I-5 WILSONVILLE FACILITY PLAN

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Oregon Department of Transportation

WILSONVILLE OREGON

I-5 WILSONVILLE FACILITY PLAN

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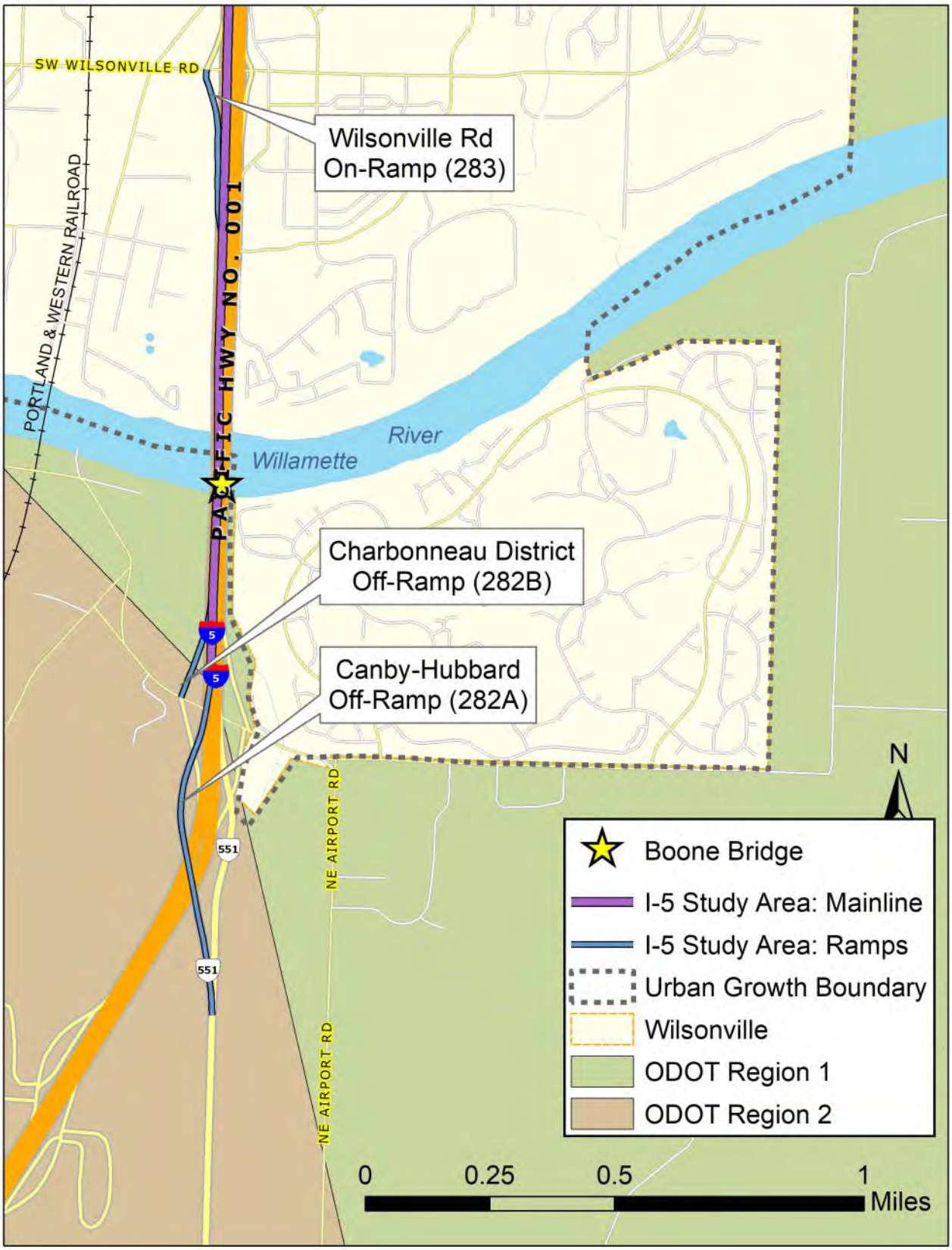

FIGURE 1. Study area map.

FIGURE 2. Vicinity map.

INTRODUCTION

The I-5 Wilsonville Facility Plan evaluates and addresses operational problems on southbound Interstate 5 from the Wilsonville Road on-ramp (Exit 283) to the Canby-Hubbard off-ramp (Exit 282A) (FIGURE 1). A bottleneck on I-5 southbound in the City of Wilsonville slows speeds and reduces travel reliability for people travelling by car, by transit, or moving freight by truck. Failure to address this bottleneck will lead to slower travel, more costly freight movement, reduced livability, and higher safety risks for those who use I-5 and the surrounding local transportation network.

The I-5 Wilsonville Facility Plan evaluates existing and future conditions on southbound I-5, and proposes a solution for the bottleneck. This is a mode-specific facility plan for motor vehicle, freight truck, and transit users of the interstate. It implements the Oregon Highway Plan without amending the highway's classifications or changing the alignment of I-5.

FIGURE 3. Aerial photo of the study area, as viewed from above the I-5: Wilsonville Road interchange looking south along I-5.

Background

This segment of I-5 is the gateway between the Portland metro area and the rest of the state (FIGURE 2) and is a key segment on the primary west coast route for regional, interstate, and international freight movement by truck. I-5 is one of the state's critical seismic lifeline routes, and the Boone Bridge (which is part of the study area) will require upgrades to withstand a major Cascadia Subduction Zone quake. This bridge is the only motor vehicle crossing of the Willamette River within 15 miles of Wilsonville's town center.

This plan represents the Oregon Department of Transportation's latest effort to manage safety and mobility on I-5 in the Wilsonville area, building on several recent successful projects. In 2009, ODOT and the City collaborated to plan the reconstruction of the I-5: Wilsonville Road interchange, including infrastructure improvements and management strategies to better serve planned growth in the area. Nine years have passed since the adoption of the interchange area management plan. In that time ODOT completed interchange reconstruction, and ODOT and the City implemented the bulk of the management plan's recommendations. More recent projects include the City's addition of a third lane to the Wilsonville Road southbound on-ramp and improvements at the Elligsen Road northbound on-ramp. These projects have improved conditions on Wilsonville Road and I-5 northbound, but most were conceived before growing traffic volumes led to the emergence of the southbound bottleneck. If congestion at this bottleneck continues to increase, southbound I-5 will soon fail to meet the mobility targets the state has set to define whether the highway is performing acceptably.

POLICY CONTEXT

The function of I-5 in the study area

The Federal Highway Administration classifies I-5 in the study area as an urban interstate on the National Highway System, and as part of the national freight network. The Oregon Highway Plan, which establishes the function each highway serves in the state-owned transportation network, affirms these classifications. It also adds I-5's function as a Tier I seismic lifeline, a high clearance route that serves large freight vehicles, and a reduction review route that requires a formal process before ODOT may construct projects that reduce overhead clearance or roadway width.

Together, these classifications define I-5 as a facility of national significance that provides connections to major cities, interregional, and interstate destinations. Its primary function is to provide safe, reliable, higher-speed operations for longer distance travel and freight movement, as well as emergency services. To fill this function, I-5 needs limited, well-spaced connections to the local system, sufficient clearance for over-dimensional freight, higher travel speeds, reliable travel times, and the structural stability to remain functional after a major quake or other disaster.

Guiding statewide goals and policies.

The Oregon Highway Plan supplies the major goals and policies that will guide decisions ODOT makes in this plan. The goals that most closely relate to the purpose of this facility plan are:

Goal 1. System Definition: To maintain and improve the safe and efficient movement of people and freight, and contribute to the health of Oregon's local, regional, and statewide economies and livability of its communities.

To meet this goal, this plan will need to:

- Remain consistent with I-5's functional classifications (Policy 1A).
- Support freight movement by improving I-5's performance and balancing the needs of freight users with other travelers (1C).
- Maintain or improve the ability of this section of I-5 to serve as a secure lifeline route for emergency services and recovery efforts after a disaster (1E).
- Maintain or improve I-5's performance relative to state mobility targets (1F).
- Maintain highway performance and improve safety by protecting the existing system and making minor improvements before considering expanding road capacity (1G).

Goal 2. System Management: To work with local jurisdictions and federal agencies to create an increasingly seamless transportation system with respect to the development, operation, and maintenance of the highway and road system that:

Safeguards the state highway system by maintaining functionality and integrity;
Ensures that local mobility and accessibility needs are met; and
Enhances system efficiency and safety.

To meet this goal, this plan will need to:

- Balance state, regional, and local needs, drawing on partnerships with the City of Wilsonville, Clackamas County, and Washington County (2A).
- Ensure that residents, businesses, regional and local governments, state agencies, and tribal governments have opportunities to participate in the planning process (2D).
- Manage and operate I-5 efficiently through the use of strategies such as transportation system management and operations, intelligent transportation systems, and transportation demand management (2E).
- Maintain or improve safe travel in the study area, with a focus on preventing fatal and severe crashes (2F).

In the past two acts authorizing federal funding for ground transportation needs, Congress emphasized the importance of bottleneck identification and addressing bottlenecks on the multimodal transportation system. To respond to this topic of national concern, ODOT completed a 2017 study of freight delay areas. The final report identified this segment of southbound I-5 as part of a Tier 2 Freight Delay Corridor (I-5 from the Columbia River to Interstate 205 is the state's only Tier 1 Corridor). The plan area's inclusion in Tier 2 indicates it is a critical location for investment if the state wishes to reduce the high costs of freight delay and unreliability to Oregon's economy.

Regional plans, policies, and regulations.

The most recent Regional Transportation Plan was adopted in 2014. It provides guidance for managing transportation in the Portland metropolitan region to best serve planned growth. Its goals and objectives are consistent with statewide policy. The Regional Transportation Plan classifies I-5 as a throughway, a mobility route with little or no property access and an emphasis with connecting major destinations across the region. Throughways are planned as six lane facilities, with on-ramp, off-ramp, and auxiliary lanes where needed. The Regional Transportation Plan recognizes that the Tigard to Wilsonville mobility corridor (including I-5 in the study area) is a critical gateway for regional travel and commerce, where transportation decisions carry statewide significance.

This facility plan seeks to move our region closer to attaining 2014 Regional Transportation Plan performance targets, which include reducing severe and fatal crashes, and reducing vehicle hours of delay per person and per truck trip. It responds to the Regional Transportation Plan's concern with how peak period congestion in this corridor impacts regional freight reliability, mobility, and travel patterns. In addition, it follows the Regional

Transportation Plan recommendation to consider providing auxiliary lanes between Wilsonville's on– and off-ramps.

The Regional Transportation Plan identifies the need for a broader multimodal study of the I-5 South Corridor, including parallel facilities. This facility plan addresses one small segment of the I-5 corridor and focuses on motorized travel. It does not preclude the broader multimodal I-5 South Corridor Refinement Plan, address the need for that broader regional study, or preclude any potential multimodal transportation solutions that could be studied as part of a refinement plan.

Local plans, policies, and regulations

The City of Wilsonville's Comprehensive Plan (2013) and Transportation System Plan (2016) set the local policy context for the urban locations within the study area. Relevant goals and policies seek to:

- Increase safe and reliable multimodal access and circulation;
- Reduce reliance on single occupancy vehicles;
- Work with ODOT and regional partners to maintain I-5's capacity using techniques including auxiliary lanes and targeted interchange improvements; and
- Ensure that development proceeds in balance with the transportation capacity and services needed to accommodate additional trips.

Taken together, these policies work to serve transportation needs on the local system, reduce the burden of single occupancy vehicle travel on I-5, ensure the transportation system can accommodate travel demands of new development, and support ODOT's efforts to maintain I-5's capacity.

These two local plans create strong links between transportation planning and development. The Comprehensive Plan directs the City to reduce or delay the level of development if the transportation system will be inadequate to support additional trips (Policy 3.2.3). These documents define the Regional Transportation Plan's Financially Constrained List and the city's Capital Improvement Plan as the only sources of improvements that can be considered in determining the transportation system's planned capacity, function and level of service.

This facility plan also considers the influence that operational improvements would have on the intersection of southbound I-5 and Wilsonville Road, a key link in the local transportation network. The City has designated this segment of Wilsonville Road as a major arterial, freight route and transit route.

Clackamas County's Comprehensive Plan (2017) and Transportation System Plan (2017) set the local policy context for the rural locations within the study area, south of the Willamette River and the Metro Urban Growth Boundary. Relevant goals and policies seek to:

- Enhance and maintain the function of state highways and county arterials in various ways, including with roadway improvements;
- Protect agriculture, forest, and open space uses in rural areas;
- Recognize the need to maintain a transportation system that provides opportunities to harvest agricultural and forest products and deliver them to market;
- Emphasize roadway improvements that help ensure reliable and on-time transit service in the county; and
- Improve and maintain state, regional, and county truck freight routes.

These policies recognize the importance of protecting the rural context while ensuring that highways, county arterials, transit routes, and freight routes function well and meet the needs of Clackamas County. This facility plan seeks to identify operational improvements to existing routes that meet the needs of motorized travelers, without interfering with the rural character or the farm and forest land uses near I-5.

PURPOSE STATEMENT

The purpose of this facility plan is to identify a long-term operational concept for southbound I -5 in the south Wilsonville area. The plan identifies and evaluates alternatives for addressing a bottleneck that forms in the evening peak on this section of I-5, which reduces efficiency and reliability for people traveling by private vehicle, by bus, and by shuttle; and for freight haulers moving goods by truck.

An appropriate operational concept will meet all of the following criteria as of the year 2040:

- Enables southbound I-5 in the south Wilsonville area to meet state mobility targets
- Enables I-5 to meet local performance benchmarks in the evening peak period
- Improves travel time reliability during the evening peak
- Reduces the risk of fatal or severe crashes
- Reduces the impacts of I-5 evening peak period congestion on Wilsonville Road
- Considers the need for local travel across the Willamette River
- Minimizes the potential for property and environmental impacts
- Can be designed and constructed in combination with the Boone Bridge seismic retrofit project

The location of this bottleneck creates an unusual land use context for this plan. ODOT and the City of Wilsonville have undertaken this planning effort with the purpose of resolving an urban transportation problem, which arises from and impacts travel within the Metro urban growth boundary. Because the causes of this bottleneck involve traffic patterns on the Boone Bridge, which crosses the urban growth boundary, this plan evaluates project alternatives that extend a short distance (approximately 0.7 miles) into Clackamas County rural reserves. This plan is not intended to support or create a basis for urbanization of these rural reserves. ODOT and the City recognize the need to protect the agricultural and forest land uses within the rural portions of the study area.

In addition to the above criteria, this plan will focus on operational concepts that:

- Can likely be constructed within ODOT's existing right-of-way
- Do not create, close, or alter highway access points from rural roads or private properties
- Do not add travel capacity to OR-551 beyond the I-5: OR-551 (Exit 282A) interchange area.

FIGURE 4. I-5 and the Wilsonville Road (Exit 283) south-bound on-ramp.

Description of the study area

The facility plan encompasses 0.9 miles of the I-5 southbound mainline (milepost 283.54-282.64), a three-lane section of the highway from the Wilsonville Road on-ramp to the Canby-Hubbard off-ramp. The two-lane Wilsonville Road on-ramp begins at a four-way signalized intersection on Wilsonville Road, merges into one lane at a ramp meter, and is 0.3 miles long (FIGURE 4). There is a project underway to add a third lane to the on-ramp to provide additional vehicle storage when the ramp meter is operating. After the ramp reaches the mainline, a 100-foot long merge lane extends to the south of the ramp's gore point (the triangular shape formed where the on-ramp lane meets the mainline).

The Boone Bridge is made of two adjacent steel structures that support one bridge surface, which forms a 0.2 mile crossing of the Willamette River (FIGURE 5). The bridge was constructed in 1953 and widened in 1967. The bridge serves as the primary link between the Portland metro area and Marion County, as well as between Wilsonville and the communities of Aurora, Canby, Donald, Hubbard, Molalla, and Woodburn. The nearest alternate motor vehicle crossings over the river are Oregon 219 south of

FIGURE 5. I-5 Boone Bridge over the Willamette River.

Newberg and Oregon 43 between West Linn and Oregon City, with a minimum detour length of nearly 13 miles. It has a sufficiency rating of 80.1, indicating it meets desirable criteria. However, its construction took place before modern seismic standards and the bridge has been found to be seismically vulnerable (see the 2016 Oregon Bridge Conditions Report).

The Charbonneau District off-ramp exits the highway 0.7 miles south of the Wilsonville Road on-ramp (FIGURE 6). Its single lane extends a quarter mile before coming to a stop-controlled intersection with NE Miley Road.

The Canby-Hubbard off-ramp begins 0.2 miles south of the Charbonneau off-ramp and merges with Oregon 551 (Wilsonville-Hubbard Highway). The study area includes the first 0.2 miles of the off-ramp, a one-lane section that becomes two lanes at the edge of the study area.

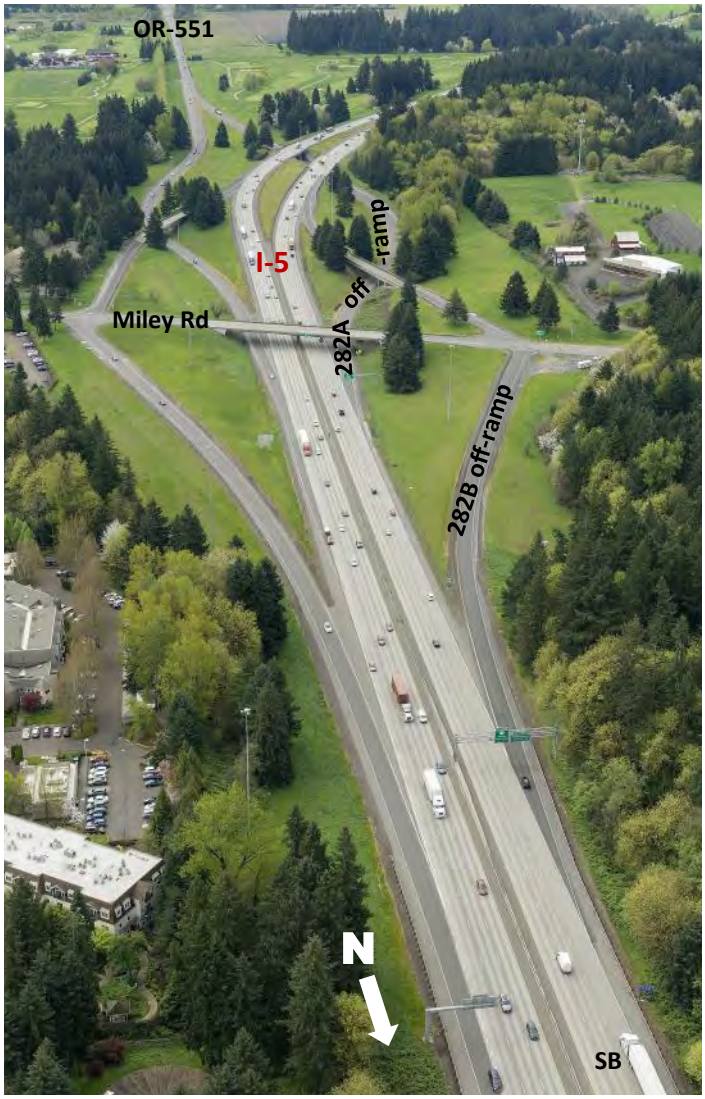

FIGURE 6. I-5 and the Charbonneau District (Exit 282B) and Canby-Hubbard (Exit 282A) interchanges.

I-5 traffic patterns and operations

Technical memoranda developed during the planning process can be found in Appendix A.

For analysis purposes, 4-5 p.m. is the peak hour when the greatest volumes move through the study area. On a typical day, I-5 southbound across the Boone Bridge experiences congested conditions from 3-7 p.m.

The annual average daily southbound traffic on the Boone Bridge is 63,590 vehicles. Freight trucks (vehicles with three or more axels and/or six or more tires) represent approximately 14 percent of daily volumes, higher than is typical for Portland metro area freeway segments. Multiple transit agencies route buses along this segment of I-5, including Amtrak (6 southbound buses per weekday), Greyhound (4 southbound buses per weekday), POINT Intercity Transit, (7 southbound buses per weekday),

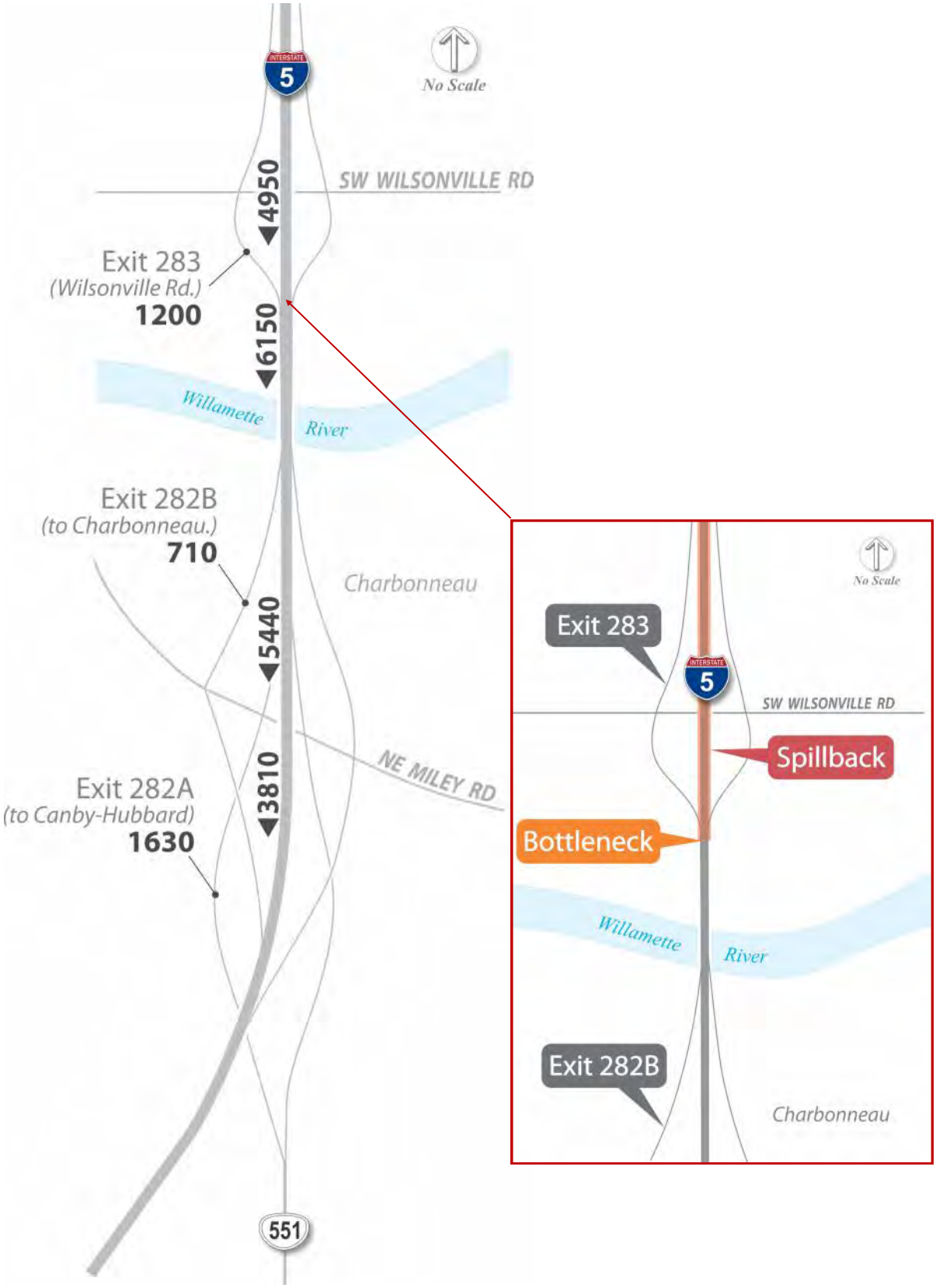

FIGURE 7. 2017 southbound I-5 traffic volumes during the evening peak hour.

and Wilsonville SMART (14 southbound buses per weekday, some jointly operated with Salem Cherriots). A variety of organizations and operators also route airport and commuter shuttles through the study area.

During the evening peak hour, approximately 6,150 vehicles cross the Boone Bridge heading south (FIGURE 7). Twenty percent of those vehicles enter at the Wilsonville Road on-ramp. Twelve percent of all southbound vehicles crossing the bridge exit at the Charbonneau off-ramp, 26 percent exit at Canby-Hubbard, and the remaining 52 percent continue south on I-5.

Average travel speeds slow considerably over the course of the extended peak period and do not increase until after 6 p.m. The slowest speeds and greatest unreliability occur at I-5 southbound over Wilsonville Road, just north of the merge with the Wilsonville Road on-ramp. Average speeds at this bottleneck location drop to a low of 30 mph for close to an hour during the peak, and have been gradually decreasing for at least three years (FIGURE 8).

This bottleneck is part of a freight delay area on southbound I-5 that extends from the Boone Bridge to I-205. ODOT's study of freight delay areas determined that delays in this segment result in an annual economic cost of $746,000 per mile of I-5.

As FIGURE 9 shows, travel through the bottleneck area (the I-5 mainline north of the Wilsonville Road on-ramp) is highly unreliable as well as highly congested during the evening peak. On the most congested days each month, travel through the bottleneck area will take

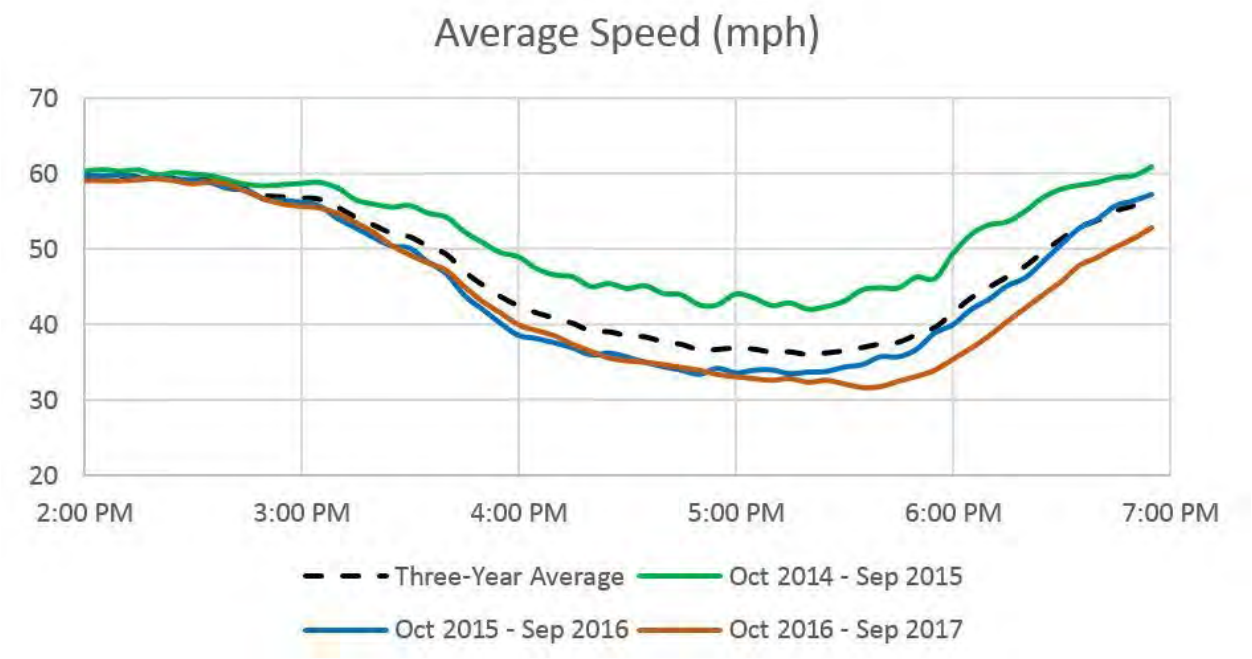

FIGURE 8. Change in average evening peak travel speeds on southbound I-5 from 2014-2017.

three times as long as it does on the least congested days. Travelers and freight movers making regular trips in the corridor must plan extra time for their trip to ensure they will not be late. This unpredictability can be more frustrating and costly for users than consistent and predictable congestion.

The bottleneck begins to form where the Wilsonville Road on-ramp merges onto the I-5 mainline. With no local access bridge and no nearby alternatives for crossing the Willamette River, local travelers use the Wilsonville Road on-ramp to cross the river via the Boone Bridge. Six out of 10 vehicles entering at the Wilsonville Road on-ramp use the first two exits south of the river (FIGURE 10). They are joined on these exits by 3 out of 10 vehicles that entered the study area on I-5 while making longer-distance regional trips. Meanwhile, the other vehicles entering at Wilsonville Road attempt to merge left to reach a less congested lane, and the

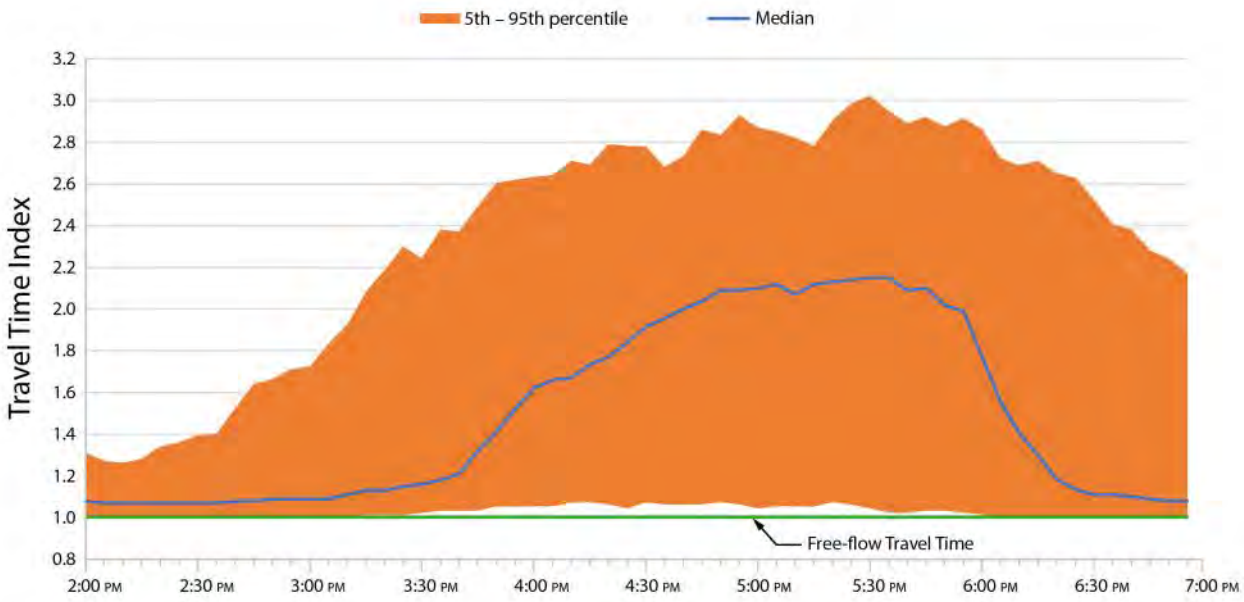

FIGURE 9. Evening peak travel time reliability in the bottleneck area on the southbound I-5 mainline.

The free-flow travel time is how long it takes to drive this segment when there is no congestion. The median travel time is how long it takes to drive this segment at a particular time on a day with average congestion. For this section of I-5, the median travel time is twice the free-flow travel time during the peak hour (4-5 p.m.). The orange area represents the variation in travel times that are observed in the bottleneck area (equivalent to the difference between the second-best travel day each month and the second worst).

through travelers also merge left to avoid the slowest conditions. These movements lead to much higher vehicle volumes in the right-hand lane than in the inner lanes as traffic moves across the Boone Bridge. This imbalance in vehicle volumes across lanes contributes to slow and unreliable travel conditions on the I-5 mainline that extend north toward the Elligsen exit.

ODOT measures highway mobility using the volume-to-capacity or v/c ratio, which assesses theoretical demand to use the facility compared to the actual vehicle capacity (based on number of lanes, road geometry, traffic control and travel speeds). Higher v/c ratios indicate greater levels of congestion, The bottleneck area has a v/c ratio of 0.98. The statewide

FIGURE 10. Destinations for southbound vehicles on I-5 in the study area.

Left: vehicles entering at the Wilsonville Road on-ramp. Middle: vehicles traveling into the study area on the I-5 mainline. Right: all southbound vehicles crossing the Boone Bridge.

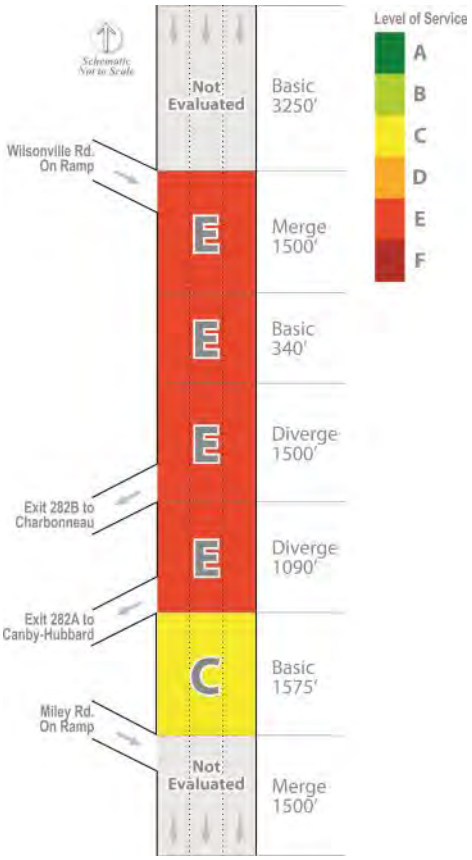

FIGURE 11. 2017 level of service grades for southbound I-5 in the study area.

mobility target of 0.99 represents the point where there is no available capacity on the roadway.

The City of Wilsonville uses level of service, another mobility measure that assesses operational efficiency and delay, then assigns an "A-F" grade. This measure shows level of service grade "E" (the City's benchmark for minimum acceptable operations) through most of the study area and confirms that the congested conditions in the study area do not fully clear until after the Canby-Hubbard off-ramp (FIGURE 11).

Crash history

Analysis of the most recent available crash data (2011-2015) found above-average crash rates on the I-5 southbound mainline between the Wilsonville Road off-ramp and on-ramp, with rear-end and sideswipe crashes indicating that the collisions are due to speed differences by lane and merging attempts taking place in congested conditions. Sections of the study area south of the bottleneck location had crash rates at or below average rates. No fatal or severe injury crashes occurred during the five years analyzed. The study area does not contain any locations that ODOT's Safety Priority Index System ranks in the top 10 percent (the locations with the most and most severe crashes statewide).

Land use context and local traffic conditions

Wilsonville is a regional employment destination with more than 20,000 workers and I-5 provides critical access to area employers. The majority of the city's large employers are industrial businesses, with commercial development as a secondary sector. The area along Wilsonville Road to the west of I-5 is zoned commercial with surrounding industrial development, and to the east of I-5 is zoned commercial with surrounding residential development and public park lands (FIGURE 12). The Wilsonville Town Center sits in the northeast quadrant of the I-5 Wilsonville Road interchange and is planned for commercial development. This zoning was established to allow businesses to take advantage of direct freight access to and from the freeway interchanges, avoiding undesirable truck traffic in residential neighborhoods.

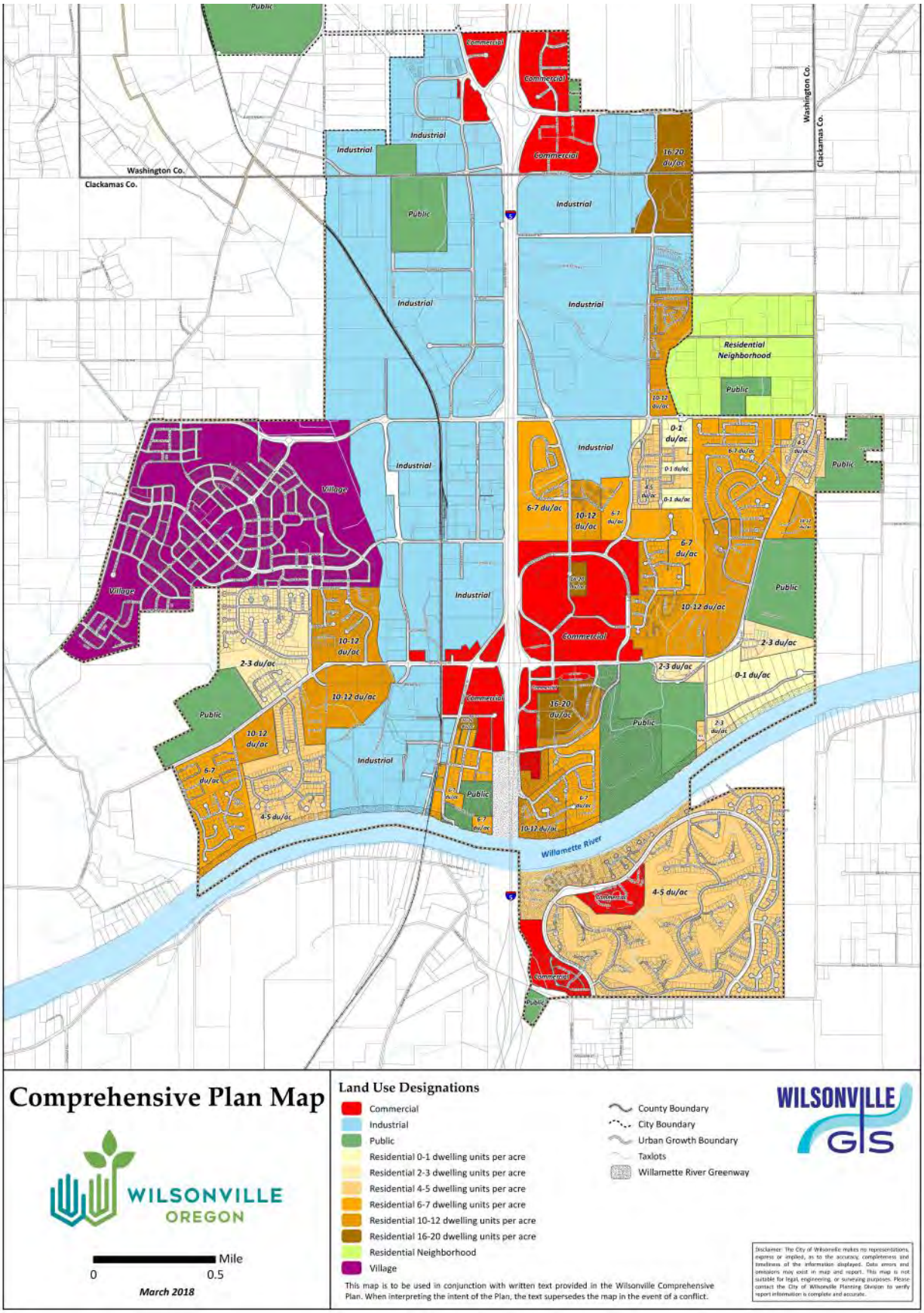

FIGURE 12. City of Wilsonville comprehensive plan map (2018).

The City of Wilsonville has data showing that upwards of 90 percent of Wilsonville employees come from outside the city limits, with significant draw from the satellite communities to the south, such as Canby, Woodburn and Salem. For these commuters, the Boone Bridge provides the only direct crossing of the Willamette River. Since the early 2000s, the region has added several hundred future employment acres to the Urban Growth Boundary on the north end of the city, such as the Coffee Creek Industrial Area and Basalt Creek Employment Area. Wilsonville has adopted the Concept Plan and Master Plan for Coffee Creek and is developing the Concept Plan for Basalt Creek.

I-5 bisects Wilsonville, with only three east-west crossings of the highway within city limits. Wilsonville Road, the southernmost of these crossings, supports multimodal accessibility with pedestrian and bicycle pathways on both sides of the street and an eight lane cross-section underneath I-5. Despite recent improvements to the interchange area and on-ramps, Wilsonville Road experiences peak period congestion, delays and unreliability due to high demand at the Wilsonville Road southbound on-ramp. Conditions at the on-ramp vary greatly from day to day. Three consecutive days of video data showed one day when the ramp meter never activated, one day when moderate queues at the ramp meter formed on the on-ramp, and one day when long queues spilled back from the on-ramp onto Wilsonville Road (FIGURE 13). Comparisons with traffic data confirmed that these three days reflect a typical range of different conditions that occur at this on-ramp.

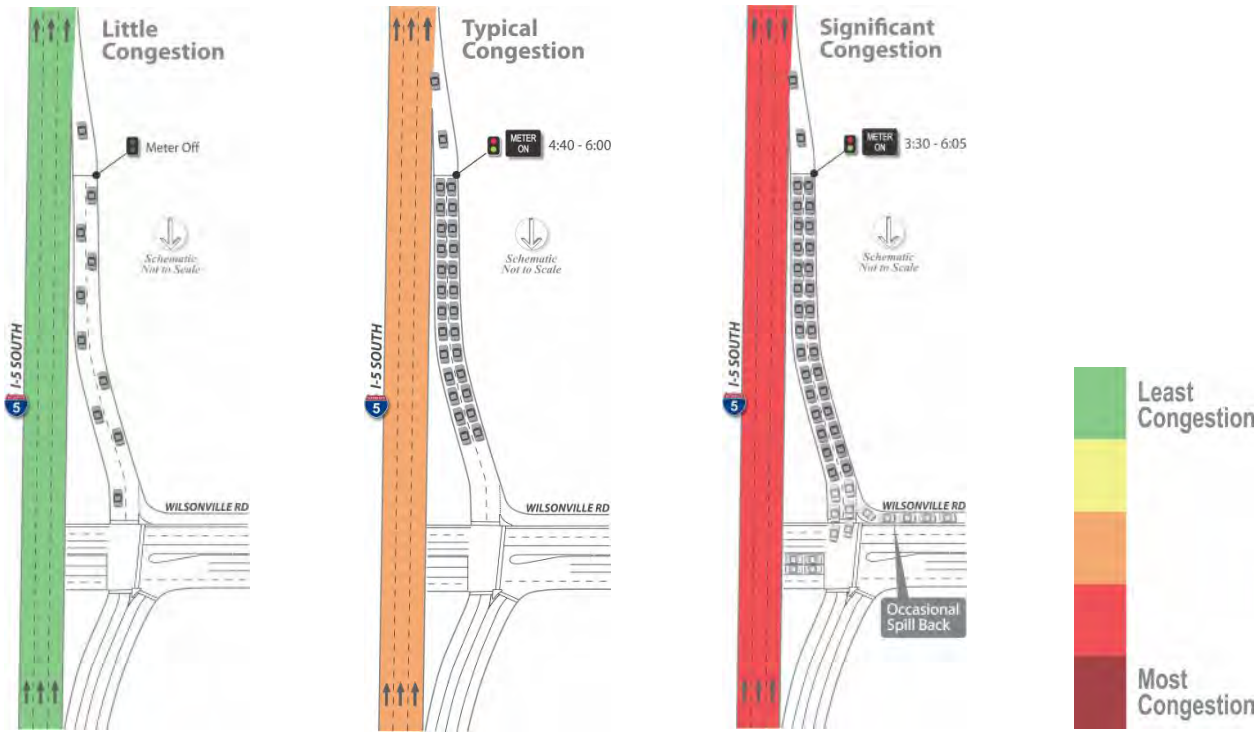

FIGURE 13. Ramp meter operations and queuing observed on the Wilsonville Road on-ramp on three consecutive days in 2018.

City staff and stakeholders report that during the extended evening peak when the ramp meter is in operation, queues from cars waiting to turn onto the on-ramp can disrupt the flow of through traffic in both directions on Wilsonville Road. These severe queues are more likely to occur during seasonal peak travel periods in the summer months. Local travelers may take a variety of detours to avoid this intersection, creating congestion on other local roads and increasing demand at the city's other two I-5 crossings and at upstream I-5 interchanges. These delayed and unreliable conditions have led to Planning Commission and City Council concerns regarding how the planned transportation system will perform as traffic increases on I-5 and the Wilsonville community grows.

Charbonneau, a neighborhood within the Wilsonville city limits, is located south of the Willamette River and east of I-5. This neighborhood is zoned primarily residential with some commercial uses. I-5 provides the only direct access between Charbonneau and the rest of Wilsonville.

South of the Wilsonville city limits and the Metro Urban Growth Boundary, the Clackamas County lands adjacent to I-5 are zoned Rural Residential Farm Forest 5-Acre (RRFF-5) and Exclusive Farm Use (EFU) (FIGURE 14). The primary allowed uses in RRFF-5 lands are farm activities, low-density residential dwellings, conservation efforts, fish and wildlife management programs, government-owned recreational facilities, and essential utilities. Existing land uses in these lands appear to be mostly residential neighborhoods. In EFU lands, the primary allowed uses are forestry and farming, with other uses allowed or conditionally approved if they do not force changes in or increase the costs of accepted farm or forest uses nearby. Near the study area, existing land uses include forested areas, several farms, some private buildings, a church, and a golf club. The areas adjacent to southbound I-5 and the 282B/282A off-ramps are mostly forested, with no buildings directly along the highway.

