.4	8.7	0
HCM Lane LOS	-	-	A	C	A	A
HCM 95th %tile Q (veh)	-	-	-	1.4	0.1	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	60	5	120	160	40	25	65	210	50	75	15
Future Vol, veh/h	15	60	5	120	160	40	25	65	210	50	75	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	1	1	0	0	3	2	3	0	0
Mvmt Flow	16	66	5	132	176	44	27	71	231	55	82	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	9.8	14.1	12.2	10.6
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	19%	38%	36%
Vol Thru, %	22%	75%	50%	54%
Vol Right, %	70%	6%	13%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	80	320	140
LT Vol	25	15	120	50
Through Vol	65	60	160	75
RT Vol	210	5	40	15
Lane Flow Rate	330	88	352	154
Geometry Grp	1	1	1	1
Degree of Util (X)	0.457	0.141	0.523	0.244
Departure Headway (Hd)	4.989	5.791	5.35	5.703
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	719	617	672	628
Service Time	3.033	3.848	3.39	3.755
HCM Lane V/C Ratio	0.459	0.143	0.524	0.245
HCM Control Delay, s/veh	12.2	9.8	14.1	10.6
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.4	0.5	3.1	1

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	505	145	35	550	5	70	0	20	5	0	5
Future Vol, veh/h	5	505	145	35	550	5	70	0	20	5	0	5
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	2	1	0	1	0	1	0	6	0	0	0
Mvmt Flow	5	537	154	37	585	5	74	0	21	5	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	590	0	0	692	0	0	1289	1289	618	1300	1364	588
Stage 1	-	-	-	-	-	-	625	625	-	662	662	-
Stage 2	-	-	-	-	-	-	664	664	-	638	702	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.11	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.509	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	995	-	-	912	-	-	141	165	482	140	149	513
Stage 1	-	-	-	-	-	-	474	480	-	454	462	-
Stage 2	-	-	-	-	-	-	452	461	-	468	443	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	995	-	-	911	-	-	132	154	480	127	139	513
Mov Cap-2 Maneuver	-	-	-	-	-	-	132	154	-	127	139	-
Stage 1	-	-	-	-	-	-	470	476	-	450	434	-
Stage 2	-	-	-	-	-	-	420	433	-	442	439	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.1	0.5	58.5	23.6
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	157	995	-	-	911	-	-	204
HCM Lane V/C Ratio	0.61	0.005	-	-	0.041	-	-	0.052
HCM Ctrl Dly (s/v)	58.5	8.6	0	-	9.1	0	-	23.6
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q (veh)	3.3	0	-	-	0.1	-	-	0.2

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	540	450	80	65	95
Future Vol, veh/h	20	540	450	80	65	95
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	3	1	2	5
Mvmt Flow	22	581	484	86	70	102

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	576	0	-	0	1161	533
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	628	-
Critical Hdwy	4.1	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	1007	-	-	-	216	541
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1001	-	-	-	209	538
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	530	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.3	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1001	-	-	-	439
HCM Lane V/C Ratio	0.021	-	-	-	0.392
HCM Ctrl Dly (s/v)	8.7	-	-	-	18.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q (veh)	0.1	-	-	-	1.8

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	275	320	35	235	445
Future Vol, veh/h	50	275	320	35	235	445
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	200	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	2	3	3	1	3
Mvmt Flow	53	289	337	37	247	468

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1318	356	0	0	374	0
Stage 1	356	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Critical Hdwy	6.45	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	171	688	-	-	1190	-
Stage 1	702	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	135	688	-	-	1190	-
Mov Cap-2 Maneuver	135	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	290	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	19.2	0	3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	135	688	1190	-
HCM Lane V/C Ratio	-	-	0.39	0.421	0.208	-
HCM Ctrl Dly (s/v)	-	-	47.8	14	8.8	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q (veh)	-	-	1.7	2.1	0.8	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	160	95	175	210	55	75	270	90	45	285	40
Future Volume (veh/h)	95	160	95	175	210	55	75	270	90	45	285	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1736	1682	1736	1723	1709	1682	1723	1750	1750	1709	1654
Adj Flow Rate, veh/h	108	182	78	199	239	49	85	307	87	51	324	38
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	1	5	1	2	3	5	2	0	0	3	7
Cap, veh/h	412	421	180	431	507	104	367	434	123	341	483	57
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.06	0.34	0.33	0.04	0.32	0.31
Sat Flow, veh/h	1108	1144	490	1127	1380	283	1602	1283	364	1667	1497	176
Grp Volume(v), veh/h	108	0	260	199	0	288	85	0	394	51	0	362
Grp Sat Flow(s),veh/h/ln	1108	0	1635	1127	0	1663	1602	0	1647	1667	0	1672
Q Serve(g_s), s	3.9	0.0	5.7	7.7	0.0	6.3	1.7	0.0	9.9	1.0	0.0	8.9
Cycle Q Clear(g_c), s	10.2	0.0	5.7	13.3	0.0	6.3	1.7	0.0	9.9	1.0	0.0	8.9
Prop In Lane	1.00		0.30	1.00		0.17	1.00		0.22	1.00		0.10
Lane Grp Cap(c), veh/h	412	0	601	431	0	611	367	0	558	341	0	540
V/C Ratio(X)	0.26	0.00	0.43	0.46	0.00	0.47	0.23	0.00	0.71	0.15	0.00	0.67
Avail Cap(c_a), veh/h	914	0	1342	942	0	1365	479	0	1300	412	0	1250
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	11.3	16.3	0.0	11.5	10.9	0.0	13.7	11.2	0.0	13.9
Incr Delay (d2), s/veh	0.2	0.0	0.4	0.6	0.0	0.4	0.2	0.0	2.5	0.1	0.0	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	1.8	1.8	0.0	2.0	0.5	0.0	3.2	0.3	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.6	0.0	11.7	16.9	0.0	11.9	11.1	0.0	16.2	11.3	0.0	16.1
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		368			487			479			413	
Approach Delay, s/veh		12.8			13.9			15.3			15.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	19.3		21.5	6.0	20.1		21.5
Change Period (Y+Rc), s	4.0	4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	6.0	35.0		39.0	4.0	37.0		39.0
Max Q Clear Time (g_c+I1), s	3.7	10.9		15.3	3.0	11.9		12.2
Green Ext Time (p_c), s	0.0	3.6		2.1	0.0	3.6		1.7

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	14.5
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	5	10	15	60	5	80	10	90	80	35	80	5
Future Vol, veh/h	5	10	15	60	5	80	10	90	80	35	80	5
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	6	0	3	0	8	10	9	5	0
Mvmt Flow	6	11	17	67	6	89	11	100	89	39	89	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	387	385	95	352	344	146	98	0	0	190	0	0
Stage 1	173	173	-	168	168	-	-	-	-	-	-	-
Stage 2	214	212	-	184	176	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.16	6.5	6.23	4.1	-	-	4.19	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.554	4	3.327	2.2	-	-	2.281	-	-
Pot Cap-1 Maneuver	575	552	967	595	582	898	1508	-	-	1343	-	-
Stage 1	834	760	-	825	763	-	-	-	-	-	-	-
Stage 2	793	731	-	809	757	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	497	528	964	558	557	897	1504	-	-	1342	-	-
Mov Cap-2 Maneuver	497	528	-	558	557	-	-	-	-	-	-	-
Stage 1	825	734	-	818	756	-	-	-	-	-	-	-
Stage 2	703	724	-	759	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.6	11.6	0.4	2.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1504	-	-	673	705	1342	-	-
HCM Lane V/C Ratio	0.007	-	-	0.05	0.229	0.029	-	-
HCM Ctrl Dly (s/v)	7.4	0	-	10.6	11.6	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q (veh)	0	-	-	0.2	0.9	0.1	-	-

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	40	150	20	5	260	105	10	50	5	45	65	45
Future Vol, veh/h	40	150	20	5	260	105	10	50	5	45	65	45
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	2	0	5	4	6	0	5	0	6	0	3
Mvmt Flow	43	161	22	5	280	113	11	54	5	48	70	48
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.7	13.3	9.5	10.5
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	19%	1%	29%
Vol Thru, %	77%	71%	70%	42%
Vol Right, %	8%	10%	28%	29%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	65	210	370	155
LT Vol	10	40	5	45
Through Vol	50	150	260	65
RT Vol	5	20	105	45
Lane Flow Rate	70	226	398	167
Geometry Grp	1	1	1	1
Degree of Util (X)	0.112	0.325	0.536	0.258
Departure Headway (Hd)	5.764	5.188	4.854	5.571
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	621	693	748	645
Service Time	3.807	3.22	2.854	3.607
HCM Lane V/C Ratio	0.113	0.326	0.532	0.259
HCM Control Delay, s/veh	9.5	10.7	13.3	10.5
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0.4	1.4	3.2	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	100	40	75	130	20	290	35	130	15	35	165
Future Volume (veh/h)	150	100	40	75	130	20	290	35	130	15	35	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1600	1627	1750	1750	1695	1750	1736	1695	1723	1750	1750	1723
Adj Flow Rate, veh/h	167	111	31	83	144	19	322	39	72	17	39	91
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	11	9	0	0	4	0	1	4	2	0	0	2
Cap, veh/h	694	909	1106	777	777	103	389	138	255	231	48	112
Arrive On Green	0.06	0.56	0.56	0.04	0.53	0.53	0.19	0.26	0.26	0.03	0.10	0.10
Sat Flow, veh/h	1524	1627	1480	1667	1467	194	1654	525	969	1667	465	1084
Grp Volume(v), veh/h	167	111	31	83	0	163	322	0	111	17	0	130
Grp Sat Flow(s),veh/h/ln	1524	1627	1480	1667	0	1660	1654	0	1494	1667	0	1549
Q Serve(g_s), s	6.7	4.5	0.8	3.2	0.0	7.2	23.5	0.0	8.3	1.3	0.0	11.5
Cycle Q Clear(g_c), s	6.7	4.5	0.8	3.2	0.0	7.2	23.5	0.0	8.3	1.3	0.0	11.5
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.65	1.00		0.70
Lane Grp Cap(c), veh/h	694	909	1106	777	0	880	389	0	393	231	0	160
V/C Ratio(X)	0.24	0.12	0.03	0.11	0.00	0.19	0.83	0.00	0.28	0.07	0.00	0.81
Avail Cap(c_a), veh/h	823	909	1106	812	0	880	527	0	672	280	0	365
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.4	14.6	4.6	13.9	0.0	17.2	42.8	0.0	41.0	53.4	0.0	61.5
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.1	0.0	0.5	7.9	0.0	0.4	0.1	0.0	9.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.8	0.2	1.3	0.0	2.9	10.5	0.0	3.1	0.5	0.0	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	12.5	14.8	4.6	14.0	0.0	17.6	50.7	0.0	41.4	53.6	0.0	71.0
LnGrp LOS	B	B	A	B		B	D		D	D		E
Approach Vol, veh/h		309			246			433			147	
Approach Delay, s/veh		12.5			16.4			48.3			69.0	
Approach LOS		B			B			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	82.2	7.9	40.9	13.1	78.2	30.3	18.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	8.0	45.0	8.0	63.0	21.0	32.0	38.0	33.0
Max Q Clear Time (g_c+I1), s	5.2	6.5	3.3	10.3	8.7	9.2	25.5	13.5
Green Ext Time (p_c), s	0.0	0.8	0.0	0.7	0.4	0.9	0.8	0.6

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		34.3
HCM 6th LOS		C

Notes

User approved changes to right turn type.

Intersection	
Int Delay, s/veh	17.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	95	85	5	10	45	95	5	110	5	125	120	75
Future Vol, veh/h	95	85	5	10	45	95	5	110	5	125	120	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	16	0	11	8	2	0	2	0	2	2	2
Mvmt Flow	106	94	6	11	50	106	6	122	6	139	133	83

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	156	0	0	100	0	0	542	487	97	498	437	103
Stage 1	-	-	-	-	-	-	309	309	-	125	125	-
Stage 2	-	-	-	-	-	-	233	178	-	373	312	-
Critical Hdwy	4.12	-	-	4.21	-	-	7.1	6.52	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.299	-	-	3.5	4.018	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	1424	-	-	1438	-	-	454	481	965	483	513	952
Stage 1	-	-	-	-	-	-	705	660	-	879	792	-
Stage 2	-	-	-	-	-	-	775	752	-	648	658	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1424	-	-	1438	-	-	303	440	965	354	469	952
Mov Cap-2 Maneuver	-	-	-	-	-	-	303	440	-	354	469	-
Stage 1	-	-	-	-	-	-	649	608	-	810	786	-
Stage 2	-	-	-	-	-	-	583	746	-	474	606	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	4	0.5	16.6	33.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	442	1424	-	-	1438	-	-	465
HCM Lane V/C Ratio	0.302	0.074	-	-	0.008	-	-	0.765
HCM Ctrl Dly (s/v)	16.6	7.7	0	-	7.5	0	-	33.7
HCM Lane LOS	C	A	A	-	A	A	-	D
HCM 95th %tile Q (veh)	1.3	0.2	-	-	0	-	-	6.6

Intersection						
Int Delay, s/veh	5.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	100	95	65	160	105
Future Vol, veh/h	55	100	95	65	160	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	5	0	4	6
Mvmt Flow	61	111	106	72	178	117

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	615	142	0	0	178	0
Stage 1	142	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	458	911	-	-	1386	-
Stage 1	890	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	395	911	-	-	1386	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	545	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	13	0	4.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	622	1386	-
HCM Lane V/C Ratio	-	-	0.277	0.128	-
HCM Ctrl Dly (s/v)	-	-	13	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q (veh)	-	-	1.1	0.4	-

Intersection	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	105	20	30	40	20	30	5	140	5	20	385	105
Future Vol, veh/h	105	20	30	40	20	30	5	140	5	20	385	105
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	10	0	0	0	0	0	33	0	0	0	2	7
Mvmt Flow	117	22	33	44	22	33	6	156	6	22	428	117
Number of Lanes	0	1	1	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	2
HCM Control Delay, s/veh	12.3	11.6	11.3	30.4
HCM LOS	B	B	B	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	84%	0%	44%	100%	0%
Vol Thru, %	0%	97%	16%	0%	22%	0%	79%
Vol Right, %	0%	3%	0%	100%	33%	0%	21%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	145	125	30	90	20	490
LT Vol	5	0	105	0	40	20	0
Through Vol	0	140	20	0	20	0	385
RT Vol	0	5	0	30	30	0	105
Lane Flow Rate	6	161	139	33	100	22	544
Geometry Grp	5	5	5	5	4b	5	5
Degree of Util (X)	0.011	0.277	0.284	0.056	0.191	0.038	0.844
Departure Headway (Hd)	7.302	6.198	7.355	6.044	6.863	6.205	5.582
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	489	577	488	590	520	576	648
Service Time	5.066	3.96	5.121	3.809	4.937	3.949	3.325
HCM Lane V/C Ratio	0.012	0.279	0.285	0.056	0.192	0.038	0.84
HCM Control Delay, s/veh	10.1	11.3	13	9.2	11.6	9.2	31.3
HCM Lane LOS	B	B	B	A	B	A	D
HCM 95th-tile Q	0	1.1	1.2	0.2	0.7	0.1	9.3

