SR 516
CORRIDOR STUDY

SR 167 IN KENT TO SR 169 IN MAPLE VALLEY

Prepared with the assistance of:

City of Black Diamond

City of Covington

City of Maple Valley

City of Kent

King County METRO

Puget Sound Regional Council

June 2012

Washington State Department of Transportation

Washington State Department of Transportation
Urban Planning Office
Seattle, WA 98104-2887

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
Urban Planning Office
Seattle, Washington

SR 516 CORRIDOR STUDY

Project Limits:

SR 516 / SR 167 Interchange to the
SR 516 /SR 169 Intersection
SR Mile Post 4.65 to16.22

June 2012

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Washington State Department of Transportation
Urban Planning Office

SR 516 Corridor Study

Study Limits
SR 167 to SR 169 (SRMP 4.65 to SRMP 16.22)

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EXECUTIVE SUMMARY

The Study

The 2010 Washington State Legislature passed ESSB 6381. The bill language stated "$150,000 of the motor vehicle account--state appropriation is provided solely for a corridor study of state route number 516 from the eastern border of Maple Valley to state route number 167 to determine whether improvements are needed and the costs of any needed improvements." The SR 516 Corridor Plan study area begins in the city of Kent, at the interchange area of SR 516, SR 181, and SR 167. The study corridor extends easterly almost 12 miles through the cities of Kent and Covington and terminates at the SR 516 and SR 169 intersection in the city of Maple Valley.

WSDOT has studied this corridor in collaboration with the cities the corridor serves, the regional planning authority, and transit providers along the route to identify if improvements are needed, and if so, what they might cost. This route is not identified as a Highway of Statewide Significance, nor is it part of the National Highway System (NHS), but it does provide a regional east-west connection between east King County and the transportation corridors to and from the urban cores of the Puget Sound area.

The Plan Vision

In September 2010, a Corridor Working Group (CWG) consisting of transportation stakeholders representing various jurisdictions, a regional planning agency, and transit convened to commence the SR 516 Corridor study. One of the first acts of the CWG was to adopt a vision for the study recommendations. The adopted vision states:

SR 516 Corridor Plan Vision

A set of consensus-based, multimodal, and sustainable recommendations for SR 516 between SR 167 and SR 169 that are based on improved safety, improved throughput of people and goods, managed access, and preparation for future population and employment growth.

This vision provided a focus for the CWG while conducting the study of the SR 516 corridor. The CWG met three times over the life of the study. The vision was maintained through direct involvement of the Corridor Working Group in the development and acceptance of the alternatives evaluation criteria and, ultimately, the corridor plan recommendations. The evaluation criteria included safety, local interest, congestion/mobility, feasibility/constructability, and environmental impact.

The CWG's efforts were supported by information and technical data gathered and prepared by Washington State Department of Transportation (WSDOT) staff.

The Plan

A corridor plan identifies transportation safety, preservation, efficiency, and mobility improvement opportunities and offers guidance to WSDOT for making intelligent investments in the corridor over a 20-year period.

The study process involved review and analysis of technical information such as land use, the built environment, the natural environment, current and forecast traffic conditions, and the collision history along the study corridor. Using the technical analysis provided by WSDOT and the information gathered through the CWG meeting process, recommendations to address the forecast deficiencies on the corridor are developed. This corridor plan provides WSDOT with a strategy, when funding is available, for improving the corridor through the year 2030. The end result is a list of near-, mid-, and long-term improvement recommendations. These recommendations are specific to the corridor, and funding has not been allocated to any of the improvement recommendations. The improvement recommendations listed in this corridor study will need to compete against other statewide transportation needs for funding opportunities.

The study corridor was divided into six segments to model for speed comparisons and capacity. Traveling eastward, the segments are as follows:

Segment 1, SR 167 I/C to Jason Avenue, is an urban section in Kent.
Segment 2, Jason Avenue to 101st Avenue, is slightly less urban in character than Segment 1.
Segment 3, 101st Avenue to 160th Avenue SE, is more suburban in character.
Segment 4, 160th Avenue SE to slightly west of 188th Avenue SE, is the urban core of Covington.
Segment 5, slightly west of 188th Avenue SE to 216th Ave SE transitions to a more suburban character
Segment 6, 216th Ave SE to SR 169, is the most rural segment.

All six segments are located within the urban growth area and within the Kent, Covington, and Maple Valley incorporated city limits. There are 34 signalized intersections along the study route and two, signalized, gate controlled, at grade railroad crossings.

Recommendations and Planning Level Cost Estimates

The following information is a list of draft recommendations developed for the SR 516 corridor between SR 167 and SR 169. It is presented in context with Moving Washington policy goals of safety, maintenance & preservation, efficiency, demand management, and strategic capacity improvements.

Maintenance - The current pavement management system program, maintenance needs identification and maintenance work log on the facility should continue. Maintaining the facility is one of the highest priorities.

Safety - The city of Kent has received a safety grant to look at and improve a portion of the corridor for bicyclists and pedestrians near the Kent-Meridian HS. Completion date for the grant work is estimated to be July of 2013. Recommend monitoring the results of the grant improvements, once completed. Continue monitoring collision data along the corridor and determine if any segment or location exhibits a need for additional analysis. To make the corridor safer, WSDOT encourages jurisdictions to manage access and consider the elimination of two way left turn lanes for roadway segments over 24,000 average daily traffic volumes.

Efficiency - This report again recommends a continued focus on access management for the full length of the study corridor. Signal operations should be optimized, with both WSDOT operated and city operated signals being coordinated throughout the study corridor. All other improvements were recommended only after the efficiency of the existing facility had been maximized.

Transportation Demand Management (TDM) - TDM options should be considered and incorporated whenever possible with new development or as adopted policy within local ordinances. TDM is an inclusive reference term for strategies that increase modal options, reduce vehicle trips, or shift use of the roadway to off peak periods. The list includes an estimated cost and benefit for each strategy. TDM recommendations for this corridor include:

- **Vanpool promotion**
- **Employer Engagement**
- **Relocation of Vanpools**
- **Multimodal commute coaching, outreach and incentives**

Strategic Capacity addition - Capacity recommendations were sequenced by timing of need over the 20 year period by 6-6-8, or 2016, 2022, and 2030 (the first six years, the second six years, and the final eight years). Timing of recommendations looks at the projected mobility needs, establishes the timeframe that the needs will exist

within the corridor, and offers a logical sequence for future improvement implementation. These time periods are not associated with actual funding. In the cases of long term needs, the specifics of what a recommended solution and cost might be is intentionally not included in this plan. This allows greater flexibility for the selection and financing of solutions that address the needs most appropriately. The recommendations are further categorized by type of recommendation, or tier. Below are descriptions of what Tier 1, Tier 2, and Tier 3 recommendations may include:

> **TIER 1** recommendations focus on low-cost projects that may deliver a high return on capital investment and have short delivery schedules. These include efficiency improvements as mentioned earlier, as well as ramp modifications, turn lanes and intersection improvements.
> **TIER 2** recommendations focus on moderate to higher cost improvements that reduce congestion on both highways and local roads. These include improvements to parallel corridors (including local roads), adding auxiliary lanes, and direct access ramps.
> **TIER 3** recommendations focus on the highest-cost projects that can deliver corridor-wide benefits. These include adding general purpose lanes, and, interchange modifications.

Near term

Widening from Jenkins Creek to 185th Ave SE	TIER 3

Mid term

Widening from 185th Ave SE to 192nd Ave SE	TIER 3
Intersection improvements at SR 516/104th Avenue SE (SR 515)	TIER 1

Long term

Capacity improvements from 192nd Ave SE to 216th Ave SE	TIER 3
Intersection improvements at SR 516/Central Avenue N	TIER 1
Intersection improvements at SR 516/SE 256th St	TIER 1
Intersection improvements at SR 516/108th Avenue SE	TIER 1
Intersection improvements at SR 516/132nd Ave SE	TIER 1
Intersection improvements at SR 516/152nd Avenue SE	TIER 1
Intersection improvements at SR 516/172nd Avenue SE	TIER 1
Intersection improvements at SR 516/SE Wax Road	TIER 1

Railroad Crossing Analysis

One of the objectives of this study was to analyze the interchange area of SR 516, SR 181, SR 167 and the traffic interactions with the at grade crossings at the Union Pacific and BNSF rail lines within the vicinity of these interchanges.. This study did not find justification for making a recommendation for grade separated crossings at those locations. The study and analysis for this area did not model for any improvements on SR 167. Should improvements move forward on SR 167, further

study should be conducted to determine impacts on traffic flow and emergency vehicle access in regards to railroad crossing operations.

Plan Implementation

The SR 516 Corridor Planning Study identifies corridor needs that are based on adopted Washington State Department of Transportation (WSDOT) thresholds and proposes actions to address those needs. While this alone does not guarantee implementation funding, the plan allows future consideration for funding requests to be focused on areas of greatest need in this corridor. These identified areas will compete with other locations around the state for future funding based on performance outcome.

Available revenue to implement the identified improvements is limited. Specific actions that should be taken to position the proposed improvements for future implementation include:

- Incorporate the SR 516 Corridor Plan recommended improvements in the State's Highway System Plan (HSP) and the Puget Sound Regional Council's (PSRC) regional transportation plan.
- Incorporate the SR 516 Corridor Plan recommended improvements, as appropriate, in county and city comprehensive plans.
- Continue collecting developer contributions to help finance improvements related to the expanding transportation demands and growth.
- Local jurisdiction involvement in funding transportation improvements, both for state facilities as well as local improvements that may be beneficial to the state facility functions.

CHAPTER 1

The Purpose of Corridor Planning

Chapter One

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CHAPTER 1 THE PURPOSE OF CORRIDOR PLANNING

Corridor plans are comprehensive documents used for addressing the long-range vision of how transportation corridors should look and function. A corridor plan forecasts approximately 20 years into the future at highway and travel conditions and develops recommendations to address those conditions. The corridor plan collects and analyzes facts and data about the corridor such as current operating conditions (travel speeds – how fast or slow does traffic move, traffic volumes, safety), potential efficiencies, environmental conditions, population growth, land uses that utilize the corridor, right of way, and other elements that affect the highway's current and future performance. It is important to the Washington State Department of Transportation (WSDOT) and its funding partners, such as the federal government, local jurisdictions, transit agencies, and Regional Transportation Planning Organizations (RTPO), to know that any projects that are built as a result of the corridor planning effort will be sustainable and function well into the future to effectively serve the increasing demands on the transportation system.

To ensure that the study recommendations are consistent with the vision and needs of local jurisdictions and communities located along the route, the corridor plan includes a public participation process consisting of the creation of a corridor working group, open meetings, and the development of a study website intended to inform the public of the study's progress. The website address is [http://www.wsdot.wa.gov/planning/Studies/SR516Corridor/]. The corridor working group's role is to inform WSDOT of community interests and concerns, help create a vision for the route, help determine decision criteria, and serve as a sounding board for study findings and recommendations.

1.1 How this Corridor Plan is used

A corridor plan serves as a comprehensive plan for a state route. For WSDOT, the corridor plan provides information for use in the Highway System Plan such as specific preservation, maintenance, safety, and mobility improvements with associated near term planning level cost estimates, and the ability to fairly prioritize the route specific recommendations against other statewide transportation needs. The corridor plan can also be used by local agency transportation stakeholders to help guide future development's layout and placement into planned improvement locations, and help implement projects on their own. The plan is also useful to RTPOs and local transportation agencies in their own planning processes. The information provided in the corridor plan can be used to ensure that regional and transit projects and programs are coordinated and complementary to the efforts of WSDOT within their jurisdictions.

The SR 516 Corridor Plan is organized into six chapters:

- *Chapter One* is an introduction to the corridor plan and document, and includes a discussion about how the study findings are used by WSDOT and others.
- *Chapter Two* is a review of the process used to determine the route deficiencies and recommended solutions. This chapter includes a description of the stakeholder and public involvement processes.
- *Chapter Three* provides information about the existing highway facility and the surrounding area. This chapter describes land uses, terrain, environmental elements, and the physical characteristics of the facility. It also contains an analysis of the existing conditions and operations, including a safety analysis.
- *Chapter Four* is an analysis of the forecasted 2030 baseline traffic conditions and serves as the basis to identify needs in the future.
- *Chapter Five* provides a focused discussion about the alternatives considered for the SR 516 corridor and specific study recommendations to address the identified needs.
- *Chapter Six* provides a discussion on plan implementation.

1.2 WSDOT Highway System Plan

The Washington State Highway System Plan (HSP) is the state highway component of the Washington State Multimodal Transportation Plan (SMTP). The SMTP is the state's overall transportation plan that includes facilities the state owns and operates and those in which the state has an interest. The HSP is updated every two years and serves as the basis for the six-year highway program, the two-year biennial budget request to the state legislature, and the ten-year Capital Improvement and Preservation Program. WSDOT is tasked with delivering an HSP that implements the legislature's goals. This is accomplished through the coordination and integration of specific components from many corridor plans state wide. The HSP is also aligned to the Washington Transportation Plan (WTP), which outlines the policies adopted by the Washington State Transportation Commission. The SR 516 Corridor Plan advances and refines recommendations within the WSDOT HSP by providing a more in-depth analysis of current and future needs along this specific corridor.

WSDOT's goal is to create a long-range plan that provides decision-makers with the most cost-effective strategies to maintain the state wide transportation system's integrity, safety, and user mobility. This is accomplished through a continual system-wide performance measuring and monitoring program, where WSDOT collects and analyzes data to determine current and future performance of the highway system. Assets that do not meet established performance threshold criteria are identified as needs. WSDOT develops cost-effective strategies, based on analysis of performance outcomes and best management practices (both national and international), to provide high benefit solutions for identified needs. WSDOT's policy, Moving Washington, aims first to keep the transportation system safe, maintain and preserve the system,

and improve the operating efficiency of the existing highway system before considering strategically adding capacity.

The funding process at WSDOT includes four major programs: Maintenance, Operations, Preservation, and Improvement. Corridor plans historically have focused on solutions associated with the Improvement program. This category of funding includes projects that contribute to congestion relief, as well as those that enhance traffic safety. Operational, Maintenance and Preservation schedules are evaluated in this plan. The current programs are reviewed and recent and future work under those categories is listed. Any programmed improvements for the corridor are included within the future analysis. The Operations, Maintenance and Preservation program develops projects which are prioritized by WSDOT using analytic processes that maximize benefit for the funding available.

1.2.1 WSDOT Improvement Subprograms

The Improvement funding program at WSDOT has five subprograms: Highway Mobility, Highway Safety, Environmental Retrofit, Economic Initiatives, and Public/Private Partnerships. Projects requiring funding within the programs are identified and included in the HSP.

Mobility Subprogram (I-1)

The Mobility Subprogram of the Highway System Improvement Program is intended to relieve congestion and improve operational efficiency. The focus is on moving people and improving intermodal connections. Typical strategies include access management, adding general purpose or high-occupancy vehicle lanes, and providing bicycle facilities and park and ride lots. Another series of operational strategies found in this subprogram seeks to optimize the existing facility capacity by influencing the patterns of usage on a route. Typical operational strategies include ramp metering (limited access highways), timely traveler information, incident response and signal synchronization.

Highway Safety Subprogram (I-2)

The Highway Safety Subprogram is intended to increase highway safety. Every two years, the Collision Analysis Locations (CAL) and Collision Analysis Corridors (CAC) in each WSDOT region are addressed with the funds available for that purpose. CACs are five mile corridors with a five year history of at least 11 fatal or serious collisions outside of cities of greater than 25,000 population. CALs are locations with a history of at least four fatal or serious collisions, and at least six evident injury collisions, also outside of cities with a population of over 25,000.The study corridor does not currently have any listed CACs or CALs.

There is also an Intersection Analysis Location List (IALL). This list rates intersections statewide using average societal cost of collisions per each target intersection, depending on the type of collision, speed, and severity for the last five years. Each year, as the latest collision data becomes available, the list should be updated to reflect the most recent five years of data. According to the currently adopted list there are no IALs along the study corridor.

Economic Initiatives Subprogram (I-3)

The Economic Initiatives Subprogram targets those improvements to state highways that contribute specifically to economic development. Objectives include creation and retention of jobs with a focus on regional freight movement. The 2007 HSP has not identified any deficiencies in the core freight grid within the study corridor.

Environmental Retrofit Subprogram (I-4)

The Environmental Retrofit Subprogram addresses situations where existing conditions on a route do not meet current environmental requirements for highways. Typical projects address storm water treatment, fish passage, noise reduction and air quality. No I-4 projects are currently programmed within the limits of this study corridor.

Deficiencies identified in the Economic Initiatives and Environmental Retrofit Subprograms are identified, prioritized and addressed within each specialty area. As is the case with the Operations, Maintenance and Preservation programs, environmental projects are prioritized using analytic processes that maximize benefit for the funding available.

1.2.2 WSDOT Programming and Prioritization Process

Transportation funding in Washington State has not kept pace with needed highway improvements and repairs. The Washington State Department of Transportation has a process for prioritizing projects to ensure that taxpayers get the most value for the dollars spent. This prioritization process is spelled out in the Revised Code of Washington (RCW 47.05). A simplified explanation of this process includes the following steps:

1. Identify a problem or deficiency.
2. Explore possible solutions.
3. Develop a scope for the project, which takes into consideration possible environmental impacts, roadway design issues, and stakeholder concerns.
4. Based on the project scope, develop a cost estimate or estimated range.
5. Determine the benefit the project will provide.
6. Compare the costs and benefits of this project with other projects of its type to determine its order of rank and priority.

1.3 Consistency with Other Plans

The planning of a state owned transportation facility must include coordination with all the affected users and participants. As such, the SR 516 CPS has reviewed and considered local and regional plans in the process of creating this planning document. The reviewed plans include:

- Transportation 2040, the regional transportation plan created by the Puget Sound Regional Council.

- Kent, Covington, and Maple Valley Transportation Improvement Plans (TIPs) and Comprehensive Plans.
- King County METRO and Sound Transit long range transit plans
- Washington Transportation Plan, Highway System Plan, Moving Washington

Transportation 2040 - Includes the following listed projects, sponsor, estimated cost, current status, and a brief description of the project:

KENT

Willis St grade separations SR 167 to Central Ave. Kent $81,000,000 Candidate

Provides a critical, grade-separated link through the commercial/industrial/central area of Kent. Links the valley warehouse/industrial center to SR 167 and I-5.

(Note – Willis Street is the local name for SR 516. This project includes both Union Pacific & BNSF railroad line grade separations)

COVINGTON

SR 516 Jenkins Creek to 185th Pl. Covington $13,000,000 Candidate

This project is to widen and reconstruct a portion of SR 516 (SE 272nd St) between Jenkins Creek and 185th Place SE. This project will include the crossing of Jenkins Creek with a new structure for the stream, widening the street from 2-lanes to 5-lanes including curb and gutter, 8' sidewalks, access control features, landscaping and provisions for u-turns.

(Note - The city of Covington has received some funding for, and is currently working on portions of the design for this project. They are actively seeking additional funding for its completion.)

MAPLE VALLEY

SR 516 213th Pl SE to SR 169 Maple Valley $4,000,000 Un-programmed

Widening from 2 to 4 lanes, center turn lane/ left turn pockets, bike lanes and sidewalks (from 213th SE to SR 169).

(Note-This project may be modified to match the updated version of Maple Valley's comprehensive plan seen below.)

The city of Maple Valley updated the transportation element of its comprehensive plan in October of 2011. The following is a copy of the city's current plan related to projects involving SR 516:

SR 516 Improvements (SE Kent-Kangley Road)			
#	Location	Description	Estimate in $1,000
116	SR 516 (213th Ave SE to 218th Ave SE) *Phase A*	Widen to 3 lanes. Add EBR turn lane at 216th Ave SE intersection. Install new curb, gutter, bike lane, and sidewalk on the north side for the entire length and the south side west of 216th Ave SE.	$4,600

117	SR 516 (207th Ave SE to 216th Ave SE) *Phase B*	Construct second EB lane on SR 516 from west city limit to 216th Ave SE. Construct second WB lane on SR 516 from 1,000 ft east of 216th Ave SE to west city limit. Include curb, gutter, bike lanes, and sidewalks. Provide center left turn lane/pockets where warranted. Improve 216th Ave SE intersection.	$4,320
118	SR 516 (218th Ave SE to 228th Ave SE) *Phase C*	Widen to 3 lanes. Install new curb, gutter, bike lane, and sidewalk on the south side for the entire length and the north side west of Witte Road. Construct center left turn lane/pockets, where warranted. Construct NB right-turn lane. Left-turn signal pockets and signal phasing provided at each approach.	$4,860
119	SR 516 (228th Ave SE to 236th Pl SE) *Phase D*	Widen to 3 lanes. Install new curb, gutter, bike lane, and sidewalk on both sides. Construct center left-turn lane/pockets, where warranted.	$3,870

(These four projects are intended to be coordinated with, and subsequent to, the city of Covington's planned widening of SR 516 from Jenkins Creek to 216th Ave SE. These projected needs are beyond the 20 year planning horizon of this corridor study.)

The Highway System Plan (2007-2026)

There are no SR 516 projects listed in the 2007-2026 HSP. In general, the HSP and T-2040 are consistent. Differences occur primarily due to the time span being considered (20 years for the HSP versus 30 years for the T-2040). The updated edition of the HSP will contain all projects on state facilities listed in T-2040, with those not within the 20 year timeframe of the HSP listed as unprogrammed regional plans and projects.

1.4 Sustainability in Planning

Sustainable transportation preserves the environment, is durable, and takes into account how much is built, how it is built, the materials used and the costs of maintenance. It manages and operates using policies and strategies that meet society's present transportation needs without compromising the ability of future generations to achieve their own goals. Emissions from transportation-related activities account for nearly half of the total greenhouse gas (GHG) emissions in Washington State. This is one reason why sustainability should be considered in all transportation decisions. Improvements must make good environmental and good economic sense for Washington. A strategic and balanced approach to conserve energy while reducing greenhouse gas emission from the transportation sector is a valuable objective with potential benefits for everyone in the region.

Making transportation sustainable

There are a number of ways to make transportation more sustainable. From long-range plans to day-to-day operations, sustainability includes designing highways that work best for communities by developing a multi-modal system that not only supports vehicular traffic but also transit, bicycling and walking. Sustainability also employs techniques that reduce storm water pollutants and air pollution.

Technology

New technology and innovative methods provide a more reliable, responsible and

sustainable transportation system. While keeping people and goods moving, conserving fuel and energy, reducing carbon emissions, and protecting our natural environment must also be considered.

Efficiency

Existing facilities should be put to their highest and best use. Highways are more efficient by smoothing traffic flow through our busiest choke points. Higher speeds do not always mean better flow and throughput. Greater consistency of movement will utilize the current system more efficiently

This long range plan focuses on doing the most we can with minimal expansion. Giving the public more options is a focus of this plan. Whether those options include transit, bicycling, walking, or utilizing technology to eliminate trips, it all adds up to a more sustainable system. The recommendations contained within this report are intended to help provide mobility into the future, minimize congestion, provide multimodal options, and maintain a safe corridor for the public to use into the future.

CHAPTER 2

The Study Process and Methodology

Chapter Two

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CHAPTER 2 THE STUDY PROCESS AND METHODOLOGY

The study process consisted of collecting data about the study corridor. Data collected included maintenance, preservation, safety, environmental, and mobility conditions. In keeping with *Moving Washington*, WSDOT's principles for making responsible and sustainable decisions; maintenance, safety, and preservation practices and procedures were examined first. After these, the corridor is studied to determine if there are operational changes that will make the existing corridor operate more efficiently. Next, strategies are looked at to determine if demand for the available capacity can be managed better. Finally, travel demand modeling is then applied to determine if any capacity improvements may be justified. The current conditions are entered into a model which forecasts a future conditions scenario utilizing local and regional long range plans as well as any recommendations and expected benefits derived from the earlier work. The model helps to determine if mobility needs will exist and when they may be expected. If justified, strategic capacity modifications to the transportation network are then considered and recommended. In making any recommendation, environmental issues, costs, local interest, risks, and other factors are considered as an integral part of the identification of needs process.

The public participation process used in developing the SR 516 Corridor Plan consisted of a Corridor Working Group (CWG) comprised of interested stakeholder jurisdictions along the study corridor. The CWG members represented their community's and elected officials perspectives and interests on issues facing the study corridor. A project website [http://www.wsdot.wa.gov/planning/Studies/SR516Corridor/] was developed to inform the public of the study's progress. Communication with the public was accomplished using a website, distribution to the stakeholder jurisdictions of an information sheet with website and contact information. The Muckleshoot and Yakama tribes were invited to participate in the study, as well as local, county, state, and federal elected officials representing the affected jurisdictions.

2.1 Stakeholder Involvement

Early in the corridor planning process, the Washington State Department of Transportation (WSDOT) staff met with or contacted various parties to inform them of the up-coming study and obtain their input about transportation issues along the corridor. The parties contacted by WSDOT were: the cities of Black Diamond, Covington, Kent, and Maple Valley; King County Metro, Puget Sound Regional Council, Sound Transit, Yakama Tribe, Muckleshoot Tribe, Cascade Bicycle Club, Middle Green River Coalition, and elected representatives.

These outreach efforts were made to publicize the study and engage individuals with a strong interest in transportation issues to represent their jurisdictions or agencies on the Corridor Working Group (CWG) committee. The CWG acted as both a focus and advisory group that helped build the vision for the corridor, generate solutions for corridor improvements, consider community opinion, and support the recommendations to be included in the final plan.

The CWG members' understanding and appreciation of the transportation issues regarding their particular areas of interest were an important component in informing WSDOT staff of local transportation issues and developing recommendations inclusive of their diverse interests.

2.1.1 Corridor Working Group Membership and Meetings

The CWG represented the communities along and near the corridor. The consistent attendance and commitment on the part of the CWG members was a crucial factor in the success of the study. The committee met three times between September 2010 and November 2011. Table 2-1 shows the CWG membership.

City of Black Diamond	City of Covington	City of Kent
City of Maple Valley	King County Metro	Puget Sound Regional Council
WSDOT		

Table 2-1: Corridor Working Group

Formal CWG meetings were held on September 27, 2010; June 16, 2011; and November 16, 2011 at Covington City Hall. There were a number of more informal meetings with individual members as well as multiple phone and e-mail communications.

2.2 Study Methodologies

The study methodologies set the parameters that were used to analyze the performance of the corridor and determine if safety, maintenance, preservation, environmental, and/or operational issues existed along the corridor. The results helped guide the creation of a plan that includes a list of near (first six years), middle (second six years), and long-term (eight years more) needs and possible recommendations addressing existing and future issues along this route, consistent with the vision and Moving Washington. In cases of longer term needs, specific recommendations as to the best way to address those needs are not given. The purpose of this strategy is to provide flexibility in determining a solution and allow future technologies and approaches to be considered and utilized if appropriate.

The study area for the traffic analysis includes SR 516 from SR 167 (State Route Mile Post SRMP 4.65) east to the SR 169 intersection in Maple Valley, (SRMP 16.22) for a total of 11.57 miles. The study corridor goes through the cities of Kent, Covington and Maple Valley; but the travel demand forecasts were done for a larger area covering the cities of Kent, Covington, Maple Valley and Black Diamond. Figure 2-1 presents the SR 516 corridor section that was analyzed for the study.

A total of 26 intersections were analyzed on this corridor. All of the intersections analyzed were signalized. Figure 2-2 shows the study intersection locations. Intersections

were chosen based on demand, consultations with various WSDOT traffic and engineering divisions, and with the Corridor Working Group.

The analysis years were 2009 for current conditions; 2016, 2022, and 2030 for future conditions. Both AM and PM peaks (rush hours) were modeled for the analysis.

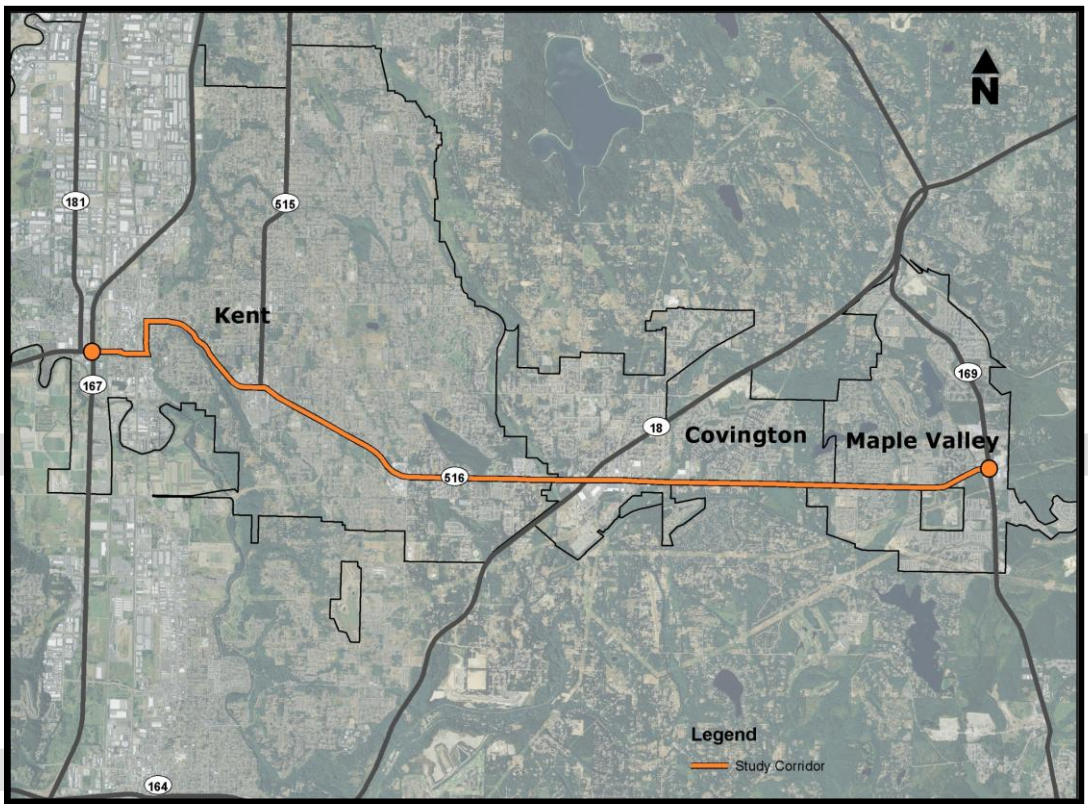

Figure 2-1 Corridor Study limits

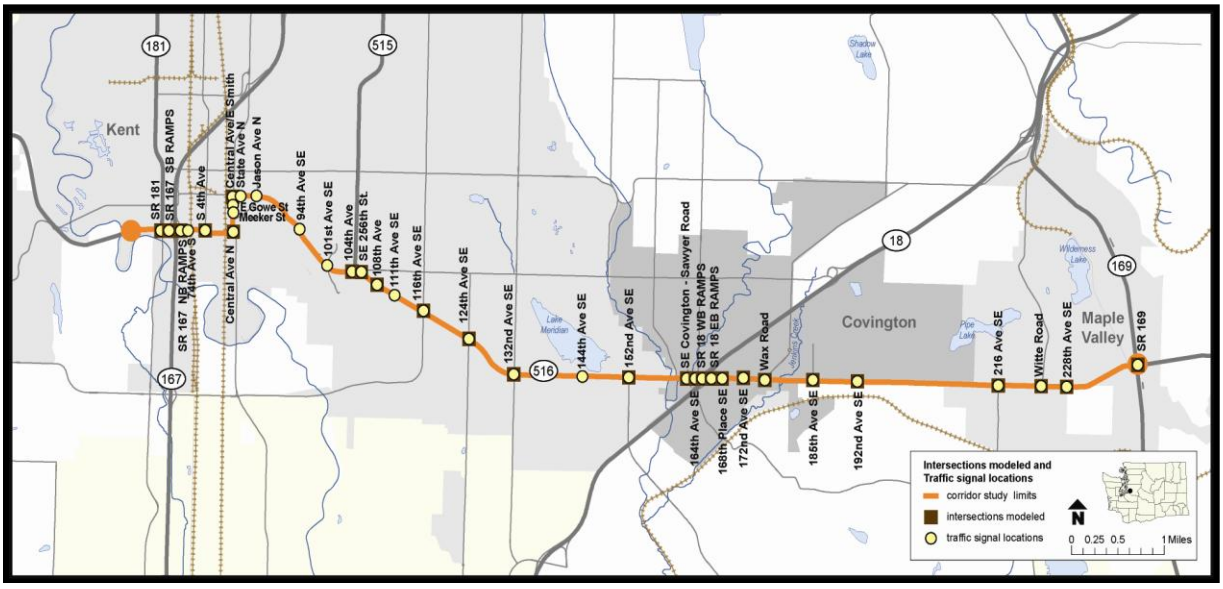

Figure 2-2 Intersections analyzed

Intersection. #	LOCATION
1	SR 516 & SR 181
2	SR 516 & SR 167 SB RAMPS
3	SR 516 & SR 167 NB RAMPS
4	SR 516 & S 4th Ave
5	SR 516 & Central Ave N
6	SR 516 (E Smith) & Central Ave
7	SR 516 & 104TH AVE
8	SR 516 & SE 256th St.
9	SR 516 & 108th Ave
10	SR 516 & 116th Ave SE
11	SR 516 & 124th Ave SE
12	SR 516 & 132nd Ave SE
13	SR 516 & 152nd Ave SE
14	SR 516 & SE Covington - Sawyer Road
15	SR 516 & 164th Ave SE
16	SR 516 & SR 18 WB RAMPS
17	SR 516 & SR 18 EB RAMPS
18	SR 516 & 168th Place
19	SR 516 & 172nd Ave SE
20	SR 516 & Wax Road
21	SR 516 & 185th Place
22	SR 516 & 192nd Ave SE
23	SR 516 & 216 Ave SE
24	SR 516 & Witte Road
25	SR 516 & 228th Ave SE
26	SR 516 & SR 169

Table 2-2 Intersection locations

2.2.1 Travel Demand Forecast

The travel demand forecasts from the Puget Sound Regional Council's (PSRC) regional travel demand model were used, incorporating data from the Kent and Maple Valley traffic models. The zone structure in the PSRC model is larger than the Kent and Maple Valley models. That is, it looks at the trends of growth and land use from a more regional perspective. The land use used in the city models as input was compared with the PSRC land use model for reasonability for the years modeled. The Kent and Maple Valley models have a finer zone system and better land use distribution information around the more immediate corridor. Using PSRC's model, in conjunction with the Kent and Maple Valley models, provides both a look at the AM and PM conditions, and the most realistic projections for the corridor's future condition.