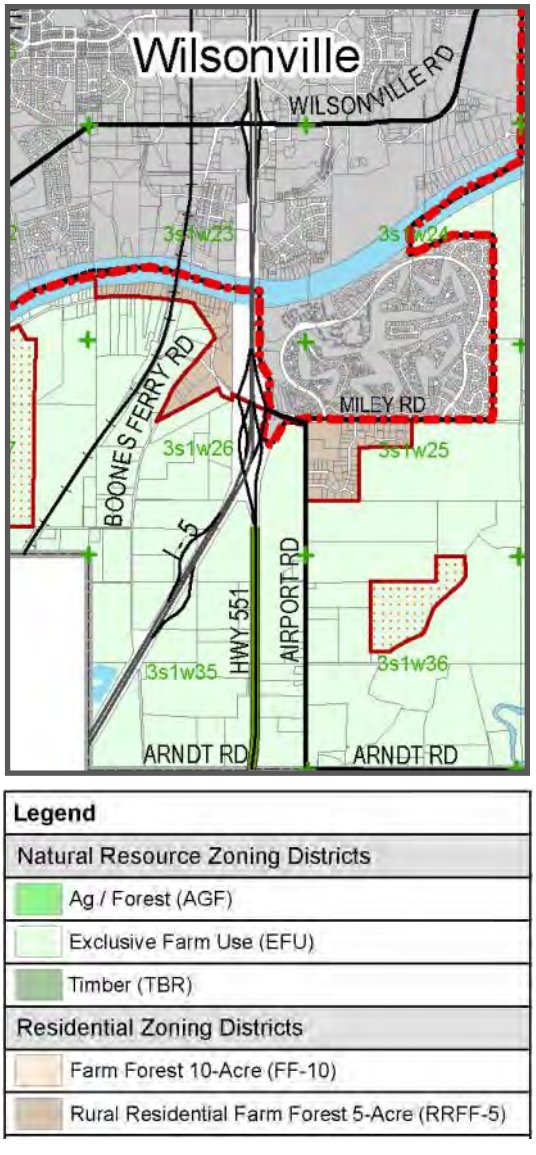

FIGURE 14. Clackamas County zoning for the lands adjacent to I-5 south of the Wilsonville city limits.

Seismic concerns

I-5 is in the seismic hazard area of the Cascadia Subduction Zone, which has historically experienced earthquakes of magnitude 9.0 or greater every 400-600 years. Many of I-5's 348 bridges were built before modern seismic design specifications. In the event of a Cascadia Subduction Zone earthquake, which based on the historical record is expected in the next 50 years, five I-5 bridges across the state would be expected to collapse and 19 more to suffer heavy damage.

I-5 is a Tier 1 Seismic Lifeline route, and is one of the most critical routes for Oregon's emergency response and recovery efforts. In 1998, ODOT performed a Phase I retrofit to prevent the bridge's superstructure from falling off the piers in an earthquake. The Boone Bridge will require a Phase II seismic retrofit to meet modern seismic standards and remain serviceable in the event of a severe earthquake.

Environmental resources

The Willamette River introduces a range of environmental resources to the study area. Impacts to these resources would need to be avoided, minimized, or mitigated when a capital project moves forward. Chinook salmon and steelhead fish species rely on the Willamette River for habit, and are subject to Endangered Species Act regulations. Locations along rivers and streams are typically areas where there may be a high probability for encountering archaeological resources and where wetlands may be found. The banks of the river in both the City of Wilsonville and Clackamas County are part of the Willamette River Greenway, and may be subject to Section 4(f) restrictions on the use of public parks and recreational lands for transportation projects. The areas south and west of the Willamette River are adjacent to land designated as rural reserve lands in Clackamas County; these reserves may contain farmland, forests, natural preserves, or streamside lands beyond the Urban Growth Boundary where development is prohibited. Noise impacts and impacts to human health must also be studied during project development.

FUTURE CONDITIONS

Methodology for future forecasting

The Metro Travel Demand Model predicts future travel volumes and patterns based on anticipated growth in population and jobs; planned land use changes; and planned transportation projects in the Portland metro area. This model is the most-commonly used tool for analysis of planning alternatives in this region of Oregon. Its forecasts provide a useful perspective on the direction future trends are likely to take, and how different project alternatives could affect transportation performance. Its results are best interpreted as showing order-of-magnitude differences between options or scenarios, rather than exact predictions of the future.

The Travel Demand Model's outputs have been analyzed in more detail using technical procedures from the Highway Capacity Manual, which sets out widely used and industry-standard approaches to modeling traffic operations at specific roadway segments or intersections.

The project team used existing conditions data to calibrate the model's outputs, in order to better reflect what current travel patterns suggest may occur in the future.

Anticipated traffic volumes and operations in 2040

The model predicts a 15 percent increase in evening peak hour traffic volumes on I-5 southbound over the Boone Bridge, from 6,150 vehicles in 2017 to 7,055 in 2040 (FIGURE 15). Modeled origin and destination patterns for the

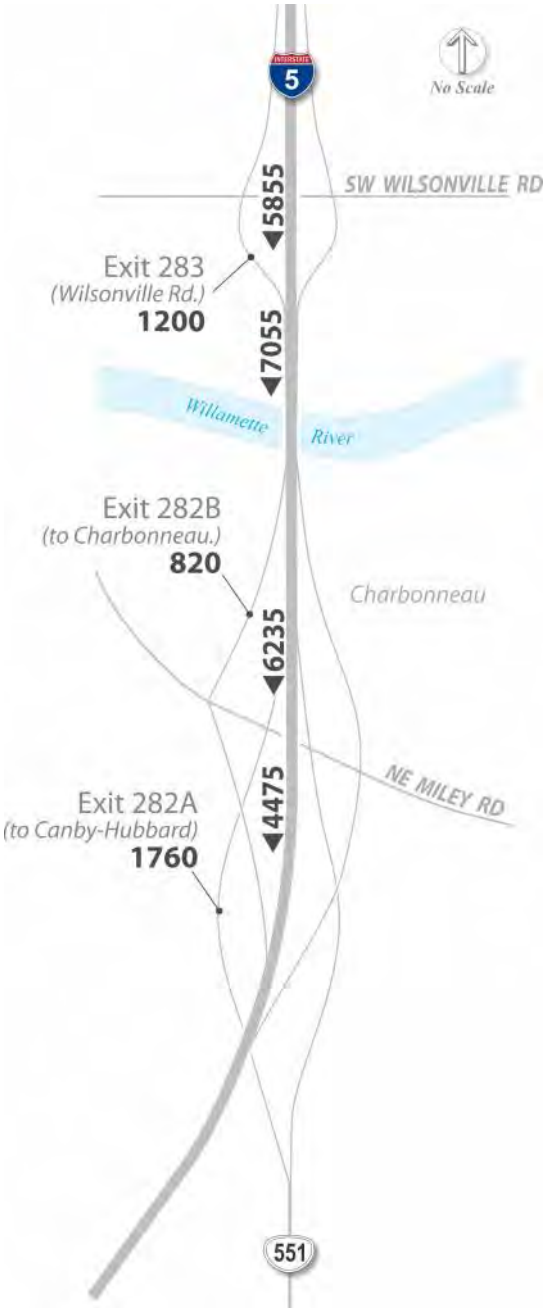

FIGURE 15. Southbound I-5 traffic volumes forecast for the year 2040 during the evening peak hour.

future are similar to those gathered via GPS data from 2017, with some minor variations. When considered together, the two sources suggest that in the future roughly 60-70 percent of vehicles entering on the Wilsonville on-ramp and 35 percent of vehicles coming from farther north on the I-5 mainline will take one of the first two off-ramps south of the Willamette River. For every 10 vehicles heading south over the Boone Bridge, one will be expected to take the Charbonneau exit and two to three will be expected to take the Canby-Hubbard exit.

If no improvements or operational changes are made to this study area, traffic congestion will worsen significantly on I-5 in this segment (Table 1). From the Wilsonville on-ramp to the Charbonneau off-ramp, the highway will fail to meet state mobility standards with v/c ratios above 0.99. Speeds in these segments drop as low as 22 mph during the average evening peak. These conditions will make travel through this section on I-5 significantly less reliable and increase the hours per day that travelers would experience congested conditions. Such degradation in performance would be expected to lead to more frequent rear-end and sideswipe collisions.

TABLE 1. Southbound I-5 levels of service forecast for the year 2040 during the evening peak hour.

	Segment	Volume/ Capacity	LOS
1	North of Wilsonville Road On-Ramp (Basic)	0.88	F
2	Wilsonville Road On-Ramp (Merge)	1.09 (Fwy) 0.61 (Ramp)	F
3	Boone Bridge (Basic)	1.06	F
4	Charbonneau Off-Ramp (Diverge)	1.08 (Fwy) 0.42 (Ramp)	F
5	Canby/Hubbard Off-Ramp (Diverge)	0.95 (Fwy) 0.89 (Ramp)	D
6	South of Canby/Hubbard Off-Ramp (Basic)	0.67	B

Forecasts suggest a 40 percent increase in the number of vehicles seeking to enter I-5 southbound from Wilsonville Road, some coming from nearby locations, others from areas further east, west, or north. With increased congestion on the I-5 mainline, ODOT might need to decrease the ramp meter rate and/or increase the hours it operates to protect the freeway's operations. During the peak hour, queues waiting at the ramp meter would fill the on-ramp and spill back onto Wilsonville Road (FIGURE 16). Vehicles would wait more than 80 seconds to move through the intersection of I-5's southbound ramps and Wilsonville Road .

Of the 1,700 drivers who would prefer to use this on-ramp

during the peak hour, 30 percent would not be able to enter if ramp meter rates remain the same. (More would not be able to enter if ODOT needed to reduce the meter rate to protect operations on I-5 during heavy congestion.) These travelers who could not enter the on-ramp would have to choose other routes, shift trips to other times, choose other modes, or not make their trip. Travel along Wilsonville Road would become more challenging in the afternoon and evening. Overall, the local system will experience more hours of congestion on more routes as these vehicles seek alternate ways to make their trips.

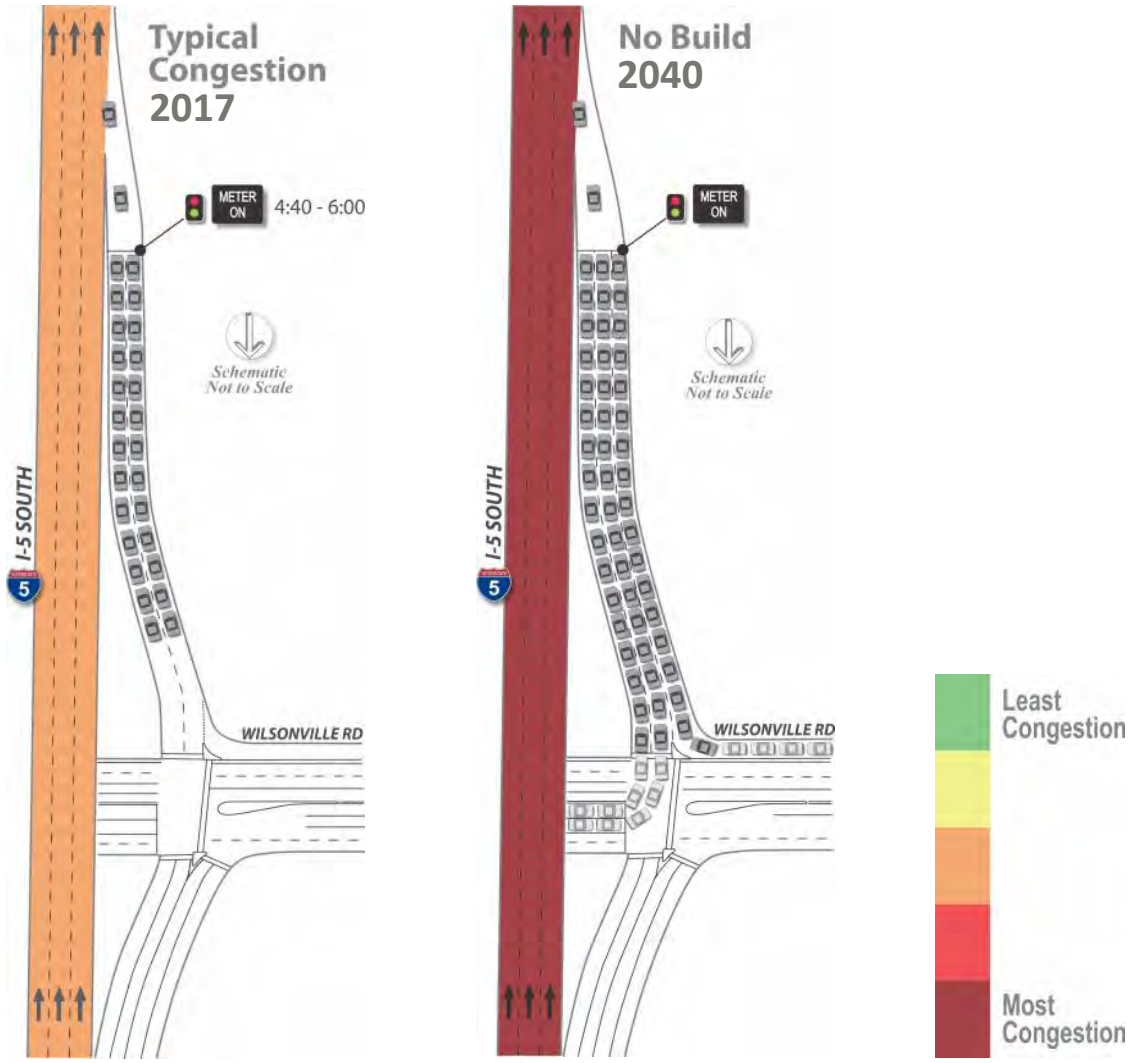

FIGURE 16. Ramp meter operations and queuing on the Wilsonville Road southbound on-ramp, as observed during typical evening peak hour congestion in 2017 (*left*) and as projected for 2040 (*right)*.

Conceptual design of plan alternatives

ODOT and the City of Wilsonville have identified three alternatives for study, each of which adds a ramp-to-ramp lane from the Wilsonville Road on-ramp across the Boone Bridge. As ODOT's 2012 Highway Design Manual explains, ramp-to-ramp (or auxiliary) lanes "are introduced adjacent to through lanes for limited distances for specific operational or capacity reasons. They are used to provide lane balance, facilitate weaving maneuvers, and help smooth out flow in through lanes. A typical application is to provide [a ramp-to-ramp] lane on the mainline between closely spaced interchanges" (p. 9-18). FIGURE 17 provides an example of a ramp-to-ramp lane on I-5 northbound in North Portland. In the study area, there are three

FIGURE 17. A ramp-to-ramp lane on I-5 northbound between the N Rosa Parks Way on-ramp (304) and the N Lombard St East off-ramp (305A).

This ramp to ramp lane is 0.2 miles long, comparable to the distance between the Charbonneau and Canby-Hubbard off-ramps.

interchanges in a one mile segment of I-5. ODOT has established spacing standards of three miles between interchanges for interstates in urban areas.

The operational problems in the study area stem from the lack of capacity in the right-hand lane to accommodate the volume of vehicles using the closely-spaced interchanges. A ramp-to-ramp lane is a targeted, lower-cost improvement that may improve traffic flow and add safe merging and weaving space. Use of ramp-to-ramp lanes alongside through lanes is consistent with Regional Transportation Plan policy establishing interstate cross-sections of three travel lanes per direction, plus ramp-to-ramp lanes where needed.

In all three build alternatives, the ramp-to-ramp lane could be constructed with the Boone Bridge seismic retrofit as one project.

Option A (FIGURE 18) adds a ramp-to-ramp lane at the Wilsonville Road on-ramp merge that

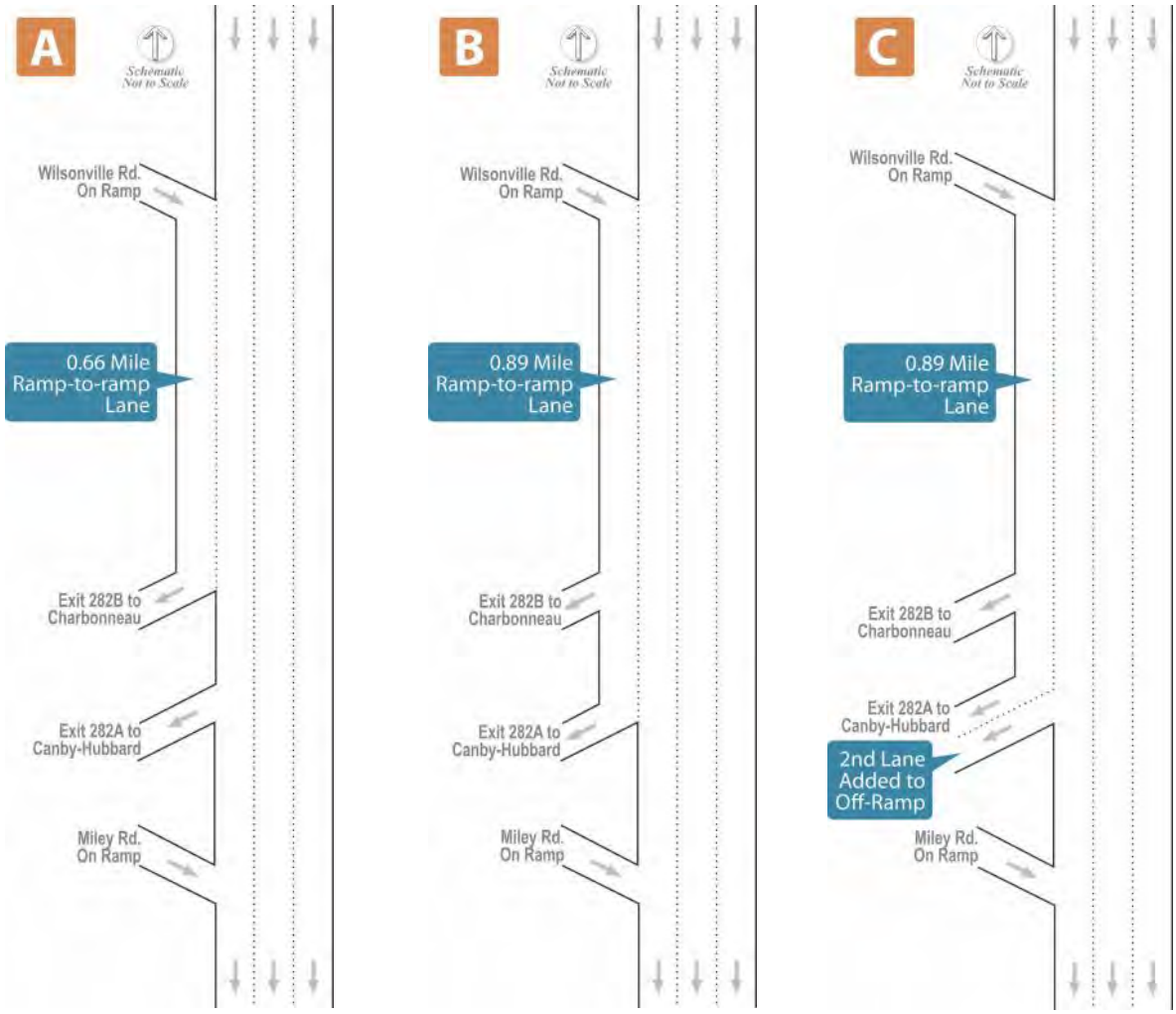

FIGURE 18. The three ramp-to-ramp lane options studied.

drops at an exit-only lane to the Charbonneau off-ramp.

Option B extends the ramp-to-ramp lane to terminate as an exit-only lane at the Canby-Hubbard off-ramp.

Option C is similar to Option B but expands the Canby-Hubbard off-ramp to become a two-lane exit, until it joins the existing two-lane section of the ramp. Travelers may access the exit either from the ramp-to-ramp lane, which departs the highway as the outer off-ramp lane, or from the right-hand through lane, which offers an optional exit to the inner off-ramp lane.

In all of the build alternatives, the three-lane Wilsonville Road on-ramp merges into one lane as it passes the ramp meter, before vehicles enter the ramp-to-ramp lane. This is due to safety concerns with multi-lane merges onto the highway, which have led ODOT to stop using those designs for new projects.

All three of these options meet the expectations laid out in the purpose statement for minimizing potential impacts within the rural reserves. Based on the data available, it appears that ODOT owns the right-of-way needed for any of the three options. None of the three options create, add, or alter highway access from either private properties or rural roads. None of the options add travel capacity to OR-551 beyond the interchange area.

Elimination of a local bridge operational concept

ODOT and the City of Wilsonville screened out a local bridge option as a potential operational concept, as it did not fit the criteria laid out in the plan purpose. Siting a new structure and building local road connections to it would have the potential for significant property and environmental impacts. In previous Transportation System Plan efforts, the City of Wilsonville determined that there is no promising alignment for a new bridge within the city limits north of the Willamette River. Most potential locations would have significant impacts to existing residential neighborhoods, public parks, or local schools. Several existing arterials that might serve as potential bridge connections are too close to the I-5: Wilsonville Road interchange, and the traffic impacts would create unacceptable safety and operational problems in the interchange area. In the Willamette River, a new bridge would require adding piers in the river or on the natural areas along the river, as well as in-water construction work. This creates the potential for substantial environmental impacts to natural resources, habitat, and fish passage. South of the river, a new bridge structure and new local road connections would have the potential to directly impact protected farm and forest lands by requiring the purchase of new right-of-way. They could also indirectly impact rural land uses by creating new access points to adjacent properties, influencing property values, or impacting the operating costs for farm and forest uses. Construction of a local bridge also could not be combined with the Boone Bridge seismic retrofit project.

The City and ODOT agreed that build alternatives on I-5 would have comparatively lower impacts to the built, rural, and natural environments in the study area. The City is leading a separate project to plan and design the French Prairie Bridge, which would provide a new bicycle and pedestrian crossing of the Willamette River that could accommodate emergency vehicles as well.

Performance, benefits, impacts, and planning-level costs of build alternatives

The project team used Highway Capacity Manual methodologies to compare how the three build alternatives would operate in 2040, and contrasted their performance with the no-build (existing) configuration of I-5.

To assess how each option compared to the no-build during the evening peak hour, the project team analyzed them using four performance measures:

- Volume-to-capacity ratios, benchmarked against the state mobility target of v/c at or below 0.99.
- Level of service, benchmarked against the City of Wilsonville target of grade "E" or above.
- Worst observed speed under typical peak hour congestion.
- Vehicle density, which evaluates how many vehicles are in each lane per mile.

The methodologies for predicting future safety outcomes are limited without more engineering detail than is available at this stage of planning. However, the measures above can provide indirect information about potential changes in crash risk, which are discussed below.

TABLE 2. 2040 performance of the southbound I-5 mainline: no build scenario compared to ramp-to-ramp lane options

Performance measures (2040 Evening peak hour)	Baseline (No Build)	Option A	Option B	Option C
Worst volume-to-capacity ratio	1.09	0.95	0.89	0.88
Worst level of service	F	E	E	D
Lowest speed	22	45	44	52
Highest vehicle density	79	40	37	35

All three options:

- Improve I-5's performance compared to the no-build (TABLE 2).
- Reduce congestion on I-5 to below state mobility targets and achieve level of service grade "E" or better on all segments of I-5 within the project area.
- Offer sufficient congestion reductions that they could be expected to improve travel time reliability.
- Improve I-5 speeds during the evening peak hour so that they remain at or above 44 mph on the typical weekday, compared to no-build speeds of below 25 mph.
- Provide more space between vehicles, which allows drivers more time to react to changing conditions and reduces the risk of crashes.
- Are expected to reduce crash rates, due to reductions in congestion and separation of weaving and merging movements from through traffic. Preventing crashes also contributes to improvements in reliability (by reducing the frequency of incidents that create unexpected delays).
- Improve local travel that uses I-5 to cross the river, by reducing congestion at the Wilsonville Road on-ramp merge point and providing separation from through traffic on the I-5 mainline.
- Present little potential for private property impacts. While right-of-way needs cannot be identified in detail until additional project design has taken plan, ODOT appears to own sufficient right-of-way to accommodate a ramp-to-ramp lane. No structures have been identified in the area where a ramp-to-ramp lane would be built.
- Present similar potential for environmental impacts. The greatest potential impacts come from the modification to the Boone Bridge itself, because the Willamette River contains the most significant cultural and natural resources in the project area. The ramp-to-ramp lane is the same over the Boone Bridge structure in all three options, so the three options would have substantially similar potential impacts to the river and its banks. The nature of these impacts will depend on how the ramp-to-ramp lane and seismic retrofit are designed, and will be assessed during project development.
- Are similar in planning-level cost estimates, with less than a 10 percent cost difference estimated between Options A (the least expensive) and C (the most expensive). The majority of the project costs stem from modifying the Boone Bridge to accommodate an additional lane, which would require the same improvements in all options. Costs of extending the lane south of the structure to Exit 282A and adding a second lane to the Canby-Hubbard off-ramp appear relatively low. Current planning-level cost estimates for the ramp-to-ramp lane project (not including the seismic work) are in the $80 million

range.

- Could be combined with design and construction of the Boone Bridge Seismic retrofit project.

Impacts of a ramp-to-ramp lane on Wilsonville Road and local system operations

Any ramp-to-ramp lane option would benefit local system performance (FIGURE 19). The Wilsonville Road on-ramp meter activates in response to congestion on the I-5 mainline. With all ramp-to-ramp options reducing congestion on I-5, the ramp meter would likely be on for fewer hours per day. This would increase the total period of time when vehicles would be able to flow freely onto I-5 from the Wilsonville Road on-ramp, and reduce the amount of time when queues could build up at the ramp meter, making it less likely they would spill back onto the local system.

Improved operations on the mainline might also allow the ramp meter to operate at a faster rate, in which case any queues that formed would clear faster. (ODOT does not determine ramp meter rates in

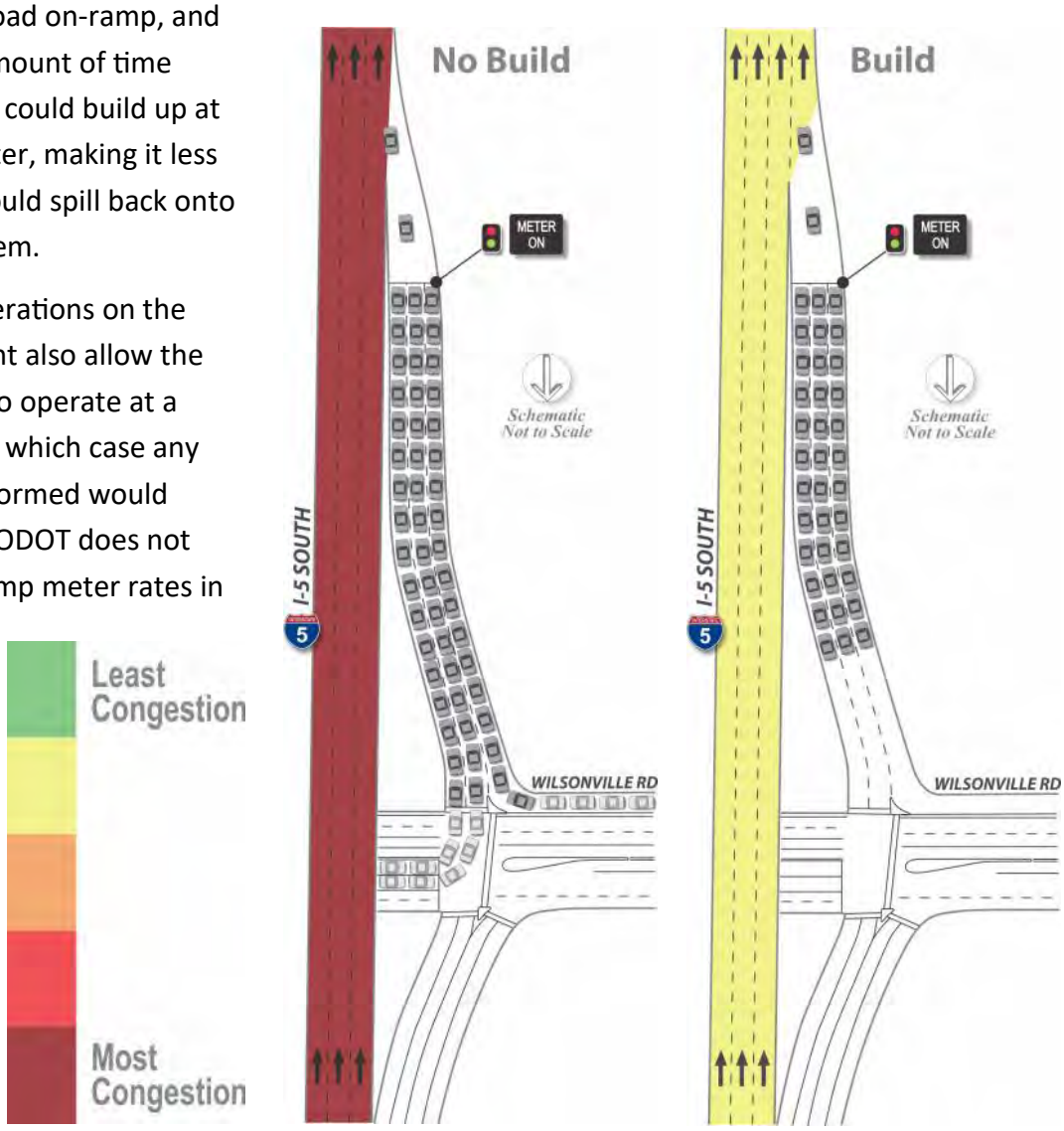

FIGURE 20. Comparison of ramp meter operations and queuing forecast for the year 2040 on the Wilsonville Road on-ramp , if no changes were made (*left)* or if a ramp-to-ramp lane were constructed (*right*).

long range plans. Traffic engineers assess meter rates after a project is constructed and ODOT has collected data on how conditions on the freeway change as a result.)

Comparison of alternatives

Of the three build alternatives, Option C provides the greatest improvements to I-5's performance.

- This alternative would reduce congestion well below the levels experienced today and increase peak hour speeds to above 50 mph throughout the project area.
- The addition of a second off-ramp lane at Canby-Hubbard (the busier of the study area's two exits) creates greater separation of the traffic entering I-5 at Wilsonville Road from the traffic already on the mainline. Vehicles on I-5 could merge directly into the second exit lane from the outer I-5 travel lane, without merging into the ramp-to-ramp lane first.
- Because of the improved traffic flow and increased separation of merging/weaving from through traffic, Option C would be expected to offer the greatest reduction in crash rates for the longest period of time.

PUBLIC INVOLVEMENT AND LOCAL GOVERNMENT PARTICIPATION

ODOT Region 1 and the City of Wilsonville partnered on the Southbound I-5 Boone Bridge Congestion Study (September 2017 through May 2018). This facility plan is the final product of that study. The Technical Advisory Committee for the study included ODOT, the City, Clackamas County, Washington County, DKS Associates, and Angelo Planning Group. (Marion County chose not to participate in the committee but received updates at project milestones.) After reviewing the technical analysis results, the committee unanimously recommended Option C as the preferred solution.

Public and stakeholder involvement activities began in December of 2017. Wilsonville area outreach efforts were led by city staff and consultants and regional outreach efforts were coordinated by ODOT. The City created a website for the congestion study, shared regular monthly articles in the Boones Ferry Messenger, sent media releases to The Wilsonville Spokesman Newspaper and provided information via email. The city's Planning Commission received five presentations from the project team between November 2017 and April 2018, including a work session in March and a public hearing on the draft facility plan in April. In

FIGURE 20. City of Wilsonville Mayor Tim Knapp introduces the project to community members attending the March 14th Open House.

June, the City Council approved a resolution of support for the I-5 Wilsonville Facility Plan.

The project team focused outreach efforts on gathering feedback about experiences with the operational problems on I-5, presenting the ramp-to-ramp options, and asking for input on the recommendation that Option C should be constructed as part of a seismic retrofit project in the future. An open house held at Wilsonville City Hall in March (FIGURE 20) drew 30-40 attendees who discussed the results of technical analysis with project team staff, received a presentation of major findings, and participated in a question and answer session. The same materials were shared in an online open house and survey hosted by the City during the second half of March. ODOT shared the draft facility plan for a 45 day public comment period beginning in April, with links to public review materials available on the city's website.

In addition, the project team met with the following stakeholder groups in March and April to share congestion study findings, answer questions, and gather input:

- Wilsonville Chamber of Commerce
- Wilsonville Rotary Club
- Charbonneau Homeowners' Association
- Washington County Coordinating Committee — Transportation Advisory Committee
- Oregon Freight Advisory Committee
- Washington County Coordinating Committee
- ODOT Region 1 Mobility Advisory Committee
- Clackamas County Coordinating Committee — C4 Metro Subcommittee
- French Prairie Forum
- Joint meeting of the Transportation Policy Alternatives Committee and Metro Technical Advisory Committee

The majority of the feedback received during the public involvement process affirmed that the project team has correctly identified the transportation problems in the study area, that the recommended operational concept was appropriate, and that ODOT should invest in building the auxiliary lane improvement as part of the seismic rehabilitation of the Boone Bridge.

A detailed synthesis of public input can be found in Appendix B.

PLANNED IMPROVEMENTS

This facility plan recommends Option C (FIGURE 21) as the best operational concept for this location for the 20-year planning horizon. This recommendation reflects the Technical Advisory Committee's consensus that this option is the most cost-effective long-term solution for the bottleneck that forms on I-5 at the Wilsonville Road on-ramp.

Option C is consistent with the state, regional, and local policies outlined in this plan. A ramp-to-ramp lane is a targeted, lower-cost improvement that will protect I-5's operations for decades to come, while maintaining the regionally-approved cross-section of six through lanes. It improves safety and reliability for longer-distance travel, freight movement, and emergency services. Option C responds to Regional Transportation Plan direction to address the impacts of peak period congestion on freight reliability, mobility, and travel patterns in this part of the I-5 corridor. It also supports desired development in the City of Wilsonville by managing the impacts of I-5 congestion on Wilsonville Road and the local transportation system. It meets screening criteria related to protecting farm and forest uses in rural reserves from urbanizing impacts. It presents only minor differences in costs and environmental impacts compared to Options A and B.

Financial feasibility assessment.

Based on revenue forecasts prepared for the 2018 Regional Transportation Plan, resources exist within ODOT's financially-constrained budget for the 2028-2040 period to design and construct a southbound auxiliary lane serving I-5 southbound from exits 283 to 282A. These resources are expected to be combined with additional funding from the ODOT bridge program to complete the seismic rehabilitation

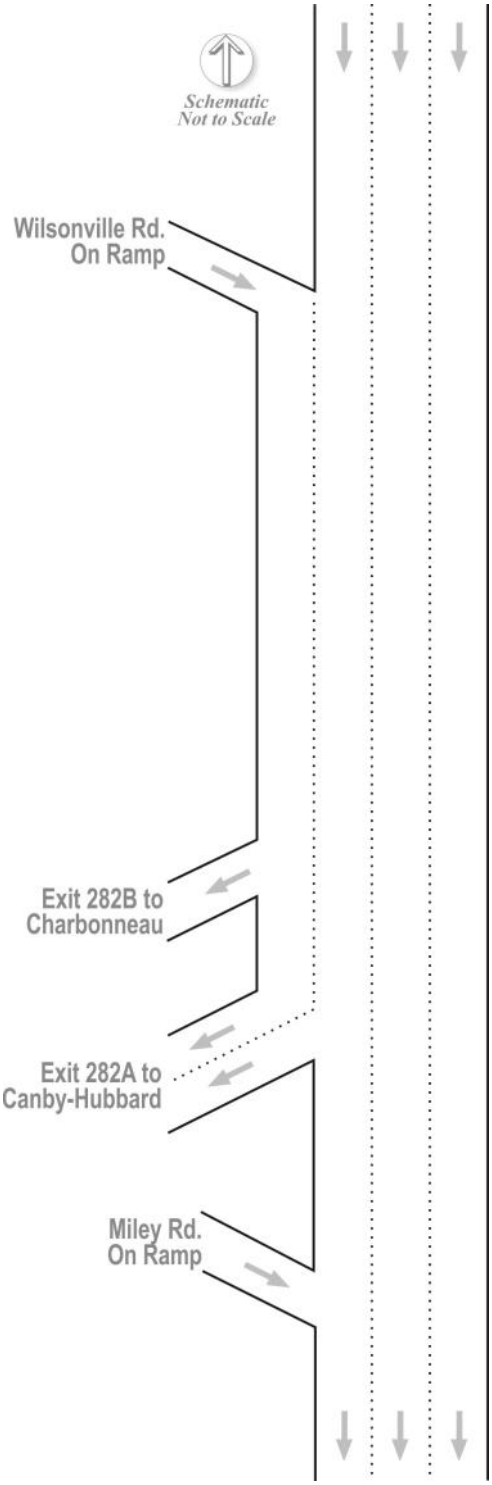

Figure 21. Option C, the recommended operational concept.

components of the Boone Bridge improvements. Completing the operation and seismic components as one project will allow ODOT to achieve economies of scale, reducing total costs.

IMPLEMENTATION RECOMMENDATIONS

Adoption of this plan is the first of several steps needed to improve the operations of southbound I-5 in the Boone Bridge area. Once this plan is adopted, ODOT will submit Option C as a project for the 2018 Regional Transportation Plan Financially Constrained Project List, for funding in the 2028-2040 time frame.

The next step will be to secure funding for project development, which will include analysis of engineering alternatives and their potential environmental impacts. ODOT's Bridge Section will analyze the Boone Bridge seismic needs to determine what improvements would ensure the structure remains standing if a major quake occurs. Once those engineering recommendations are available, the operational and seismic work will be combined into one project.

While this project development work occurs, ODOT will continue to collaborate with regional partners to increase multimodal safety, efficiency, accessibility, and reliability in the I-5 mobility corridor. ODOT fully supports the Regional Transportation Plan's recommendation of a multimodal refinement plan for the I-5 corridor from Tigard to Wilsonville. This facility plan does not preclude any transportation alternatives that could be considered as part of that broader refinement plan. Refinement plans often lead to updates to other long range plans, capital improvement plans, and transportation demand management decisions. If a refinement plan is adopted for the corridor, ODOT will review this facility plan to verify whether Option C remains an appropriate operational concept for I-5 in the Boone Bridge area.

I-5 Wilsonville Facility Plan

Appendix A

Technical Memoranda

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MEMORANDUM

DATE: December 29, 2017

TO: I-5/Wilsonville Facility Plan Project Management Team

FROM: Ray Delahanty, AICP
Maggie Lin, PhD

SUBJECT: Existing Conditions

This memorandum documents existing travel conditions on Interstate 5 (I-5) southbound between the Wilsonville Road interchange (Exit 283) on-ramp and the Charbonneau-Canby/Hubbard interchange (Exits 282B and 282A, respectively) off-ramps. Areas of analysis presented in the memorandum include:

- **Traffic volumes:** how many vehicles travel on I-5 within the study area, and how does that vary by time of day?
- **Level of service:** How well does the freeway operate?
- **Travel time, reliability, and speed trends:** What is a typical travel time through the study area in the PM peak hour? What is a 95th percentile travel time? How do these compare with free-flow travel times? How do travel speeds vary by time of day? How have travel speeds through the area changed over the past three years?
- **Intersection operations:** How does the I-5 southbound/Wilsonville Road ramp terminal intersection operate today, and what does it mean for southbound on-ramp volumes?
- **Crash history:** Do the last five years of crash data suggest that there may be safety-related characteristics to consider as improvements are contemplated?
- **Origins and destinations:** For traffic originating from I-5 or the Wilsonville Road onramp, what percentage of traffic (a) uses Exit 282A, (b) uses Exit 282B, or (c) continues south on I-5 towards Salem?

Key Findings

- The peak hour for I-5 Southbound volumes through the study area is 4:00-5:00 PM.
- Travel speeds are lower north of the Wilsonville Road on-ramp merge, and then speeds improve to the south. Travel speeds have become lower over the last three years.
- Freeway segment level of service analysis showed that the Wilsonville Road merge section performed the worst among all study area segments.
- Nearly 60% of vehicles using the Wilsonville Road on-ramp get off at either the Charbonneau off-ramp or the Canby-Hubbard off-ramp.

Study Area

The study area for this analysis is shown in Figure 1. It includes I-5 southbound from just north of the Wilsonville Road (Exit 283) on-ramp to just south of the Canby/Hubbard off-ramp (Exit 282A).

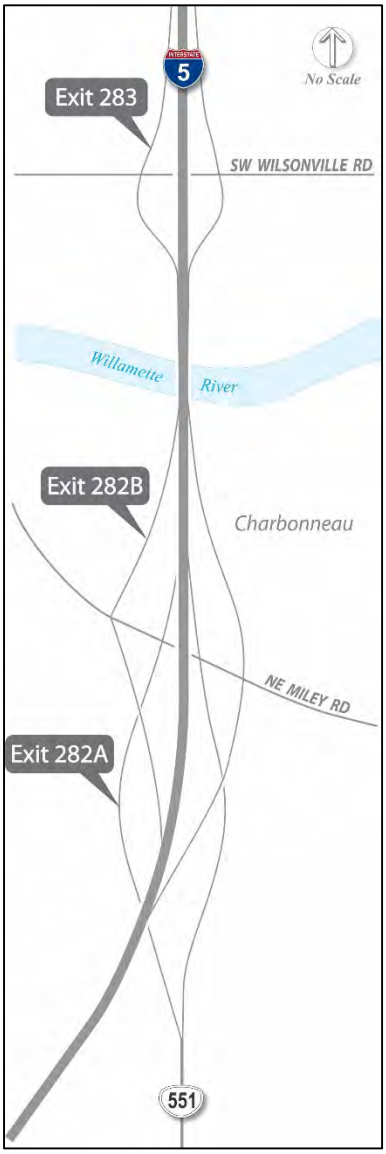


Figure 1: Study Area

Traffic Conditions

Traffic characteristics discussed in this section include:

- Traffic volumes using the freeway in the study area
- Highway Capacity Manual (HCM) level of service for freeway segments, merges, and diverges in the study area
- Travel times on I-5 southbound freeway
- Intersection operations at the I-5 Southbound/Wilsonville Road ramp terminal intersection

Traffic Volumes

Understanding how traffic volumes vary throughout the study area and over the course of the extended PM peak (2:00-7:00 PM) is critical to this study, because it sets the stage for analyzing the benefits of potential improvements.

The volumes discussed in this section do not necessarily represent the unconstrained demand for travel on I-5 southbound. The Wilsonville Road on-ramp is metered to regulate flow onto the mainline, and upstream bottlenecks, including the Wilsonville Road onramp itself, limit the mainline volume.

Weekday Expanded PM Peak Period

To better understand how volumes vary over the late afternoon and early evening, and to identify the peak hour for analysis, we assessed count data at ramp and mainline locations throughout the study area.

On and Off-Ramps

Volumes for the three ramps studied in this project were provided by ODOT. The data is aggregated on a 15-minute basis, and includes data from April 3 and April 4, 2017, which fell on a Monday and Tuesday. Although Monday volumes are sometimes lower than midweek volumes, the counts for the two days were similar, and they are averaged in the figures below.

Wilsonville Road (Exit 283) On-Ramp

Volumes on the Wilsonville Road on-ramp peak at around 1,200 vehicles per hour in the 3:00-4:00 PM hour. This may not be the highest demand hour, though. This on-ramp features a dynamically-timed meter that turns on in response to congested conditions. On a typical day the meter activates at 4:00 PM and deactivates at 5:45 PM, serving a maximum of 1,200 vehicles per hour. Volumes drop off significantly after 6:00 PM. Average daily volume over the two days for this ramp was 12,200 vehicles.

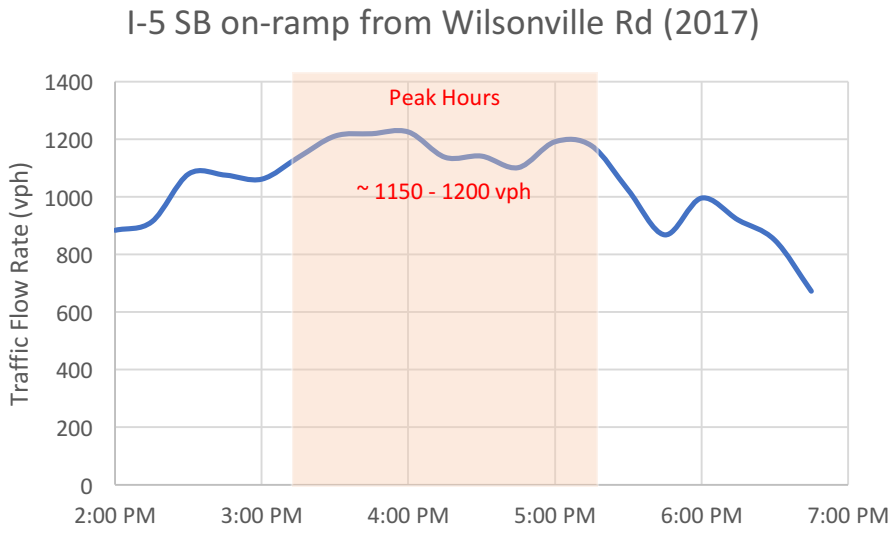


Figure 2: Exit 283 on-ramp average 15-minute weekday traffic (2017), 2:00-7:00 PM

Charbonneau (Exit 282B) Off-Ramp

The Charbonneau off-ramp serves a residential area inside the City of Wilsonville but south of the Willamette River, and the I-5 Boone Bridge is the most direct route connecting these residences to jobs, schools, and shopping in Wilsonville, as well as the rest of the Portland metropolitan area. The ramp also serves rural residential areas and farmland along the Willamette both east and west of I-5. This off-ramp experiences peak volumes of around 600 vehicles per hour between 4:00 and 5:00 PM, with demand dropping off significantly after 5:00. Average daily volume over the two days for this ramp was 6,000 vehicles.

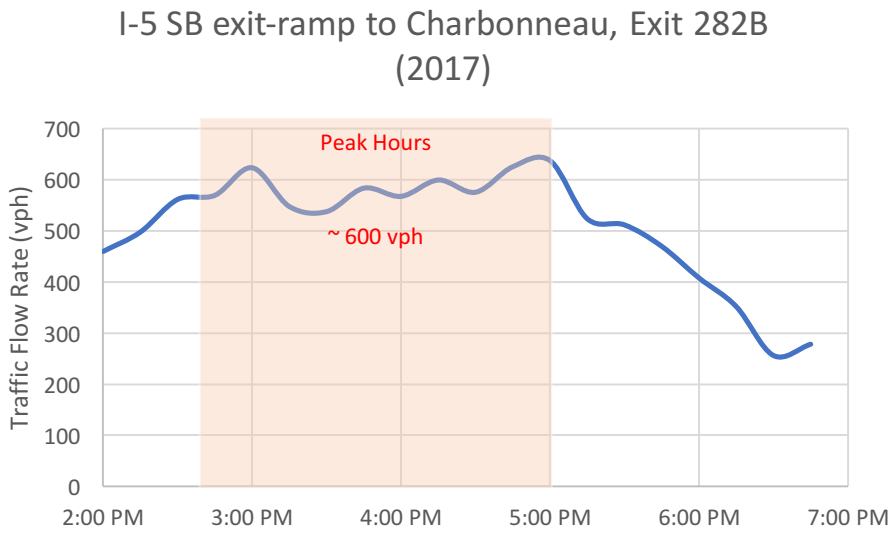


Figure 3: Exit 282B average hourly weekday volumes (2017), 2:00-7:00 PM

Canby/Hubbard (Exit 282A) Off-Ramp

The Canby/Hubbard off-ramp connects to the Wilsonville/Hubbard Highway (OR 551), which provides access to OR 99E and the adjacent cities of Canby and Woodburn. This is the highest volume ramp of the three, serving close to 1,500 vehicles in the 4:00-5:00 PM peak hour. Similar to the Charbonneau off-ramp, volumes at the Canby/Hubbard off-ramp begin declining significantly after about 5:00 PM. Average daily volume over the two days for this ramp was 14,900 vehicles.