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	115	10	15	245	10	15	80	90	60	320	80
Future Vol, veh/h	55	115	10	15	245	10	15	80	90	60	320	80
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	2	4	4	0	2	3	2	1	3
Mvmt Flow	60	126	11	16	269	11	16	88	99	66	352	88
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay, s/veh	14.1	17.3	13.2	27.3
HCM LOS	B	C	B	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	31%	6%	100%	0%
Vol Thru, %	0%	47%	64%	91%	0%	80%
Vol Right, %	0%	53%	6%	4%	0%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	170	180	270	60	400
LT Vol	15	0	55	15	60	0
Through Vol	0	80	115	245	0	320
RT Vol	0	90	10	10	0	80
Lane Flow Rate	16	187	198	297	66	440
Geometry Grp	5	5	2	2	5	5
Degree of Util (X)	0.035	0.356	0.378	0.544	0.131	0.793
Departure Headway (Hd)	7.711	6.851	6.882	6.604	7.164	6.492
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	463	523	522	546	500	558
Service Time	5.476	4.615	4.945	4.66	4.913	4.241
HCM Lane V/C Ratio	0.035	0.358	0.379	0.544	0.132	0.789
HCM Control Delay, s/veh	10.8	13.4	14.1	17.3	11	29.8
HCM Lane LOS	B	B	B	C	B	D
HCM 95th-tile Q	0.1	1.6	1.7	3.2	0.4	7.5

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	180	35	25	195	60	30	50	15	30	160	35
Future Vol, veh/h	50	180	35	25	195	60	30	50	15	30	160	35
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	1	0	0	4	0	5	4	0	9	0	5
Mvmt Flow	55	198	38	27	214	66	33	55	16	33	176	38
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	12.6	12.7	10.4	12.6
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	32%	19%	9%	13%
Vol Thru, %	53%	68%	70%	71%
Vol Right, %	16%	13%	21%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	265	280	225
LT Vol	30	50	25	30
Through Vol	50	180	195	160
RT Vol	15	35	60	35
Lane Flow Rate	104	291	308	247
Geometry Grp	1	1	1	1
Degree of Util (X)	0.176	0.437	0.454	0.397
Departure Headway (Hd)	6.054	5.399	5.311	5.787
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	590	664	677	621
Service Time	4.124	3.455	3.365	3.846
HCM Lane V/C Ratio	0.176	0.438	0.455	0.398
HCM Control Delay, s/veh	10.4	12.6	12.7	12.6
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.6	2.2	2.4	1.9

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	95	80	65	95	125
Future Vol, veh/h	25	95	80	65	95	125
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	5	6	3	0
Mvmt Flow	29	109	92	75	109	144
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	8.3	9	8.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	55%	21%	0%
Vol Thru, %	45%	0%	43%
Vol Right, %	0%	79%	57%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	145	120	220
LT Vol	80	25	0
Through Vol	65	0	95
RT Vol	0	95	125
Lane Flow Rate	167	138	253
Geometry Grp	1	1	1
Degree of Util (X)	0.216	0.168	0.289
Departure Headway (Hd)	4.664	4.38	4.113
Convergence, Y/N	Yes	Yes	Yes
Cap	770	819	875
Service Time	2.689	2.407	2.135
HCM Lane V/C Ratio	0.217	0.168	0.289
HCM Control Delay, s/veh	9	8.3	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.6	1.2

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	160	80	10	5	205	15	0	5	5	30	5	295
Future Vol, veh/h	160	80	10	5	205	15	0	5	5	30	5	295
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	1	0	0	0	1	0	0	0	0	0	0	1
Mvmt Flow	167	83	10	5	214	16	0	5	5	31	5	307
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay, s/veh	11.6	10.9	8.7	11.8
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	64%	2%	100%	0%
Vol Thru, %	50%	32%	91%	0%	2%
Vol Right, %	50%	4%	7%	0%	98%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	250	225	30	300
LT Vol	0	160	5	30	0
Through Vol	5	80	205	0	5
RT Vol	5	10	15	0	295
Lane Flow Rate	10	260	234	31	313
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.016	0.384	0.338	0.055	0.447
Departure Headway (Hd)	5.592	5.304	5.194	6.356	5.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	639	680	694	567	703
Service Time	3.636	3.333	3.223	4.056	2.853
HCM Lane V/C Ratio	0.016	0.382	0.337	0.055	0.445
HCM Control Delay, s/veh	8.7	11.6	10.9	9.4	12
HCM Lane LOS	A	B	B	A	B
HCM 95th-tile Q	0	1.8	1.5	0.2	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	210	210	1130	200	215	1545
Future Volume (veh/h)	210	210	1130	200	215	1545
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1709	1709	1709	1709	1709	1709
Adj Flow Rate, veh/h	228	40	1228	151	234	1679
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	254	226	1927	860	257	2541
Arrive On Green	0.16	0.16	0.59	0.59	0.16	0.78
Sat Flow, veh/h	1628	1448	3333	1448	1628	3333
Grp Volume(v), veh/h	228	40	1228	151	234	1679
Grp Sat Flow(s),veh/h/ln	1628	1448	1624	1448	1628	1624
Q Serve(g_s), s	17.9	3.1	32.1	6.1	18.4	30.3
Cycle Q Clear(g_c), s	17.9	3.1	32.1	6.1	18.4	30.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	254	226	1927	860	257	2541
V/C Ratio(X)	0.90	0.18	0.64	0.18	0.91	0.66
Avail Cap(c_a), veh/h	413	368	1927	860	313	2541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.34	0.34	0.42	0.42
Uniform Delay (d), s/veh	53.8	47.6	17.3	12.0	53.8	6.4
Incr Delay (d2), s/veh	11.1	0.2	0.6	0.2	12.7	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	2.7	11.1	1.9	8.2	7.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	64.9	47.8	17.8	12.1	66.5	7.0
LnGrp LOS	E	D	B	B	E	A
Approach Vol, veh/h	268		1379			1913
Approach Delay, s/veh	62.4		17.2			14.2
Approach LOS	E		B			B

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	105.7	24.3	24.5	81.2
Change Period (Y+Rc), s	5.4	4.0	4.0	5.4
Max Green Setting (Gmax), s	87.6	33.0	25.0	58.6
Max Q Clear Time (g_c+I1), s	32.3	19.9	20.4	34.1
Green Ext Time (p_c), s	41.2	0.4	0.2	17.7

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	19.0
HCM 6th LOS	B

APPENDIX H. TRANSPORTATION PROJECTS AND PROGRAMS

TECHNICAL MEMORANDUM #11

DATE: September 8, 2025

TO: Don Hardy and Ryan Potter | City of Canby

FROM: Reah Flisakowski, Kevin Chewuk, Eileen Chai | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update
Transportation Projects and Programs

Project #: 23023-000

This document presents the draft list of transportation system investments to address all the identified City needs, regardless of the ability to fund them. The complete list of projects is referred to as Aspirational Projects. This draft project list may be further refined based on Project Management Team, public and stakeholder and Planning Commission and City Council input.

The final steps in the TSP process include applying measurable evaluation criteria and assigning each project an initial high, medium, and low priority based on the project prioritization framework that will calculate scores using the seven TSP goals approved earlier in the process. This initial priority ranking for each project will be used to arrive at a Financially Constrained list of projects (Technical Memo #12: Draft Financially Constrained Capital Project List).

PROCESS FOR DEVELOPING PROJECTS

The project team developed the recommended transportation solutions using guidance provided by the project goals and with input from three main sources:

- Stakeholders (via committee meetings, in-person events and project website comments)
- Previous Plans (such as the 2010 Canby TSP, Canby OR 99E Corridor and Gateway Plan and Canby Walnut Street Extension)
- Independent Project Team Evaluation (Existing and Future Multimodal Transportation Conditions and Needs Evaluation)

The full list of projects in this TSP are referred to as Aspirational Projects. Aspirational projects include all identified projects for improving the transportation network along major streets in the City's Urban Growth Boundary (hereby referred to as the planning area), regardless of their priority or their likelihood to be funded. This TSP focuses on streets in the planning area with a vehicle functional classification of Neighborhood Route or higher. Additional improvements will occur with private development in the City's planning area, including the build out of the local street network consistent with the standards developed as part of this TSP.

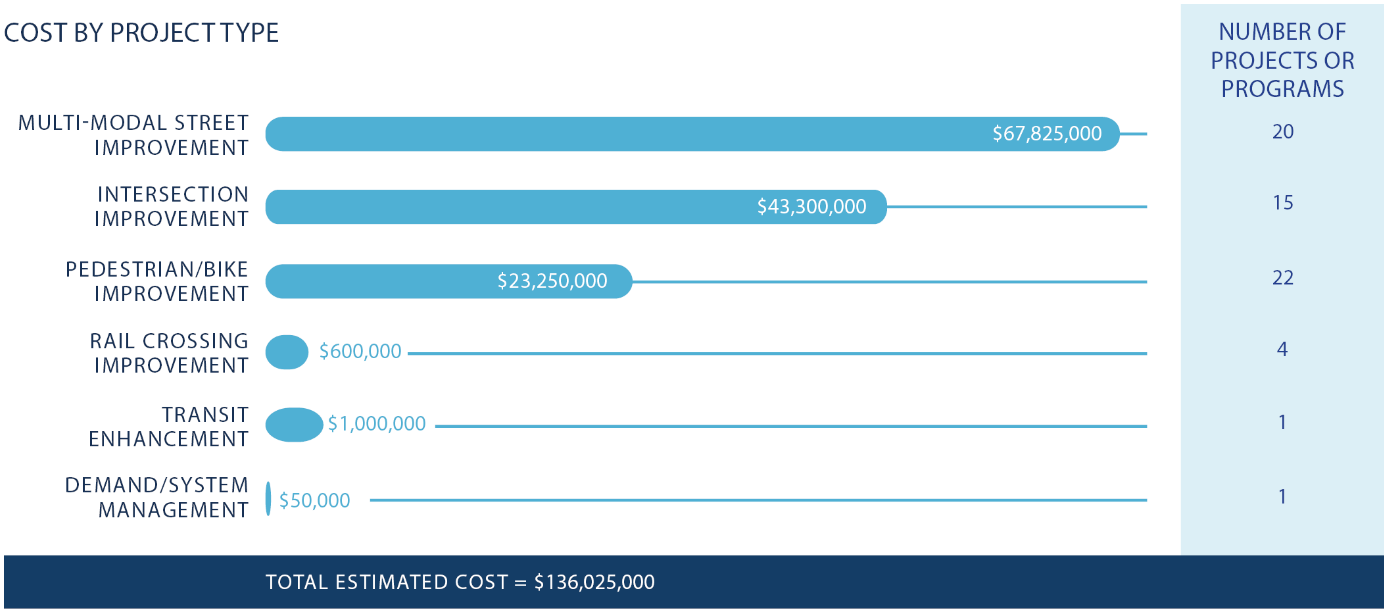
The TSP planning process screens candidate projects to set aside those that may not be feasible due to environmental or existing development limitations. The remaining projects are a combination of new and previous ideas for the transportation system that seek to address the gaps and deficiencies in the City.

ASPIRATIONAL PROJECTS

The full aspirational list includes 63 projects totaling over $136 million in total investments (see Figure 1). For the purposes of cost estimates, project design elements are identified, however, the actual design elements for any project are subject to change and will ultimately be determined through a preliminary and final design process and are subject to City, ODOT, Clackamas County, and/or other partner agency approval. The Aspirational projects were assigned to one of several categories:

- **Multi-Modal Street Improvement** – these projects will improve or construct new multi-modal streets throughout the planning area, each with facilities for motorists, pedestrians, and bicyclists. A total of 20 projects are identified that, as of 2025, will cost an estimated $67.8 million to complete.
- **Intersection Improvement** – these projects will improve safety and mobility at intersections throughout the planning area. A total of 15 projects were identified to construct new or improve existing intersections that, as of 2025, will cost an estimated $43.3 million to complete.
- **Pedestrian/ Bike Improvement** – these projects include stand-alone sidewalk, path and roadway crossing improvements, and an integrated network of bicycle lanes, marked on-street routes and shared-use paths to facilitate safe and convenient travel citywide. A total of 22 pedestrian and bicycle projects were identified that, as of 2025, will cost an estimated $23.3 million to complete.
- **Rail Crossing Improvement** – these projects will enhance the safety of rail crossings. A total of 4 projects are identified that, as of 2025, will cost an estimated $600,000.
- **Transit Enhancement** – this will enhance the quality and convenience for transit passengers. One transit project was identified that, as of 2025, will cost an estimated $1 million.
- **Demand/ System Management** – this will encourage more efficient usage of the transportation system. One project was identified that, as of 2025, will cost an estimated $50,000.

FIGURE 1: LEVEL OF INVESTMENT BY MODE OF TRAVEL



PROPOSED ASPIRATIONAL PROJECTS

Table 1 and Figure 2, Figure 3 and Figure 4include the proposed multimodal network projects for vehicles, pedestrians, bicyclists and transit riders. The proposed networks are consistent with the standards and policies established in the TSP and address the gaps and deficiencies identified in Technical Memorandum #7 and #9.

TABLE 1: DRAFT ASPIRATIONAL PROJECT LIST

PROJECT ID		PROJECT DESCRIPTION	PROJECT SUMMARY	TOTAL ESTIMATED COST (2025)
1		**OR 99E (Corridor #1) Improvements from SW Berg Parkway to Territorial Road**		
	1a	Construct a shared-use path on the north side of OR 99E for pedestrian and bicycle travel (Major Pedestrian and Bicycle Route) between Elm Street and Pine Street.	Pedestrian/ Bike Improvement	$4,875,000
	1b	Improve the SW Berg Parkway intersection. Cost assumes replacing the incandescent traffic signal bulbs with light emitting diodes (LEDs), and providing overhead lane-use signs.	Intersection Improvement	$25,000
	1c	Improve the Elm Street rail crossing to include hinged pedestrian gate skirts on the sidewalks.	Rail Crossing Improvement	$150,000
	1d	Improve the Grant Street rail crossing to include hinged pedestrian gate skirts on the sidewalks.	Rail Crossing Improvement	$150,000
	1e	Improve the Ivy Street intersection. Cost assumes left-turn traffic calming treatments (e.g., hardened centerline), signal timing adjustments for safety, and reflectorized backplates behind traffic signals and LED bulbs.	Intersection Improvement	$50,000
	1f	Improve the Ivy Street rail crossing to include hinged pedestrian gate skirts on the sidewalks.	Rail Crossing Improvement	$150,000
	1g	Improve the segment from Knott Street to Locust Street. Cost assumes installation of sidewalks on the north side.	Pedestrian/ Bike Improvement	$450,000
	1h	Improve the Pine Street intersection. Cost assumes conversion of the southbound approach to include a left-turn lane and a shared through-right turn lane and widening of the northbound approach to include a left-turn lane, through lane, and right-turn lane, and traffic signal modification.	Intersection Improvement	$2,100,000
	1i	Improve the Pine Street rail crossing to include hinged pedestrian gate skirts on the sidewalk.	Rail Crossing Improvement	$150,000
	1j	Construct a shared-use path for pedestrian and bicycle travel (Major Pedestrian and Bicycle Route) between the Logging Road Trail and the sidewalks on south side of OR 99E.	Pedestrian/ Bike Improvement	$625,000
	1k	Construct a shared-use path for pedestrian and bicycle travel (Major Pedestrian and Bicycle Route) on the north side of OR 99E between Pine Street, the Logging Road Trail and N Redwood Street.	Pedestrian/ Bike Improvement	$1,850,000
	1l	Construct a shared-use path for pedestrian and bicycle travel (Major Pedestrian and Bicycle Route) on the south side of OR 99E between N Redwood Street/Sequoia Parkway and Territorial Road.	Pedestrian/ Bike Improvement	$4,625,000
2		**Territorial Road (Corridor #2) Improvements from N Birch Street to Haines Road**		
	2a	Improve the N Birch Street intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000