The combination of the city traffic models' datasets and PSRC's traffic demand model were used to forecast growth factors for the intersections and individual segments on this

corridor. The 2016, 2022, and 2030 baseline roadway networks were assumed and modeled to have existing facilities plus road improvement projects that were actually funded. The comprehensive land use plans and transportation improvement programs (TIPs) for the cities of Kent, Covington, and Maple Valley, as well as for King County and WSDOT were used to identify funded projects. As agreed to with the CWG, unfunded projects were considered but not factored into the traffic model analysis. Kent and Maple Valley models forecast demand for the PM peak hour only. The PSRC model was used to estimate AM growth factors. The roadway segments in the study corridor were analyzed using SYNCHRO and SIMTRAFFIC simulation modeling software packages and HCM methodologies. The methods and assumptions are included in Appendix D, Traffic Analysis.

2.2.2 Identification of Potential Operational Issues

Mobility performance measures were established to set a benchmark for establishing potential operational issues along the corridor. Various performance measures to evaluate the corridor are shown below:

- Level of Service at intersections
- Operating speed on segments in future with and without correction measures
- Delay by approach (and movement where necessary) for each intersection
- HCM Corridor LOS by segment
- Vehicle Miles Traveled (VMT) by segment
- Maximum throughput for each segment – before and after comparison
- Travel time on various segments of the corridor

Thresholds for mobility needs identification were established by WSDOT using Moving Washington policies. The intersection Level of Service (LOS) was evaluated using an LOS below E as the threshold for evaluating an intersection's performance. In addition, delay in seconds by approach and movement was evaluated for reasonableness. SimTraffic, commercial software for simulation models was used to find the travel time for each segment by direction and was used to measure future segment delay with and without proposed improvements. This information was used to calculate future operating speeds on the corridor by segment with and without proposed correction measures. Segment performance was determined by looking at the operating speeds on the corridor and comparing that to a standard of 70% of posted speed. Segments operating below 70% of posted speed during peak conditions were considered a need and became a prospective candidate for further study. The analyzed segments can be seen in Figure 2-3.

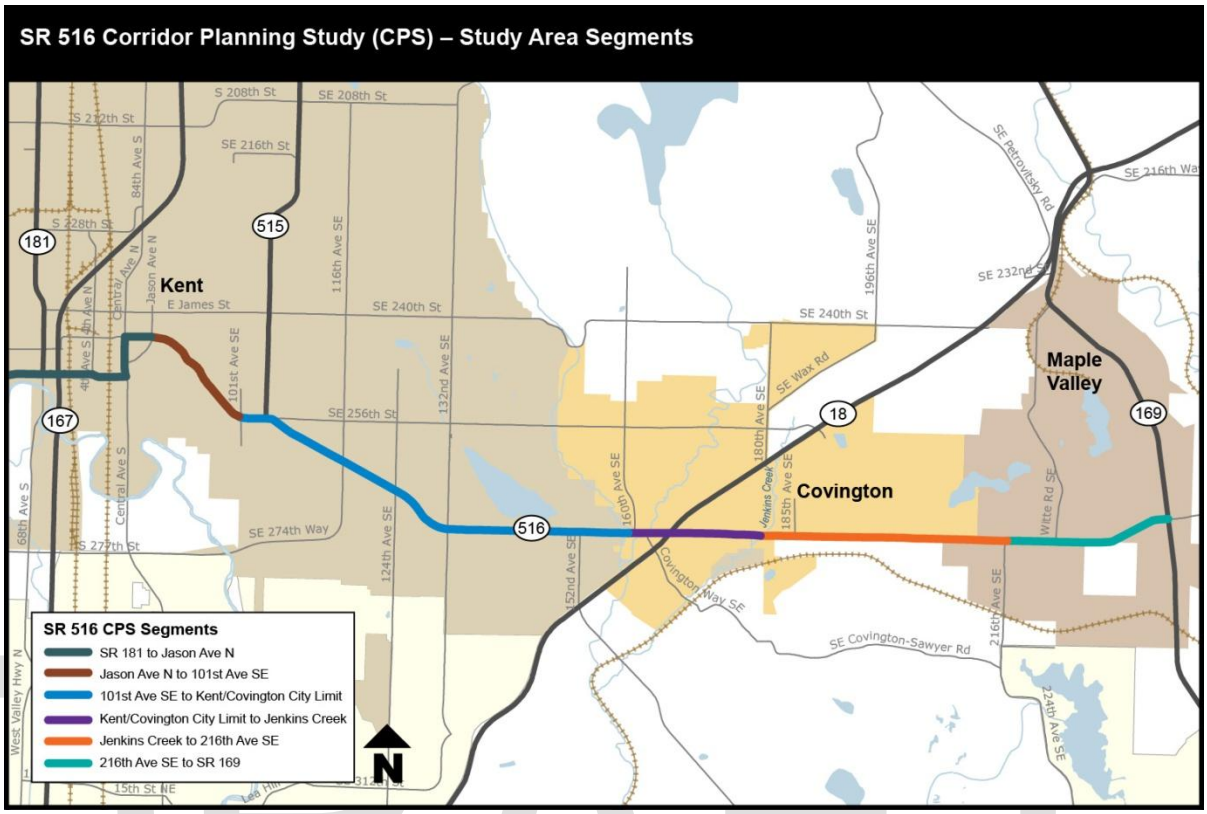

Figure 2-3 Study segments used for analysis

While the thresholds were important to establish a baseline for operational issues and subsequent project consideration, they were not the only parameter used to establish a list of needs. Some mobility needs were offset by other factors such as a low return in increased mobility relative to the cost, environmental concerns, lack of local support, and if a recommendation was not deemed as being feasible.

CHAPTER 3

Existing Route Characteristics &Conditions

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CHAPTER 3 EXISTING ROUTE CHARACTERISTICS

This chapter contains information about the existing conditions and characteristics of SR 516 from SR 167 in Kent to SR 169 in Maple Valley from mile post [SRMP] 4.52 to SRMP 16.22, for a total of 11.56 miles (see "Study Corridor" map in Figure 3-1.) Traveling east along the study corridor, local names for SR 516 include S Kent Des Moines Road, Willis Street, Central Avenue, E Smith Street, Canyon Drive, SE 256th Street, SE Kent Kangley Road, and SE 272nd Street. The information in this chapter includes the physical and functional characteristics of the corridor, existing roadside and environmental issues, surrounding land use, and traffic operations based on current traffic volumes.

Figure 3-1: Study Corridor Map

3.1 SR 516 and the Transportation Network

SR 516, located in King County, is an east-west arterial that begins at the intersection of SR 509 in Des Moines and ends at SR 169 in Maple Valley, a total of 14.66 miles. The immediate area served by the study corridor (as defined by the legislation –ESSB 6381- that approved funding for the study) is bounded to the west by SR 167 in Kent (immediately to the east of SR 181) and to the east by SR 169 in the city of Maple Valley. The study corridor serves commuter, local, commercial, recreational, freight, and non-motorized traffic.

There are a number of state highway connections with the study corridor. The westernmost portion of the study corridor (SRMP 4.52) has connections to SR 181 and SR 167. These two connections provide access to I-405 to Renton to the north.

The connection to SR 167 provides access to Pierce County to the south, or to SR 18 and I-5. At MP 7.35, SR 516 connects with SR 515 (104th Avenue SE) providing access north to Renton. At the eastern end of the study corridor SR 516 (SRMP 16.22) connects to SR 169, providing access north to Renton and I-405 and south to Enumclaw and Pierce County. SR 516 also passes below SR 18 in Covington at SRMP 11.46 with ramp connections. SR 18 provides southwesterly connections to SR 167 and I-5 in Auburn and northeasterly connections up to and including I-90 in North Bend.

The only parallel local arterial serving east west travel needs for a portion of the length of the study corridor is SE 240th, located about two miles to the north of SR 516. Multiple local arterials feed into and out of the SR 516 study corridor. They include Central Avenue, S 277th St, 132nd Ave SE in Kent, Covington Way, SE Wax Rd in Covington, and 216th Ave SE and Witte Rd SE in Maple Valley.

The Puget Sound Regional Council's Land Use model and census data from 2010 were utilized to provide a snapshot of the corridor's principal uses as well as who is using the corridor. At the western portion, in the Kent area, the corridor serves commercial traffic as well as providing a commuting link to transit and non-transit users located to the east. As one travels east, the corridor is more commuter and local use oriented. The majority of travelers use only a portion of the study corridor to make another connection at an intersecting street or highway so it does not typically serve as a regional throughway, but rather a local use connector.

Census data indicates the area is populated with 28% under 18 years of age, and 9% 65 or older. The population within the study area census tracts is approximately 69% white, 7% African American, 11% Asian, and 10% Hispanic or other. Approximately 9% of the study area population falls below the poverty level. The majority of ethnic minorities, lower income, and non-English speaking peoples reside in the Kent portion of the study area.

Freight

The western terminus of the study area experiences a large volume of freight traffic. The rail lines operated by Union Pacific and BNSF carry large quantities of commercial goods, much of which is transferred to trucks for distribution throughout the valley area and other destinations. SR 167 is a primary freight route for the state. The eastern end of the study corridor, while carrying less total tonnage than the western end, does carry resource based truck traffic. The WSDOT Freight and Goods Transportation System lists the entire 14.66 mile long SR 516 study corridor as T-2, with an annual tonnage amount of 4,690,000, and an average daily truck volume of 1,600 vehicles. The study corridor has at grade crossings with two rail lines, Union Pacific and BNSF. Both crossings are located at the western end of the study corridor.

Bike Facilities

There are few designated bike lanes located along the study corridor. The city of Covington's Parks, Recreation & Open Space Plan shows the segment of SR 516 as a shared roadway from SE Wax Rd to SR 169. In Kent, between Jason Avenue and

252nd street (SRMP 5.95 to 6.72), there is a designated five foot bike lane on the south side of the highway intended for easterly (uphill) bike traffic. Between Witte Road and 228th Ave SE in Maple Valley (SRMP 15.10 to 15.38), there is a designated five foot bike lane on both sides of the roadway. The King County bicycle guide map shows a shared roadway designation between SE 256th and 108th SE, Covington Way SE to 164th Ave SE, and SE Wax Rd to SR 169.

Pedestrian Facilities-Sidewalks

South side

Starting at SR 167 in Kent and traveling east, sidewalks are present on the south side of the roadway from the NBND SR 167 off-ramp to the RR crossing (SRMP 4.72 to 4.78), S 4th Avenue to Jason Ave/Titus St (SRMP 4.93 to 5.95), about 150 feet east of Jason Ave/Titus St to 97th Pl S (SRMP 5.98 to 6.91), 101st Avenue SE to Jenkins Creek in Covington (SRMP 7.13 to 12.24), 207th Ave SE to 208th Ave SE (SRMP 14.10 to 14.11), 211th Ave SE to 216th Ave SE (SRMP 14.34 to 14.63), about 450 feet to the west of 228th SE to about 10 feet east of 228th SE (SRMP 15.30 to 15.39), and the last 850 feet of the highway to SR 169 (SRMP 16.05 to 16.22).

North side

On the north side of SR 516, the sidewalk locations are from the NBND SR 167 on ramp to the UPRR crossing (SRMP 4.72 to 4.80), S 4th Ave to the west bank of Jenkins Creek (SRMP 4.97 to 12.29), about 370 feet west of the shopping center entrance to 185th Ave SE (SRMP 12.45 to 12.67), 186th Ave SE to Cedar Heights JHS (SRMP 12.75 to 13.37) about 130 feet at a bus pullout (SRMP 14.16 to 14.18), Witte Rd to about 700 feet east of 228th Ave SE, (SRMP 15.09 to 15.52) and the last 850 feet of the highway to SR 169 in Maple Valley (SRMP 16.05 to 16.22). See figure 3.2 for actual locations of bicycle and sidewalk facilities.

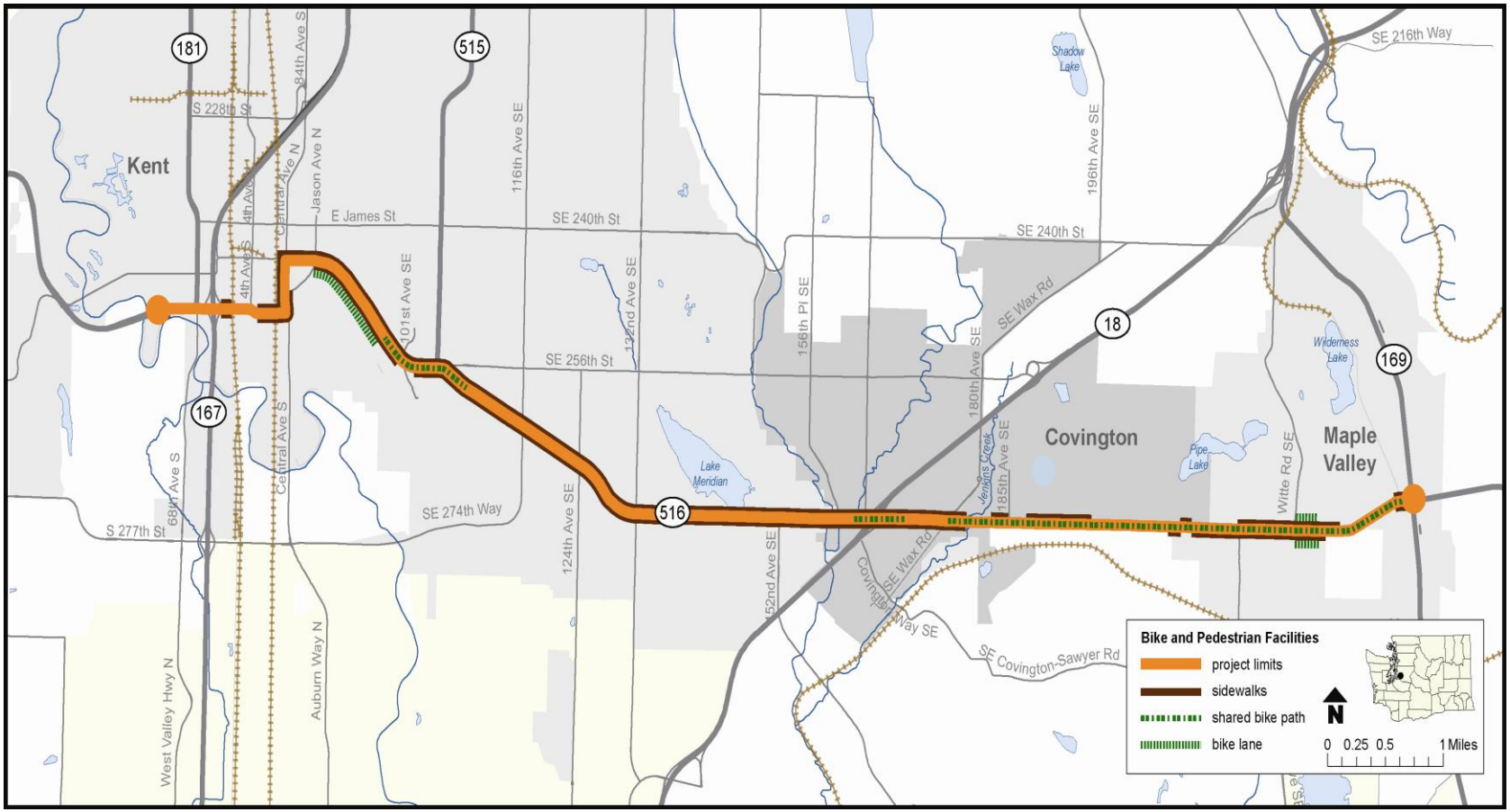

Figure 3.2 - Sidewalk and Bicycle facility locations

3.2 Functional Characteristics of the Highway

Highway functions and operations are categorized by classifications. The information under the subheadings below provides an overview of the functional characteristics of the Study Corridor. Appendix A, Highway Classifications, contains general information about these classification systems and their relationship to funding and operations.

3.2.1 SR 516 Classifications

Highway classifications determine the design standards required for route improvements, and affect the funding mechanisms controlling the improvements that can take place on the highway. Table 3.1 summarizes the classification status of the highway.

Classification System	Current Classification of SR 516 SRMP 4.52 to SRMP 16.22
Federal Functional Class	U12 - Urban other freeway/expressway MP 4.52 to MP 4.99 U14 - Urban principal arterial MP 4.99 to MP 11.45 U16 - Urban minor arterial MP 11.45 to MP 16.22
State Functional Class	U1 Urban principal arterial MP 4.55 to MP 11.45 U2 Urban minor arterial MP 11.45 to MP 16.22
Highways of Statewide Significance (HSS)	Not HSS
National Highway System (NHS)	Not NHS
*Freight and Goods Trans. System (FGTS) Status	T2 – 4,000 to 10,000 tons annually MP 4.52 to MP 16.22
Scenic/Recreational	Not a Scenic Byway
Terrain	Level MP 4.52 to MP 5.68 Rolling MP 5.68 to MP 16.22
Access Classification	Partial Control MP 4.52 to MP 7.34 Modified Control (planned) MP 7.34 to MP 16.22

* 2009 WSDOT Freight & Goods Transportation System (FGTS) Update

Table 3.1: SR 516 Classifications

3.2.2 Access Classification

Access management is used to maintain the capacity and safety of a state highway. The objective is to control the disruptions to through traffic caused by vehicles entering and exiting the highway. National studies have shown that roadways with fewer driveways or access points are safer and capable of moving more cars per hour than roadways with numerous driveways and connecting streets. Managing the access along a highway can help maximize efficiency, reduce "strip" type development, increase safety, and reduce congestion.

There are two types of state highway access control, Limited Access and Managed Access. Limited Access Highways are highways in which the abutting property owner's right of access to the state highway has been purchased by the state, with the result being that the abutting property owner may or may not have access to the state highway. Limited Access Highways are further defined as Full, Partial, or Modified limited access control.

Managed Access Highways are all of the remaining state highways that are not already limited access highways. Managed Access Highways are highways in which access is regulated by the governmental entity having jurisdiction over the facility. Managed Access Highways are further classified from Class 1, the most restrictive, to Class 5, the least restrictive.

Access is governed by state law, specifically Chapter 47.50 of the Revised Code of Washington (RCW). The Washington State Department of Transportation (WSDOT) has developed Washington Administrative Code (WAC) 468-51 and 468-52 to implement this law. WAC 468-52 establishes five classification categories for non-limited-access highways. The five categories are based on surrounding land uses and highway function. Access spacing objectives are also specified in each highway classification, although these are subject to internal review and adjustment on a case-by-case basis. Driveways that were in place prior to 1991 were grandfathered when the Access Management Law (RCW 47.50) was enacted. Driveways constructed after 1991 or driveway connections to parcels being redeveloped would be subject to regulation. Those parcels where the new construction increases the volume of traffic or changes the type of traffic are required to comply with the access spacing, size and location standards through a permitting process. WSDOT works with the county and the city to ensure that developers comply with the access requirements during the project's SEPA review. WSDOT issues the permit in the unincorporated areas and the city issues the permit within the city limits. WSDOT access management classification categories are described below in Table 3.2.

Class	Speed	Volume	Spacing Approach	Spacing Intersect.	Multilane Median	Notes
1	High	High	1320 ft	1 mile	Median is required	Longer trips - serves regional function.
2	Medium to High	Medium to High	660 ft	0.5 mile	TWLTL* may be substituted if ADT < 20,000	Longer trips. Direct access allowed only if no other alternative.
3	Medium	Medium	330 ft	0.5 mile	TWLTL* may be substituted if ADT < 25,000	Shorter trips. Two-way left turn lane allowed if warranted.
4	Medium	Medium	250 ft	0.5 mile	Median not required	Short trips. Two-way left turn lane is typical here.
5	Low to Medium	Medium to High	125 ft	0.25 mile	Median not required	Short trips. Property access is emphasized.
Partial Control	At-grade intersections are allowed for selected public roads, and approaches for existing private driveways. No commercial approaches allowed. No direct access if alternate public road access is available					
Full Control	Access only through interchanges at selected public roads, rest areas, viewpoints, or weigh stations. All at-grade crossings and private approaches prohibited					
Modified Control	At-grade intersections are allowed for selected public roads, and approaches for existing private driveways. Commercial approaches may be allowed. No direct access if alternate public road access is available					

*Two-way left turn lane

Table 3.2: WSDOT Access Classifications

SR 516 is designated as both a limited access and managed access highway. WAC 468-52-070 provides for review and modification of access classifications. This study is not recommending any changes to the access classification.

Table 3.3 depicts access classifications for the SR 516 study area by segments.

Segment mileposts	Description of Study Segment	Existing Access Classification *
4.55-4.98	SR 167 vicinity to S 4th Ave (Kent)	Full
4.98-11.35	S 4th Ave (Kent) to 164th Ave SE (Covington)	M3 (Modified planned**)
11.35-11.41	164th Ave SE to SR 18 vicinity (Covington)	Modified
11.41-11.56	SR 18 vicinity to 167th Pl SE (Covington)	Full
11.56-16.22	167th Pl SE (Covington) to SR 169 (Maple Valley)	M3

* Except for full access control, the city is the permitting authority within incorporated limits.

****** Modified access is planned for sometime in the future. No access hearing for this section has been held.

Table 3.3 SR 516 Access Classifications

3.2.3 Terrain and Roadside Classifications

The WSDOT's *State Highway Log Planning Report (2010)* was reviewed to determine the terrain classification for the Study Route. The terrain designation in this report is used in the design process.

The terrain surrounding the study corridor routes are classified as level from SR 167 interchange area to Meeker/Central (SRMP 4.55 to SRMP 5.68) and rolling from Meeker/Central to SR 169 (SRMP 5.68 to SRMP 16.22).

Rolling terrain is usually found in areas where hills and foothills are present and where the slopes rise and fall gently. Occasional steep slopes might cause restriction to horizontal and vertical alignments. This designation refers to the contour of the roadway as it relates to the frequency and steepness of hills and the effect these elements have on truck speed. A rolling designation indicates that trucks slow down frequently.

WSDOT's Unstable Slope Management System collects information about unstable slopes that present potential hazards to the state highway system. There are no listed unstable slopes along the study corridor.

Roadside character, defined in the WSDOT *Roadside Classification Plan, 1996,* is a description of the landscape from the roadway user's perspective; and encompasses the area between the pavement edge and the right of way boundaries. The roadside designations for the study corridor are as follows:

Segments	SRMP	Classification
SR167 to 74th Ave S	4.53 to 5.03	SEMIURBAN-Kent
74th Ave S to Titus/Jason	5.03 to 5.93	URBAN-Kent
Titus/Jason to 101st Ave SE	5.93 to 7.13	SEMIURBAN-Kent
101st Ave SE to 108th Ave SE	7.13 to 7.63	URBAN-Kent
108th Ave SE to Wax Rd vic.	7.63 to 12.23	SEMIURBAN-Kent, Covington
Wax Rd vic to SR 169	12.23 to 16.23	RURAL

Table 3.4 Roadside Designations

It is WSDOT's policy to protect and restore the roadside character as designated in the *Roadside Classification Plan,* and to incorporate the plan into regional and route specific planning. All improvement and safety projects that result in disturbance to

the roadside require complete restoration to the requirements specified by the roadside classification within the project limits. The roadside restoration of proposed safety and improvement projects fall under Treatment Level 2, which is the basic level of treatment to restore the operational, environmental and visual functions of the roadside. The plan promotes aesthetic harmony and continuity, and advocates the use of native species.

Areas of work falling within wetlands or wetland buffer areas may require additional re-vegetation or habitat management plans as required by the critical areas ordinance of the local jurisdiction in which the work occurs. As specific impacts are calculated during the design phase of individual projects recommended by this study, the local agencies will be consulted regarding the degree and character of re-vegetation required in these areas.

3.3 Land Use Characteristics

The SR 516 study corridor is located within the Urban Growth Areas of Kent, Covington, and Maple Valley. Land uses range from highly commercialized areas in all three city core areas to more suburban residential/rural residential outside the core areas.

The Washington State Growth Management Act (RCW 36.60A) is in effect in King County. It stipulates 14 goals that serve as the guiding principles for land use planning. The comprehensive plan is a tool used to help communities resolve how to balance the competing interests represented by these goals. King County is part of the Puget Sound Regional Council, and is guided by both its comprehensive plan and the regional growth plan, Vision 2040.

3.4 Physical Characteristics

The physical characteristics of a corridor provide insights into the types of transportation problems experienced on the route and can be useful for developing the best solutions to those problems. These characteristics relate not only to the roadway itself – geometry, roadway section, horizontal and vertical alignments – but also to the surrounding area considering such elements as right of way and environmental resources.

3.4.1 Geometric Elements

Roadway corridor's alignment, profile and section need to be considered when determining how a route functions and how it might be improved. For this purpose, the latest information from the WSDOT Transportation Data Office (TDO) has been reviewed as part of this study. The most current information about roadway geometry can be obtained from the WSDOT's *State Highway Log Planning Report (2010)*, as well as other TDO data sources. The highway log pertaining to the study section can be found in Appendix B. Other WSDOT records and resources, such as as-built highway plans, are also reviewed for use within this analysis.

Existing Roadway Section

The roadway section refers to the widths of the lanes and shoulders that make up the roadway. In general, the lanes and shoulders that make up the Study Corridor routes meet current WSDOT standards for these elements based on roadway classification and current traffic volumes. Details about SR 516 roadway sections, including types of materials used in the construction of the roadways and shoulders, and existing channelization can be found in Appendix B.

Existing Vertical/Horizontal Alignment

Roadway grades on the Study Corridor routes range between 0% and 7.8% (in Kent). Additional information can be found in Appendix B.

3.4.2 Pavement

WSDOT recently completed the 2011 Pavement Tour which did not identify repaving needs on the study corridor. The SR 516 pavement will be re-evaluated during the 2013 North West Region (NWR) Pavement Tour, and at that time a determination will be made whether the SR 516 pavement conditions warrant being scoped for a future project. It should be noted that NWR has a fairly long list of "past due" pavement projects and that if SR 516 warrants a paving project, it will need to compete and prioritize against the other paving needs for available funding.

NWR Maintenance has included SR 516 MP 7.30 to MP 16.20 in the 2011-2013 region crack seal program (excluding MP 11.09 to MP 12.31 which was paved in 2010). This segment has intermittent "alligator cracking" and will receive crack seal treatment. The city of Maple Valley has concerns about the condition of the existing pavement between 228th Ave SE and SR 169. Additional field investigation by WSDOT has been requested to better determine the condition of this segment and possible remediation.

Washington State Pavement Management System provides estimated "due dates" for paving in 0.1 mile segments. The estimated due dates indicate the majority of SR 516 is not due for repaving for several years.

3.4.3 Bridges and Structures

There are two bridges on the SR 516 portion of the study corridor. One bridge is immediately south of Lake Meridian's southern shore. It is actually a half bridge, on the southern side of the road, spanning a storm water detention pond/wetland (SRMP 10.20 to 10.30, bridge #516/014). The second is a full width bridge, spanning Soos Creek (SRMP 11.07 to 11.09, bridge #516/016). An additional four structures span over SR 516 in the study area. They are northbound and southbound SR 167 at SRMP 4.64 and SRMP 4.66 and eastbound and westbound SR 18 at SRMP 11.45).

See Table 3.5 and Figure 3.3 for bridge locations. Both structures on SR 516 mainline have sidewalks on both sides. The bridge inspection schedule is every two years. The following bridge information is based on WSDOT's Highway Road Log and the WSDOT Bridge Office:

State Route	SR 516 Milepost	Stream/Feature Name	Nearest Cross Street	Sufficiency Rating[a]
516	10.20 to 10.30	Storm water detention pond / wetland (half bridge - Eastbound lane)	Between SE 270th Pl and 148th Ave SE	76.52
516	11.07 to 11.09	Soos Creek (Bridge)	160th Ave SE	92.11
167	4.64	Southbound lanes Overcrossing	SR 167- SR516	91.24
167	4.66	Northbound lanes Overcrossing	SR 167- SR516	89.12
18	11.45	Westbound lanes Overcrossing	SR 18- SR516	94.80
18	11.45	Eastbound lanes Overcrossing	SR 18- SR516	96.83

a - If the value in this column is < 50, the structure needs repair or replacement.

Table 3.5: Bridge Locations

None of the bridges within the study corridor is listed as needing repair or replacement.

3.4.4 Intersection Inventory and Traffic Channelization

There are currently 34 traffic signal controlled roadway intersections along the study corridor route. Locations of traffic signals and channelization/refuge areas are in Appendix B, Physical Characteristics.

There are also two rail lines crossing the study corridor. The BNSF Railway crossing is approximately ½ mile east of SR 167 interchange (I/C) area. The Union Pacific crossing is east and adjacent to the SR 167/SR 516 I/C. Both railroad crossings are signalized with automatic gates.

Rail freight schedules can vary by time of day, day of the week, or time of year. Shippers' demands, overall freight traffic levels, ship traffic at the ports, and maintenance work are all factors in scheduling. Typically, the UP will see up to 15 freight trains per day operating on their mainline between Tukwila (Black River Jct.) and Tacoma. The BNSF line is a busier rail line with up to 40 daily freight trains and an additional 28 daily Amtrak & Sounder passenger trains between Seattle and Tacoma operating through Kent.

3.4.5 Right of Way

Existing right of way widths vary from 60 feet to 100 feet along the study corridor route. The right of way width is an important consideration when contemplating improvements that require additional space. Right of way purchase can be a significant cost item,

especially in a highly developed area. More details about right of way widths and specific locations are given in Appendix B, Physical Characteristics.

3.4.6 Utilities

Over 200 unique franchise agreements have been identified along the Study Corridor, involving 83 separate companies, 20 individuals and 23 municipalities/departments. A table of franchises is found in Appendix C, Utility Locations. Current listings are maintained at the WSDOT Northwest Region Utilities Office.

3.5 Environmental Overview

Environmental elements described in this corridor plan consist of information collected to identify and document potential environmental issues as part of the transportation study process. The study identifies known areas of concern, both in the existing right of way (ROW), and adjacent to the ROW. Areas of concern will influence decisions about whether improvements should be considered, what type of improvement would be the most sustainable, and help to give designers of any improvements insight into the conditions they may be working in. Areas of concern outside of the ROW are important to identify and consider when contemplating improvements that require additional space. The environmental information collection helps WSDOT to make informed decisions that are sustainable, responsible, and sensitive to the areas potentially affected. Specific impacts to environmental elements would be determined, and associated permits obtained, when a project has been funded for design and construction.

Wetlands

The Department of Natural Resources (DNR) and National Wetlands Inventory (NWI) were used to determine if and where wetlands exist along the study corridor. (Figure 3.3) This determination was used as a preliminary check for selecting possible recommendations and the potential consequences to the wetlands in the area.

If individual projects are chosen and developed from the study recommendations, an in-depth wetland delineation should be completed to determine the full extent of recorded wetlands and potential impacts and mitigations. The area should also be examined to identify other wetlands that may not have been included on the maps. Wetlands should be avoided if possible when designing roadway improvements. If construction impacts are unavoidable, they should be minimized to the degree practicable, and any unavoidable impacts mitigated according to WSDOT's "no net loss" policy regarding wetland functions and values. Wetland filling along the study segment is regulated by King County, the US Army Corps of Engineers, and the Washington State Department of Ecology through Section 401 of the Clean Water Act.

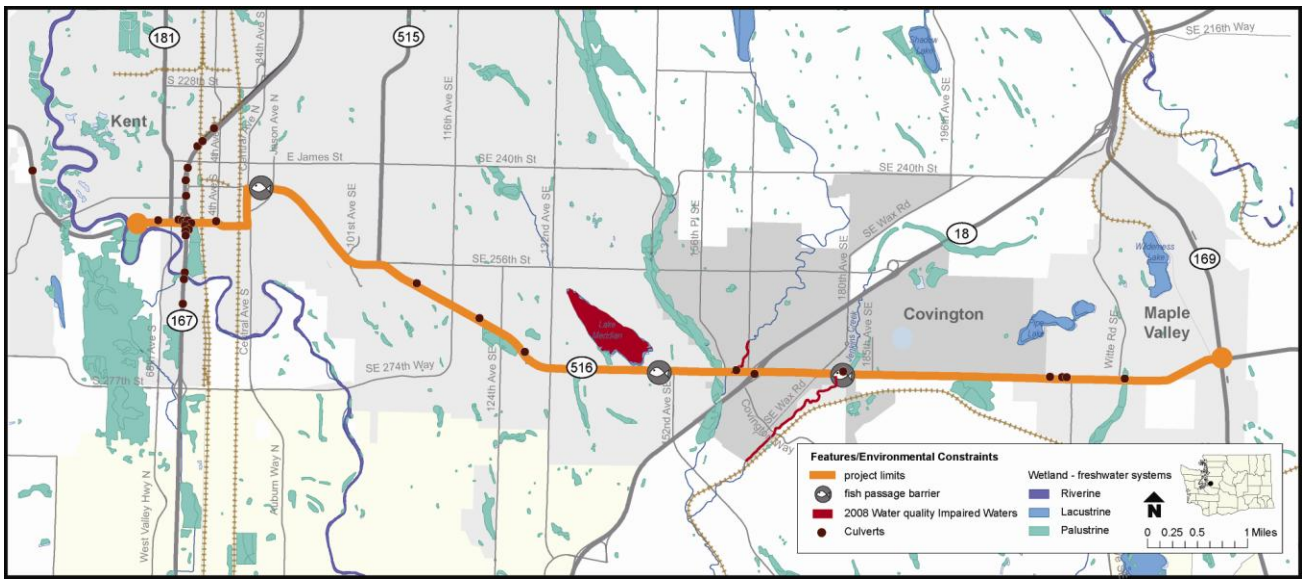

Figure 3.3: Wetland, Water Quality, and Fish Barrier Locations

Fish Passage Barriers

WSDOT is required to install and maintain all culverts, fishways, and bridges to provide unrestricted fish passage as per Washington law, RCW 77.57.030. Design of fish barrier correction will be based on the latest version of the Washington Department of Fish and Wildlife's (WDFW) *Fish Passage Design at Road Culverts* manual or its successor. Through use of this design guidance and in coordination with WDFW, it is expected that new highway construction at stream crossings will not result in additional barriers to fish passage.