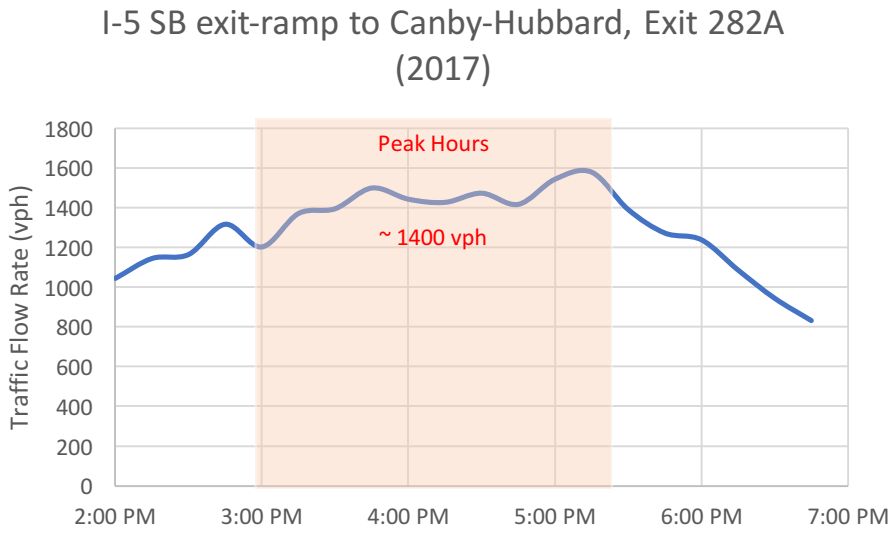


Figure 4: Exit 282A average hourly weekday volumes (2017), 2:00-7:00 PM

I-5 Mainline

We collected traffic counts during extended PM peak periods (2:00-7:00 PM) at three locations on the I-5 southbound mainline:

- Just north of the Wilsonville Road (Exit 283) on-ramp merge
- Between the Wilsonville Road (Exit 283) on-ramp merge and Charbonneau (Exit 282B) off-ramp diverge
- Between the Charbonneau (Exit 282B) off-ramp diverge and the Canby/Hubbard off-ramp diverge

Counts were collected over a three-day midweek period, from Tuesday October 17 to Thursday, October 19, 2017. A review of the counts showed that the Thursday volumes were significantly lower than the other two days. By reviewing the video footage and HERE[1] data during the days we collected counts, the travel speeds (as shown in Figure 5) indicated that the traffic on Thursday was more congested that the other two days, allowing less throughput into the study area.

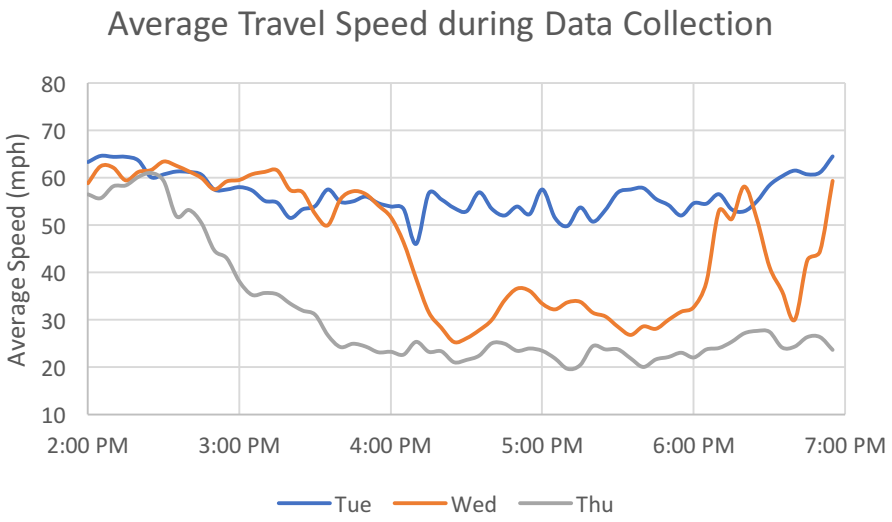


Figure 5: Average travel speed north of Wilsonville Road on-ramp, 2:00-7:00 PM, October 17th (Tue) to 19th (Thu), 2017

The Tuesday and Wednesday data were selected to represent typical weekday volumes. The volume profiles for the average of the two days are presented and discussed below. Speed data for the two days, derived from HERE data, is provided as well for a comparison.

[1] HERE is a vendor whose products include archived travel speed and travel time data for roadway segments.

North of the Wilsonville Road (Exit 283) On-Ramp

Just upstream of the Wilsonville Road on-ramp, The I-5 southbound mainline experiences volumes of 4,000-4,500 vehicles per hour from about 2:30 to 5:30 PM. The peak 15-minute volume occurred from 4:45-5:00 PM, with the peak hour occurring at 4:00-5:00 PM. Speeds through the area begin to drop as volumes accumulate over the peak period, reaching a low of around 30 mph, and then begin to rise again around 5:30 PM.

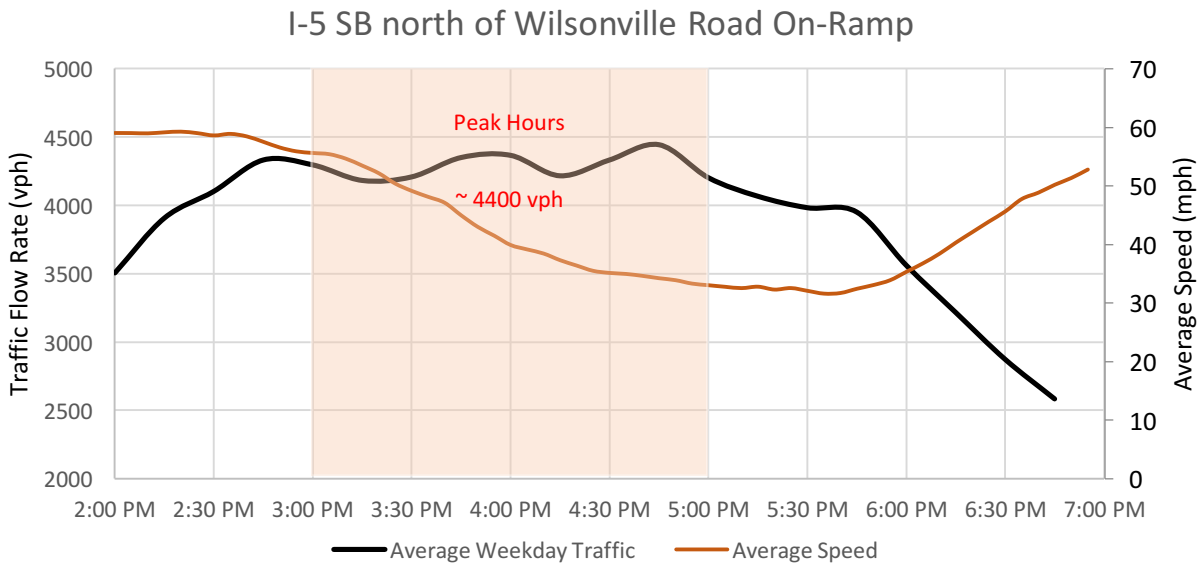


Figure 6: Average hourly weekday volumes (2017) north of Wilsonville Road on-ramp, 2:00-7:00 PM

North of the Charbonneau (Exit 282B) Off-Ramp

This segment of I-5 southbound which includes the Boone Bridge experiences volumes of around 5,000-5,500 vehicles per hour from about 2:30-5:45 PM. This represents around 1,700-1,800 vehicles per hour per lane, meaning this freeway segment is operating approximately at capacity over a three-hour PM peak period. The highest volumes were observed at 3:45-4:00 PM, with the peak hour occurring at 3:45-4:45 PM. Speeds through the area begin to drop as volumes accumulate over the peak period, reaching a low of just under 50 mph, and then begin to rise again around 5:30 PM.

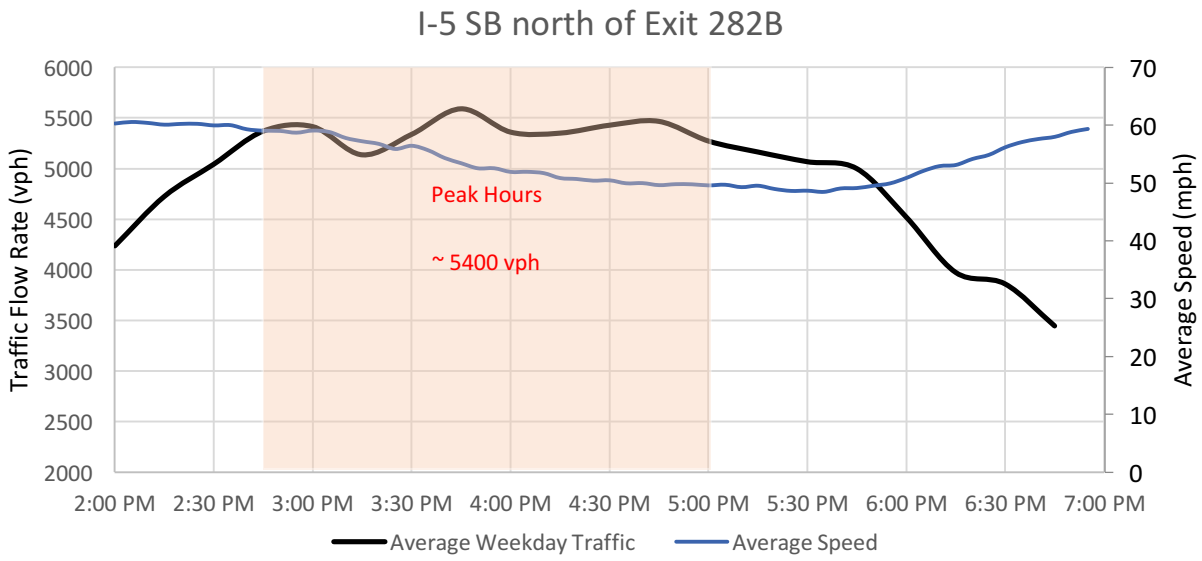


Figure 7: Average hourly weekday volumes (2017) north of Charbonneau off-ramp, 2:00-7:00 PM

Between the Charbonneau and Canby/Hubbard (Exits 282B and 282A) Off-Ramps

This short segment of I-5 southbound experiences volumes of around 4,500-5,000 vehicles per hour from about 2:45-5:45 PM. The highest average volumes were observed at 3:45-4:00 PM, with the peak hour occurring at 3:45-4:45 PM. Speeds through the area begin to drop as volumes accumulate over the peak period, reaching a low of just under 50 mph, and then begin to rise again around 5:30 PM.

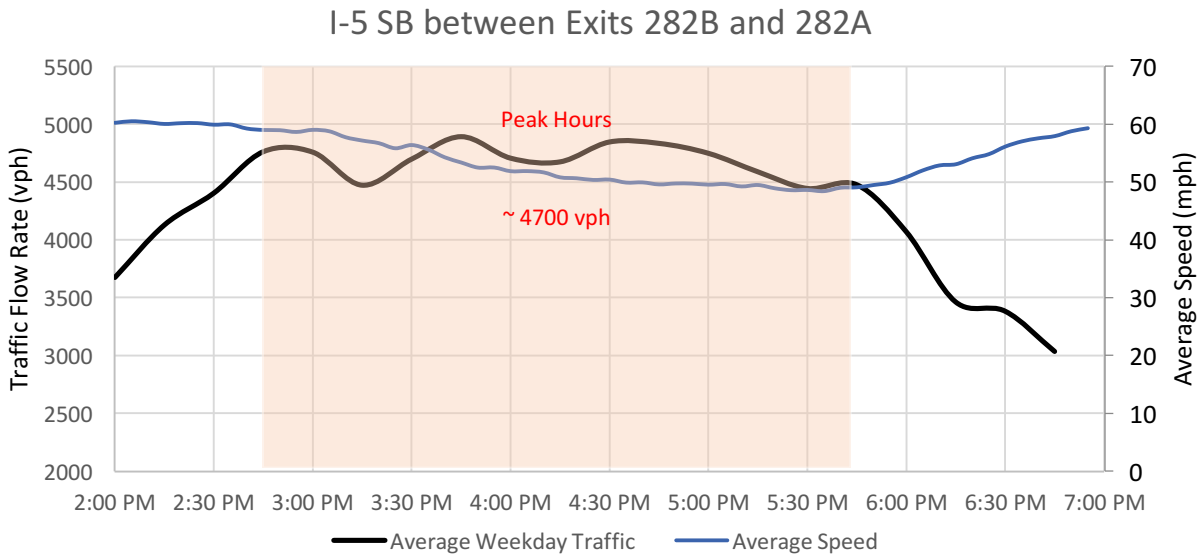


Figure 8: Average hourly weekday volumes (2017) between Charbonneau and Canby/Hubbard off-ramps, 2:00-7:00 PM

Volume by Lane

I-5 southbound through the study area is a three lane facility. A review of volumes by lane shows imbalance through the study area due to high on-ramp volumes at Wilsonville Road, which impact flow in the right lane of I-5 upstream, and high demand for the Exit 282A and 282B off-ramps. Volumes by lane at two key locations are shown in Figure 9.

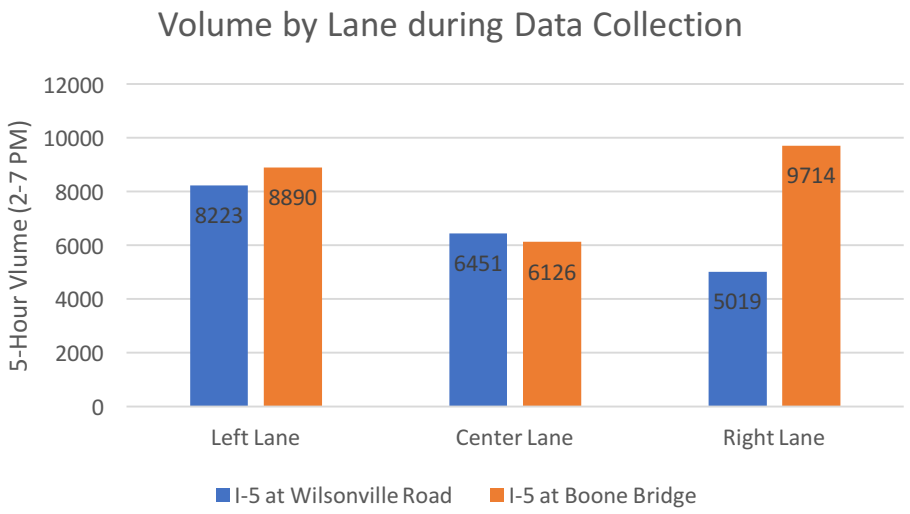


Figure 9: Volumes by lane, 2:00-7:00 PM Wednesday, October 18, 2017

Volumes at Wilsonville Road, upstream of the on-ramp, are consistent with video review of counts, which show slower speeds, higher density, and less throughput in the right lane, while vehicles in the left lane experience higher speeds and throughput.

South of the Wilsonville Road on-ramp, on the Boone Bridge, volumes are significantly higher in the right lane, reflecting high demand for the Exit 282A and 282B off-ramps. Origin and destination analysis is discussed further later in a later section of this memorandum.

Study Area Peak Hour

For the existing freeway operations analysis, we assessed the data from the mainline locations, which was tabulated in 15-minute bins. We used the ODOT-provided ramp counts, which were also aggregated at the 15-minute level, to back check the peak hour selection.

It is important to note that the Wilsonville Road on-ramp meter is active from 4:00 to 5:45 PM. The spike in volumes at the southern two mainline locations at 3:45 PM likely reflects the higher on-ramp flows from Wilsonville Road just prior to ramp meter activation. For our analysis, we selected a peak hour of 4:00-5:00 PM, which reflects operations with an active ramp meter, and is consistent with the peak hours from the three ramp count locations as well.

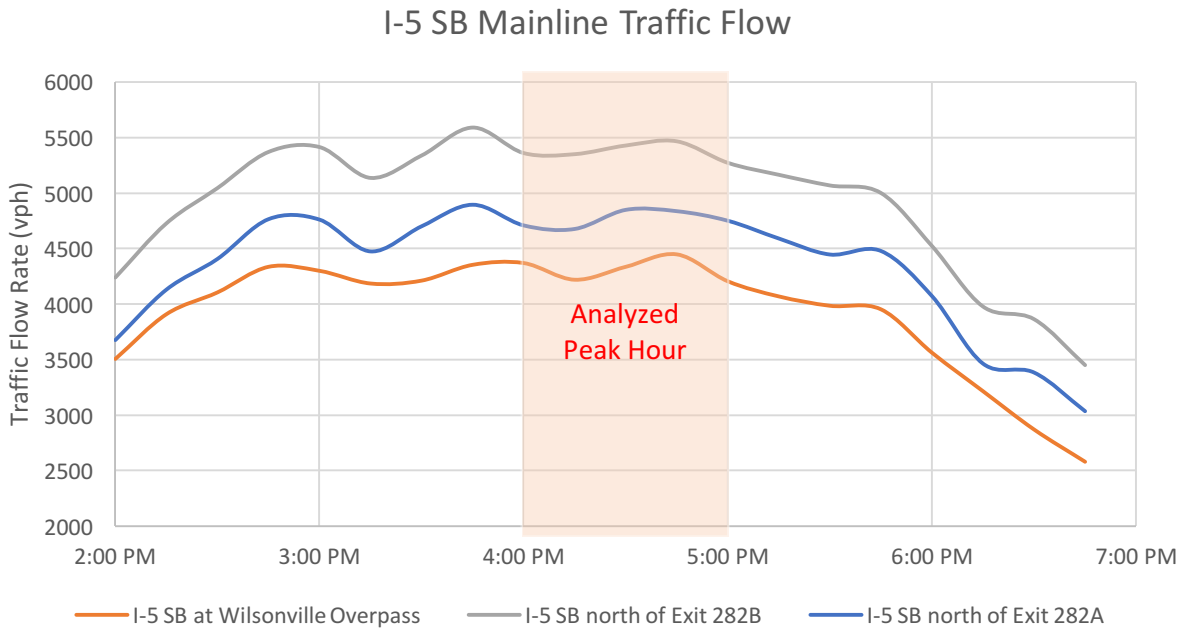


Figure 10: Hourly Comparison of I-5 Locations and Peak Hour Selection

Seasonal Adjustment

We performed an adjustment to the count data to reflect "30th highest hour" conditions for analysis. This is considered a conservative approach that ensures that the traffic data analyzed reflects something near a seasonal peak condition. The adjustment is described below.

Table 1: Seasonal Adjustment Using ATR #03-011

	2016	2015	2014	2013	2012
Peak Month (August)	110%	109%	112%	112%	112%
Mainline Count Month (October)	97%	98%	97%	96%	96%

As shown above, the percentage of ADT values listed during August, the peak month, and October, the count month, for the past five years are reviewed to calculate the average. The highest and lowest values, shown as shaded, are dropped from this calculation. The average monthly factors are determined as follows:

- The average peak month (August) is: (110%+112%+112%) / 3 = 111%
- The average mainline count month (October) is: (97%+97%+96%) / 3 = 97%
- The seasonal adjustment for mainline counts is August / October = 111% / 97% = 1.14

Therefore, a factor of 1.14 (a 14% increase) was applied to the October count data to reflect 30th highest hour conditions.

Freeway Performance

Using a balanced peak hour (4:00-5:00 PM) volume set, as shown in Figure 11, we performed HCM 2010 analysis on three types of freeway segments in the study area:

- **Basic segments:** Freeway segments that are outside of merge, diverge, or weaving areas.
- **Merge segments:** Segments in which two or more traffic streams combine to form a single traffic stream (e.g., the Wilsonville Road on-ramp merge)
- **Diverge segments:** Segments in which a single traffic stream divides to form two or more separate traffic streams (e.g., the Charbonneau or Canby/Hubbard off-ramp diverges)

HCM 2010 analysis uses geometric and volume data to compute facility demand/capacity rations and levels of service (LOS). Worksheets for this analysis include more detail on inputs and results, and are included in the appendix to this memorandum.

There are currently no weaving segments in the study area. HCM 2010 weaving segment analysis will be conducted on auxiliary lane alternatives in a future project task.

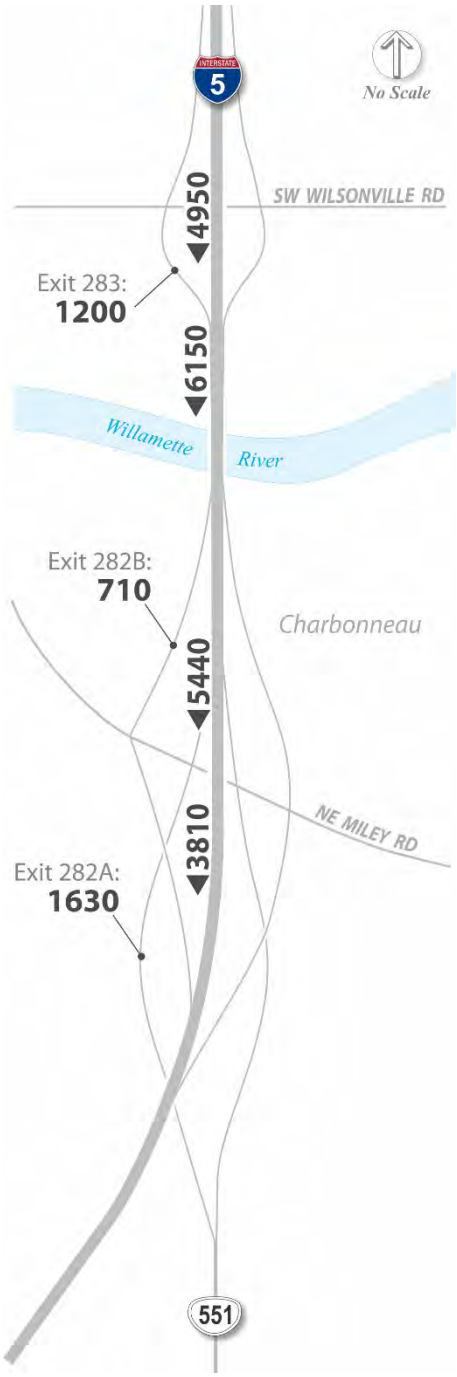


Figure 11: Existing PM Peak Volumes

HCM Analysis

HCM freeway segment analysis results are shown in Table 1, with the segments and level of service shown in Figure 12.

Table 2: HCM Freeway Segment Performance (PM Peak Hour)

	Segment	Volume/ Capacity	LOS
1	Wilsonville Road On-Ramp (Merge)	0.98 (Fwy) 0.61 (Ramp)	E
2	Boone Bridge (Basic)	0.93	E
3	Charbonneau Off-Ramp (Diverge)	0.94 (Fwy) 0.36 (Ramp)	E
4	Canby/Hubbard Off-Ramp (Diverge)	0.83 (Fwy) 0.83 (Ramp)	E
5	South of Canby/Hubbard Off-Ramp (Basic)	0.57	C

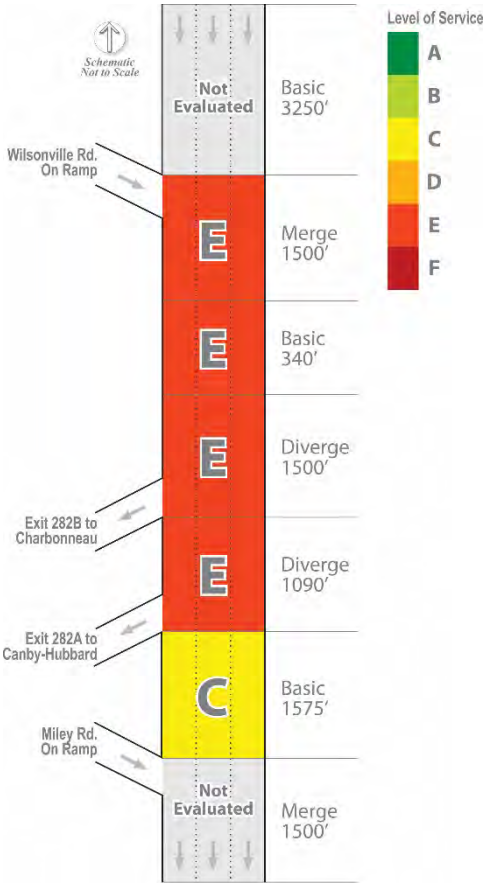


Figure 12: HCM Freeway Segment LOS Results (PM Peak Hour)

The Wilsonville Road on-ramp merge segment performs the worst of all segments studied, with a 0.98 volume-to-capacity ratio. As discussed earlier, volumes and speeds at this location vary by lane, with significant upstream impacts due to this high volume merge and demand for downstream exits 282A and 282B.

Travel Times and Speed

The time it takes to travel a segment of roadway can be a useful measure of congestion and reliability. For the I-5/Wilsonville Facility Plan, we collected travel time data and calculated travel time index, which is defined as follows:

Travel Time Index (TTI): The experienced travel time divided by the free-flow travel time (i.e., uncongested conditions). For example, an experienced travel time of four minutes on a segment for which the free-flow travel time would be two minutes would be **2.0**. The TTI for free-flow conditions, representing the "ideal trip," is **1.0**. Therefore, the higher the TTI, the more delay the traveler is experiencing compared to uncongested conditions.

We obtained the most recent available three years of HERE data (October 2014 to September 2017), which is aggregated in five minute intervals. Within this data set, we analyzed only the non-holiday midweek days of Tuesday through Thursday, and only the extended PM peak period of 2:00-7:00 PM.

HERE data is provided in predefined facility segments. The segments that overlap the project study area are:

- **North segment:** From the Elligsen Road (Exit 286) on-ramp to the Wilsonville Road (Exit 283) on-ramp. (Mile points 286.15 to 283.54)
- **South segment:** From the Wilsonville Road (Exit 283) on-ramp to the Canby/Hubbard off-ramp (Exit 282A). (Mile points 283.54 to 282.65)

The south segment encompasses most of the study area, while the north segment is likely to be more indicative of spillback issues from the I-5/Wilsonville Road on-ramp merge.

In the figures that follow, we provide travel time indices for each of the two segments over the five-hour extended PM peak period. Indices shown include:

- **Median Travel Time Index:** The index based on the 50th percentile travel time experienced over the course of the three years studied. This can be interpreted as the travel time experienced at the given time on a typical mid-week weekday.
- **95th Percentile Travel Time Index:** The index based on the 95th percentile (95th worst out of 100) travel time experienced over the course of the three years studied. This can be interpreted as the travel time experienced at the given time on the second-to-worst weekday of the month. The 95th percentile is often used to represent conditions a traveler should account for in order to be reasonably sure of arriving on time to their destination.

North Segment

The segment north of the I-5/Wilsonville Road on-ramp merge experiences higher delays than the segment south of the merge. As shown in the figure below, the median travel time on the segment is around twice as long as the uncongested travel time (TTI = 2.0) from around 4:30 to 5:45 PM. The 95th percentile travel time peaks around 5:30 PM, with a travel time index of about 3.0. This means that for a traveler to ensure they will arrive at their destination on time 95% of the time, they need to leave early enough to account for conditions where travel takes three times as long as it does under an uncongested state.

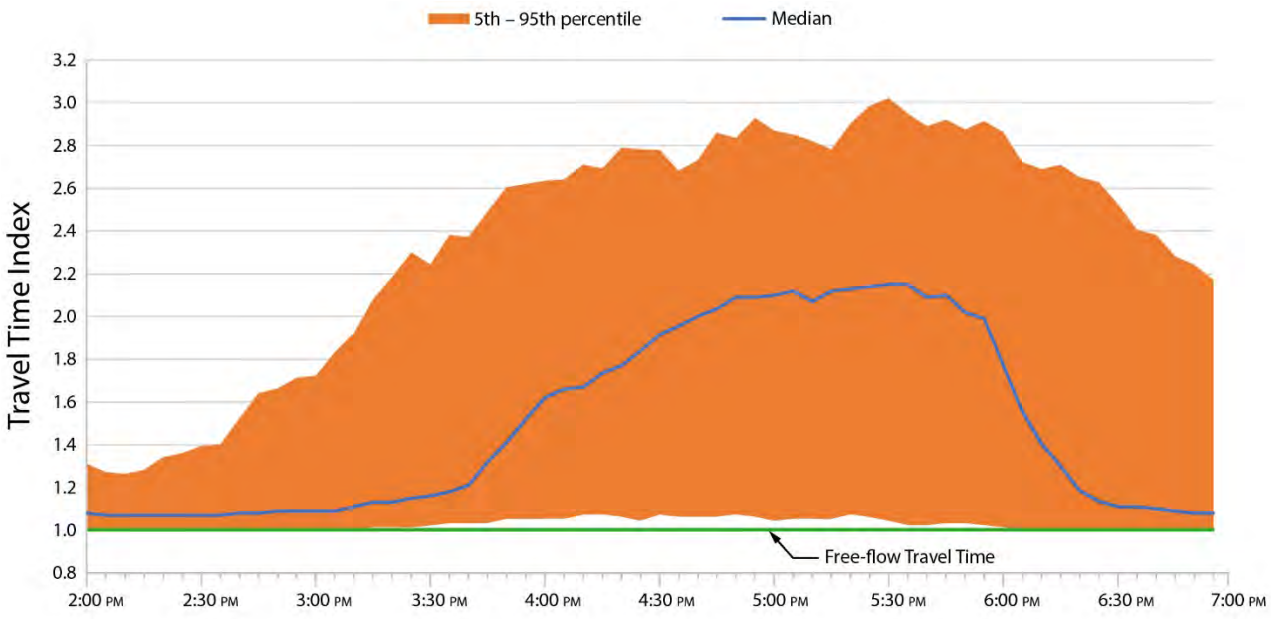


Figure 13: North Segment Travel Time Index, 2:00-7:00 PM (most recent three years of data)

South Segment

The segment south of the I-5/Wilsonville Road on-ramp merge experiences lower delays than the segment to the north. The figure below illustrates the travel time index by time of day over the 2:00-7:00 PM period. At the most congested time (around 5:30 PM), the median travel time is less than 150% of the free-flow travel time, and the 95th percentile travel time is around two times as long as the free-flow time. This means that for a traveler to ensure they will arrive at their destination on time 95% of the time, they need to leave early enough to account for conditions where travel takes nearly twice as long as it does under an uncongested state.

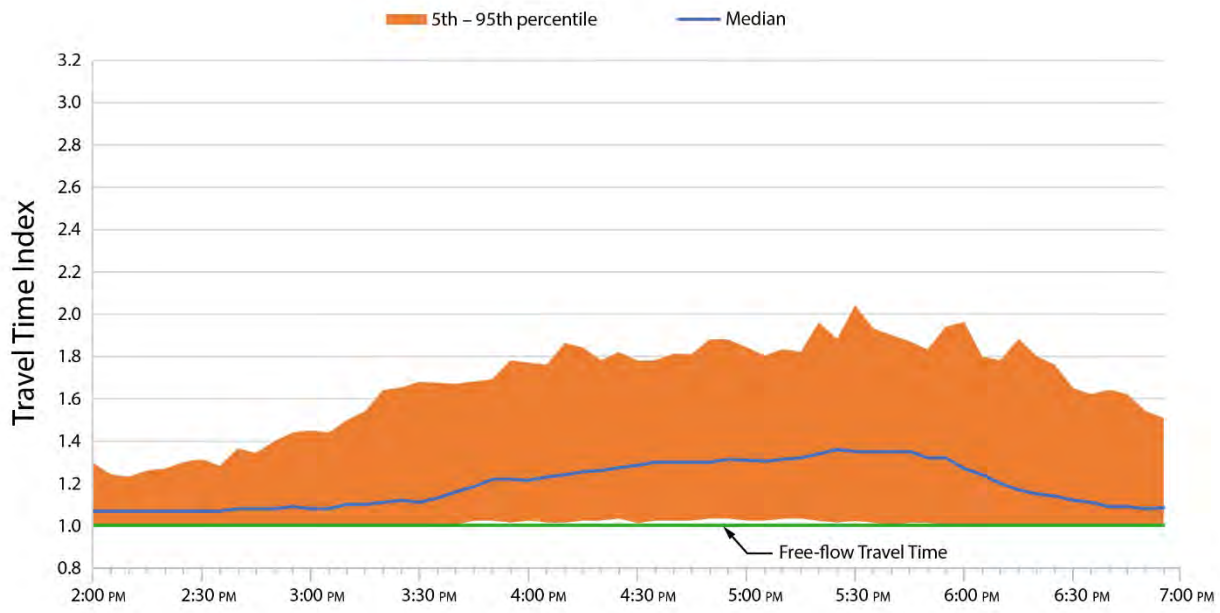


Figure 14: South Segment Travel Time Index, 2:00-7:00 PM (most recent three years of data)

The higher travel time indices in the section north of the Wilsonville Road on-ramp merge point suggests that this location is a traffic bottleneck. The increase volume and friction at the merge point causes delays to spill back to the north towards the next interchange (Elligsen Road/Exit 286), while travel speeds are higher to the south of the merge point.

Trend in Travel Speed

A review of the three years of HERE data collected indicates that travel speeds north of the Wilsonville Road on-ramp bottleneck have slowed over recent years. Figure 15 shows that average speeds in the first 12 months of data (October 2014 – September 2015) dropped as low as about 42 mph at 5:00 PM. Data for the following two years showed worsening conditions, with average speeds dropping below 35 mph by 5:00 PM, and the slowing continuing later into the PM peak period in the most recent year of data (October 2016 – September 2017), reaching about 32 mph around 5:30 PM.

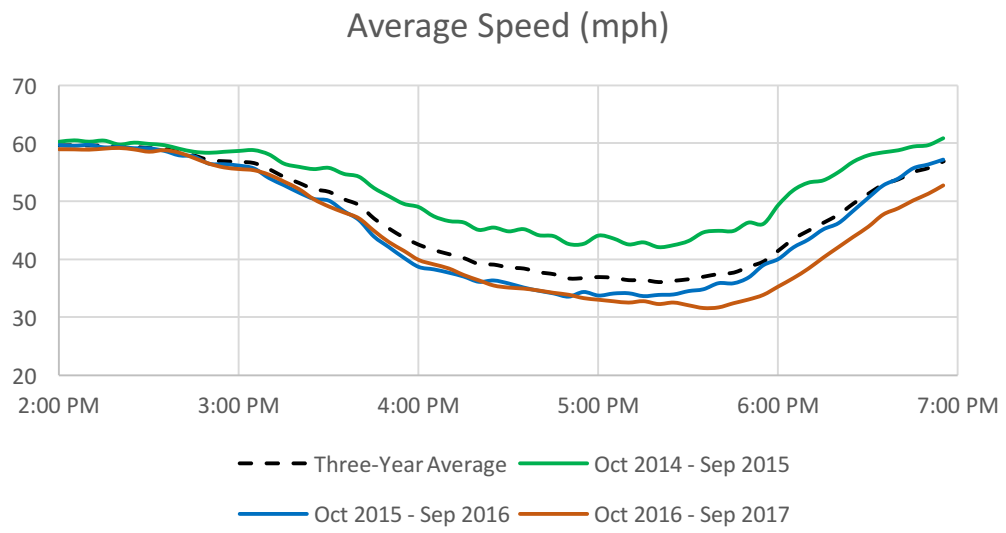


Figure 15: Average Travel Speed, north of Wilsonville Rd on ramp, 2:00-7:00 PM (most recent three years of data)

Intersection Performance

We reviewed performance of the I-5 Southbound/Wilsonville Road ramp terminal intersection based on a recent analysis completed for a City of Wilsonville traffic impact study.[2] Results are shown in Table 3, below.

Table 3: Intersection Operations, PM Peak Hour

Intersection	Average Delay	LOS	V/C
I-5 Southbound/Wilsonville Road	26 sec.	C	0.43

It is important to note that the intersection operations shown in Table 3 represent operations based on observed volumes at the intersection, and may not represent full demand. The intersection analysis does not account for delay and queuing back from the I-5 mainline from incidents on I-5, and from the signal meter on the I-5 southbound ramp that regulates the flow of traffic onto I-5. The meter is shown in Figure 16**Error! Reference source not found.**.

The existing capacity of this ramp meter is 1,200 vehicles per hour. If the peak hour demand of the southbound on-ramp exceeds 1,200 vehicles, additional storage would be necessary to prevent spillback and associated impacts on SW Wilsonville Road.

Figure 16: Signal Meter on I-5 Southbound Ramp at SW Wilsonville Road Interchange

According to intersection counts, approximately 1,150 vehicles are entering the southbound on-ramp during the peak hour, which is nearing the ramp meter's full capacity. When traffic incidents occur on I-5 and I-205, regional traffic may use surface streets to access I-5 southbound at Wilsonville Road, causing on-ramp demand to exceed the 1,200 vehicle meter rate. When this occurs, the southbound on-ramp queues back to Wilsonville Road and the I-5 Southbound/Wilsonville Road ramp terminal intersection is significantly impacted, with vehicles experiencing traffic delays similar to level of service "F" (greater than 80 seconds of delay).

[2] DW Fritz Renovation Traffic Impact Analysis, counts collected June 7, 2017.

SAFETY ANALYSIS

We reviewed ODOT's Safety Priority Index System (SPIS) documentation and analyzed the last five years of available crash data to better understand potential safety issues in the study area.

SPIS Review

The SPIS system uses a weighted index to account for crash frequency and severity on roadway segments. One location was flagged in the SPIS data as scoring among the highest 10% of locations statewide in both the 2014 and 2015 analysis. The segment generally corresponds to the Boone Bridge, but a review of crash data in the segment showed that most of the crashes are northbound, and therefore did not occur in this project's study area. There were no fatal crashes included the SPIS data.

Five-Year Crash Analysis

We collected the most recent five years (2011-2015) of available crash data for the study area and calculated the crash rate per million vehicle miles traveled (MVMT), a typical crash rate metric that accounts for exposure. Crash rates were calculated for each of four segments on southbound I-5, as shown in Figure 17.

The results are shown in Table 4 on the following page.

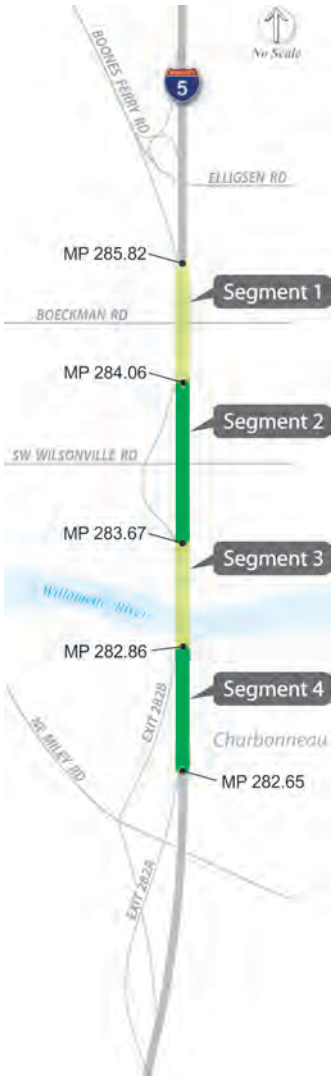


Figure 17: Crash Study Segments

Table 4: Crash Analysis Results (2011-2015)

Study Segment Safety Analysis					ODOT State Highway Crash Rates		
Segment	Length	2011-2015 Total Crashes	AADT	Crash Rate	Segment Type	2015 Avg. Rate	Exceeds Rate?
Mainline							
1. I-5 SB Mainline (Hwy 141 on ramp to Exit 283)	1.76	59	63,970	0.29	Interstate Freeway	0.51	No
2. I-5 SB Mainline (Exit 283 to Wilsonville Rd on ramp)	0.39	24	53,150	0.63	Interstate Freeway	0.51	**Yes**
3. I-5 SB Mainline (Wilsonville Rd on ramp to Exit 282B)	0.81	49	63,590	0.52	Interstate Freeway	0.51	**Yes**
4. I-5 SB Mainline (Exit 282B to Exit 282A)	0.21	5	58,120	0.22	Interstate Freeway	0.51	No
Ramps							
Wilsonville Rd SB on ramp	0.34	4	10,440	0.617	-	-	-
I-5 SB Exit 282B off-ramp	0.25	0	5,470	0	-	-	-
I-5 SB Exit 282A off-ramp	0.72	7	12,580	0.423	-	-	-

Mainline segments

Segment 1 is between the Elligsen Road on-ramp (Exit 286) and the Wilsonville Road off-ramp (Exit 283). The crash rate, 0.29 crashes per MVMT, is well below ODOT's published average rate for similar facilities (0.51).

Segment 2 is between the Wilsonville Road off-ramp and the Wilsonville Road on-ramp. The crash rate for this segment, 0.63 per MVMT, exceeds the average rate. This segment is influenced by the merging activities downstream of the on ramp. There were fourteen rear-end crashes and six sideswipe crashes in this segment.

Segment 3 is between the Wilsonville Road on-ramp and the Charbonneau off-ramp (Exit 282B), which is a freeway segment involving merging activities downstream of the Wilsonville Road on-ramp and diverging activities (lane changes, etc.) upstream of the exit ramp. The crash rate per MVMT was 0.52, slightly above the average rate. There were 28 rear-end crashes and 8 sideswipe crashes.

Segment 4 is a diverge segment between the Charbonneau (Exit 282B) and Canby/Hubbard (Exit 282A) off-ramps. The crash rate of 0.22 per MVMT was well below the average rate.

The overall distribution of crash types is shown in Figure 18, and indicates a high proportion of rear-end crashes, which are typical of stop-and-go conditions in congested areas. Sideswipe crashes are the next most prevalent type, and are typical for locations with significant lane changing activity and speed differential between lanes.

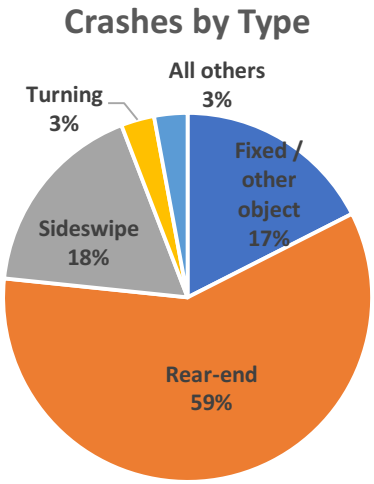


Figure 18: Crash types on I-5 SB mainline segments, 2011-2015

Ramps

All crashes on the Wilsonville Road on-ramp were rear-end. On the Canby-Hubbard off-ramp, three crashes were fixed object crashes, two were rear-end, and one was sideswipe.

There were no crashes on the Charbonneau (Exit 282B) off-ramp.

ORIGIN-DESTINATION PATTERNS

Understanding the proportion of I-5 southbound traffic that uses the Charbonneau exit, the Canby/Hubbard exit, or stays on I-5 continuing south is critical to being able to evaluate the effectiveness of an operational improvement like an auxiliary lane. If a high proportion of traffic originating from the Wilsonville Road on-ramp is destined for one of the two exits, then an auxiliary lane may help reduce friction and improve operations and safety, providing a much greater distance for merging and lane changing than currently exists.

We used a primary data source, Streetlight, which allows analysis of origins and destinations through the use of navigation and GPS data commonly found in today's vehicles. We back-checked the results by running origin-destination analysis using the Metro regional travel demand model. The results are described in the following sections.

Streetlight Data Analysis

We performed analysis of PM peak hour origins and destinations using the last twelve months of available Streetlight data (October 2016 – September 2017). Streetlight relies on available GPS data from a sample of the overall personal vehicle and commercial vehicle fleets on the roadway network. The origin-destination percentages are calibrated based on additional data inputs from DKS, including segment and ramp volumes, and personal/commercial vehicle mix based on vehicle classification.

Analysis shows that nearly 60% of the traffic originating from the Wilsonville Road on-ramp uses one of the two study area exits (27% at Charbonneau and 32% at Canby/Hubbard). This means that, if an auxiliary lane were added, a significant amount of peak hour traffic would use that lane only and not conflict with mainline traffic.

The overall Streetlight origin-destination distributions are illustrated in Figure 19 below.

Figure 19: Destinations for traffic originating from Wilsonville Road (left), I-5 north of Wilsonville Road (center), and combined (right) based on Streetlight data

Metro Model Data Analysis

We used the Metro regional travel demand model with the 4:00-5:00 PM trip table to help validate the Streetlight results. Origins and destinations were obtained by using Visum's flow bundle feature, which allows an analyst to select a network link and see where volumes using that link propagate through the network. The Metro model results are shown in Figure 20 below.