	2b	Improve to a Collector Street with pedestrian and bike facilities from N Birch Street to N Holly Street. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,525,000
	2c	Provide pedestrian facilities from N Holly Street to N Locust Street. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$1,375,000
	2d	Provide pedestrian facilities from N Locust Street to N Maple Street. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$1,375,000
	2e	Improve the N Maple Street intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
	2f	Provide pedestrian facilities from N Maple Street to N Redwood Street. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$2,850,000
	2g	Improve to a Collector Street with pedestrian and bike facilities from OR 99E to Haines Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,225,000
3		**N Birch Street and N Cedar Street (Corridor #3) Improvements from Territorial Road to 3rd Avenue**		
	3a	Improve N Birch Street to include shared lane markings and route wayfinding for bikes from Territorial Road to Knights Bridge Road.	Pedestrian/ Bike Improvement	$50,000
	3b	Improve the N Birch Street/Knights Bridge Road intersection. Cost assumes restriping the N Birch Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000
	3c	Improve the N Cedar Street/Knights Bridge Road intersection. Cost assumes restriping the N Cedar Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000
	3d	Improve N Cedar Street to include shared lane markings and route wayfinding for bikes from Knights Bridge Road to 3rd Avenue.	Pedestrian/ Bike Improvement	$50,000
4		**SW Berg Parkway and 3rd Avenue (Corridor #4) Improvements from OR 99E to N Ivy Street**		
	4a	Extend SW Berg Parkway as a Collector Street with a truck route designation and pedestrian and bike facilities from OR 99E to 3rd Avenue. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,875,000
	4b	Reconfigure 3rd Avenue to provide bike lanes on both sides from the Berg Parkway extension to N Grant Street.	Pedestrian/ Bike Improvement	$75,000
	4c	Improve 3rd Avenue to include shared lane markings and route wayfinding for bikes from N Grant Street to N Ivy Street.	Pedestrian/ Bike Improvement	$25,000
5		**Walnut Street (Corridor #5) Improvements from OR 99E to 1st Avenue**		
	5a	Construct a Collector Street with a truck route designation and pedestrian and bike facilities from OR 99E to 1st Avenue. Cost assumes a 3-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$7,200,000

	5b	Improve the OR 99E intersection. Cost assumes installation of a traffic signal.	Intersection Improvement	$2,200,000
	5c	Improve the 1st Avenue intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
6		**Holly Street (Corridor #6) Improvements from 22nd Avenue to Knights Bridge Road**		
	6a	Improve to a Collector Street with pedestrian and bike facilities from 22nd Avenue to Territorial Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,400,000
	6b	Improve the Territorial Road intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
	6c	Improve to a Collector Street with pedestrian and bike facilities from Territorial Road to Knights Bridge Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side and on-street parking on one-side.	Multi-modal Street Improvement	$4,300,000
7		**10th Avenue/11th Avenue (Corridor #7) Improvements from N Birch Street to N Redwood Street**		
	7a	Improve 10th Avenue from N Birch Street to N Pine Street to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$100,000
	7b	Improve 11th Place/11th Avenue from N Pine Street to N Redwood Street to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$25,000
	7c	Consturct pedestrian facilties from N Holly Street to N Pine Street. Cost assumes sidewalks on each side.	Pedestrian/ Bike Improvement	$4,525,000
8		**4th Avenue (Corridor #8) Improvements from Pine Street to N Redwood Street**		
	8a	Improve the Pine Street intersection. Cost assumes realignment of N Pine Street to the north away from the railroad crossing to align with 4th Avenue at a new 3-leg intersection.	Multi-modal Street Improvement	$1,075,000
	8b	Extend 4th Avenue as a Collector Street with pedestrian and bike facilities from the N Pine Street realignment to N Redwood Street. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,625,000
9		**N Pine Street (Corridor #9) Improvements from 4th Avenue to Territorial Road**		
	9a	Improve to a Collector Street with pedestrian and bike facilities from the 4th Avenue extension to 15th Avenue. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,925,000
	9b	Reconfigure to provide bike facilities from 17th Avenue to Territorial Road. Cost assumes bike lanes on each side.	Pedestrian/ Bike Improvement	$25,000
10		**N Redwood Street (Corridor #10) Improvements from 11th Avenue to Territorial Road**		

	10a	Improve the N Redwood Street intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
	10b	Reconfigure to provide bike facilities from 11th Avenue to Territorial Road. Cost assumes bike lanes on each side.	Pedestrian/ Bike Improvement	$75,000
11		**N Locust Street (Corridor #11) Improvements from N Birch Street to N Redwood Street**		
	11a	Improve from NE 4th Avenue to NE 10th Avenue to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$25,000
	11b	Improve from NE Territorial Road tto 22nd Avenue to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$50,000
	11c	Improve from NE 10th Avenue to NE Territorial Road to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$50,000
12		**3rd Avenue (Corridor #12) Improvements from Elm Street to Ivy Street**		
	12a	Improve 3rd Avenue to include shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$25,000
	12b	Improve the Ivy Street intersection. Cost assumes installing a partial diverter on west leg to close westbound receiving lane and installing crosswalk, ramps, and pedestrian refuge island (remove crosswalk striping on north leg).	Pedestrian/ Bike Improvement	$125,000
13		**Township Road (Corridor #13) Improvements from Ivy Street to Mulino Road**		
	13a	Improve the S Ivy Street intersection. Cost assumes conversion of flashing yellow light to traffic signal when traffic volumes meet warrants.	Intersection Improvement	$375,000
	13b	Improve to a Collector Street with pedestrian and bike facilities from the Logging Road Trail to Sequoia Parkway. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,850,000
	13c	Improve the Sequoia Parkway intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
	13d	Improve to a Collector Street with pedestrian and bike facilities from the Sequoia Parkway to Mulino Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,050,000
	13e	Improve the Mulino Road intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
14		**4th Avenue (Corridor #14) Improvements from the Logging Road Trail to Mulino Road**		
	14a	Improve to a Collector Street with pedestrian and bike facilities from the Logging Road Trail to Sequoia Parkway. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,250,000

	14b	Extend 4th Avenue as a Collector Street with a truck route designation and pedestrian and bike facilities from Sequoia Parkway to Mulino Road. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,375,000
15		**1st Avenue and Haines Road (Corridor #15) Improvements from SE Hazeldell Way to Territorial Road**		
	15a	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from SE Hazeldell Way to Walnut Street. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,925,000
	15b	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from Walnut Street to Mulino Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,400,000
	15c	Improve the Mulino Road intersection. Cost assumes installation of a roundabout.	Intersection Improvement	$4,800,000
	15d	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from Mulino Road to Territorial Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,225,000
16		**Mulino Road (Corridor #16) Improvements from 1st Avenue to 13th Avenue**		
	16a	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from 1st Avenue to Township Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$6,475,000
	16b	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from Township Road to 13th Avenue. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,625,000
17		**13th Avenue (Corridor #17) Improvements from Redwood Street to Mulino Road**		
	17a	Improve to a Collector Street with pedestrian and bike facilities from Redwood Street to Sequoia Parkway. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,300,000
	17b	Improve to a Collector Street with a truck route designation with pedestrian and bike facilities from Sequoia Parkway to Mulino Road. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,200,000
A		**Transit Service Enhancements**		
	A1	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, sidewalk connections, bicycle parking and lighting.	Transit Enhancement	$1,000,000
B		**Demand and System Management Enhancements**		
	B1	Install new bike parking throughout the City. Standard rack parking should be provided in areas where users park for less than two hours. Long-term parking that is secure and weather-protected should be provided in areas where users park for more than two hours.	Demand/ System Management	$50,000

FIGURE 2: DRAFT ASPIRATIONAL ROADWAY PROJECTS

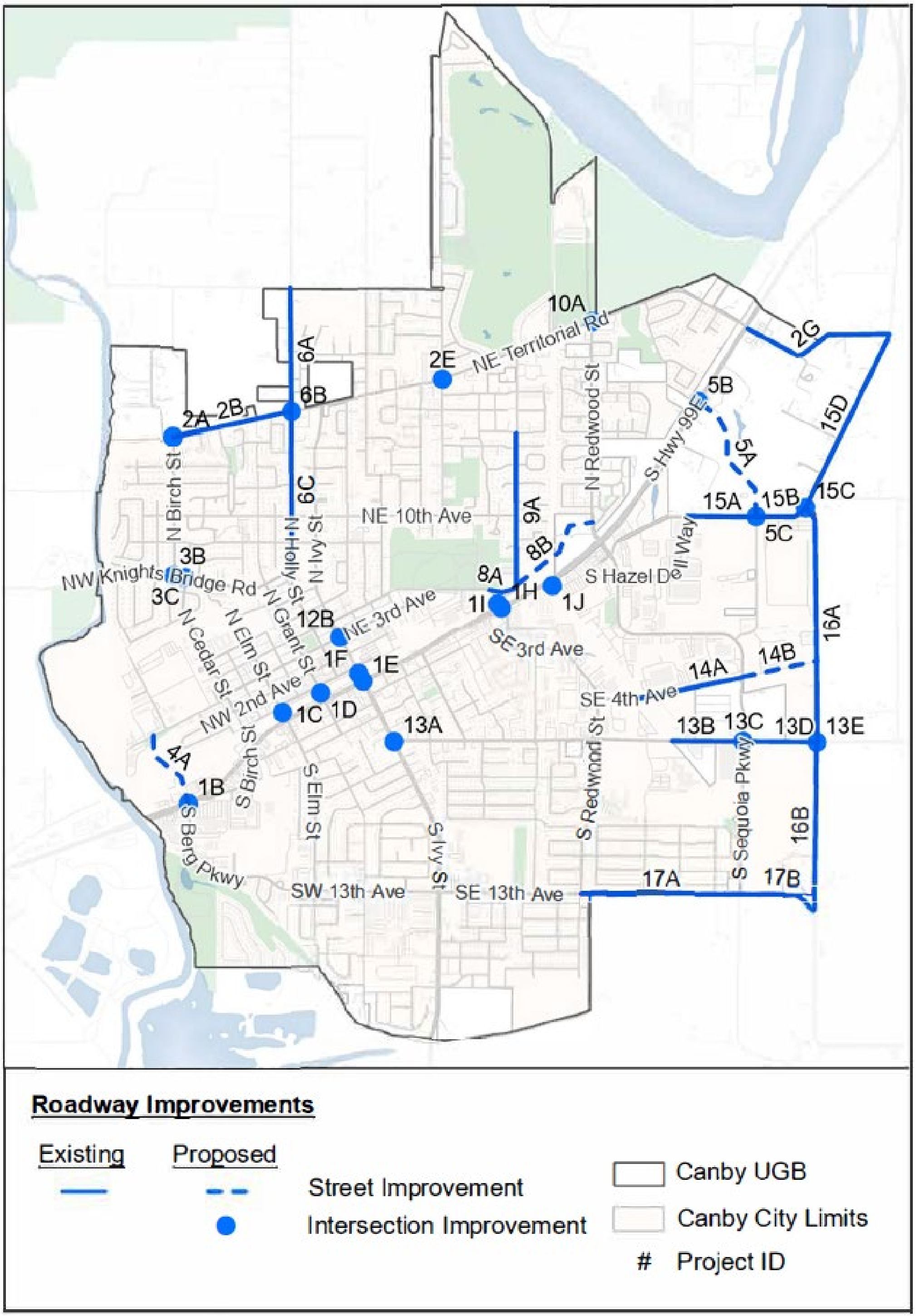


FIGURE 3: DRAFT ASPIRATIONAL PEDESTRIAN PROJECTS

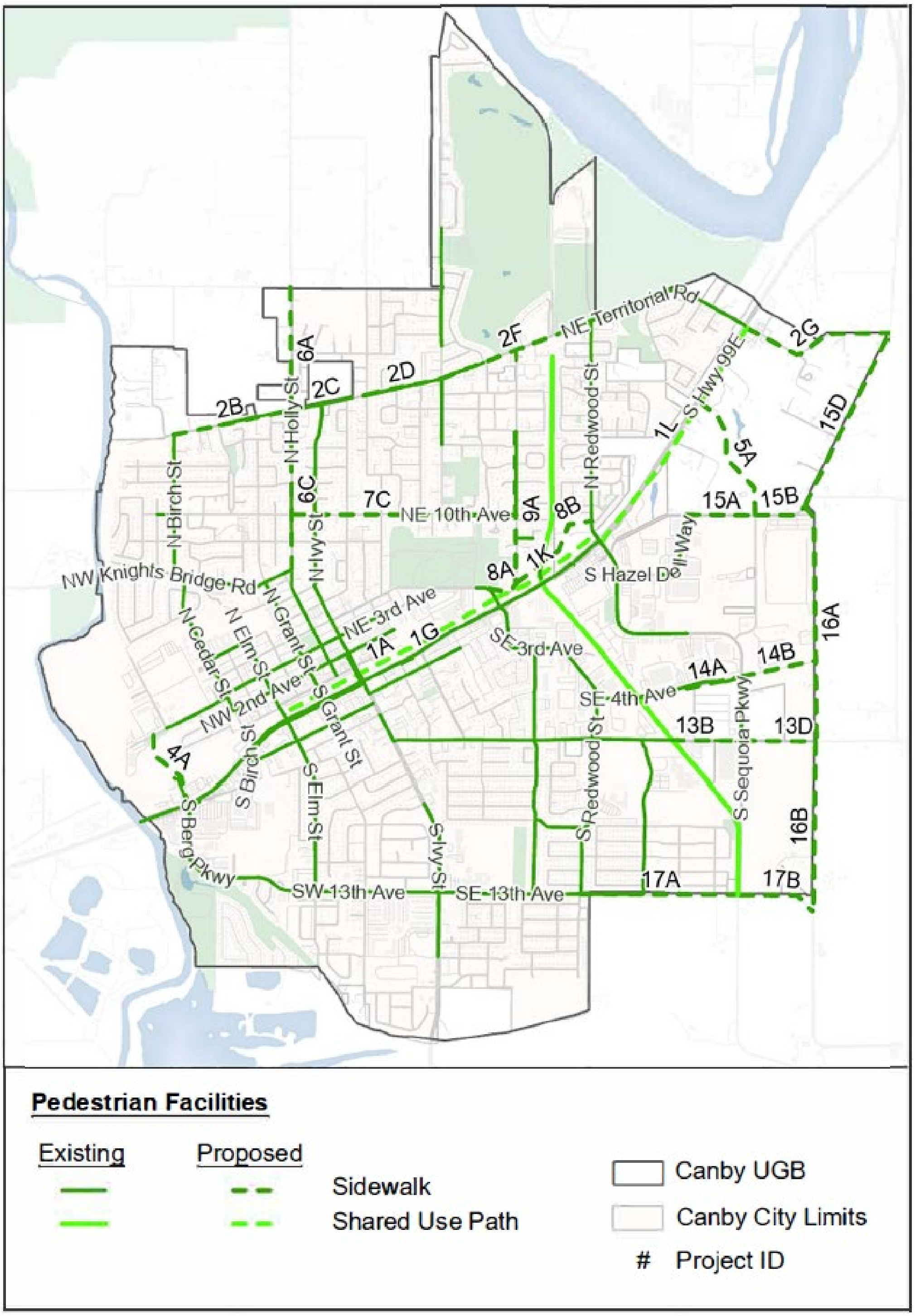
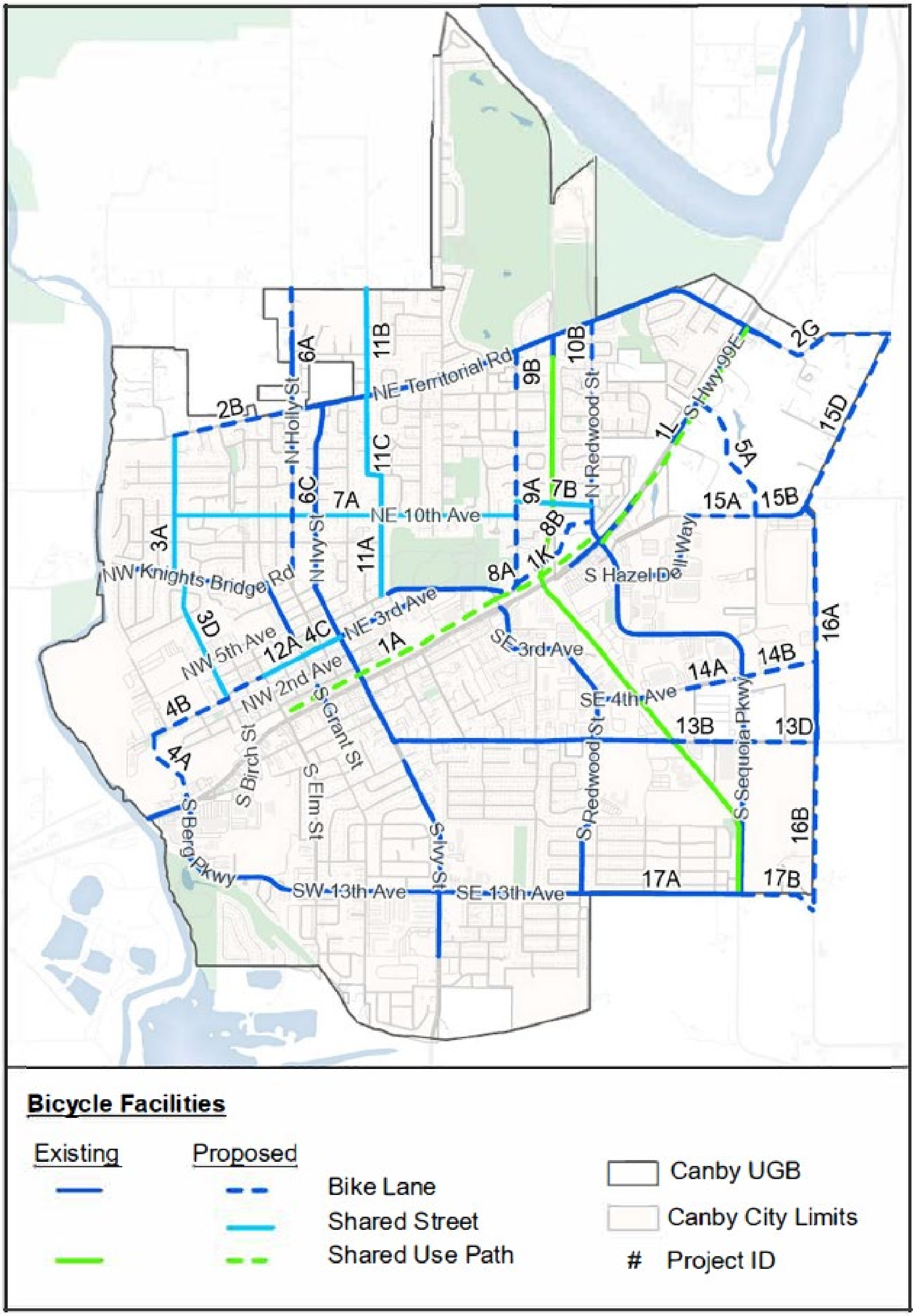