In 1991, the Washington State Legislature, working with WSDOT and WDFW, organized and implemented a fish passage inventory on Washington State Highways. The purpose of the inventory is to document fish passage problems located at state highway stream crossings to prioritize the correction of these fish passage barriers. The need for repair is based on the potential to gain fish habitat. In general, a barrier requires repair if there is a minimum of 200 meters of functional fish habitat both upstream and downstream.

WSDOT has a goal of evaluating and correcting state highway fish barriers based on a twenty-year system plan. It designates dedicated funding to correct the highest priority fish passage barriers within the Environmental Retrofit Program's Six-Year Plan. Also, as road projects are constructed, additional fish passage barriers are removed whenever Hydraulic Project Approval (HPA) from WDFW is required.

Locations are identified as fish passage barriers by the Salmonid Screening, Habitat Enhancement and Restoration Division of Washington Department of Fish and Wildlife (WDFW). See Table 3.6 for the three fish barrier locations within the study area. Jenkins Creek is the highest ranking fish barrier retrofit of the three locations in

the study area, but none of the three have been programmed in the six year state plan for environmental retrofitting.

Existing Fish Passage Barriers	
MP 5.82 Mill Creek	Site ID is 997651 – Partially blocks access to 4,561 square meters of upstream habitat
MP 10.58 Big Soos Creek	Site ID is 997670 – Partially blocks access to 3,514 square meters of upstream habitat
MP 12.33 Jenkins Creek	Site ID is 990210 – Box culvert that partially blocks access to 18,561 square meters of upstream habitat

Table 3.6 Fish Barrier locations

WSDOT is looking into the concept of coordinating fish barrier replacement on a more watershed-wide basis. That is, coordinating efforts among multiple jurisdictions to remove multiple barriers on a potentially high value fish rearing area. To date, the concept is in its infancy, with a possible pilot program being considered in the Olympic Region of WSDOT.

Wellhead / Aquifer / Watercourse protection

The corridor study segment is located on several wellhead protection zones. The roadway lies within a ten year wellhead protection zone from Alford in Kent to SR 169 in Maple Valley. One year wellhead protection zone areas are located on the corridor between 116th and 119th, 122nd to 133rd, 148th to 158th, 175th to 196th, and from Witte Rd to SR 169. The distinction of the different time periods is an indication of the time it takes for surface water to migrate to the well supply.

The corridor study area is not located over a Sole Source Aquifer or an area identified as an Aquifer Recharge Area of Concern. Between approximately 181st Ave SE and 207th Ave SE in Covington, to the south of the roadway, is a category one Critical Aquifer Recharge Area (CARA). The GMA defines CARAs as "areas with a critical recharging effect on aquifers used for potable water."

There are three impaired and threatened watercourses near SR 516 which are on the 2008 Water Quality Impaired Waters (303d) list. The first is Little Soos Creek located approximately at 160th Ave SE, another is Lake Meridian, near SE 270th Place, and the third is Jenkins Creek, located near SE Wax Road. See Figure 3.3 above.

Current WSDOT water quality/water quantity treatment practices, as described within WSDOT's *Highway Runoff Manual*, should be adequate to protect the groundwater supply. Figures 3.4 and 3.5 shows the approximate locations of aquifer recharge areas and wellhead protection zones relative to the study area corridor. Any proposed improvements will need to address the current classifications and requirements during

the design phase to improve current conditions or avoid impacting any additional areas.

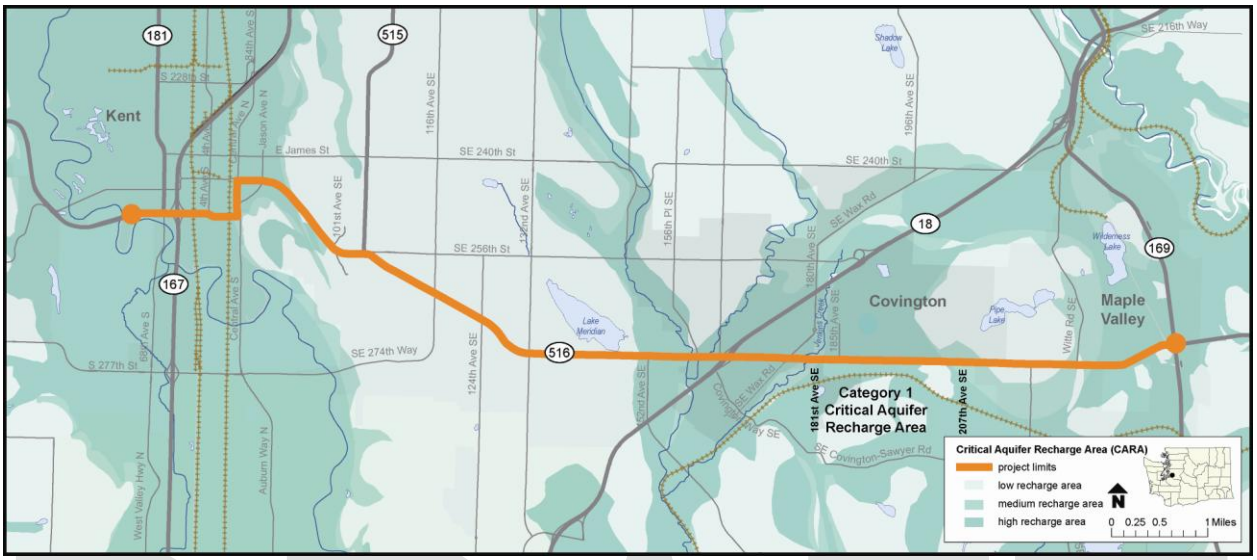

Figure 3.4 Aquifer Recharge Areas

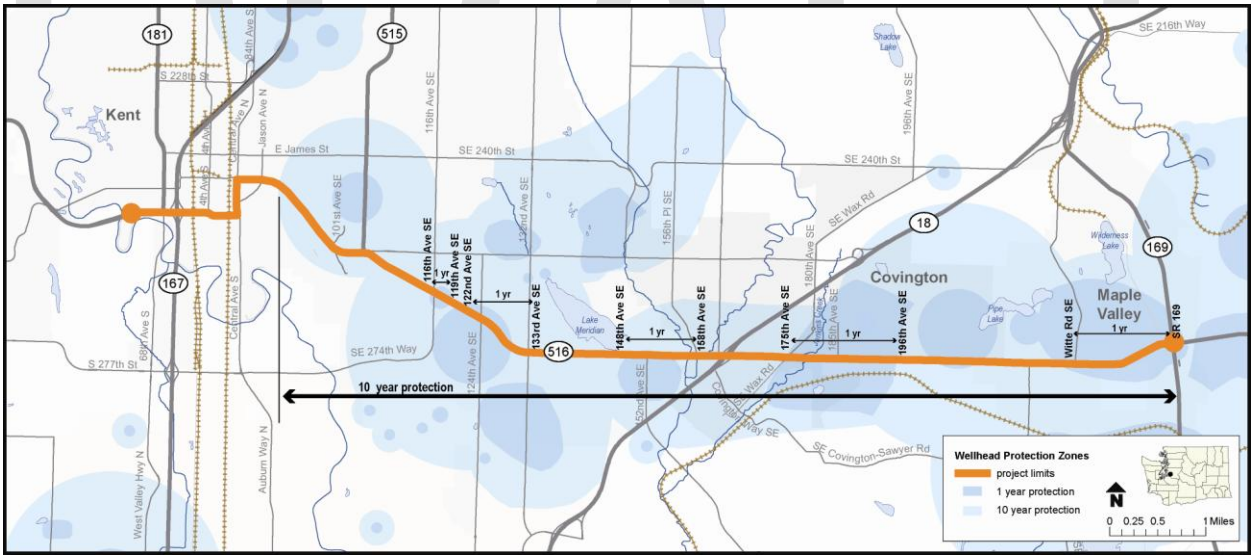

Figure 3.5 Wellhead Protection Areas

Environmental Mitigation

Locating suitable mitigation sites is a high priority for projects that will displace existing wetlands or increase the impervious area represented by the highway. It is generally undesirable to construct mitigation for wetland impacts within highway right of way. Many highway activities, such as guardrail installation, slope flattening, excavation or fill that alters the water table or flow to a wetland, and noise and air impacts on wetland wildlife, could adversely affect an adjacent mitigation site. There

is an existing mitigation site located at MP 10.25 which is listed as a storm water detention pond and wetland.

If no other reasonable alternative is available in a particular area, during the design phase of a project, engineering staff should work closely with the staff of the Northwest Region Environmental Services office to determine the extent of unavoidable wetland impacts and to locate an appropriate mitigation site.

Mitigation for increased storm water runoff resulting from the addition of impervious surfacing, such as swales and ponds, can often take place within highway right of way if sufficient area exists. The appropriate level of storm water treatment can be determined using the *WSDOT Highway Runoff Manual*.

The cost of the construction of wetland mitigation sites and storm water treatment facilities can be considerable, and should be considered when estimating overall project construction costs.

Historical and Cultural Resources

The Washington Heritage Register and the National Register of Historic Places were researched to identify historical properties along the Study Corridor.

During the design phase of any projects recommended by this plan, a cultural resources survey should be conducted in the area of potential effect.

A cultural resources survey may include a literature search to determine if previously documented sites or resources exist in the vicinity, as well as a ground survey to determine the potential for encountering artifacts of an historic or archaeological nature during construction. Results of the survey, and the determination of effects of the construction projects, should be presented for the State Historic Preservation Officer's concurrence.

Two archeological sites have been recorded near the study area. One is in the vicinity of N 1st & 2nd Avenues and W Smith & Temperance Streets. The second is in the vicinity of the southwest quadrant of the SR 516 and SR 169 intersection. The Carnation Milk Factory/Kent Hardware Co at 203 Meeker Street is a property that has been recognized as historically significant. The Department of Archaeology and Historic Preservation staff suggested that they would not expect to find any significant issues or major archeological sites that would impact any proposed solutions on the route. Historic-era resources may be affected throughout the corridor, but the likelihood of delays due to unforeseen cultural resources compliance is not great. Staff further stated that if projects do develop from the plan and federal money is used, a Section 106 review would be required. Also, if state funds are used, a 0505 Executive Order level review would be required.

The Muckleshoot and Yakama Tribes were sent letters in June of 2011, describing the study, outlining the limits of the study area, and asking if they would like to be involved in the corridor study and if they had concerns about any cultural or natural resources being potentially affected by this study. While the tribes had not indicated

having a concern at that time, or after a subsequent phone call follow up in April 2012, should any project move forward toward development, further outreach to the tribes should be implemented at the very earliest stages.

Environmental Justice

Environmental justice refers to the inequitable adverse effect of transportation projects on social, economic and health status of minority and low-income populations in a community. One of the goals of WSDOT is to avoid, minimize or mitigate any disproportionate impact to these populations resulting from WSDOT activities in the area. To accomplish this, information about potential environmental justice communities was gathered using 2010 Census data through the PSRC and the Office of Superintendent of Public Instruction's Washington State Report Card. All census tracts abutting the SR 516 roadway study vicinity were used to compile the following information.

The census data indicated that the study area census tract population is 83,300 with 28% under 18 years of age and 9% are 65 years old or older. Approximately 69% of the proximity population is White, 7% African American, 1% Native American, 11% Asian, 1% Native Hawaiian or Other Pacific Islander, and 11% Hispanic or Latino. Within the city of Kent, several areas of non-English speaking populations exist. The first area along the study corridor, between SR 167 and 94th Ave S, census data indicates there are 5% or more of the population whose primary language is Spanish or Spanish Creole. Between 94th Ave S and 132nd Ave SE there are populations of 5% or more whose primary language is Spanish, Spanish Creole, Slavic, or Russian Slavic.

The Kent and Tahoma school districts reported that 47% and 15% (respectively) of their student body qualified for the federal free or reduced price meals program.

Noise

Transportation projects that construct a highway at a new location, or significantly change the horizontal or vertical alignment of an existing highway or increase the number of through traffic lanes, require evaluation as to whether it is reasonable and feasible to provide mitigation for noise impacts.

During the design phase, any project should be evaluated for potential noise impacts and modeled to predict traffic noise levels if necessary. Although the federal government participates in the majority of costs associated with noise barriers along interstate highways, those that are constructed along smaller state routes like SR 516 are typically funded solely by the state. WSDOT has a cost-benefit criterion, which is applied to determine if a noise barrier is reasonable and feasible.

Air Quality

WSDOT's GIS layer for air quality, information provided by Washington Department of Ecology, was consulted to determine if there are air quality issues in the vicinity of the study corridor. The study corridor is within a former carbon monoxide and one-hour ozone maintenance area, but currently is in attainment for all criteria pollutants. Currently the air quality meets state and federal standards.

Climate Change

WSDOT's Moving Washington is exploring more sustainable ways to plan, build, operate and maintain the state's transportation infrastructure. This reflects the Agency's commitment to build a more sustainable transportation system and lessen the transportation sector's effect on the environment.

WSDOT is pursuing multiple strategies to reduce greenhouse gas emissions from the transportation sector. These include:

- Increasing travel options to reduce vehicle miles traveled per capita.
- Supporting improved vehicle technology.
- Lowering the carbon content of fuels.
- Improving the efficiency of the transportation system.

In response to the Governor's Executive Order 09-05: Washington's Leadership on Climate Change, WSDOT; in consultation with the Departments of Ecology and Commerce; and in collaboration with local governments, business, and environmental representatives; worked to estimate current and future state-wide levels of vehicle miles traveled, evaluate potential changes to the vehicle miles traveled benchmarks established in RCW 47.01.440 as appropriate to address low- or no-emission vehicles, and develop additional strategies to reduce emissions from the transportation sector. Findings and recommendations from this work were reported to the Governor in December 2010.

Hazardous Materials

The Hazardous Sites List, toxics cleanup program, and the Leaking Underground Storage Tank databases maintained by Washington Department of Ecology were used to determine if there is known potential for encountering hazardous materials during the construction of any proposed improvements to the Study Route. The website can be reviewed at [http://apps.ecy.wa.gov/website/facsite/viewer.htm].

The Leaking Underground Storage Tank database lists several properties on the Study Corridor route. They are; 7-11 by Bridges, Mr. Sudsy Car Wash by Titus St., Chevron Station by 100th Pl SE, East Kent Chevron by 141st Ave SE, Circle K Store by 164th Ave SE, Harris Enterprises by 172nd Ave SE, Junior High 6 by 196th Ave SE, and Maple Valley BP station by SR 169. Before any maintenance work or corridor improvements in these areas, these databases should be reviewed for updated information, and site assessments performed, if warranted.

3.6 Transit

The study corridor area is served by King County Metro transit. There are no routes operating along the entire length of the study corridor. The route that comes closest to serving the entire study corridor is the 168, operating between Kent Station and SR 169, while several other routes such as the 150, 157, and 161 operate along shorter segments, with typical service frequency of about 30 minutes. Routes 157, 158, and 159 are

primarily commuter runs travelling from the Lake Meridian P&R to Kent and Seattle in the AM peak and in the reverse direction during the PM peak. Route 912 serves transit needs between Black Diamond and Covington, but on a limited frequency. Routes 914 and 916 provide Dial-A-Ride Transit (DART) service within the study corridor area.

In the fall of 2009, Route 168 operated hourly on weekdays, along the current routing between Kent and Maple Valley/4 Corners, with weekend service operating hourly as far east as SE 272nd/192nd Ave SE in Covington. Since then, by means of a WSDOT Urban Mobility Grant, route 168 has been significantly upgraded to supply 30 minute service on weekdays, until about 7PM, then hourly until the end of service around midnight and also extend the weekend hourly trips out to 4 Corners for a consistent service pattern. These improvements were implemented in September 2010. Since that time, service on route 168 has been increased approximately forty per cent. Ridership on the route has also increased although by a smaller percentage (14%), going from 434,100 annual rides prior to the change to around 495,100 annual rides at the time of this report. With the size of the service increase, the growth in ridership was better than anticipated. Going forward, ridership on the route is likely to continue to grow. The current grant funding expires in June 2013, but Metro has expressed a desire to continue the current service levels if funding can be secured.

Park and Ride lots can serve the travelling public in the form making transit travel more convenient, with side benefits of less vehicle miles travelled, less congestion, and less pollution. Below is a list of the four Park & Ride lots in the vicinity of the study corridor with occupancy rates from Spring of 2011:

- Four Corners Shopping Center (leased lot) - 26920 Maple Valley Hwy
  Capacity-24 / Average Daily Utilization-22 MT Routes: 143, 149, 168
- Cornerstone United Methodist Church (leased lot) - 20730 SE 272nd St.
  Capacity-20 / Average Daily Utilization-15 MT Route: 168
- Lake Meridian P&R (Metro) - 26805 132nd Ave SE
  Capacity-172 / Average Daily Utilization-45 MT Routes: 157, 158, 159, 161, 168, 914
- Kent Station/garage & surface lots (Sound Transit) - 301 Railroad Ave N
  Capacity-1,101 / Average Daily Utilization-988 MT Routes: 150, 153, 158, 159, 162, 164, 166, 168, 169, 180, 183, 566, 913, 914, 916, 952, ST Routes 566 & Sounder

Figure 3.4 shows the existing transit service routes and P&R locations within the study corridor.

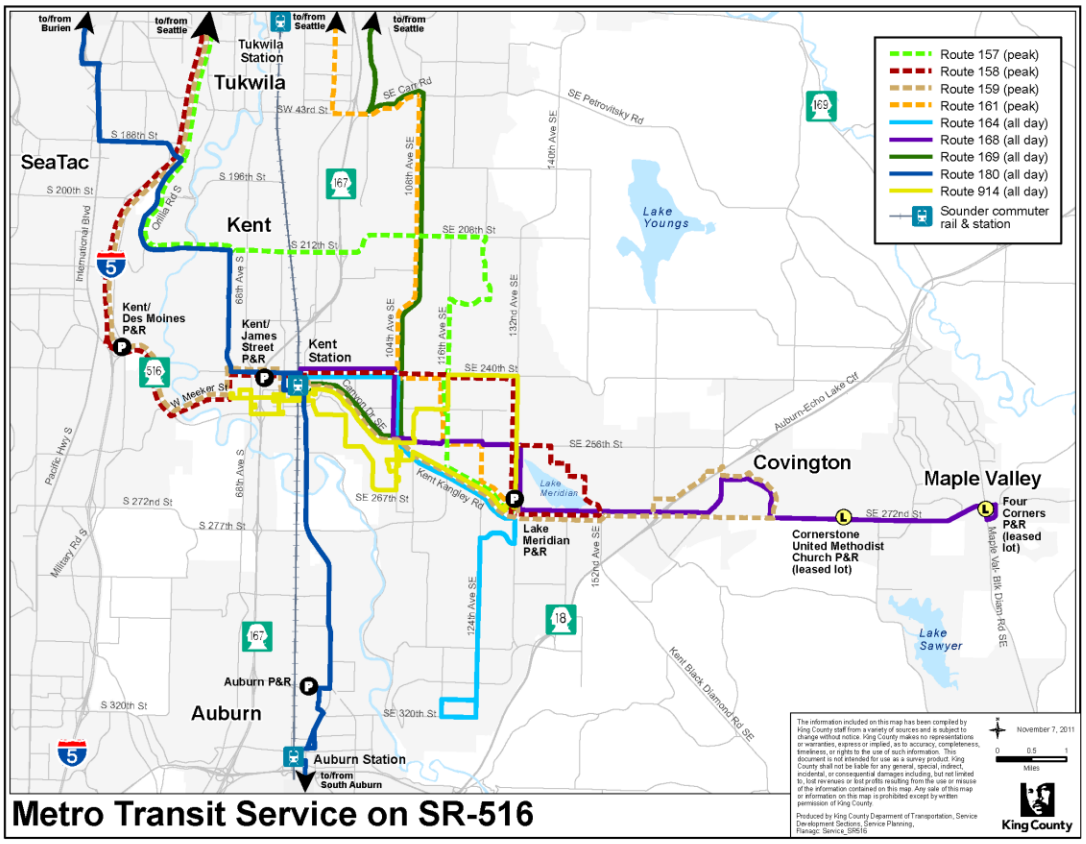

Figure 3.6 Transit service map

Southeast King County DMU Commuter Rail Feasibility Study.
In 2010, WSDOT completed the *Southeast King County Diesel Multiple Unit (DMU) Commuter Rail Feasibility Study*. As part of this study, a transit based *Enhanced Bus Scenario* was developed to compare the DMU rail option to transit. (It should be emphasized that the service improvements assumed in this analysis are not in the King County Metro budget and have not been proposed or presented for public or County Council review.) In this analysis, enhanced transit service is implemented with improvements to two existing Metro routes, #149 (SR 169 corridor) and route #168 (SR 516 corridor), along with a new peak-period express route operating from Maple Valley and Covington to the Auburn Sounder Station via SR 18. These routes would roughly parallel the DMU Commuter Rail service on the BNSF Railway's Stampede Pass line.

The complete study can be reviewed at:
www.wsdot.wa.gov/planning/Studies/SEKingCommuterRailStudy/

It should be noted the WSDOT Urban Mobility Grant mentioned earlier and the resulting recent increase in service for route # 168 actually exceeds the enhanced service scenario for route #168 looked at for the DMU study.

3.7 Highway Segments and Intersections

The study area for the traffic analysis includes SR 516 from SR 181 / SR 167 (ARM 4.92) on the west end to just east of the SR 169 intersection in Maple Valley (ARM 16.49). A total of 26 signalized intersections were analyzed on this corridor. The corridor in the study area goes through the cities of Kent, Covington and Maple Valley, but the travel demand forecasts were done for a larger area covering the cities of Kent, Covington, Maple Valley and Black Diamond as well as parts of King County associated with the study area. The study corridor was broken into six segments to analyze both volumes and average speeds of vehicular traffic. The segments are listed below and can be seen on figure 3.7.

1. SR 181 to Jason/Titus Avenues
2. Jason/Titus Avenues to 101st Ave SE
3. 101st Ave SE to Kent/Covington city limit
4. Kent/Covington city limit to 185th Ave SE
5. 185th Ave SE to 216th Ave SE
6. 216th Ave SE to SR 169

Land use

The zone structure in the PSRC model is larger compared to the Kent and Maple Valley models. The land uses used in these models as input were compared with PSRC land uses for reasonability for 2009, 2020, and 2030. The cities of Kent and Maple Valley models are for the years 2008 and 2030. The cities of Kent and Maple Valley models have a finer zone system and better land use distribution around the corridor giving more accurate results in the modeling scenarios for the intersections and segments.

Future Year Network Assumptions

The comprehensive plans and transportation improvement programs (TIPs) for the cities of Covington, Kent, Black Diamond, Maple Valley, as well as for King County and WSDOT were reviewed and considered in the analysis. As mentioned earlier, unfunded transportation projects were not included in the future year network assumptions.

The existing conditions analysis for the SR 516 corridor was carried out for AM and PM peak hour conditions. This included identifying level of service (LOS) calculations at key intersections, corridor LOS for various segments on the corridor and collecting travel times for segments. Figure 3.7 shows the locations and Table 3.7 lists the names of the intersections that were analyzed. The segments for the study are shown in Figure 3.8.

Table 3.7: SR 516 Corridor Study - Intersections analyzed

Int. #	SR 516 Corridor Study Intersections	
	MP	**LOCATION**
1	4.52	SR 181
2	4.66	SR 167 SB RAMPS
3	4.72	SR 167 NB RAMPS
4	4.98	S 4th Ave
5	5.30	Central Ave N
6	5.68	Central Ave/E Smith
7	7.34	104th Ave
8	7.40	SE 256th St.
9	7.62	108th Ave
10	8.18	116th Ave SE
11	8.73	124th Ave SE
12	9.38	132nd Ave SE
13	10.61	152nd Ave SE
14	11.26	SE Covington - Sawyer Road
15	11.37	164th Ave SE
16	11.42	SR 18 WB RAMPS
17	11.51	SR 18 EB RAMPS
18	11.65	168th Place SE
19	11.87	172nd Ave SE
20	12.10	Wax Road
21	12.66	185th Ave SE
22	13.11	192nd Ave SE
23	14.63	216th Ave SE
24	15.10	Witte Road
25	15.38	228th Ave SE
26	16.22	SR 169

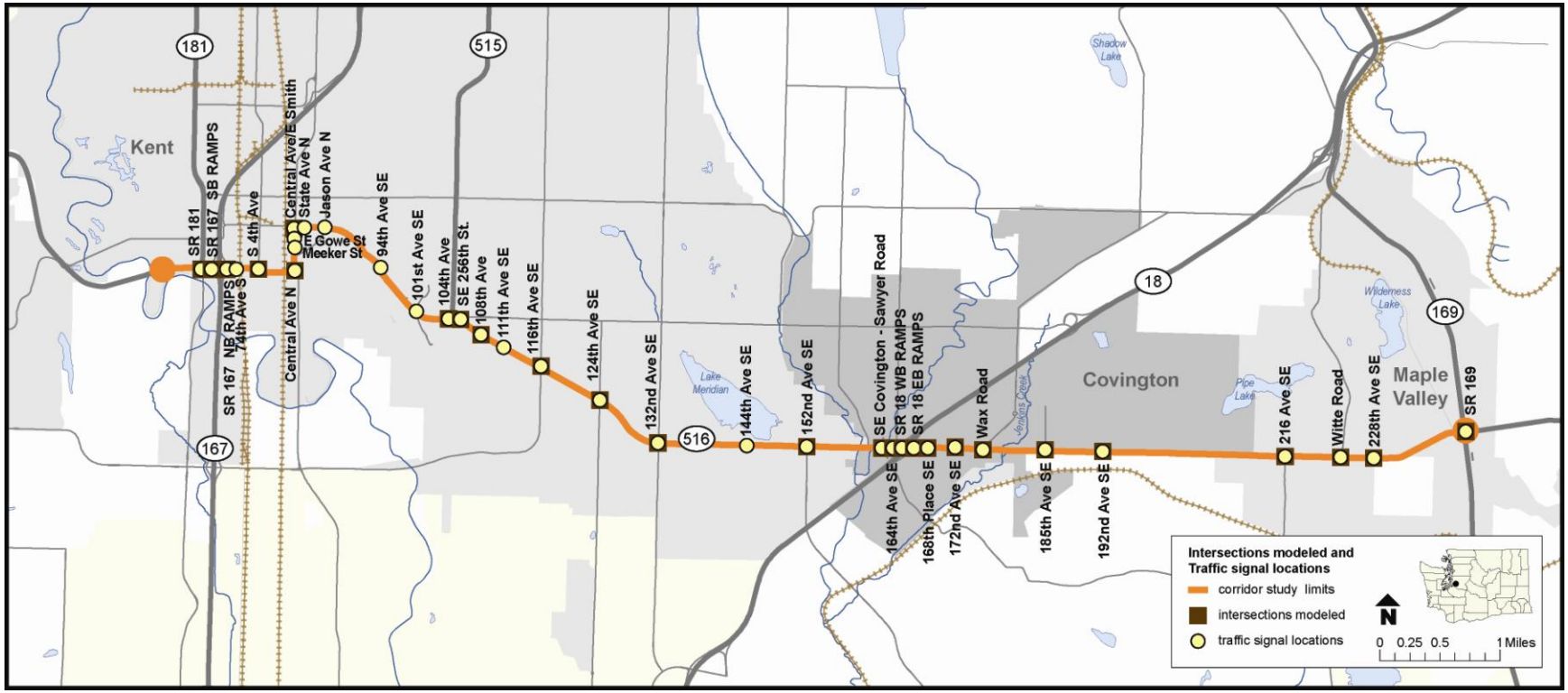

Figure 3.7: SR 516 Corridor Study - Intersections for the analysis

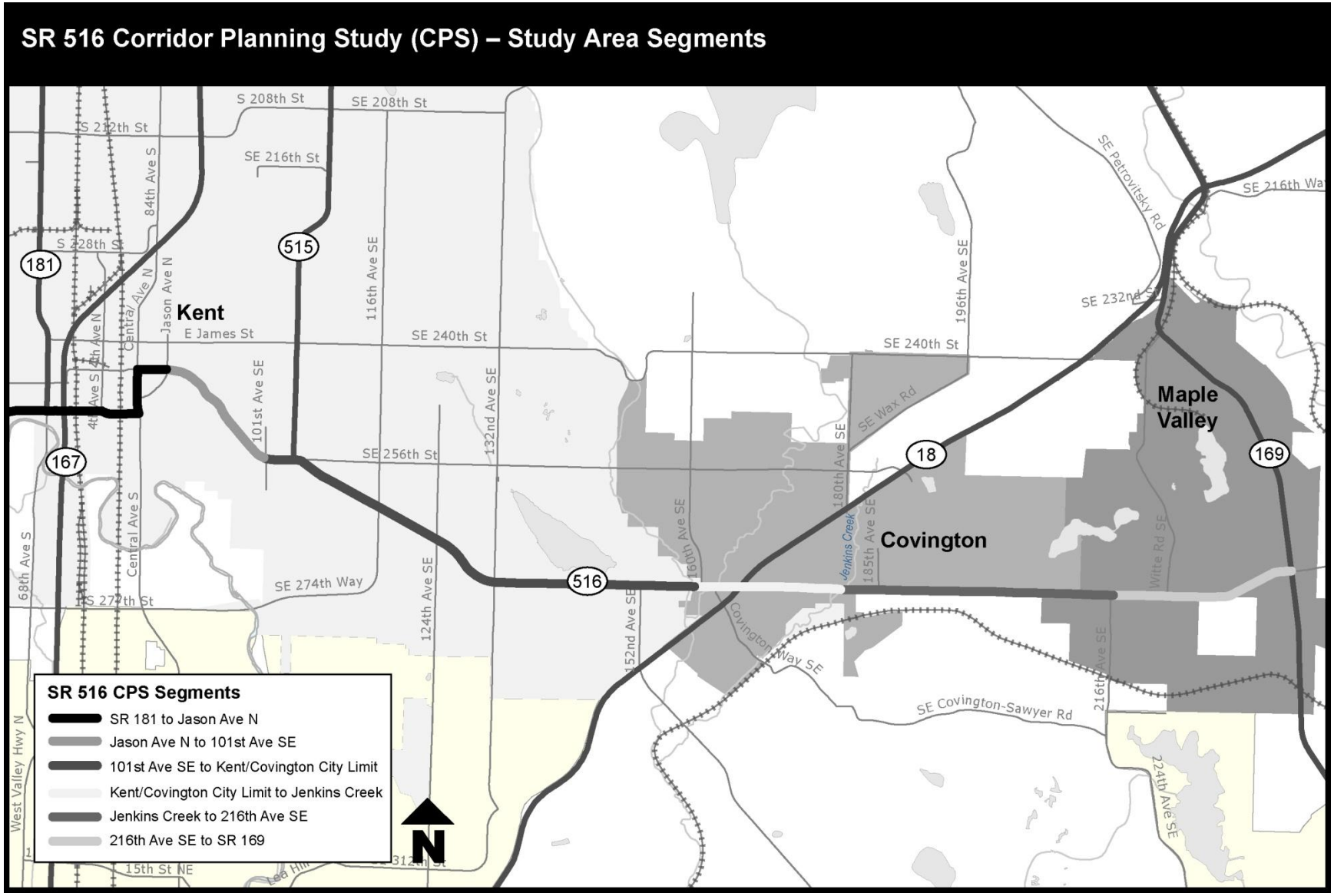

Figure 3.8: SR 516 Corridor Study - Segments for the analysis

Existing - Intersection LOS

All the intersections operate at an acceptable level of service during the AM peak hour of operation. Other than the Union Pacific Rail Road (UPRR) crossing impacts on the intersections near the SR 167 interchange, all the intersections on SR 516 between SR 181 and Central Avenue N operate at LOS D or better in existing conditions. All but four of the intersections operate at or above LOS D during the PM peak hour in existing conditions. The four intersections operating below LOS D are:

SR 516 and 104th Avenue SE (LOS E)
SR 516 and 172nd Avenue SE (LOS E)
SR 516 and SR 169 (LOS E)
SR 516 and SE Wax Rd (LOS F)

Existing - Segment Travel Speed

A threshold target of 70% for the ratio of operating speed to the posted speed was used in order to identify roadway segments that may need more analysis and/or improvements. The inputs for this analysis include roadway classification; geometric information of segments including number of lanes, segment length and left turn channelization; free flow speed; annual average daily traffic (AADT); directional distribution; saturation flow rate; peak hour factor; and other information.

During the AM peak hour operation in the existing condition, three segments fall below the 70% speed threshold. These segments are SR 181 to Jason Avenue N, 101st Avenue SE to Kent/Covington City Limit, and Kent/Covington City Limit to Jenkins Creek. During PM peak hour operation in the existing condition, the same three segments fall below the 70% speed threshold.

Existing - Railroad Crossing Analysis

Because of its close proximity to the interchange area at SR 516 and SR 167, the Union Pacific (UP) railroad track was the principle focus of this analysis. Field observation is one of the best methods of assessing railroad crossing roadway impacts since it also includes any additional influence of BNSF rail traffic to the east of the UP line. In addition to nine days of observation, the study included information from camera operations in the Northwest Region traffic division as well as data and input from the city of Kent.

The number of trains crossing SR 516 was based on data received from the city of Kent for May 2010. The data reveals that on average, one UP train crosses SR 516 during the AM peak hour. Trains are of various lengths and run at different speeds. To capture impacts of trains with various lengths and speeds, the project team assumed a railroad gate closure for 2, 3, 4, and 5 minutes. For each of these closure durations, the project team developed a model to estimate traffic queue length and average vehicle delay. During existing AM peak hour, the average eastbound travel time from SR 181 to Central Avenue S was 1.3 minutes per vehicle for the worst case scenario with five minutes closure time. Westbound traffic experiences little more than one minute of delay per

vehicle average for the five minutes closure. The same data reveals crossing of one UP train during a two-hour PM peak period on an average. A gate closure of 2, 3, 4, and 5 minutes was again used for analysis. During existing PM peak hour, the average eastbound travel time from SR 181 to Central Avenue S is 0.7 minutes per vehicle during the worst case scenario with five minutes closure duration. For the same closure duration, westbound traffic experiences a delay of about 0.2 minutes per vehicle average. Sounder train trips on the BNSF line, running approximately every half hour, have a short gate closure time due to their short length.