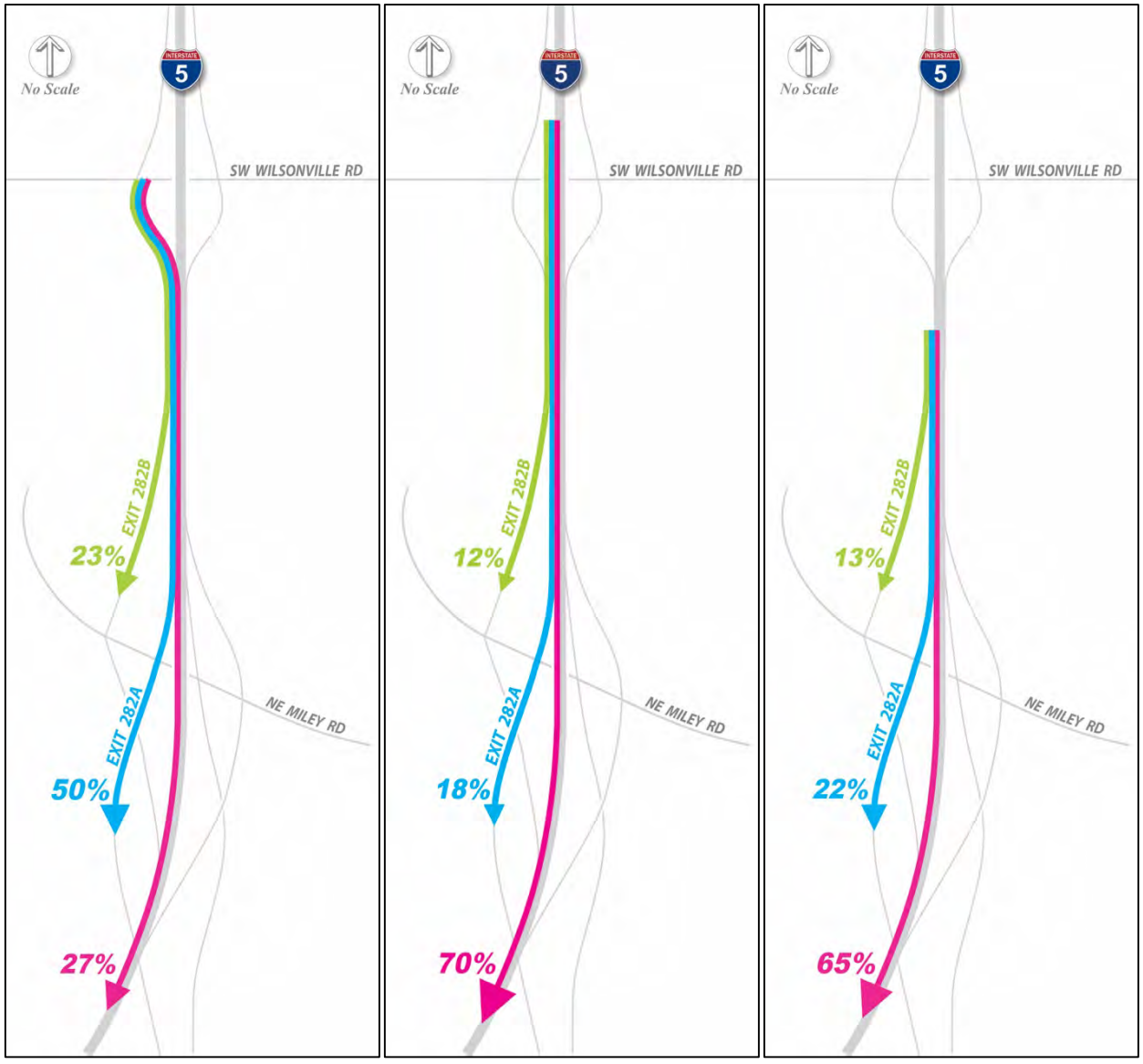


Figure 20: Destinations for traffic originating from Wilsonville Road (left), I-5 north of Wilsonville Road (center), and combined (right) based on Metro model data

Comparison

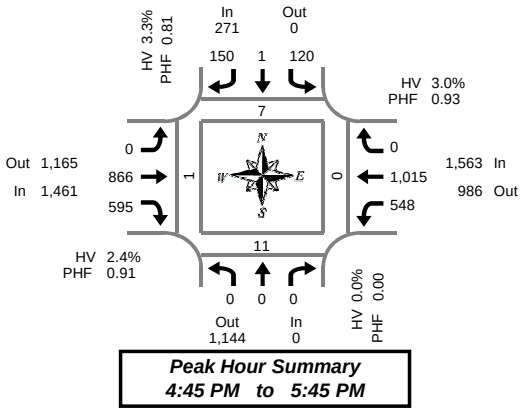
The Metro model predicts that a very high proportion (73%) of traffic originating from the Wilsonville Road on-ramp will use one of the two off-ramps in the study area. Our estimate from the Streetlight data sample was lower (59%), but still high enough to make the prospect of an auxiliary lane promising. Both methods estimated that around 70% of traffic originating from the I-5 mainline north of Wilsonville Road would stay on I-5 south of the Canby/Hubbard exit.

Appendix A

Traffic Counts

Total Vehicle Summary

Clay Carney
(503) 833-2740



I-5 SB Ramp & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	9	0	11	0	0	64	60	0	37	62	0	0	243	0	0	0	0
4:05 PM	0	0	0	0	4	0	13	0	0	96	47	0	31	77	0	0	268	0	1	0	0
4:10 PM	0	0	0	0	6	0	9	0	0	74	41	0	49	80	0	0	259	0	1	0	0
4:15 PM	0	0	0	0	15	0	8	0	0	54	46	0	51	74	0	1	248	3	0	0	0
4:20 PM	0	0	0	0	12	0	10	0	0	65	49	0	41	75	0	0	252	3	2	0	0
4:25 PM	0	0	0	0	9	0	8	0	0	95	44	0	40	70	0	0	266	3	1	0	0
4:30 PM	0	0	0	0	4	0	9	0	0	66	45	0	51	87	0	1	262	0	0	0	0
4:35 PM	0	0	0	0	7	0	12	0	0	58	37	0	47	70	0	1	231	0	0	0	0
4:40 PM	0	0	0	0	11	0	11	0	0	64	48	0	34	93	0	0	261	2	1	0	0
4:45 PM	0	0	0	0	15	0	13	0	0	72	41	0	53	97	0	0	291	0	1	0	0
4:50 PM	0	0	0	0	9	0	17	1	0	62	46	0	52	83	0	0	269	0	0	0	0
4:55 PM	0	0	0	0	9	0	8	0	0	55	56	0	56	80	0	0	264	1	0	0	0
5:00 PM	0	0	0	0	5	0	15	0	0	73	63	0	26	71	0	0	253	1	0	0	0
5:05 PM	0	0	0	0	4	0	11	0	0	77	52	0	55	100	0	0	299	0	1	0	0
5:10 PM	0	0	0	0	16	0	6	0	0	89	46	0	50	75	0	0	282	2	0	0	0
5:15 PM	0	0	0	0	12	1	12	0	0	62	45	0	45	76	0	0	253	0	3	0	0
5:20 PM	0	0	0	0	12	0	8	0	0	83	49	0	42	95	0	0	289	1	0	0	0
5:25 PM	0	0	0	0	3	0	11	0	0	95	46	0	51	90	0	0	296	0	1	0	1
5:30 PM	0	0	0	0	7	0	12	0	0	49	50	0	48	76	0	1	242	1	1	0	0
5:35 PM	0	0	0	0	17	0	19	0	0	74	57	0	36	66	0	2	269	0	0	0	0
5:40 PM	0	0	0	0	11	0	18	0	0	75	44	0	34	106	0	0	288	1	4	0	0
5:45 PM	0	0	0	0	11	0	7	0	0	79	43	0	45	87	0	1	272	2	0	0	2
5:50 PM	0	0	0	0	5	0	10	0	0	60	54	2	51	75	0	0	255	0	0	0	0
5:55 PM	0	0	0	0	10	0	11	0	0	66	42	0	45	86	0	0	260	0	0	0	0
Total Survey	0	0	0	0	223	1	269	1	0	1,707	1,151	2	1,070	1,951	0	7	6,372	20	17	0	3

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	19	0	33	0	0	234	148	0	117	219	0	0	770	0	2	0	0
4:15 PM	0	0	0	0	36	0	26	0	0	214	139	0	132	219	0	1	766	9	3	0	0
4:30 PM	0	0	0	0	22	0	32	0	0	188	130	0	132	250	0	2	754	2	1	0	0
4:45 PM	0	0	0	0	33	0	38	1	0	189	143	0	161	260	0	0	824	1	1	0	0
5:00 PM	0	0	0	0	25	0	32	0	0	239	161	0	131	246	0	0	834	3	1	0	0
5:15 PM	0	0	0	0	27	1	31	0	0	240	140	0	138	261	0	0	838	1	4	0	1
5:30 PM	0	0	0	0	35	0	49	0	0	198	151	0	118	248	0	3	799	2	5	0	0
5:45 PM	0	0	0	0	26	0	28	0	0	205	139	2	141	248	0	1	787	2	0	0	2
Total Survey	0	0	0	0	223	1	269	1	0	1,707	1,151	2	1,070	1,951	0	7	6,372	20	17	0	3

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	1,144	1,144	0	271	0	271	1	1,461	1,165	2,626	0	1,563	986	2,549	3	3,295
%HV	0.0%				3.3%				2.4%				3.0%				2.8%
PHF	0.00				0.81				0.91				0.93				0.98

Pedestrians Crosswalk			
North	South	East	West
7	11	0	1

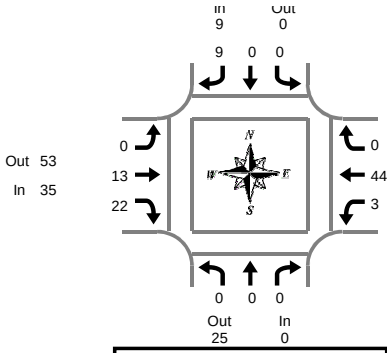
By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	120	1	150	271	0	866	595	1,461	548	1,015	0	1,563	3,295
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	3.3%	0.0%	1.5%	3.7%	2.4%	0.5%	4.3%	0.0%	3.0%	2.8%
PHF	0.00	0.00	0.00	0.00	0.75	0.25	0.77	0.81	0.00	0.90	0.87	0.91	0.85	0.97	0.00	0.93	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	110	0	129	1	0	825	560	0	542	948	0	3	3,114	12	7	0	0
4:15 PM	0	0	0	0	116	0	128	1	0	830	573	0	556	975	0	3	3,178	15	6	0	0
4:30 PM	0	0	0	0	107	1	133	1	0	856	574	0	562	1,017	0	2	3,250	7	7	0	1
4:45 PM	0	0	0	0	120	1	150	1	0	866	595	0	548	1,015	0	3	3,295	7	11	0	1
5:00 PM	0	0	0	0	113	1	140	0	0	882	591	2	528	1,003	0	4	3,258	8	10	0	3

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



I-5 SB Ramp & SW Wilsonville Rd

Wednesday, June 07, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	2	0	2	7
4:05 PM	0	0	0	0	0	0	3	3	0	6	2	8	0	4	0	4	15
4:10 PM	0	0	0	0	0	0	0	0	0	3	3	6	0	2	0	2	8
4:15 PM	0	0	0	0	0	0	1	1	0	5	0	5	4	7	0	11	17
4:20 PM	0	0	0	0	0	0	1	1	0	3	2	5	0	5	0	5	11
4:25 PM	0	0	0	0	0	0	1	1	0	2	0	2	1	5	0	6	9
4:30 PM	0	0	0	0	1	0	1	2	0	1	1	2	1	4	0	5	9
4:35 PM	0	0	0	0	0	0	1	1	0	1	0	1	0	3	0	3	5
4:40 PM	0	0	0	0	1	0	0	1	0	2	3	5	1	6	0	7	13
4:45 PM	0	0	0	0	0	0	0	0	0	3	5	8	0	3	0	3	11
4:50 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	5	0	5	6
4:55 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	2	0	2	5
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	3	0	12	0	12	15
5:05 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	4	0	4	7
5:10 PM	0	0	0	0	0	0	2	2	0	2	1	3	0	0	0	0	5
5:15 PM	0	0	0	0	0	0	1	1	0	1	2	3	1	3	0	4	8
5:20 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	7	0	7	11
5:25 PM	0	0	0	0	0	0	1	1	0	0	1	1	0	3	0	3	5
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	2	0	2	0	2	4
5:35 PM	0	0	0	0	0	0	1	1	0	1	1	2	0	0	0	0	3
5:40 PM	0	0	0	0	0	0	2	2	0	1	3	4	2	3	0	5	11
5:45 PM	0	0	0	0	1	0	0	1	0	4	2	6	2	5	0	7	14
5:50 PM	0	0	0	0	0	0	1	1	0	1	0	1	1	1	0	2	4
5:55 PM	0	0	0	0	2	0	1	3	0	0	1	1	0	2	0	2	6
Total Survey	0	0	0	0	5	0	19	24	0	46	36	82	13	90	0	103	209

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	3	3	0	14	5	19	0	8	0	8	30
4:15 PM	0	0	0	0	0	0	3	3	0	10	2	12	5	17	0	22	37
4:30 PM	0	0	0	0	2	0	2	4	0	4	4	8	2	13	0	15	27
4:45 PM	0	0	0	0	0	0	1	1	0	4	7	11	0	10	0	10	22
5:00 PM	0	0	0	0	0	0	3	3	0	3	5	8	0	16	0	16	27
5:15 PM	0	0	0	0	0	0	2	2	0	4	4	8	1	13	0	14	24
5:30 PM	0	0	0	0	0	0	3	3	0	2	6	8	2	5	0	7	18
5:45 PM	0	0	0	0	3	0	2	5	0	5	3	8	3	8	0	11	24
Total Survey	0	0	0	0	5	0	19	24	0	46	36	82	13	90	0	103	209

Heavy Vehicle Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound I-5 SB Ramp			Southbound I-5 SB Ramp			Eastbound SW Wilsonville Rd			Westbound SW Wilsonville Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	25	25	9	0	9	35	53	88	47	13	60	91
PHF	0.00			0.56			0.80			0.62			0.84

By Movement	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	9	9	0	13	22	35	3	44	0	47	91
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.56	0.00	0.54	0.79	0.80	0.38	0.58	0.00	0.62	0.84

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

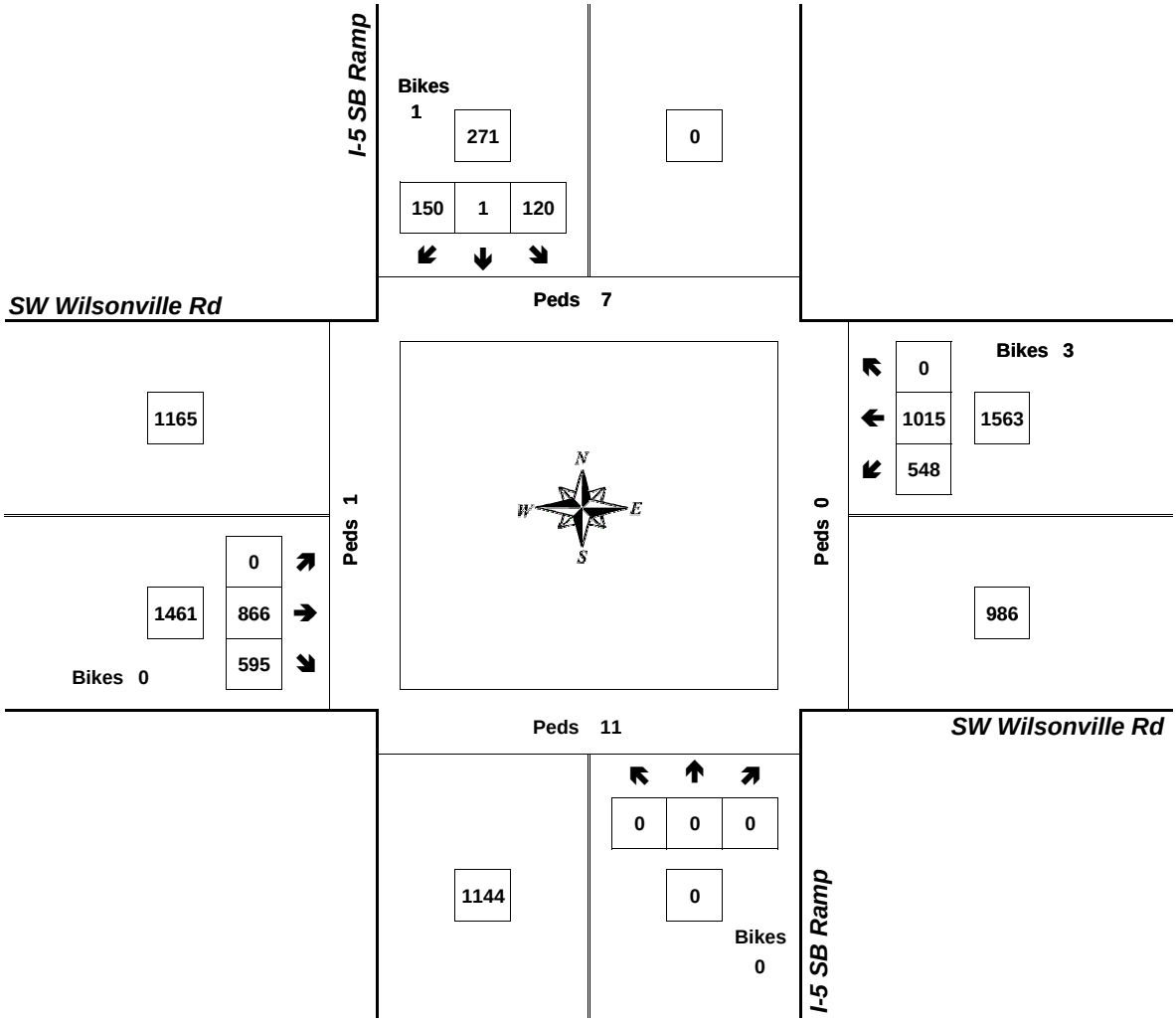
Interval Start Time	Northbound I-5 SB Ramp				Southbound I-5 SB Ramp				Eastbound SW Wilsonville Rd				Westbound SW Wilsonville Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	2	0	9	11	0	32	18	50	7	48	0	55	116
4:15 PM	0	0	0	0	2	0	9	11	0	21	18	39	7	56	0	63	113
4:30 PM	0	0	0	0	2	0	8	10	0	15	20	35	3	52	0	55	100
4:45 PM	0	0	0	0	0	0	9	9	0	13	22	35	3	44	0	47	91
5:00 PM	0	0	0	0	3	0	10	13	0	14	18	32	6	42	0	48	93

Peak Hour Summary

Clay Carney
(503) 833-2740

I-5 SB Ramp & SW Wilsonville Rd

4:45 PM to 5:45 PM
Wednesday, June 07, 2017



Approach	PHF	HV%	Volume
EB	0.91	2.4%	1,461
WB	0.93	3.0%	1,563
NB	0.00	0.0%	0
SB	0.81	3.3%	271
Intersection	0.98	2.8%	3,295

Count Period: 4:00 PM to 6:00 PM

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/17/17
Location/Intersection: I-5 at Wilsonville Rd Overpass
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	0	276	380	1	23	4	0	5	61	15	1	0	3	769
2:15 PM	3	374	445	1	30	8	0	5	67	24	0	2	8	967
2:30 PM	1	465	421	2	34	8	1	1	51	19	0	1	9	1013
2:45 PM	2	436	483	3	32	6	0	5	61	23	0	0	4	1055
3:00 PM	2	426	505	2	31	3	2	1	65	13	2	3	6	1061
3:15 PM	0	456	512	1	26	8	2	2	44	22	1	1	1	1076
3:30 PM	1	412	491	1	26	2	1	1	46	12	0	1	3	997
3:45 PM	1	459	522	1	28	4	0	0	46	8	0	2	1	1072
4:00 PM	3	445	570	0	14	4	1	1	46	8	0	1	1	1094
4:15 PM	0	402	582	1	22	1	1	5	34	12	0	0	0	1060
4:30 PM	0	458	542	0	26	5	3	3	39	8	0	0	3	1087
4:45 PM	2	461	551	1	21	7	2	3	48	7	0	0	4	1107
5:00 PM	1	425	532	0	25	1	1	1	54	3	1	1	3	1048
5:15 PM	0	466	483	1	13	1	0	2	42	10	0	1	5	1024
5:30 PM	0	444	496	0	21	1	1	1	44	11	0	0	0	1019
5:45 PM	0	389	512	1	16	2	1	2	36	11	0	0	2	972
6:00 PM	2	391	484	2	17	1	0	0	45	13	0	0	3	958
6:15 PM	1	361	452	0	7	4	2	1	46	13	1	2	3	893
6:30 PM	1	309	365	0	16	1	1	1	37	4	0	1	4	740
6:45 PM	1	288	298	1	7	0	0	0	41	6	1	0	3	646
Total	21	8143	9626	19	435	71	19	40	953	242	7	16	66	19658
%	0.11%	41.42%	48.97%	0.10%	2.21%	0.36%	0.10%	0.20%	4.85%	1.23%	0.04%	0.08%	0.34%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/18/17
Location/Intersection: I-5 at Wilsonville Rd Overpass
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	349	461	3	54	7	0	3	78	20	1	1	6	984
2:15 PM	0	337	506	1	60	0	0	1	59	17	0	0	6	987
2:30 PM	1	365	551	3	32	3	0	4	63	14	0	0	3	1039
2:45 PM	1	436	545	2	30	9	0	11	55	21	0	1	1	1112
3:00 PM	2	451	524	1	26	4	1	5	65	8	0	0	1	1088
3:15 PM	2	429	479	3	22	8	1	3	58	4	0	1	6	1016
3:30 PM	1	469	527	5	30	5	2	3	63	3	0	0	0	1108
3:45 PM	1	497	500	1	25	9	0	1	60	9	0	1	0	1104
4:00 PM	0	490	508	1	30	5	1	4	45	3	0	0	3	1090
4:15 PM	2	407	569	1	23	6	1	2	30	3	0	0	5	1049
4:30 PM	1	480	517	1	22	4	0	8	34	9	0	1	3	1080
4:45 PM	1	504	517	1	30	4	0	2	47	6	0	1	3	1116
5:00 PM	1	470	488	3	25	1	0	4	48	8	0	2	4	1054
5:15 PM	1	446	488	2	18	2	0	3	44	5	0	0	1	1010
5:30 PM	0	436	448	0	32	4	1	2	39	7	0	0	4	973
5:45 PM	2	429	484	0	23	3	0	3	46	6	1	1	6	1004
6:00 PM	1	360	377	2	20	3	1	3	45	7	2	0	2	823
6:15 PM	0	292	368	1	5	2	0	1	42	2	1	0	1	715
6:30 PM	1	300	342	3	11	3	1	1	29	4	1	0	0	696
6:45 PM	0	286	312	3	11	0	1	0	29	2	0	0	1	645
Total	19	8233	9511	37	529	82	10	64	979	158	6	9	56	19693
%	0.10%	41.81%	48.30%	0.19%	2.69%	0.42%	0.05%	0.32%	4.97%	0.80%	0.03%	0.05%	0.28%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/19/17
Location/Intersection: I-5 at Wilsonville Rd Overpass
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	0	330	469	4	18	6	9	1	49	15	1	1	3	906
2:15 PM	2	321	486	0	14	6	1	2	42	10	0	1	4	889
2:30 PM	0	311	478	4	16	3	5	0	49	19	0	0	4	889
2:45 PM	0	344	475	4	28	2	5	1	45	18	0	0	5	927
3:00 PM	1	359	441	2	24	5	0	5	44	9	1	1	2	894
3:15 PM	2	349	472	1	23	5	0	2	29	6	0	1	1	891
3:30 PM	1	317	429	2	26	2	0	1	41	17	0	0	4	840
3:45 PM	0	375	440	0	16	2	0	0	33	12	0	1	2	881
4:00 PM	0	402	417	1	25	2	0	3	29	15	0	2	2	898
4:15 PM	1	379	452	2	26	3	0	2	30	5	0	0	0	900
4:30 PM	3	430	417	1	23	5	1	3	27	9	0	1	1	921
4:45 PM	0	390	411	0	23	3	0	3	50	5	0	0	2	887
5:00 PM	0	348	466	0	16	1	0	2	36	5	1	0	1	876
5:15 PM	0	416	462	0	25	3	0	1	26	8	0	0	4	945
5:30 PM	0	354	444	1	24	3	0	1	37	9	0	1	1	875
5:45 PM	0	364	442	0	23	5	1	0	45	8	0	0	4	892
6:00 PM	1	361	427	0	32	1	0	1	42	7	0	0	3	875
6:15 PM	0	376	446	0	13	5	0	3	47	3	1	1	3	898
6:30 PM	0	362	396	2	19	5	0	1	51	2	0	0	3	841
6:45 PM	0	395	364	2	12	0	0	1	55	0	0	0	2	831
Total	11	7283	8834	26	426	67	22	33	807	182	4	10	51	17756
%	0.06%	41.02%	49.75%	0.15%	2.40%	0.38%	0.12%	0.19%	4.54%	1.03%	0.02%	0.06%	0.29%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/17/17
Location/Intersection: I-5 north of Miley Rd Exit
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	371	487	2	30	5	0	5	59	18	1	1	2	982
2:15 PM	2	457	542	1	44	9	0	6	74	24	1	1	6	1167
2:30 PM	5	523	578	2	36	11	0	4	50	25	0	0	6	1240
2:45 PM	1	549	641	1	39	8	0	6	64	19	0	0	2	1330
3:00 PM	2	534	654	2	34	7	1	8	67	14	2	2	4	1331
3:15 PM	0	531	666	2	33	7	1	3	46	19	1	1	5	1315
3:30 PM	0	560	606	5	33	7	0	6	52	13	0	1	1	1284
3:45 PM	3	604	680	3	30	6	0	3	50	6	0	1	1	1387
4:00 PM	3	593	669	2	28	3	1	4	46	7	1	0	2	1359
4:15 PM	1	529	712	1	20	2	2	2	40	11	0	0	1	1321
4:30 PM	1	569	680	2	34	3	1	3	38	9	0	1	1	1342
4:45 PM	2	615	671	1	29	7	0	2	51	8	0	0	3	1389
5:00 PM	0	576	631	2	31	3	0	2	46	7	0	1	3	1302
5:15 PM	0	588	628	1	24	1	0	1	46	8	0	2	4	1303
5:30 PM	0	574	605	2	22	1	1	1	45	10	0	0	0	1261
5:45 PM	0	506	629	1	23	3	0	1	41	8	0	0	2	1214
6:00 PM	3	521	606	3	27	1	0	1	41	15	0	0	2	1220
6:15 PM	2	465	550	0	19	5	1	2	53	13	0	0	4	1114
6:30 PM	1	433	480	2	19	3	0	4	35	5	0	0	6	988
6:45 PM	1	353	389	1	6	0	0	0	50	3	0	0	4	807
Total	28	10451	12104	36	561	92	8	64	994	242	6	11	59	24656
%	0.11%	42.39%	49.09%	0.15%	2.28%	0.37%	0.03%	0.26%	4.03%	0.98%	0.02%	0.04%	0.24%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/18/17
Location/Intersection: I-5 north of Miley Rd Exit
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	416	561	1	34	7	1	8	74	28	1	1	4	1137
2:15 PM	1	403	651	1	46	5	2	3	61	17	0	0	6	1196
2:30 PM	1	468	683	3	42	4	0	2	55	19	0	0	5	1282
2:45 PM	1	532	686	2	35	10	0	9	56	20	0	2	2	1355
3:00 PM	2	541	705	1	41	6	0	3	52	18	1	1	5	1376
3:15 PM	2	520	614	4	30	11	2	3	48	14	0	2	3	1253
3:30 PM	2	562	688	8	40	9	0	5	59	9	0	0	3	1385
3:45 PM	1	627	674	2	29	11	0	1	48	12	1	1	1	1408
4:00 PM	0	583	634	2	39	7	0	2	45	7	0	1	1	1321
4:15 PM	2	538	737	1	24	8	1	2	23	12	0	0	6	1354
4:30 PM	2	583	709	2	23	4	0	3	35	8	0	0	3	1372
4:45 PM	1	581	673	0	26	5	1	2	41	11	0	0	3	1344
5:00 PM	1	574	670	2	16	5	0	1	48	14	0	0	3	1334
5:15 PM	1	558	652	2	13	4	0	2	40	6	0	0	1	1279
5:30 PM	0	535	653	2	20	3	0	3	48	7	0	0	2	1273
5:45 PM	2	578	619	1	22	6	0	3	44	7	0	1	3	1286
6:00 PM	4	449	501	2	19	3	1	2	48	4	0	2	6	1041
6:15 PM	0	383	439	2	9	1	0	0	37	1	0	0	2	874
6:30 PM	2	378	501	1	14	3	0	0	40	2	0	1	1	943
6:45 PM	0	425	441	5	10	3	0	0	32	0	0	0	1	917
Total	26	10234	12491	44	532	115	8	54	934	216	3	12	61	24730
%	0.11%	41.38%	50.51%	0.18%	2.15%	0.47%	0.03%	0.22%	3.78%	0.87%	0.01%	0.05%	0.25%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/19/17
Location/Intersection: I-5 north of Miley Rd Exit
Direction Counted: Southbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	416	582	3	32	8	1	7	58	14	0	0	6	1128
2:15 PM	2	423	589	2	27	8	0	1	47	12	0	0	5	1116
2:30 PM	0	422	586	2	33	5	1	5	64	13	0	1	7	1139
2:45 PM	0	490	573	3	18	7	2	0	45	16	0	3	4	1161
3:00 PM	1	461	574	2	20	6	2	3	46	11	1	2	2	1131
3:15 PM	2	500	557	1	33	5	1	2	32	7	0	1	1	1142
3:30 PM	1	477	578	1	23	2	0	2	38	15	0	0	6	1143
3:45 PM	0	464	605	5	17	3	1	2	40	10	0	0	5	1152
4:00 PM	0	472	649	3	22	3	0	0	34	11	0	0	2	1196
4:15 PM	1	489	630	2	23	3	0	3	25	9	0	1	1	1187
4:30 PM	3	520	603	1	23	3	1	3	31	7	0	0	1	1196
4:45 PM	0	465	616	3	21	1	1	1	43	8	0	0	2	1161
5:00 PM	0	482	601	1	24	1	1	1	40	5	0	1	2	1159
5:15 PM	1	514	611	1	22	3	0	1	23	8	1	0	3	1188
5:30 PM	0	478	614	0	22	7	0	1	40	7	1	0	2	1172
5:45 PM	0	533	593	2	18	4	1	2	40	7	1	0	5	1206
6:00 PM	1	501	597	0	34	3	0	3	40	12	1	0	3	1195
6:15 PM	1	468	613	1	17	5	0	0	47	5	1	1	3	1162
6:30 PM	0	419	608	1	22	4	1	4	52	0	1	3	1	1116
6:45 PM	0	482	539	3	22	2	0	3	49	2	0	4	1	1107
Total	14	9476	11918	37	473	83	13	44	834	179	7	17	62	23157
%	0.06%	40.92%	51.47%	0.16%	2.04%	0.36%	0.06%	0.19%	3.60%	0.77%	0.03%	0.07%	0.27%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/17/17
Location/Intersection: I-5 btwn Miley Rd Exit and Miley Rd Overpass
Direction Counted: Soutbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	346	390	1	27	5	0	0	59	16	0	2	2	849
2:15 PM	1	411	444	1	40	10	0	3	72	26	0	1	7	1016
2:30 PM	4	459	506	2	30	12	0	1	50	27	0	1	5	1097
2:45 PM	1	486	551	1	36	7	0	3	61	24	0	0	3	1173
3:00 PM	2	493	563	2	29	7	0	2	64	13	2	2	6	1185
3:15 PM	0	475	560	3	29	7	0	2	44	20	1	1	5	1147
3:30 PM	2	475	572	3	21	5	2	0	53	11	0	0	3	1147
3:45 PM	3	509	617	2	23	4	2	0	46	8	0	1	2	1217
4:00 PM	3	524	598	1	18	2	2	0	46	8	0	1	2	1205
4:15 PM	0	480	613	1	13	4	2	0	40	12	0	0	0	1165
4:30 PM	1	479	621	1	18	5	1	2	35	9	0	0	3	1175
4:45 PM	2	522	607	1	19	8	0	2	51	5	3	1	1	1222
5:00 PM	0	517	571	1	31	3	0	0	52	6	0	0	5	1186
5:15 PM	0	593	484	1	30	1	0	0	45	7	0	3	4	1168
5:30 PM	0	547	489	1	22	2	0	1	48	9	0	0	0	1119
5:45 PM	0	522	489	2	26	3	0	1	41	7	0	0	2	1093
6:00 PM	2	535	481	4	28	1	0	2	41	14	0	1	2	1111
6:15 PM	2	409	455	0	17	6	0	3	54	11	1	1	3	962
6:30 PM	0	439	359	1	19	3	0	1	38	5	0	1	5	871
6:45 PM	1	358	278	1	12	0	0	1	46	4	0	2	4	707
Total	25	9579	10248	30	488	95	9	24	986	242	7	18	64	21815
%	0.11%	43.91%	46.98%	0.14%	2.24%	0.44%	0.04%	0.11%	4.52%	1.11%	0.03%	0.08%	0.29%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/18/17
Location/Intersection: I-5 btwn Miley Rd Exit and Miley Rd Overpass
Direction Counted: Soutbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	1	379	444	3	38	6	0	5	81	23	2	1	6	989
2:15 PM	1	388	521	1	44	4	2	4	63	16	0	0	5	1049
2:30 PM	1	445	532	3	38	4	0	5	57	17	2	0	2	1106
2:45 PM	1	503	568	3	39	8	0	5	59	20	0	1	2	1209
3:00 PM	1	520	556	1	34	6	1	3	51	15	1	0	6	1195
3:15 PM	1	478	497	3	28	8	3	3	52	11	0	0	6	1090
3:30 PM	2	522	554	5	38	9	1	1	57	11	0	0	3	1203
3:45 PM	0	566	563	1	26	10	0	2	47	12	0	1	2	1230
4:00 PM	0	524	529	1	32	7	0	2	46	7	0	0	1	1149
4:15 PM	3	471	625	1	23	5	2	3	23	12	0	0	5	1173
4:30 PM	2	552	616	2	25	3	0	3	36	7	0	0	3	1249
4:45 PM	1	561	534	1	34	6	0	1	45	10	0	1	2	1196
5:00 PM	1	565	531	2	22	3	0	3	47	12	0	0	3	1189
5:15 PM	1	522	532	2	17	3	0	4	42	3	0	0	1	1127
5:30 PM	0	497	523	1	25	2	0	0	46	7	0	0	3	1104
5:45 PM	2	507	551	2	21	5	0	2	44	8	0	0	4	1146
6:00 PM	4	419	416	2	19	4	0	1	48	7	0	2	3	925
6:15 PM	0	353	365	1	8	1	0	1	37	3	0	0	1	770
6:30 PM	2	376	382	1	15	2	0	0	34	7	0	1	1	821
6:45 PM	0	400	362	5	10	2	0	0	21	10	0	0	1	811
Total	24	9548	10201	41	536	98	9	48	936	218	5	7	60	21731
%	0.11%	43.94%	46.94%	0.19%	2.47%	0.45%	0.04%	0.22%	4.31%	1.00%	0.02%	0.03%	0.28%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

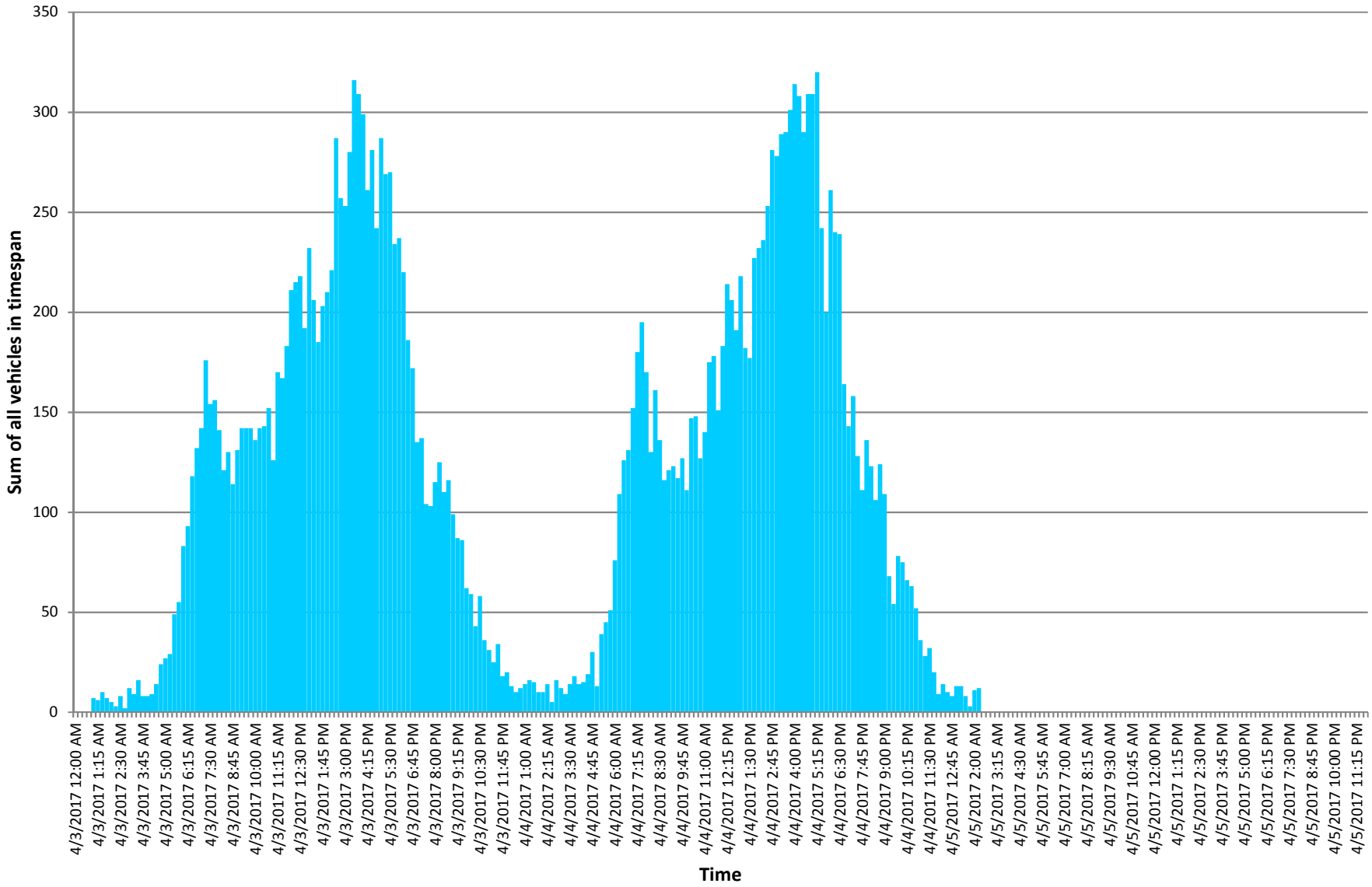
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date Counted: 10/19/17
Location/Intersection: I-5 btwn Miley Rd Exit and Miley Rd Overpass
Direction Counted: Soutbound All Lanes

	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	
	Motorcycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Interval Total
2:00 PM	0	314	510	2	29	7	0	5	60	17	0	0	4	948
2:15 PM	1	350	528	1	23	7	1	2	48	13	0	0	2	976
2:30 PM	0	322	546	2	28	5	1	6	64	15	2	1	4	996
2:45 PM	0	369	547	4	25	5	1	4	41	15	0	0	5	1016
3:00 PM	1	356	501	1	29	8	0	1	49	8	1	1	2	958
3:15 PM	1	401	507	0	27	5	1	4	31	6	0	0	2	985
3:30 PM	2	391	518	3	24	1	0	3	42	11	0	0	7	1002
3:45 PM	0	388	526	3	20	2	0	3	42	7	0	0	4	995
4:00 PM	0	413	568	2	29	1	0	1	33	8	0	0	4	1059
4:15 PM	1	399	538	3	26	3	0	3	25	13	0	3	0	1014
4:30 PM	2	444	542	1	22	5	1	0	30	9	0	0	3	1059
4:45 PM	0	414	504	0	26	2	1	6	43	5	0	0	3	1004
5:00 PM	0	423	487	1	22	2	0	2	42	3	0	2	2	986
5:15 PM	0	491	508	2	22	2	0	3	24	5	0	0	5	1062
5:30 PM	0	437	484	0	30	3	1	2	42	5	0	1	3	1008
5:45 PM	0	448	510	2	25	4	2	1	33	8	0	0	4	1037
6:00 PM	2	424	497	2	40	3	0	4	38	15	0	1	3	1029
6:15 PM	0	415	543	3	26	4	0	3	50	6	0	2	3	1055
6:30 PM	0	362	528	0	24	6	0	4	46	6	0	0	4	980
6:45 PM	0	422	493	3	27	0	0	1	43	5	0	0	2	996
Total	10	7983	10385	35	524	75	9	58	826	180	3	11	66	20165
%	0.05%	39.59%	51.50%	0.17%	2.60%	0.37%	0.04%	0.29%	4.10%	0.89%	0.01%	0.05%	0.33%	
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13	

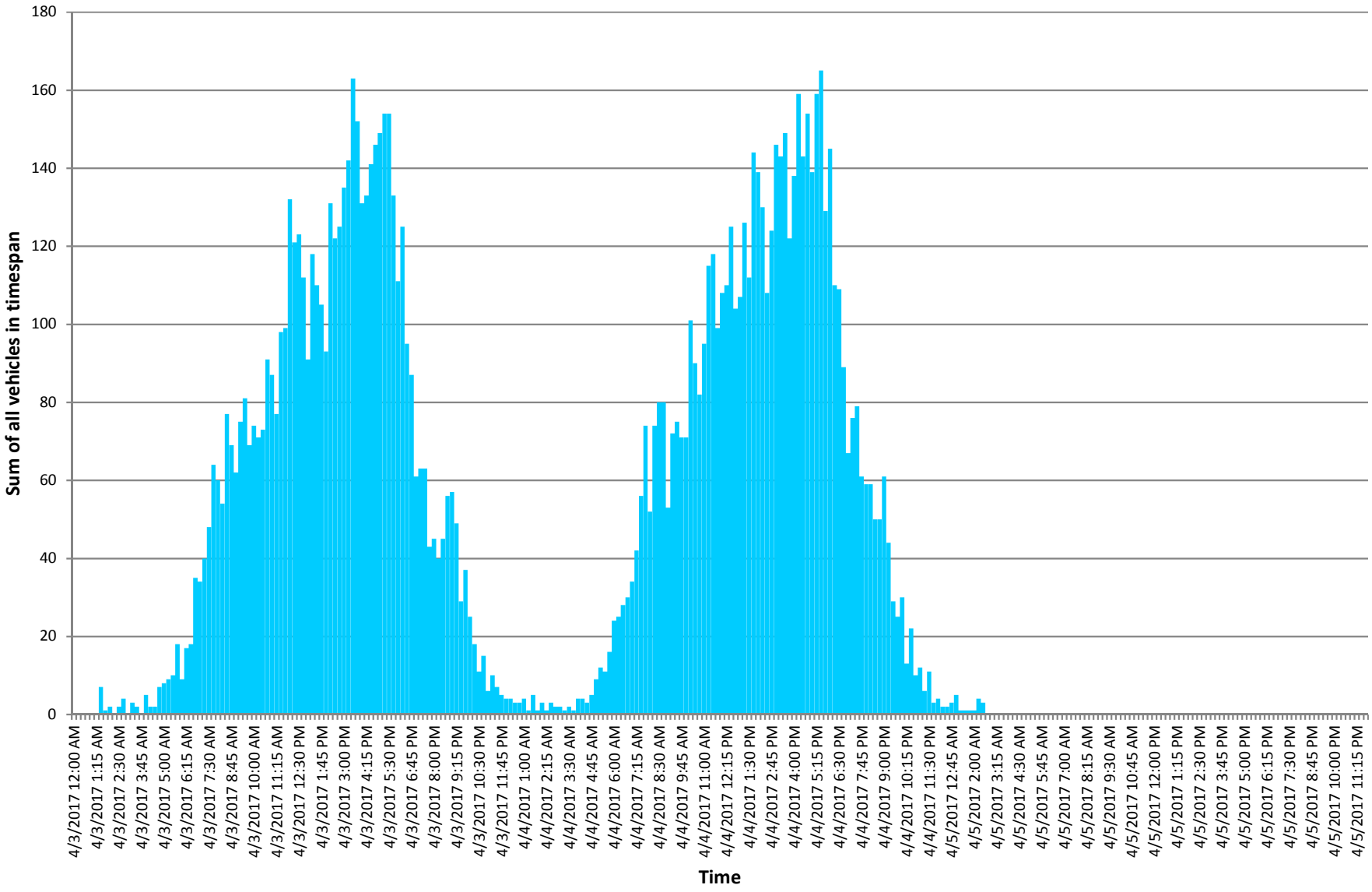
I-5 SB Wlsonville Rd On Ramp

Period: 4/3/2017-4/5/2017 | Grouping: By 15min | Lane / Direction / Flow: Whole Section | Vehicle Type: Vehicles | Axle Group: ALL | Weight Bin: ALL | Q | Data Basis: 15937 [15min] |



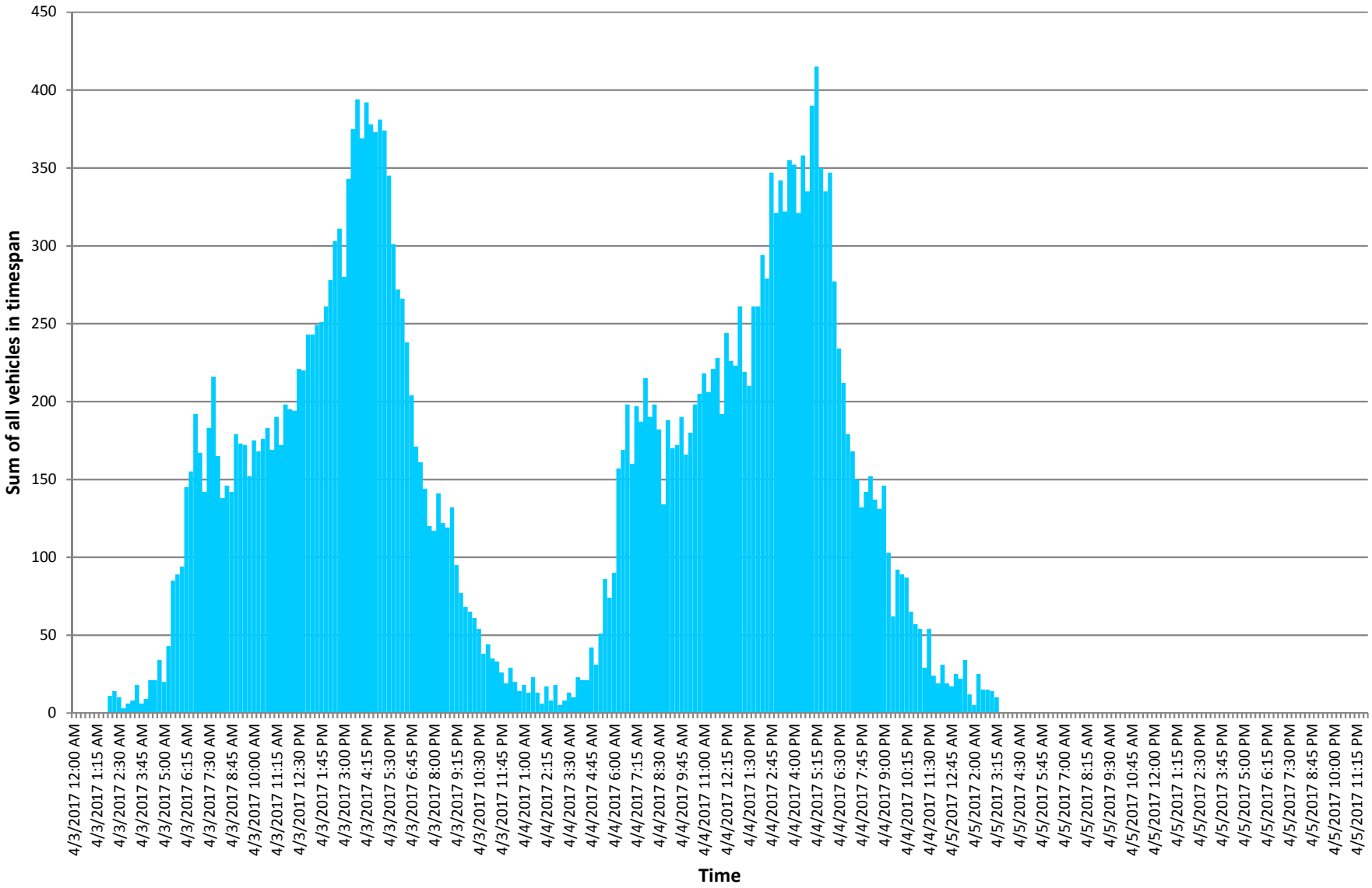
I-5 SB Exit 282B

Period: 4/3/2017-4/5/2017 | Grouping: By 15min | Lane / Direction / Flow: Whole Section | Vehicle Type: Vehicles | Axle Group: ALL | Weight Bin: ALL | Q | Data Basis: 15931 [15min] |



I-5 SB Exit 282A

Period: 4/3/2017-4/5/2017 | Grouping: By 15min | Lane / Direction / Flow: Whole Section | Vehicle Type: Vehicles | Axle Group: ALL | Weight Bin: ALL | Q | Data Basis: 17092 [15min] |



Appendix B

Freeway Segment HCM Reports

HCS7 Freeway Facilities Report

Project Information

Analyst	MDL	Agency	DKS Associates
Jurisdiction	ODOT	Time Period Analyzed	PM Peak 4-5PM
Analysis Year	2017	Date	11/7/2017
Project Description	I-5 SB Wilsonville		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Merge	Merge	Wilsonville Road Merge Segment	1500	3
2	Basic	Basic	I-5 Mainline between 283 to 282B	340	3
3	Diverge	Diverge	Exit 282B Diverge Segment	1500	3
4	Diverge	Diverge	Exit 282A Diverge Segment	1090	3
5	Basic	Basic	I-5 Mainline after 282A	1575	3

Facility Segment Data

Segment 1: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6334	1278	6679	2100	0.95	0.61	53.3	51.3	39.6	36.7	E

Segment 2: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	6282	6784	0.93	54.8	38.2	E

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6282	756	6679	2100	0.94	0.36	58.7	55.7	35.7	35.6	E

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	5557	1736	6679	2100	0.83	0.83	57.3	53.8	32.3	35.2	E

Segment 5: Basic

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period			(pc/h)	(pc/h)	Ratio	(mi/h)	(pc/mi/ln)	
1	0.98	0.999	3892	6784	0.57	63.6	20.4	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	57.3	32.2	32.2	1.2	D

Facility Overall Results

Space Mean Speed, mi/h	57.3	Density, veh/mi/ln	32.2
Average Travel Time, min	1.2	Density, pc/mi/ln	32.2

Appendix C

Intersection HCM Report

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	866	595	548	1015	0	0	0	0	120	1	150
Future Volume (vph)	0	866	595	548	1015	0	0	0	0	120	1	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1583	3400	3505					1665	1670	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1583	3400	3505					1665	1670	2760
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	884	607	559	1036	0	0	0	0	122	1	153
RTOR Reduction (vph)	0	0	399	0	0	0	0	0	0	0	0	109
Lane Group Flow (vph)	0	884	208	559	1036	0	0	0	0	61	62	44
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	3%	3%	3%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	539	850	2214					476	478	790
v/s Ratio Prot		c0.17		c0.16	0.30					0.04	c0.04	0.02
v/s Ratio Perm			0.13									
v/c Ratio		0.51	0.39	0.66	0.47					0.13	0.13	0.06
Uniform Delay, d1		28.9	27.5	37.0	10.6					29.1	29.1	28.5
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		1.1	2.1	4.0	0.7					0.6	0.6	0.0
Delay (s)		30.0	29.6	41.0	11.3					29.6	29.7	28.5
Level of Service		C	C	D	B					C	C	C
Approach Delay (s)		29.8			21.7			0.0			29.0	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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DRAFT MEMORANDUM

DATE:	January 27, 2018
TO:	I-5/Wilsonville Facility Plan Project Management Team
FROM:	Ray Delahanty, AICP Maggie Lin, PhD
SUBJECT:	Future Conditions and Improvement Options FINAL

This memorandum documents future (2040) travel conditions on Interstate 5 (I-5) southbound between the Wilsonville Road interchange (Exit 283) on-ramp and the Charbonneau-Canby/Hubbard interchange (Exits 282B and 282A, respectively) off-ramps. The future conditions described include no-build conditions as well as three improvement concepts that provide a new auxiliary lane between the Wilsonville Road on-ramp and a downstream off-ramp.