FIGURE 4: DRAFT ASPIRATIONAL BICYCLE PROJECTS



APPENDIX I. TRANSPORTATION PROJECT PRIORITIZATION

TECHNICAL MEMORANDUM #12

DATE: November 26, 2025

TO: Don Hardy and Ryan Potter | City of Canby

FROM: Reah Flisakowski, Kevin Chewuk, Eileen Chai | DKS Associates

SUBJECT: City of Canby Transportation System Plan Update
Transportation Project Prioritization

Project #: 23023-000

This document summarizes how the Financially Constrained Plan was developed, including a summary of the transportation funding, project prioritization process and a detailed listing of the Financially Constrained and Unconstrained projects.

PROCESS FOR DEVELOPING PROJECTS

The project team developed the recommended transportation solutions using guidance provided by the project goals and with input from three main sources (see Appendix B):

- Stakeholders (via Project Advisory Committee and Technical Advisory Committee meetings, in-person events and project website comments)
- Previous Plans (such as the 2010 Canby TSP, Canby OR 99E Corridor and Gateway Plan and Canby Walnut Street Extension)
- Independent Project Team Evaluation (Existing and Future Multimodal Transportation Conditions and Needs Evaluation in Technical Memorandum #7 and #9)

The full list of projects in this TSP are referred to as Aspirational Projects. Aspirational projects include all identified projects for improving the transportation network along major streets in the City's Urban Growth Boundary (hereby referred to as the planning area), regardless of their priority or their likelihood to be funded. This TSP focuses on streets in the planning area with a vehicle functional classification of Neighborhood Route or higher. Additional improvements will occur with private development in the City's planning area, including the build out of the local street network consistent with the standards developed as part of this TSP.

The TSP planning process screens candidate projects to set aside those that may not be feasible due to environmental or existing development limitations. The remaining projects are a combination of new and previous ideas for the transportation system that seek to address the gaps and deficiencies in the City.

ASPIRATIONAL PROJECTS

The draft Aspirational project list presented in Technical Memo #11 (Transportation Projects and Programs) has been refined based on Project Management Team, public and stakeholder and Planning Commission and City Council input. Key changes to the Aspirational project list are summarized below.

- Updated project cost estimates, including reducing the unit cost assumption for a roundabout. The project cost estimates represent the sum of several components required for implementation, including the estimated administration, design, right-of-way, environmental and construction costs.
- Removal of 4 projects that would have installed hinged pedestrian gate skirts at rail crossings.
- Addition of 5 long-term feasibility "study" projects that are unlikely to be constructed in the 20-year TSP horizon but reflect high priorities for the City to close critical gaps in the street system, improve emergency vehicle and freight truck access and help relieve congestion on OR 99E through Canby. These projects, Project ID B2 to B6 in Table 2, represent needs identified through the community engagement process and system analysis, but require more extensive study to better understand the complexity of the issues, coordinate with agency partners, analyze potential alternatives and help advance the ideas should a feasible solution be identified in the future.
- Addition of 5 pedestrian/bike improvement projects, Project ID 1c, 12a, 12b, 12c and 13a in Table 2.

The updated project list includes 72 projects totaling over $195 million in total investments. For the purposes of cost estimates, project design elements are identified, however, the actual design elements for any project are subject to change and will ultimately be determined through a preliminary and final design process and are subject to City, ODOT, Clackamas County, and/or other partner agency approval. The Aspirational projects were assigned to one of several categories:

- **Multi-Modal Street Improvement** – these projects will improve or construct new multi-modal streets throughout the planning area, each with facilities for motorists, pedestrians, and bicyclists. A total of 21 projects are identified that, as of 2025, will cost an estimated $98.7 million to complete.
- **Intersection Improvement** – these projects will improve safety and mobility at intersections throughout the planning area. A total of 17 projects were identified to construct new or improve existing intersections that, as of 2025, will cost an estimated $46.7 million to complete.
- **Pedestrian/ Bike Improvement** – these projects include stand-alone sidewalk, path and roadway crossing improvements, and an integrated network of bicycle lanes, marked on-street routes and shared-use paths to facilitate safe and convenient travel citywide. A total of 27 pedestrian and bicycle projects were identified that, as of 2025, will cost an estimated $45.8 million to complete.
- **Transit Enhancement** – this will enhance the quality and convenience for transit passengers. One transit project was identified that, as of 2025, will cost an estimated $1 million.

- **Demand/ System Management** – this includes future studies and other improvements that will encourage more efficient usage of the transportation system. A total of 6 projects were identified that, as of 2025, will cost an estimated $3.3 million to complete.

PROJECT FUNDING

Each project was reviewed to consider how it might be funded during the next 20 years. All projects were assigned a primary funding agency which include Canby, Canby Area Transit (CAT), Clackamas County and ODOT. In general, the primary funding agency was assumed to be the current or future facility owner, as they are responsible to oversee construction and long-term maintenance. In some cases, funding partnerships were identified for projects that were expected to provide mutual benefits between agencies or where there were opportunities to accelerate projects to completion. Each project was also assigned an assumed funding source, which included the City Street Fund (i.e., State Highway Trust Fund, Local Gas Tax, County Vehicle Registration Fee and Street Maintenance Fee revenues, etc.), the City Transportation System Development Charge (TSDC) revenues, or partner agency funds (i.e., ODOT, CAT). It is important to note that these funding assumptions do not oblige any agency to commit to these projects or fund them in this manner.

This TSP presents the high priority City projects that are constrained to a level of funding that is expected to be available for the next 20 years. In addition, the TSP identifies priority projects that the City could use to inform its decisions for applying the Transportation System Development Charge revenues it receives. While there may be other partnering opportunities with ODOT and Clackamas County, these decisions are ultimately up to those agencies. Private development projects will likely also be built in coordination with land use actions and future development in the planning area, with much of the private development share likely included in the system development charge for transportation.

Approximately $13.95 million is estimated to be available for locally funded improvements over the next 20 years. About $31.6 million of the total project costs are assumed to be City responsibility (see Table 1). This TSP has identified about $138.7 million worth of needed investments that are assumed to be TSDC eligible improvements, and it assumes that the TSDC project list and associated rate will be updated to align with the transportation needs established in the TSP. Revenue from the City TSDC will be expected to provide $10.98 million for eligible projects over the next 20 years based on the current TSDC fee, and this TSP assumes increased revenue from the City TSDC will provide an additional $27 million through 2043 (see the "Potential Additional Funding Sources" section in the Appendix). The TSP has also identified projects estimated at over $25 million for other partner agencies, and while there may be opportunities with other agencies to jointly fund projects, no additional funding was assumed as these decisions are ultimately up to those agencies. Refer to Appendix A for more information on the expected transportation revenue and expenditures.

TABLE 1: ASPIRATIONAL PROJECT FUNDING (2025 DOLLARS)

<table>
<tr><th>FUNDING SOURCE</th><th>TOTAL FUNDING NEED</th><th>ESTIMATED FUNDING AVAILABLE THROUGH 2043</th></tr>
<tr><td>CANBY STREET FUND</td><td>$31,600,000</td><td>$13,950,000</td></tr>
<tr><td>CANBY TRANSPORTATION SYSTEM DEVELOPMENT CHARGE – CURRENT TSDC RATE</td><td rowspan="2">$138,700,000</td><td>$10,980,000</td></tr>
<tr><td>CANBY TRANSPORTATION SYSTEM DEVELOPMENT CHARGE –POTENTIAL INCREASED TSDC RATE</td><td>$27,000,000</td></tr>
<tr><td>PARTNER AGENCY</td><td>$25,275,000</td><td>$0 *</td></tr>
<tr><td>TOTAL</td><td>$195,575,000</td><td>$51,930,000</td></tr>
</table>

Notes: * While there may be opportunities with other agencies to jointly fund projects, no additional funding beyond the revenue from the Canby Street Fund was assumed as these decisions are ultimately up to those agencies.

PRIORITIZING ASPIRATIONAL PROJECTS

Unless the City expands its funding options, many of the Aspirational projects identified are not reasonably likely to be funded by 2043 (as shown in Table 1). For this reason, projects from the Aspirational list were evaluated and ranked using a set of measurable evaluation criteria that reflect how well they achieve the transportation goals and objectives described in Technical Memo #4. The prioritization score was calculated for each project using the criteria associated with each TSP goal.

The projects were initially scored on the seven criteria from 1 (low) to 10 (high). The criteria were weighted equally, resulting in overall possible scores ranging from 7 to 70. An evaluation ranking of "high" was assigned for projects with the highest total scores, "medium" for the middle one-third of project scores, and "low" for projects with the lowest total scores. The methodology for calculating the scores for each criterion can be found in Technical Memo #4, in the Project Prioritization Framework section.

The final priority ranks listed in Table 3 were used to divide projects from the Aspirational project list into two improvement packages, referred to as Financially Constrained and Unconstrained. The project priority rankings do not create an obligation to construct projects in any order and it is recognized that these priorities may change over time. The City of Canby will use the priorities listed in this TSP to guide investment decisions but will also regularly reassess local priorities to leverage new opportunities and reflect evolving community interests.

The City is not required to implement projects identified on the Financially Constrained list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free to pursue any of these opportunities at any time.

The purpose of the Financially Constrained project list is to establish reasonable expectations for the level of improvements that will occur and give the City initial direction on where funds should be allocated. During the short-term most of the City's investments will occur within the current City limits. As annexation occurs over time, other projects will have the potential to be funded by the City or through private development as a condition of approval.

FINANCIALLY CONSTRAINED PROJECTS

Financially Constrained projects are the most valued, in terms of how they meet critical needs and how well they work to deliver on community goals. Projects in this group have a total construction budget that is similar to the reasonably available funding over the planning horizon, meaning the $13.95 million likely to be available through existing City funding sources and $37.98 million from the City TSDC. The projects included in the Financially Constrained list (shown in Table 3 and Figure 1) were recommended within several different priority horizons, based on the project evaluation score:

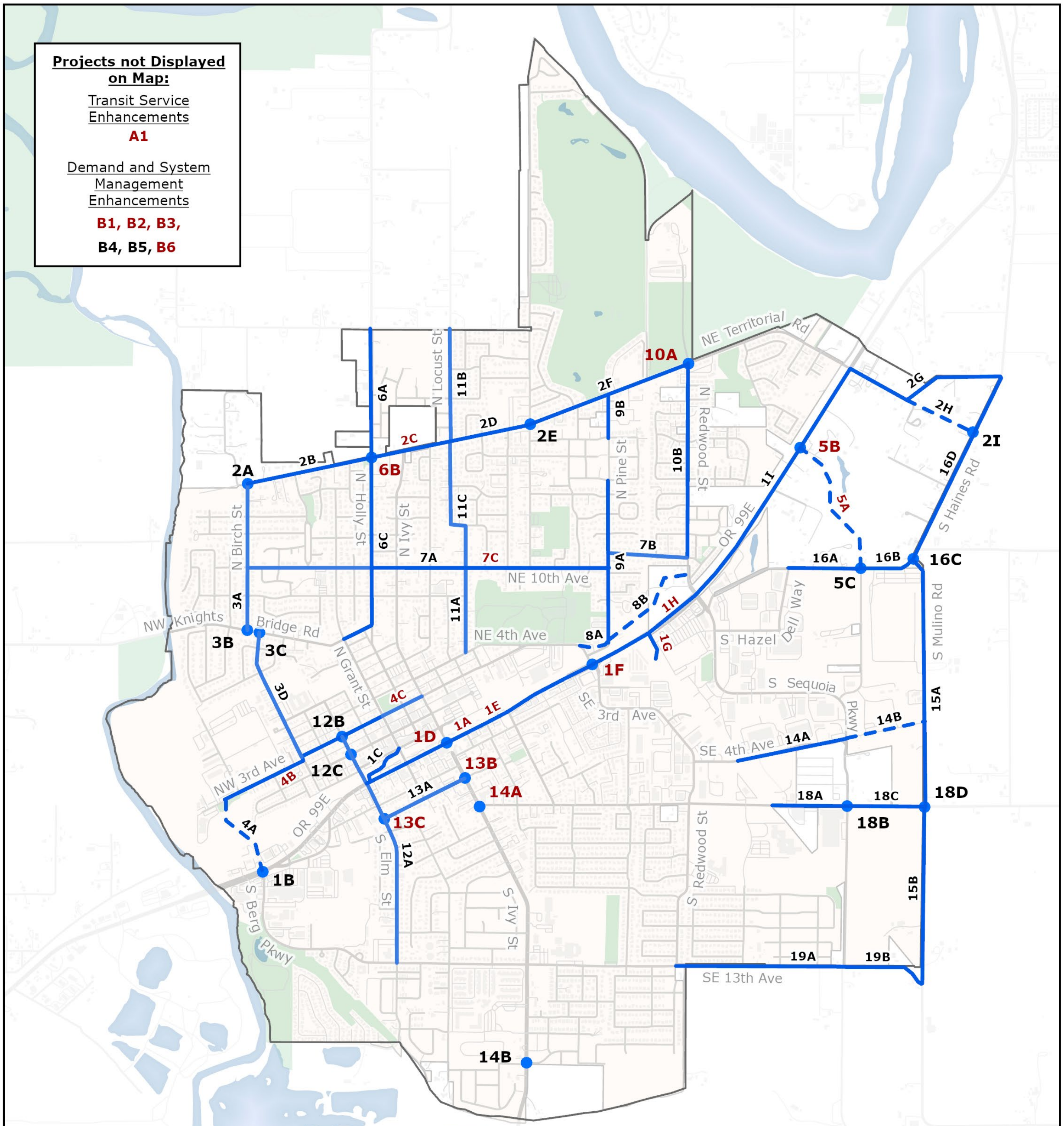
- **Tier 1:** Projects recommended for implementation within 1 to 5 years.
- **Tier 2:** Projects recommended for implementation within 5 to 10 years.
- **Tier 3:** Projects likely to be implemented beyond 10 years.