3.8 Safety and Collision History

The Washington State Department of Transportation has adopted a Target Zero© goal of reducing the fatal and serious injury collisions statewide to zero by 2030. More detailed information connected to the development and application TargetZero can be found at [http://targetzero.com/]. This corridor safety analysis was developed with the intent to identify locations where improvements may be considered for eliminating or reducing the severity of fatal and serious injury collisions.

The safety analysis was performed for the SR 516 corridor from Mile Post (MP) 4.85 to MP 16.22 and for the five year period 2005-2009. The safety analysis focused on strategies to eliminate or decrease the severity of fatal and serious injury collisions. WSDOT's official Collision Analysis Location (CAL), Collision Analysis Corridor (CAC), and Intersection Analysis Location (IAL) lists were reviewed and countermeasures considered when needed following the process outlined in the WSDOT Highway Safety website to make sure any identified locations had been addressed. Cities with a population equal to or greater than 25,000 are responsible for safety conditions and remedies within their boundaries. There were no CAC or CAL sites identified within the study corridor. CACs are five mile corridors with a five year history of at least 11 fatal or serious collisions outside of cities of greater than 25,000 in population. CALs are less than one mile sections with a five year history of four fatal or serious collisions and more than six evident injury collisions outside of cities with a population of 25,000 or greater. The city of Kent has a population above 25,000 And is responsible for safety remedies within their boundaries. The cities of Covington and Maple Valley are currently below the 25,000 population threshold, but may reach the 25,000 population during the 20 year study time span.

IALs are intersections that exhibit a collision rate exceeding certain criteria. This list rates intersections statewide using average societal cost of collisions per each target intersection, depending on the type of collision, speed, and severity for the last five years. Each year, as the latest collision data becomes available, the list should be updated to reflect the most recent five years of data. According the currently adopted list there are no IALs along the study corridor.

To conduct the safety analysis a computer program called SafetyAnalyst was utilized to assess the number of collisions at a defined location and develop recommendations for reducing the severity or frequency of collisions at that location.

The safety analysis showed there were 24 serious safety incidents over a five year span between 2005 and 2009, of which 20 of the incidents resulted in serious injury, and four resulted in a fatality. Seven of the 24 collisions, with three of the fatalities, involved alcohol. Other causal factors included speeding and not granting the right of way to oncoming traffic. The general trend is a decrease in serious collisions with each passing year. Collisions were spread out between the three cities along the study corridor, occurred at all times of day and night and did not reflect any seasonal trend. By times of day fatalities occurred in early to mid-morning and mid to late afternoon.

What this data shows is that the collisions and fatalities appear to be random in nature and are mainly the result of driver behavior. Given the collision history and the contributing circumstances behind the collisions, SafetyAnalyst was not able to generate specific counter-measures for mitigating these types of collisions.

In review of the collisions that occurred within the limits of this corridor it was noted that there were four collisions involving pedestrians between MP 7.06 and MP 9.5. In looking at what the potential generators are for the collisions, there is a high school on the north side of the highway (Kent Meridian) with housing and a METRO bus stop on the south side of the corridor. These features create an attraction for both bicycle and pedestrian traffic. There is a continuous sidewalk on the north side of SR 516, and a partial sidewalk to the south. These factors may contribute to pedestrian crossings at non-delineated locations. The city of Kent received a grant in October of 2010 to improve pedestrian safety in the general area (MP 7.06 to MP 8.75). June 2013 is the anticipated completion date. Opportunities for pedestrians to safely travel along and across SR 516 should be re-evaluated after the grant improvements are in place.

Although no immediate safety improvement locations were identified, based on the results generated from SafetyAnalyst and the anticipated growth surrounding the SR 516 corridor, consideration may be given for general improvements to help decrease the total number of collisions. Although the safety analysis does not show this corridor to be a high priority safety location, if a decision is made by a city to proceed with safety improvements on this corridor, at least two potential actions should be considered. They are:

- Increased emphasis on the implementation of access management for the corridor.
- Elimination of two way left turn lanes at locations exceeding 24,000 ADT.

CHAPTER 4

Future Baseline Conditions

Chapter Four

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CHAPTER 4 FUTURE BASELINE CONDITIONS

Future baseline conditions refer to the corridor's performance at several time points in the future, using forecasted population and employment growth. This future performance is modeled based on several assumptions. These include:

- Including only currently programmed (financed) transportation improvements in the corridor area for determining the corridor's future capacity and developing a more realistic determination of what the demands on the corridor will be.
- Puget Sound Regional Council's (PSRC) regional travel demand model (EMME software) and VISUM model data from the cities of Kent and Maple Valley for forecasting travel demand.
- Modeling for AM and PM peak hours of the existing condition and three future time point conditions of 2016, 2022 and 2030.
- 26 signalized intersections were analyzed within the study corridor. The intersections were selected based on WSDOT analysis and local jurisdiction's input. Below LOS E is used as the determination of need for intersections.
- The study corridor is broken into six segments for speed analysis purposes. The segments are used to determine the average future speed and compare it to the posted speed. Segments operating below 70% of the posted speed or operating over capacity are considered as needing additional study or improvements.
- Existing signals are assumed to be optimized in the future years for the greatest efficiency. This operational efficiency is a recommendation of this report
- All maintenance and preservation work required to keep the facility in working condition is assumed for all years.

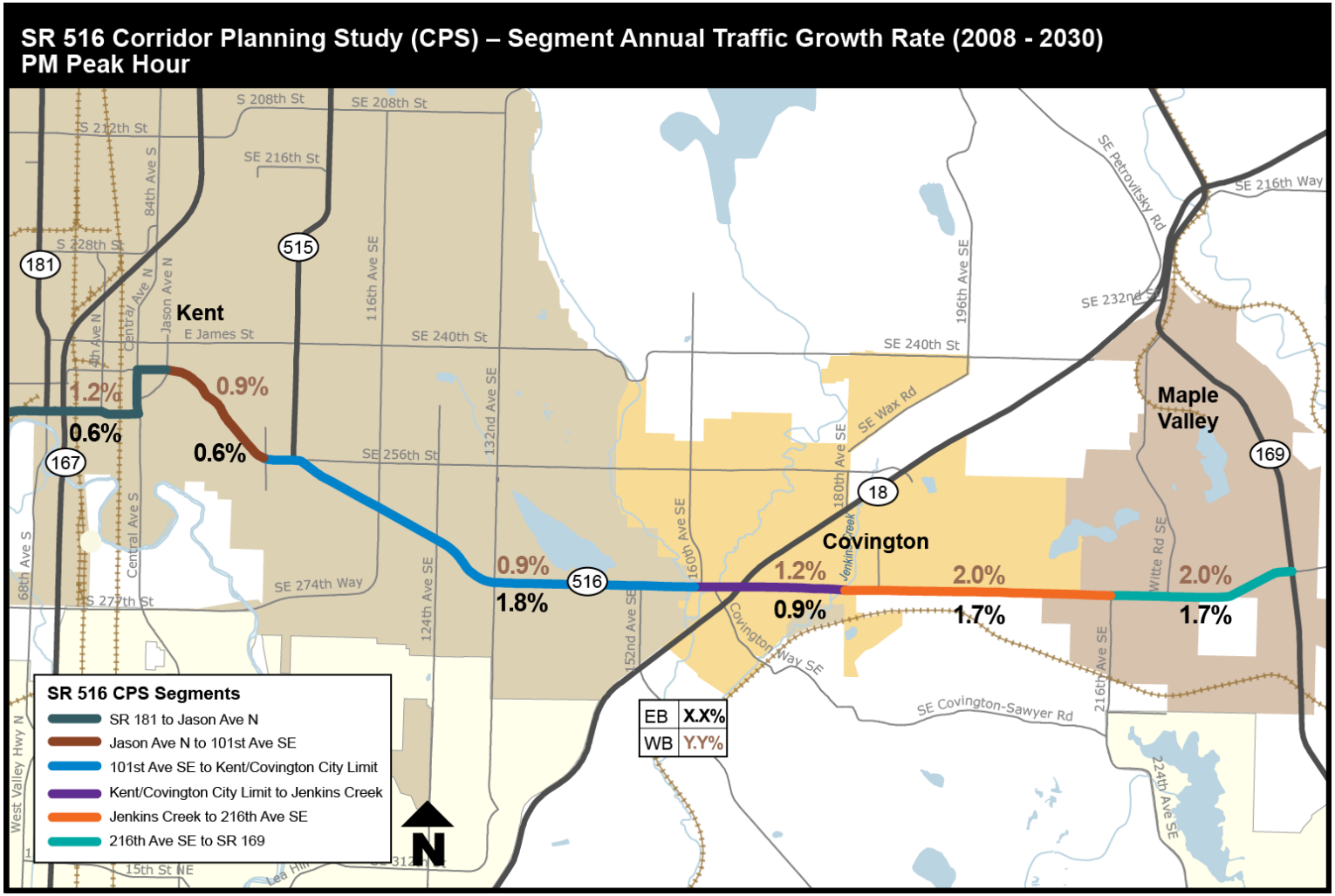
4.1 Traffic Volume Estimates

The travel demand forecasts from Puget Sound Regional Council's (PSRC) regional travel demand model (Version 1.0bb) in EMME software were used along with the cities of Kent and Maple Valley models (in VISUM software). These models were used to forecast growth factors for the intersections on this corridor. The 2020 and 2030 baseline roadway networks included only funded projects. Unfunded, planned projects were not factored into the modeling analysis. . The cities of Kent and Maple Valley model's results forecast demand for PM peak hour only. The PSRC model was used as a supplement to both estimate AM growth factors as well as provide a more regional application of traffic generation and destination projections. The roadway segments in the study corridor were analyzed using SYNCHRO and SIMTRAFFIC simulation modeling software packages and Highway Capacity Manual methodologies.
. All analyses focused on the AM and PM peak hours of existing condition (2009) and three future year conditions (2016, 2022 and 2030).

Between the period of 2009 and 2030, PM peak hour demand grows 1.8% annually in the eastbound direction of SR 516 in Kent. Covington and Maple Valley segments in the eastbound direction show a 1.7% annualgrowth rate. In the westbound direction, the growth is forecasted at 2% annually)for the segment in Covington and Maple Valley.

The growth rate by direction for six segments is shown in **Figure 4.1**.

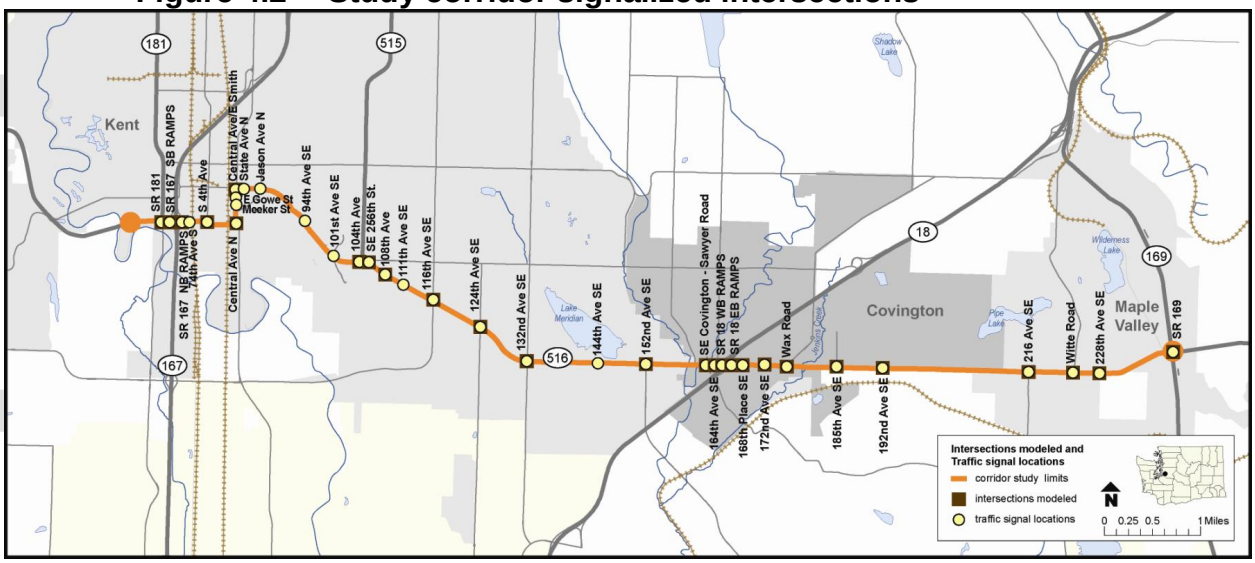
Figure 4.1: Traffic Growth Rate along the Corridor (2008-2030 PM Peak Hour)



4.2 Future Traffic Conditions

Future year analyses were conducted for three different years - 2016, 2022 and 2030. The analyses focused on AM and PM peak demand periods. Future year growth rates for each of the 26 intersections were applied by approach and by movement. Growth rates were applied to the traffic counts to develop future traffic demand for analyzing both segment and intersection performance. Like existing condition analyses, future condition analyses focused on evaluation of intersection LOS, segment travel speed and railroad crossing delays. All signalized intersections in the future years analyses were assumed to have optimized timing for peak efficiency before establishing if a need will exist. Figure 4.2 shows the locations of all signalized intersections, and identifies the 26 intersections analyzed.

Figure 4.2 Study corridor signalized intersections



4.3 Highway Segments – 70% Speed Comparison

For the segment travel speed and speed ratio calculation, the same methodologies and tools were used as the existing condition analysis. The six segments were analyzed for the year 2030 to determine which segments may warrant further study and analysis. Speed comparison is used as a better measure of efficiency and allowing greater throughput. Travel at 70% of the posted speed is assumed to maximize user throughput. Projected average speeds on any given segment that were under 70% of the posted speeds were used as one of the conditions for determining if a potential need existed on that segment and if further study was justified. Another condition for determining if a need exists is the density of signalized intersections typically found in more urbanized areas. Higher densities of signalized intersections slows through traffic, allowing safer cross traffic movement and access to the mainline corridor. All segments, including those

containing a large number of signalized intersections in close proximity, were modeled for speed comparisons. All of the segments with high density traffic signalization are slower than 70% of posted speed, but were not listed as being deficient since signal operations will have a deleterious effect on mainline traffic speeds, but have the benefit of safely allowing cross traffic movements and access to the corridor.

AM Peak Hour

During the AM peak hour operation in 2030 conditions, four segments are projected to fall below the 70% speed threshold target in both the eastbound and westbound directions. These segments are:

- SR 181 to Jason Avenue N *
- 101st Avenue SE to Kent/Covington City Limit *
- Kent/Covington City Limit to Jenkins Creek *
- Jenkins Creek to 216th Ave SE

* These three segments have a large number of signalized intersections in close proximity to one another

Figure 4.3 shows the AM peak hour ratios of projected speeds compared to posted speeds.

PM Peak Hour

During PM peak hour operations in 2030 conditions, the same four segments noted above fall below the 70% threshold. Figure 4.4 shows the PM peak hour ratios of projected speeds compared to posted speeds.

Two segments, Jenkins Creek to 216th Ave SE and 216th Ave SE to SR 169, were analyzed for the 2016 and 2022 mid-term conditions. Of those two segments, only Jenkins Creek to 216th Ave SE segment is projected to operate below the 70% speed threshold during the 20 year study time span. The Jenkin's Creek to 216th Ave SE segment was broken down into smaller segments to determine a more precise look at the timing and locations of future needs. The three partial segments within Jenkins Creek to 216th Ave SE were:
Jenkins Creek to 185th Ave SE,
185th Ave SE to 192nd Ave SE, and
192nd Ave SE to 216th Ave SE.

Figure 4.3 Ratio of Operating Speed to Posted Speed (AM Peak Hour)

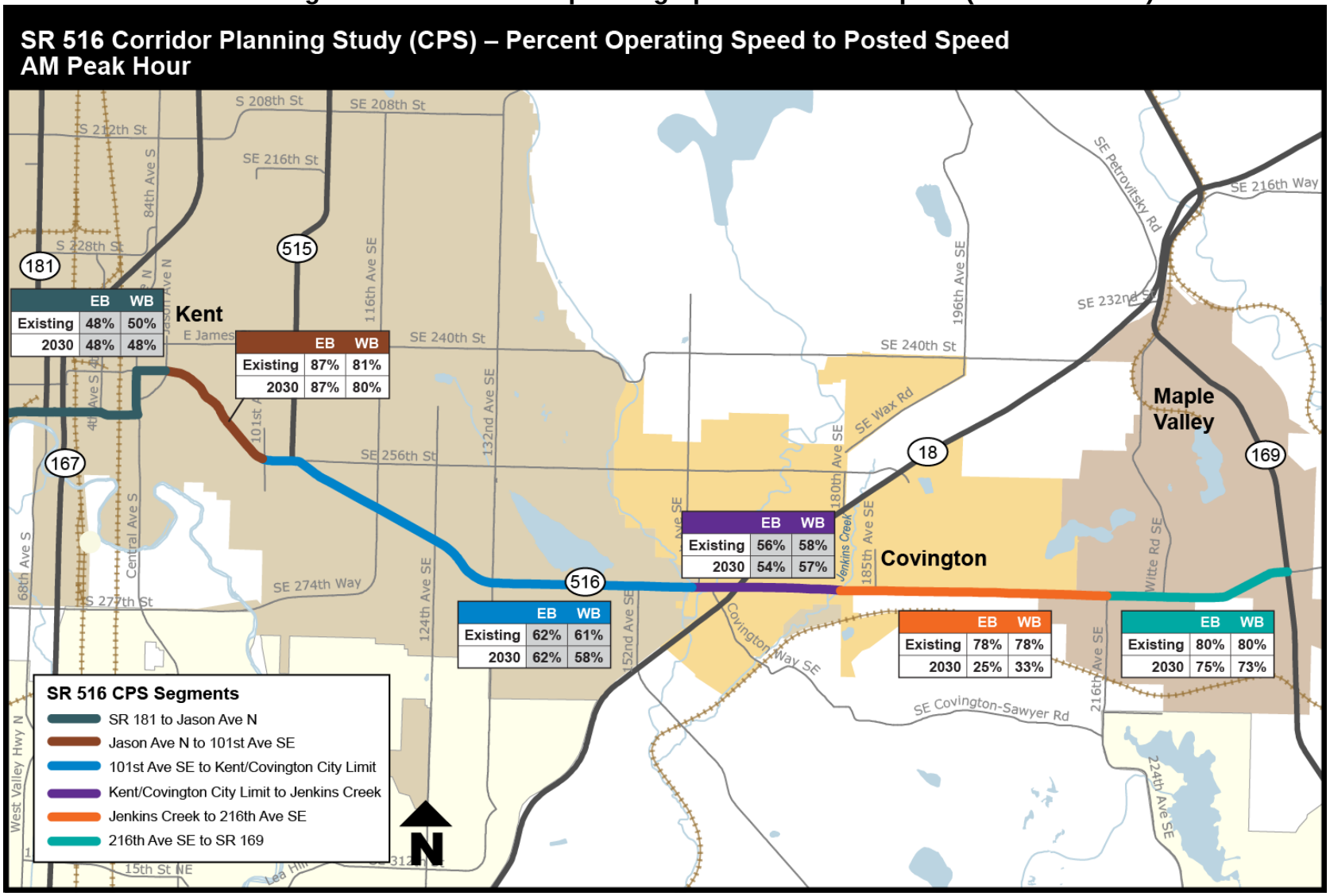
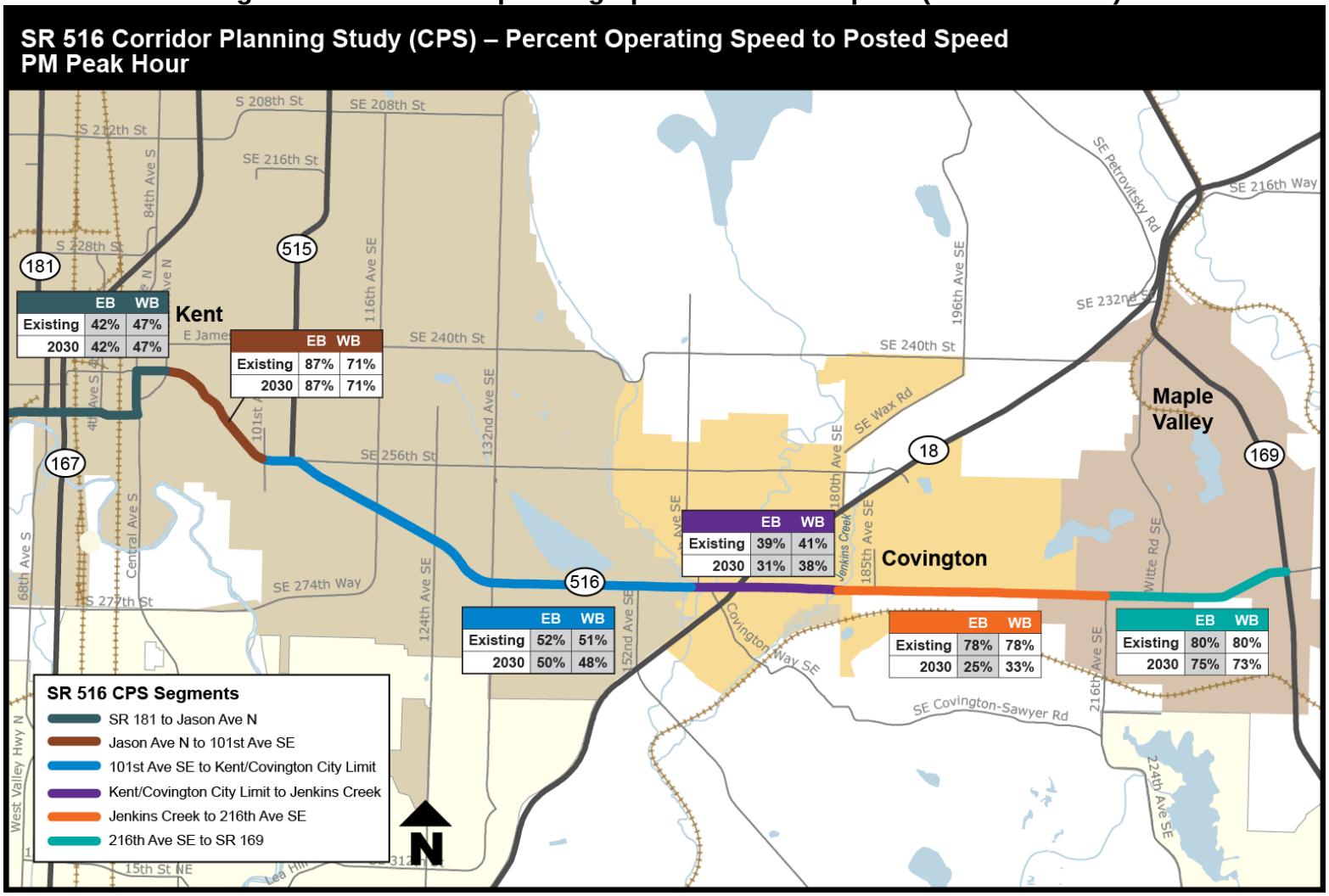


Figure 4.4 Ratio of Operating Speed to Posted Speed (PM Peak Hour)



4.4 Intersection LOS with programmed improvements

Intersections

Based upon analysis, with only currently programmed improvements and optimized signal operations considered as being in place, of 26 signalized intersections studied, nine would operate below LOS E in 2030. This was further broken out by determining by what time frame, which intersections would fall below the standard. AM peak periods did not indicate any intersections in the study corridor would fail. The following intersections are modeled as operating below LOS E and the timeframe it is forecast to occur by. Boldface type indicates the intersection was identified as a need earlier in the study timeframe.

Existing conditions – PM peak

SR 516 and SE Wax Rd

Near Term (2016) conditions – PM peak (w/optimized signal operation)

SR 516 and 104th Avenue SE

Mid Term (2022) conditions – PM peak (w/optimized signal operation)

SR 516 and Central Avenue
SR 516 and 104th Avenue SE
SR 516 and 132nd Avenue SE

Far Term (2030) conditions – PM peak (w/optimized signal operation)

SR 516 and Central Avenue N/E Smith St
SR 516 and 104th Avenue SE
SR 516 and SE 256th St
SR 516 and 108th Avenue SE
SR 516 and 132nd Avenue SE
SR 516 and 152nd Avenue SE
SR 516 and 164th Avenue SE
SR 516 and 172nd Avenue SE
SR 516 and SE Wax Road

4.5 Railroad Crossing Analysis (future)

The railroad crossing analysis for 2030 future year conditions used the same methodology as explained in the existing railroad crossing analysis in chapter three. The vehicular volumes were adjusted according to the growth rates, but no modifications were made to the Union Pacific train trip frequencies or lengths for modeling the future case scenario.

During 2030 AM peak hour, under the worst case scenario of five minutes closure time, the average travel time from SR 181 to Central Avenue S could increase from 1.3 minutes up to 2.25 minutes in the eastbound direction and from a little over one minute to 2.45 minutes in the westbound direction, respectively. During 2030 PM peak hour, under the worst case scenario of five minutes closure time, the average travel time from SR 181 to Central Avenue S could increase from 0.7 minutes up to 1.91 minutes in the eastbound direction and from 0.2 minutes to 3.19 minutes in the westbound direction, respectively.

In this worst case scenario, eastbound traffic queues could extend far enough to negatively affect four signalized intersections including the SR 167 ramp junctions. The westbound traffic queue could extend as far as Central Avenue.

Another safety issue associated with railroad usage and closure times is emergency access across the tracks during train travel episodes.. This is not limited to the highway wait times but all local access roadways across the tracks. If a train is restricting access to an emergency on the other side, other units may have to be called in to respond, increasing the time it takes for emergency crews to arrive at the incident.

4.6 Non Motorized Issues

The corridor has developed over time in much the same way as other highways. The original purpose was to move vehicular traffic. As shown on earlier on Figure 3.2, there are breaks in sidewalk continuity, especially in the more rural sections. Bicycle facilities are infrequent and not interconnected at this time. Within the Comprehensive plan for Covington for example, the portion of SR 516 west of Wax Road is not recommended as a bike route, due to high volumes of through and turning vehicular traffic. (The city has made efforts to provide more bike-friendly connections to the north and south of SR 516.) The city of Maple Valley recommends sidewalks along SR 516 as part of its non-motorized plan. The cities have made efforts to include pedestrian and bicycle amenities as a requirement for permitting new development as it occurs along the corridor. These efforts are sporadic and dependant on where the new development may occur. Without dedicated funding for these amenities, apart from new development, this piecemeal approach will likely continue. Coordination between WSDOT and local jurisdictions should continue in an effort to make the corridor more pedestrian and bicycle friendly.

4.7 City Identified Transportation Improvement Needs

The following transportation improvement needs are identified by the cities of Kent, Covington, and Maple Valley. The improvement needs were derived both from the cities' Transportation Improvement Program (TIP) lists and from conversations with the CWG.

The city of Kent has identified the need for SR 516 intersection improvements at Willis St. and Central Ave., Smith St. and Central Ave., 132nd Ave SE, SE 256th St/104th Ave SE and 108th Ave SE (this is tied to an extension of 108th Ave SE to 256th Ave SE). They also indicated a need for grade separation of the two, at-grade, RR crossings in the vicinity of SR 167. The city's TIP and Comprehensive plan can both be found at: [http://www.kentwa.gov/transportation/]

The city of Covington has identified a need for widening SR 516 to five lanes from Jenkins Creek to 192nd Ave SE as well as from 160th Ave SE to 164th Ave SE with intersection improvements. The city's TIP can be found at:
[http://www.covingtonwa.gov/city_departments/publicworks/engineering/engineering.html]
The Comprehensive plan can be found at:
[http://www.covingtonwa.gov/city_departments/communitydevelopment/strategiclongrangeplanning/compplaninfoandforms.html#revize_document_center_rz67]

The city of Maple Valley has identified the need for widening SR 516 to five lanes from the western city limits to 218th Ave SE, and then widening to three lanes from 218th Ave SE to SR 169. Sidewalks and bike facilities should be included in the widening, as well as intersection improvements at 216th Ave SE, 218th Ave SE, Witte Rd, and SR 169. The city has additionally identified a need for pavement restoration between 228th Ave SE and SR 169. The city's TIP can be found at:
[http://www.maplevalleywa.gov/index.aspx?page=356]
The Comprehensive plan can be found at:
[http://www.maplevalleywa.gov/index.aspx?page=93]

CHAPTER 5

Improvement Recommendations

Chapter Five

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CHAPTER 5 IMPROVEMENT RECOMMENDATIONS

5.1 The Alternatives Considered

Moving Washington is WSDOT's framework for making transparent, cost-effective decisions that keep people and goods moving and support a healthy economy, environment and communities. Moving Washington reflects the state's transportation goals and objectives for planning, operating and investing. State law directs public investments in transportation to support economic vitality, preservation, safety, mobility, the environment and system stewardship. Moving Washington provides the principles for making responsible and sustainable decisions.

Maintain and Keep Safe – The highest priority is maintaining and preserving the safe and long-lasting performance of existing infrastructure, facilities and services. This is the heart of Moving Washington and the principal target of the state's investments in its transportation system.

After maintenance and safety needs are addressed, Moving Washington combines three essential transportation strategies to achieve and align our objectives and those of our partners.

Operate Efficiently – This approach gets the most out of existing highways by using traffic-management tools to optimize the flow of traffic and maximize available capacity. Strategies include utilizing traffic technologies such as ramp meters and other control strategies to improve traffic flow and reduce collisions, deploying Incident Response to quickly clear collisions, optimizing traffic signal timing to reduce delay, and implementing low-cost/high-value enhancements to address immediate needs.

Manage Demand – Transportation Demand Management (TDM) is an umbrella term for strategies that reduce vehicle trips or shift use of the roadway to off-peak periods. Demand management is one of WSDOT's strategies to fight congestion. TDM options include several low-cost strategies that create the least amount of environmental impacts. Whether shifting travel times away from peak periods, using public transportation, or reducing the need to travel altogether, managing demand on overburdened routes allows our entire system to function better. Overall strategies include using variable-rate tolling in ways that reduce traffic during the most congested times and balance capacity between express and regular lanes, improving the viability of alternate modes, and providing traveler information to allow users to move efficiently through the system.

Add Capacity Strategically - Only after maintenance, safety, efficient operations, and transportation demand management options are considered, strategic capacity improvements, under a three tiered system, are considered. Tier 1 projects are typically low cost high return projects, such as Intelligent Transportation System (ITS), turn lanes, and intersection improvements. Tier 2 are moderate to higher cost projects that further reduces congestion on both highways and local roads, examples are auxiliary lanes and parallel corridors. Tier 3 projects are the highest cost and longest range projects such as adding general purpose lanes and improving interchanges.

5.2 Evaluation Criteria and Performance Measures

Moving Washington principles were applied in the creation and application of the following criteria used to determine corridor needs.

- Safety analysis included identifying any current sites listed as Collision Analysis Corridors (CACs), Collision Analysis Locations (CALs), or being on the Intersection Analysis Location List (IALL). Following that, a program called Safety Analyst was used to determine if potential future safety issues could be identified and addressed.
- Maintenance and preservation issues were investigated to determine if there are current or anticipated unmet needs for the study corridor.
- Efficiencies were looked for in the current and future operations of the corridor.
- Demand management techniques were investigated to determine their possible employment in the study corridor.
- Strategic capacity was then considered if other techniques failed to adequately address future mobility issues.

There were other issues investigated in this study. One of the highest priorities for the city of Kent was an analysis of the interactions of two, at grade, railroad crossings in the vicinity of the interchange area at SR 181, SR 167, and SR 516. Of particular concern is the Union Pacific track, located about 500 feet to the east of the SR 167 northbound off/on ramp intersection. The interactions of rail and vehicular traffic were analyzed using a SYNCHRO model and comparing time delays at RR crossings to standard intersections as well as looking into possible safety issues with traffic queuing resulting from train traffic during vehicular peak times.

The study corridor was analyzed for needs using Level of Service measurements at 26 signalized intersections and speed and capacity analysis on six separate segments within the study corridor. The speed analysis was used in ascertaining whether speeds were already, or expected to drop, below 70% of the posted speed. Simple capacity calculations of the facility, local desire to improve, and constructability of improvements, were also involved in reaching consensus on whether a need existed and if an improvement would be considered for inclusion into this study's recommendations.

In addition to looking at potential improvements to be considered for this corridor, timing of implementing the potential improvements is also considered. A 20 year span of time is used to analyze the performance of the corridor and arrive at a set of options to be considered for the entire 20 year period. The entire set of options is ranked and then assigned to the first six years, the second six years, or the final eight years. The first subset is populated with those options that would satisfy a current need within the first six-years of the base year used for modeling. The second subset is populated with those options that would satisfy a future need within the second six-year period (12 years after the base year) and finally the last subset is populated with those options that would satisfy a future need within the last eight years (20 years after the base year). The 6-6-8 timing application is intended to focus on "best projects first", but does not actually indicate completion in this time frame. Solutions in this study and other corridor studies will be included in the HSP database and will compete with other state transportation projects based on performance outcomes.

While potential improvements and timing were looked at for the corridor, those needs arising further into the future were not assigned a specific improvement. Rather than potentially restrict future actions based on remedies developed in the past, it is preferable to allow flexibility in addressing those needs when they arise. Newer technologies could exist to assess the needs and determine how best to address them. A better understanding of the current conditions will be available at that point in time and will help lawmakers to make better decisions as to where to invest in improvements along the corridor. For these reasons, recommendations for addressing the far-term needs will not be specific, nor will they include an estimate of costs. The needs, as identified in this report will be stated, but the potential solutions will be evaluated closer to the time of actual need.

5.3 Recommendations

It is important to note that all of the study recommendations are unfunded by the state at this time. The recommendations made in this study are focused only on the needs of the SR 516 corridor under investigation. Ultimate funding and implementation of any of the study recommendations by the state are dependent on their relative importance as compared to all of the needs of the state transportation system; and the ability of the local jurisdictions to obtain funding for the improvements.