Areas of analysis presented in the memorandum include:

- **Forecast traffic volumes:** How did we forecast volumes for future analysis? How many vehicles are forecast to travel on I-5 within the study area in the 2040 PM peak hour?
- **Origins and destinations:** For traffic originating from I-5 or the Wilsonville Road onramp, what percentage of traffic will (a) use Exit 282A, (b) use Exit 282B, or (c) continue south on I-5 towards Salem?
- **Freeway performance:** How well does the freeway operate under no-build conditions and the three auxiliary lane alternatives?
- **Intersection performance:** How is the I-5 southbound/Wilsonville Road ramp terminal intersection forecast to operate in the future, and how does its operation relate to conditions on the southbound ramp?

Key Findings

- All auxiliary lane options perform significantly better than the baseline (no-build) option, with significant improvements in vehicle speed and density on the segment just north of the Wilsonville Road on-ramp.
- Option C, which includes an auxiliary lane from the Wilsonville Road on-ramp to the Canby/Hubbard off-ramp, with an additional option lane at the off-ramp, provides the most benefit throughout the study area.
- Turning movement demand from Wilsonville Road toward the southbound on-ramp is forecast to significantly exceed the 1,200 vehicle-per-hour ramp metering rate, with spillback impacting operations at the intersection regardless of improvement option.

STUDY AREA

The study area for this analysis is shown in Figure 1. It includes I-5 southbound from just north of the Wilsonville Road (Exit 283) on-ramp to just south of the Canby/Hubbard off-ramp (Exit 282A).

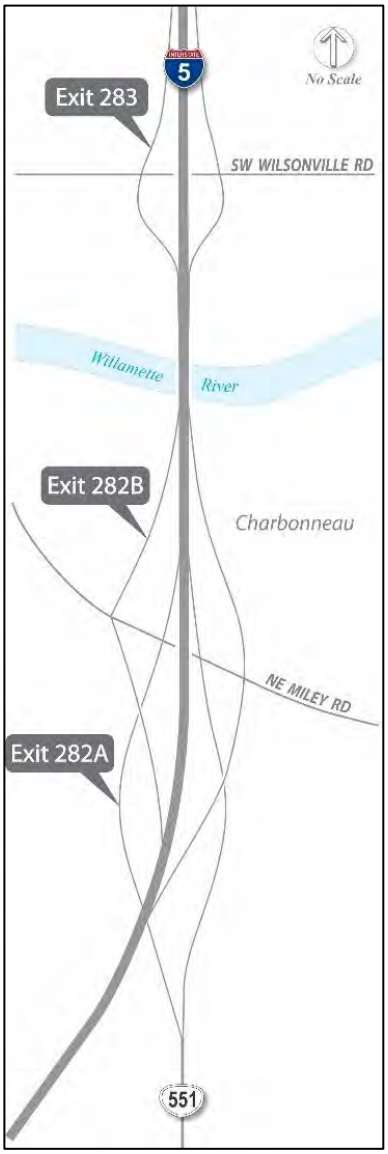

Figure 1: Study Area

TRAFFIC VOLUMES

This section discusses the forecasting process and presents the 2040 PM peak hour volumes that were used to analyze future conditions and alternatives.

Forecasting

We developed year 2040 PM peak hour volumes for the study area to analyze under a future no build scenario as well as three build scenarios. The methodology for forecasting 2040 volumes is described more fully in the project's *Forecasting Methodology* memorandum, which is included in the appendix, but generally included the following steps:

- Year 2017 PM peak hour traffic volumes, developed for this project's existing conditions analysis, were used as a base for the future volumes.
- Year 2010 and Year 2040 traffic volumes were extracted from Metro's regional travel demand model for all links in the study area.
- A 23-year growth increment based on link volume growth between 2010 and 2040 was applied to the Year 2017 traffic volumes.

Accounting for the meter on the Wilsonville Road southbound on-ramp required an adjustment to the forecasting process. Because base year counts show that the meter already operates at capacity of 1,200 vehicles per hour, no growth was added to the on-ramp. Rather, we assessed overall regional patterns in the travel demand model future year and estimated that an additional 300 vehicles in the PM peak period would access I-5 southbound at an upstream interchange instead of experiencing long delays at the Wilsonville Road on-ramp.

Note that the forecast volumes reported in this memo for the I-5 southbound/Wilsonville Road intersection are those in the adopted Wilsonville TSP. These volumes indicate a demand of about 1,700 for the southbound on-ramp. The forecast for this intersection was done using an older version of the regional model, and is not expected to precisely match the volumes forecast for the freeway analysis, which are based on the current regional model.

Forecast Volumes

The forecast PM peak hour traffic volumes for the study area are shown in Figure 2. Traffic across the Boone Bridge southbound is expected to increase 15% between 2017 and 2040, from 6,150 vehicles to 7,055 vehicles in the PM peak hour. All of the growth originates from I-5 southbound upstream, as the Wilsonville Road on-ramp volume is assumed to be capped at the metering rate of 1,200 vehicles per hour.

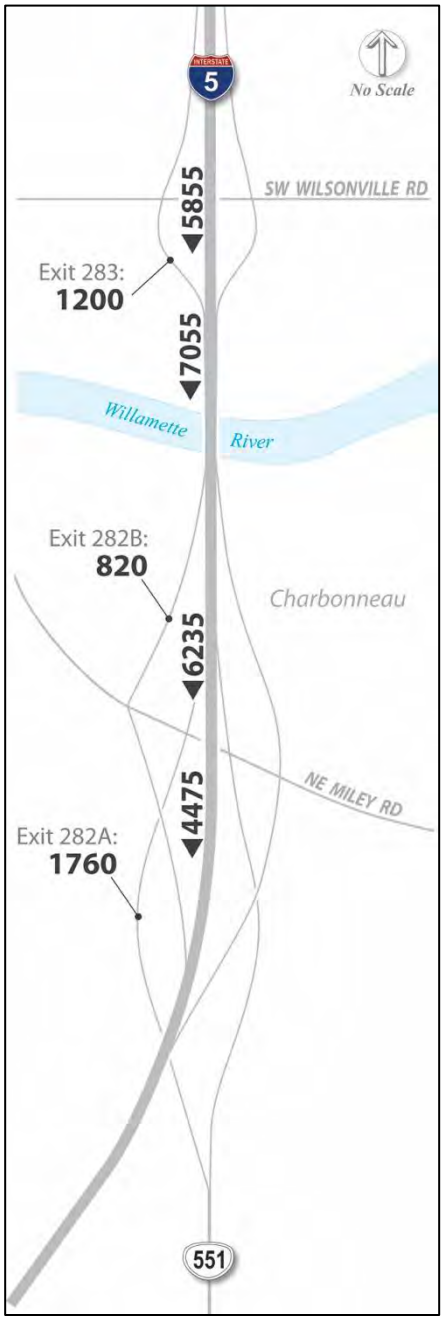

Figure 2: 2040 PM Peak Hour Traffic Volumes

Origin-Destination Patterns

Current origin and destination patterns through the study area were documented in the Existing Conditions memorandum for this project. We used a primary data source, Streetlight, which allows analysis of origins and destinations available GPS data from a sample of the overall personal vehicle and commercial vehicle fleets on the roadway network.

For future conditions analysis, we modified the origin-destination percentages to reflect the relative growth of forecast volumes from the two origins (I-5 southbound and the Exit 283 on-ramp) and the three destinations (I-5 southbound and the two off-ramps at Exits 282A and 282B.

The overall Streetlight origin-destination distributions are illustrated in Figure 3 below. Destinations for the 1,200 vehicles entering at Wilsonville Road are forecast to be proportionally the same as they are under existing conditions, while destinations for traffic originating from I-5 further upstream is assumed to be weighted slightly more towards Exit 282B and I-5 further south towards Salem. Results from the 2040 Metro Model for the 4:00-5:00 PM hour are shown in Figure 4 for comparison.

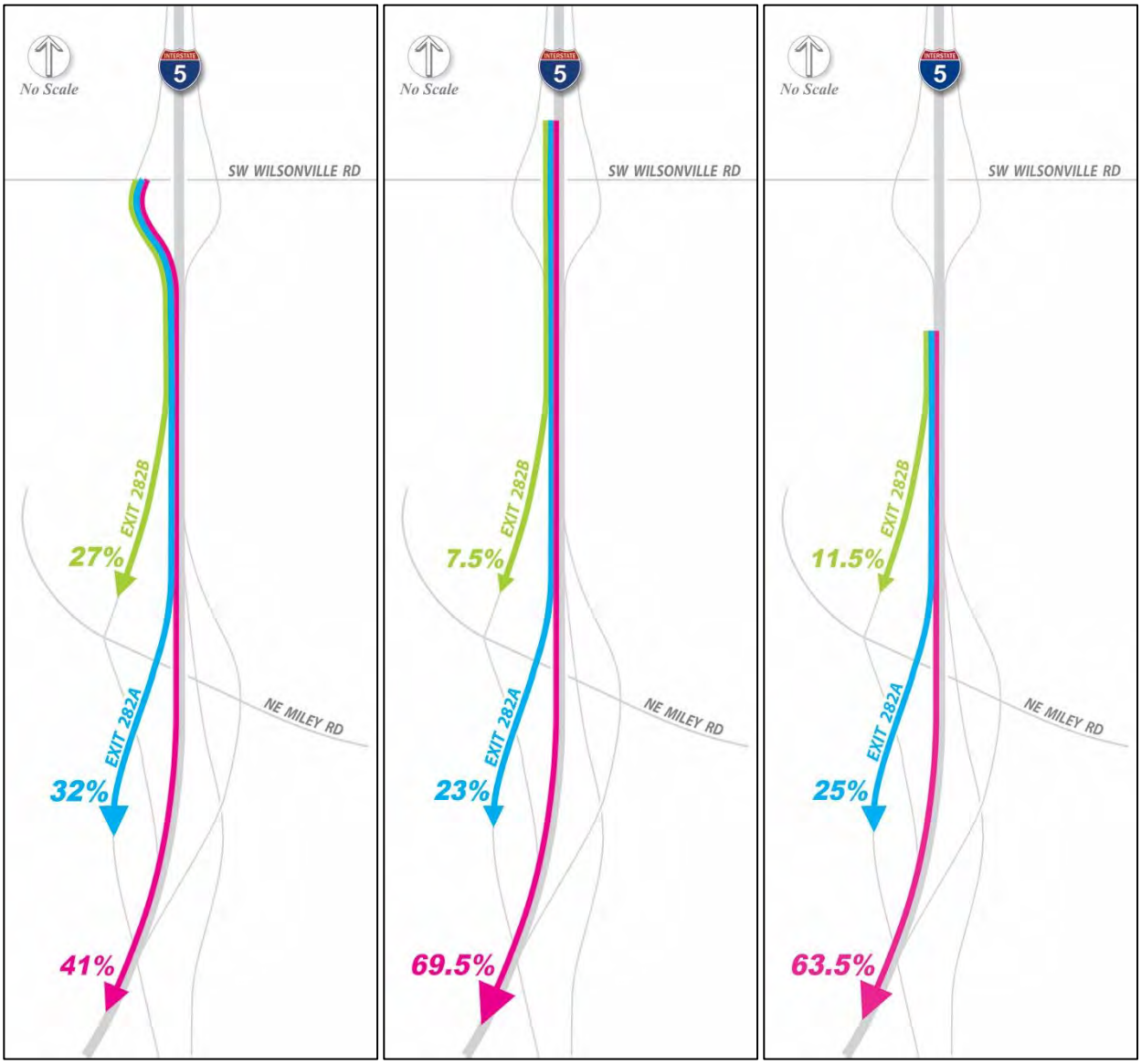

Figure 3: 2040 PM peak hour destinations for traffic originating from Wilsonville Road (left), I-5 north of Wilsonville Road (center), and combined (right). Based on Streetlight data

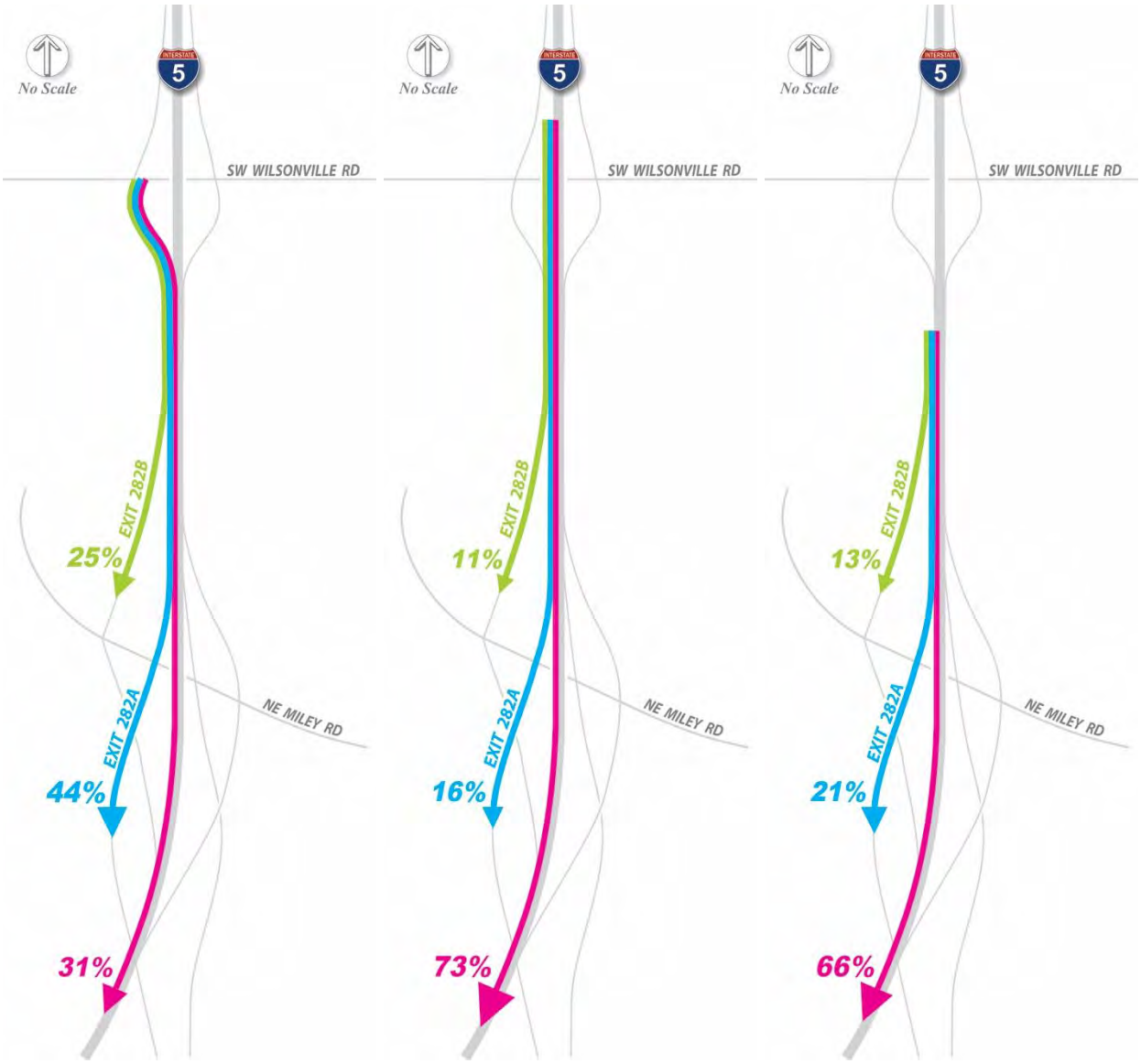

Figure 4: 2040 PM peak hour destinations for traffic originating from Wilsonville Road (left), I-5 north of Wilsonville Road (center), and combined (right). Based on Metro Model 2040 4:00-5:00 PM

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FREEWAY PERFORMANCE

Using the 2040 PM peak hour volume set shown in Figure 2, we performed HCM 2010 analysis on the baseline (no-build) freeway configuration and three alternative lane configurations. Including the alternatives, there are four types of freeway segments in the study area:

- **Basic segments:** Freeway segments that are outside of merge, diverge, or weaving areas.
- **Merge segments:** Segments in which two or more traffic streams combine to form a single traffic stream (e.g., the Wilsonville Road on-ramp merge)
- **Diverge segments:** Segments in which a single traffic stream divides to form two or more separate traffic streams (e.g., the Charbonneau or Canby/Hubbard off-ramp diverges)
- **Weaving segments:** Segments in which two or more traffic streams traveling in the same general direction cross paths along a significant length of freeway without the aid of traffic control devices (except for guide signs)

HCM 2010 analysis uses geometric and volume data to compute a variety of segment-specific and facility-wide performance measures, including:

- **Volume-to-Capacity (v/c) ratio:** The volume of vehicles delivered into a segment divided by the theoretical segment capacity.
- **Vehicle Density:** the number of passenger car equivalents per lane-mile. Higher densities indicate lower speed and more difficulty changing lanes.
- **Average Speed:** The estimated average vehicle speed through the segment during the analysis period.
- **Level of Service:** A letter grade A through F based on multiple criteria, with A indicating free-flow speed and ease of lane changing, and F indicating significantly congested conditions. In this report LOS is usually impacted most by vehicle density.

Performance of individual segments is impacted by how well upstream and downstream segments perform, i.e., the adjacent segments' ability to deliver or accommodate traffic flow.

HCM analysis assumes that segment volumes are evenly distributed across lanes, although existing conditions analysis showed that demand through the study area results in disproportionately high volumes in the right lane. Therefore, the analysis in this report may be underestimating congestion and delay due to merging, weaving, and diverging.

Worksheets for this analysis include more detail on inputs and results, and are included in the appendix to this memorandum.

Baseline 2040 Freeway Analysis

HCM freeway segment analysis results for the no-build condition are shown in Table 1, with the segments and level of service shown in Figure 5. Operations worsen significantly under 2040 conditions compared to existing conditions. All segments south to Exit 282A drop to LOS F (compared to LOS E under existing), and freeway volume-to-capacity ratios exceed 1.0 from the Wilsonville Road on-ramp to the Charbonneau off-ramp.

Note that the merge segment at the Wilsonville Road on-ramp (Segment 2) may not be able to accommodate the 1,200 vehicles allowed by the ramp meter in the PM peak hour, given the overall demand on downstream Segment 3 (over 7,000 vehicles on the Boone Bridge) and lane imbalance toward the right lane, as discussed in existing conditions.

Table 1: HCM Freeway Segment Performance, Baseline (2040 PM Peak Hour)

	Segment	Volume/ Capacity	LOS
1	North of Wilsonville Road On-Ramp (Basic)	0.88	F
2	Wilsonville Road On-Ramp (Merge)	1.09 (Fwy) 0.61 (Ramp)	F
3	Boone Bridge (Basic)	1.06	F
4	Charbonneau Off-Ramp (Diverge)	1.08 (Fwy) 0.42 (Ramp)	F
5	Canby/Hubbard Off-Ramp (Diverge)	0.95 (Fwy) 0.89 (Ramp)	D
6	South of Canby/Hubbard Off-Ramp (Basic)	0.67	B

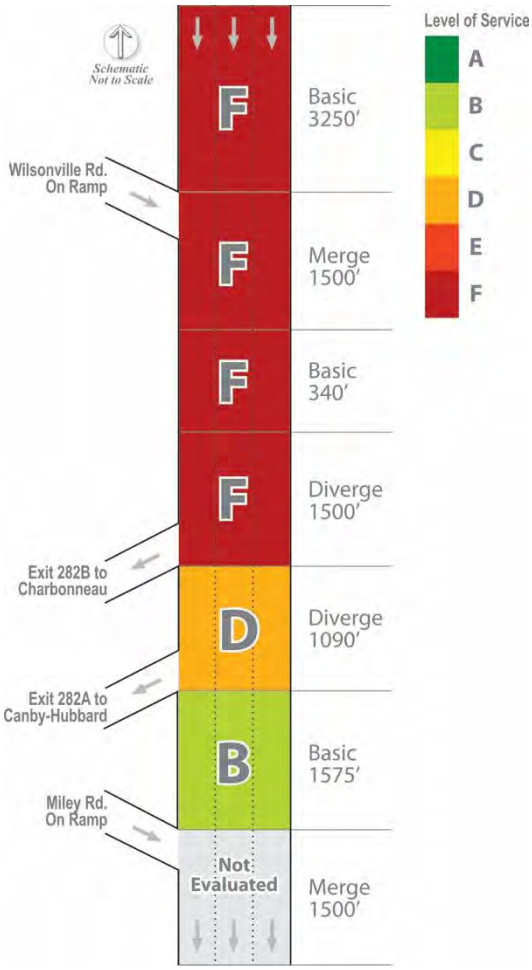

Figure 5: HCM Freeway Segment LOS Results, Baseline (PM Peak Hour)

Build Alternatives

To address the deficiencies identified under existing and future conditions, three alternatives were developed to improve operations through the study area:

- Option A: Auxiliary lane connecting the Exit 283 Wilsonville Road on-ramp to the Exit 282B Charbonneau off-ramp
- Option B: Auxiliary lane connecting the Exit 283 Wilsonville Road on-ramp to the Exit 282A Canby/Hubbard off-ramp
- Option B: Auxiliary lane connecting the Exit 283 Wilsonville Road on-ramp to the Exit 282A Canby/Hubbard off-ramp with an option lane

The alternatives are shown in Figure 6 below.

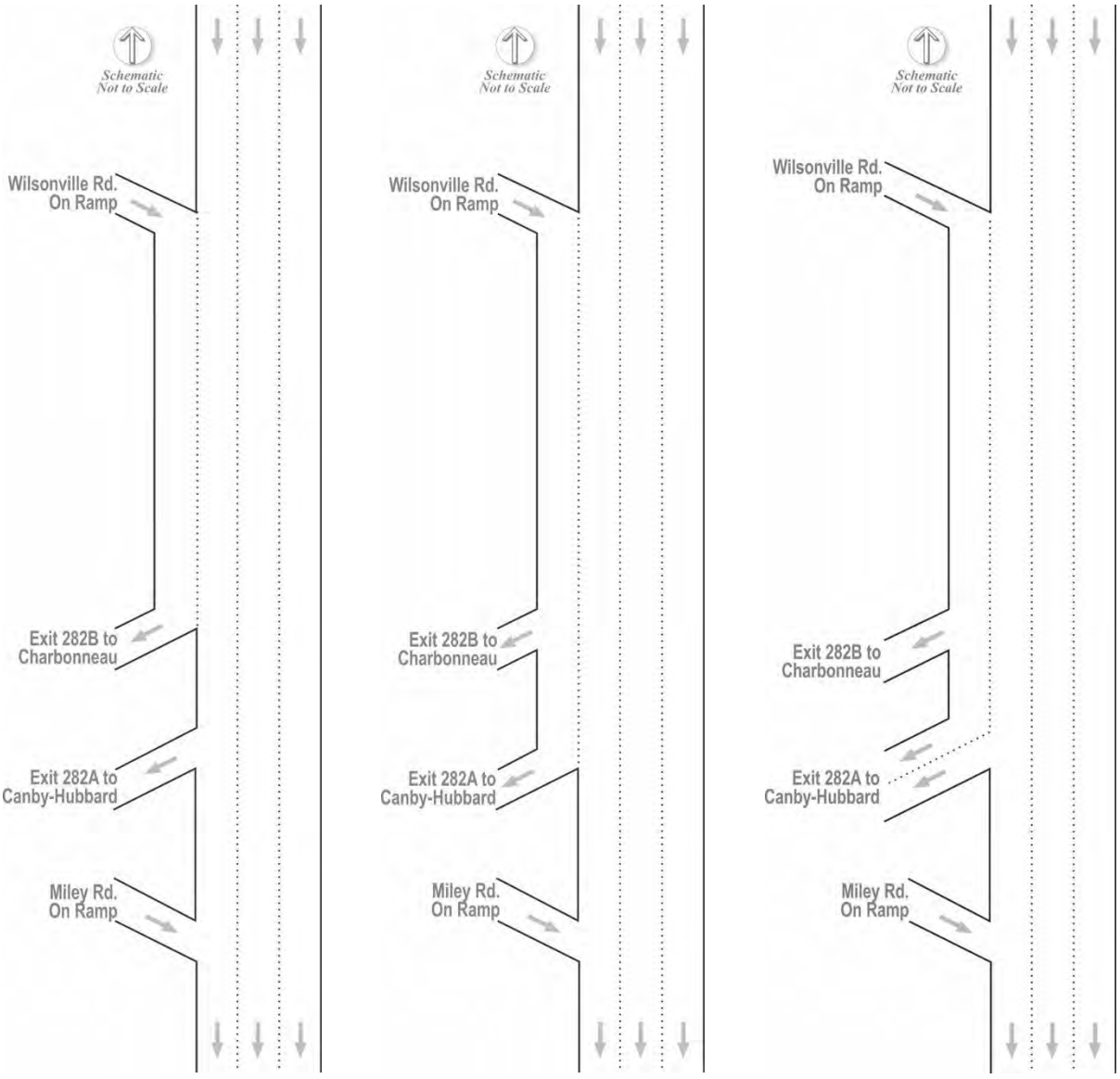

Figure 6: Improvement Options A (left), B (center), and C (right)

Option A 2040 Freeway Analysis

HCM freeway segment analysis results for Option A are shown in Table 2, with the segments and level of service shown in Figure 7. For analysis purposes, the merge, basic, and diverge segments from the Wilsonville Road on-ramp to the Charbonneau off-ramp are converted into a single weaving segment (segment 2 in the table below). Weaving segment analysis accounts for the proportion of traffic from the mainline and the on-ramp, respectively, that need to make a lane change.

Results show that the Option A auxiliary lane to Exit 282B improves conditions at the most problematic locations in the study area. All segments now operate at LOS E or better and a v/c ratio of 0.95 or better. Segment 1, upstream of the Wilsonville on-ramp, benefits the most, with the HCM analysis estimating significantly lower vehicle densities and higher speeds. The upstream improvements allow higher vehicle flow into Segment 4, south of the two off-ramps, causing an increase in vehicle density and change in LOS from B to C.

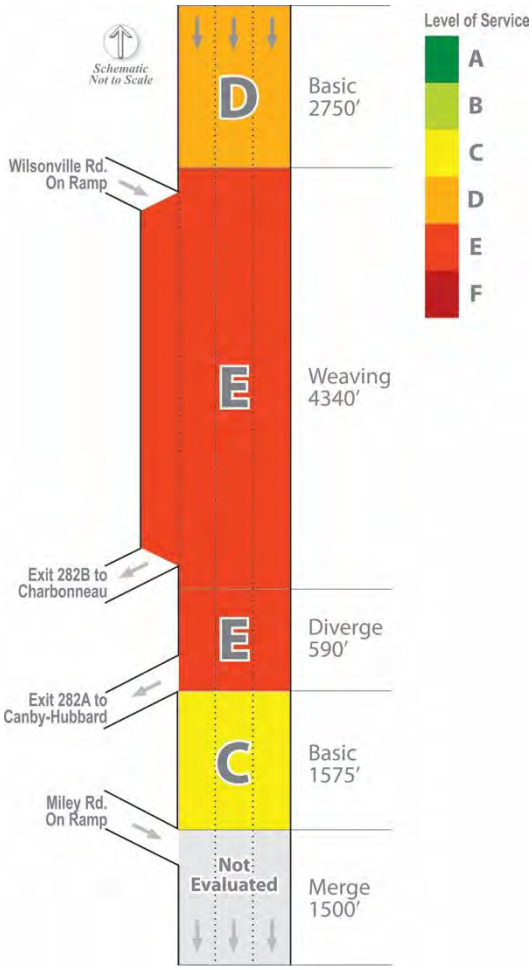

Figure 7: HCM Freeway Segment LOS Results, Option A (PM Peak Hour)

Table 2: HCM Freeway Segment Performance, Option A (2040 PM Peak Hour)

	Segment	Volume/ Capacity	LOS
1	North of Wilsonville Road On-Ramp (Basic)	0.88	D
2	Wilsonville Road On-Ramp to Charbonneau Off-Ramp (Weave)	0.86	E
3	Canby/Hubbard Off-Ramp (Diverge)	0.95 (Fwy) 0.89 (Ramp)	E
4	South of Canby/Hubbard Off-Ramp (Basic)	0.67	C

Option B 2040 Freeway Analysis

HCM freeway segment analysis results for Option B are shown in Table 3, with the segments and level of service shown in Figure 8. The analysis performed for Option B was similar to that for Option A, with the segment from the Wilsonville Road on-ramp to the Charbonneau off-ramp treated as a weave, and the next segment downstream to the Canby-Hubbard off-ramp treated as a diverge with a wider cross-section.

Results show that the Option B auxiliary lane to Exit 282A improves conditions further on segment 3, from the Charbonneau off-ramp to the Canby/Hubbard off-ramp. Under Option B, the v/c ratio on the freeway at this location is 0.70, compared to 0.95 under Option A, and the improvement in LOS (from E to C) reflects higher mainline speeds and lower vehicle density.

Table 3: HCM Freeway Segment Performance, Option B (2040 PM Peak Hour)

	Segment	Volume/ Capacity	LOS
1	North of Wilsonville Road On-Ramp (Basic)	0.88	D
2	Wilsonville Road On-Ramp to Charbonneau Off-Ramp (Weave)	0.86	E
3	Canby/Hubbard Off-Ramp (Diverge)	0.70 (Fwy) 0.89 (Ramp)	C
4	South of Canby/Hubbard Off-Ramp (Basic)	0.67	C

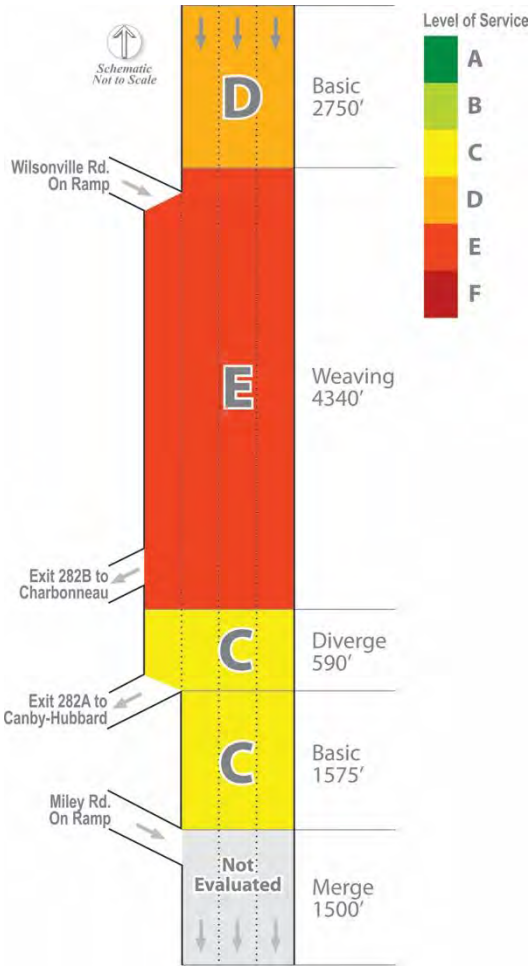

Figure 8: HCM Freeway Segment LOS Results, Option B (PM Peak Hour)

Option C 2040 Freeway Analysis

HCM freeway segment analysis results for Option C are shown in Table 4, with the segments and level of service shown in Figure 9. The analysis performed for Option C was similar to that for Option B, with the segment from the Wilsonville Road on-ramp to the Charbonneau off-ramp treated as a weave, and the next segment downstream to the Canby-Hubbard off-ramp treated as a diverge with a wider cross-section as well as additional ramp capacity due to the option lane. This option would require some widening of the Exit 282A off-ramp to accommodate a second lane.

Results show that the Option C auxiliary lane to Exit 282A with option lane improves conditions further compared to Options A and B on segment 3. Under Option C, the v/c ratio on the ramp at this location is 0.45, compared to 0.89 under Option B.

Table 4: HCM Freeway Segment Performance, Option B (2040 PM Peak Hour)

	Segment	Volume/ Capacity	LOS
1	North of Wilsonville Road On-Ramp (Basic)	0.88	D
2	Wilsonville Road On-Ramp to Charbonneau Off-Ramp (Weave)	0.86	E
3	Canby/Hubbard Off-Ramp (Diverge)	0.70 (Fwy) 0.45 (Ramp)	C
4	South of Canby/Hubbard Off-Ramp (Basic)	0.67	C

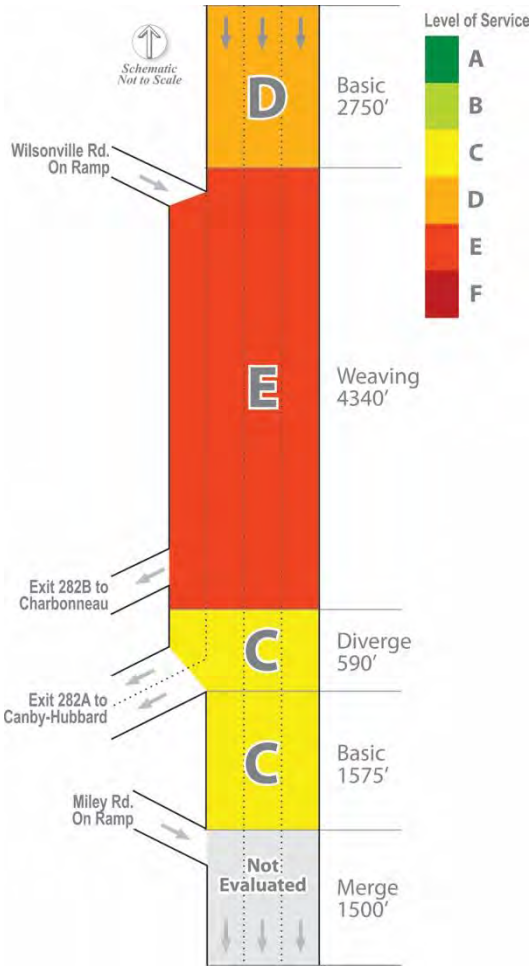

Figure 9: HCM Freeway Segment LOS Results, Option C (PM Peak Hour)

Additional Analysis of Options B and C

For Options B and C, treating the auxiliary lane section between the Charbonneau off-ramp and the Canby/Hubbard off-ramp as a diverge section rather than a weaving section may not capture the full picture of operations through the study area. However, HCM 2010 methodology does not provide a recommended approach for analyzing a long auxiliary lane, such as Wilsonville Road to Canby/Hubbard, with an intermediate off-ramp (Charbonneau).

To get another view of operations, we performed an additional HCM analysis approach on the segment using a weaving analysis that omitted the Exit 282B ramp and volumes, treating the Wilsonville Road to Canby/Hubbard auxiliary lane as a single weaving segment. The additional simplified weaving analysis helps to describe more fully the value of the additional off-ramp lane at Exit 282A. Results are shown in Figure 10 and Table 5, which shows additional performance measures from the weaving analysis.

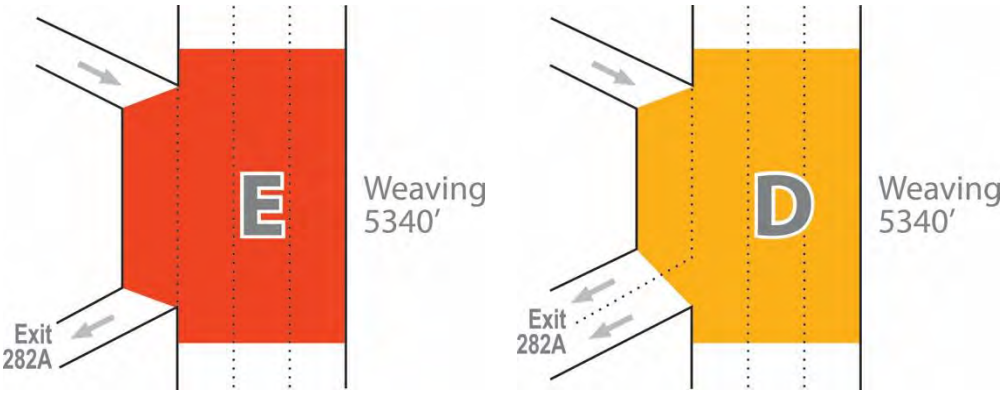

Figure 10: HCM weaving analysis results for Option B (left) and Option C (right), PM peak hour

Table 5: Comparison of simplified HCM weaving analysis for Options B and C (PM peak hour)

Performance Measure	Option B	Option C
Average Speed	44 mph	52 mph
Vehicle Density (passenger cars per mile per lane)	36.7	30.9
Level of Service (LOS)	E	D

The two-lane off-ramp in Option C helps promote lower vehicle densities (and improved LOS), since not all vehicles exiting at Exit 282A must use the auxiliary lane as in Option B. The improvement in density is intuitive, as the 1,760 exiting vehicles in a single lane would be higher than the average of about 1,500 vehicles per lane (4,475 vehicles across three lanes) continuing southbound.

Comparison of Options

HCM analysis provides outputs across a variety of performance measures, helping to estimate vehicle density and average speed through a freeway facility study area. A summary of how the bassline and three improvement options performed is shown in Table 6.

Table 6: Summary of HCM 2010 Freeway Analysis Results for PM Peak Hour

Performance Measure	Baseline (No Build)	Option A	Option B	Option C
Highest v/c ratio	1.09	0.95	0.89	0.88
Highest Vehicle Density (passenger cars per mile per lane)	79.3	40.2	40.2 *(36.7)*	40.2 *(35.0)*
Worst Level of Service (LOS)	F	E	E *(E)*	E *(D)*
Worst Speed through Analysis Area	22 mph	45 mph	45 mph *(44 mph)*	45 mph *(52 mph)*

Results from simplified weaving analysis shown in (*italics and parentheses*).
Best performing option for each measure shown in gray.

Option C, which constructs an auxiliary from the Wilsonville Road on-ramp to the Canby/Hubbard off-ramp, with two exit lanes, performs the best across all measures. The following are key findings for each scenario:

- The baseline option performs worst upstream of the Wilsonville Road on-ramp merge, where vehicle density is estimated to be nearly 80 passenger cars per mile per lane (pcpmpl), well over the 45-car threshold for LOS F, and speed is estimated at about 22 mph.
- Option A is a significant improvement, with the new auxiliary lane significantly lowering upstream density and improving speed in Segment 1 to 57 mph. The diverge segment at the Canby/Hubbard exit becomes the worst-performing location in terms of v/c ratio (0.95).
- Option B improves on Option A by extending the auxiliary lane, lowering the freeway mainline v/c ratio at the Canby/Hubbard off-ramp to 0.70.
- Option C improves on Option B by providing a second off-ramp lane at Canby/Hubbard, thereby helping to balance lane utilization and improve density and speed through the segment.

Potential Safety Benefits

Existing conditions crash analysis showed that southbound I-5 around the Wilsonville Road on-ramp experiences higher than average crash rates, with a particularly high number of rear-end crashes. Forecasting future crash activity is beyond the scope of this study. With the increased congestion forecast for no-build conditions in this memo, the frequency of rear-end and sideswipe collisions would be expected to rise, as congestion worsens in the peak hour and continues to spread to other hours of the day.

While the benefits of every freeway improvement vary by context, research has shown that auxiliary lanes tend to provide safety benefits by reducing conflicts at merge points. An auxiliary lane can reduce overall crashes in a merge-diverge area by 20% overall, and up to 24% for multiple vehicle crashes and fatal plus injury crashes.[1]

[1] National Cooperative Highway Research Program Report 687, *Determining Guidelines for Ramp and Interchange Spacing,* 2011.

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INTERSECTION PERFORMANCE

We reviewed performance of the I-5 Southbound/Wilsonville Road ramp terminal intersection based on recent analysis in the Wilsonville Transportation System Plan Update. The forecasting and intersection analysis had been updated with new base year counts in 2017. Results are shown in Table 7, below.

Table 7: Intersection Operations, PM Peak Hour

Intersection	Average Delay	LOS	V/C
I-5 Southbound/Wilsonville Road	47 sec.	D	0.90

The intersection operations shown in Table 5 represent operations based on traffic counts and forecasting using the regional travel demand model. The traffic counts from the base year may not represent full demand, so the intersection analysis does not account for delay and queuing back from the I-5 mainline from incidents on I-5, and from the signal meter on the I-5 southbound ramp that regulates the flow of traffic onto I-5.