UNCONSTRAINED PROJECTS

Unconstrained projects are those remaining from the Aspirational list that likely will not receive funding by 2043. These projects (shown in Table 3 and Figure 1) are recommended within the following priority horizons, based on the project evaluation score:

- **Unconstrained Tier 1:** Projects with the highest priority for implementation beyond the projects included on the Financially Constrained list, should additional funding become available.
- **Unconstrained Tier 2:** Projects with the next highest priority for implementation beyond the projects included on the Financially Constrained list, should additional funding become available.
- **Unconstrained Tier 3:** The last phase of projects to be implemented, should additional funding become available.

FIGURE 1: FINANCIALLY CONSTRAINED AND UNCONSTRAINED PROJECTS



Transportation Network Improvements:

Along Existing Corridors	Along Planned Corridors (Conceptual Alignments)	
solid line	dashed line	Vehicle, Pedestrian and/or Bike Corridor Improvements
	dot	Intersection Improvements

\# Project Included in the Financially Constrained Package

\# Project Included in the Unconstrained Package

Canby Urban Growth Boundary

Canby City Limits

TABLE 2: FINANCIALLY CONSTRAINED AND UNCONSTRAINED PROJECTS

Project ID	Project Location	Project Description	Project Category	Estimated Project Cost (2025 Dollars)	Potential Funding Source	Potential Agency Partner *	Project Evaluation Score **	Package ***	Priority Horizon
	OR 99E (Corridor #1) Improvements from SW Berg Parkway to Territorial Road								
1a	OR 99E between Elm Street and Pine Street	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$10,100,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
1b	OR 99E/SW Berg Parkway intersection	Enhance Safety at Existing Intersection. Cost assumes replacing the incandescent traffic signal bulbs with light emitting diodes (LEDs), providing overhead lane-use signs and signal pole modifications.	Intersection Improvement	$750,000	State Funds	ODOT	Medium	Unconstrained	Unconstrained Tier 2
1c	Downtown Canby between OR 99E to NW 1st Avenue	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path with an overcrossing of the railroad in Downtown Canby, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$8,600,000	State Funds / City Transportation System Development Charge	ODOT	High	Unconstrained	Unconstrained Tier 1
1d	OR 99E/Ivy Street intersection	Widening at Existing Intersection. Cost assumes widening of the Ivy Street approaches to include a separate left-turn lane, through lane, and right-turn lane, and traffic signal and railroad crossing modifications. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Intersection Improvement	$9,650,000	State Funds	ODOT	Medium	Financially Constrained	Tier 3
1e	OR 99E from Knott Street to Locust Street	Minor Upgrade to Pedestrian Facilities. Cost assumes installation of sidewalks on the north side.	Pedestrian/ Bike Improvement	$950,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
1f	OR 99E/Pine Street intersection	Widening at Existing Intersection. Cost assumes conversion of the southbound approach to include a left-turn lane and a shared through-right turn lane and widening of the northbound approach to include a left-turn lane, through lane, and right-turn lane, and traffic signal modification. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Intersection Improvement	$5,550,000	State Funds / City Transportation System Development Charge	ODOT	Medium	Financially Constrained	Tier 3
1g	OR 99E between the Logging Road Trail and the sidewalks on south side of OR 99E	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path.	Pedestrian/ Bike Improvement	Funded/ Under Construction	Funded/ Under Construction	ODOT	High	Financially Constrained	Tier 1
1h	OR 99E between Pine Street, the Logging Road Trail and N Redwood Street	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$5,750,000	State Funds / City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 3
1i	OR 99E between N Redwood Street/Sequoia Parkway and Territorial Road	Major Upgrade to Pedestrian and Bike Facilities. Cost assumes a shared-use path adjacent to OR 99E, but final improvement to be determined through a future corridor-wide improvement plan (see Project B6). Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$11,250,000	State Funds / City Transportation System Development Charge	ODOT	Medium	Unconstrained	Unconstrained Tier 1
	Territorial Road (Corridor #2) Improvements from N Birch Street to Haines Road								
2a	Territorial Road/N Birch Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2b	Territorial Road from N Birch Street to N Holly Street	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2c	Territorial Road from N Holly Street to N Locust Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on both sides.	Pedestrian/ Bike Improvement	$1,900,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3
2d	Territorial Road from N Locust Street to N Maple Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$750,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
2e	Territorial Road/N Maple Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2

Project ID	Project Location	Project Description	Project Category	Estimated Project Cost (2025 Dollars)	Potential Funding Source	Potential Agency Partner *	Project Evaluation Score **	Package ***	Priority Horizon
2f	Territorial Road from N Maple Street to N Redwood Street	Minor Upgrade to Pedestrian Facilities. Cost assumes sidewalks on the north side.	Pedestrian/ Bike Improvement	$2,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
2g	Territorial Road from OR 99E to Haines Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,800,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
2h	Territorial Road from OR 99E to Haines Road	New 2-lane Collector. Cost assumes realignment of Territorial Road to the south and east as a 2-lane street with sidewalks and bike lanes on each side, to connect with Haines Road at a new 3-leg intersection.	Multi-modal Street Improvement	$2,150,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
2i	Territorial Road/Haines Road intersection	Traffic Control Improvement at New Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	N Birch Street and N Cedar Street (Corridor #3) Improvements from Territorial Road to 3rd Avenue								
3a	N Birch Street from Territorial Road to Knights Bridge Road	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
3b	N Birch Street/Knights Bridge Road intersection	New Turn Lane at Existing Intersection. Cost assumes restriping the N Birch Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
3c	N Cedar Street/Knights Bridge Road intersection	New Turn Lane at Existing Intersection. Cost assumes restriping the N Cedar Street approach to include separate left-turn and right-turn lanes.	Intersection Improvement	$75,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
3d	N Cedar Street from Knights Bridge Road to 3rd Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
	SW Berg Parkway and 3rd Avenue (Corridor #4) Improvements from OR 99E to N Ivy Street								
4a	SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad	New 2-lane Collector with a Truck Route Designation. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side. Project B2 is a Phase 1 study for this project, and this Phase 2 will be based on the outcome of Project B2. Project impacts the existing rail corridor, and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Multi-modal Street Improvement	$17,950,000	City Transportation System Development Charge		High	Unconstrained	Unconstrained Tier 1
4b	3rd Avenue from the Berg Parkway extension to N Grant Street	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of 3rd Avenue to provide bike lanes on both sides.	Pedestrian/ Bike Improvement	$200,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
4c	3rd Avenue from N Grant Street to N Ivy Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
	Walnut Street (Corridor #5) Improvements from OR 99E to 1st Avenue								
5a	Walnut Street from OR 99E to 1st Avenue	New 3-lane Collector with a Truck Route Designation. Cost assumes a 3-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$6,400,000	City Transportation System Development Charge		High	Financially Constrained	Tier 1
5b	OR 99E/Walnut Street intersection	Traffic Control Improvement at New Intersection. Cost assumes a new traffic signal.	Intersection Improvement	$3,000,000	City Transportation System Development Charge	ODOT	High	Financially Constrained	Tier 1
5c	Walnut Street/1st Avenue intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
	Holly Street (Corridor #6) Improvements from 22nd Avenue to Knights Bridge Road								
6a	Holly Street from 22nd Avenue to Territorial Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,850,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
6b	Holly Street/Territorial Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Financially Constrained	Tier 3
6c	Holly Street from Territorial Road to Knights Bridge Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side and on-street parking on one-side.	Multi-modal Street Improvement	$4,700,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2

Project ID	Project Location	Project Description	Project Category	Estimated Project Cost (2025 Dollars)	Potential Funding Source	Potential Agency Partner *	Project Evaluation Score **	Package ***	Priority Horizon
	10th Avenue/11th Avenue (Corridor #7) Improvements from N Birch Street to N Redwood Street								
7a	10th Avenue from N Birch Street to N Pine Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
7b	11th Place/11th Avenue from N Pine Street to N Redwood Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
7c	10th Avenue from N Holly Street to N Pine Street	Major Upgrade to Pedestrian Facilities. Cost assumes sidewalks on each side.	Pedestrian/ Bike Improvement	Funded/ Under Construction	Funded/ Under Construction		High	Financially Constrained	Tier 1
	4th Avenue (Corridor #8) Improvements from Pine Street to N Redwood Street								
8a	N Pine Street/NE 4th Avenue intersection	New 2-lane Collector. Cost assumes realignment of N Pine Street to the north away from the railroad crossing to align with 4th Avenue at a new 3-leg intersection, as a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,650,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
8b	4th Avenue from the N Pine Street realignment to N Redwood Street	New 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side. Project B3 is a Phase 1 study for this project, and this Phase 2 will be based on the outcome of Project B3.	Multi-modal Street Improvement	$7,150,000	City Transportation System Development Charge		Medium	Unconstrained	Unconstrained Tier 1
	N Pine Street (Corridor #9) Improvements from 4th Avenue to Territorial Road								
9a	N Pine Street from the 4th Avenue extension to 15th Avenue	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,350,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
9b	N Pine Street from 17th Avenue to Territorial Road	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of N Pine Street to provide bike lanes on each side.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
	N Redwood Street (Corridor #10) Improvements from 11th Avenue to Territorial Road								
10a	N Redwood Street/Territorial Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,750,000	City Transportation System Development Charge / City Street Funds		Medium	Financially Constrained	Tier 3
10b	N Redwood Street from 11th Avenue to Territorial Road	Major Upgrade to Bike Facilities. Cost assumes reconfiguration of N Redwood Street to provide bike lanes on each side.	Pedestrian/ Bike Improvement	$200,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
	N Locust Street (Corridor #11) Improvements from N Birch Street to N Redwood Street								
11a	N Locust Street from NE 4th Avenue to NE 10th Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
11b	N Locust Street from NE Territorial Road to 22nd Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
11c	N Locust Street from NE 10th Avenue to NE Territorial Road	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$175,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
	Elm Street (Corridor #12) Improvements from NW 3rd Avenue to SW 13th Avenue								
12a	Elm Street from NW 3rd Avenue to SW 13th Avenue	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes. Project impacts an existing rail crossing and coordination will be required with the ODOT Rail Crossing Safety Section before any improvements or modifications occur.	Pedestrian/ Bike Improvement	$350,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
12b	Elm Street/NW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing ramps, and curb extensions on the north leg of Elm Street and east leg of NW 3rd Avenue	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
12c	Elm Street/NW 2nd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing a diverter on west leg of SW 2nd Avenue to limit the west leg to right-in, right-out only and installing ramps, and curb extensions.	Pedestrian/ Bike Improvement	$300,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 2
	SW 3rd Avenue (Corridor #13) Improvements from Elm Street to Ivy Street								
13a	SW 3rd Avenue from Elm Street to Ivy Street	Minor Upgrade to Bike Facilities. Cost assumes shared lane markings and route wayfinding for bikes.	Pedestrian/ Bike Improvement	$150,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2

Project ID	Project Location	Project Description	Project Category	Estimated Project Cost (2025 Dollars)	Potential Funding Source	Potential Agency Partner *	Project Evaluation Score **	Package ***	Priority Horizon
13b	Ivy Street/SW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing a partial diverter on west leg of SW 3rd Avenue to close westbound receiving lane and installing crosswalk, ramps, and pedestrian refuge island on Ivy Street (remove crosswalk striping on north leg).	Pedestrian/ Bike Improvement	$300,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3
13c	Elm Street/SW 3rd Avenue intersection	Minor Upgrade to Pedestrian Facilities. Cost assumes installing crosswalk, ramps, and curb extensions on Elm Street.	Pedestrian/ Bike Improvement	$250,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
	S Ivy Street (Corridor #14) Improvements from Township Road to SE 18th Avenue								
14a	Township Road/S Ivy Street intersection	Traffic Control Improvement at Existing Intersection. Cost assumes conversion of flashing yellow light to traffic signal when traffic volumes meet warrants.	Intersection Improvement	$175,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 3
14b	Ivy Street/SE 18th Avenue intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,850,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 1
	Mulino Road (Corridor #15) Improvements from 1st Avenue to 13th Avenue								
15a	Mulino Road from 1st Avenue to Township Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$6,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
15b	Mulino Road from Township Road to 13th Avenue	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	SE 1st Avenue and Haines Road (Corridor #16) Improvements from SE Hazeldell Way to Territorial Road								
16a	SE 1st Avenue from SE Hazeldell Way to Walnut Street	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,450,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
16b	SE 1st Avenue from Walnut Street to Mulino Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$1,950,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
16c	SE 1st Avenue/Mulino Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,800,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Medium	Unconstrained	Unconstrained Tier 1
16d	Haines Road from Mulino Road to Territorial Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$5,550,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Medium	Unconstrained	Unconstrained Tier 2
	SE 4th Avenue (Corridor #17) Improvements from the Logging Road Trail to Mulino Road								
17a	SE 4th Avenue from the Logging Road Trail to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$3,700,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
17b	SE 4th Avenue from Sequoia Parkway to Mulino Road	New 2-lane Collector with a Truck Route Designation. Cost assumes overcrossing of the railroad and a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,250,000	City Transportation System Development Charge		Low	Unconstrained	Unconstrained Tier 3
	Township Road (Corridor #18) Improvements from Ivy Street to Mulino Road								
18a	Township Road from the Logging Road Trail to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,400,000	City Transportation System Development Charge / City Street Funds		Medium	Unconstrained	Unconstrained Tier 2
18b	Township Road/Sequoia Parkway intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
18c	Township Road from the Sequoia Parkway to Mulino Road	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,550,000	City Transportation System Development Charge / City Street Funds		Low	Unconstrained	Unconstrained Tier 3
18d	Township Road/Mulino Road intersection	Traffic Control Improvement at Existing Intersection. Cost assumes installation of a roundabout, but final traffic control to be determined through a future intersection control analysis.	Intersection Improvement	$2,900,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	13th Avenue (Corridor #19) Improvements from Redwood Street to Mulino Road								
19a	13th Avenue from Redwood Street to Sequoia Parkway	Upgrade to 2-lane Collector. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$4,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3