The draft recommendations were presented to the Corridor Working Group at the November 16, 2011 meeting. The Corridor Working Group recommended additional analysis to the east of Jenkins Creek with a refinement in the length of the segment being analyzed. Upon further consideration of *Moving Washington* priorities, stakeholder comments, and additional technical analysis, the list was refined and produced the following recommendations.

5.3.1 Preservation Strategies

The highway system is composed of many features, such as bridges, culverts, barriers, guardrail, pavement, ditches, catch basins, signals and traffic signs. These highway features are kept functioning by performing various activities such as inspection, cleaning and repair. The Highway Activity Tracking System (HATS) is designed to support WSDOT staff to document their maintenance activities. By tracking their activities, it is much easier to determine what work has been done and what work there is to do in the near future. In 2011, WSDOT spent over $32,000 in maintenance funds (M2) for this portion of SR 516. The overall pavement condition is good; crack sealing the portion between milepost 5.71 to 9.09 (Titus St. to about 127th Ave SE) is needed to extend the pavement life. WSDOT should continue with the Washington State Pavement Management System pavement monitoring and repair program. The next inspection is scheduled for 2013 and pavement needs will be reassessed at that time.

In spring 2012 the city Maple Valley identified the portion of SR 516 between 228th Ave SE and SR 169 as needing pavement repair due to rutting and cracking. WSDOT maintenance staff did a field inspection of that segment and agreed the current condition warrants repair and has committed to addressing the condition. According to WSDOT's maintenance schedule, there will be some crack sealing repairs done during summer 2012 on this stretch of the corridor.

Other roadside issues identified by WSDOT maintenance forces as ongoing needs include vegetation control (oversize tree removal), signage upgrading, and drainage improvements needed to prevent flooding as a condition for permitting any additional development. Both the state and local municipalities should continue on-going facilities maintenance and repair, including drainage, signage, illumination, guardrail, and striping. Local jurisdictions should consult with WSDOT Maintenance and Operations prior to permitting new development along the corridor.

5.3.2 Safety Strategies

Access management should be continued by the cities within their jurisdictional boundaries. Better access management reduces both the frequency and severity of collisions on any corridor. As collision data is collected in the future, if any segment or intersection becomes a Collision Analysis Corridor (CAC), Collision Analysis Location (CAL), or Intersection Analysis Location (IAL), and prioritizes against other statewide safety needs, a remedy should be scoped and considered for implementation.

Kent has recently been awarded a pedestrian safety grant to focus on SR 516 between 104th Ave SE to 124th Ave SE. Completion is scheduled for July 2012. The resulting effect should be monitored as the pedestrian safety grant improvements are implemented by Kent.

Both the state and the cities should continue to monitor collisions on the study corridor and, if warranted, determine if a specific physical fix would be effective. Enhanced education of the public on topics such as impaired driving, excessive speed, and awareness of non-motorized modes of travel should be offered to improve safety on the corridor. As general considerations for safety enhancement on any roadway, speed reductions and physical separation of opposing lanes and/or removal of two way left turn lanes should also be considered whenever appropriate.

5.3.3 Efficient Operation Strategies

Continue access management efforts. In addition to its safety benefits, access management will also help the flow of traffic and maximize throughput, making the system more efficient at a comparatively low cost. This report also recommends maximizing flow characteristics and throughput by optimizing signal timing whenever and wherever possible. Northwest Region Operations has recommended the corridor, and the signals along the corridor, should continue to be reviewed at a minimum of every three years to ensure that it is operating at the best possible efficiency, minimizing vehicle delay while, to the best extent practicable, maximizing traffic flow. Kent, which is the signal operating agency within their city limits, should coordinate signal operations with WSDOT to help maximize the efficiency of the system throughout the corridor.

5.3.4 Transportation Demand Management (TDM) Strategies

TDM is an umbrella term for strategies that reduce vehicle trips or shift use of the roadway to off peak periods. TDM strategies are implemented in partnership with local governments, transit agencies, employers, and others, so the development of strategies will depend on the capacity and interests of local partners. Other considerations will

include the objectives for the corridor, existing land uses and services, analysis of travel patterns and travel behavior, and financial resources.

Based upon traffic modeling and analysis, in 2030 a 5 percent reduction in peak hour trips would remove 450 daily commute trips from the highway and could result in an approximate $8 to $10 million in roadway capacity construction savings. This target is assumed to be achieved within those twenty years as a result of the TDM measures. Some of the key characteristics of the study corridor pertaining to TDM are;

- Largely low-density residential uses
- Small-scale, disbursed commercial areas
- Peak hour traffic includes commuters traveling relatively long distances to employment centers (Tukwila, Bellevue, Seattle, Tacoma, etc.) and local trips that start and end within the corridor (errands, shopping, local schools)
- A lack of continuous trails and other bicycle/pedestrian amenities
- Park and ride(s) closest to the Kent Sounder Station are oversubscribed; others on the corridor are underutilized.
- Bus transit service on the corridor operates on 30 minute peak hour headways; increased frequencies are not included in local transit plans
- Large, low-density residential developments on and near the corridor planned for the future

The following table lists TDM strategies that are recommended for this corridor. Accompanied with the strategy is a suggested timeline, approximate cost, estimate of trips removed, and basis for the assumptions.

Table 5-1 TDM Recommendations

Recommended Strategy	Timing	Cost	Trips removed
Vanpool promotion - Market vanpools and offer subsidies and incentives for new vanpools	2020-2030	$14,000 per year	100 daily commute trips
Engage employers - Supplement existing CTR/GTEC/TMA/transit efforts with targeted investments at businesses that employ corridor residents. Support for employers who will improve commute efficiency by offering telework/compressed work week technical assistance; transit, carpool and vanpool subsidies; priority parking for carpools and vanpools; increasing SOV parking fees at worksites; etc.	2020-2030	$60,000 to $80,000 per year	200 daily commute trips
Relocate Vanpools - Target outreach and incentives to existing vanpools to encourage them to move from over utilized park and rides to underutilized park and rides. This frees up parking at over utilized park and rides for new transit users. Vanpools that move to underutilized park and rides stay in these locations because they are often located closer to their homes and are hassle-free	2020, 2022, 2024, 2026, 2028	$20,000 per year, conduct biannually	100 (relocate ten vanpools to redeem 100 parking spaces at park and ride with high levels of transit service)
Multimodal commute coaching, outreach and incentives - Community-based outreach and marketing programs, e.g. Curb the Congestion, In Motion, that provide individualized commute coaching and incentives to move people from SOV commutes to other modes.	2024-2030	$80,000 – $120,000 per year	100 daily commute trips

Vanpool promotion (Based on incentives for vanpooling, I-90, 2009)
Engage employers (Based upon: CTR, GTECs, outreach to Bellevue employers 2008)
Relocate Vanpools (Based on: I-405 vanpool relocation project, Renton Transit Center and South Renton Park and Ride, 2007/2008
Multimodal commute coaching, outreach and incentive (Based on: Curb the Congestion on 164th in Snohomish County)

There are a number of other TDM strategies that may be considered in addition to the strategies listed above. Some other strategies are:

- Ridesharing – promote vanpools and carpools, provide ridematching assistance through Rideshareonline.com, develop and maintain ride share meet-up locations

- Transit improvements – add service where appropriate to support connections to rail and transit routes
- School trip management – work with schools to support increased walking, bicycling, and school bus use, parent ride-sharing
- Telework – promote and support employer telework programs, provide technical assistance to employers and employees, consider telework centers in the community if there is demand
- Bike to transit stations – promote and support safe bicycling routes to rail/transit stations to create broader access to main commuter routes
- Employer/commute trip reduction programs – work with employers to promote commute options to employees through outreach, assistance, and incentives; identify key employers on the destination end to work with to affect trips originating in the suburban community
- Residential-based trip reduction programs – use individualized and social marketing programs to educate and support households to make more efficient trip choices
- Growth and transportation efficiency centers – establish a geographic outreach approach and work with employers, neighborhoods and schools within the area to promote transportation alternatives
- Personal travel assistance – establish a public outreach presence to assist travelers in making choices and using alternatives
- Incentives – provide incentives for travelers that use alternative modes being promoted in the corridor
- Improve non-motorized infrastructure – make investments in bicycle and pedestrian infrastructure to improve access and safety for bikers and walkers
- Human service improvements – improve/expand human services transportation
- Land use policies – work with local governments to make land use policies, plans and regulations more transportation-efficient, may include TDM requirements for new development (such as limited parking, transit passes to residents, etc.)

5.3.5 Strategic Capacity Addition Strategies

Capacity improvements are broken down into three subsets, Tier 1, Tier 2, and Tier 3 projects. TIER 1 recommendations focus on low-cost projects that may deliver a high return on capital investment and have short delivery schedules. These include incident management, Intelligent Transportation System, access management, ramp modifications, turn lanes and intersection improvements. TIER 2 recommendations focuses on moderate to higher cost improvements that reduce congestion on both highways and local roads. These include improvements to parallel corridors (including local roads), adding auxiliary lanes, and direct access ramps. TIER 3 recommendations focuses on the highest-cost projects that can deliver corridor-wide benefits. These include adding general purpose lanes and interchange modifications.

In addition to creating a list of recommendations based on performance criteria and timing of need, additional analysis was employed to look at potential solution locations and the existing landscape to help ascertain the potential impediments that may be faced when attempting to construct the improvements. The study then developed planning level cost estimates for the potential improvements, including the impediments. A benefit-cost analysis was conducted using the estimated costs of the improvements and comparing those to the benefits, based on collision reduction and annual 24-hour user travel time savings for 20 years after implementing the project. BCs are shown as a range due to variability in the planning level cost estimates. The impediments and benefit-cost analyses apply only to the 2016 and 2022 recommendations. A more detailed look at the analyses can be found in Appendix E.

The following are capacity recommendations for the study corridor. It should be remembered funding for these recommendations is subject to prioritizing against other state wide transportation needs. The recommendations are further broken down into a sequence that reflects a logical approach to considering implementation. The time frames do not imply a schedule depicting actual implementation timing. Longer term recommendations do not include specifics as to how the needs should be met. This approach allows for greater flexibility for decision making in the future.

2016 Needs, Recommendations, and Cost Estimates

Widening from Jenkins Creek to 185th Ave SE TIER 3

- Widen and reconstruct SR 516 between Jenkins Creek and 185th Place SE. This project will include the crossing of Jenkins Creek with a new structure for the stream, widening the street from 2-lanes to 5-lanes including curb and gutter, 8' sidewalks, access control features, landscaping and provisions for u-turns. This recommendation is consistent with the city of Covington's Transportation Improvement Plan.
- Estimated cost range (2011 dollars) $10.6M to $15.2M
- Considerations for construction include possible impacts to wetlands, residential properties, and access and egress points to and from SR 516. Additional costs have been included in the estimate for the remediation of the existing fish barrier location at Jenkins Creek.
- The benefit cost ratio was determined to be 0.88 to 0.61.

2022 Needs, Recommendations, and Cost Estimates

Widening from 185th Ave SE to 192nd Ave SE TIER 3

- Widen and reconstruct SR 516 between 185th Place SE and 192nd Avenue SE. This project will widen the street from 2-lanes to 5-lanes including curb and gutter, 8' sidewalks, access control features, landscaping and provisions for u-turns. This recommendation is consistent with the city of Covington's Transportation Improvement Plan.
- Estimated cost range (2011 dollars) $10.2M to $13.6M
- Considerations for construction include possible impacts to residential properties, and access and egress points to and from SR 516.
- The benefit cost ratio range was determined to be between 0.74 to 0.56

Intersection improvements at SR 516/104th Avenue SE (SR 515) TIER 1

- Improvements could range from local street improvements helping to relieve pressure on this intersection, and/or access removal of SE 256th St to SR 516, and/or a roundabout and/or improving the current intersection design with additional turning lanes, storage lanes and other related improvements.
- Estimated cost range (2011 dollars) $3.5M to $19.5M
- Considerations for construction include possible impacts to adjacent parking lots and businesses.

- The benefit cost ratio was determined to be 7.54 to 5.66.

2030 Needs and Recommendations

Capacity improvements from 192nd Ave SE to 216th Ave SE	TIER 3
Intersection improvements at SR 516/Central Avenue N	TIER 1
Intersection improvements at SR 516/SE 256th St	TIER 1
Intersection improvements at SR 516/108th Avenue SE	TIER 1
Intersection improvements at SR 516/132nd Ave SE	TIER 1
Intersection improvements at SR 516/152nd Avenue SE	TIER 1
Intersection improvements at SR 516/172nd Avenue SE	TIER 1
Intersection improvements at SR 516/SE Wax Road	TIER 1

5.4 Environmental Considerations

As discussed in chapter 3, Environmental Overview, there are a number of environmental considerations to be addressed before any physical alteration of the existing corridor is undertaken. In connection with suggested improvements as part of this study, the primary area of interest is Jenkins Creek in Covington. Before any improvements are made to the corridor facilities, wetland, wellhead, and fish barrier issues must be addressed. Covington has already been working on a preliminary design for roadway widening and culvert replacement. Covington has been working on this design in cooperation with King County and the Department of Fish and Wildlife. The improvement to the roadway at Jenkins Creek will result in the removal of an existing fish passage barrier with better access to approximately 18,500 square meters of upstream habitat.

WSDOT is in the preliminary stages of looking at stream sheds and the fish barrier issue in a more holistic manner, with the thought of coordinating efforts between different participants. WSDOT Olympic Region is considering a pilot study on the Olympic Peninsula. The general idea is that many jurisdictions may have single project fish passage needs and limited funds to accomplish the work. If each jurisdiction moved ahead on its own individual timeline, just a "piece" of a stream is opened up to fish passage. But if jurisdictions got together and pooled their monies and identified the best way to prioritize projects in the area, i.e. focus on the "right" barriers, there is a

likelihood of maximizing the stream's fish rearing potential. The hoped for results could include maps to show existing problems and potential combinations of fixes. All investigations into this concept will be coordinated with the Environmental Services Office. While the effort to coordinate fish barrier removals on a stream shed basis is in its infancy, when any of the three existing fish barriers along the study corridor is being considered for replacement, the project managers should investigate the progress of the coordination effort, and utilize the findings if available.

Any other work performed on the intersections or associated with development along the roadway must address the environmental issues associated with the area and ensure that these actions do not impact the environment unnecessarily or create a future environmental issue that may impact the state facility's functions.

CHAPTER 6

Next Steps

Chapter Six

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CHAPTER 6 NEXT STEPS

This chapter presents an overview of the next steps towards integration with other plans, obtaining project funding, and initiating implementation of the SR 516 recommendations. The SR 516 Corridor Planning Study identifies corridor needs that are based on Washington State Department of Transportation (WSDOT) *Moving Washington* guidelines and proposes actions to address those needs. While this alone does not guarantee implementation funding, the plan allows future consideration for funding requests to be focused on areas of greatest need in this corridor. These identified areas will compete with other similar locations around the state for future funding based on performance outcome.

The SR 516 Corridor Plan has identified preservation, safety, operational efficiencies, TDM strategies, and capacity improvements that are recommended to meet the corridor needs. With prevailing economic conditions, the available revenue needed to implement these recommendations is very limited and cannot fund the recommendations in the near term. In the future, actual conditions and available technology may present opportunities to address corridor needs in more sustainable and less capital intensive ways. The shareholders should determine the best approach to achieving the desired outcome. Given the higher priority of maintenance, safety, efficient operations, and demand management, these strategies are to be considered and utilized prior to capacity improvements being implemented. As a representation of a logical sequence for considering the capacity recommendations, a 6 year, 6 year, and 8 year scenario was created. These time spans work out to be the equivalent of 2016, 2022, and 2030. Again, it must be made clear that this timing scenario is not associated with any funding mechanism, but only as a recommendation of what order capacity improvements should be considered should funding become available.

Specific actions that should be taken to position the corridor plan proposed improvements for future implementation include:

- Incorporate the SR 516 Corridor Plan recommended improvements in the State's Highway System Plan (HSP) and the Puget Sound Regional Council transportation plan.
- Incorporate the SR 516 Corridor Plan recommended improvements, as appropriate, in city comprehensive plans.

6.1 What are the State's Transportation Policy Goals?

In 2007, the Washington State Legislature and the Governor created five investment policies for planning, operations, performance, and investment in the state's transportation system as outlined in RCW 47.04.280 (derived from Senate Bill 5412). A sixth policy goal was added by the legislature in 2010. Investment in the state transportation system must support one or more of the following policy goals:

• Economic Vitality: To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy.
• Preservation: To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services.
• Safety: To provide for and improve the safety and security of transportation customers and the transportation system.
• Mobility: To improve the predictable movement of goods and people throughout Washington state.
• Environment: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment.
• Stewardship: To continuously improve the quality, effectiveness, and efficiency of the transportation system.

Moving Washington provides the investment principles for making responsible and sustainable decisions. These principles include:

- **Maintenance and Preservation**
- **Safety**
- **Operational Efficiencies**
- **Demand Management**
- **Strategic Addition of Capacity**

6.2 Washington Transportation Plan

The 2007-2026 Washington Transportation Plan (WTP) is the long range, multimodal transportation plan for the state.
The WTP covers all modes in the transportation system and is required by state and federal law. The current plan covers the period from 2007-2026. Because the plan projects nearly $38 billion in unfunded needs, it has established guiding principles for investments in current and future facilities. The guiding principles in the WTP largely reflect the policy goals adopted by the State Legislature in RCW 47.04.280 (see discussion on previous page under "Transportation Policy Goals"). According to the 2007-2026 Washington Transportation Plan, current law funding for the 20-year WTP period provides approximately $29 billion for transportation projects, including the 2003 Nickel Package and the 2005 Transportation Partnership Act (TPA).

6.3 Highway System Plan (HSP)

The Washington State Highway System Plan (HSP) is the state highway component of the Washington State Multimodal Transportation Plan (SMTP). The SMTP is the state's overall transportation plan that will include an analysis of facilities the state owns and those in which the state has an interest. The HSP is updated every two years and serves as the basis for the six-year highway program and the two-year biennial

budget request to the State Legislature. WSDOT is dedicated to delivering an HSP that implements the Legislature's goals. This is accomplished through the coordination and integration of specific components from many statewide modal and program plans. The HSP is also aligned to the Washington Transportation Plan (WTP), which outlines the policies adopted by the Washington State Transportation Commission.

This corridor plan is meant to update, support and help refine the highway system plan. Recommendations in the corridor plan, while important to this specific corridor, must prioritize against other statewide needs identified in the HSP to be selected for financing through the six year highway program and the biennial budget request submitted by WSDOT.

The Highway System Plan addresses current and forecasted needs for state-owned and operated highways in the state of Washington. As a "living" document, the HSP is updated every two years. The recommendations from studies such as this help provide the basis for each new iteration of the HSP.

The HSP contains a constrained and unconstrained section. The constrained section lists projects and revenue that would be available to fund the projects. The unconstrained section of the HSP lists additional projects and project needs without a funding source.

6.4 Regional Plan Importance

Metropolitan Planning Organizations (MPO) and Regional Transportation Planning Organizations (RTPO) have specific responsibilities under both federal and state law relating to transportation and growth management planning. The organization that performs these planning functions within the study area is the Puget Sound Regional Council (PSRC), the MPO for Kitsap, King, Pierce, and Snohomish Counties. Transportation 2040 is the current transportation plan adopted by PSRC. This regional plan focuses on the transportation system investments needed to provide an integrated, multimodal transportation system in the Central Puget Sound. For transportation projects to receive federal funding, they must be consistent with and included in this regional transportation plan.

The two most important reasons a project should be incorporated into a regional plan are:

- It demonstrates to funding agencies that the plan has support at state, regional, and local levels
- It addresses a critical requirement under the Growth Management Act, which requires plans to be consistent between and among jurisdictions.

6.5 Local Plan Importance

Local planning serves to emphasize the anticipated needs of the population located closest to the study area. Local plans include the Transportation Element within the Comprehensive Plan as well as a Transportation Improvement Plan (TIP). Each

jurisdiction's planning documents serve as a tool that helps guide their growth, as well as a reference to adjoining jurisdictions and service providers (such as WSDOT) what their goals are.

6.6 What Funding Sources are Available?

There are a variety of funding sources that can be utilized to fund recommendations. Given the current economic climate, coupled with the limited dollars that are available for projects and the stiff competition for available funding; one or all of the sources listed below might be needed to fund the improvements

Local Agency Funding - To be eligible for and competitive in most grant programs, local matching dollars are required – in fact, the more local participants are involved in and support a project financially, the more competitive a grant application can become. In addition to local matching dollars for grants, some communities have formed transportation benefit districts to raise funds for transportation projects. These districts, formed by the local government(s) through legislative action or a vote of the people, levy a tax for a specific transportation project within that jurisdiction(s).
State law regarding benefit transportation districts should be consulted before such a district is established by the jurisdiction(s).

Development Impact Fees - The use of development impact fees to fund public facilities that are necessary to provide services for new developments and maintain acceptable level-of-service has been widely used in Washington and across the U.S. Development impact fees are one-time charges applied to new developments. Their goal is to raise revenue for the construction or expansion of capital facilities located outside the development to maintain an acceptable level-of-service for all users. Impact fees are assessed and dedicated principally for the provision of additional water and sewer systems, roads, schools, libraries, parks, and recreation facilities made necessary by the presence of new residents in the area. As new developments are approved, consideration should be given to their impact on the operation of local, county, and state highways within the proximity of the new development. New development along the corridor should be tasked with providing facilities that may be missing in the area involved. Examples can be sidewalks, bike facilities, safe vehicular access, landscaping, transit stops, etc. Other improvements may include requiring appropriate TDM measures as a condition of development. These facilities benefit the business as well as the travelling public. Developers can also participate in improvements to mitigate impacts on a pro-rata share basis (rough proportion based upon new traffic added)

State Funding - The state of Washington also administers a number of funding programs that can be used for transportation projects. The most common source of state grant funds for projects along the corridor is the Transportation Improvement Board (TIB). The Washington State Legislature created the Transportation Improvement Board (TIB) to foster state investment in quality local transportation projects. The TIB distributes grant funding, which comes from the revenue generated by three cents of the statewide gas tax, to cities and counties for funding transportation projects.

For the improvements, these funds can be used by the incorporated cities to lead selected improvement projects within their jurisdictions, such as intersection improvements or parallel street improvements than can divert traffic from the state highway along the corridor.

Another means of funding and implementing corridor plan recommendations is through legislative funding. Congressional delegates could choose to line-item a project that provides safety, congestion, economic, or other benefits that meet community needs. Study findings and recommendations in support of projects help to demonstrate the need and endorse the solution. Moreover, since the plan is developed through a public process, stakeholder support is behind the recommendations.

Federal Funds - One of the most common sources of funding for major highway projects is the federal SAFETEA-LU program or the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users. With guaranteed funding for highways, highway safety, and public transportation totaling $244.1 billion, SAFETEA-LU represents the largest surface transportation investment in our nation's history. The two landmark bills that brought surface transportation into the 21st century - the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21) - shaped the highway program to meet the nation's changing transportation needs. SAFETEA-LU builds on this firm foundation, supplying the funds and refining the programmatic framework for investments needed to maintain and grow our vital transportation infrastructure.

Within SAFETEA-LU, the Surface Transportation Program (STP) provides flexible funding that may be used by states and localities for projects on any federal-aid highway. In addition, the Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. While there are many sources of federal grants, including direct legislative "earmarks", these two are the most commonly used for projects similar to those along the corridor.

SAFETEA-LU expired on September 30, 2009, but has been extended for each budget cycle up to the present time. Efforts are currently underway in the U.S. Congress, USDOT, and national organizations to help shape the next act. Each state and Regional Transportation Planning Organization should help shape the act and the types of projects to be funded within the act.

Appendix A – Route Classifications

Table 3.1 in this report lists various classification schemes used by the Washington State Department of Transportation (WSDOT) and others in managing the state's transportation system. Program funding, operations and maintenance are among the WSDOT functions affected by these classification programs. The following is a brief description of each classification program and its function.

Functional Class (Federal and State)
Federal Functional Classification is one of the determining factors of eligibility for Federal Transportation Funding. The classification should reflect the residential, commercial and industrial uses served by the route, municipal boundaries, and the urbanized area designations of the U.S. Bureau of the Census.

State functional classifications seek to group highways, roads and streets by the character of service they provide. The system was developed for transportation planning purposes. It recognizes the various roles that individual routes play in the transportation network. Functional classification at this level is used to identify how to direct travel through the transportation network in the most logical and efficient manner. State functional classifications in Washington are divided in two major divisions, Rural and Urban. For this division the Federal Aid Highway Urban (or Urbanized) Area Boundary is used to divide the route classifications. See "Functional Classification System Concepts, Criteria, and Procedures, FHWA 1989" for more information.

Highway of Statewide Significance (HSS)
The designation of Highways of Statewide Significance (HSS) was mandated by the 1998 Washington State Legislature. Highways of Statewide Significance include, at a minimum, interstate highways and other principal arterials that are needed to connect major communities in the state. The designation helps assist with the allocation and direction of highway funding. HSS highways are considered a higher priority for correcting identified deficiencies.
In some cases, the local Metropolitan Planning Organization or Regional Transportation Planning Organization, in coordination with WSDOT, sets the level of service standard for state highways within their jurisdiction. The 1998 legislation directed the Washington State Department of Transportation to set the level of service standards for HSS routes in consultation with local governments. However, WSDOT retains the authority to make final decisions regarding level of service standards for HSS routes.

National Highway System (NHS)
The National Highway System consists of approximately 160,000 miles of roadway important to the nation's economy, defense, and mobility. It includes highways, principal arterials, the strategic highway network and its major connectors, and its intermodal connectors. The system encourages states to focus on a limited number of high priority routes and to concentrate on improving them with federal aid funds. At the same time, the states can incorporate design and construction improvements that address their

traffic needs safely and efficiently. Operational improvements, such as stalled vehicle removal, and Intelligent Transportation System technology, can also be funded.

Freight and Goods Transportation System (FGTS)
The WSDOT Freight and Goods Transportation System classification tracks the tonnage carried by all state and many county routes. Its purpose is to provide meaningful data for the use of planners and decision makers responsible for prioritizing route improvements.

Appendix B – Physical Characteristics - State Highway Log

COLUMN HEADINGS KEY

DIRECTION TO INVENTORY

Features that get tagged with this code occur ON the main traveled way.
I = INCREASING - Milepost increases when traveling the roadway in the increasing direction. Usually odd numbered routes run south to north increasing and even numbered routes run west to east increasing. There are some exceptions to this rule.
D = DECREASING - Milepost decreases when traveling the roadway in the decreasing direction. Usually odd numbered routes run north to south decreasing and even numbered routes run east to west decreasing. There are some exceptions to this rule.
B = BOTH - The feature affects both the increasing and decreasing direction of travel.

LEFT/RIGHT INDICATOR

Features that get tagged with this code occur ALONG SIDE the main traveled way. All Left Right Indicators are assigned based on the INCREASING direction of travel, starting from the left and working to the right.
L = LEFT Represents features located along side the decreasing traveled way.
LC = LEFT CENTER Represents features located along side the median side of the decreasing traveled way.
C = CENTER Represents a feature that occurs between the increasing and decreasing traveled way.
RC = RIGHT CENTER Represents features located along side the median side of the increasing traveled way.
R = RIGHT Represents features located along side the increasing traveled way.
B = BOTH The feature occurs along side both the increasing and decreasing traveled way.

DESCRIPTION – DESCRIPTION OF FEATURE

Bridge/UXing/XRoad - OW (Owner Code)
ST = State CO = County CT = City
FS = Forest Service PK = Park Service RS = Reservation
PV = Private MY = Military OT = Other
SO = State/County SI = State/City CC = County/City
Bridge/UXing/XRoad - TC (Traffic Control)
SS = Stop Sign YS = Yield Sign
AF = Amber Flashing RS = Railroad Signal
OT = Other Traffic Control NO = No Traffic Control
SZ = School Zone PC = Pedestrian Control
SG = Stop and Go FS = Fire Signal
RF = Red Flashing OF = Officer or Flagman
Bridge/UXing/XRoad - L (Illumination) Y = Yes, N = No

WIDTH AND SURFACE INFORMATION

DECREAS/DIV (DECREASING/DIVIDED)
NBR LNS D = Number of lanes in decreasing direction of the roadway.
I = Number of lanes in increasing direction of the roadway.
LFT SHD W = Width of outside shoulder in decreasing direction of the roadway. No width will be shown when surface type = C or W.
S = Shoulder Surface Type

A = Asphalt, B = Bituminous, G = Gravel, S = Soil, C = Curb, W = Wall, P = Portland Cement Concrete, O = Other

RDY W = Width of roadway in decreasing direction of the roadway.

S = Roadway Surface Type

A = Asphalt, P = Portland Cement Concrete, B = Bituminous, G = Gravel, S = Soil, O = Other

RHT SHD W = Width of inside shoulder in decreasing direction of the roadway. No width will be entered when surface type = C or W.

S = Shoulder Surface Type (same as left shoulder surface types).

MEDIAN

WD Median Width

S Median Surface Type

S = Soil, G = Gravel, O = Other, A = Asphalt, B = Bituminous, P = Portland Cement Concrete

BR Median Barrier Type

DE = Depressed, CU = Curb, FB = Flex Beam, JE = Jersey Type Barrier, GP = Guide Post, RG = Rock Wall * Gabion, UP = Unprotected, IA = Impact Attenuator, WA = Wall, FE = Fence

SS = Snow Shed, BE = Bridge End Guard Rails, GR = Guard Rail, CA = Cable

INCRES/UNDI (INCREASING/UNDIVIDED)

Will be used for divided multilane in the direction of inventory, and for the entire roadway for two lane or undivided highways.

LFT SHD W = Width of inside shoulder in increasing direction of the roadway.

S = Shoulder Surface Type

RDY W = Width of roadway in increasing direction of the roadway.

S = Roadway Surface Type

RHT SHD W = Width of outside shoulder in increasing direction of the roadway.

S = Shoulder Surface Type

SPC USE LNS WID - Width of Special Use Lane

Special Use Lane Types - (Appears in Description Field)

Climbing Two Way Turn High Occupancy Vehicle

Bicycle Reversible Slow Vehicle Turnout

Chain Up Transit Truck Climbing Shoulder

Holding Weaving/Speed Change

TOT RDY WIDTH - Total roadway width includes decreasing roadway, increasing roadway and special use lane widths. This total does not include shoulder and median widths.

CLASSIFICATIONS

MTCE Maintenance

A = Maintenance Area Number

SE = Maintenance Section Number

CITY NBR City Number assigned to a city by the Census.

STFC State Functional Classification

R1 = Rural-Principal Arterial U1 = Urban-Principal Arterial

R2 = Rural-Minor Arterial U2 = Urban-Minor Arterial

R3 = Rural-Collector U3 = Urban-Collector

R4 = Rural-Unclassified U4 = Urban-Unclassified

R5 = Rural-Interstate U5 = Urban-Interstate

Urban Area - An area designated by WSDOT in cooperation with the Transportation Improvement Board and Region transportation planning organizations, subject to the approval of the FHWA.

Legal Speed

D = Official speed limit as designated for decreasing direction of the roadway.

IB = Official speed limit as designated for increasing or both directions of the roadway.

TR Terrain - The contour of the roadway as it relates to the frequency and steepness of hills and the effect on truck speed.

L = Level - Trucks maintain speed.
R = Rolling - Trucks slow down frequently.
M = Mountainous - Trucks slow to a crawl frequently.

PK Parking Zone - Type of parking that is permitted on a State Route (cities only).

B = Both sides parking permitted
L = Left side parking only permitted
P = Parking prohibited on both sides
R = Right side parking only permitted
X = Prohibited during peak hours

ST Street Name Alias - The local name of a street assigned to a State Route as the State Route passes through a city.

*** = A street name alias is assigned to a State Route (The street name will appear in the description field).**

$ Designates when the previous feature is no longer valid.

INTERSECTION DETAIL

SRMP State Route Milepost at intersection.
B "Back" milepost indicator.
ARM Accumulated route mile at intersection.

TURN LANES

Entering an intersection in the increasing direction of travel would be "near approach."
Entering an intersection in the decreasing direction of travel would be "far approach."
LGT WD Length (in miles) and width (in feet) will appear in each category of turn and acceleration lanes.
L NEAR Left turn lane in near approach of intersection.
R NEAR Right turn lane in near approach of intersection.
L FAR Left turn lane in far approach of intersection.
R FAR Right turn lane in far approach of intersection.

ACCELERATION LANES

LEFT Left acceleration lane in near approach of intersection.
L CNTR Acceleration lane in near approach of intersection.
R CNTR Acceleration lane in far approach of intersection.
RIGHT Right acceleration lane in far approach of intersection.
Vehicles traveling in the decreasing direction of the roadway use Left and Left Center acceleration lanes.
Vehicles traveling in the increasing direction of the roadway use Right and Right Center acceleration lanes.