The capacity of this ramp meter is assumed to continue to be 1,200 vehicles per hour for the 2040 analysis. If the peak hour demand of the southbound on-ramp exceeds 1,200 vehicles, additional storage would be necessary to prevent spillback and associated impacts on SW Wilsonville Road. Forecast turning movement demand for this intersection indicates PM peak hour volumes of 1,720, meaning that 520 more vehicles will be attempting to enter the on-ramp during the peak hour than will be metered onto the freeway. Given this excess demand in the peak hour, it is likely that there will be excess demand in shoulder hours (e.g., 5:00-6:00 PM) as well.

For planning purposes, average space needed for vehicles in storage lanes is assumed to be 25 feet. This means that in the PM peak hour, a minimum of 13,000 lane-feet would be needed to prevent queuing from spilling back to the I-5 southbound/Wilsonville Road intersection and impacting operations there. With planned ramp improvements, storage between the ramp meter and the ramp terminal intersection may increase to about 3,000 lane-feet, accommodating about 120 vehicles. The additional demand would either queue back along Wilsonville Road from the ramp terminal intersection, or seek alternate routes or times.

When traffic incidents occur on I-5 and I-205, additional regional traffic may use surface streets to access I-5 southbound at Wilsonville Road, causing on-ramp demand to even further exceed the 1,200-vehicle meter rate. When this occurs, the southbound on-ramp queues back to Wilsonville Road and the I-5 Southbound/Wilsonville Road ramp terminal intersection is significantly impacted, with vehicles experiencing traffic delays similar to level of service “F” (greater than 80 seconds of delay).

Appendix A

Freeway Segment HCM Reports

HCS7 Freeway Facilities Report

Project Information

Analyst	MDL	Agency	DKS Associates
Jurisdiction	ODOT	Time Period Analyzed	PM Peak 4-5PM
Analysis Year	2040	Date	
Project Description	I-5 SB Wilsonville		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	6
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Before 283	3250	3
2	Merge	Merge	Wilsonville Road Merge Segment	1500	3
3	Basic	Basic	Mainline between 283 to 282B	340	3
4	Diverge	Diverge	Exit 282B Diverge Segment	1500	3
5	Diverge	Diverge	Exit 282A Diverge Segment	1090	3
6	Basic	Basic	Mainline after 282A	1575	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	5180	6784	0.88	21.8	79.3	F

Segment 2: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6219	1278	6679	2100	1.09	0.61	53.6	51.7	38.7	36.2	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	6219	6784	1.06	58.7	35.3	F

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6219	873	6679	2100	1.08	0.42	58.6	55.5	35.4	35.5	F

Segment 5: Diverge

Time	PHF	fHV	Flow Rate	Capacity	d/c	Speed	Density	LOS

Period					(pc/h)		(pc/h)		Ratio		(mi/h)		(pc/mi/ln)		
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	5346	1874	6679	2100	0.95	0.89	57.0	53.5	31.3	34.8	D

Segment 6: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	3472	6784	0.67	62.8	17.8	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	36.3	47.9	47.8	2.9	F

Facility Overall Results

Space Mean Speed, mi/h	36.3	Density, veh/mi/ln	47.8
Average Travel Time, min	2.9	Density, pc/mi/ln	47.9

HCS7 Freeway Facilities Report

Project Information

Analyst	MDL	Agency	DKS Associates
Jurisdiction	ODOT	Time Period Analyzed	PM Peak 4-5PM
Analysis Year	2040	Date	
Project Description	I-5 SB Wilsonville		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	4
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Before 283	2750	3
2	Weaving	Weaving	Wilsonville Road to Exit 282B	4340	4
3	Diverge	Diverge	Exit 282A Diverge Segment	590	3
4	Basic	Basic	Mainline after 282A	1575	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	5980	6784	0.88	57.0	35.0	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	7258	8456	0.86	45.3	40.2	E

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6369	1874	6679	2100	0.95	0.89	57.0	53.5	37.2	38.6	E

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	4571	6784	0.67	63.2	24.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	50.9	36.3	35.9	2.1	E

Facility Overall Results

Space Mean Speed, mi/h	50.9	Density, veh/mi/ln	35.9
Average Travel Time, min	2.1	Density, pc/mi/ln	36.3

HCS7 Freeway Facilities Report

Project Information

Analyst	MDL	Agency	DKS Associates
Jurisdiction	ODOT	Time Period Analyzed	PM Peak 4-5PM
Analysis Year	2040	Date	
Project Description	I-5 SB Wilsonville		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	4
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Before 283	2750	3
2	Weaving	Weaving	Wilsonville Road to Exit 282B	4340	4
3	Diverge	Basic	Exit 282A Diverge Segment	590	4
4	Basic	Basic	Mainline after 282A	1575	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	5980	6784	0.88	57.0	35.0	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	7258	8456	0.86	45.3	40.2	E

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6369	1874	9045	2100	0.70	0.89	62.7	-	25.4	-	C

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	4571	6784	0.67	63.2	24.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.1	35.5	35.1	2.1	E

Facility Overall Results

Space Mean Speed, mi/h	51.1	Density, veh/mi/ln	35.1
Average Travel Time, min	2.1	Density, pc/mi/ln	35.5

HCS7 Freeway Facilities Report

Project Information

Analyst	MDL	Agency	DKS Associates
Jurisdiction	ODOT	Time Period Analyzed	PM Peak 4-5PM
Analysis Year	2040	Date	
Project Description	I-5 SB Wilsonville		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	4
Total Time Periods	1	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	Mainline Before 283	2750	3
2	Weaving	Weaving	Wilsonville Road to Exit 282B	4340	4
3	Diverge	Basic	Exit 282A Diverge Segment	590	4
4	Basic	Basic	Mainline after 282A	1575	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	5980	6784	0.88	57.0	35.0	D

Segment 2: Weaving

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	7258	8456	0.86	45.3	40.2	E

Segment 3: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.98	0.94	0.999	0.999	6369	1874	9045	4200	0.70	0.45	62.7	-	25.4	-	C

Segment 4: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.98	0.999	4571	6784	0.67	63.2	24.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	51.1	35.5	35.1	2.1	E

Facility Overall Results

Space Mean Speed, mi/h	51.1	Density, veh/mi/ln	35.1
Average Travel Time, min	2.1	Density, pc/mi/ln	35.5

HCS7 Freeway Weaving Report

Project Information

Analyst		Date	1/3/2018
Agency		Analysis Year	2018
Jurisdiction		Time Period Analyzed	
Project Description			

Geometric Data

Number of Lanes (N), ln	4	Segment Type	Freeway
Short Length (L_s), ft	3435	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	3.00	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	0.968
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Volume (V_i), veh/h	3975	500	380	1380
Peak Hour Factor (PHF)	0.98	0.94	0.94	0.94
Total Trucks, %	0.09	0.06	0.06	0.06
Heavy Vehicle Adjustment Factor (f_{HV})	0.999	0.999	0.999	0.999
Flow Rate (v_i), pc/h	4060	532	405	1470

Weaving Flow Rate (v_w), pc/h	2002	Freeway Max Capacity (c_{IFL}), pc/h/ln	2336
Non-Weaving Flow Rate (v_{NW}), pc/h	4465	Density-Based Capacity (c_{IWL}), pc/h/ln	2163
Total Flow Rate (v), pc/h	6467	Demand Flow-Based Capacity (c_{IW}), pc/h	7742
Volume Ratio (VR)	0.310	Weaving Segment Capacity (c_W), veh/h	7734
Minimum Lane Change Rate (LC_{MIN}), lc/h	2002	Adjusted Weaving Area Capacity (c_{wa}), veh/h	7487
Maximum Weaving Length (L_{MAX}), ft	5691	Volume-to-Capacity Ratio (v/c)	0.86

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	4601	Average Weaving Speed (S_W), mi/h	51.3
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	2685	Average Non-Weaving Speed (S_{NW}), mi/h	41.4
Weaving Lane Change Rate (LC_W), lc/h	3061	Average Speed (S), mi/h	44.0
Total Lane Change Rate (LC_{All}), lc/h	5746	Density (D), pc/mi/ln	36.7
Weaving Intensity Factor (W)	0.339	Level of Service (LOS)	E

HCS7 Freeway Weaving Report

Project Information

Analyst		Date	1/3/2018
Agency		Analysis Year	2018
Jurisdiction		Time Period Analyzed	
Project Description			

Geometric Data

Number of Lanes (N), ln	4	Segment Type	Freeway
Short Length (L_s), ft	3435	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	0
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	3.00	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	0.968
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Volume (V_i), veh/h	3975	500	380	1380
Peak Hour Factor (PHF)	0.98	0.94	0.94	0.94
Total Trucks, %	0.09	0.06	0.06	0.06
Heavy Vehicle Adjustment Factor (f_{HV})	0.999	0.999	0.999	0.999
Flow Rate (v_i), pc/h	4060	532	405	1470

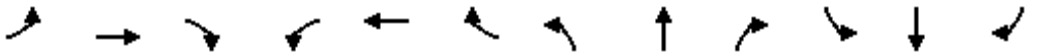
Weaving Flow Rate (v_w), pc/h	2002	Freeway Max Capacity (c_{IFL}), pc/h/ln	2336
Non-Weaving Flow Rate (v_{NW}), pc/h	4465	Density-Based Capacity (c_{IWL}), pc/h/ln	2163
Total Flow Rate (v), pc/h	6467	Demand Flow-Based Capacity (c_{IW}), pc/h	7742
Volume Ratio (VR)	0.310	Weaving Segment Capacity (c_W), veh/h	7734
Minimum Lane Change Rate (LC_{MIN}), lc/h	532	Adjusted Weaving Area Capacity (c_{wa}), veh/h	7487
Maximum Weaving Length (L_{MAX}), ft	5691	Volume-to-Capacity Ratio (v/c)	0.86

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	4601	Average Weaving Speed (S_W), mi/h	53.3
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	2685	Average Non-Weaving Speed (S_{NW}), mi/h	52.0
Weaving Lane Change Rate (LC_W), lc/h	1591	Average Speed (S), mi/h	52.4
Total Lane Change Rate (LC_{All}), lc/h	4276	Density (D), pc/mi/ln	30.9
Weaving Intensity Factor (W)	0.269	Level of Service (LOS)	D

Appendix B

Intersection HCM Report



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰↰	↑↑					↰	↰	↱↱
Traffic Volume (vph)	0	1120	970	750	1050	0	0	0	0	450	0	650
Future Volume (vph)	0	1120	970	750	1050	0	0	0	0	450	0	650
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91	1.00	0.97	0.95					0.95	0.95	0.88
Frpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		5085	1583	3400	3505					1665	1665	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		5085	1583	3400	3505					1665	1665	2760
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1143	990	765	1071	0	0	0	0	459	0	663
RTOR Reduction (vph)	0	0	389	0	0	0	0	0	0	0	0	146
Lane Group Flow (vph)	0	1143	601	765	1071	0	0	0	0	229	230	517
Confl. Bikes (#/hr)						3						1
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	3%	3%	3%
Turn Type		NA	Perm	Prot	NA					Split	NA	custom
Protected Phases		2		1	6					7	7	4
Permitted Phases			2									
Actuated Green, G (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Effective Green, g (s)		37.5	37.5	27.5	69.5					31.5	31.5	31.5
Actuated g/C Ratio		0.34	0.34	0.25	0.63					0.29	0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		4.9	4.9	2.3	4.9					2.3	2.3	2.3
Lane Grp Cap (vph)		1733	539	850	2214					476	476	790
v/s Ratio Prot		0.22		c0.23	0.31					0.14	0.14	c0.19
v/s Ratio Perm			c0.38									
v/c Ratio		0.66	1.12	0.90	0.48					0.48	0.48	0.65
Uniform Delay, d1		30.8	36.2	39.9	10.7					32.5	32.5	34.5
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		2.0	74.4	14.4	0.8					3.5	3.5	1.7
Delay (s)		32.8	110.7	54.4	11.5					35.9	36.0	36.1
Level of Service		C	F	D	B					D	D	D
Approach Delay (s)		68.9			29.4			0.0			36.1	
Approach LOS		E			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

I-5 Wilsonville Facility Plan

Appendix B

Synthesis of Public Input

Timeline of public and stakeholder involvement activities.

During the planning process, the Facility Plan project team shared project information at the following meetings, presentations, and online comment opportunities.

November 2017

- Wilsonville Planning Commission — 11/8

January 2018

- Wilsonville City Council — 1/4

February 2018

- Wilsonville Planning Commission — 2/14
- Wilsonville Chamber of Commerce — 2/16

March 2018

- Wilsonville Rotary Club — 3/1
- Charbonneau Homeowners Association — 3/6
- Open house (Wilsonville City Hall) — 3/14
- Wilsonville Planning Commission — 3/14
- Online open house and online survey #1 — 3/14 through 3/28

April 2018

- Washington County Coordinating Committee Transportation Advisory Committee — 4/5
- Oregon Freight Advisory Committee — 4/11
- Wilsonville Planning Commission Public Hearing — 4/11
- 45-day public comment period on draft plan and online survey #2— 4/11 through 5/29
- Washington County Coordinating Committee — 4/16
- ODOT Region 1 Mobility Advisory Committee — 4/17
- Clackamas County Coordinating Committee Metro Subcommittee — 4/18
- French Prairie Forum — 4/18

May 2018

- Metro Joint Meeting of the Transportation Policy Advisory Committee and the Metro Technical Advisory Committee — 5/2
- 30-day State Agency Coordination response period — 5/4 through 6/4

June 2018

- Wilsonville City Council Public Hearing — 6/4

In addition to these involvement activities, the project team used the following information tools to distribute project information:

- Southbound I-5 Boone Bridge Congestion Study Website— launched December 2017 and updated regularly
- Project update e-flyers and e-blasts — six notifications linked to project milestones, December 2017 through June 2018
- News releases — coordinated with e-flyers/e-blasts, sent to the Wilsonville Spokesman and The Oregonian
- Boones Ferry Messenger — monthly updates beginning December 2017

Synthesis of public input.

The majority of the feedback received during the public involvement process affirmed that the project team has correctly identified the transportation problems in the study area, that the recommended operational concept was appropriate, and that ODOT should invest in building the auxiliary lane improvement as part of the seismic rehabilitation of the Boone Bridge.

Alongside those general themes, several more specific comments came from partner jurisdictions, stakeholders, and members of the public

- Currently, ODOT predicts funding will be available to construct operational improvements in the 2028-2040 time frame. The City of Wilsonville, several Clackamas and Washington County jurisdictions, freight stakeholders, South Metro Region Area Transit, and many members of the public stated that this was too long to wait for a solution to this

bottleneck. They have encouraged ODOT and the Commission to pursue construction sooner than 2028, and to study interim improvements that can be made in the near term.

- The 2014 Regional Transportation Plan recommends that the I-5 mobility corridor from Tigard to Tualatin be the focus of a broad, multimodal corridor refinement plan, to consider a full range of transportation improvements and demand management options. Metro and many of the region's jurisdictions expressed the continued need for this broader refinement plan.
- Metro, Clackamas County, the City of Wilsonville, and 1000 Friends of Oregon all expressed the need to protect the Clackamas County rural reserves in the study area from urbanizing pressures.

Three work products follow that offer more detail regarding the input received during the planning process.

1. A Questions and Answers Document that responded to questions the project team received during presentations, meetings, and through email or survey responses.
2. A summary for the Online Open House providing themes and individual comments from the March 2018 online open house and survey.
3. A summary for the 45-day public comment period providing themes from the April-May 2018 online survey form used to collect input on the draft plan.

Southbound I-5 Boone Bridge Congestion Study

Questions and Answers

Updated May 18, 2018

What is the timeline for construction?

- Based on revenue forecasts prepared for the 2018 Regional Transportation Plan, resources exist within ODOT's financially-constrained budget for the 2028-2040 period to design and construct a southbound ramp-to-ramp lane serving I-5 southbound from exits 283 to 282A. These resources are expected to be combined with additional funding from the ODOT bridge program to complete the seismic rehabilitation components of the Boone Bridge improvements. Completing the operation and seismic components as one project will allow ODOT to achieve economies of scale, reducing total costs.

What are the next steps?

- We are collecting public comment on the draft facility plan through May 29, and the final plan (the "I-5 Wilsonville Facility Plan") will go to the Oregon Transportation Commission for adoption in July. ODOT intends to propose the ramp-to-ramp lane project for the Financially Constrained project list in the 2018 Regional Transportation Plan. The next phase of work, project development, does not yet have assigned funding or a set timeframe.

Could I-5 Southbound be restriped now to include a ramp-to-ramp lane?

- No, the Boone Bridge is too narrow to be restriped for an additional lane. This would result in very narrow shoulders on both sides of the bridge. Very narrow shoulders on freeway increase the likelihood of fatal and severe crashes and make it more difficult for emergency responders to reach locations where incidents occur.

Will the project include bike/ped facilities?

- This study focuses on motor vehicle operations (including private vehicles, transit, and freight), as those are the modes directly affected by the bottleneck on I-5. No decisions have been made about bike/ped facilities.

Would a ramp-to-ramp lane affect local roads like Boeckman?

- No, Boeckman is north of the area where a ramp-to-ramp lane is recommended. In general, we do not expect a ramp-to-ramp lane to directly affect local roads. Indirectly, a reduction of I-5 congestion might reduce delays or detours on the local system related to queuing at the Wilsonville Road southbound on-ramp.

Would we need to widen the bridge?

- The study didn't explore bridge design or reconstruction options; it focused on identifying the right operational solution for I-5 southbound. In project development, more detailed engineering will identify what changes to the bridge structure might be needed to accommodate an added ramp-to-ramp lane.

What are the seismic improvements? When?

- The Boone Bridge has already received one seismic retrofit in 1998 to keep the bridge from falling off the piers in the event of a quake. We know the bridge will need more improvements to survive a major quake, but more analysis is needed to determine exactly what that project will be. ODOT does not have a set timeline for when that analysis will be finished or a seismic project will enter construction.

How is this coordinating with French Prairie?

- The French Prairie Bridge project is in project development and design, farther along than this study and plan. ODOT and Wilsonville staffs working on the two projects are coordinating, and the French Prairie Forum receive a presentation on the Southbound I-5 Boone Bridge Congestion Study this spring. We do not expect the two projects to conflict or directly impact each other.

How fast are people exiting at Canby?

- We don't have that data. Since this interchange provides a connection between higher-speed highways, it was designed for 50 mph where the Canby-Hubbard off-ramp departs the freeway, and higher speeds as the ramp crosses under I-5 to join OR-551.

Can we eliminate the Charbonneau exit and make travelers use the Canby-Hubbard exit instead?

- We don't expect this would fix the bottleneck on I-5 north of the Boone Bridge. The Wilsonville Road on-ramp and Canby-Hubbard off-ramp are within a mile of each other, offering only a short opportunity for drivers to merge into or out of the right-hand lane. (For comparison, ODOT standards are for freeway interchanges to be three miles apart in urban areas.) Removing the Charbonneau District off-ramp would not increase this distance. Providing connections back to Miley Road from Canby-Hubbard would require a costly federal review process, and the long ramps needed would have a significant footprint on the area around I-5. This design would not offer the opportunity to combine operational improvements with the Boone Bridge seismic project, and would therefore be more difficult to fund.

Can we raise highway speeds everywhere to 65 mph?

- This kind of major change would take a decision by the Oregon Transportation Commission and possibly the Oregon Legislature, and is beyond the scope of this plan. In addition, raising speed

limits in the study area would not fix the bottleneck, which results from too many vehicles trying to use the outermost lane over the Boone Bridge.

How would a ramp-to-ramp lane affect emergency response times?

- By reducing congestion, improving travel time reliability, and reducing the risk of crashes, this project would make it easier for emergency response vehicles to move swiftly through the study area in the evening peak.

Would signing the outermost lane as “exit only” resolve the bottleneck?

- This would effectively reduce I-5 from three travel lanes to two in the study area. This could increase interruptions to through travel, instead of improving it as a ramp-to-ramp lane would.

Could ODOT place signs on I-5 southbound north of the study area advising through traffic to merge left?

- ODOT is considering whether these signs would improve traffic flow as an interim measure and will share information after studying the suggestion.

Would a flyover ramp be a potential solution here?

- It would be a significantly higher cost project with higher environmental impacts, and it would not relate to the seismic retrofit needed on the Boone Bridge.

Why didn’t you study adding more general travel lanes to I-5 and continuing them toward Salem and Eugene?

- In past planning efforts, the Portland metropolitan region made a collective policy decision that the right width for Metro area freeways was three travel lanes in each direction, plus interchanges and ramp-to-ramp lanes where needed. ODOT Region 1 has focused on identifying and solving specific operational problems on the freeways as the most cost-effective use of limited funds. Studying the creation of new lanes south of the Portland region would require a much broader effort involving many more constituencies and groups in the Willamette Valley. In general, adding general purpose travel lanes is costly and can have many impacts to the environment and to private property. It also is not a long-term solution to congestion, as new lanes fill up with drivers who were previously traveling at other times, on other routes, or using other modes of transportation.

Does this plan prevent a broader study of the I-5 South corridor (I-5 and parallel facilities from Tigard to Wilsonville)?

- Past regional planning efforts have recommended studying multimodal travel improvements for the I-5 corridor in the south part of the metro region. This plan doesn’t preclude a broader study.

MEMORANDUM

Online Open House Summary
Southbound I-5 Boone Bridge Congestion Study

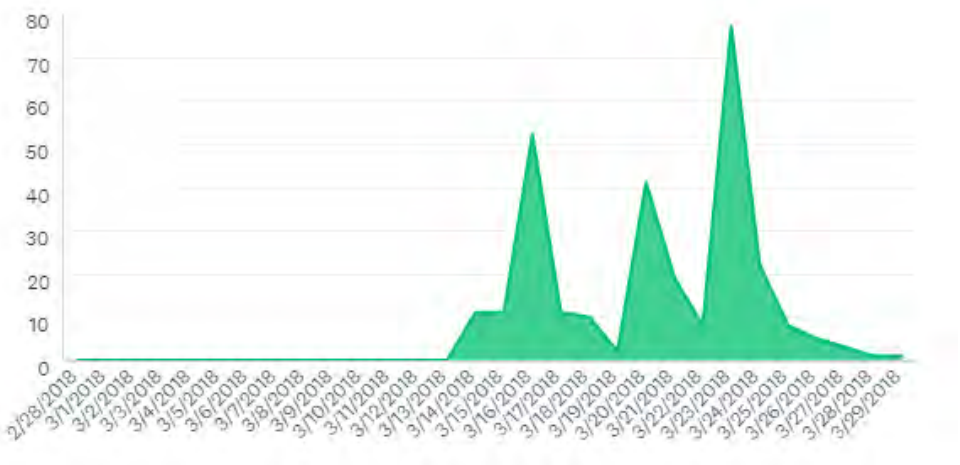
DATE 4/2/2018
TO Southbound I-5 Boone Bridge Congestion Study Project Team
FROM Andrew Parish, AICP, Angelo Planning Group
CC

INTRODUCTION & SUMMARY

This memorandum briefly describes the results of the Online Open House for the Southbound I-5 Boone Bridge Congestion Study. The purpose of the open house was to gather input from the public to determine community preferences regarding solutions to southbound congestion on Interstate 5 near Boone Bridge.

Total Responses

There were a total of 282 respondents to who provided at least some information in the survey. Responses came in three distinct spikes, associated with specific outreach efforts.



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Key Takeaways

The following were the key takeaways from the online open house responses. Detailed information is provided on the following pages.

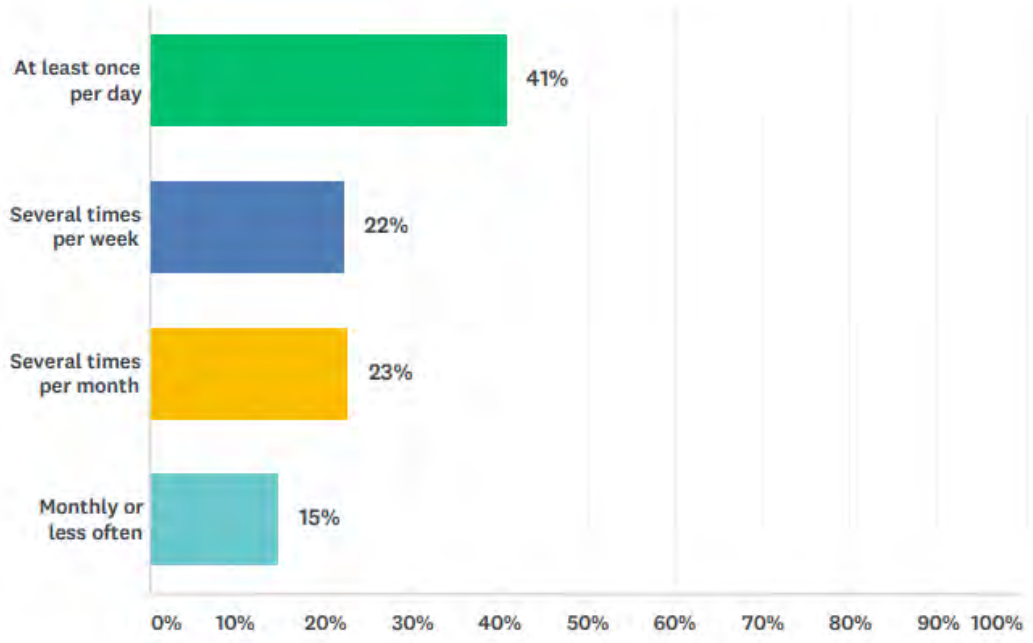
- Most survey respondents used I-5 to cross the Boone Bridge going south at least several times per week (41% at least once per day; 22% several times per week). Nearly 80% said they were likely to use the Wilsonville Road on-ramp on a typical trip, and over half said they were likely to use the Charbonneau District off-ramp. 43% said they were likely to use the Canby-Hubbard off-ramp. (All of which is to say – this survey appears to have reached those that use/would be affected by the proposal)
- Respondents generally experienced unpredictable travel times, frequent congestion, and spillback. A lower percentage (though still the majority) experienced dangerous weaving behavior.
- Given the information presented, **75% of respondents chose Option C** as their preferred build. Option B was the second most preferred.
- **Almost all respondents** said that ODOT should invest in operational improvements in this part of I-5.
- The average level of support for the recommended alternative is **very high: 92/100**.
- Asked to list primary reasons for their level of support, people provided many separate comments. Congestion, safety, and commuting times were among the most common issues identified.

DETAILED SURVEY RESPONSES

The following pages include detailed information for each question asked in the survey.

Q1: How often do you personally use I-5 to cross the Boone Bridge going South?

Answered: 280 Skipped: 2



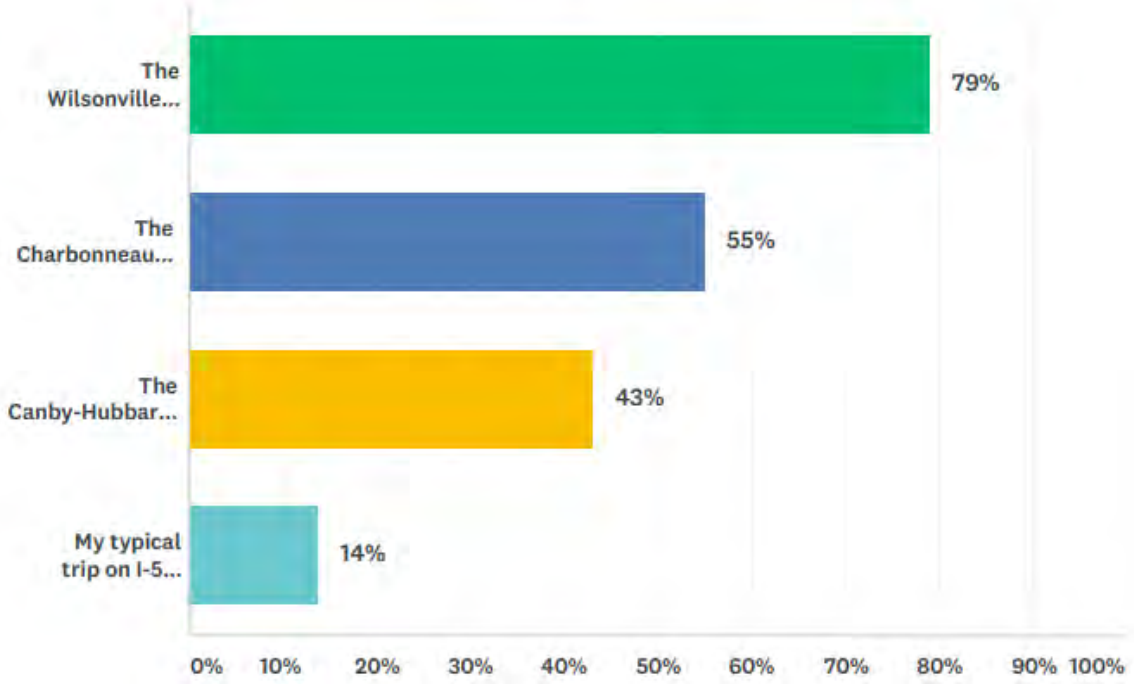
ANSWER CHOICES	RESPONSES	
At least once per day	41%	114
Several times per week	22%	62
Several times per month	23%	63
Monthly or less often	15%	41
TOTAL		280

#	ADDITIONAL COMMENTS	DATE
1	Daily Monday through Friday	3/28/2018 7:53 PM
2	Avoid it at all costs due to traffic. I gladly use the north Wilsonville exit.	3/25/2018 2:18 PM
3	Two to 3 times per day common	3/24/2018 10:35 AM
4	This is a real bottleneck, esp. when there is a traffic incident nearby. And as it is the only link across the river to the south, kind of scary.	3/23/2018 5:26 PM
5	Would use it more but try to avoid the traffic.	3/23/2018 4:31 PM
6	I commute from Canby to Wilsoville for work	3/23/2018 4:12 PM
7	Usually take the 1st Wilsonville exit when coming from Portland	3/23/2018 12:17 PM
8	never!	3/21/2018 7:42 AM
9	I'm retired and plan my trips to avoid driving during the peak time. I live in Canby and have family in Wilsonville. If we are visiting we either leave before 4:30 or wait until after 6:30 to drive home.	3/21/2018 7:38 AM
10	i live in salem so i use it 2 times a day to get to work	3/20/2018 3:17 PM
11	At 415pm	3/20/2018 2:43 PM

12	Wilsonville to the Canby-Aurora Exit 5 days/week	3/20/2018 2:39 PM
13	It is a dangerous area and would definitely help to relieve congestion and increase safety.	3/18/2018 7:28 PM
14	4x a day	3/18/2018 9:27 AM
15	I get off I5 at Thebes Wilsonville Road exit, this congestion effects me every day even though I don't cross the bridge	3/16/2018 7:18 PM
16	However, I'm still affected by traffic anytime I go to Fred Meyer	3/16/2018 6:49 PM
17	The impacts to the Boone Bridge don't start in Wilsonville, they start further North highlighting the need for a true regional option	3/16/2018 12:23 PM
18	RETIRED, LIVING IN CHARBONNEAU	3/16/2018 11:51 AM
19	While I do not cross the bridge daily, I am caught in the congestion every weekday. Depending on the traffic, the congestion can begin at the 217 interchange, but usually at the I-205 interchange.	3/16/2018 10:54 AM
20	Depending on time of day the merge can be challenging	3/16/2018 10:42 AM
21	I travel from Charbonneau to Wilsonville and back everyday. Even going to pick up groceries is a huge, time consuming ordeal.	3/16/2018 9:50 AM
22	My commute does not include the Boone bridge, but this bottleneck causes backups throughout Wilsonville roads that impact my commute. Occasionally these are severe, causing 30-60 min delays in my commute from Tualatin to Wilsonville.	3/16/2018 9:38 AM
23	I travel from Charbonneau to Wilsonville and back daily. If I want to just go shopping it takes extra time to merge on the freeway southbound just to go a short distance to Charbonneau exit.	3/16/2018 9:28 AM
24	Commute ... use it 2 times per day	3/15/2018 12:00 AM

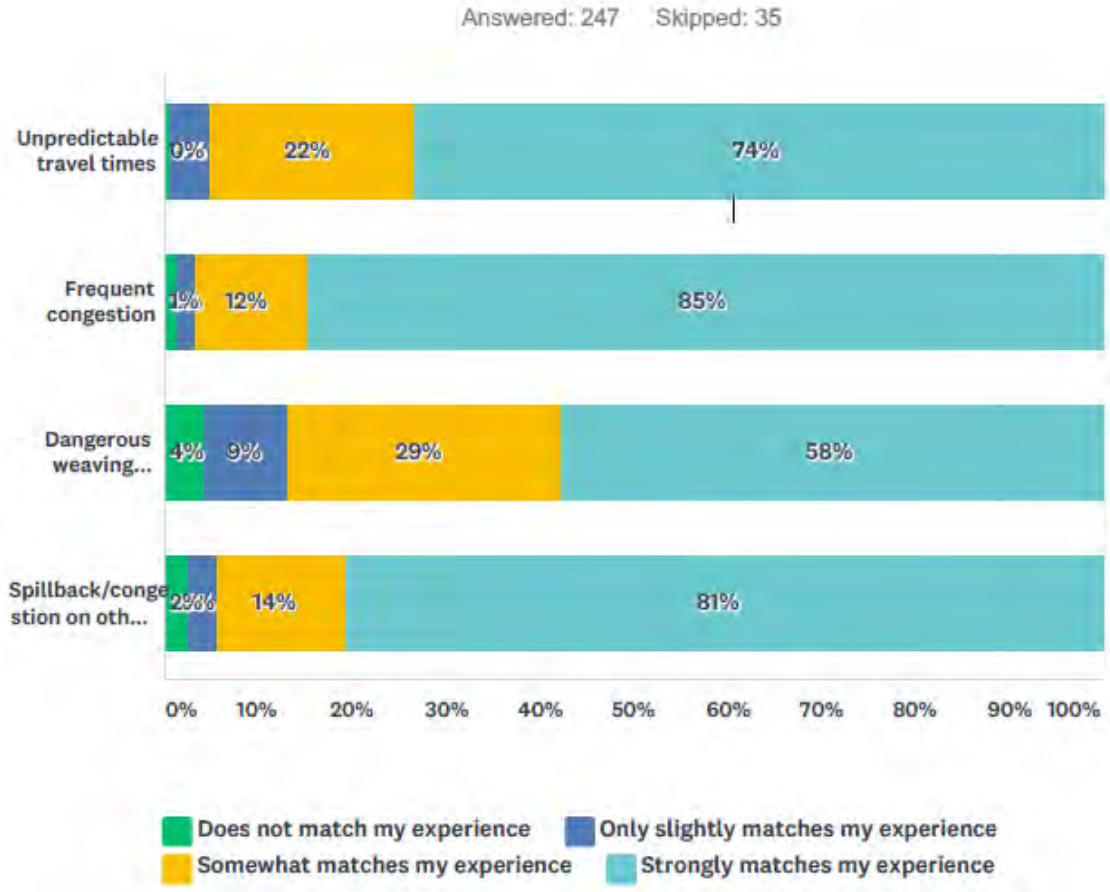
Q2 On the typical trip that takes you across the Boone Bridge going south, please mark all of the entrances/exits you are likely to use:

Answered: 262 Skipped: 20



ANSWER CHOICES	RESPONSES	
The Wilsonville Road on-ramp (Exit 283)	79%	207
The Charbonneau District off-ramp (Exit 282B)	55%	144
The Canby-Hubbard off-ramp (Exit 282A)	43%	113
My typical trip on I-5 starts farther north and ends farther south than these entrances/exits	14%	36
Total Respondents: 262		

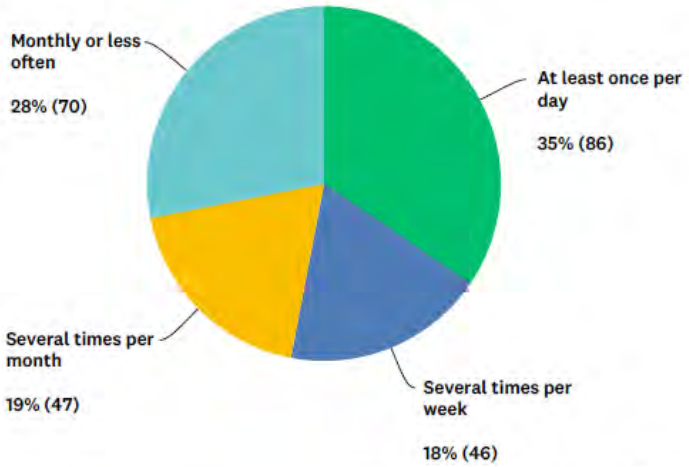
Q3 To what extent does your personal experience on this part of I-5 match our analysis?



	DOES NOT MATCH MY EXPERIENCE	ONLY SLIGHTLY MATCHES MY EXPERIENCE	SOMEWHAT MATCHES MY EXPERIENCE	STRONGLY MATCHES MY EXPERIENCE	TOTAL	WEIGHTED AVERAGE
Unpredictable travel times	0% 1	4% 11	22% 53	74% 181	246	2.73
Frequent congestion	1% 3	2% 5	12% 29	85% 207	244	2.84
Dangerous weaving behavior	4% 10	9% 21	29% 69	58% 137	237	2.54
Spillback/congestion on other roads in Wilsonville	2% 6	3% 7	14% 34	81% 197	244	2.78

Q4 How often do you personally use I-5 to the Charbonneau District (Exit 282B) or the Canby-Hubbard (Exit 282A) off ramp?

Answered: 249 Skipped: 33

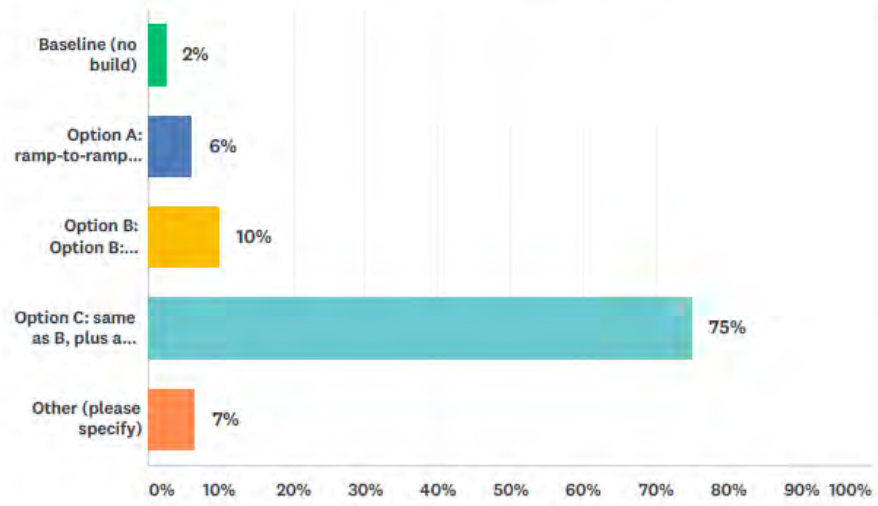


ANSWER CHOICES	RESPONSES	
At least once per day	35%	86
Several times per week	18%	46
Several times per month	19%	47
Monthly or less often	28%	70
TOTAL		249

#	ADDITIONAL COMMENTS	DATE
1	4-6 times per week	3/23/2018 3:04 PM
2	Monday through Friday on my way home from work	3/23/2018 2:32 PM
3	I continue traveling to Salem	3/23/2018 2:18 PM
4	No use of Exit 282B or Exit 282A.	3/23/2018 1:59 PM
5	We live in charbonneau and most trips we travel north on I5, thus when we return we are impacted by the backup. Even taking alternate routes, the backup is unacceptable. When traveling from the 217 south to charbonneau the 11 mike trip which usually takes us 13minutes takes over an hour during peak traffic. Average speed about 10 mph !!!	3/23/2018 12:56 PM
6	I work in town at the Library 9-5	3/20/2018 2:51 PM
7	only as a bypass route to avoid I-5 backup onto 99E	3/20/2018 2:45 PM
8	Ramp light is a joke	3/18/2018 9:28 AM
9	I get off at 283, I rarely go over the bridge during rush hour	3/16/2018 7:21 PM
10	Congestion & delays stretch North beyond Ellingson Rd Exit.	3/16/2018 12:44 PM
11	Boone Bridge travel issues impact me in 2 ways: 1) live in Wilsonville and visit parents in Woodburn and (2) work downtown Portland and live in Wilsonville. Without mid-day mass transit options direct to Wilsonville (train or express bus) the issue is compounded.	3/16/2018 12:25 PM
12	Having the "only" lane on the NB section of the bridge has helped tremendously!	3/16/2018 11:25 AM
13	I live in Wilsonville.	3/16/2018 10:56 AM
14	I'm so happy you're proposing this. It's so needed	3/16/2018 10:46 AM
15	Congestion & slower typical speed of travel poignant much further	3/16/2018 10:35 AM
16	The spillback/congestion on other wilsonville roads is severe at times, as there's no good alternative to the Boone Bridge for south-bound traffic across the Willamette. Any traffic avoiding I-5 due to congestion is forced on at Wilsonville, or must go far out to Oregon City or Newberg to cross the river.	3/16/2018 9:43 AM
17	About half the time I am on I-5 north of 283 and try to remain in the left lane to ease congestion from all of the traffic entering on 283. It is challenging and dangerous trying to merge right to exit at 282B.	3/16/2018 9:36 AM
18	These 2 exits are crucial for commuters not only going into Canby and Aurora but all cities South and east of Canby. The other options are unacceptable in order to cross the Willamette.	3/16/2018 9:36 AM
19	I don't use these exits, I'm traveling further down.	3/14/2018 4:31 PM

Q5 Given the information above, what is your preferred option?

Answered: 246 Skipped: 36



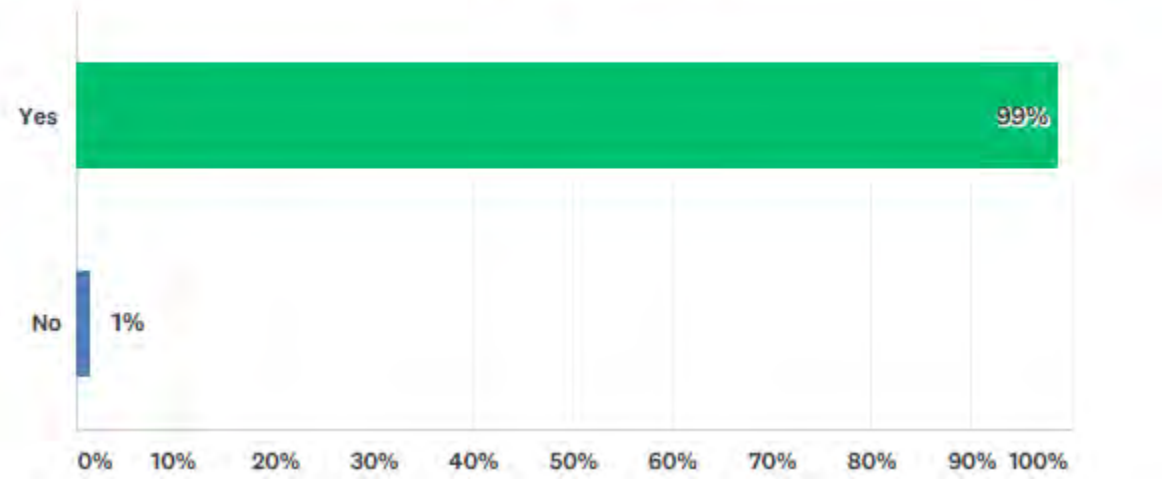
ANSWER CHOICES	RESPONSES	
Baseline (no build)	2%	6
Option A: ramp-to-ramp lane from Wilsonville Rd to Charbonneau exit	6%	15
Option B: Option B: ramp-to-ramp lane extends south to Canby-Hubbard exit	10%	24
Option C: same as B, plus a second turn lane added to the Canby-Hubbard off-ramp	75%	185
Other (please specify)	7%	16
TOTAL		246

#	OTHER (PLEASE SPECIFY)	DATE
1	Option C, but the extra lane extends north to connect to the SW Elligsen Rd. (Exit 286) exit-only lane.	3/25/2018 6:01 PM
2	If development was allowed south of the river it would take pressure off the Boone Bridge during peak times as the flow caused by development south of the river would run against the normal traffic flow. It will even be a more disastrous condition when industrial coffee creek is built out and trucks need to go south.	3/25/2018 5:44 PM
3	You need another bridge or bypass to get from WV to Canby	3/23/2018 2:20 PM
4	It is quite apparent that this is the solution that would reduce the congestion most significantly.	3/18/2018 6:05 PM
5	Option A is most relevant to me, but I support B as well if traffic supports that option.	3/18/2018 9:48 AM
6	add 3 or 4 lanes and be done with the problem	3/18/2018 9:29 AM
7	This needs to start at Elligsen Road ramp or will still be a bottleneck from the I 205 influx. Thanks for looking at this. We were thinking of moving from the area because of this nightmare. Tired of dealing with it.	3/17/2018 10:03 AM
8	I also think that adding signs indicating that the on-ramp merged would fix current problems.	3/17/2018 7:26 AM

9	I am in full agreement that something should be done and am happy to put money towards a project to relieve this issue. I like what option C proposes, but am disappointed that it essentially only brings us to a "D" grade. If we're investing in this, I want to see more of an improvement than that. There must be more options available.	3/16/2018 1:32 PM
10	The cross over traffic alone will cause congestion (those starting North of Wilsonville and exiting via Charbonneau or Canby-Hubbard or those leaving Wisonville traveling beyond Canby-Hubbard on I5)	3/16/2018 12:28 PM
11	Scrap the bike/ped bridge and use those funds to do C with a special crossing attachment for bikes/peds under the bridge.	3/16/2018 10:59 AM
12	When will southbound traffic congestion from Tualatin to Charbonneau exit be addressed? It's just as bad.	3/16/2018 9:51 AM
13	Not an expert. Will this just move the bottleneck further south?	3/16/2018 9:40 AM
14	If we are going to do the project, do it correctly according to the engineering.	3/16/2018 9:38 AM
15	Although Option C performs the best, it is also the most costly. Some of the money should be put towards providing safe pedestrian and bicycle access across the bridge. Why isn't this part of your analysis? Doesn't ODOT realize that many people choose to ride their bike or walk across this bridge on the shoulders? If not room will be provided to peds and bikes, a separate bridge near the P&W railroad bridge should be built (as planned by the City) instead.	3/15/2018 10:41 AM
16	Build it ASAP ... in 10 years you will need a second bridge !! This is the main highway route from CA to WA	3/15/2018 12:12 AM

Q6 Do you believe that ODOT should invest in operational improvements in this part of I-5?