Project ID	Project Location	Project Description	Project Category	Estimated Project Cost (2025 Dollars)	Potential Funding Source	Potential Agency Partner *	Project Evaluation Score **	Package ***	Priority Horizon
19b	13th Avenue from Sequoia Parkway to Mulino Road	Upgrade to 2-lane Collector with a Truck Route Designation. Cost assumes a 2-lane street with sidewalks and bike lanes on each side.	Multi-modal Street Improvement	$2,700,000	City Transportation System Development Charge / City Street Funds	Clackamas County	Low	Unconstrained	Unconstrained Tier 3
	Transit Service Enhancements								
A1	New Transit Amenities	Improve transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, sidewalk connections, bicycle parking and lighting.	Transit Enhancement	$1,000,000	City Transit Funds	CAT	High	Financially Constrained	Tier 3
	Demand and System Management Enhancements								
B1	New Bike Parking	Install new bike parking throughout the City. Standard rack parking should be provided in areas where users park for less than two hours. Long-term parking that is secure and weather-protected should be provided in areas where users park for more than two hours.	Demand/ System Management	$50,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B2	Future Roadway Feasibility Study of extending SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad (Project 4a)	Study the feasibility of extending SW Berg Parkway or another roadway in Downtown Canby from OR 99E to the north over the railroad (Project 4a). This study will evaluate connectivity and how a potential overcrossing of the railroad could be built in the future. Extending SW Berg Parkway or another roadway in Downtown Canby would create the City's first overcrossing of the railroad, closing a critical gap in the street system and improving emergency vehicle and freight truck access. This new crossing would also help relieve congestion on city streets.	Demand/ System Management	$500,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B3	Future Roadway Feasibility Study of extending 4th Avenue from N Pine Street to N Redwood Street (Project 8b)	Study the feasibility of extending 4th Avenue from N Pine Street to N Redwood Street (Project 8b). This study will evaluate connectivity and how a potential street extension could be built in the future, including how it interacts with the Logging Road Trail and where it might connect to N Redwood Street. Extending 4th Avenue would create a new Collector north of OR 99E, closing a critical gap in the street system and helping to relieve congestion on OR 99E through downtown Canby.	Demand/ System Management	$250,000	City Transportation System Development Charge / City Street Funds		High	Financially Constrained	Tier 2
B4	Future Roadway Feasibility Study of an additional bridge crossing of the Molalla River	Provide an additional bridge crossing of the Molalla River. While this project is unlikely to be constructed in the 20-year TSP horizon, it is included since providing a new bridge crossing and improving the connection between Interstate 5 and the City is a high priority for residents and commerce, helping to relieve congestion on OR 99E through the City and improving freight truck access. Phase 1 of this project will study the feasibility of a new bridge and identify how it could be built in the future. This study will evaluate connectivity and identify system improvements that may be needed to support a future bridge crossing and associated roadway connections. This project will identify critical environmental and other considerations associated with the potential alignment(s) traveling through rural areas of the County. Phase 2 construction of this project will be based on the outcome of Phase 1.	Demand/ System Management	$1,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	High	Unconstrained	Unconstrained Tier 1
B5	Future Roadway Feasibility Study of a parallel arterial route to OR 99E through the City from west of Berg Parkway to east of Territorial Road	Provide a parallel arterial route to OR 99E through the City from west of Berg Parkway to east of Territorial Road. While this project is unlikely to be constructed in the 20-year TSP horizon, it is included since providing an alternative route for traffic is a high priority for residents and commerce, helping to relieve congestion on OR 99E through the City and improving freight truck access. Phase 1 of this project will study the feasibility of a roadway and identify how it could be built in the future. This study will evaluate connectivity and identify system improvements that may be needed to support it. This project will identify critical environmental and other considerations associated with the potential alignment(s). Phase 2 construction of this project will be based on the outcome of Phase 1.	Demand/ System Management	$1,000,000	City Transportation System Development Charge / City Street Funds	Clackamas County	High	Unconstrained	Unconstrained Tier 1
B6	Future Study of the OR 99E Corridor through Canby to develop a corridor-wide improvement plan	Study the OR 99E Corridor through Canby to develop a corridor-wide improvement plan to align the highway with the context zone from the ODOT Highway Design Manual. Critical focus areas in Canby are new, expanded, and improved pedestrian and bicycle crossings, expanded pedestrian facilities and buffer from the vehicle travel way, protected and separated bicycle facilities, and improved traffic flow for vehicles and freight.	Demand/ System Management	$500,000	State Funds / City Street Funds	ODOT	High	Financially Constrained	Tier 2

Notes: * While there may be opportunities with other agencies to jointly fund projects, no additional funding beyond the revenue from the Canby Street Fund was assumed as these decisions are ultimately up to those agencies.
** The project priority rankings do not create an obligation to construct projects in any order and it is recognized that these priorities may change over time. The City of Canby will use the priorities listed in this TSP to guide investment decisions but will also regularly reassess local priorities to leverage new opportunities and reflect evolving community interests.
*** The City is not required to implement projects identified on the Financially Constrained list first. Priorities may change over time and unexpected opportunities may arise to fund particular projects. The City is free to pursue any of these opportunities at any time.

APPENDIX

APPENDIX A TRANSPORTATION REVENUE AND EXPENDITURES

The following sections provide details on the transportation funding that can reasonably be expected through 2043. The funding assumptions will help prioritize the investments the City can make in the transportation system and will be utilized to develop reasonable budgeting assumptions when selecting a set of transportation improvements to meet identified needs over the next 20 years.

CURRENT FUNDING SOURCES

The City uses several primary revenue sources for transportation, including the State Highway Trust, Local Gax Tax, Street Maintenance Fee, Transportation System Development Charges and Vehicle Registration Fees, in addition to other miscellaneous funds.

- **State Highway Trust Fund**

  The State Highway Trust Fund makes distributions from the state motor vehicle fuel tax, vehicle registration and title fees, driver license fees and truck weight-mile taxes. Cities and counties receive a share of State Highway Trust Fund money, and by statute may use the money for any road-related purpose, including walking, biking, bridge, street, signal, and safety improvements.

- **Local Gas Tax**

  Canby has an adopted local gas tax that is collected by fuel distributors. The local gas tax is three cents per gallon, and the collected funds may be used for capital improvements or system maintenance.

- **Street Maintenance Fee**

  Canby assesses a recurring monthly street maintenance fee to all residences and businesses within the City that is used to fund on-going maintenance of streets. The current monthly fee for residential uses is $5.00 per single family residence, $3.34 per multi-family unit, $2.09 per unit for detached senior housing and mobile home parks and $1.04 per unit for attached senior housing and congregate care facilities. The monthly fee for non-residential uses varies based on the estimated number of trips a particular land use generates and a $0.522 base charge per trip.

- **Transportation System Development Charge**

  The Transportation System Development Charge (TSDC) is a one-time fee assessed on all new development and some redevelopment occurring within the City. The funds collected can pay for constructing or improving portions of roadways impacted by applicable development and include roadway improvements, bikeways and pedestrian facilities. The fee is based on the proposed land use and size, and is proportional to each land use's potential PM peak hour vehicle trip generation.

  In Canby, only projects included on the TSDC project list are currently authorized to receive funds, however, the TSDC list may be modified in the future to include additional projects from the TSP. The City currently collects a TSDC of $484 per Equivalent Length New Daily Trips (ELNDT) for transportation facilities.

- **Vehicle Registration Fees**

  Clackamas County established a $30 per year vehicle registration fee for new renewals/registrations starting January 2020 to help fund capital improvements or system maintenance. Forty percent of the revenue is allocated to cities within the county, which equates to approximately $350,000 annually for Canby.

REVENUES AND EXPENDITURES

The following sections detail the revenue and expenditure forecasts.

REVENUES

Annual revenues include $1.525 million from the State Highway Trust Fund, $525,000 from the local gas tax, $750,000 from the street maintenance fee, $350,000 from County vehicle registration fees and $525,000 from other miscellaneous revenue sources including grants, service charges and earned interest (see Table 1). In addition, the TSDC is expected to provide approximately $950,000 annually for Canby.

Assuming, as a conservative estimate[1], the same levels of funding occur in the future, Canby can expect to receive approximately $66.15 million in State Highway Trust Fund, County vehicle registration fee, local gas tax, street maintenance fee and miscellaneous fee revenue through 2043. In addition, the City TSDC is expected to provide approximately $17.1 million in revenue through 2043.

EXPENDITURES

Expenditures include personnel services, roadway striping, traffic control, vegetation trimming, street sweeping, maintenance, and roadway engineering. The City estimates that it spends approximately $2.9 million per year (or $52.2 million through 2043) to maintain and operate its streets.

This includes an escalation rate of 3.3 percent[2] on the current Personnel Services, and Materials and Services expenditures and 10.0 percent on the current Capital Outlay/Maintenance expenditures[3] to account for rising costs and ensure that needed roadway maintenance and repair work will not be deferred through 2043. Deferring necessary repair and preservation means spending much more to fix the same streets later, and repair costs rise exponentially as streets are left unmaintained. Every $1 spent to keep a street in good condition avoids $6 to $14 needed later to rebuild the same street once it has deteriorated significantly[4]. Heavy truck traffic and wet weather comprise two of the most critical factors in pavement deterioration[5]. Heavy trucks (particularly those hauling gravel, logs,

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[1] This assumes the population growth rate in Canby will be roughly the same as the cost inflation rate, therefore, maintaining existing revenues through 2043.

[2] Escalation rate of 4.5 percent based on the Construction Cost Index.

[3] The Capital Outlay/Maintenance expenditures include the entire street maintenance fee revenue (i.e., $750,000 annually or $13.5 million through 2043) with the 10 percent escalation rate.

[4] Smart Growth America, American Association of State Highway Officials (AASHTO)

[5] Long-Term Pavement Performance, U.S. Department of Transportation, Federal Highway Administration

construction materials, overseas containers, agricultural products, garbage) flex the pavement and create spaces underneath. Wet weather, with cracked pavement or poor drainage, can also lead to water undermining pavement.

In addition, approximately $340,000 per year (or $6.12 million through 2043) is needed to administer the TSDC. This is based on the 2 percent compliance cost portion of the TSDC revenue allocation[6].

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[6] TSDC revenue is allocated as follows: Motorized Improvements– 64%, Non-Motorized Improvements- 18%, Reimbursement Fees– 16% and Compliance Costs– 2%.

FUNDING SUMMARY

Through 2043, the City is expected to have approximately $13.95 million for general street improvement needs (e.g., construction of new facilities) with an additional $10.98 million in TSDC revenue specifically for projects on the TSDC project list (or other projects that may be added to the TSDC list in the future), as shown in Table 1.

TABLE 3: CANBY TRANSPORTATION REVENUE AND EXPENDITURES (2025 DOLLARS)

STREET FUND	AVERAGE ANNUAL AMOUNT	ESTIMATED THROUGH 2043
REVENUES		
STATE HIGHWAY TRUST FUND	$1,525,000	$27,450,000
LOCAL GAS TAX	$525,000	$9,450,000
STREET MAINTENANCE FEE	$750,000	$13,500,000
COUNTY VEHICLE REGISTRATION FEE	$350,000	$6,300,000
MISCELLANEOUS REVENUES	$525,000	$9,450,000
TOTAL STREET FUND REVENUES	**$3,675,000**	**$66,150,000**
EXPENDITURES		
PERSONNEL SERVICES	$1,025,000 *	$18,450,000
MATERIALS AND SERVICES	$725,000 *	$13,050,000
CAPITAL OUTLAY/MAINTENANCE	$925,000 **	$16,650,000
TRANSFERS OUT	$225,000 *	$4,050,000
TOTAL STREET FUND EXPENDITURES	**$2,900,000**	**$52,200,000**
STREET FUND SUMMARY (REVENUE–EXPENDITURES)	**$775,000**	**$13,950,000**
TRANSPORTATION SYSTEM DEVELOPMENT CHARGE FUND * **	**AVERAGE ANNUAL AMOUNT**	**ESTIMATED THROUGH 2043**
TSDC REVENUE	$950,000	$17,100,000
TSDC EXPENDITURE	$340,000	$6,120,000
TSDC FUNDING SUMMARY (REVENUE-EXPENDITURES)	**$610,000**	**$10,980,000**

Notes: * An escalation rate of 3.3 percent was applied to the current average annual expenditure.

** An escalation rate of 10 percent was applied to the current average annual street maintenance fee revenue and used as the total expenditure.

*** Assumes current TSDC rate and project list. Only projects included on the TSDC project list are currently authorized to receive funds, however, the TSDC list may be modified in the future to include additional projects from the TSP.

POTENTIAL ADDITIONAL FUNDING SOURCES

New transportation funding options include local taxes, assessments and charges, and state and federal appropriations, grants, and loans. Factors that constrain these resources, include the willingness of local leadership and the electorate to burden residents and businesses with taxes and fees; the portion of available local funds dedicated or diverted to transportation issues from other competing city programs; and the availability of State and Federal funds. The City should consider all opportunities for providing or enhancing funding for the transportation improvements included in the TSP. It is also worth noting that many of the TSP projects will be implemented with partner agencies (i.e., ODOT, Clackamas County), and some will also likely be built in coordination with land use actions and future development.

Counties and cities have used the following sources to fund the capital and maintenance aspects of their transportation programs. As described below and summarized in Table 2, they may help to address existing or new needs identified in Canby's TSP.

TABLE 4: POTENTIAL FUNDING OPTIONS

FUNDING OPTION	ALLOWED USE OF FUNDS	ACTION REQUIRED TO IMPLEMENT	EXAMPLE CHARGE	POTENTIAL ADDITIONAL ANNUAL REVENUE
TRANSPORTATION SYSTEM DEVELOPMENT CHARGE UPDATE	Capital improvements	City Council action	+$517 per ELNDT ($1,001 per ELNDT)	+$1.20 million
			+$775 per ELNDT ($1,259 per ELNDT)	+$1.75 million
			+$1,033 per ELNDT ($1,517 per ELNDT)	+$2.35 million
STREET MAINTENANCE FEE INCREASE	Capital improvements or maintenance	City Council action	+10% per month for residential units and non-residential uses	+$75,000
LOCAL FUEL TAX INCREASE	Capital improvements or maintenance	Voter Approval	+$.01 per gallon	+$175,000
PROPERTY TAX LEVY	Capital improvements or maintenance	Voter Approval	$0.10 per $1,000 in assessed value (per year, for 5 years)	+$225,000
LOCAL IMPROVEMENT DISTRICTS	Capital improvements	Affected Property Owners	n/a	n/a
DEBT FINANCING	Capital improvements	Varies	n/a	n/a

TRANSPORTATION SYSTEM DEVELOPMENT CHARGE UPDATE

The City currently collects a TSDC of $484 per ELNDT for transportation facilities. The City may wish to update the current TSDC rate for transportation facilities based on the transportation needs established in the TSP. As an example, a TSDC rate of $1,001, $1,259 or $1,517 per ELNDT would provide the City with an additional $1.20 million, $1.75 million, or $2.35 million annually, respectively, and an additional $21.6 million, $31.5 million, or $42.3 million through 2043, respectively. A rate study is required to determine appropriate TSDC fees based on capacity project costs, growth potential, and local preferences.

STREET MAINTENANCE FEE INCREASE

The current monthly fee for residential uses is $5.00 per single family residence, $3.34 per multi-family unit, $2.09 per unit for detached senior housing and mobile home parks and $1.04 per unit for attached senior housing and congregate care facilities. The monthly fee for non-residential uses varies based on the estimated number of trips a particular land use generates and a $0.522 base charge per trip.

As an example, raising the current street maintenance fees by 10 percent would increase the monthly cost to $5.50 per single family residence, $3.67 per multi-family unit, $2.30 per unit for detached senior housing and mobile home parks and $1.14 per unit for attached senior housing and congregate care facilities, and to a $0.5742 base charge per trip for non-residential uses. This potential increase is estimated to provide an additional $75,000 annually or $1.35 million through 2043.