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                                                     STATE HIGHWAY LOG                                            PAGE       324

SR 516  MAINLINE                             STATE ROUTE - SRSH        COUNTY  KING                          DOT DISTRICT 1

                                                                         -------WIDTH AND SURFACE INFORMATION-------
                            :DIRECTION TO INVENTORY       |-BRIDGE |   |DECREAS/DIV |         |INCRES/UNDI |SPC|   |------CLASSIFICATIONS---
                            : :LEFT/RIGHT INDICATOR       |-UXING- |NBR|LFT      RHT|         |LFT      RHT|USE|TOT|                |LEGAL|
                            : :                           |-XROAD- |LNS|SHD RDY SHD|MEDIAN- |SHD RDY SHD|LNS|RDY|MTCE|CITY|ST|SPEED|T|P|S
SRMP   B ARM    |FEATURE    |D|LR|DESCRIPTION             |OW TC L |D I|W/S W/S W/S|WD/S BR |W/S W/S W/S|WID|WID|A SE|NBR |FC|D  IB|R|K|T

  4.68B   4.67                                                      2 2 10A 24A     16A UP     24A 10A      48 4 03 0615 U1     55 R P *
  4.78B   4.77 WYE CONN      L  SR 181                      ST    Y
  4.52    4.79 EQUATION         004.80B=004.52                      2 2 10A 24A     16A UP     24A 10A      48 4 03 0615 U1     40 L P *
               INTRSECTN     L  SR 181                      ST SG Y
               INTRSECTN     R  OLD SR 181-68TH AVE S       CT SG Y
  4.53    4.80 WYE CONN      L  SR 181                      ST    Y
  4.54    4.81 WYE CONN      R  OLD SR 181-68TH AVE S       CT    Y
  4.57    4.84 WYE CONN      R  SR 167 OFF RAMP             ST    Y
  4.58    4.85 ON RAMP       L  SR 167                      ST SG Y 2 2 10A 24A     16A CU     24A 10A      48 4 03 0615 U1     40 L P *
               OFF RAMP      R  SR 167                      ST SG Y
  4.64    4.91 UXING       B    SR 167 SB                   ST
                                BRDG NUM 167/122W
  4.66    4.93 UXING       B    SR 167 NB                   ST
                                BRDG NUM 167/122E
  4.72    4.99 ON RAMP       R  SR 167                      ST SG Y 2 2 $$C 28A     14A CU     28A $$C      56 4 03 0615 U1     40 L P *
               OFF RAMP      L  SR 167                      ST SG Y
  4.75    5.02                                                      2 2   C 28A     14A UP     28A   C      56 4 03 0615 U1     40 L P *
  4.77    5.04 INTRSECTN     R  74TH AVE S                  CT    Y 2 2   C 40A     14A UP     40A   C      80 4 03 0615 U1     40 L P *
  4.78    5.05 BEG SU LN     R  WEAVING/SPEED CHANGE 11A            2 2   C 40A     14A UP     40A   C  11  91 4 03 0615 U1     40 L P *
  4.80    5.07 BEG SU LN     L  WEAVING/SPEED CHANGE 11A            2 2 12A 40A     14A UP     40A  4A  22 102 4 03 0615 U1     40 L P *
  4.82    5.09 RR XING     B    NUM 396581U GRADE                   2 2 12A 24A     14A UP     24A 10A  22  70 4 03 0615 U1     40 L P *
  4.83    5.10 END SU LN     L  WEAVING/SPEED CHANGE 11A            2 2 12A 24A     14A UP     24A 10A  11  59 4 03 0615 U1     40 L P *
  4.84    5.11 END SU LN     R  WEAVING/SPEED CHANGE 11A            2 2 12A 24A     14A UP     24A 10A $$$  48 4 03 0615 U1     40 L P *
  4.93    5.20                                                      2 2 10A 24A     16A UP     24A  8A      48 4 03 0615 U1     40 L P *
  4.98    5.25 INTRSECTN     B  S 4TH AVE                   CT SG Y 2 2 $$$ $$$    $$$$ $$   C 82A $$C      82 4 03 0615 U1     30 L P *
  4.99    5.26 WYE CONN      R  S 4TH AVE                   CT    Y
  5.04    5.31 END ST      I    KENT DES MOINES RD                  2 2                      C 44A   C      44 4 03 0615 U1     30 L B *
               BEG ST      I    WILLIS ST
               INTRSECTN     B  S 3RD AVE                   CT    Y
  5.09    5.36 INTRSECTN     B  S 2ND AVE                   CT    Y
  5.15    5.42 INTRSECTN     L  S 1ST AVE                   CT    Y
  5.17    5.44 INTRSECTN     R  S 1ST AVE                   CT    Y

INTERSECTION DETAIL     ----------TURN LANES----------   ------ACCELERATION LANES------
                        L NEAR  R NEAR  L FAR   R FAR    LEFT--  L-CNTR  R-CNTR  RIGHT-
SRMP   B ARM            LGT WD  LGT WD  LGT WD  LGT WD   LGT WD  LGT WD  LGT WD  LGT WD
------- ------          --- --  --- --  --- --  --- --   --- --  --- --  --- --  --- --
  4.52    4.79          .07 16          .03 13
  4.58    4.85                  .06 12  .02 16
  4.72    4.99          .02 16
  4.77    5.04                          .04 16
  4.98    5.25          .03 12  .03 12  .02 12  .06 12
  5.04    5.31          .03 12
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SRMP	B	ARM	FEATURE	D	LR	DESCRIPTION	B	NUM	85640K	GRADE	-BRIDGE-UXING-XROAD- OW	TC	L	D	I	-WIDTH AND SURFACE INFORMATION-------- DECREAS/DIV LFT NBR LNS	W/S	SHD	RDY	W/S	RHT SHD MEDIAN- WD/S	W/S	BR	INCRES/UNDI SPC LFT SHD	W/S	RHT SHD	W/S	USE TOT RDY LNS	WID	------CLASSIFICATIONS--- MTCE A	SE	CITY NBR	ST FC	LEGAL SPEED D	T IB	P R	S K	T
5.19		5.46	RR XING				B							2	2																									
5.20		5.47	INTRSECTN		R	RAILROAD AVE S					CT				Y								C	44A		C		44	4	03	0615	U1		30	L	B	*
5.22		5.49	INTRSECTN		L	RAILROAD AVE S					CT				Y																								
5.25		5.52	INTRSECTN		R	BRIDGES AVE S					CT				Y	2	2						C	58A		C		58	4	03	0615	U1		30	L	B	*
5.30		5.57	END ST	I		WILLIS ST										2	2						C	50A		C		50	4	03	0615	U1		30	L	P	*
			BEG ST	I		CENTRAL AVE																																
			INTRSECTN		R	S CENTRAL AVE					CT	SG	Y																									
5.35		5.62	INTRSECTN		L	E SAAR ST					CT		Y	2	2																							
5.42		5.69																																				
5.44		5.71	INTRSECTN		B	E TITUS ST					CT		Y	2	2						C	58A		C		58	4	03	0615	U1		30	L	P	*
5.45		5.72	BEG SU LN		C	TWO WAY TURN					12A			2	2						C	46A		C	12	58	4	03	0615	U1		30	L	P	*
5.48		5.75	END SU LN		C	TWO WAY TURN					12A			2	2						C	58A		C	$$$	58	4	03	0615	U1		30	L	P	*
5.52		5.79	INTRSECTN		B	E GOWE ST					CT	SG	Y	2	2						C	50A		C		50	4	03	0615	U1		30	L	P	*
5.56		5.83	INTRSECTN		B	MEEKER ST					CT	SG	Y	2	2																						
5.68		5.95	END ST	I		CENTRAL AVE															C	58A		C		58	4	03	0615	U1		30	R	P	*
			BEG ST	I		SMITH ST																																
			INTRSECTN		L	SMITH ST					CT	SG	Y																									
			INTRSECTN		L	N CENTRAL AVE					CT	SG	Y																									
			INTRSECTN		B	N STATE AVE					CT	SG	Y																									
5.74		6.01	INTRSECTN		C	TWO WAY TURN					12A			2	2						C	46A		C	12	58	4	03	0615	U1		30	R	P	*
5.77		6.04	BEG SU LN		R	N KENNEBECK AVE					CT		Y	2	2						C	55A		C	$$$	55	4	03	0615	U1		30	R	P	*
5.82		6.09	INTRSECTN		C	TWO WAY TURN					12A			2	2																						
5.87		6.14	END SU LN		L	CLARK AVE N					CT		Y	2	2						C	64A		C		64	4	03	0615	U1		30	R	P	*
5.88		6.15	INTRSECTN		R	TITUS ST					CT	SG	Y	2	2																						
5.93		6.20	INTRSECTN		L	JASON AVE					CT	SG	Y	2	2						C	64A		C		64	4	03	0615	U1		30	R	P	*
5.95		6.22	BEG SU LN		R	BICYCLE				05A				2	2						C	64A		C	5	69	4	03	0615	U1		30	R	P	*
			WYE CONN		R	TITUS ST					CT		Y																									
5.99		6.26	MP MARKER		R	6															C	64A		C	5	69	4	03	0615	U1		40	R	P	*
6.04		6.31	END ST	I		SMITH ST								2	2																						
			BEG ST	I		CANYON DR																																
			INTRSECTN		L	HAZEL AVE					CT		Y																									

INTERSECTION DETAIL			----------TURN LANES----------				------ACCELERATION LANES------			
			L NEAR	R NEAR	L FAR	R FAR	LEFT--	L-CNTR	R-CNTR	RIGHT-
SRMP	B	ARM	LGT WD	LGT WD	LGT WD	LGT WD	LGT WD	LGT WD	LGT WD	LGT WD
5.30		5.57			.05 12					
5.52		5.79	.02 12	.03 12	.02 12					
5.56		5.83	.02 10		.03 10					
5.68		5.95	.04 10		.03 12					
5.74		6.01	.02 12		.03 12					
5.93		6.20	.03 12		.04 12					
6.04		6.31	.02 12							

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:DIRECTION TO INVENTORY
: :LEFT/RIGHT INDICATOR

SRMP	B ARM	FEATURE	D	LR	DESCRIPTION		BRIDGE-UXING-XROAD- OW	TC	L	NBR LNS D	I	DECREAS/DIV LFT SHD W/S	RDY W/S	RHT SHD W/S	MEDIAN- WD/S	BR	INCRES/UNDI LFT SHD W/S	RDY W/S	RHT SHD W/S	SPC USE LNS WID	TOT RDY WID	MTCE A	SE	CITY NBR	ST FC	LEGAL SPEED D IB	T R	P K	S T
6.05	6.32									2	2						C	64A	C	5	69	4	03	0615	U1	40	R	P	*
6.07	6.34	INTRSECTN		L	CANYON DR		CT		Y																				
6.08	6.35									2	2	C	22A		4A	JE	$	30A	C	5	57	4	03	0615	U1	40	R	P	*
6.16	6.43	INTRSECTN		L	ALVORD AVE N		CT		Y																				
6.22	6.49									2	2	C	22A		4A	JE		22A	8A	5	49	4	03	0615	U1	40	R	P	*
6.26	6.53									2	2	$	$$$		$$$$	$$	C	56A	8A	5	61	4	03	0615	U1	40	R	P	*
6.30	6.57	INTRSECTN		L	WEILAND ST		CT		Y																				
6.35	6.62									2	2						C	44A	8A	5	49	4	03	0615	U1	40	R	P	*
6.45	6.72									2	2						C	55A	6A	5	60	4	03	0615	U1	40	R	P	*
6.54	6.81	INTRSECTN		L	94TH AVE S		CT	SG	Y																				
6.57	6.84	WYE CONN		L	94TH AVE S		CT		Y																				
6.60	6.87									2	2						C	44A	6A	5	49	4	03	0615	U1	40	R	P	*
6.72	6.99	END SU LN		R	BICYCLE	05A				2	2						C	50A	$$C	$$$	50	4	03	0615	U1	40	R	P	*
6.74	7.01									2	2						C	56A	C		56	4	03	0615	U1	40	R	P	*
6.77	7.04	INTRSECTN		L	S 252ND ST		CT		Y																				
6.89	7.16	WYE CONN		R	97TH PL S		CT		Y																				
6.91	7.18	END ST	I		CANYON DR					2	2						C	44A	6A		44	4	03	0615	U1	40	R	P	*
		BEG ST	I		SE 256TH ST																								
		INTRSECTN		R	97TH PL S		CT		Y																				
6.99	7.26	MP MARKER		R	7																								
7.04	7.31									2	2						C	44A	4A		44	4	03	0615	U1	40	R	P	*
7.06	7.33	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	44A	4A	12	56	4	03	0615	U1	40	R	P	*
7.10	7.37	END SU LN		C	TWO WAY TURN	12A				2	2						C	56A	4A	$$$	56	4	03	0615	U1	40	R	P	*
7.13	7.40									2	2						C	56A	4A		56	4	03	0615	U1	35	R	P	*
7.15	7.42	INTRSECTN		R	101ST AVE SE		CT	SG	Y	2	2						C	60A	$$C		60	4	03	0615	U1	35	R	P	*
		ENT/EXIT		L	KENT-MERIDIAN HIGH SCH		CT	SG	Y																				
7.20	7.47	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	48A	C	12	60	4	03	0615	U1	35	R	P	*
7.29	7.56	END SU LN		C	TWO WAY TURN	12A				2	2						C	60A	C	$$$	60	4	03	0615	U1	35	R	P	*
7.34	7.61	INTRSECTN		R	104TH AVE SE		CT	SG	Y	2	2						C	60A	C		60	4	01	0615	U1	35	R	P	*
		INTRSECTN		L	SR 515		ST	SG	Y																				
7.35	7.62	WYE CONN		L	SR 515		ST		Y																				

INTERSECTION DETAIL

SRMP	B ARM	TURN LANES L NEAR LGT	WD	R NEAR LGT	WD	L FAR LGT	WD	R FAR LGT	WD	ACCELERATION LANES LEFT-- LGT	WD	L-CNTR LGT	WD	R-CNTR LGT	WD	RIGHT- LGT	WD
6.07	6.34	.03	12														
6.30	6.57	.02	12														
6.54	6.81	.04	11														
6.77	7.04	.02	12					.04	12					.01	12		
7.15	7.42	.02	12			.03	12										
7.34	7.61	.03	12			.03	12										
7.35	7.62							.02	12								

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 SR 516   MAINLINE                         STATE ROUTE - SRSH         COUNTY  KING                 DOT DISTRICT 1

                                                                      -------WIDTH AND SURFACE INFORMATION-------
                            :DIRECTION TO INVENTORY       |-BRIDGE |   |DECREAS/DIV |          |INCRES/UNDI|SPC|   |------CLASSIFICATIONS---
                            : :LEFT/RIGHT INDICATOR       |-UXING- |NBR|LFT     RHT |          |LFT     RHT|USE|TOT|                |LEGAL |
                            : :                           |-XROAD- |LNS|SHD RDY SHD |MEDIAN-   |SHD RDY SHD|LNS|RDY|MTCE|CITY|ST|SPEED |T|P|S
 SRMP   B ARM   |FEATURE    |D|LR|DESCRIPTION             |OW TC L |D I|W/S W/S W/S |WD/S BR   |W/S W/S W/S|WID|WID|A SE|NBR |FC|D  IB |R|K|T

   7.38    7.65                                                     2 2                          C 60A   C        60 4 01 0615 U1     35 R P *
   7.40    7.67 END ST     I    SE 256TH ST
                BEG ST     I    KENT KANGLEY RD-272ND ST
                INTRSECTN    L  SE 256TH ST                CT SG Y
   7.42    7.69 ENT/EXIT     R  SHOPPING CENTER            PV    Y
   7.43    7.70 WYE CONN     L  SE 256TH ST                CT    Y 2 2                           C 59A   C        59 4 01 0615 U1     35 R P *
                ENT/EXIT     R  SHOPPING CENTER            PV    Y
   7.46    7.73 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     35 R P *
   7.62    7.89 END SU LN    C  TWO WAY TURN          12A          2 2                           C 59A   C $$$    59 4 01 0615 U1     35 R P *
                INTRSECTN    R  108TH AVE SE               CT SG Y
   7.67    7.94 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     35 R P *
   7.78    8.05 END SU LN    C  TWO WAY TURN          12A          2 2                           C 59A   C $$$    59 4 01 0615 U1     35 R P *
   7.82    8.09 INTRSECTN    R  111TH AVE SE               CT SG Y
                ENT/EXIT     L  WASHINGTON PARK APTS       PV SG Y
   7.86    8.13                                                    2 2                           C 59A   C        59 4 01 0615 U1     45 R P *
   7.87    8.14 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     45 R P *
   8.02    8.29 MP MARKER    R  8
   8.05    8.32 INTRSECTN    R  114TH AVE SE               CT    Y
   8.12    8.39 END SU LN    C  TWO WAY TURN          12A          2 2                           C 59A   C $$$    59 4 01 0615 U1     45 R P *
   8.16    8.43 MISC FEATR   L  BUS PULLOUT
   8.18    8.45 INTRSECTN    B  116TH AVE SE               CT SG Y
   8.21    8.48 WYE CONN     R  116TH AVE SE               CT    Y
   8.24    8.51 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     45 R P *
   8.46    8.73 END SU LN    C  TWO WAY TURN          12A          2 2                           C 59A   C $$$    59 4 01 0615 U1     45 R P *
   8.48    8.75 INTRSECTN    L  SE 263RD ST                CT    Y
   8.50    8.77 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     45 R P *
   8.69    8.96 END SU LN    C  TWO WAY TURN          12A          2 2                           C 71A   C $$$    71 4 01 0615 U1     45 R P *
   8.73    9.00 WYE CONN     L  124TH AVE SE               CT    Y
   8.75    9.02 INTRSECTN    B  124TH AVE SE               CT SG Y 2 2                           C 59A   C        59 4 01 0615 U1     45 R P *
   8.77    9.04 MISC FEATR   R  BUS PULLOUT
   8.80    9.07 BEG SU LN    C  TWO WAY TURN          12A          2 2                           C 47A   C  12    59 4 01 0615 U1     45 R P *

 INTERSECTION DETAIL     ----------TURN LANES----------   ------ACCELERATION LANES------
                         L NEAR  R NEAR  L FAR   R FAR    LEFT--  L-CNTR  R-CNTR  RIGHT-
 SRMP   B ARM            LGT WD  LGT WD  LGT WD  LGT WD   LGT WD  LGT WD  LGT WD  LGT WD
 ------- ------          --- --  --- --  --- --  --- --   --- --  --- --  --- --  --- --
   7.40    7.67          .03 14
   7.43    7.70                          .03 12
   7.62    7.89                          .02 12
   7.82    8.09          .03 12          .03 12
   8.18    8.45          .03 12          .03 12
   8.48    8.75          .01 12                                           .01 12
   8.75    9.02          .03 12  .03 12  .03 12
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:DIRECTION TO INVENTORY
: :LEFT/RIGHT INDICATOR

SRMP	B	ARM	FEATURE	D	LR	DESCRIPTION		-BRIDGE -UXING- -XROAD- OW	TC	L	NBR LNS D	I	DECREAS/DIV LFT SHD W/S	RDY W/S	RHT SHD W/S	MEDIAN- WD/S	BR	INCRES/UNDI LFT SHD W/S	RDY W/S	RHT SHD W/S	SPC USE LNS WID	TOT RDY WID	MTCE A	SE	CITY NBR	ST FC	LEGAL SPEED D	IB	T R	P K	S T
8.80		9.07	MISC FEATR		L	BUS PULLOUT					2	2						C	47A	C	12	59	4	01	0615	U1	45		R	P	*
8.94		9.21	INTRSECTN		L	127TH AVE SE		CT		N																					
9.00		9.27	MISC FEATR		L	BUS PULLOUT																									
9.02		9.29	MISC FEATR		R	BUS PULLOUT																									
9.13		9.40	END SU LN		C	TWO WAY TURN	12A				2	2						C	59A	C	$$$	59	4	01	0615	U1	45		R	P	*
9.15		9.42	INTRSECTN		R	128TH PL SE		CT		N																					
9.22		9.49	ENT/EXIT		L	SHOPPING CENTER		PV		Y																					
			ENT/EXIT		R	BUSINESS		PV		Y																					
9.30		9.57	ENT/EXIT		L	SHOPPING CENTER		PV		Y																					
9.31		9.58	ENT/EXIT		R	SHOPPING CENTER		PV		Y																					
9.34		9.61	ENT/EXIT		R	SHOPPING CENTER		PV		Y																					
9.36		9.63	MISC FEATR		L	BUS PULLOUT																									
9.38		9.65	INTRSECTN		B	132ND AVE SE		CT	SG	Y	2	2						C	60A	C		60	4	01	0615	U1	45		R	P	*
9.43		9.70	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	48A	C	12	60	4	01	0615	U1	45		R	P	*
9.50		9.77	MISC FEATR		R	BUS PULLOUT																									
9.56		9.83	INTRSECTN		R	135TH AVE SE		CT		N																					
9.66		9.93	MISC FEATR		L	BUS PULLOUT																									
9.68		9.95	INTRSECTN		B	137TH AVE SE		CT		Y																					
9.70		9.97	MISC FEATR		R	BUS PULLOUT																									
9.84		10.11	INTRSECTN		L	139TH PL SE		CT		Y																					
9.87		10.14	INTRSECTN		L	140TH AVE SE		CT		N																					
9.93		10.20	INTRSECTN		L	PVT RD		PV		N																					
			INTRSECTN		R	141ST AVE SE		CT		N																					
10.00		10.27	MP MARKER		R	10																									
10.12		10.39	END SU LN		C	TWO WAY TURN	12A				2	2						C	60A	C	$$$	60	4	01	0615	U1	45		R	P	*
			INTRSECTN		R	144TH AVE SE		CT	SG	Y																					
10.13		10.40	MISC FEATR		L	BUS PULLOUT																									
10.14		10.41	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	48A	C	12	60	4	01	0615	U1	45		R	P	*
			INTRSECTN		L	SE 270TH PL		CT		Y																					
10.18		10.45	END SU LN		C	TWO WAY TURN	12A				2	2						C	60A	C	$$$	60	4	01	0615	U1	45		R	P	*
			MISC FEATR		R	BUS PULLOUT																									
10.20		10.47	BEG BRIDGE	B		HALF BRIDGE		ST			2	2						C	51P	C		51	4	01	0615	U1	45		R	P	*
						BRDG NUM 516/014																									
10.30		10.57	END BRIDGE	B		HALF BRIDGE					2	2						C	60A	C		60	4	01	0615	U1	45		R	P	*

INTERSECTION DETAIL

SRMP	B ARM	TURN LANES L NEAR LGT	WD	R NEAR LGT	WD	L FAR LGT	WD	R FAR LGT	WD	ACCELERATION LANES LEFT-- LGT	WD	L-CNTR LGT	WD	R-CNTR LGT	WD	RIGHT- LGT	WD
9.15	9.42					.01	10										
9.22	9.49	.03	10			.02	10										
9.38	9.65	.04	12	.12	12	.05	12	.13	12								
10.12	10.39					.02	12										

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SR 516 MAINLINE   STATE ROUTE - SRSH   COUNTY KING   DOT DISTRICT 1

:DIRECTION TO INVENTORY
: :LEFT/RIGHT INDICATOR

-------WIDTH AND SURFACE INFORMATION------- / ------CLASSIFICATIONS---

SRMP	B	ARM	FEATURE	D	LR	DESCRIPTION		-BRIDGE -UXING- -XROAD- OW	TC	L	NBR LNS D	I	DECREAS/DIV LFT SHD W/S	RDY W/S	RHT SHD W/S	MEDIAN- WD/S	BR	INCRES/UNDI LFT SHD W/S	RDY W/S	RHT SHD W/S	SPC USE LNS WID	TOT RDY WID	MTCE A	SE	CITY NBR	ST FC	LEGAL SPEED D IB	T R	P K	S T
10.31		10.58									2	2						C	60A	C		60	4	01	0615	U1	45	R	P	*
10.36		10.63	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	48A	C	12	60	4	01	0615	U1	45	R	P	*
10.37		10.64	INTRSECTN		R	148TH AVE SE		CT		N																				
10.43		10.70	INTRSECTN		R	PVT RD		PV		N																				
			ENT/EXIT		L	LAKE MERIDIAN PARK		CT		N																				
10.51		10.78	MISC FEATR		B	BUS PULLOUT																								
10.53		10.80	INTRSECTN		L	150TH PL SE		CT		Y																				
10.56		10.83	END SU LN		C	TWO WAY TURN	12A				2	2						C	71A	C	$$$	71	4	01	0615	U1	45	R	P	*
10.61		10.88	INTRSECTN		R	152ND AVE SE		CT	SG	Y	2	2						C	60A	C		60	4	01	0615	U1	45	R	P	*
			INTRSECTN		L	152ND WAY SE		CT	SG	Y																				
10.66		10.93	BEG SU LN		C	TWO WAY TURN	12A				2	2						C	48A	C	12	60	4	01	0615	U1	45	R	P	*
10.67		10.94	MISC FEATR		R	BUS PULLOUT																								
10.71		10.98	MISC FEATR		L	BUS PULLOUT																								
10.85		11.12	INTRSECTN		R	156TH AVE SE		CT		N																				
10.91		11.18	ENT/EXIT		R	FIRE STATION		PV	FS	N																				
10.96		11.23	MISC FEATR		B	BUS PULLOUT																								
11.04		11.31	MP MARKER		R	11																								
11.07		11.34	CHG SU LN		C	TWO WAY TURN	12P				2	2						C	48P	C	12	60	4	01	0615	U1	45	R	P	*
			BEG BRIDGE	B		SOOS CREEK		ST																						
						BRDG NUM 516/016																								
11.09		11.36	END BRIDGE	B		SOOS CREEK					2	2						C	48A	C	12	60	4	01	0615	U1	45	R	P	*
			CHG SU LN		C	TWO WAY TURN	12A																							
11.13		11.40	LEAVE CITY			KENT					2	2						C	48A	C	12	60	4	01	0293	U1	45	R	P	*
			ENTER CITY			COVINGTON																								
			INTRSECTN		L	160TH AVE SE		CT		Y																				
11.14		11.41	MISC FEATR		R	SGN ENT COVINGTON																								
11.20		11.47	END SU LN		C	TWO WAY TURN	12A				2	2						C	60A	C	$$$	60	4	01	0293	U1	45	R	P	*
11.25		11.52									2	2						C	60A	C		60	4	01	0293	U1	35	R	P	*
11.26		11.53	INTRSECTN		B	COVINGTON WAY SE		CT	SG	Y																				
11.31		11.58	MISC FEATR		R	BUS PULLOUT																								
11.33		11.60									2	2						C	70A	C		70	4	01	0293	U1	35	R	P	*
11.35		11.62	MISC FEATR		L	BUS PULLOUT																								
11.37		11.64	INTRSECTN		L	164TH AVE SE		CT	SG	Y	2	2						C	87A	C		87	4	01	0293	U1	35	R	P	*
			ENT/EXIT		R	BUSINESS PARK		PV	SG	Y																				
11.42		11.69	OFF RAMP		R	SR 18		ST	SG	Y	2	2						C	82A	C		82	4	01	0293	U1	35	R	P	*

INTERSECTION DETAIL

SRMP	B	ARM	TURN LANES: L NEAR LGT	WD	R NEAR LGT	WD	L FAR LGT	WD	R FAR LGT	WD	ACCELERATION LANES: LEFT-- LGT	WD	L-CNTR LGT	WD	R-CNTR LGT	WD	RIGHT- LGT	WD
10.61		10.88	.03	12	.04	13	.03	12										
11.26		11.53	.03	12			.03	12										
11.37		11.64	.04	13			.02	13	.05	13								

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 SR 516  MAINLINE                           STATE ROUTE - SRSH        COUNTY  KING                  DOT DISTRICT 1

                                                                    -------WIDTH AND SURFACE INFORMATION-------
                              :DIRECTION TO INVENTORY         |-BRIDGE |   |DECREAS/DIV |           |INCRES/UNDI|SPC|   |------CLASSIFICATIONS---
                              : :LEFT/RIGHT INDICATOR         |-UXING- |NBR|LFT     RHT |           |LFT     RHT|USE|TOT|                |LEGAL|
                              : :                             |-XROAD- |LNS|SHD RDY SHD |MEDIAN-    |SHD RDY SHD|LNS|RDY|MTCE|CITY|ST|SPEED|T|P|S
 SRMP   B ARM    |FEATURE     |D LR|DESCRIPTION               |OW TC L |D I|W/S W/S W/S|WD/S BR    |W/S W/S W/S|WID|WID|A SE|NBR |FC|D  IB|R|K|T

 11.42    11.69 ON RAMP      L  SR 18                         ST SG Y 2 2                          C 82A   C       82 4 01 0293 U1     35 R P *
 11.45    11.72 UXING       B   SR 18 WB                      ST      2 2                          C 82A   C       82 4 01 0293 U2     35 R P *
                                BRDG NUM 018/025N
 11.47    11.74 UXING       B   SR 18 EB                      ST
                                BRDG NUM 018/025S
 11.51    11.78 ON RAMP      R  SR 18                         ST SG Y 2 2                          C 70A   C       70 4 01 0293 U2     35 R P *
                OFF RAMP     L  SR 18                         ST SG Y
 11.53    11.80                                                       2 2                          C 56A   C       56 4 01 0293 U2     35 R P *
 11.58    11.85 INTRSECTN    L  167TH PL SE                   CT    Y 2 2                          C 68A   C       68 4 01 0293 U2     35 R P *
 11.59    11.86                                                       2 2                          C 64A   C       64 4 01 0293 U2     35 R P *
 11.65    11.92 INTRSECTN    B  168TH PL SE                   CT SG Y
 11.68    11.95 MISC FEATR   R  BUS PULLOUT
 11.71    11.98 INTRSECTN    L  169TH PL SE                   CT    Y
 11.87    12.14 INTRSECTN    B  172ND AVE SE                  CT SG Y
 11.96    12.23 MISC FEATR   B  BUS PULLOUT
 11.98    12.25 MP MARKER    R  12
 11.99    12.26 ENT/EXIT     R  SHOPPING CENTER               PV    N
 12.02    12.29 INTRSECTN    L  PVT RD                        PV    N
 12.08    12.35 WYE CONN     R  SE WAX RD                     CT    Y
 12.10    12.37 INTRSECTN    B  SE WAX RD                     CT SG Y
 12.12    12.39 WYE CONN     L  SE WAX RD                     CT    Y 2 2                          C 64A   C       64 4 01 0293 U2     50 R P *
 12.16    12.43 BEG SU LN    C  TWO WAY TURN            12A           2 1                          C 52A   C   12  64 4 01 0293 U2     50 R P *
 12.18    12.45                                                       2 1                          C 44A  8A   12  56 4 01 0293 U2     50 R P *
 12.21    12.48 ENT/EXIT     L  MEDICAL PARK                  PV    N
 12.23    12.50 END SU LN    C  TWO WAY TURN            12A           1 1                         8A 50A  8A $$$  50 4 01 0293 U2     50 R P *
 12.31    12.58                                                       1 1                         4A 22A  4A       22 4 01 0293 U2     50 R P *
 12.38    12.65                                                       1 1                         4A 22A  4A       22 4 01 0293 U2     45 R P *
 12.43    12.70                                                       1 1                        $$C 26A  4A       26 4 01 0293 U2     45 R P *
 12.52    12.79 ENT FROM     L  SHOPPING CENTER               PV    Y
 12.53    12.80 EXIT TO      L  SHOPPING CENTER               PV    Y
 12.66    12.93 BEG SU LN    C  TWO WAY TURN            12A           1 1                         8A 22A  4A   12  34 4 01 0293 U2     45 R P *

 INTERSECTION DETAIL    ----------TURN LANES----------   ------ACCELERATION LANES------
                        L NEAR  R NEAR  L FAR   R FAR    LEFT--  L-CNTR  R-CNTR  RIGHT-
 SRMP   B ARM           LGT WD  LGT WD  LGT WD  LGT WD   LGT WD  LGT WD  LGT WD  LGT WD
 ------- ------         --- --  --- --  --- --  --- --   --- --  --- --  --- --  --- --
 11.42    11.69                 .05 13  .03 24
 11.51    11.78         .03 24
 11.65    11.92         .04 12  .08 12  .06 12
 11.87    12.14         .08 12          .07 12                                   .02 12
 12.10    12.37         .07 12          .04 13
 12.52    12.79                                          .01 12
 12.53    12.80                                 .13 12
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SR 516 MAINLINE STATE ROUTE - SRSH COUNTY KING DOT DISTRICT 1

SRMP	B	ARM	FEATURE	D	DIRECTION TO INVENTORY : :LEFT/RIGHT INDICATOR : : LR	DESCRIPTION	-BRIDGE -UXING- -XROAD- OW	TC	L	NBR LFT LNS D	DECREAS/DIV RHT SHD I	RDY W/S	SHD W/S	MEDIAN- BR	WIDTH AND SURFACE INFORMATION INCRES/UNDI SPC LFT RHT USE SHD RDY SHD LNS W/S W/S W/S WID	TOT RDY MTCE WID A SE	NBR	CITY	ST	FC	CLASSIFICATIONS LEGAL SPEED D	T IB	P R	S K	T
12.66		12.93	INTRSECTN		L	185TH AVE SE		CT	SG	Y 1 1					8A 22A 4A 12	34 4 01	0293	U2		45 R	P *
12.74		13.01	INTRSECTN		L	186TH AVE SE		CT		Y 1 1					5A 22A 4A 12	34 4 01	0293	U2		45 R	P *
12.85		13.12	END SU LN		C	TWO WAY TURN	12A			1 1					8A 34A 7A $$$	34 4 01	0293	U2		45 R	P *
12.92		13.19	INTRSECTN		L	189TH AVE SE		CT		Y 1 1					8A 46A 7A	46 4 01	0293	U2		45 R	P *
12.94		13.21	BEG SU LN		C	TWO WAY TURN	12A			1 1					8A 22A 7A 12	34 4 01	0293	U2		45 R	P *
12.99		13.26	MP MARKER		R	13															
13.01		13.28	END SU LN		C	TWO WAY TURN	12A			1 1					8A 34A 7A $$$	34 4 01	0293	U2		45 R	P *
13.11		13.38	INTRSECTN		L	192ND AVE SE		CT	SG	Y 1 1					2A 46A 7A	46 4 01	0293	U2		45 R	P *
13.13		13.40	BEG SU LN		C	TWO WAY TURN	12A			1 1					2A 34A 7A 12	46 4 01	0293	U2		45 R	P *
13.15		13.42													5A 22A 7A 12	34 4 01	0293	U2		45 R	P *
13.30		13.57	ENT/EXIT		L	WOODSIDE VILLAGE		PV		Y 1 1					9A 34A 7A 12	46 4 01	0293	U2		45 R	P *
13.32		13.59	ENT/EXIT							1 1					8A 22A 7A 12	34 4 01	0293	U2		45 R	P *
13.38		13.65	ENT/EXIT		L	CEDAR HTS JR HIGH SCHOOL		PV		N											
13.39		13.66	MISC FEATR	B		PED XING															
13.47		13.74	ENT/EXIT		L	CEDAR HTS JR HIGH SCHOOL		PV		N											
13.51		13.78								1 1					8A 22A 4A 12	34 4 01	0293	U2		45 R	P *
13.61		13.88	END SU LN		C	TWO WAY TURN	12A			1 1					8A 34A 4A $$$	34 4 01	0293	U2		45 R	P *
13.67		13.94	INTRSECTN		L	201ST AVE SE		CT		Y											
13.78		14.05								1 1					4A 23A 4A	23 4 01	0293	U2		45 R	P *
13.81		14.08	INTRSECTN		L	203RD AVE SE		PV		N											
13.85		14.12	INTRSECTN		L	204TH AVE SE		CT		N											
13.97		14.24	MP MARKER		R	14															
14.06		14.33	INTRSECTN		R	207TH AVE SE		PV		Y											
14.07		14.34	MISC FEATR		R	BUS PULLOUT															
14.08		14.35	BEG SU LN		C	TWO WAY TURN	12A			1 1					4A 23A 4A 12	35 4 01	0293	U2		45 R	P *
14.11		14.38	WYE CONN		R	208TH AVE SE		CT		Y											
14.12		14.39	INTRSECTN		R	208TH AVE SE		CT		Y											
14.17		14.44	END SU LN		C	TWO WAY TURN	12A			1 1					4A 23A 4A $$$	23 4 01	0293	U2		45 R	P *
14.18		14.45	INTRSECTN		L	209TH AVE SE		CT		Y											