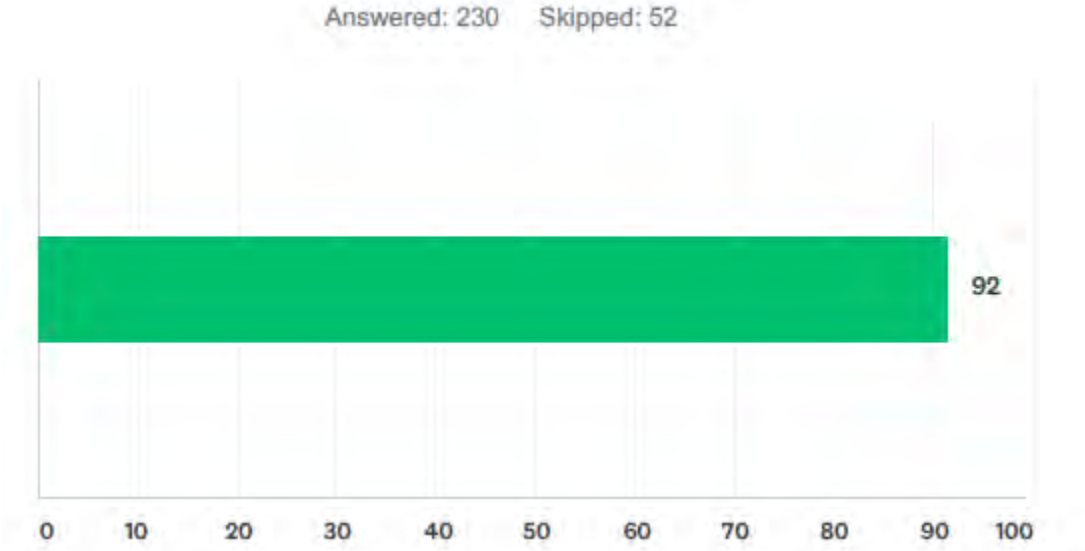
Answered: 236 Skipped: 46



ANSWER CHOICES	RESPONSES	
Yes	99%	233
No	1%	3
TOTAL		236

#	ADDITIONAL COMMENTS	DATE
1	Must look at long term master plan for region. Region is out of employment lands. Development south not river is inevitable (even though political environment says "NO") The proper long term planning should ask "What are best options assuming development south of river."	3/25/2018 6:02 PM
2	a fourth lane should extend past the Miley road entrance for one mile	3/25/2018 12:06 PM
3	Please Incorporate any feasible noise barriers to new additions to freeway	3/24/2018 2:04 PM
4	Hurry!!!	3/23/2018 4:53 PM
5	ODOT Should be pouring resources into carpool lanes and effective light rail systems.	3/23/2018 2:58 PM
6	Also use signag southbound I-5 for through traffic stay right	3/23/2018 1:13 PM
7	When odot changed the n/b lane configuration for the Miley Road on ramp to the Wilsonville off ramp by adding a "through traffic lane" the results were dramatic. HOWEVER, traffic stopping for the off ramp signal at Wilsonville Road caused backups. If you develop the proposed plan, you need to consider what backup wil occur for traffic getting off for charbonneau. Currently there is a boulevard stop sign which even now causes some ramp backup.	3/23/2018 1:10 PM
8	Seems like a short term solution...will we just keep building out as our pop. grows?	3/22/2018 8:32 AM
9	This should have started roughly 10 years ago.	3/21/2018 11:12 PM
10	This evaluation should have happened at least 10 years ago.	3/21/2018 11:04 PM
11	As the only crossing on the Willamette River for miles in either direction this is problem spot with few alternatives available.	3/21/2018 8:57 AM
12	save lives, time, money	3/20/2018 2:49 PM
13	Already running late.	3/20/2018 2:24 PM
14	This problem has wide ranging impacts throughout the I-5 corridor and the solution should be implemented as soon as possible.	3/18/2018 6:08 PM
15	Increased DMV rental fees will assist greatly with this project.	3/16/2018 1:00 PM
16	And they need to see what then can do further North or invest in a Max train to go from south of Wilsonville, possible Salem w/a stop at a park & ride in the vicinity of Canby-Hubbard, direct to downtown PDX	3/16/2018 12:32 PM
17	Consider system management measures first, including pricing and transit improvements. Consider including HOV lanes, and potentially a dedicated transit ramp in the Barber St. vicinity.	3/16/2018 12:06 PM
18	Work must be done at night or weekends. There shouldn't be any construction during peak rush hour or commutes will be unbearable.	3/16/2018 9:57 AM
19	It is also worrisome that when so many cars are sitting on the bridge at once how much stress is on the bridge itself. This is a major artery bridge.	3/16/2018 9:47 AM
20	What about the bike lanes?	3/16/2018 9:41 AM
21	As a planner at Cherriots, we partner with SMART to provide bus service between Wilsonville and Salem, taking many cars off the road that would otherwise be contributing to the congestion. Improvements would help our buses keep their schedules and also help with reliability of the schedules, which people rely on to get to work or other appointments in Salem.	3/15/2018 10:50 AM
22	Immediately ... not in 10 years ! You'll need to add another bridge with 6 lanes in 10 years !!	3/15/2018 12:18 AM

Q7 What is your level of support for the recommended alternative?



Q8 What are your primary reasons for this level of support?

203 responses, listed below.

Responses to Q8: Primary reasons for this level of support.
I have to deal with this situation on a daily basis. I have lived in other areas of the country with horrendous traffic, and there significant investment was made to expand the roadways to ease congestion.
My first choice is none of A-C, but instead "D", to build a bridge across the Willamette to serve local Wilsonville traffic between the north and south parts of the city and its immediate hinterlands. Include walking and cycling routes. Look to the Sellwood Bridge as a model. Why widen I-5, a regional and interstate expressway, to solve a local bottleneck? The problem isn't I-5, it's that there are too few crossings of the Willamette in the south metro area. A site to consider would include a route connecting SW Boones Ferry Road and Boones Ferry Crossing NE at NE Butteville Road, or vicinity. A second is farther west connecting SW Kinsman Road and NE Butteville Road. Get legislative approval of an urban growth boundary (UGB) exception if necessary to site the bridge and connecting roads outside the metro UGB. Looking east of I-5, a third site is connecting SW Metolius Loop with SW French Prairie Road near the Charbonneau Golf Club. A fourth site is connecting SW Rose Lane with either SW French Prairie (near SW Lakeside Loop) or east to NE Eilers Road. The advantage is that land on the east bank and west of I-5 is rural and so has less market value and is less expensive to buy or seize by eminent domain. Also, because the bottleneck is a local problem, a special assessment can be levied on Wilsonville landowners for some proportionate share of the costs of the bridge over some time, say 20-30 years, based on the 60% or so that Wilsonville traffic constitutes of the I-5 congestion along the Boones Bridge.

Responses to Q8: Primary reasons for this level of support.
A similar example of the local bridge line of thinking is seen for the Columbia River Crossing in the video, "A Common Sense Alternative to the CRC" (6 min., 14 sec.) View it to further understand what I'm getting at. My second choice would be baseline (no build). As a first reason, my first choice is actually none of A-C, but instead "D", to build a bridge across the Willamette to serve local Wilsonville traffic between the north and south parts of the city and its immediate hinterlands. Include walking and cycling routes. Look to the Sellwood Bridge as a model. Why widen I-5, a regional and interstate expressway, to solve a local bottleneck that is caused locally? The problem isn't I-5; it's that there are too few crossings of the Willamette River in the south metro area. A site to consider would include a route connecting SW Boones Ferry Road and Boones Ferry Crossing NE at NE Butteville Road, or vicinity. A second is farther west connecting SW Kinsman Road and NE Butteville Road. Get legislative approval of an urban growth boundary (UGB) exception if necessary to site the bridge and connecting roads outside the metro UGB. Looking east of I-5, a third site is connecting SW Metolius Loop with SW French Prairie Road near the Charbonneau Golf Club. A fourth site is connecting SW Rose Lane with either SW French Prairie (near SW Lakeside Loop) or east to NE Eilers Road. The advantage is that land on the east bank and west of I-5 or east of Charbonneau is rural and so has less market value and is less expensive to buy or seize by eminent domain. Also, because the bottleneck is a local problem, a special assessment can be levied on Wilsonville landowners for some proportionate share of the costs of the bridge over some time, say 20-30 years, based on the 60% or so that Wilsonville traffic constitutes of the I-5 congestion along the Boones Bridge. Why should taxpayers across the metro area shoulder the full burden? A similar example of the local bridge line of thinking is seen for the Columbia River Crossing in the video, "A Common Sense Alternative to the CRC" (6 min., 14 sec.) View it to further understand what I'm getting at. My second choice would be baseline (no build). As a second reason, it seems automated vehicles (AVs) would increase capacity and reduce or eliminate the problem anyway in the 20-30 years it'll take for them to mainstream. Third, Oregon has a climate action plan, and a de facto highway widening is clearly is not in support of that. Fourth, has attempting to build our way out of automotive congestion for the last eighty-plus years taught DOTs nothing? The increased capacity would disappear because driving will become easier and faster, so there'll be more vehicle trips and more often. Fifth, the legislature continues to kvetch about lacking money while not tackling tax reform,

Responses to Q8: Primary reasons for this level of support.
and I'd be loath if a project that ostensibly is limited to transportation funding through Metro might not become involved in a legislative session. I believe when the Portland city council considered cutting a much smaller capital project - Capitol Highway in Portland - the legislature in 2017 session found state money to fund it. I don't object against that project; my point is that regional projects have a way of having their proponents discover one pot of money isn't enough, and more is needed from a larger pool of taxpayers. Sixth, as a Portland resident, I have no desire to improve the commutes of Wilsonville residents when the streets in my neighborhood in Southwest are crumbling -- literally -- with potholes and gravel growing by the week. And don't tell me it's institutional protocol that state projects get state and Metro money. It's political will. Aren't we supposed to pave unpaved streets, get crumbled streets resurface, and get sidewalks and bike paths to get us all to drive less? Why isn't the region blanketed with rail and frequent bus lines so I can travel to and from Portland and the 'burbs and beyond with little worry about service hours, frequency, travel times, and transfers? Spend the money on these things. And don't tell me it's institutional protocol that TriMet and ODOT (and SMART) are separate collections of pots of money. Seventh, if there were fewer than 13 miles between the Boones Bridge and the next nearest road crossing, I-5 wouldn't be quite so bad, same as if there was a bridge near Lake Oswego between the Sellwood and I-205 bridges, that would do wonders for out-of-direction travel on the Ross Island and I-205 bridges. Now there are two projects that merit Metro funding! Eighth, the bad publicity over the past several months (particularly in the Portland Tribune) of lack of ODOT oversight of its contractors with millions of dollars lost and a major bridge needing to be rebuilt doesn't instill confidence in the proposed project. Ninth, in the scheme of things, I'd rather spend tax money on more important things, socialist goods such as universal health care, a universal basic income, housing as a right, and environmental remediation. Traffic congestion is a mere nuisance by comparison. I add that with the threat of excessive automation in the near future in the on-going class war if trends continue, I don't foresee thousands of jobless Metro residents (freight drivers, retail workers, even swaths of white collar workers) commuting across the Boones Bridge to jobs they no longer have because robots have replaced them. BTW, with more public housing, community land trusts, co-housing, and rent control, more people could afford live in closer proximity to work and wouldn't commute as much and as far; now there's a congestion mitigation measure! Tenth, because capital has all but fully co-opted the federal government, leading to abandonment of the American people by Congress and the President, with some embattled progressive agency heads remaining, I expect no money from Washington. This means greater burden on and discretion with our state and Metro funds. The Boones Bridge doesn't make my list of priorities.
Reduce traffic on I-5 Southbound coming from further up towards Portland.
It makes the most sense, and seems to be the best option for handling future traffic increases.
There is no reason for this congestion. The biggest bother is the fact that it congests Wilsonville Rd. back to the high school.

Responses to Q8: Primary reasons for this level of support.
Time of travel. Safety of vehicles. Quicker response times of emergency vehicles. Lower pollutant effect of cars taking an extra 30 or more minutes to get from the Hwy 217 interchange to past the Boone Bridge.
Traveling it every day it gets so frustrating and alot of wasted time waiting in traffic.
Most cost effective alternative -let's solve for the future.
Safety during the movement of personnel and products.
I travel I5 southbound to Wilsonville Rd at least twice every weekday and experience extreme traffic delays more than twice per week which affects traffic flow as far north on I5 as hwy 217 (I rarely enter I5 southbound farther north than hwy 217). My arrival times to destinations on Wilsonville Rd often vary between 10-45 minutes! I imagine anyone traveling farther south on I5 experience even greater delays often.
The government is spending tax payer money but depriving the taxpayers from obtaining additional tax revenue from south of the river. Government is spending money for improvements for south of the river but receiving no revenue from south of the river. All groups knowledgeable of the regions shortfall of employment lands know that, but for the political position of anti-development groups, south of the river development is the ideal place for future employment land development.
Reduction in spillback congestion in southbound lanes north of Wilsonville road, and both east & west bound spillback traffic on Wilsonville queuing on to SB I-5 on ramp. Current 3-lane queuing will help, but only moderately. An additional question lane can't accommodate backups that on occasion extend as much as a mile to the west for eastbound Wilsonville road traffic in the afternoons.
I-5 southbound traffic flow would improve and reduce congestion seen south of Hwy 217. Traffic on Wilsonville Rd is greatly impacted during rush hour which affects travelers that have no intention of utilizing I-5.
Traffic will only get more congested over the years. There also needs to be more rail alternatives between Portland and Salem. Many people commute from Salem and a rail line that runs more frequently, and with earlier and later trains would help. adding a commuter lane, (2 or more occupants) for peak congestion times might help.
Only bridge over Willamette in the area, so it is often an absolute necessity to travel across it.
I would strongly support any of the suggested improvements!
Safety, Illuminate congestion
These traffic issues impact our family daily as well as thousands of other people as is obvious. If at all possible please bump this ahead of other (possibly) less important or impactful projects. Is it possible to do a temporary ramp to ramp lane by rearranging the current traffic lanes - or even extending the first Wilsonville exit only lane as a drive through lane for as long as possible to ease the congestion at an earlier point on I5? Please find some temporary solution until you can put a permanent solution in place. To do nothing for several more years is not a viable option as far as I'm concerned.
safety and reliable transit times
Traffic congestion on I-5 and surface streets in Wilsonville
I drive this section every day. The people taking the Canby/Hubbard exit often wait until the last moment to cut in front of cars in the right lane to take their exit. Two lanes for the exit will hopefully alleviate that.
Congestion - making this portion nearly unusable during certain time periods. I worry about the ability of emergency vehicles to utilize the corridor during heavy traffic or blockage due to accidents.

Responses to Q8: Primary reasons for this level of support.
It does impact the quality of life/access to Wilsonville
Best for all I-5 users, freight, tourists, transit Needed for those who take this to commute Only way to prevent disaster on local Wilsonville Road use
Poor traffic flow, bottle-necking and issues effecting Wilsonville Rd.
I live off of Brown Rd and Wilsonville Rd as well as other side/back streets are getting increasingly congested during peak traffic hours. We feel trapped at home if we need to run what should be a 10-15 minute errand (such as to Fred Meyer) because it will/can take significantly longer than it should. I also drive home every evening (from the north) and often take a variety of other routes because of the heavy congestion on I-5 through Wilsonville.
Area growth will only continue and increase the problems that are currently observed.
Major congestion through i5 as well as the main roads of Wilsonville that lead to the on ramp for 283
something has to get done
Driving it every day for work
It's already not working. 10 yrs from now when a solution is finally implemented the area will be more crowded then it is now. We need to get this going now.
Safety for all traveling this stretch and beyond
Most likely of the three to improve traffic. Need bike infrastructure
Something must be done. Traffic in this area is horrible!
Safety
Sick of traffic, this has taken too long to correct
Not certain it will work
It is the most logical to improve the traffic flow with the greatest impact.
To improve traffic congestion and decrease risk of accidents.
Improving I-5 congestion will reduce the impact on wilsonville surface streets.
Option C provides LOS D, which is greatly needed, and should allow the Wilsonvile Rd S ramp meter to offer increased flow, reducing local congestion in and around Wilsonville Road.
traffic is not getting better--it will only get worse
Live in Charbonneau. Anything that moves traffic along is safer for all.
This is an obvious improvement for all traffic traveling on I-5 south from Wilsonville. It will only get worse if not changed.
The problem is real, and getting worse. Something must be done!
I am affected by the Boone Bridge bottleneck every day during peak commute times in that it affects track slowdown far before one even reaches Wilsonville. It is my hope that this improvement will also help with the traffic that starts accumulating when driving south out of Tualatin during the commute work-week.
I live in Wilsonville and we need relief traveling from east side to west side and visa versa. Also, we need relief in effort to get home to Wilsonville while traveling south on I-5!! All summer long the commute is horrible on Fridays, and nearly horrible at any other time or day!

Responses to Q8: Primary reasons for this level of support.
We have considered moving from Wilsonville for our upcoming retirement, and we have lived here since 1990.
Will solve my waiting time to get home
daily useage
The ramp is needed to help alleviate the city congestion at peak hours. The poor planning in lights and roads in the city near I-5 is the major cause. Rude drivers weaving into on-ramp lanes and not waiting adds to the problem, yet law enforcement does not have a presence to deter the behavior.
This area has deteriorated at a surprisingly fast pace over the last several years. If we don't start on a solution quickly, it will be a significant constraint on travel before a solution is in place.
The candy ferry will soon by faster the I 5 southbound if we don’t do something...
Safety in getting on and off the freeway
The lack of adequate traffic design throughout the city as well as poor redesign when the worked on the I-5 a few years ago has led to this massive problem. It has greatly decreased the quality of life in Wilsonville
Traffic
This is a problem that has been ignored until now, for inexplicable reasons.
Living in Charbonneau my husband and I use this section at least once a day, if not more.
Safety getting on and off I-5 plus timely travel.
I feel trapped in my home south of the river - there is less and less reliable "windows" (mid-day) that I can make round trips into W'ville or the city. Getting caught in congestion is awful, and drivers get impatient, behaving recklessly.
1. Facilitate access to/from Wilsonville and points South. 2. Relieve congestion on Wilsonville Road. 3. Improve through traffic safety and travel times on I-5.
safety
I feel the second lane for the Hubbard exit isn’t necessary because by then the congestion is mostly gone. I use that exit all the time.
A major project of this nature should over designed for current volume and great magin for growth and growth will come as the metropolitan area moves south to find less expensive housing
Traffic is not just dangerous. It leads to wasted fuel. It worsens air quality. Save lives, save fuel, and air quality. Do it.
Tired of having to avoid driving through Wilsonville at certain times or having to leave considerably earlier to places because all side roads are backed up as a result of the terrible freeway congestion. The congestion is so bad on side roads in Wilsonville that people end up blocking intersections in a frustrated attempt to make any progress in their commute.
There is no reason to pursue this based on the current situation and the forcasted data
I work in Wilsonville and live in Canby - in current state commute home is terrible. Commute to work with ramp to ramp lane is fine majority of the time.
Having lived in Wilsonville for well over 40 years I have seen I-5 access constantly deteriorating. Considering how long it takes for any of the alternatives we will see not relief for at least 10 years. I shudder to think how bad it will be by then.

Responses to Q8: Primary reasons for this level of support.
Traffic around Wilsonville is terrible. It's frustrating and very limiting. No one from Portland wants to come and visit during peak hours.
I already have a 45 minute commute on a good day. I work in WV. Sometimes it can take me 45 min just to get on to the freeway because the in town traffic is backed up so bad due to the freeway.
Better function for I-5 and for Wilsonville streets.
less congestion now and in the future
Prevention of increased congestion on Wilsonville Rd. Right now Wilsonville Rd typically is congested to the extent of 20-30 minutes during peak hours to just enter the on-ramp to I-5.
I see the delays and know that the volume of traffic entering the freeway from Wilsonville is to blame. I also think that people going north and south through Wilsonville for some inexplicable reason slow down without traffic issues.
Driving this route daily increases the potential of an accident and wastes a great deal of time.
Ease in getting to area across the bridge
I5 needs lots of improvements and this is 1 of them. 4-5 Lanes in each direction would be ideal
I'm currently caught up in the discussed comgestion!
Lack of frequent use. We are retired, and to some extent, can stay away from the congestion. We do recognize the problem, and agree that this solution has merit.
I live in Charbonneau, and my closest services are across the Boone bridge. Sometimes it may take 30 minutes to run an errand that should take no more than 10.
Safety and efficiency
Congestion
Inability to travel across I-5/Willamette River durning rush hour times.
Traffic congestion backing up far past the 217 is terrible. If there were an emergency, emergency vehicles and personnel would be substantially delayed. THIS MUST BE RESOLVED
Traffic backed up on Wilsonville Rd and there being no other way to easily access south I-5
Safe and traffic flow
ANYTHING THAT HELPS RELIEVE CONGESTION OVER THE BRIDGE
Traffic is really bad. Need to widen all of I 5
safety and relief congestion on Wilsonville Road first, then I-5
Congestion is ridiculous and horribly unsafe!
We drive it everyday and it is a safety hazard now
Traffic is terrible, I5 needs to be improved.
The congestion on I-5 South at Boone Bridge is becoming more and more constant - not just at PM peak. Moreover, the PM peak congestion heavily impacts the Wilsonville road network, making it difficult for those not getting on I-5 South to easily move throughout the City.
This may temporarily relieve some congestion, but I would rather the state focus that funding on getting folks out of vehicles and into buses, vanpools, etc. by improving those services and making those the preferred choice.
When coming from the north to Wilsonville, I can't plan on getting home until around 7 pm. All bets are off for getting home earlier.

Responses to Q8: Primary reasons for this level of support.
When I have to leave Wilsonville during the week, I can never count on getting home in a timely manner. All the alternative routes to Wilsonville are also backed. It would be awesome to be able to get home before 7 pm.
Traffic seldom, if ever, gets better if ignored.
good solution to frequent problem
It would create less congestion
I think we need to look towards the future and predicted growth. I believe this option is the best to accommodate growth in the long-term.
Even though I only take this route a few times a month I always check my smart phone to see how bad traffic is before I leave work to see how much extra time I may need to take to cross the Boone Bridge.
Travel times. Emergency vehicals
Ease congestion, move around with more predictability in travel time.
The need to get this problem fixed for now and for future use.
Congestion is ridiculous. Only getting worse as Wilsonville expands. Soon I'll have to get off at 289 to get to my home in south Wilsonville.
Commuting times need to be improved for public safety and quality of life reasons.
Traffic is only going to get worse. This should have been addressed years ago when the traffic started getting so bad.
Traffic in this area will lead to fatality's
Southbound I5 traffic has become horrible, and the Boone Bridge seems to be a reason for it.
Time
Traffic is always backed up in Wilsonville. It could easily impact emergency vehicles. This area is growing so we should be solving current issues as well as plan for the future
Unless another bridge over the Willamette is built, the Boone bridge is the only North-South access for miles. Traffic gets worse every year and will not get better anytime soon. This seems to be the option that I have heard of.
Traffic safety and travel time reduction
anything to make traveling the state better and less frustrating is a plus. I am more likely to play "tourist" when the traffic isn't a major issue.
I use the bridge daily, coming and going to Wilsonville from the South. The dedicated lane from Charbonneau to Wilsonville was a great improvement with traffic and merging when put in and I believe this will have a huge beneficial impact as well. I believe we also need more turning lanes from Wilsonville Rd(from the West) entering the I5 South onramp.
less time on the road
There are no other options to get south of the river and it can frequently take 20-30 minutes to get on the Freeway and block traffic throughout Wilsonville. Wilsonville will be crippled with the predicted future traffic on this Bridge. This should help keep speeds higher over the bridge and reduce the back-up on I-5 S as well as on Wilsonville Road.
Dealing with this congestion everyday on my way home from work is frustrating. Option C would alleviate people needing to get over from regular traffic flow (causing further congestion) to exit at the Canby/Hubbard exit.
I'd like to see traffic flowing on I-5. I dislike hearing complaints about how bad traffic is in this location. There tend to be lots of accidents from congestion.
with this there may not be as many accidents from cars merging onto the freeway and totally stopping traffic when that is the only way over the river

Responses to Q8: Primary reasons for this level of support.
traffic jams, increased hostility road rage, potential for accidents. I want to get home in a timely manner.
Pro: better traffic flow for I5 AND throughout Wilsonville. Cons: More Cars on the road=environmental impact, and the high cost.
Safety
It would improve traffic conditions, safety, and increase productivity time by reducing travel time. Additionally, I think it would be wise to choose Option C, as this seems to be the most forward thinking and would serve as a better solution for a longer period of time, rather than having to make additional improvements sooner.
Less time spent on Wilsonville Rd or Town Center Loop W. waiting just to get to the on ramp and the congestion that becomes apparent as everyone is trying to make the light to make the South bound ramp. Also it should alleviate people from lane jumping at the base of the underpass where the first straight lane next to the turning lane will race up under the bridge and barge in and force less cars to be able to move through the turning lanes to the under bridge lanes as they block those up. The additional lane to Miley Rd will alleviate those having to jump over and drivers will have more time to get over to their exit ramp.
Safety and feelings of unhappiness with this area
Due to me and everyone else having to wait in traffic to get where we need to go.
I live in Woodburn and work in Wilsonville. It would help so much getting home every day, getting to work every day and even on weekends, when I need to make a trip to Tualatin.
This area is a death trap. There is always an accident or almost an accident daily. There is traffic congestion spillage into Wilsonville, preventing people from shopping/stopping here. They just want out.
Ease congestion, improve reliability
Traffic is terrible NOW !!!!!
Conditions are currently very unreliable so to hear that they could become worse as years go on, it is very unsettling. It would cause me to look elsewhere to live and work.
Safety
Safety
Heavy congestion increasing travel times, decreaseing reliability and impacting freight movement and commuters who move via SOV or transit.
Daily commute from North Marion County to Portland and back is bad at the Terwilliger Curves and Wilsonville. Traffic on/off from 551 always slows the freeway and the solution of auxilliary lane is relatively inexpensive solution
The traffic is terrible. Obviously this needs to be fixed.
Improving traffic speeds and safety.
If we don't do something soon, the next 20 years will be unbearable.
Most positive impact on congestion. Congestion impact should be manageable. This would be a very beneficial project with very little downsides.
Travel safely
The idea seems obvious or at least has come of its time.
Most important bridge between CA and WA
Travel over the bridge daily.
Safety, environmental and economic.
I commuted south to Albany every day for work for two years and had to factor in nearly half an hour to get from my home in South Wilsonville to I5 beyond the mentioned exits because

Responses to Q8: Primary reasons for this level of support.
of the congestion related to Wilsonville road and these exits. A trip that would typically only take me 5-10 minutes. The unreliability meant I often sat in my car for 30 minutes, either at work because I was early or in my car in Wilsonville simply trying to leave the traffic.
Safety, livability
By 2040 this might not be sufficient. I have heard growth in the valley is supposed to be much higher.
As a resident of Wilsonville I feel trapped in town during large portions of the day due to the congestion.
This is a daily time waster for so many people. It is affecting the livability of the whole area.
I am often affected by the back ups on this stretch of the highway whether I am traveling on I5 or just trying to get around town. I have even been stranded at Fred Meyer several times due to highway traffic backing up into the parking lot. It is very frustrating and concerning that I can't even get around when I'm not even trying to use the highway. So much so that if it continues to get worse we will likely move out if Wilsonville. While I definitely support ODOT investing in improvements here, I am concerned amd disappointed that the recommended improvement is only bringing us from an "E" rating to a "D" rating. If we're going to invest time and money into improvements, I believe it should bring us up to an A or B level. Otherwise we'll be right back in the same situation in a couple years and spending even more money and time to do yet another upgrade again. In the end likely spending twice as much than if we had just done something better the first time.
This congestion affects not only that specific area of I-5, but Wilsonville road and congestion often spreads much further north.
There are so many people moving to the greater Wilsonville area that road conditions will worsen quickly on I-5, and the traffic is already terrible.
Difficulty getting home from Wilsonville and areas North due to extreme traffic backup.
We have lived in Wilsonville for 10 years, and the recent increase in congestion is affecting our daily living and preventing people from coming to our area to invest in our economy. Wilsonville is losing its appeal.
Horrible congestion on Wilsonville Rd. Frequent accidents in bottleneck area.
The traffic is horrible. In the summer on Sundays it is horrible as well! From noon to 5 pm it is terrible.
offers the greatest improvement in traffic flow
The need is clear.
Newly moved to area; try to avoid heavy traffic times in driving schedule.
Fear of accident without the improvement
Traffic & commute time is getting exponentially worse with the massive influx of new population in Oregon. This (and similar) projects will help mitigate an already frustrating daily experience.
Traffic has increased dramatically causing long travel times on I-5 south, with backups even prior to the North Wilsonville exit off ramp.
As previously noted, the cross over traffic will create issues, much like the 205/Tualatin interchange. I can't believe that fixes like these will do much to ease the issue as I've already stated, it is a regional issue with Wilsonville bearing the brunt of it due to location at the "funnel end" of the problem.
I live in charbonneu
Need options to manage the existing capacity better before adding additional freeway capacity.

Responses to Q8: Primary reasons for this level of support.
AGREE WITH WHAT YOU'VE LISTED ABOVE
Id rather not be stuck in traffic almost daily, beginning in Tualatin and thru Wilsonville
I live on Butteville Road (Charbonneau exit) and 99% of my travel is between points north, Wilsonville and exit 282B.
Something has to be done to maintain the sanity and safety of those of us who use Boones Bridge.
Ease congestion.
Reduced traffic/bottleneck and increased safety.
Option a and b will only Bandaid the problem and option C is forward thinking.
Something must be done NOW. We cannot wait 10+ years unless the state wants to be responsible for creating the most insane congestion problems in the history of I-5.
I live off Wilsonville Rd to the west of I-5, and sometimes traffic can be backed up on Wilsonville Rd beyond the railroad tracks, and getting onto I-5 can take a long time. During times like this it is practically impossible to exit the Fred Meyer Parking lot. Even when traffic is not terrible on Wilsonville Rd, merging onto I-5 south can be scary. I drive an SUV, but still feel vulnerable when I first get onto I-5 going south and I'm trapped between semi-trailers, or in front of one. Traffic can slow down so quickly right before the bridge that it gets scary, and often there is no other lane to escape to. Things don't speed up until after the Canby exit.
Since 2004 I've lived in Charbonneau & watched traffic on the i-5 corridor between just south of Miley Road to just north of Elligten Rd. become a parking lot several times a day. It effects traffic both north and south of that corridor so much that I join many in doing off freeway driving at high traffic house. This looks like a good first step toward a solution.
We need a solution. If the research shows this is the best alternative, lets get it done.
liviability, safety.
It appears that Option C will not only provide a good solution to the congestion over the Boone bridge but also the best opportunity to reduce the backups further north on I-5 that occur as a result.
The additional auxiliary lane is badly needed - Right now there are 4 north-bound lanes, but only 3 south-bound lanes on the bridge, causing much worse south-bound traffic. Extending the auxiliary lane to Exit 282A and adding a 2nd exit lane for minor cost difference seems like the obvious best case.
Living in Wilsonville is challenging due to these traffic issues. Not only does it make it more difficult to get home from the North but any travel within the city on any roads leading to the I-5 is extremely difficult. We often have to change or cancel plans during those hours.
Ability to travel from Charbonneau to Wilsonville and back, potential for accidents, reliability for transits to keep a consistent schedule, and stress/strain on bridge.
Travel from Charbonneau and back, inability for transit to keep a timely schedule that people can rely on, potential for traffic accidents, and stress on bridge itself.
Safety
This project, particularly Alternative C, makes sense. It's too bad it will take so long for study and implementation.
Help clear congestion on Wilsonville road by improving I-5 flow.
I think adding an exit only when you get onin Wilsonville will add to congestion most people want to go further and will have to immediately merge plus people will use lane to try to get around traffic adding to the problem
Lets help solve the high traffic and dangerous caused by the conditions on this bridge
Relieve traffic congestion

Responses to Q8: Primary reasons for this level of support.
Congestion spilling back onto Wilsonville Road means slower travel times for Cherriots and SMART buses going to Salem. I can't support it "strongly" because there are no provisions for bicycles and pedestrians going across the river. Some of the funding needs to support a bike/ped bridge across the river, even if it is a mile away from the Boone Bridge.
Spending 1/2 hour trying to get on 1-5 from Wilsonville Road
Provides the most relief from traffic congestion
Commute
Even getting TO Wilsonville from Points North in the aft/eve is a waste of time and a hassle.
to reduce congetion
to improve overall traffic flow south
Congestion is getting worse and the traffic is spilling over into the city streets already. It will only get worse in the future
congestion has worsened to the point where it has significantly impacted quality of life, and without transit options that could get commuters to and from downtown in a reasonable amount of time, it is only going to get much worse as the population of Wilsonville expands.
Wilsonville Rd congestion every weekday
Very much needed for this traffic problem
Students coming to campus are greatly affected by the traffic backing up I-5 past Wilsonville. It often looks like a parking lot. This may help their commutes to campus.
Not only does this make my commute easier but it makes people more likely to consider our business viable in the late afternoon hours of the day. I think people avoid Wilsonville businesses after 3 pm during the week.
frequent personal use. reduce frequent accidents in this area
I take it daily and it's so frustrating how long it takes to get onto I-5 SB. When there's an accident it's even worst.

Q9 If a ramp-to-ramp lane moves forward for more detailed engineering and project development, what questions or concerns would you want ODOT and the City to address before constructing the improvements?

140 responses, listed below.

Responses to Q9: additional questions or concerns
Would this entail widening the Boone Bridge? What would be the time estimate for completion? How much would construction impact the current traffic pattern?
1. What alternatives besides Options A-C have the parties seriously developed and considered before selecting one of those options? 2. Who has political authority to stop the project? 3. How much would the project cost and who'd pay for it, by which I mean which bucket of tax money (any of federal, state, Metro, City of Wilsonville)?

Responses to Q9: additional questions or concerns
4. What's likely to go wrong (cost overruns, shoddy contractor work), who's responsible, and what's the contingency plan?
N/A
Signage so that drivers understand they don't have to immediately change lanes for further southbound travel.
Construction congestion
I feel a short term solution would be to move the I-5 South on-ramp metering lights further north to allow vehicles entering the freeway a greater distance to get up to speed before needing to merge. I understand the reason the metering lights are so far south is to allow for more cars to be staged in the on-ramp and keep them from creating congestion on surface streets. But, I believe two things can be done to solve this problem between now and 2028 when the Boone Bridge improvements may start. 1. Widen the on-ramp staging area to allow for 3 lanes of cars behind the metering lights. 2. Convert the center island on Wilsonville road between Town Center Loop and Parkway Avenue on the east side of I-5 from a flower/tree bed into a Left Turn Only lane for entrance into the Southbound I-5 on-ramp. While those trees and flowers contribute to the charm of Wilsonville, they are unfortunately wasted space that could be used to ease traffic flow.
Hopefully the work will be done during the night or from 9-2 during the day. Not during rush hour!!
Option "C" provides that those coming for north of exit 383 do not ave to change to the far right lane to exit. Requires less "weaving".
The impact future truck traffic caused by the development of Coffee Creek Industrial lands will have on this short strip of I-5 in the future
Get it done! This should have been done a decade ago!!!
Reducing the impact on southbound I-5 traffic during any improvements is very important so that the situation that is currently bad is not made worse.
Can the bridge carry the extra load?
How construction would impact current traffic and how additional construction on the bridge would impact bridge safety. Also, if during construction, upgrades could be made to bridge to ensure safety.
Adding any kind of noise barriers to protect the surrounding neighborhoods from the freeway noise.
cost
please keep Fir trees along the on ramp. Plant more trees along I-5 throughout the area and in the median
Traffic during construction
Make sure siesmic upgrade to bridge done at same time
Ensuring that construction is done on off peak hours, such as overnight between 8pm-5am, to prevent further back up and delays. Also ensuring that signage is clear near the exits as well as ahead of them so commuters can plan ahead on which lane they need to be in, avoiding the crazy last minute weaving and cutting in front of other cars to get into the correct lane

Responses to Q9: additional questions or concerns
boone bridge width
How will the construction effect my daily travel?
Canby exit - currently when taking the Canby exit it splits into two lanes. Those 2 lanes will need to be extended to the stop light or will have tons of folks backed up onto the,freeway.
What, if any downsides would it have?
Bike infrastructure. There's no easy way south - all the way to Newberg, or the Canby ferry
Find out why the entire Portland area has such bad traffic problems due to no new highways in 40 years. Our senators and representatives have done a very poor job getting Federal funding for our roads. When spending time on the East Coast, the highway systems are so much newer and better. Those states are getting much more money than Oregon for their roads.
Safety concerns on the Boone Bridge as it will likely not have a shoulder lane.
The back up starts at 2pm at 205 south onto it. I totally use back roads as the freeway is not reliable
How long before the project could begin.
Can't think of anything.
Commit to providing safety factors for all modes of vehicular traffic (i.e. including bicycles) in the design, including separation of the non-motorized vehicle lane from the motorized vehicle lanes.
How will they add lanes over the bridge? How much more narrow will lanes be? Concerned about oversized trucks.
Hurry!
Just get it done
cost covered by bonds?
How soon could it happen
None
How will you address the congestion during construction? How long will it take to build?
Do an adequate design and plan for the future.
Traffic lights off of Wilsonville Rd.
There are so many traveling across the river from Charbonneau... why not consider a new bridge that does not require everyone to travel on I-5?
Is there room on the Boone Bridge to create a SAFE extra lane SB?
The Feds need to take account of the importance of the bridge upgrade for West Coast commerce now and for national security, e.g. in the event of seismic disaster.
city should make internal improvements (frontage roads or other) to relieve I5
Congestion during construction. And I still think Wilsonville Road will have bad congestion by a Fred Meyer.
It is needed MOW!
How quickly could this be completed to alleviate a never ending current issue.
Analyze what the traffic will be after 10 years and plan accordingly. The current congestion was predictable over 10 years ago. What was done in the last 10 years? Nothing!
Address bad drivers. It doesn't matter which way you come at the on ramp to go South by Fred Meyer, the almost accidents (and a couple actual accidents) and reckless driving that occurs in this area due to everyone's frustration w/ the traffic situation is astounding.

Responses to Q9: additional questions or concerns
Main caution would be not adding more development pressure on lands south of the Willamette, which would negate any advantages of the ramp-to-ramp improvements.
Future status of the Wilsonville-Hubbard Highway, i.e. when will it be widened to accept 2 lanes southbound?
Major spillage back onto Wilsonville road.
What can be done to minimize the impacts of the work on the bridge to allow another lane
how fast can you do it?! Will it cost Wilsonville residents?
How to coordinate the signals on Wilsonville road to better handle the comgestion
How to minimize traffic congestion during construction and how long would the disruption be
None
Timeline, when and can the project be expedited.
Seismic upgrades to the bridge
Analyze the potential for further backup due to increased traffic speeds would have in the charbonneau off ramp, this causing off ramp backup. Possibly use a traffic regulated signal for charbonneau allowing faster movement of traffic for the I5 off ramp onto Miley Road. Traffic going WB on Miley accross the bridge is minimal but can cause problems
That you build a solution that will last...not the cheap one that fixes the problem short-term
Keep us informed
Seismic issues of the bridge.
How will this be a solution for the long term? If the project were built today, within 5-10 years, we will likely have the same problem because of pop growth.
How many years before construction can start on the additional lanes?
How many years in the future will it take for the construction to start?
Environmental impacts of the project.
cost
With a ramp to ramp, would the lights on the south bound ramp be needed anymore? They are the reason for congestion in Wilsonville.
Temporary 4-lane striping across Boone Bridge to Charbonneau I think would be very beneficial.
Will there also be bike lanes?
That the speed limit from I-205 past the Canby exit be reduced from 65 to 55. There are too many accidents in this area to support a speed limit of 65.
How fast they can implement
Look at the impact of moving more traffic from the arterials to the new lanes of the bridge. Traffic backs up quickly when the bridge backs up. I would be interested in a park and ride south of the river that ties into the future pedestrian bridge into Wilsonville.
planning construction timeline to balance the need to have the least amount of impact and the shortest amount of time. also do it right the first time, no short cuts on lowest bid.
More lanes from Wilsonville Rd (west) entering the freeway. I have been stuck trying to get on the freeway (as far back to almost Brown Rd) as long as 45 minutes with all the funneling from various streets to one onramp turning lane.
Honest opinion? Traffic flows better when the metered ramp (on-ramp) lights are OFF. Traffic has time to get up to speed before entering the freeway! I'm NOT in favor of the stacked on-ramp being discussed, but would rather the metered lights on the on-ramp stay OFF.

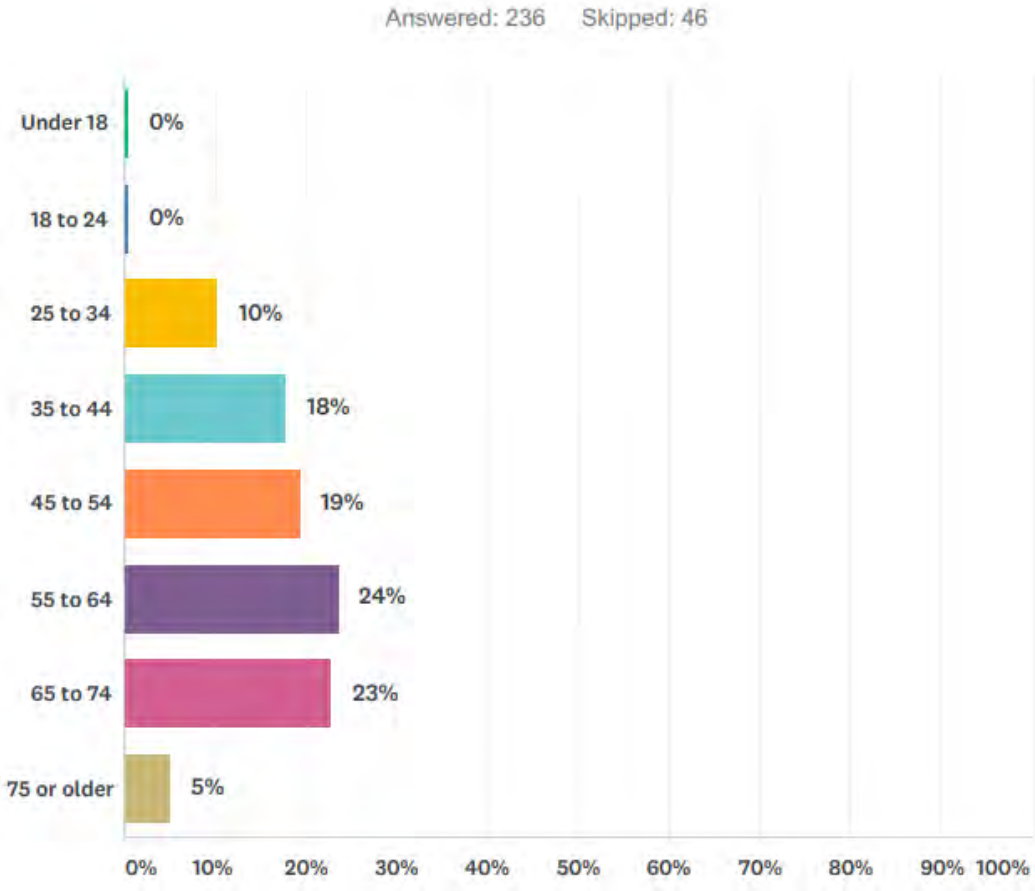
Responses to Q9: additional questions or concerns
Determine the impact on current traffic while construction is underway. Do research to make sure this is the best way to handle it. It seems like a separate bridge connecting Charbonneau/Canby to Wilsonville could remove congestion on I-5 & provide an alternate route if the current bridge was blocked or damaged.
proper studies and public feedback
What are the longer term expectations for transportation changes/improvments? What alternatives have been considered?
What is the expected timeline for this project? When would Oregonians (and visitors) see this become reality?
Try not to make it worse than it is. Do the work in the when the least traffic needs the area. Remember that the bridge is only way many people can get home
None. Ramp to ramp lane would be a great improvement
Is this the right long-term solution to the problem. Are there projects being proposed by the City that will reverse these benefits of lessened traffic.
Oversize the bridge because eventually it'll have to be widened again.
Be aggressive in planning I-5 is the heartbeat of the state. Extremely high growth in Wilsonville and sorounding area
What would be the traffic effects of the construction to make this happen and how long would those be.
What is the bike/ped solution for safely crossing the Willamette River?
cost efficiencies of completing project in conjunction with Boone Bridge earthquake retrofit
1. If a 4th lane is added across the Boone Bridge, how will this affect shoulder widths, and the ability for a vehicles to pull off in an emergency? 2. How will bike/ped access on the bridge be affected? Due to the lack of alternatives, people currently use the right shoulder. 3. This is a good temporary fix, but what steps are being taken to plan for the rehabilitation/replacement/widening of the Boone Bridge? It's current condition is poor, and at 65 years old, will soon reach the end of its original design life.
Impact on the environment? Project timeline? Impact on Wilsonville residents?
Cana you work as much as possible at night, to help freeway movement during the day?
How long would the planning and construction process take? What would the impacts on surrounding properties during construction.
None.
Stop with the ramp light in Wilsonville. It is a joke. It delays inevitable build-up. The one day the power was out (no light) -NO PROBLEMS.
How will traffic over the bridge be affected during construction?
Add commuter rail to Woodburn and Salem.
As one of the 40% that is NOT traveling to the Charbonnau or Canby exits I'm still concerned that this will mean significant delays, despite the research. Attempting to cross lanes in order to get out of an exit only is often very frustrating during busy times. I fear that this won't solve many problems and will only create a scenario similar to that of the 217 to I5 south off ramp which immediately leads to two exit only lanes into Tualatin. This stretch is typically worse than the Wilsonville stretch in my experience. To spend all the time and money to create a similar scenario would be wasteful and frustrating.