LOCAL FUEL TAX INCREASE

To estimate the potential revenue generated from a local fuel tax increase in Canby, the monthly gallons of fuel utilized in Canby was obtained. Canby fuel distributors collected revenue on 1,230,689 gallons of fuel in August 2025 or an estimated 64 gallons of fuel per resident during 2025. Assuming the same average monthly fuel usage per resident, a local fuel tax increase of one cent per gallon, to four cents per gallon, could generate an additional $175,000 annually or $3.15 million through 2043.

PROPERTY TAX LEVY

Property tax levies are another funding option available to Cities. Voter approval is required to enact a local option tax, and the tax may be imposed for up to five years at a time, at which time a City will need voter approval if it desires to renew the levy. The only exception is that a levy for a specific capital project may be imposed for the expected useful life of the capital project up to a maximum of 10 years. Assuming a rate of $0.10 per $1,000 in assessed value as a five-year levy for the City, the City could expect to collect around $225,000 annually over five years.

LOCAL IMPROVEMENT DISTRICTS

Local Improvement Districts (LIDs) can fund capital transportation projects that benefit a specific group of property owners. LIDs require owner/voter approval and a specific project definition.

Assessments against benefiting properties pay for improvements. LIDs can supply match for other funds where a project has system wide benefit beyond benefiting the adjacent properties. LIDs are often used for sidewalks and pedestrian amenities that provide local benefit to residents along the subject street. Property owners are assessed a proportional share of the cost at the end of the project or the City may elect to allow for installment payments with interest.

DEBT FINANCING

While not a direct funding source, debt financing is another funding method. Through debt financing, available funds can be leveraged, and the cost can be spread over the project's useful life. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but it is also viewed as an equitable funding source for larger projects because it spreads the burden of repayment over existing and future customers who will benefit from the projects. One caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations. Three methods of debt financing are listed below:

- General Obligation (GO) Bonds – Subject to voter approval, a City can issue GO bonds to debt finance capital improvement projects. GO bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property throughout the City (i.e., a property tax increase). Depending on the critical nature of projects identified in the TSP and the willingness of the electorate to accept increased taxation for transportation improvements, voter approved GO bonds may be a feasible funding option for specific projects. Proceeds may not be used for ongoing maintenance.
- Limited Tax General Obligation (LTGO) Bonds – Limited Tax General Obligation (LTGO) Bonds are similar to General Obligation (GO) bonds; however, they do not have to be voted on by constituents. A City pledges its general revenues to bondholders along with the utility revenues. The advantages to this option are that it does not require reserves or coverage (such as Revenue bonds) and does not require a vote.
- Revenue Bonds – Revenue bonds are debt instruments secured by rate revenue. For a City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds due to the perceived stability offered by the "full faith and credit" of a jurisdiction.

GRANT OPPORTUNITIES

Grant opportunities could also provide additional funding for the City. Several major grant opportunities are listed below.

ODOT STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP) FUNDING

The Statewide Transportation Improvement Program, also known as the STIP, is the Oregon Department of Transportation's capital improvement plan for state and federally-funded projects.

ODOT has modified the process for selecting projects that receive STIP funding to allow local agencies to receive funding for projects off the state system. Projects that enhance system connectivity and improve multi-modal travel options are the focus. The updated TSP prepares the City to apply for STIP funding.

TRANSPORTATION AND GROWTH MANAGEMENT PLANNING GRANTS

Transportation and Growth Management (TGM) Planning Grants help communities address pressing transportation, land use, and growth management issues. TGM grants are for long range planning work for streets and land to lead to more livable, sustainable, and economically vital communities. This planning also increases opportunities for transit, walking and bicycling.

CONNECT OREGON GRANTS

Connect Oregon is an initiative established by the 2005 state legislature to invest in non-highway modes of transportation. The program currently funds aviation, rail, and marine projects via competitive grants and matching funds for federal grant programs. In past years, the program also funded bicycle, pedestrian and transit projects.

OREGON COMMUNITY PATHS PROGRAM

The Oregon Community Paths grant program helps communities create and maintain off-street pedestrian and bicycle facilities, with the goal of complementing and expanding existing active transportation programs across the state. ODOT uses money from the Multimodal Active Transportation Fund and federal Transportation Alternatives Program fund for this program, with grants provided for project development, construction, reconstruction, major resurfacing or other improvements of multi-use paths that improve access and safety for people walking and bicycling.

SAFE ROUTES TO SCHOOL PROGRAMS

Safe Routes to School refers to efforts that improve, educate, or encourage children safely walking (by foot or mobility device) or biking to school. ODOT has two main types of Safe Routes to School programs: infrastructure and non-infrastructure. Infrastructure programs focus on making sure safe walking and biking routes exist through investments in crossings, sidewalks and bike lanes, flashing beacons, and the like. Non-infrastructure programs focus on education and outreach to ensure awareness and safe use of walking and biking routes. In 2023, the Oregon Legislature authorized $15 million in gas tax revenue annually to the Safe Routes to School Construction Program.

APPENDIX B TRANSPORTATION PROJECT SOURCES

The following table provides details on how the recommended transportation solutions were developed using guidance from stakeholders, previous plans and independent project team evaluation in Technical Memorandum #7 and #9.

TABLE: ASPIRATIONAL PROJECT SOURCES

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
OR 99E	Sidewalks		LTS	OR 99E throughout Canby	2023 - Future Needs		Addressed through other projects	No
	Bike Lanes		Bike facilities	OR 99E throughout Canby	2023 - Future Needs		Addressed through other projects	No
	Non-Capacity Improvements	N1	Construct multi-modal improvements (associated with STA designation) and repave highway (includes Pedestrian Projects S1 and C4)	OR 99E (Elm Street to Locust Street)	2011 Canby TSP - FC	No		No
	Sidewalks	S1	Install sidewalks (north side)	OR 99E (north side, Knott St to Locust St)	2011 Canby TSP - FC	Yes	-	Yes
	Enhanced Pedestrian Crossing	C4	Install pedestrian refuge island	OR 99E (between Ivy St and Locust St)	2011 Canby TSP - FC	No	Under Construction	No
	Safety		Install safety countermeasures, potentially including: Replacing incandescent traffic signal bulbs with light emitting diodes (LEDs) Providing overhead lane-use signs Reflective backplate signs behind traffic signals Left-turn traffic calming Reduce # of driveways (access management) Remove two-way left turn lane and replace with median	OR 99E from Elm St to Pine St	2023 Canby TSP - Future Needs	Yes	Flagged in safety evaluation	Yes
	UPRR safety		Installing hinged pedestrian gate skirts on the sidewalks at rail crossings	OR 99E from Elm St to Pine St	2011 Canby TSP - FC	No	Flagged in safety assessment	No
	Enhanced Pedestrian Crossing	C1	Improve crosswalk and ramps	OR 99E and UPPR (at Elm St)	2011 Canby TSP - FC	No	ODOT is building curb ramps at intersection w/OR99E	Yes
	Railroad Crossing Improvements	R1	Improve rail crossing (fill in gaps adjacent to rails) Install hinged pedestrian gate skirts on the sidewalks at the rail crossing	UPRR (at Elm St)	2011 Canby TSP - FC	Yes	Sidewalks exist but no pedestrian barrier exists	Yes
	Enhanced Pedestrian Crossing	C2	Improve crosswalk and ramps, install pedestrian refuge island	OR 99E and UPRR (at Grant St)	2011 Canby TSP - FC	No	ODOT is building curb ramps at intersection w/OR99E	Yes
	Railroad Crossing Improvements	R2	Improve rail crossing (fill in gaps adjacent to rails) Install hinged pedestrian gate skirts on the sidewalks at the rail crossing	UPRR (at Grant St)	2011 Canby TSP - FC	Yes	Sidewalks exist but no pedestrian barrier exists	Yes
	Enhanced Pedestrian Crossing	C3	Improve crosswalk and ramps, install pedestrian refuge island	OR 99E (at Ivy St)	2011 Canby TSP - FC	No	ODOT is building curb ramps at intersection w/OR99E	Yes
	Railroad Crossing Improvements	R3	Improve rail crossing (fill in sidewalk gaps adjacent to rails) Install hinged pedestrian gate skirts on the sidewalks at the rail crossing	UPRR (at Ivy St)	2011 Canby TSP - FC	Yes	Sidewalks exist but no pedestrian barrier exists	Yes
	Safety		Left-turning traffic calming treatments (e.g., hardened centerline) Adjust signal timing for safety Reflectorized backplates and replace bulbs with LED bulbs	OR 99E & S Ivy St	2023 Canby TSP - Future Needs	Yes	Flagged in safety evaluation - Rear end, Left Turn	Yes
	Isolated Intersection Capacity Improvements		Add second SB LT lane, WB RT lane; consider trade-offs with ROW acquisition, degradation to ped, bike LTS	OR 99E & S Ivy St	2023 Canby TSP - Future Needs	Yes	reduces v/c to ~0.95	Yes
	Isolated Intersection Capacity Improvements		L4&L9	OR 99E/Pine Street	2023 - Future Needs	No	Not able to meet 2043 v/c	No
	Large-Scale Capacity Improvements	L4	Install westbound right-turn lane, convert southbound approach to two left turn lanes and a shared through-right lane (requires additional lane across railroad tracks), relocate southbound approach stop bar behind railroad tracks, and adjust signal timing to run with split phases for northbound and southbound approaches (includes Pedestrian Project C7 and Bicycle Project R4)	OR 99E/Pine Street and Adjacent Union Pacific Railroad Crossing	2011 Canby TSP - FC		Reduces v/c to ~0.98	Yes
	Large-Scale Capacity Improvements	L9	Close Union Pacific Railroad crossing and install gate that only allows service to emergency vehicles	OR 99E/Pine Street and Adjacent Union Pacific Railroad Crossing	2011 Canby TSP - FC	No		No

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
	Enhanced Pedestrian Crossing	C7	Improve crosswalk and ramps	OR 99E (at Pine St)	2011 Canby TSP - FC	Yes	ODOT is building curb ramps, rebuilding sidewalk on NW corner at intersection w/OR99E	Yes
	Railroad Crossing Improvements	R4	Provide rail crossing Improve rail crossing (fill in sidewalk gaps adjacent to rails) Install hinged pedestrian gate skirts on the sidewalks at the rail crossing	UPRR (at Pine St-NE 4th Ave)	2011 Canby TSP - FC	Yes	Associated with C7, L4	Yes
	Enhanced Pedestrian Crossing		Build enhanced pedestrian crossing of OR 99E between Sequoia Parkway the eastern edge of the UGB	OR 99E between Sequoia Parkway and the eastern edge of the Canby UGB	2011 - Future Needs	Yes	>4500ft segment with no crossing. Even with Walnut St extension in between, still >2000 ft of segment without crosswalk	Yes
	Safety		Installing safety countermeasures advance warning signs (e.g., signal ahead)	OR 99E & Sequoia Pkwy	2023 - Future Needs	No	Flagged in safety evaluation - Angle	No
	Safety		Replacing incandescent traffic signal bulbs with light emitting diodes (LEDs) Providing overhead lane-use signs	OR 99E & SW Berg Pkwy	2023 Canby TSP - Future Needs		Flagged in safety evaluation - Rear end	Yes
	Non-Capacity Improvements	N2	Convert to adaptive signal system	All traffic signals on OR 99E within Canby city limits	2011 Canby TSP - FC	No	Signal timing data updated	No
	Large-Scale Capacity Improvements	L2	Install traffic signal (associated with Otto Road Extension)	OR 99E/Otto Road	2011 Canby TSP - FC	No	New signal at Walnut	No
	Large-Scale Capacity Improvements	L8	Install overcrossing of OR 99E and Union Pacific Railroad with ramps and traffic signals providing access to OR 99E on the south side of the overcrossing and a frontage road along the north side of OR 99E connecting Otto Road to Pine Street	OR 99E/Otto Road	2011 Canby TSP - FC	No	-	No
	Sidewalks	S11	Install sidewalks, crosswalks, ramps	Otto Rd (OR 99E to SE 1st Ave)	2011 Canby TSP - FC	No	Walnut Street extension	No
	Bike Lanes	B7	Install bike lanes	Otto Rd (OR 99E to Mulino Road)	2011 Canby TSP - FC	No	Walnut Street extension	No
	Large-Scale Capacity Improvements	L1	Construct new road (includes two roundabouts and Pedestrian Project S10 and Bicycle Project B7)	Otto Road Extension (OR 99E to Mulino Road)	2011 Canby TSP - FC	No	Walnut Street extension	No
	Isolated Intersection Capacity Improvements		Add dual left?	OR 99E & Territorial Rd	2023 - Future Needs	Yes		
S Ivy St	Sidewalks		Build sidewalks between Township Road and SW 16th Ave	Ivy Street between Township Road and 13th Avenue	2023 Canby TSP - Future Needs		partial sidewalk and Moderate to High LTS	Yes
	Bike Lanes		Build buffered/protected bike lane on Ivy St between NW 1st Ave and SW 3rd Ave	NW 1st Ave to SW 3rd Ave	2023 Canby TSP - Future Needs	Yes	New project; has bike lane but Moderate LTS	Yes
	Bike lanes		Add buffer and/or phsyical separation to existing bike lane between SW 3rd Ave and SW 13th Ave	SW 13th Ave and SW 3rd Ave	2023 Canby TSP - Future Needs	Yes	New project; Existing facility is insufficient	Yes
	Bike boxes		Add bike boxes to Ivy St/Township Rd intersection (all approches)	Ivy St/Township Rd intersection	2023 Canby TSP - Future Needs	Yes	New project:Will facilitiate left turns	Yes
	Bike boxes		Add bike boxes to Ivy St/13th Ave intersection (all approaches)	Ivy St/SW 13th Ave	2023 Canby TSP - Future Needs	Yes	New project;Will facilitiate left turns	Yes
	Sidewalks	S4	Fill in sidewalk gaps	S Ivy St (OR 99E to Lee Elementary)	2011 Canby TSP - FC	No	North of the school still need to be filled	No
	Sidewalks	S12	Fill in sidewalk gaps	S Ivy St (S 13th Ave to S 16th Ave)	2011 Canby TSP - FC	No	One-side sidewalk	No
	Traffic signal	I1	Install traffic signal (includes Pedestrian Project C5)	Township Road/South Ivy Street	2011 Canby TSP - FC	No	Not able to meet 2043 v/c. Flasher is under construction. When warrant is met, install traffic signal	No
	Enhanced Pedestrian Crossing	C5	Install crosswalk and ramps	S Ivy St (north leg at Township Rd)	2011 Canby TSP - FC	Yes		Yes
	Isolated Intersection Capacity Improvements	I7	Install eastbound right-turn lane	South Ivy Street/SW 2nd Avenue	2011 Canby TSP - FC	No	Volumes too low in model plot	No