SRMP	B	ARM	INTERSECTION DETAIL L NEAR LGT WD	R NEAR LGT WD	TURN LANES L FAR LGT WD	R FAR LGT WD	ACCELERATION LANES LEFT-- L-CNTR LGT WD	R-CNTR LGT WD	RIGHT- LGT WD
12.66		12.93	.02 12		.01 12				
12.74		13.01	.04 12		.02 12				
12.92		13.19	.09 12		.02 12				
13.11		13.38			.02 12				
13.30		13.57			.02 12				
13.47		13.67			.02 12				
13.67		13.74	.03 12				.02 12	.01 12	
14.06		14.33							
14.11		14.38		.03 12		.02 12			
14.18		14.45	.01 12					.03 12	

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1DOT-RNB160J                          STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION                          DATE 03/14/11
                                                    T R I P S   S Y S T E M                                         TIME 17:13:26
                                                      STATE HIGHWAY LOG                                             PAGE      332

 SR 516  MAINLINE                         STATE ROUTE - SRSH        COUNTY  KING                        DOT DISTRICT 1

                                                                    -------WIDTH AND SURFACE INFORMATION-------
                                  :DIRECTION TO INVENTORY      |-BRIDGE |   |DECREAS/DIV |         |INCRES/UNDI|SPC|   |------CLASSIFICATIONS---
                                  : :LEFT/RIGHT INDICATOR      |-UXING- |NBR|LFT     RHT |         |LFT     RHT|USE|TOT|                 |LEGAL|
                                  : :                          |-XROAD- |LNS|SHD RDY SHD |MEDIAN-  |SHD RDY SHD|LNS|RDY|MTCE|CITY|ST|SPEED|T|P|S
 SRMP   B ARM    |FEATURE        |D LR|DESCRIPTION              |OW TC L |D I|W/S W/S W/S |WD/S BR  |W/S W/S W/S|WID|WID|A SE|NBR |FC|D  IB|R|K|T

  14.31   14.58                                                        1 1                       4A 23A  4A      23 4 01 0293 U2     45 R P *
  14.32   14.59 INTRSECTN    L  211TH AVE SE           CT    N
  14.38   14.65                                                        1 1                       4A 34A $$C      34 4 01 0293 U2     45 R P *
  14.42   14.69 LEAVE CITY      COVINGTON                              1 1                       4A 34A   C      34 4 01 0739 U2     40 R P *
                ENTER CITY      MAPLE VALLEY
  14.45   14.72 MISC FEATR   R  BUS PULLOUT
  14.48   14.75 INTRSECTN    B  213TH PL SE            CT    Y
  14.50   14.77                                                        1 1                       4A 23A  4A      23 4 01 0739 U2     40 R P *
  14.63   14.90 INTRSECTN    R  216TH AVE SE           CT SG Y 1 1                               4A 23A  7A      23 4 01 0739 U2     40 R P *
  14.75   15.02 INTRSECTN    L  218TH AVE SE           CT    Y
  14.95   15.22 MP MARKER    R  15
  15.10   15.37 BEG SU LN    L  BICYCLE           05A                  1 1                      $$C 28A  7A   5  33 4 01 0739 U2     40 R P *
                INTRSECTN    B  WITTE RD SE            CT SG Y
  15.21   15.48                                                        1 1                        C 28A  4A   5  33 4 01 0739 U2     40 R P *
  15.30   15.57 BEG SU LN    R  BICYCLE           05A                  1 1                        C 46A $$C  10  56 4 01 0739 U2     40 R P *
  15.38   15.65 END SU LN    R  BICYCLE           05A                  1 1                        C 46A  6A   5  51 4 01 0739 U2     40 R P *
                INTRSECTN    B  228TH AVE SE           CT SG Y
  15.47   15.74 END SU LN    L  BICYCLE           05A                  1 1                       4A 23A  6A $$$  23 4 01 0739 U2     40 R P *
  15.49   15.76                                                        1 1                       4A 23A  4A      23 4 01 0739 U2     40 R P *
  15.73   16.00 INTRSECTN    R  SE 271ST PL            CT    Y
  15.74   16.01 INTRSECTN    L  233RD PL SE            CT    Y
  15.86   16.13 INTRSECTN    L  235TH AVE SE           CT    Y
  15.96   16.23 INTRSECTN    L  236TH PL SE            CT    Y
  16.00   16.27 MP MARKER    R  16
  16.10   16.37 BEG SU LN    C  TWO WAY TURN      12A                  1 1                      $$C 46A $$C  12  58 4 01 0739 U2     40 R P *
  16.12   16.39                                                        1 2                        C 46A   C  12  58 4 01 0739 U2     40 R P *
  16.14   16.41 END SU LN    C  TWO WAY TURN      12A                  1 2                        C 46A   C $$$  46 4 01 0739 U2     40 R P *
  16.16   16.43 ENT/EXIT     L  SHOPPING CENTER        PV    Y 1 2                                C 58A   C      58 4 01 0739 U2     40 R P *
  16.22   16.49 END ST     I    KENT KANGLEY RD-272ND ST
                INTRSECTN    B  SR 169                 ST SG Y

 INTERSECTION DETAIL     ----------TURN LANES----------   ------ACCELERATION LANES------
                         L NEAR  R NEAR  L FAR   R FAR     LEFT--  L-CNTR  R-CNTR  RIGHT-
 SRMP   B ARM            LGT WD  LGT WD  LGT WD  LGT WD    LGT WD  LGT WD  LGT WD  LGT WD
 ------- ------          --- --  --- --  --- --  --- --    --- --  --- --  --- --  --- --
  14.48   14.75          .03 12  .06 12  .03 12
  14.63   14.90                  .02 12  .03 12
  15.10   15.37          .05 11          .04 11  .04 11
  15.38   15.65          .03 12  .08 12  .04 12  .08 12
  15.73   16.00                  .01 12
  15.96   16.23          .03 12                  .02 12
  16.16   16.43                                  .04 12
  16.22   16.49          .03 12
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SR 516 Report MP 4.65 to 16.22Appendix B

Appendix C – Utility Locations

The following pages show the approximate location of the utilities that exist within the study corridor, according to the Washington State Department of Transportation (WSDOT) Northwest Region Utilities office, as of August 31, 2011. Detailed research is required in each case to establish any prior rights by easement that may exist. Exact locations of these utilities are available from the as-built drawings maintained by the utility company.

DOT-RHB100-PB

WASHINTON STATE
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FRANCHISE LIST REPORT

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Roadway SR	Type	Beg MP	End MP	Doc No	Doc Type	R/C	AMD	Install Type	Status	Region	County	Approval Date	Expiration Date	Holder Name
516	Mainline	.00	16.22	C0092	UF	O	92	Power Cable	I	NW	King	05/05/1930	01/06/1975	PUGET SOUND POWER & LIGHT CO.
516	Mainline	.03	16.22	06337	UF	O	0	Telephone Cable	A	NW	King	04/25/1980	04/25/2005	U S WEST COMMUNICATIONS, INC.
516	Mainline	2.25	7.34	02342	UF	O	0	Power Cable	I	NW	King	09/22/1953	09/22/1978	PUGET SOUND POWER & LIGHT CO.
516	Mainline	2.62	13.70	0000014218	UP	O	0	Power Cable	A	NW	King	04/25/1990		PUGET SOUND ENERGY - merge
516	Mainline	4.16	11.65	02363	UF	O	0	Water Line	A	NW	King	12/15/1953	12/15/1978	CITY OF KENT
516	Mainline	4.57	4.57	NA-S-0896	GP	O	0	Unknown	A	NW	Unknown	06/01/1955		WSDOT TEMP. HOLDER NO.
516	Mainline	4.60	4.60	NA-S-0869	GP	O	0	Unknown	A	NW	Unknown	03/22/1955		WSDOT TEMP. HOLDER NO.
516	Mainline	4.65	4.65	NA-S-0872	GP	O	0	Unknown	A	NW	Unknown	03/28/1955		WSDOT TEMP. HOLDER NO.
516	Mainline	4.75	4.75	0000015810	GP	O	0	Unknown	A	NW	Unknown	07/07/1993		WSDOT TEMP. HOLDER NO.
516	Mainline	4.77	4.77	0000014073	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	4.78	4.78	EN3213	UP	O	0	Power Cable	A	NW	King	06/15/1972		PUGET SOUND ENERGY - merge
516	Mainline	4.78	4.78	0000018139	UP	O	0	Telecommunication Fa	A	NW	King	04/01/2003		AT&T CORP.
516	Mainline	4.78	4.78	0000018142	UP	O	0	Telecommunication Fa	A	NW	King	04/01/2003		TOUCH AMERICA, INC.
516	Mainline	4.78	4.78	K4358	GP	O	0	Unknown	A	NW	Unknown	03/14/1980		WSDOT TEMP. HOLDER NO.
516	Mainline	4.79	4.79	K4297	GP	O	0	Unknown	A	NW	Unknown	02/13/1980		WSDOT TEMP. HOLDER NO.
516	Mainline	4.79	4.79	K3825	GP	O	0	Unknown	A	NW	Unknown	09/14/1977		WSDOT TEMP. HOLDER NO.
516	Mainline	4.79	4.79	K3830	GP	O	0	Unknown	A	NW	Unknown	12/02/1977		WSDOT TEMP. HOLDER NO.
516	Mainline	4.79	4.79	EN3400	UP	O	0	Television Cable	A	NW	King	01/02/1974		U S WEST COMMUNICATIONS, INC.
516	Mainline	4.79	4.79	0000010488	UP	O	0	Power Cable	A	NW	King	09/28/1982		PUGET SOUND POWER & LIGHT CO.
516	Mainline	4.79	4.79	0000010551	UP	O	0	Telephone Cable	A	NW	King	09/16/1982		U S WEST COMMUNICATIONS, INC.
516	Mainline	4.80	4.80	K4046	GP	O	0	Unknown	A	NW	Unknown	10/16/1978		WSDOT TEMP. HOLDER NO.
516	Mainline	4.80	4.80	K4366	UP	O	0	Water Line	A	NW	King	02/19/1980		WSDOT TEMP. HOLDER NO.
516	Mainline	4.84	4.84	EN-S-1967	UP	O	0	Sanitary Sewer Line	A	NW	King	10/20/1967		WSDOT TEMP. HOLDER NO.
516	Mainline	4.92	4.92	0000014672	UP	O	0	Telephone Cable	A	NW	King	11/09/1990		QWEST CORPORATION
516	Mainline	4.79	4.79	0000010551	UP	O	0	Telephone Cable	A	NW	King	09/16/1982		U S WEST COMMUNICATIONS, INC.
516	Mainline	4.95	4.98	K3907	GP	O	0	Miscellanous	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	4.98	4.98	0000014915	UP	O	0	Telephone Cable	A	NW	King	05/20/1991		QWEST CORPORATION
516	Mainline	5.17	5.17	0000015031	UP	O	0	Telecommunication Fa	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	6.00	6.10	01462	UF	O	0	Water Line	I	NW	King	06/23/1942	06/23/1967	HUDGINS PAUL G
516	Mainline	6.40	8.28	02372	UF	O	0	Natural Gas Line	I	NW	King	11/24/1953	01/19/1979	WASHINGTON NATURAL GAS CO.
516	Mainline	6.54	6.74	03123	UF	O	0	Water Line	I	NW	King	01/15/1962	01/15/1987	CITY OF KENT
516	Mainline	6.60	8.18	03189	UF	O	0	Water Line	I	NW	King	06/17/1963	06/17/1988	CITY OF KENT
516	Mainline	6.90	7.00	02691	UF	O	0	Sanitary Sewer Line	I	NW	King	07/16/1957	07/16/1982	CITY OF KENT
516	Mainline	6.91	6.91	02075	UF	O	0	Sanitary Sewer Line	I	NW	King	07/11/1950	07/11/1975	KENT MERIDIAN SCHOOL DISTRICT
516	Mainline	7.35	7.81	03507	UF	O	0	Sanitary Sewer Line	I	NW	King	03/15/1965	03/15/1990	CITY OF KENT
516	Mainline	7.36	7.36	EN-S-2252	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	7.45	7.45	EN-S-1940	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	7.72	7.72	EN-S-2177	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	7.81	7.81	EN-S-2263	GP	O	0	Unknown	A	NW	Unknown	10/24/1969		WSDOT TEMP. HOLDER NO.
516	Mainline	7.81	9.05	04013	UF	O	0	Sanitary Sewer Line	I	NW	King	09/25/1968	09/25/1993	CITY OF KENT
516	Mainline	7.91	8.28	03072	UF	O	2	Natural Gas Line	I	NW	King	07/31/1981	08/22/1986	WASHINGTON NATURAL GAS CO.
516	Mainline	7.91	10.91	10051	UF	C	0	Natural Gas Line	I	NW	King	06/22/1988	06/22/2010	WASHINGTON NATURAL GAS CO.
516	Mainline	7.98	7.98	0000014750	GP	O	0	Unknown	A	NW	Unknown	01/04/1990		WSDOT TEMP. HOLDER NO.
516	Mainline	7.98	7.98	0000012358	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.04	9.37	06337	UF	O	5	Telephone Cable	A	NW	King	08/01/1989	04/25/2005	U S WEST COMMUNICATIONS, INC.
516	Mainline	8.05	8.18	10066	UF	O	0	Sanitary Sewer Line	I	NW	King	03/24/1989	03/24/2014	R.GUTHRIE COMPANY
516	Mainline	8.05	8.18	10136	UF	O	0	Sanitary Sewer Line	I	NW	King	05/21/1991	03/24/2014	CITY OF KENT
516	Mainline	8.06	8.11	0000015288	GP	O	0	Unknown	A	NW	Unknown	07/23/1992		WSDOT TEMP. HOLDER NO.
516	Mainline	8.10	8.10	K3505	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.17	8.20	0000015040	GP	O	0	Unknown	A	NW	Unknown	08/01/1991		WSDOT TEMP. HOLDER NO.
516	Mainline	8.18	8.18	0000016322	GP	O	0	Unknown	A	NW	Unknown	09/01/1994		WSDOT TEMP. HOLDER NO.

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Roadway SR	Type	Beg MP	End MP	Doc No	Doc Type	R/C	AMD	Install Type	Status	Region	County	Approval Date	Expiration Date	Holder Name
516	Mainline	8.18	8.18	K4022	GP	O	0	Unknown	A	NW	Unknown	08/14/1978		WSDOT TEMP. HOLDER NO.
516	Mainline	8.18	8.18	0000014018	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.18	9.37	01978	UF	O	0	Telephone Cable	I	NW	Unknown	05/06/1949	05/06/1974	U S WEST COMMUNICATIONS, INC.
516	Mainline	8.18	11.41	05610	UF	O	3	Power Cable	A	NW	King	04/07/1987	01/21/1999	PUGET SOUND POWER & LIGHT CO.
516	Mainline	8.18	13.90	05610	UF	O	0	Power Cable	A	NW	King	01/21/1974	01/21/1999	PUGET SOUND POWER & LIGHT CO.
516	Mainline	8.18	15.27	08675	UF	O	0	Water Line	A	NW	King	08/29/1983	08/29/2008	CITY OF KENT
516	Mainline	8.18	16.22	05120	UF	O	0	Television Cable	I	NW	King	12/15/1969	12/15/1994	TCI CABLEVISION OF AUBURN, INC.
516	Mainline	8.20	8.20	0000014911	GP	O	0	Unknown	A	NW	Unknown	04/26/1991		WSDOT TEMP. HOLDER NO.
516	Mainline	8.25	8.25	0000012612	GP	O	0	Unknown	A	NW	Unknown	02/24/1987		WSDOT TEMP. HOLDER NO.
516	Mainline	8.25	8.25	0000010545	AC	O	0	Residential Approach	A	NW	King			ACKERSON, MAYNARD
516	Mainline	8.25	10.37	03072	UF	O	1	Natural Gas Line	I	NW	King	06/20/1966	06/20/1991	WASHINGTON NATURAL GAS CO.
516	Mainline	8.28	8.45	0000010057	GP	O	0	Grading	A	NW	King			SOOS CREEK ESTATES
516	Mainline	8.28	10.37	03072	UF	O	0	Natural Gas Line	I	NW	King	08/22/1961	08/22/1986	WASHINGTON NATURAL GAS CO.
516	Mainline	8.29	8.29	0000010653	UP	O	0	Storm Sewer Lines	A	NW	King	11/02/1982		CITY OF KENT
516	Mainline	8.29	8.29	0000010441	UP	O	0	Water Line	A	NW	King	04/13/1982		CITY OF KENT
516	Mainline	8.30	8.32	0000010457	UP	O	0	Power Cable	A	NW	King	05/28/1982		PUGET SOUND POWER & LIGHT CO.
516	Mainline	8.32	8.32	HQ-63-04B	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.36	8.36	0000010541	UP	O	0	Power Cable	A	NW	King	07/29/1982		PUGET SOUND POWER & LIGHT CO.
516	Mainline	8.36	8.41	0000015763	GP	O	0	Unknown	A	NW	Unknown	01/20/1994		WSDOT TEMP. HOLDER NO.
516	Mainline	8.40	8.40	0000015187	GP	O	0	Unknown	A	NW	Unknown	06/09/1992		WSDOT TEMP. HOLDER NO.
516	Mainline	8.43	8.43	0000011771	GP	O	0	Unknown	A	NW	Unknown	04/05/1985		WSDOT TEMP. HOLDER NO.
516	Mainline	8.44	8.44	0000011772	GP	O	0	Unknown	A	NW	Unknown	04/05/1985		WSDOT TEMP. HOLDER NO.
516	Mainline	8.45	8.45	K4241	GP	O	0	Unknown	A	NW	Unknown	09/24/1979		WSDOT TEMP. HOLDER NO.
516	Mainline	8.45	8.45	K4263	GP	O	0	Unknown	A	NW	Unknown	09/28/1979		WSDOT TEMP. HOLDER NO.
516	Mainline	8.47	8.47	0000013539	GP	O	0	Unknown	A	NW	Unknown	09/12/1987		WSDOT TEMP. HOLDER NO.
516	Mainline	8.49	8.49	UC 2629	GP	O	0	Unknown	A	NW	Unknown	06/05/1989		WSDOT TEMP. HOLDER NO.
516	Mainline	8.50	8.50	0000016393	GP	O	0	Unknown	A	NW	Unknown	11/14/1994		WSDOT TEMP. HOLDER NO.
516	Mainline	8.53	8.53	0000011948	GP	O	0	Unknown	A	NW	Unknown	08/06/1985		WSDOT TEMP. HOLDER NO.
516	Mainline	8.54	8.54	0000016095	UP	O	0	Natural Gas Line	A	NW	King	12/18/1995		WASHINGTON NATURAL GAS CO.
516	Mainline	8.57	8.57	0000010174	UP	O	0	Power Cable	A	NW	King	08/31/1981		PUGET SOUND POWER & LIGHT CO.
516	Mainline	8.62	8.62	0000011914	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.63	8.63	0000014770	GP	O	0	Unknown	A	NW	Unknown	03/07/1991		WSDOT TEMP. HOLDER NO.
516	Mainline	8.72	8.72	0000012207	GP	O	0	Unknown	A	NW	Unknown	04/17/1986		WSDOT TEMP. HOLDER NO.
516	Mainline	8.73	8.73	K3655	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.73	8.73	EN-S-2154	GP	O	0	Unknown	A	NW	Unknown	10/04/1968		WSDOT TEMP. HOLDER NO.
516	Mainline	8.73	8.73	K3850	GP	O	0	Unknown	A	NW	Unknown	09/02/1977		WSDOT TEMP. HOLDER NO.
516	Mainline	8.75	10.85	10047	UF	C	0	Water Line	I	NW	King	03/03/1988	03/03/2013	KING COUNTY WATER DIST. #111
516	Mainline	8.79	8.79	0000014226	GP	O	0	Unknown	A	NW	Unknown	01/31/1990		WSDOT TEMP. HOLDER NO.
516	Mainline	8.80	8.80	000013541	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.83	8.83	K4370	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	8.83	8.83	0000016188	UP	O	0	Storm Sewer Lines	A	NW	King	05/03/1994		PACIFIC INDUSTRIES INC.
516	Mainline	8.84	8.84	0000016187	AC	O	0	Residential Approach	A	NW	King			PACIFIC INDUSTRIES INC.
516	Mainline	8.84	8.84	0000015429	AC	O	0	Residential Developme	A	NW	King			CLIBBORN, BRUCE
516	Mainline	8.86	8.86	0000015841	UP	O	0	Water Line	A	NW	King	08/31/1993		KING COUNTY WATER DIST. #111
516	Mainline	8.86	8.94	10051	UF	C	2	Natural Gas Line	I	NW	King	02/25/1993	02/23/2010	WASHINGTON NATURAL GAS CO.
516	Mainline	8.92	8.92	0000010377	UP	O	0	Natural Gas Line	A	NW	King	02/04/1982		PUGET SOUND ENERGY
516	Mainline	8.92	8.94	0000015584	GP	O	0	Unknown	A	NW	Unknown	11/09/1992		WSDOT TEMP. HOLDER NO.
516	Mainline	8.95	8.95	EN-S-2031	GP	O	0	Unknown	A	NW	Unknown	05/08/1965		WSDOT TEMP. HOLDER NO.
516	Mainline	9.09	9.09	K4402	GP	O	0	Unknown	A	NW	Unknown	03/13/1980		WSDOT TEMP. HOLDER NO.
516	Mainline	9.11	9.15	0000014084	GP	O	0	Unknown	A	NW	Unknown	10/03/1989		WSDOT TEMP. HOLDER NO.

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516 Mainline	9.15	9.15	0000013655	GP	O	0	Unknown	A	NW	Unknown	01/18/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	9.18	9.18	UC 2682	GP	O	0	Unknown	A	NW	Unknown	07/20/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	9.21	9.21	EN-S-1955	GP	O	0	Unknown	A	NW	Unknown	08/14/1967		WSDOT TEMP. HOLDER NO.
516 Mainline	9.21	9.21	0000015824	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.21	9.21	0000011028	GP	O	0	Unknown	A	NW	Unknown	03/28/1984		FLUEGEL, KEITH & MARILYN
516 Mainline	9.23	9.23	0000013763	GP	O	0	Unknown	A	NW	Unknown	03/21/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	9.24	9.24	EN3388	UP	O	0	Natural Gas Line	A	NW	King	11/26/1973		PUGET SOUND ENERGY - merge
516 Mainline	9.25	9.25	0000011604	GP	O	0	Unknown	A	NW	Unknown	11/06/1984		WSDOT TEMP. HOLDER NO.
516 Mainline	9.29	9.29	0000014424	GP	O	0	Unknown	A	NW	Unknown	05/16/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	9.31	9.51	0000013439	GP	O	0	Unknown	A	NW	Unknown	07/19/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	9.32	9.32	0000014544	GP	O	0	Unknown	A	NW	Unknown	08/07/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	9.33	9.33	NA-S-0955	GP	O	0	Unknown	A	NW	Unknown	01/19/1956		WSDOT TEMP. HOLDER NO.
516 Mainline	9.33	10.60	03235	UF	O	0	Water Line	I	NW	King	12/17/1962	12/17/1987	CITY OF KENT
516 Mainline	9.35	9.35	0000010380	UP	O	0	Power Cable	A	NW	King	02/19/1982		PUGET SOUND ENERGY - merge
516 Mainline	9.36	9.36	0000012659	GP	O	0	Unknown	A	NW	Unknown	03/17/1987		WSDOT TEMP. HOLDER NO.
516 Mainline	9.36	9.36	0000015521	GP	O	0	Unknown	A	NW	Unknown	08/25/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	9.37	9.37	EN-S-1882	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.37	9.37	EN-S-2144	GP	O	0	Unknown	A	NW	Unknown	10/11/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	9.37	9.37	0000012658	GP	O	0	Unknown	A	NW	Unknown	03/24/1987		WSDOT TEMP. HOLDER NO.
516 Mainline	9.37	9.37	0000011766	GP	O	0	Unknown	A	NW	Unknown	04/11/1985		WSDOT TEMP. HOLDER NO.
516 Mainline	9.37	9.37	0000010768	UP	O	0	Television Cable	A	NW	King	12/14/1982		TCI CABLEVISION OF AUBURN, INC.
516 Mainline	9.37	9.48	0000015759	UP	O	0	Sanitary Sewer Line	A	NW	King			CITY OF KENT
516 Mainline	9.37	10.12	01324	UF	R	0	Telephone Cable	I	NW	King	06/20/1966	06/20/1991	U S WEST COMMUNICATIONS, INC.
516 Mainline	9.37	10.19	10047	UF	C	2	Water Line	I	NW	King		03/03/2013	KING COUNTY WATER DIST. #111
516 Mainline	9.37	10.61	03893	UF	O	0	Natural Gas Line	I	NW	King	01/15/1968	01/15/1993	WASHINGTON NATURAL GAS CO.
516 Mainline	9.37	13.35	03037	UF	O	0	Water Line	I	NW	King	01/24/1961	01/24/1986	CITY OF KENT
516 Mainline	9.37	16.22	0000012392	UP	O	0	Power Cable	A	NW	King			PUGET SOUND ENERGY - merge
516 Mainline	9.38	9.38	0000013995	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.38	9.38	UC 2919	GP	O	0	Unknown	A	NW	Unknown	05/01/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	9.38	9.66	06337	UF	O	2	Telephone Cable	A	NW	King	07/26/1984	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	9.38	10.59	06675	UF	O	2	Water Line	A	NW	King	02/19/1985	08/29/2008	CITY OF KENT
516 Mainline	9.39	11.11	06337	UF	O	11	Telephone Cable	A	NW	King	02/13/1996	02/13/1996	U S WEST COMMUNICATIONS, INC.
516 Mainline	9.42	9.42	EN-S-1973	GP	O	0	Unknown	A	NW	Unknown	11/02/1967		WSDOT TEMP. HOLDER NO.
516 Mainline	9.44	9.44	EN3386	UP	O	0	Natural Gas Line	A	NW	King	10/25/1973		PUGET SOUND ENERGY - merge
516 Mainline	9.45	9.50	0000014869	GP	O	0	Unknown	A	NW	Unknown	05/29/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	9.46	9.46	EN-S-2338	GP	O	0	Unknown	A	NW	Unknown	03/26/1970		WSDOT TEMP. HOLDER NO.
516 Mainline	9.46	9.46	0000016456	GP	O	0	Unknown	A	NW	Unknown	02/22/1995		WSDOT TEMP. HOLDER NO.
516 Mainline	9.46	9.46	0000015702	GP	O	0	Unknown	A	NW	Unknown	06/17/1993		WSDOT TEMP. HOLDER NO.
516 Mainline	9.47	9.47	0000015405	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.48	9.48	EN-S-1976	GP	O	0	Unknown	A	NW	Unknown	11/09/1967		WSDOT TEMP. HOLDER NO.
516 Mainline	9.51	9.51	EN3243	UP	O	0	Natural Gas Line	A	NW	King	07/18/1972		PUGET SOUND ENERGY - merge
516 Mainline	9.53	9.53	EN-S-2173	GP	O	0	Unknown	A	NW	Unknown	11/25/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	9.56	9.56	0000015173	GP	O	0	Unknown	A	NW	Unknown	11/20/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	9.61	9.61	K4196	GP	O	0	Unknown	A	NW	Unknown	05/14/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	9.61	9.61	0000012676	GP	O	0	Unknown	A	NW	Unknown	03/03/1987		WSDOT TEMP. HOLDER NO.
516 Mainline	9.62	9.62	0000015017	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.62	9.67	0000016246	GP	O	0	Miscellanous	A	NW	King	08/16/1994		GRADWOHL, RICHARD
516 Mainline	9.63	9.63	0000015447	GP	O	0	Unknown	A	NW	Unknown	03/15/1993		WSDOT TEMP. HOLDER NO.
516 Mainline	9.66	9.67	0000010307	UP	O	0	Telephone Cable	A	NW	King	12/29/1981		U S WEST COMMUNICATIONS, INC.
516 Mainline	9.66	10.12	06337	UF	O	1	Telephone Cable	A	NW	King	12/12/1983	04/25/2005	U S WEST COMMUNICATIONS, INC.

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516 Mainline	9.67	9.67	0000013970	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.68	9.68	0000010121	UP	O	0	Water Line	A	NW	King			KING COUNTY WATER DIST. #111
516 Mainline	9.68	9.68	0000015742	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.70	9.70	0000010235	UP	O	0	Power Cable	A	NW	King	11/05/1981		PUGET SOUND POWER & LIGHT CO.
516 Mainline	9.70	9.70	0000012251	GP	O	0	Unknown	A	NW	Unknown	04/23/1986		WSDOT TEMP. HOLDER NO.
516 Mainline	9.74	9.74	0000014800	GP	O	0	Unknown	A	NW	Unknown	02/06/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	9.76	9.76	K4111	GP	O	0	Unknown	A	NW	Unknown	11/28/1978		WSDOT TEMP. HOLDER NO.
516 Mainline	9.83	9.83	0000015081	GP	O	0	Unknown	A	NW	Unknown	09/24/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	9.83	9.84	0000011157	UP	O	0	Telephone Cable	A	NW	King	11/04/1983		QWEST CORPORATION
516 Mainline	9.84	9.84	0000011082	UP	O	0	Natural Gas Line	A	NW	King	10/05/1983		WASHINGTON NATURAL GAS CO.
516 Mainline	9.84	9.84	0000011096	UP	O	0	Power Cable	A	NW	Unknown	11/17/1983		PUGET SOUND POWER & LIGHT CO.
516 Mainline	9.84	9.84	0000EN-S-2367	GP	O	0	Telephone Cable	A	NW	King	09/18/1970		WSDOT TEMP. HOLDER NO.
516 Mainline	9.87	9.87	K4266	GP	O	0	Unknown	A	NW	Unknown	09/07/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	9.87	9.87	K4253	GP	O	0	Unknown	A	NW	Unknown	09/06/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	9.91	9.93	0000011117	UP	O	0	Telephone Cable	A	NW	King	05/09/1984		PUGET SOUND POWER & LIGHT CO.
516 Mainline	9.92	9.92	0000010405	UP	O	0	Storm Sewer Lines	A	NW	King	02/23/1982		CASCADE SEWER DISTRICT
516 Mainline	9.92	9.92	0000012568	GP	O	0	Unknown	A	NW	Unknown	12/29/1986		WSDOT TEMP. HOLDER NO.
516 Mainline	9.93	9.93	K4313	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	9.93	9.93	EN-S-2009	GP	O	0	Unknown	A	NW	Unknown	03/21/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	9.93	9.94	0000011048	GP	O	0	Unknown	A	NW	Unknown	08/31/1983		LAKEMOOR CONSTRUCTION CO.
516 Mainline	9.93	9.95	0000011158	UP	O	0	Telephone Cable	A	NW	King	11/04/1983		QWEST CORPORATION
516 Mainline	9.96	10.14	06337	UF	O	10	Telephone Cable	A	NW	King	03/27/1991	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	10.00	10.00	HQ-65-41	UP	O	0	Power Cable	A	NW	King	11/09/1965		BONNEVILLE POWER ADMINISTRATIOI
516 Mainline	10.00	10.03	0000010851	AC	O	0	Commercial Approach	A	NW	King			HOLMAN, RONALD
516 Mainline	10.00	14.00	C0114	UF	O	0	Telephone Cable	I	NW	King	02/09/1931	02/09/1956	LAKE MERIDIAN TELEPHONE CO
516 Mainline	10.01	10.01	0000011882	AC	O	0	Unknown	A	NW	King	07/23/1985		WSDOT TEMP. HOLDER NO.
516 Mainline	10.04	10.04	EN-S-1986	AC	O	0	Residential Developme	A	NW	King	12/26/1967		WSDOT TEMP. HOLDER NO.
516 Mainline	10.05	10.05	0000015242	UP	O	0	Natural Gas Line	A	NW	King	01/23/1992		PUGET SOUND ENERGY - merge
516 Mainline	10.05	10.05	0000012094	UP	O	0	Power Cable	A	NW	King	01/13/1986		PUGET SOUND ENERGY - merge
516 Mainline	10.12	10.12	0000014066	UP	O	0	Water Line	A	NW	King	12/01/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	10.12	10.12	0000010480	UP	O	0	Natural Gas Line	A	NW	King	05/17/1982		WASHINGTON NATURAL GAS CO.
516 Mainline	10.13	10.17	0000014822	UP	O	0	Natural Gas Line	A	NW	King	08/08/1991		PUGET SOUND ENERGY - merge
516 Mainline	10.18	10.21	0000015484	GP	O	0	Landscaping	A	NW	King	07/31/1992		KLEIN, NANCY
516 Mainline	10.19	10.19	EN-S-2198	UP	O	0	Power Cable	A	NW	King	01/03/1969		PUGET SOUND ENERGY - merge
516 Mainline	10.20	11.09	06675	UF	O	3	Water Line	A	NW	King	08/18/1995	08/29/2008	CITY OF KENT
516 Mainline	10.20	11.09	10051	UF	C	3	Natural Gas Line	I	NW	King	10/07/1997	06/22/2010	WASHINGTON NATURAL GAS CO.
516 Mainline	10.22	10.22	K4131	AC	O	0	Unknown	A	NW	King	02/21/1979		SOOS CREEK WATER AND SEWER DIS
516 Mainline	10.30	10.30	EN3355	UP	O	0	Sanitary Sewer Line	A	NW	King	06/14/1973		CASCADE SEWER DISTRICT
516 Mainline	10.31	10.44	0000015136	AC	O	0	Unknown	A	NW	King	10/03/1991		DEPT OF NATURAL RESOURCES
516 Mainline	10.35	10.35	0000011414	UP	O	0	Power Cable	A	NW	King	07/13/1984		PUGET SOUND POWER & LIGHT CO.
516 Mainline	10.37	10.37	EN-S-2161	UP	O	0	Telephone Cable	A	NW	King	10/16/1968		QWEST CORPORATION
516 Mainline	10.37	10.43	0000012546	UP	O	0	Television Cable	A	NW	King	01/14/1987		TCI CABLEVISION OF AUBURN, INC.
516 Mainline	10.37	11.37	04023	UF	O	0	Telephone Cable	I	NW	King	09/25/1968	09/25/1993	U S WEST COMMUNICATIONS, INC.
516 Mainline	10.38	10.38	0000011700	UP	O	0	Telephone Cable	A	NW	King	01/23/1985		QWEST CORPORATION
516 Mainline	10.38	10.41	0000012196	UP	O	0	Sanitary Sewer Line	A	NW	King	03/04/1986		SOOS CREEK WATER AND SEWER DIS
516 Mainline	10.40	10.53	0000012247	UP	O	0	Water Line	A	NW	King	05/09/1986		KING COUNTY WATER DIST. #111
516 Mainline	10.41	10.41	K4192	AC	O	0	Residential Approach	A	NW	King	06/24/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	10.43	10.43	0000011739	UP	O	0	Power Cable	A	NW	King	03/06/1985		PUGET SOUND ENERGY - merge
516 Mainline	10.46	10.46	K4193	AC	O	0	Residential Approach	A	NW	King	06/24/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	10.50	10.50	K4194	AC	O	0	Residential Approach	A	NW	King	06/24/1979		WSDOT TEMP. HOLDER NO.