Responses to Q9: additional questions or concerns
Seriously consider starting this project at Elligsen Road
How long do they expect this project to keep us at a "D" rating until it starts declining again?
How will you manage possible additional congestion during construction?
Please allow for Tri-Met service (Max) or WES directly to downtown from Wilsonville. It's crazy that it only goes to Beaverton. So many people, including me, would use the service if it went directly downtown (Portland). I save 30-40 minutes a day by driving downtown instead of taking the WES to beaverton and then the Max to downtown. We could encourage more people to use public trans if we offered service to the downtown area directly from Wilsonville and Tualatin. Please provide all I-5 improvements at night and on the weekends.
Concerned about the traffic backup during construction of the ramp-to-ramp lane.
How would it impact us? Would you be smart enough to do work at night?
None.
Fiscal responsibility, feasible timelines for completion.
Don't create another 205/Tualatin interchange challenge, that is one dangerous place. Think regional!
Would construction delay existing commute
What system management measures will ODOT take prior to/in concert with the capacity increase?
Boone Bridge needs to be retrofitted to withstand a 9 earthquake
Would the ramp to ramp lane be built onto the existing bridge? If so, what measurements would take place to ensure it is safely built? What traffic impacts would happen during this project?
Information on how and when the traffic will be impacted with each stage of the project.
Will the bridge be wider or just adjusted by reducing emergency lane?
I want to make sure that a lane cannot be created with the existing set up (even if it means doing away with an emergency pull out on the bridge).
I would want them to extend the extra lane to the Canby exit and add another exit lane.
A designated extra lane both north and south between the Wilsonville exits might help significantly as well
Quality construction that keeps in mind our weather conditions(slippery when wet)
Will the proposed improvements on I-5 beneficially improve the traffic volumes and backups that occur on Wilsonville city streets between 3:30PM and 6PM as workers leave work (from business on either side of I-5) and head south?
Much of the spillback and congestion throughout Wilsonville roads is due to congestion from this bottleneck. Slow traffic on I-5 sends traffic onto back-roads to avoid, but all south-bound traffic from back-roads must get on at Wilsonville Road due to the river crossing. There are no good river crossing alternatives - nearest options are Oregon City and Newberg. The City of Wilsonville has performed several extensive road upgrades on Wilsonville road in the past decade to try and band-aid this problem, but as long as there's a bottleneck on Boone Bridge the local traffic congestion will persist. I would encourage ODOT to consider the most extensive upgrades possible to alleviate the bridge bottleneck, to avoid future congestion issues.
Must do construction at night or way before/after 3-7 rush hour times or commutes will be unbearable.
Just get it DONE!
Get rid of the stupid lights at the onramps.

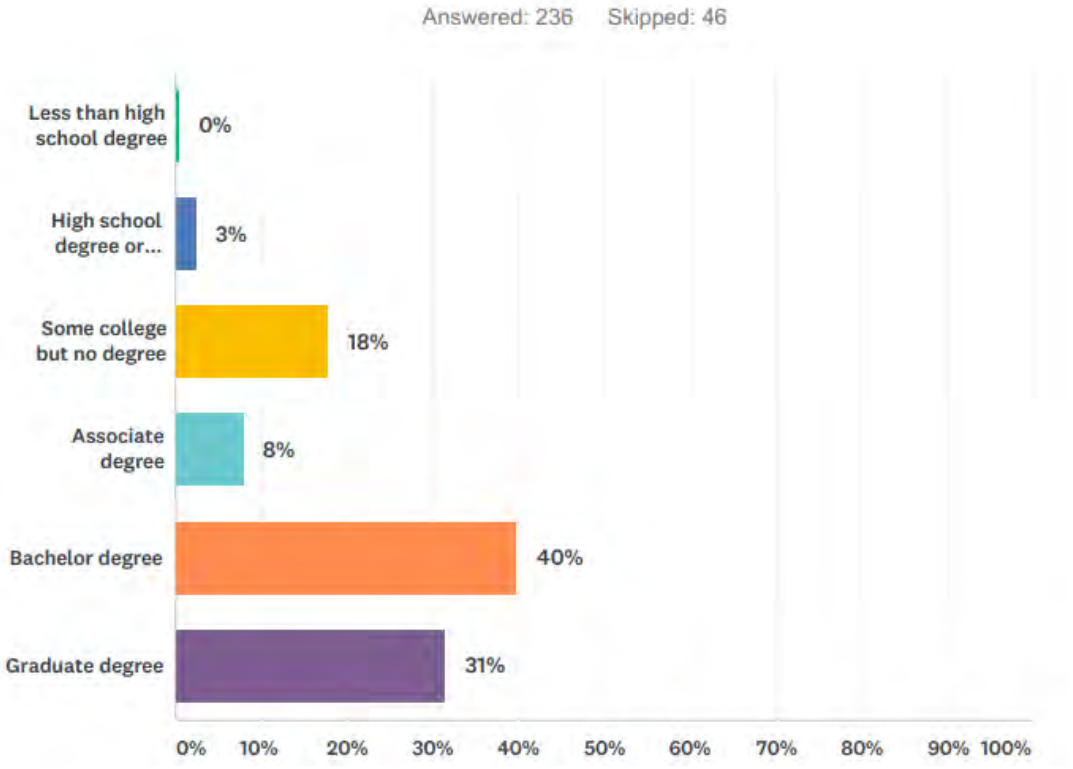
Responses to Q9: additional questions or concerns
Work must be done at night, weekends or way after or before rush hour times or bottleneck will be unbearable.
Is the ramp to ramp lane going to be metered, increasing the backup onto Wilsonville Road? If not, will it be separated to prevent scofflaws from jumping the meter queue?
None. Just do it!!
move on it asap
Although the numbers of bicycles and pedestrians crossing the Boone Bridge are small, it is the only link across the river for miles. This is a multi-modal crossing and needs to be treated as such. If adding a ramp to ramp lane would eliminate the shoulder on the bridge, this means bikes and pedestrians no longer have a safe way to cross the bridge unless the take the SMART bus, which only runs every half an hour. Some of the funds used to improve the crossing should be dedicated for the construction of a bike/ped bridge which is within a mile of I-5 along the river.
N/a
My major concern is this: Why did it take so long to recognize this problem and why will this project take so long to complete (anticipated start date: 2028!)? This project seems to be a "no-brainer" for reducing at least some of the congestion on I-5, and plans like this should have been in the works years ago. I'm also concerned with the way ODOT appears to be handling the whole mobility and access issue for Portland and the surrounding area. How does this project fit into the overall scheme for moving people and goods in and out of Portland? I'm new to this area. It looks like the I-5 corridor is the major artery which, if an earthquake or a serious accident were to happen, would shut down people and commerce movement for days, weeks, months or perhaps years. Do you folks understand how vulnerable the economy of the area is to a serious incident or event? Have you calculated the risk and cost? Where I came from (Colorado) CDOT had worked out and published the cost of congestion on I-70 to the state's economy. They have a different problem in that expanding I-70 many of the mountain areas is extremely costly. On the other hand, ODOT has more flexibility in terms of its options. What are they?
Why not build another bridge with 6 lanes ? That is what is needed . As soon cas you get done with the puny 1 lane addition it will be totally too small and 10 years behind what is needed . You need a new bridge ....period .
Is the roadbed wide enough to include safe breakdown lanes?
to take further growth inaccount
Any delays will take a bad situation to only worse
After north WILSONVILLE I-5 EXIT try to direct south bound traffic to merge left at a sign at the Boeckman Rd.overpass.
How would this work given the space limitations o the Boone Bridge?

Responses to Q9: additional questions or concerns
How quickly can this be done?
Do it now, not in 10 years.
Traffic that is weaving from the on ramp to continue past the canby exit.
Is there sufficient street capacity and infrastructure to support the on-ramp traffic into the cities? If not, then the backups will continue.
Signage and enforcement to avoid late-merge incidents a la the 217S merge onto I-5 south. This would pertains to the traffic continuing south on I-5 past the 282 exits.
extent southbound from hwy 551 to the wilsonville exit also. the existing extension did little to reduce the morning traffic impact
Hopefully the main work will take place during evening hours.

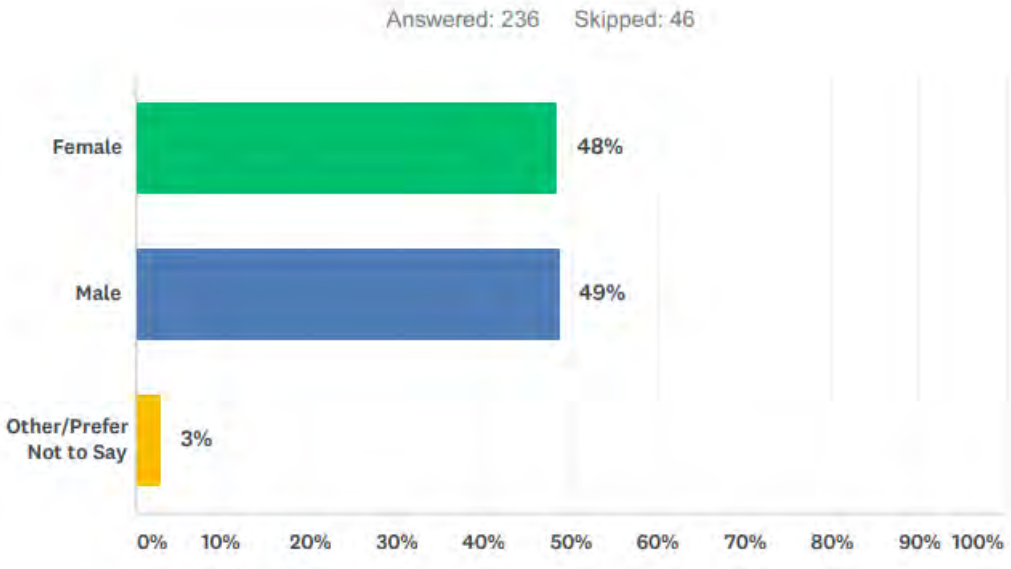
Q10: What is your age?



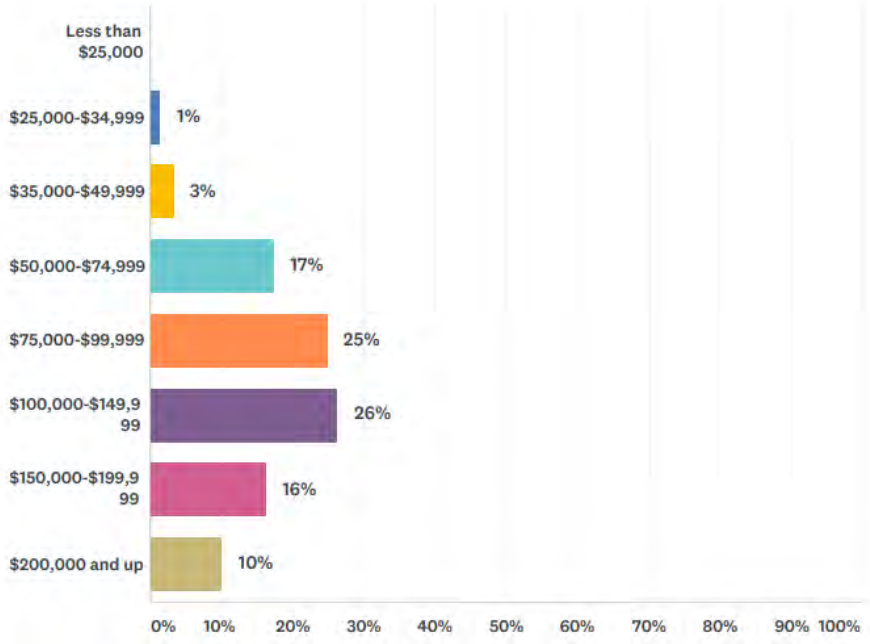
Q11 What is the highest level of school you have completed or the highest degree you have received?



Q12 What is your gender?

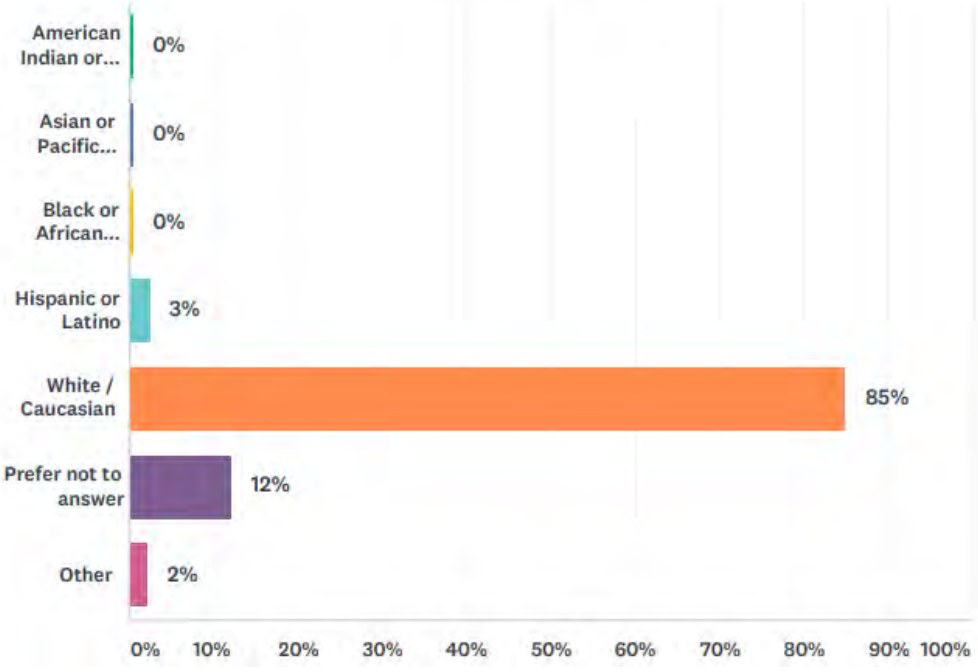


Q13 What is your approximate average household income?

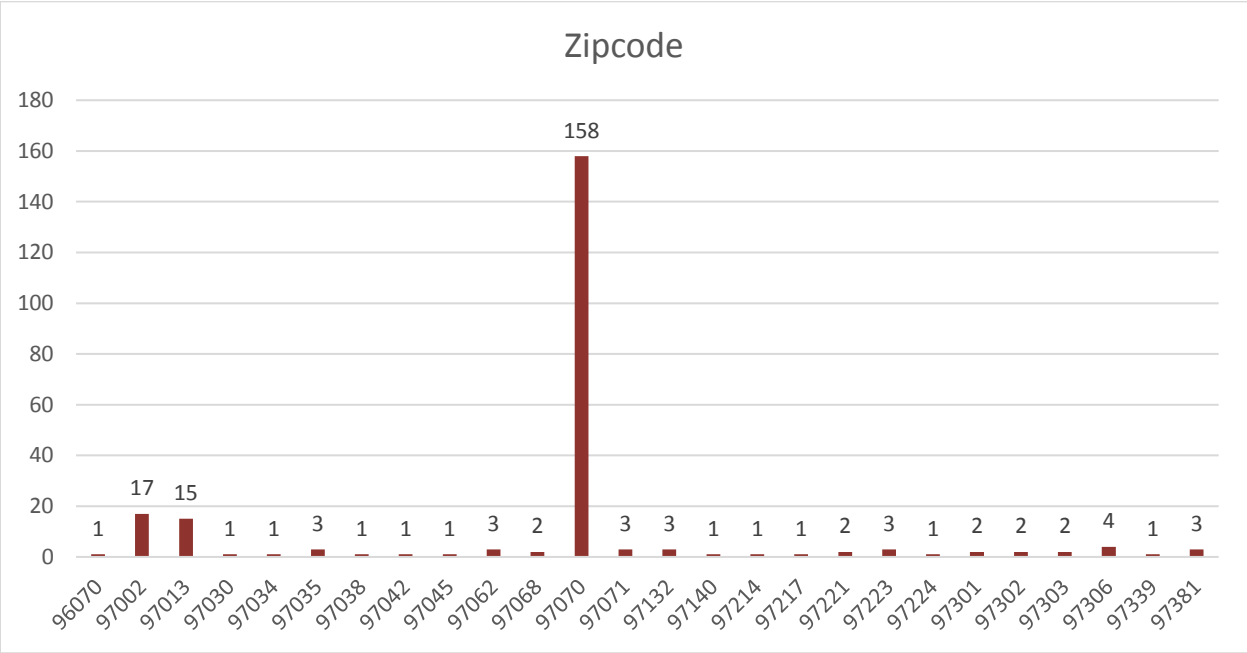


Q14 Please specify your race and ethnicity. (Check all that apply.)

Answered: 231 Skipped: 51



Q15: Please enter your zipcode



ODOT 45-Day Public Comment Period
Summary of Comments Submitted

The draft I-5 Wilsonville Facility Plan was posted on ODOT's website for public comment in May 2018. ODOT received 44 responses from the online comment form.

Common themes

The need for investment:

Many comments described the delays experienced daily on I-5 in both directions and local streets and expressed the need for relief.

Several comments asked ODOT to consider not only adding an auxiliary lane, but widening the mainline in both directions.

One respondent said ODOT should aim for a higher level of service to accommodate future growth.

One respondent thought funds could be put to better use in a different location.

Respondents said investments are needed for safety, to reduce the bottleneck and for the viability of Wilsonville.

Investments needed soon:

Many comments reflected the need for investment immediatel . Respondents want the best option to address congestion selected and for ODOT to consider future growth. The 2028-2040 time line is too far to wait for congestion relief.

Local road improvements:

Many comments reflected increased congestion in Wilsonville on local roads.

- Add capacity to the Wilsonville Road on ramp and for traffi waiting on Wilsonville Road.
- Consider no-turn on red lights on local roads.
- Add an additional vehicle bridge in Wilsonville.

Bicycle and pedestrian facilities:

Many comments reflected the need for a bicycle and pedestrian facility on the Boone Bridge in addition to Wilsonville's planned French Prairie Bridge.

Other comments:

One respondent recommended exploring if it is possible to discourage commercial vehicle use during peak commute times or to restrict trucks to a specific lane. They also recommended encouraging the use of ships for commercial goods.

One respondent recommended building a new additional bridge instead of retrofitting the Boone Bridge

What we heard: by the numbers

61 percent
said they traveled southbound on the Boone Bridge daily.

75 percent
drive alone in a private vehicle when making the trip.

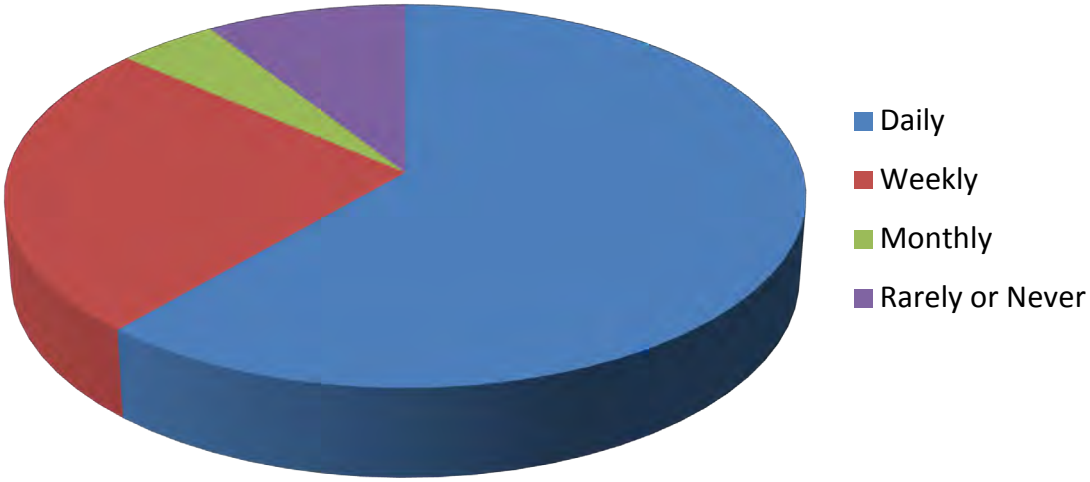
97 percent
said the draft I-5 Wilsonville Facility Plan described the congestion and unreliable travel times experienced when traveling on southbound I-5.

85 percent
strongly agreed ODOT should invest in congestion-related improvements.

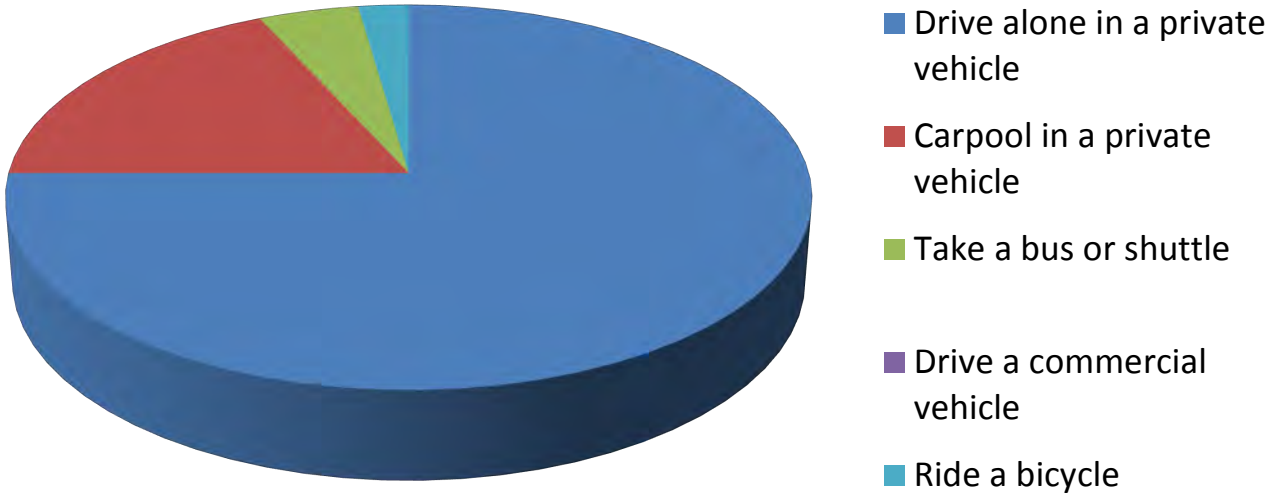
50 percent
strongly agreed that option C seemed like the correct option.

Oregon Department of Transportation

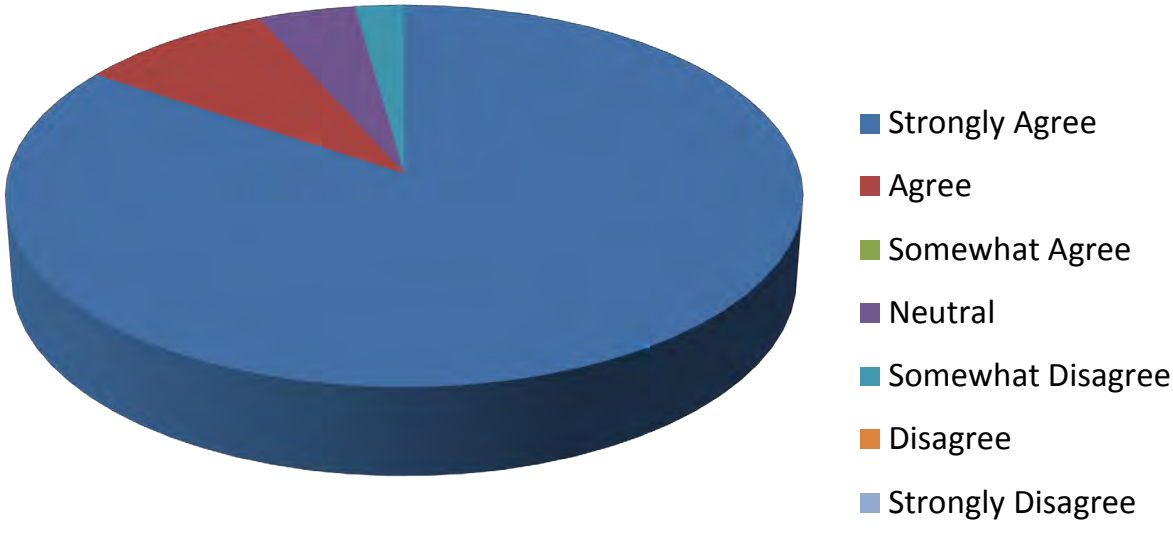
How often do you travel south across the Boone Bridge?



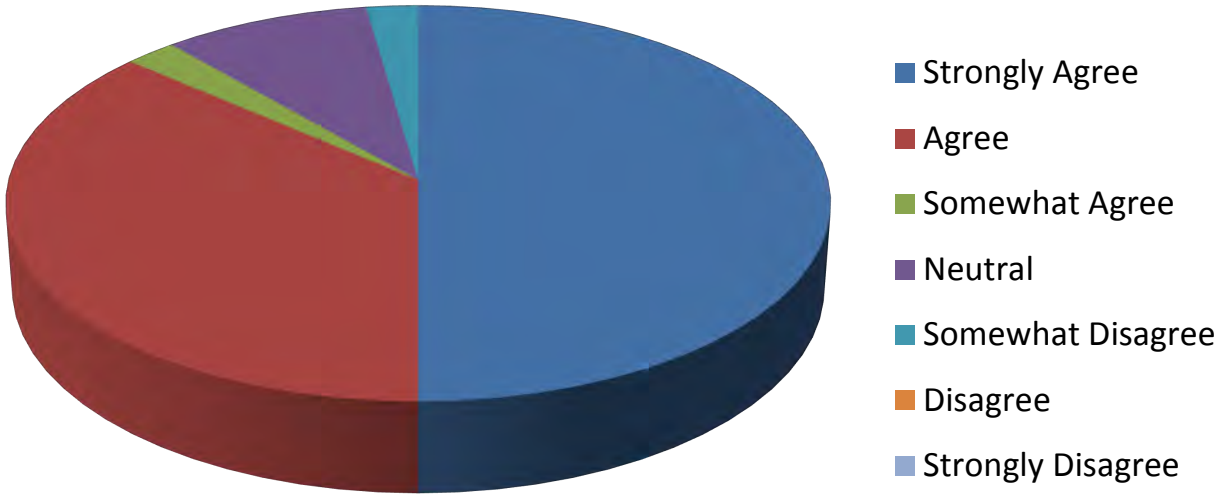
How do you travel over the Boone Bridge?



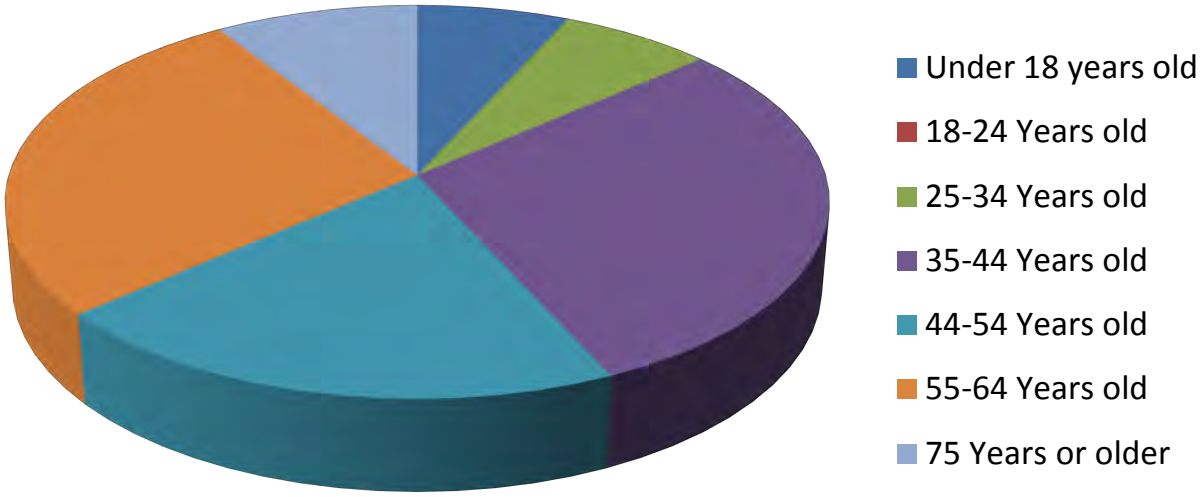
How strongly do you agree an investment is needed?



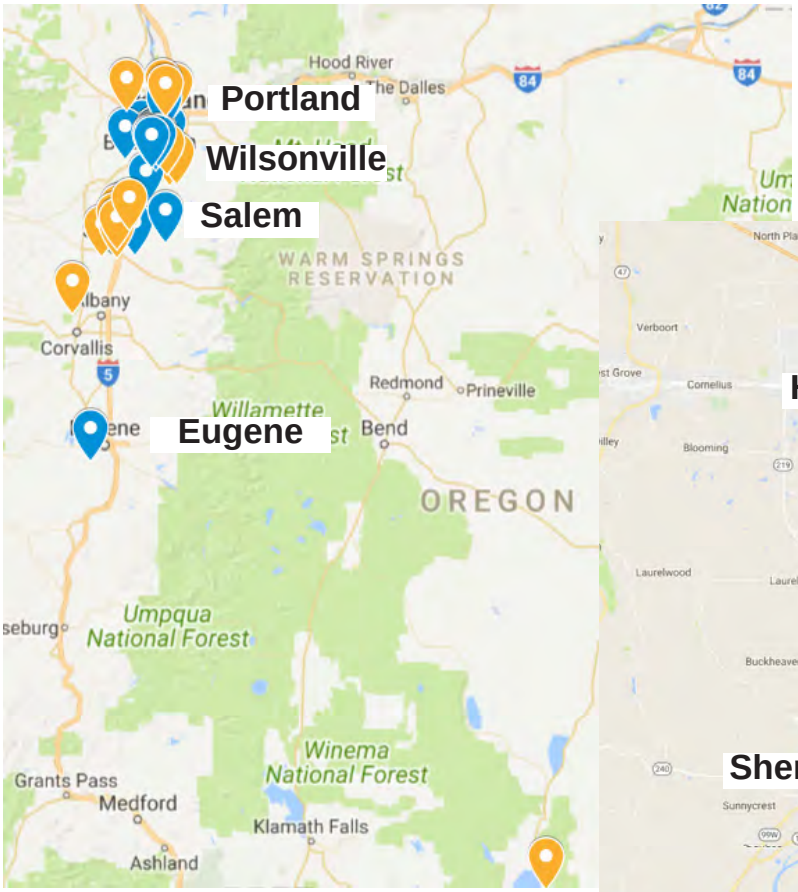
How strongly do you agree Option C seems like the right improvement?



What is your age?



Where do you live and work?



Key

Blue dots represent home zip codes.

Orange dots represent places of employment or frequent travel.

I-5 Wilsonville Facility Plan

Appendix C

Consistency With Adopted State, Regional, and Local Plans

Preface

This appendix provides a summary of adopted state, regional, and local plans that cover geographic and policy areas relevant to this Facility Plan. For each plan, the appendix will briefly summarize the goals and/or policies that bear directly on the Facility Plan, and will describe the ways in which this Facility Plan achieves consistency with those elements. This appendix provides additional information to support the findings of fact submitted to the Oregon Transportation Commission to show compliance with Oregon Administrative Rule 731-015-0065: Coordination Procedures for Adopting Final Facility Plans. This appendix includes information regarding the responses submitted by affected jurisdictions and state agencies as part of the invitation to review the draft facility plan under 731-015-0065.

Statewide Planning Goals

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 Statewide Planning Goals. The goals express the state's policies on land use and related topics, such as citizen involvement, housing, and natural resources. Most of the goals are accompanied by guidelines, which are suggestions about how a goal may be applied. The Department of Land Conservation and Development (DLCD) is responsible for administering Oregon's statewide land use planning program.

- The Findings submitted to the OTC for adoption with this Facility Plan address Goal 1 (Citizen Involvement); Goal 3 (Agricultural Lands); Goal 4 (Forest Lands); Goal 5 (Natural Resources); Goal 12 (Transportation); Goal 14 (Urbanization); and Goal 15 (Willamette River Greenway). ODOT has prepared Findings of Fact demonstrating compliance with all seven of these goals. The remaining twelve statewide planning goals were determined not applicable, because the Facility Plan does not include any of the identified resources and/ or the highway improvements do not impact any of the identified resources. ODOT invited DLCD to review the draft Facility Plan and received no formal response.

Statewide Transportation Policy Plans

Oregon Transportation Plan (2006)

The Oregon Transportation Plan (OTP) is a 25-year plan that comprehensively assesses state, regional, and local and both public and private transportation facilities and services. It includes all other statewide transportation modal and topic plans under its umbrella, and establishes the overarching goals for transportation planning in Oregon. The Facility Plan implements the following OTP goals:

Goal 1: Mobility and Accessibility. Provide a balanced, efficient and integrated transportation

system that ensures interconnected access to all areas of the state, the nation and the world. Promote transportation choices that are reliable, accessible and cost-effective.

- The Facility Plan adopts an improvement that increases the operational efficiency of I-5. It provides motorized modes of travel with more reliable and accessible crossings of the Willamette River, which serves as the boundary between the Portland metropolitan region and the rest of the state.

Goal 2: Management of the System. Improve the efficiency of the transportation system by optimizing operations and management. Manage transportation assets to extend their life and reduce maintenance costs.

- The facility plan identifies an operational improvement that allows ODOT to better manage the existing transportation assets, rather than requiring the construction of new facilities.

Goal 3: Economic Vitality. Expand and diversify Oregon's economy by transporting people, goods, services and information in safe, energy-efficient and environmentally sound ways. Provide Oregon with a competitive advantage by promoting an integrated freight system.

- The Facility Plan improves the economic efficiency of motorized freight using southbound I-5 in the Wilsonville area, and also reduces congestion and delay effecting private drivers and transit users in the evening peak commute hours.

Goal 5: Safety and Security. Build, operate and maintain the transportation system so that it is safe and secure. Take into account the needs of all users: operators, passengers, pedestrians and property owners.

- The Facility Plan will decrease the risk of crashes on I-5 for all motorized modes and improve conditions for emergency responders using the highway during the evening peak. It does not preclude bicycle/pedestrian improvements along I-5 in the study area, and is not expected to directly impact private property.

Goal 7 – Coordination, Communication and Cooperation. Foster coordination, communication and cooperation between transportation users and providers so various means of transportation function as an integrated system. Work to help all parties align interests, remove barriers and offer innovative, equitable solutions.

- The Facility Plan was developed in partnership with directly affected jurisdictions and in coordination with all regional jurisdictions. The planning process was open and offered multiple opportunities for community members and stakeholder groups to receive information about the plan and offer input about their experiences, values, and preferred solutions.

Oregon Highway Plan (1999)

The Oregon Highway Plan defines policies and investment strategies for Oregon's state

highway system for the next 20 years. It further refines the goals and policies of the Oregon Transportation Plan and is part of Oregon's Statewide Transportation Plan. The Facility Plan implements the following OHP goals:

Goal 1. System Definition. To maintain and improve the safe and efficient movement of people and freight, and contribute to the health of Oregon's local, regional, and statewide economies and livability of its communities.

- The Facility Plan is consistent with the functional classification of I-5 as an urban interstate on the national freight network, which is meant to provide safe, reliable, higher-speed operations for longer distance travel and freight movement, as well as emergency services. The operational improvements in this facility plan address congestion and reliability issues that impact freight, transit, and private vehicle users. Those improvements are intended for construction in conjunction with a seismic retrofit project that will ensure the highway can serve as a lifeline route in the event of a Cascadia Subduction zone quake. The improvements will allow the highway to meet state mobility targets in the year 2040. The ramp-to-ramp lane and addition of an exit lane are minor improvements that do not add general travel lane capacity. They will increase safety of roadway users and reduce congestion impacts to emergency service providers.

Goal 2. System Management. To work with local jurisdictions and federal agencies to create an increasingly seamless transportation system with respect to the development, operation, and maintenance of the highway and road system.

- The Facility Plan balances the needs of longer distance trips on I-5 with the need for local travelers to use the highway to cross the Willamette River, in the absence of existing or feasible local motor vehicle bridge options. The Plan was developed in partnership with directly affected jurisdictions, and community members, stakeholder groups, and other government jurisdictions and agencies had multiple opportunities to participate in the planning process. The Plan focuses on operational improvements to I-5, and will increase the ability for ODOT to use the Wilsonville Road on-ramp meter to manage congestion on the highway without severe impacts to local roads. By reducing merging and weaving movements between closely-spaced interchanges; reducing vehicle densities; and evening out speed and volume differentials between travel lanes; the Facility Plan will reduce the risk of crashes on I-5.

Oregon Freight Plan (2017)

The Oregon Freight Plan provides a roadmap for the Oregon Department of Transportation (ODOT), other state and local agencies, tribal governments and the private sector to work together to preserve and enhance the state's freight system. It identifies a number of issues that need to be addressed in order to ensure that Oregon has an efficient and sustainable freight transportation system that continues to support economic growth. These issues

include:

1) Focusing freight system improvements, maintenance and protection on the freight corridors that plan the most critical role in supporting the state's economy.

2) Addressing capacity constraints, congestion, unreliability, and geometric deficiencies on multimodal freight corridors.

3) Improving the efficiency, reliability, and safety of long-haul freight corridors.

- The Facility Plan focuses on I-5, which is one of the most critical trucking routes for the Oregon economy. It addresses a bottleneck that has contributed to congestion and unreliability in one of Oregon's highest-ranked freight delay corridors. Along with improving the efficiency of I-5 in this location, the planned improvement will improve travel time reliability and reduce crash risk for freight trucks as well as other motorized vehicles.

Oregon Public Transportation Plan (1997)

The Oregon Public Transportation Plan provides 20-year guidance for the development of transit, rideshare, and transportation demand management services in Oregon. It aimed to increase per capita transit hours in Oregon metro areas, increase the percentage of Oregonians who make peak hour commutes by means other than driving alone, decrease vehicle miles traveled per capita, and increase the percentage of Oregonians living in communities with daily intercity transit services. It contains policies meant to assure mobility within urban areas, provide access to rural areas, strengthen economic opportunities by providing travel options that increase access to jobs, and provide a basic level of mobility to meet essential travel needs throughout Oregon.

- The Facility Plan addresses a bottleneck that currently impacts multiple intercity bus routes, shuttles, and vanpools between the Portland metropolitan region and communities to the south. By increasing reliability on I-5 and reducing the impacts of congestion to travel times, the planned improvements increase the viability of these public transportation options as a way to meet commute or other daily travel needs.

Regional and Local Comprehensive Plans

Metro Regional Transportation Plan (2014)

The Regional Transportation Plan (RTP) integrates land-use, economic, environmental and transportation policies to accomplish desired outcomes for the Portland metropolitan region. The plan lays out the priorities for road, transit, freight, bicycle and pedestrian improvements, and a strategy to pay for them. The RTP seeks to meet and manage the transportation needs associated with the region's long-range plan, the 2040 Growth Concept.

- The Facility Plan advances several of the RTP's goal areas. It sustains economic competitiveness and prosperity by increasing the efficiency and reliability of motor vehicle, transit, and truck trips in the plan area. The auxiliary lane improvement will enhance safety and security by decreasing the risk of crashes, providing greater ease of access for emergency responders during the evening peak, and increasing efficient management of I-5 by reducing crash-related delays. The Facility Plan also implements several recommendations for the I-5 Tigard to Wilsonville Mobility Corridor in Section 5.3.1.2 of the RTP. Metro reviewed the draft Facility Plan and their letter sent 6/4/2018 did not identify inconsistencies with the RTP. Therefore the Facility Plan has been deemed to be consistent.

Clackamas County Comprehensive Plan (2001 with adopted updates)

The basic aim of the County Comprehensive Plan is to organize and coordinate the complex interrelationships among people, land, resources, and facilities in such a way as to protect the future health, safety, quality of life and welfare of Clackamas County residents. It recognizes urban-rural identities; emphasizes resource preservation in farm, forest, and rural areas; manages growth in urban communities; and protects landscapes, rivers, and other natural attractions. The County's Transportation System Plan (2013) is a component of the Comprehensive Plan.

- The Facility Plan serves motorized travel needs within urbanized Metro-area Clackamas County, while protecting the urban-rural transition that occurs at the Willamette River. The Plan considered options that minimized the potential for impacts to the farm and forest lands and uses in the rural reserves south of the river, as well as potential for impacts to the Willamette River Greenway. It improves the safety and reliability of southbound river crossings in the Wilsonville area of Clackamas County. The auxiliary lane improvement is a conditional use in Clackamas County, and ODOT will work with the County to design a project that can obtain necessary approvals related to the adjacent rural reserves and the Willamette River Greenway. Clackamas County staff participated in the Technical Advisory Committee to ensure consistency with adopted County plans. County staff did not provide a formal response to the invitation to review the draft Facility Plan for consistency, and so it has been deemed to be consistent.

Marion County Comprehensive Plan (2002)

Marion County Comprehensive Plan was developed for the purpose of providing a guide to development and conservation of Marion County's land resources. It is a generalized long-range policy guide that provides the basis for decisions on the physical, social, and economic development of Marion County. These policies are based on inventories, developmental limitations, projected needs, and the urban growth management strategy. State Land Conservation and Development Commission Goals and Guidelines are factors, as well.

- The Facility Plan is located north of the Marion County boundary and does not make any policy changes or improvements within County lands. When invited to review the draft Facility Plan for consistency, Marion County declined to make a formal response and so the Facility Plan has been deemed to be consistent.

Washington County Comprehensive Plan (2017)

The Washington County Comprehensive Plan provides the policies and implementing strategies and standards which guide general land use and transportation plans in Washington County, Oregon. It includes the County Transportation System Plan (2015).

- The Facility Plan is located south of the Washington County boundary and does not make any policy changes or improvements within County lands. Washington County staff participated in the Technical Advisory Committee to ensure consistency with adopted County plans. County staff reviewed the draft Facility Plan and submitted a 6/14/2018 letter that deemed it to be consistent.

City of Aurora Comprehensive Plan (2009)

The comprehensive plan is a strategic document that guides city policymaking. It helps the city make informed choices about future growth and development. It addresses a wide range of issues, from water resources to physical design, from land use to an increasingly diverse population, from promoting the image of the city to maintaining a sound financial base. It formally incorporate sustainability-based planning into programs, plans and policies, and document Aurora's efforts.

- The Facility Plan is located north of the City of Aurora and does not make any policy changes or improvements within City lands. City staff reviewed the draft Facility Plan and submitted a 5/25/2018 letter that deemed it to be consistent.

City of Canby Comprehensive Plan (2007)

The City of Canby developed its comprehensive plan to address ensure provision of services necessary to the community's health, safety, and general. The City planned to accommodate 20,000 inhabitants rather than establish a time frame for planned services.

- The Facility Plan is located north of the City of Canby and does not make any policy changes or improvements within City lands. City staff reviewed the draft Facility Plan and submitted a 5/7/2018 letter that deemed it to be consistent.

City of Donald Comprehensive Plan (2015)

The purpose of this Comprehensive Plan is to establish a guide for the growth and development of the Donald community. The plans and policies contained in this document are an adopted statement of public policy which shall serve, not only as a guide in the decision making process, but also to communicate an understanding of the community's growth

policies to the general public, other affected agencies and the private landowner.

- The Facility Plan is located north of the City of Donald and does not make any policy changes or improvements within City lands. When invited to review the draft Facility Plan for consistency, City staff declined to make a formal response and so it has been deemed to be consistent.

City of Wilsonville Comprehensive Plan (2013)

The Comprehensive Plan is an official statement of the goals, policies, implementation measures, and physical plan for the development of the City. The plan documents the City's approach to the allocation of available resources for meeting current and anticipated future needs. In doing so, it records current thinking regarding economic and social conditions. The plan includes policies and development codes meant to protect significant resources, including public park lands and the Willamette River Greenway. The 2013 Transportation System Plan is a sub-element of the City's comprehensive plan, and it includes policies, projects, and programs that could be implemented through the City's Capital Improvement Plan, development requirements, or grant funding.

- The Facility Plan was developed in partnership with the City of Wilsonville, with the City leading local public involvement activities to meet Comprehensive Plan goals related to citizen involvement. The Facility Plan identifies transportation improvements that support urban growth and development consistent with the adopted land uses in the City's comprehensive plan. The auxiliary lane improvement will enhance safe and efficient vehicular, transit, pedestrian, and bicycle access and circulation on Wilsonville Road in the vicinity of I-5, by reducing the likelihood of significant southbound freeway congestion causing queue spillbacks on the local system. This improvement will manage the capacity of I-5 to improve the flow of goods and services in the evening peak period, both on southbound I-5 and cross-town on Wilsonville Road. During project development, ODOT will design the project (including the auxiliary lane improvement and the Boone Bridge seismic retrofit) so that it can obtain any necessary approvals related to the Willamette River Greenway Overlay Zone, the Significant Resource Overlay Zone, and the Memorial to Boones Ferry Trail. City staff participated in the Technical Advisory Committee to ensure consistency with adopted County plans. On 6/4/2018, the City adopted Resolution 2690 recommending adoption of the Facility Plan by the Oregon Transportation Commission. The City submitted no other formal response to the invitation to review the draft Facility Plan, and so the Facility Plan is deemed to be consistent.

South Metro Area Regional Transit Master Plan (2017)

The Transit Master Plan (TMP) provides a broad look ahead to the type of transit system and supportive transportation options required to meet Wilsonville's mobility needs. This is accomplished by providing proposals for improved transit service as well as strategies to

reduce single-occupancy vehicles. With its combined transit and transportation options approaches, the TMP will guide future decision-making for SMART for the next five to seven years. The TMP is a component of the City of Wilsonville Comprehensive Plan.

- The Facility Plan improves efficiency and reliability for three SMART transit routes operating in the evening peak on I-5 southbound and on Wilsonville Road. SMART staff reviewed the draft Facility Plan and submitted a 6/1/2018 letter that deemed the auxiliary lane improvement to be the most beneficial to SMART of the options considered, due to the improvements it offered to both cross-town and inter-city routes.