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
	Isolated Intersection Capacity Improvements	I8	Install partial diverter on west leg to close westbound receiving lane (includes Pedestrian Project C8)	South Ivy Street/SW 3rd Avenue	2011 Canby TSP - FC	No	No reason to install diverter	No
	Enhanced Pedestrian Crossing	C8	Install crosswalk, ramps, and pedestrian refuge island	S Ivy St (south leg at SW 3rd Ave)	2011 Canby TSP - FC	Yes	Original project called for closing crosswalk on north leg, but there's no reason to	Yes
	Isolated Intersection Capacity Improvements	I3	Remove southbound stop sign, restrict east leg to right-in/right-out, and install diverter on west leg to only allow southbound right turns	North Ivy Street/North 1st Avenue	2011 Canby TSP - FC	No	No need to remove SB stop sign or restrict to RI/RO	No
Township Rd	Sidewalks		Build sidewalks on Township Road near Baker Prairie Middle School and Cecile Trost Elementary School	Township Road near Baker Prairie Middle School and Cecile Trost Elementary School	2023 Canby TSP - Future Needs	Yes	partial sidewalk and Moderate to High LTS	Yes
	Bike Lanes		Build bike lanes on Township Rd east of Seqoia Pkwy	South Township Road (east of Sequoia Parkway)	2011 Canby TSP - Future Needs	Yes		Yes
	Sidewalks	S13	Install sidewalks	S Township Rd (OPRR to Sequoia Pkwy)	2011 Canby TSP - FC	Yes		Yes
	Railroad Crossing Improvements	R5	Move guardrail and improve rail crossing (fill in gaps adjacent to rails)	OPRR (at Township Rd)	2011 Canby TSP - FC	Yes	ROW for sidewalks is a challenge	Yes
	Isolated Intersection Capacity Improvements	I2	Convert to all-way stop and install eastbound and westbound left-turn lanes (includes Pedestrian Project C6)	Township Road/Sequoia Parkway	2011 Canby TSP - FC		AWS installed, butnot EB WB turn lanes, no crosswalk except west leg; meets EB LT warrant but not WB	Yes
	Enhanced Pedestrian Crossing	C6	Provide crosswalk	Township Rd (at Sequoia Pkwy)	2011 Canby TSP - FC	Yes		Yes
	Roundabout Improvements	O2	Install roundabout	Township Road/Redwood Street	2011 Canby TSP - FC	No	Current AWS, 2043 meeting mobility target	No
	Roundabout Improvements	O3	Intersection improvement	Township Road/Mulino Road	2011 Canby TSP - FC	Yes	Meets 2043 mobility target, but need to consider future UGB expansion and traffic attraction to the intersection	Yes
Knights Bridge Rd	Sidewalks	S6	Fill in sidewalk gaps	Knights Bridge Rd (west UGB to Ash St)	2011 Canby TSP - FC	Yes	Segment between UGB and Ash St	Yes
	Sidewalks	S10	Install sidewalks	Holly St from Knights Bridge to 6th Ave, 6th Ave from Holly St to Ivy St	2011 Canby TSP - FC	Yes	Assuming this is 6th Ave	Yes
	Bike Lanes		Install bike lanes	6th Ave from Knights Bridge to Ivy Street	2023 Canby TSP - Future Needs	Yes	New project	Yes
	Bike Lanes	B2	Stripe bike lanes	Knights Bridge Rd (west edge of UGB to Holly St)	2011 Canby TSP - FC	No	Ash St to UGB	No
	Isolated Intersection Capacity Improvements	I5	Restripe northbound approach to include a right-turn lane	Knights Bridge Road/Cedar Street	2011 Canby TSP - FC	No		No
	New Roadways		Build a bypass from Knights Bridge Road to Territorial Road	Knights Bridge Road to Territorial Road	2024 Public Engagement	Yes	Unlikely to be funded	Yes
N Holly St	Sidewalks	S7	Fill in sidewalk gaps	N Holly St (NW 5th Ave to NW Territorial Rd)	2011 Canby TSP - FC	Yes	One-side sidewalk in between	Yes
	Ped		LTS	Holly Street near Triangle Park	2023 - Future Needs	No	partial sidewalk and High LTS	No
	Bike Lanes	B1	Install enhancements to create a bicycle boulevard	N Holly St (NW 6th Ave to Multi-Use Traild)	2011 Canby TSP - FC	Yes		Yes
	Bike Lanes	B3	Stripe bike lanes (widen as needed)	N Holly St (NW 22nd Ave to NW 6th Ave)	2011 Canby TSP - FC		Consider adding physical separators/buffer	Yes
SE 13th Ave	Sidewalks		fill sidewalk gaps on SE 13th Ave east of S Redwood St	SE 13th Avenue (east of South Redwood Street)	2011 Canby TSP - Future Needs	Yes	One-side/no sidewalk in between	Yes
	Sidewalks		fill sidewalk gaps on SE 13th Ave between Ivy St and S Redwood St	13th Avenue near the complex that includes Philander Lee Elementary School	2023 Canby TSP - Future Needs	Yes	has sidewalk and Moderate LTS	Yes

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
	Bike lanes		Add buffer and/or physical separation to existing bike lanes	Logging Road to OR 99E (on SW Berg Parkway)	2023 Canby TSP - Future Needs	Yes		Yes
	Non-Capacity Improvements	N3	Perform safety study and construct traffic calming and other safety improvements prior to constructing Sequoia Parkway Extension to SE 13th Avenue	SE/SW 13th Avenue (Berg Parkway to Sequoia Parkway Extension)	2011 Canby TSP - FC	No		No
SE Sequoia Parkway	Sidewalks			SE Sequoia Parkway	2011 Canby TSP - Future Needs	No	One-side/no sidewalk in between	No
	Bike Lanes		Restripe to add buffer to bike lanes	Sequoia Parkway between Township Road and OR 99E	2023 Canby TSP - Future Needs	Yes	currently has bike lanes but experiences Moderate LTS	Yes
	Large-Scale Capacity Improvements	L7	Install two-lane collector roadway with grade-separated rail crossing (includes sidewalks and bike lanes)	Sequoia Parkway Extension (Township Rd to SE 13th Avenue)	2011 Canby TSP - FC	No	Sidewalk one side	No
Pine St (OR 99E to NE 4th Ave)	Sidewalks	S5	Install sidewalks	Pine St (OR 99E to NE 4th Ave)	2011 Canby TSP - FC	Yes	Segment between OR99E and fairground	Yes
	Bike Lanes	B6	Install bike lanes	Pine St (OR 99E to NE 4th Ave)	2011 Canby TSP - FC	Yes	OR99 to fairground	Yes
South Haines Road	Sidewalks			South Haines Road	2011 Canby TSP - Future Needs	No		No
	Bike Lanes			South Haines Road	2011 Canby TSP - Future Needs	No		No
	Enhanced Pedestrian Crossing			South Haines Road	2011 Canby TSP - Future Needs	No	With some HH, might need to consider, not seeing why crossing is nessasary	No
	Isolated Intersection Capacity Improvements		improved connectivity to OR 99E from the Canby Pioneer Industrial Area	South Haines Road	2011 Canby TSP - Future Needs	No	Improve Territorial Road as new connector?	No
South Mulino Road	Sidewalks			South Mulino Road	2011 Canby TSP - Future Needs	No	Mostly no, with short segment of one-side	No
	Enhanced Pedestrian Crossing			South Mulino Road	2011 Canby TSP - Future Needs	No	Not expecting many ped, might not be priority	No
	Bike Lanes			South Mulino Road	2011 Canby TSP - Future Needs	No	One-side/no bike lane	No
South Walnut Street	Sidewalks			South Walnut Street	2011 Canby TSP - Future Needs	No	One-side sidewalk	No
	Bike Lanes			South Walnut Street	2011 Canby TSP - Future Needs	No		No
SE 1st Avenue	Sidewalks			SE 1st Avenue	2011 Canby TSP - Future Needs	No	some one-side sidewalk	No
	Bike Lanes			SE 1st Avenue	2011 Canby TSP - Future Needs	No	One-side/no bike lane	No
Territorial Rd	Sidewalks	S8	Fill in sidewalk gaps	Territorial Rd (Holly St to OR 99E)	2011 Canby TSP - FC	No	One-side/no sidewalk in between	No
	Bike Lanes			SE Territorial Road	2011 Canby TSP - Future Needs		No west of Holly St	No
	Bike Lanes		Add buffer and/or physical separation to existing bike lanes	N Holly St to OR 99E	2023 - Future Needs	Yes	New project	Yes
	Isolated Intersection Capacity Improvements		potential intersection upgrade (does not meet signal warrant)	Territorial Rd & Redwood St	2023 Canby TSP - Future Needs	Yes	Not able to meet 2043 v/c	Yes
	New Roadways		Create bypass to I-5	Terrirotiral Road to I-5 connection west of Canby. Alternate route could be Arnt Road extension	2024 Public Engagement	Yes	Unlikely to be funded	Yes
SE 4th Avenue	Large-Scale Capacity Improvements	L5	Install two-lane collector roadway (includes Pedestrian Project S13 and Bicycle Project B8)	SE 4th Avenue Extension (Sequoia Parkway to Mulino Road)	2011 Canby TSP - FC	No	Assumed as baseline project	No
	Bike Lanes	B8	Install bike lanes	SE 4th Ave (Sequoia Pkwy to Mulino Rd)	2011 Canby TSP - FC	No	Assumed as baseline project	No

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
NE 3rd Avenue & NE 4th Ave	Large-Scale Capacity Improvements	L6	Convert roadways to one-way travel (to provide sufficient space for bike lane and sidewalks)	NE 3rd Avenue (Locust Street to NE 4th Avenue) and NE 4th Avenue (Locust Street to NE 3rd Avenue)	2011 Canby TSP - FC	No	B4	No
NE 3rd Avenue	Sidewalks	S2	Install sidewalks	NE 3rd Ave (Locust Street to NE 4th Ave)	2011 Canby TSP - FC	No		No
	Bike Lanes	B4	Stripe bike lane (provide sufficient space for bike lane and sidewalks by converting roadways to one-way travel)	NE 3rd Ave (Locust St to NE 4th Ave) and NE 4th Ave (Locust St to NE 3rd Ave)	2011 Canby TSP - FC	No		No
NE 4th Ave	Sidewalks	S3	Install sidewalks	NE 4th Ave (NE 3rd Ave to Fairgrounds)	2011 Canby TSP - FC	No		No
	Bike Lanes	B5	Install bike lanes	NE 4th Ave (NE 3rd Ave to Fairgrounds Entrance)	2011 Canby TSP - FC	No		No
NE 10th Ave (Holly St to Pine St)	Sidewalks	S9	Install sidewalks	NE 10th Ave (Holly St to Pine St)	2011 Canby TSP - FC	Yes		Yes
	Bike lanes		Stripe buffered bike lanes or create bicycle boulevard	N Holly St to Logging Road connection (NE 9th or NE 11th Ave)	2024 Public Engagement	Yes	Select facility type based on volumes	Yes
SE Hazel Dell Way	Sidewalks			SE Hazel Dell Way	2011 Canby TSP - Future Needs	No	One-side sidewalk	No
Elm Street	Bike Lanes			Elm Street (between NW 3rd Avenue and SW 4th Avenue)	2011 Canby TSP - Future Needs	No		No
North Birch Street	Bike Lanes			North Birch Street (between Knights Bridge Road and NW Territorial Road)	2011 Canby TSP - Future Needs	No		No
Redwood Street	Bike Lanes		Bike facilities	Redwood Street between OR 99E and 13th Avenue	2023 - Future Needs	No	has bike lane but Moderate LTS	No
Berg Parkway	Large-Scale Capacity Improvements	L10	Extend Berg Parkway to NW 3rd Avenue via a grade-separated crossing of the Union Pacific Railroad	Berg Parkway Extension	2011 Canby TSP - FC	Yes	Will not be on FC list	Yes
Grant St	Isolated Intersection Capacity Improvements	I4	Remove southbound stop sign	North Grant Street/NW 1st Avenue	2011 Canby TSP - FC	No		No
	Isolated Intersection Capacity Improvements	I6c	Install westbound right-turn lane	South Grant Street/SW 2nd Avenue	2011 Canby TSP - FC	No		No
NW 3rd Ave & N Cedar St	Safety		Improving intersection warning (e.g., pavement marking, striping, and signage) Converting the intersection to an all-way stop control Installing continental crosswalk markings and advance pedestrian warning signs	NW 3rd Ave & N Cedar St	2023 - Future Needs	No	Only 2 crashes 2017-2021	No
Old Pacific Highway (near Canby High School)	Sidewalks			Old Pacific Highway (near Canby High School)	2011 Canby TSP - Future Needs	No	Not sure where Old Pacific Highway is, seems like it's the south of OR99 close to Berg, partial sidwalks and bikelanes	No
	Bike Lanes			Old Pacific Highway (near Canby High School)	2011 Canby TSP - Future Needs	No	Not sure where Old Pacific Highway is, seems like it's the south of OR99 close to Berg, partial sidwalks and bikelanes	No
OR 99E and Molalla Forest Rd Trail	Multi-Use Trail	T1	Connect multi-use trail to sidewalks on south side of OR 99E	OR 99E and Molalla Forest Rd Trail	2011 Canby TSP - FC	Yes		Yes
Parallel Route to OR 99E (between Elm St and Molalla Forest Rd Trail)	Multi-Use Trail	T2	Construct multi-use trail along rail corridor	Parallel Route to OR 99E (between Elm St and Molalla Forest Rd Trail)	2011 Canby TSP - FC	Yes	ROW is an issue	Yes

Location	Category	2011 TSP Project #	Project Description	Project Extent	Source	Still Applicable?	Assessment	Include Project in TSP Update?
Safe Routes to School (yearly funding)	Program Strategy	P1	Prepare initial plan and provide yearly funding ($50,000 per year)	Safe Routes to School (yearly funding)	2011 Canby TSP - FC	Yes		Yes
ADA Improvements (yearly funding)	Program Strategy	P2	Prepare initial plan and provide yearly funding ($50,000 per year)	ADA Improvements (yearly funding)	2011 Canby TSP - FC	Yes		Yes
SW 2nd Avenue	Bike Boulevard		Upgrade to bike boulevard	Canby Square driveway on SW 4th Ave to intersection of S Ivy St/SW 2nd Ave	2023 Canby TSP - Future Needs	Yes	Provides bike route parallel to OR 99E	Yes
	Enhanced Pedestrian Crossings		Install ADA compliant pedestrian curb ramps at all intersections		2023 Canby TSP - Future Needs	Yes	Need to prioritize	Yes
	Transit		Improve ped/bike facilities near transit stops		2023 - Future Needs		Too vague	No
	Transit		Consider potential alignments for transit expansion and ensure network designs that can adequately serve it.		2023 Canby TSP - Future Needs			Yes
	Transit		improve transit stop amenities (e.g., shelters, benches), prioritizing highest-ridership locations		2023 Canby TSP - Future Needs	Yes	ODOT is adding bus shelters on OR99E	Yes
	Safety		Building out Canby's low-stress walking and biking networks will enhance safety and help prevent future crashes involving vulnerable road users, including people walking and biking		2023 - Future Needs	No	Too vague	No
	Safety		Assess railroad crossings for multimodal safety enhancements		2023 - Future Needs		Addressed through other projects	No
	Safety		Addressing the impacts of evolving vehicle technologies (i.e., autonomous and connected vehicles (CAVs), city fleet safety upgrades) and proactively identifying high-risk characteristics of the street network, including at locations that have not yet experienced crashes		2023 - Future Needs	No	Too vague	No
	Other		Apply for TGM grant to assess opportunities to support electric vehicle adoption and use (i.e., public and private charging infrastructure).		2023 Canby TSP - Future Needs	Yes	Suggest a study or plan	Yes
	Other		Improve connectivity of streets in the City through implementation of recommended transportation facility and access spacing standards.		2023 - Future Needs	No		No
	Other		River crossing (Territorial Rd to west)		2023 - Future Needs	Yes	Addressed through other projects	No
	Other		UGB Expansion		2023 - Future Needs	No	Need to get UGB expansion map from Kevin and see if control ot other improvements are needed to prepare for additional traffic	No
SE 1st Avenue/Haines Road/Mulino Road/Bremer Road	Roundabout Improvements	O1	Consider roundabout or other potential improvements	SE 1st Avenue/Haines Road/Mulino Road/Bremer Road	2011 Canby TSP - FC	Yes	Realign, improved with traffic control (e.g., traffic signal, roundabout), UGB expansion	Yes