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516	Mainline	10.51	10.54	0000011751	UP	O	0	Telephone Cable	A	NW	King	03/07/1985		QWEST CORPORATION
516	Mainline	10.51	10.63	10051	UF	C	1	Natural Gas Line	I	NW	King	02/23/1990	06/22/2010	WASHINGTON NATURAL GAS CO.
516	Mainline	10.54	10.54	0000013802	UP	O	0	Telephone Cable	A	NW	King	04/13/1989		QWEST CORPORATION
516	Mainline	10.57	10.57	K3632	UP	O	0	Water Line	A	NW	King	04/06/1976		WSDOT TEMP. HOLDER NO.
516	Mainline	10.58	10.67	02776	UF	O	0	Water Line	I	NW	King	06/17/1958	06/17/1983	CITY OF KENT
516	Mainline	10.59	11.65	06675	UF	O	1	Water Line	A	NW	King	11/22/1983	08/29/2008	CITY OF KENT
516	Mainline	10.61	10.61	EN-S-1949	AC	O	0	Residential Developme	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	10.61	10.61	EN-S-2347	UP	O	0	Storm Sewer Lines	A	NW	King	07/27/1971		PUGET SOUND ENERGY - merge
516	Mainline	10.61	10.64	K4176	AC	O	0	Commercial Approach	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	10.62	10.62	0000014068	UP	O	0	Telephone Cable	A	NW	King	12/01/1989		QWEST CORPORATION
516	Mainline	10.64	10.67	0000013385	AC	O	0	Commercial Approach	A	NW	King	07/06/1988		NEW PACIFIC DEVELOPMENT CORPOI
516	Mainline	10.69	10.70	0000012144	UP	O	0	Power Cable	A	NW	King	02/07/1986		PUGET SOUND ENERGY - merge
516	Mainline	10.70	10.70	0000011955	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	10.74	10.74	0000013480	AC	O	0	Commercial Approach	A	NW	King	09/19/1988		GUSA, BYRON
516	Mainline	10.74	10.80	0000013055	UP	O	0	Telephone Cable	A	NW	King	01/02/1988		QWEST CORPORATION
516	Mainline	10.76	10.85	0000019125	GP	O	0	Telecommunication Fa	A	NW	King	07/23/2009		Qwest Communications
516	Mainline	10.77	10.77	0000015448	UP	O	0	Sanitary Sewer Line	A	NW	King	03/15/1993		SOOS CREEK WATER AND SEWER DIS
516	Mainline	10.78	10.78	0000013079	UP	O	0	Power Cable	A	NW	King	11/02/1988		PUGET SOUND ENERGY - merge
516	Mainline	10.79	10.79	0000015058	UP	O	0	Water Line	A	NW	King	07/25/1991		COVINGTON WATER DISTRICT
516	Mainline	10.84	10.84	K3928	AC	O	0	Unknown	A	NW	King	02/15/1978		WSDOT TEMP. HOLDER NO.
516	Mainline	10.84	10.98	10047	UF	C	1	Water Line	I	NW	King	08/16/1989	03/03/2013	KING COUNTY WATER DIST. #111
516	Mainline	10.89	10.89	0000013808	AC	O	0	Commercial Approach	A	NW	King	04/04/1989		KING COUNTY FIRE DISTRICT # 37
516	Mainline	10.92	10.92	0000014257	UP	O	0	Power Cable	A	NW	King	01/26/1990		PUGET SOUND ENERGY - merge
516	Mainline	10.97	10.97	0000010910	UP	O	0	Telephone Cable	A	NW	King	05/06/1983		QWEST CORPORATION
516	Mainline	11.05	11.05	01302	UF	O	0	Power Cable	I	NW	King	01/24/1941	01/24/1966	BONNEVILLE POWER ADMINISTRATIOI
516	Mainline	11.06	11.06	01506	UF	O	0	Power Cable	I	NW	King	12/22/1942	12/22/1967	BONNEVILLE POWER ADMINISTRATIOI
516	Mainline	11.09	13.76	06337	UF	O	8	Telephone Cable	A	NW	King	10/22/1990	04/25/2005	U S WEST COMMUNICATIONS, INC.
516	Mainline	11.11	14.38	10268	UF	C	0	Natural Gas Line	A	NW	King	07/30/1999	07/30/2024	PUGET SOUND ENERGY
516	Mainline	11.11	16.21	10251	UF	C	0	Water Line	A	NW	King	01/06/1997	01/06/2022	COVINGTON WATER DISTRICT
516	Mainline	11.14	11.14	K4443	UP	O	0	Water Line	A	NW	King	06/23/1980		WSDOT TEMP. HOLDER NO.
516	Mainline	11.16	11.24	0000015700	GP	O	0	Miscellanous	A	NW	King	04/20/1993		KING COUNTY
516	Mainline	11.18	11.38	0000017139	UP	O	0	Natural Gas Line	A	NW	King	08/19/1999		PUGET SOUND ENERGY
516	Mainline	11.23	11.23	0000011472	UP	O	0	Telephone Cable	A	NW	King	08/08/1984		U S WEST COMMUNICATIONS. INC.
516	Mainline	11.25	11.25	K3661	AC	O	0	Unknown	A	NW	King	06/09/1976		WSDOT TEMP. HOLDER NO.
516	Mainline	11.25	11.42	01763	UF	R	0	Telephone Cable	I	NW	King	02/16/1971	02/16/1996	U S WEST COMMUNICATIONS, INC.
516	Mainline	11.25	13.45	03550	UF	O	0	Telephone Cable	I	NW	King	06/07/1965	06/07/1990	U S WEST COMMUNICATIONS, INC.
516	Mainline	11.27	11.27	0000013022	AC	O	0	Residential Approach	A	NW	King	06/02/1998		CRAMER, CHARLES
516	Mainline	11.28	12.09	06337	UF	O	4	Telephone Cable	A	NW	King	06/10/1986	04/25/2005	U S WEST COMMUNICATIONS, INC.
516	Mainline	11.29	11.29	K3890	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	11.30	14.30	C0099	UF	O	0	Water Line	I	NW	King	06/16/1930	06/16/1955	CITY OF KENT
516	Mainline	11.32	11.32	0000013585	AC	O	0	Commercial Approach	A	NW	King	01/27/1989		BOLDMAN, P.
516	Mainline	11.32	11.32	0000018982	UP	O	0	Power Cable	A	NW	King	05/27/2008		Puget Sound Energy
516	Mainline	11.33	11.33	NA-S-0940	UP	O	0	Water Line	A	NW	King	10/28/1955		WSDOT TEMP. HOLDER NO.
516	Mainline	11.34	11.34	HQ-56-06F	UP	O	0	Power Cable	A	NW	King	09/24/1956		BONNEVILLE POWER ADMINISTRATIOI
516	Mainline	11.35	11.35	K3647	AC	O	0	Unknown	A	NW	King	06/03/1976		WSDOT TEMP. HOLDER NO.
516	Mainline	11.35	11.35	0000013025	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516	Mainline	11.36	11.36	0000010304	UP	O	0	Water Line	A	NW	King	12/03/1981		COVINGTON WATER DISTRICT
516	Mainline	11.36	11.40	EN-S-2353	AC	O	0	Unknown	A	NW	King	07/01/1970		WSDOT TEMP. HOLDER NO.
516	Mainline	11.36	11.59	03971	UF	O	3	Water Line	I	NW	King	03/04/1988	07/15/1993	COVINGTON WATER DISTRICT
516	Mainline	11.37	11.37	K3650	UP	O	0	Power Cable	A	NW	King	05/17/1976		PUGET SOUND ENERGY - merge

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516 Mainline	11.37	11.37	K3602	UP	O	0	Telephone Cable	A	NW	King	01/08/1976		U S WEST COMMUNICATIONS. INC.
516 Mainline	11.37	11.37	0000015450	UP	O	0	Storm Sewer Lines	A	NW	King	07/24/1992		KING COUNTY LIBRARY
516 Mainline	11.37	11.37	UC 2909	UN	O	0	Miscellanous	A	NW	King	11/27/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	11.37	12.12	03971	UF	O	1	Water Line	I	NW	King	05/19/1978	07/15/1993	COVINGTON WATER DISTRICT
516 Mainline	11.42	11.53	10268	UF	C	2	Natural Gas Line	A	NW	King	08/22/2002	07/30/2024	PUGET SOUND ENERGY
516 Mainline	11.45	16.22	K4004	GP	O	0	Miscellanous	A	NW	King	05/24/1978		WSDOT TEMP. HOLDER NO.
516 Mainline	11.48	11.55	03084	UF	O	0	Water Line	I	NW	King	08/22/1961	08/22/1986	CITY OF KENT
516 Mainline	11.55	14.38	10254	UF	C	0	Television Cable	A	NW	King	01/21/1999	01/21/2004	TCI CABLEVISION OF AUBURN, INC.
516 Mainline	11.57	11.60	K4157	AC	O	0	Unknown	A	NW	King	03/13/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	11.58	11.65	0000016991	GP	O	0	Landscaping	A	NW	Kitsap	05/14/1997		FRED MEYER
516 Mainline	11.58	11.65	0000016244	AC	O	0	Residential Approach	A	NW	King	05/29/1996		ROUND-UP CORPORATION
516 Mainline	11.62	12.26	10052	UF	O	1	Sanitary Sewer Line	A	NW	King	09/14/1989	06/13/2013	SOOS CREEK WATER AND SEWER DIS
516 Mainline	11.63	13.85	06675	UF	O	4	Water Line	A	NW	King	08/01/1995	08/29/2008	CITY OF KENT
516 Mainline	11.65	11.65	EN2174	UP	O	0	Telephone Cable	A	NW	King	11/23/1968		U S WEST COMMUNICATIONS. INC.
516 Mainline	11.65	11.66	0000017206	UP	O	0	Water Line	A	NW	King	06/01/1998		COVINGTON WATER DISTRICT
516 Mainline	11.65	11.71	0000017199	UP	O	0	Water Line	A	NW	King	05/26/1998		KING COUNTY WATER DIST. # 58
516 Mainline	11.66	11.67	0000017197	UP	O	0	Water Line	A	NW	King	05/28/1998		PUGET SOUND POWER & LIGHT CO.
516 Mainline	11.71	11.71	K3645	UP	O	0	Telephone Cable	A	NW	King	05/17/1976		U S WEST COMMUNICATIONS. INC.
516 Mainline	11.71	11.76	0000012091	UP	O	0	Telephone Cable	A	NW	King	12/03/1985		U S WEST COMMUNICATIONS. INC.
516 Mainline	11.75	11.87	0000012479	GP	O	0	Landscaping	A	NW	King	07/24/1987		COVINGTON SQUARE
516 Mainline	11.76	11.88	04059	UF	O	1	Natural Gas Line	A	NW	King	02/06/1987	12/16/1993	WASHINGTON NATURAL GAS CO.
516 Mainline	11.81	11.81	0000013724	UP	O	0	Water Line	A	NW	King	04/10/1989		COVINGTON WATER DISTRICT
516 Mainline	11.85	11.87	0000011884	UP	O	0	Power Cable	A	NW	King	06/24/1985		PUGET SOUND ENERGY - merge
516 Mainline	11.86	11.86	0000011315	UP	O	0	Water Line	A	NW	King	04/20/1984		COVINGTON WATER DISTRICT
516 Mainline	11.86	11.86	K4562	AC	O	0	Commercial Approach	A	NW	King	04/08/1981		WSDOT TEMP. HOLDER NO.
516 Mainline	11.87	11.87	0000011774	UP	O	0	Water Line	A	NW	King	06/27/1985		COVINGTON WATER DISTRICT
516 Mainline	11.87	11.87	0000011836	UP	O	0	Natural Gas Line	A	NW	King	05/03/1985		PUGET SOUND ENERGY
516 Mainline	11.87	11.91	0000014338	UP	O	0	Sanitary Sewer Line	A	NW	King	05/30/1991		CASCADE SEWER DISTRICT
516 Mainline	11.88	11.88	10052	UF	O	4	Sanitary Sewer Line	I	NW	King			Soos Creek Water and Sewer District
516 Mainline	11.90	11.90	0000015451	AC	O	0	Commercial Approach	A	NW	King			KNUTSEN, ROBERT
516 Mainline	11.90	11.90	0000015433	AC	O	0	Commercial Approach	A	NW	King			WENDY'S
516 Mainline	11.90	11.90	0000012083	UP	O	0	Water Line	A	NW	King			COVINGTON WATER DISTRICT
516 Mainline	11.91	11.91	0000012583	UP	O	0	Power Cable	A	NW	King	01/28/1987		PUGET SOUND ENERGY - merge
516 Mainline	11.91	11.99	03971	UF	O	2	Water Line	I	NW	King	12/30/1985	07/15/1993	COVINGTON WATER DISTRICT
516 Mainline	11.92	11.92	0000012522	UP	O	0	Commercial Approach	A	NW	King	10/20/1986		COVINGTON WATER DISTRICT
516 Mainline	11.92	11.92	K4171	AC	O	0	Commercial Approach	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	11.93	11.94	K4225	UP	O	0	Power Cable	A	NW	King	07/18/1979		PUGET SOUND ENERGY - merge
516 Mainline	11.94	11.94	0000016232	AC	O	0	Commercial Approach	A	NW	King	01/23/1995		COVINGTON SQUARE LIMITED PARTNI
516 Mainline	11.96	11.96	0000012571	UP	O	0	Water Line	A	NW	King			COVINGTON WATER DISTRICT
516 Mainline	11.99	12.02	0000010670	UP	O	0	Water Line	A	NW	King	01/03/1983		COVINGTON WATER DISTRICT
516 Mainline	12.00	12.00	K3698	UP	O	0	Natural Gas Line	A	NW	King	09/20/1976		PUGET SOUND ENERGY
516 Mainline	12.00	12.00	0000013397	AC	O	0	Commercial Approach	A	NW	King			COVINGTON PLAZA
516 Mainline	12.01	12.01	0000016570	GP	O	0	Miscellanous	A	NW	King	06/14/1995		WSDOT TEMP. HOLDER NO.
516 Mainline	12.01	12.06	0000013543	UP	O	0	Telephone Cable	A	NW	King			U S WEST COMMUNICATIONS. INC.
516 Mainline	12.02	12.02	0000010555	AC	O	0	Commercial Approach	A	NW	King			SEARCY, CARL M.
516 Mainline	12.02	12.02	0000010818	AC	O	0	Commercial Approach	A	NW	King	09/08/1983		BOTTEMILLER, EVERETT W.
516 Mainline	12.03	12.03	K4594	AC	O	0	Commercial Approach	A	NW	King	07/29/1981		WSDOT TEMP. HOLDER NO.
516 Mainline	12.03	12.05	0000011977	UP	O	0	Power Cable	A	NW	King	09/05/1985		PUGET SOUND ENERGY - merge
516 Mainline	12.04	12.08	0000011989	UP	O	0	Natural Gas Line	A	NW	King	09/18/1985		PUGET SOUND ENERGY
516 Mainline	12.05	12.05	0000017140	UP	O	0	Natural Gas Line	A	NW	King	03/12/1998		PUGET SOUND ENERGY

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516 Mainline	12.05	12.08	0000013542	UP	O	0	Power Cable	A	NW	King	11/14/1988		PUGET SOUND ENERGY - merge
516 Mainline	12.05	12.10	0000010039	UP	O	0	Water Line	A	NW	King	06/19/1981		COVINGTON WATER DISTRICT
516 Mainline	12.07	12.09	0000015511	GP	O	0	Landscaping	A	NW	King	09/16/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	12.08	12.08	0000016834	UP	O	0	Telecommunication Fa	A	NW	King	09/05/1996		SEATTLE CITY LIGHT
516 Mainline	12.08	12.08 UC	2638	UN	O	0	Miscellanous	A	NW	King	02/08/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	12.08	14.63	10254	UF	C	1	Television Cable	A	NW	King	10/04/1999	10/04/2004	TCI CABLEVISION OF WASHINGTON, I
516 Mainline	12.09	12.13	0000015588	UP	O	0	Power Cable	A	NW	King	11/16/1992		PUGET SOUND ENERGY - merge
516 Mainline	12.09	13.17	04059	UF	O	0	Natural Gas Line	A	NW	King	12/16/1968	12/16/1993	WASHINGTON NATURAL GAS CO.
516 Mainline	12.10	12.10	0000013398	UP	O	0	Sanitary Sewer Line	A	NW	King	08/15/1988		CASCADE SEWER DISTRICT
516 Mainline	12.10	12.10	0000013659	UP	O	0	Storm Sewer Lines	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	12.10	12.10	0000015590	UP	O	0	Telephone Cable	A	NW	King	11/13/1992		U S WEST COMMUNICATIONS. INC.
516 Mainline	12.10	12.10	EN-S-2309	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	12.10	12.10	EN-S-2134	AC	O	0	Unknown	A	NW	King	08/23/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	12.12	12.12	0000016006	UP	O	0	Telephone Cable	A	NW	King	12/10/1993		U S WEST COMMUNICATIONS. INC.
516 Mainline	12.12	13.13	03971	UF	O	0	Water Line	I	NW	King	07/15/1968	07/15/1993	COVINGTON WATER DISTRICT
516 Mainline	12.13	12.13 UC	2672	UN	O	0	Miscellanous	A	NW	King	07/02/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	12.14	12.14	0000014098	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY
516 Mainline	12.15	12.15	0000011335	UP	O	0	Water Line	A	NW	King	05/14/1984		COVINGTON WATER DISTRICT
516 Mainline	12.17	12.17	0000012826	UP	O	0	Telephone Cable	A	NW	King	06/04/1987		U S WEST COMMUNICATIONS. INC.
516 Mainline	12.20	12.20	0000012564	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	12.20	12.20 UC	2584	UN	O	0	Miscellanous	A	NW	King	05/31/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	12.21	12.21	0000012646	UP	O	0	Water Line	A	NW	King			COVINGTON WATER DISTRICT
516 Mainline	12.23	12.25	0000012669	UP	O	0	Power Cable	A	NW	King	04/13/1987		PUGET SOUND ENERGY - merge
516 Mainline	12.32	12.34	0000019126	GP	O	0	Telecommunication Fa	A	NW	King	07/23/2009		Qwest Communications
516 Mainline	12.33	12.33	0000010923	UP	O	0	Telephone Cable	A	NW	King	05/04/1983		QWEST CORPORATION
516 Mainline	12.35	12.35	0000013183	UP	O	0	Water Line	A	NW	King	03/03/1988		COVINGTON WATER DISTRICT
516 Mainline	12.35	12.35	K4113	UP	O	0	Telephone Cable	A	NW	King	12/27/1978		U S WEST COMMUNICATIONS. INC.
516 Mainline	12.35	12.36	0000010902	UP	O	0	Water Line	A	NW	King	05/19/1983		CITY OF KENT
516 Mainline	12.35	12.60	0000013142	AC	O	0	Residential Approach	A	NW	King	06/01/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	12.36	12.36	0000012922	UP	O	0	Sanitary Sewer Line	A	NW	King	10/14/1987		CASCADE SEWER DISTRICT
516 Mainline	12.40	12.40	K4413	UP	O	0	Power Cable	A	NW	King	04/01/1980		PUGET SOUND ENERGY - merge
516 Mainline	12.43	12.75	0000018994	UP	O	0	Miscellanous	A	NW	King	06/09/2008		Qwest Corporation
516 Mainline	12.43	12.75	0000019032	UP	O	0	Telephone Cable	A	NW	King	11/18/2008		Qwest Corporation
516 Mainline	12.43	13.20	06337	UF	O	16	Telephone Cable	A	NW	King	07/16/2001	04/25/2005	QWEST CORPORATION
516 Mainline	12.45	12.45	0000015384	AC	O	0	Commercial Approach	A	NW	King			MULTICARE
516 Mainline	12.45	12.45 UC	2973	UN	O	0	Miscellanous	A	NW	King	02/22/1993		WSDOT TEMP. HOLDER NO.
516 Mainline	12.49	12.49	K3564	UP	O	0	Water Line	A	NW	King	02/18/1976		COVINGTON WATER DISTRICT
516 Mainline	12.55	12.55	0000013485	UP	O	0	Natural Gas Line	A	NW	King	08/29/1988		PUGET SOUND ENERGY
516 Mainline	12.61	12.61	K3705	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY
516 Mainline	12.61	12.61	K3687	UP	O	0	Water Line	A	NW	King	08/13/1976		COVINGTON WATER DISTRICT
516 Mainline	12.64	12.68	0000018960	UP	O	0	Power Cable	A	NW	King	03/14/2008		Puget Sound Energy
516 Mainline	12.66	12.73	0000018992	UP	O	0	Telecommunication Fa	A	NW	King	07/14/2008		Comcast of Washington IV, Inc.
516 Mainline	12.67	12.67	0000010729	AC	O	0	Residential Approach	A	NW	King			LOBBAN, HENRY F.
516 Mainline	12.67	12.73	0000013300	UP	O	0	Power Cable	A	NW	King	05/19/1988		PUGET SOUND ENERGY - merge
516 Mainline	12.73	12.73	0000013301	UP	O	0	Power Cable	A	NW	King	05/09/1988		PUGET SOUND ENERGY - merge
516 Mainline	12.73	12.73	K4237	AC	O	0	Residential Developme	A	NW	King	09/11/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	12.73	12.73	0000015300	UP	O	0	Telephone Cable	A	NW	King	03/06/1992		U S WEST COMMUNICATIONS. INC.
516 Mainline	12.74	12.74	0000015378	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY
516 Mainline	12.74	12.74	0000012806	UP	O	0	Water Line	A	NW	King			COVINGTON WATER DISTRICT
516 Mainline	12.75	12.75	0000015977	UP	O	0	Television Cable	A	NW	King	12/01/1993		TCI CABLEVISION OF WASHINGTON, I

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516 Mainline	12.75	12.76	0000011632	UP	O	0	Power Cable	A	NW	King	11/26/1984		PUGET SOUND ENERGY - merge
516 Mainline	12.76	12.76	0000011639	UP	O	0	Water Line	A	NW	King	11/13/1984		COVINGTON WATER DISTRICT
516 Mainline	12.76	12.76	0000012651	AC	O	0	Commercial Approach	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	12.86	12.86	0000013246	UP	O	0	Water Line	A	NW	King	05/04/1988		COVINGTON WATER DISTRICT
516 Mainline	12.86	15.41	05610	UF	O	4	Power Cable	A	NW	King	11/08/1990	01/21/1999	PUGET SOUND POWER & LIGHT CO.
516 Mainline	12.93	12.93	0000013174	UP	O	0	Water Line	A	NW	King	02/04/1988		COVINGTON WATER DISTRICT
516 Mainline	12.94	12.95	0000014087	UP	O	0	Television Cable	A	NW	King			TCI CABLEVISION OF AUBURN, INC.
516 Mainline	12.94	13.01	0000013590	UP	O	0	Power Cable	A	NW	King			PUGET SOUND ENERGY - merge
516 Mainline	12.97	13.87	05610	UF	O	5	Power Cable	A	NW	King	09/21/1993	01/21/1999	PUGET SOUND POWER & LIGHT CO.
516 Mainline	12.98	13.01	0000013853	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	12.98	13.01	0000014693	AC	O	0	Residential Approach	A	NW	King	01/14/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	13.02	13.02	0000014729	AC	O	0	Residential Approach	A	NW	King	03/11/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	13.02	13.02	0000016908	UP	O	0	Natural Gas Line	A	NW	Kitsap	01/08/1997		WASHINGTON NATURAL GAS CO.
516 Mainline	13.02	13.02	0000015018	AC	O	0	Residential Developme	A	NW	King	02/03/1999		R.G. STEWARD HOMES INC.
516 Mainline	13.04	13.04	K4151	AC	O	0	Logging Approach	A	NW	King	02/14/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	13.04	13.04	0000013866	UP	O	0	Water Line	A	NW	King	05/08/1989		COVINGTON WATER DISTRICT
516 Mainline	13.05	13.05	EN-S-2048	AC	O	0	Residential Developme	A	NW	King	08/12/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	13.06	13.06	0000014017	UP	O	0	Natural Gas Line	A	NW	King	05/07/1990		PUGET SOUND ENERGY
516 Mainline	13.09	13.09	K4539	UP	O	0	Water Line	A	NW	King	12/11/1980		COVINGTON WATER DISTRICT
516 Mainline	13.11	13.11	UC 2645	UN	O	0	Miscellanous	A	NW	King	02/17/1989		WSDOT TEMP. HOLDER NO.
516 Mainline	13.11	13.11	EN3282	UP	O	0	Power Cable	A	NW	King	11/03/1972		PUGET SOUND ENERGY - merge
516 Mainline	13.11	13.16	0000018868	UP	O	0	Power Cable	A	NW	King	08/20/2007		Puget Sound Energy
516 Mainline	13.11	13.23	05062	UF	O	2	Natural Gas Line	A	NW	King	12/05/1991	08/18/1994	WASHINGTON NATURAL GAS CO.
516 Mainline	13.11	13.23	10115	UF	O	0	Sanitary Sewer Line	A	NW	King	11/14/1990	11/14/2015	CITY OF BLACK DIAMOND
516 Mainline	13.12	13.12	10268	UF	C	3	Natural Gas Line	A	NW	King	04/07/2008	07/30/2024	Puget Sound Energy
516 Mainline	13.13	15.86	04001	UF	O	0	Water Line	I	NW	King	08/19/1968	08/19/1993	COVINGTON WATER DISTRICT
516 Mainline	13.14	13.62	06337	UF	O	9	Telephone Cable	A	NW	King	09/24/1990	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	13.17	13.17	0000017513	UP	O	0	Natural Gas Line	A	NW	King	09/09/1999		PUGET SOUND ENERGY - merge
516 Mainline	13.17	16.22	05062	UF	O	0	Natural Gas Line	A	NW	King	08/18/1969	08/18/1994	WASHINGTON NATURAL GAS CO.
516 Mainline	13.18	13.18	0000012270	UP	O	0	Water Line	A	NW	King	04/29/1986		COVINGTON WATER DISTRICT
516 Mainline	13.20	13.20	0000014474	AC	O	0	Residential Approach	A	NW	King	07/12/1990		PUGET SOUND ENERGY
516 Mainline	13.20	14.60	10268	UF	C	1	Natural Gas Line	A	NW	King	06/27/2002	07/30/2024	PUGET SOUND ENERGY - merge
516 Mainline	13.21	13.22	0000015334	UP	O	0	Telephone Cable	A	NW	King	04/22/1992		U S WEST COMMUNICATIONS, INC.
516 Mainline	13.24	13.24	0000011136	UP	O	0	Water Line	A	NW	King	12/02/1983		COVINGTON WATER DISTRICT
516 Mainline	13.28	13.28	EN3328	UP	O	0	Water Line	A	NW	King	03/05/1973		COVINGTON WATER DISTRICT
516 Mainline	13.30	13.31	0000014088	UP	O	0	Television Cable	A	NW	King	10/19/1989		TCI CABLEVISION OF WASHINGTON, I
516 Mainline	13.33	13.33	0000013173	UP	O	0	Water Line	A	NW	King	02/04/1988		COVINGTON WATER DISTRICT
516 Mainline	13.34	13.65	06337	UF	O	3	Telephone Cable	A	NW	King	03/25/1985	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	13.37	13.39	0000011122	UP	O	0	Power Cable	A	NW	King	12/02/1983		PUGET SOUND POWER & LIGHT CO.
516 Mainline	13.37	13.54	06337	UF	O	7	Telephone Cable	A	NW	King	08/30/1989	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	13.39	13.48	05062	UF	O	3	Natural Gas Line	A	NW	King	02/23/1993	08/18/1994	PUGET SOUND ENERGY
516 Mainline	13.40	13.40	EN-S-2273	UP	O	0	Water Line	A	NW	King	07/14/1969		WSDOT TEMP. HOLDER NO.
516 Mainline	13.43	13.43	0000017312	UP	O	0	Water Line	A	NW	King	11/17/1998		COVINGTON WATER DISTRICT
516 Mainline	13.43	13.85	10254	UF	C	2	Television Cable	A	NW	King	12/13/2000		TCI CABLEVISION OF WASHINGTON, I
516 Mainline	13.44	13.44	0000015097	UP	O	0	Natural Gas Line	A	NW	King	09/24/1991		PUGET SOUND ENERGY - merge
516 Mainline	13.45	13.45	0000011676	UP	O	0	Television Cable	A	NW	King	01/02/1985		TCI CABLEVISION OF AUBURN, INC.
516 Mainline	13.46	13.51	0000015282	UP	O	0	Water Line	A	NW	King	03/06/1992		COVINGTON WATER DISTRICT
516 Mainline	13.46	13.51	0000015347	GP	O	0	Commercial Approach	A	NW	King	05/08/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	13.47	13.47	000015066	UP	O	0	Telephone Cable	A	NW	King			U S WEST COMMUNICATIONS, INC.
516 Mainline	13.47	13.47	0000010272	AC	O	0	Residential Approach	A	NW	King			SCOTT, JEFF R.

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Roadway Type	SR	Beg MP	End MP	Doc No	Doc Type	R/C	AMD	Install Type	Status	Region	County	Approval Date	Expiration Date	Holder Name
Mainline	516	13.48	13.48	0000014280	UP	O	0	Water Line	A	NW	King	03/09/1990		COVINGTON WATER DISTRICT
Mainline	516	13.48	13.48	0000014472	UP	O	0	Natural Gas Line	A	NW	King	07/25/1990		PUGET SOUND ENERGY - merge
Mainline	516	13.49	13.49	0000011068	UP	O	0	Power Cable	A	NW	King			PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.50	13.51	0000010614	UP	O	0	Power Cable	A	NW	King	09/20/1982		PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.51	13.51	0000010259	UP	O	0	Water Line	A	NW	King	11/03/1981		COVINGTON WATER DISTRICT
Mainline	516	13.51	13.51	0000010177	AC	O	0	Residential Approach	A	NW	King			HEUPEL, CALVIN
Mainline	516	13.53	13.53	0000014371	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY
Mainline	516	13.54	13.57	0000014979	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY
Mainline	516	13.55	13.55	EN3056	UP	O	0	Natural Gas Line	A	NW	King	03/22/1971		PUGET SOUND ENERGY
Mainline	516	13.55	13.57	0000014567	UP	O	0	Power Cable	A	NW	King	08/29/1990		PUGET SOUND ENERGY - merge
Mainline	516	13.57	13.58	0000010156	UP	O	0	Power Cable	A	NW	King	08/17/1981		PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.59	13.59	K4397	UP	O	0	Water Line	A	NW	King	03/11/1980		COVINGTON WATER DISTRICT
Mainline	516	13.60	13.60	K3670	UP	O	0	Power Cable	A	NW	King	07/27/1976		PUGET SOUND ENERGY - merge
Mainline	516	13.63	13.65	0000010346	UP	O	0	Power Cable	A	NW	King	02/19/1982		PUGET SOUND ENERGY - merge
Mainline	516	13.65	13.65	0000010230	UP	O	0	Natural Gas Line	A	NW	King	10/20/1981		WASHINGTON NATURAL GAS CO.
Mainline	516	13.67	13.67	0000010266	UP	O	0	Water Line	A	NW	King	03/05/1984		COVINGTON WATER DISTRICT
Mainline	516	13.67	13.67	UC 2921	UN	O	0	Miscellanous	A	NW	King	04/17/1992		WSDOT TEMP. HOLDER NO.
Mainline	516	13.67	13.67	UC 2942	UN	O	0	Miscellanous	A	NW	King	05/06/1992		WSDOT TEMP. HOLDER NO.
Mainline	516	13.73	13.73	K4063	AC	O	0	Residential Approach	A	NW	King	04/08/1980		WSDOT TEMP. HOLDER NO.
Mainline	516	13.73	13.73	K3697	AC	O	0	Residential Approach	A	NW	King	11/17/1976		WSDOT TEMP. HOLDER NO.
Mainline	516	13.74	15.07	01135	UF	O	0	Power Cable	I	NW	King	11/28/1939	11/28/1989	PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.76	13.76	K4201	UP	O	0	Water Line	A	NW	King	05/25/1979		COVINGTON WATER DISTRICT
Mainline	516	13.77	13.77	000010630	UP	O	0	Water Line	A	NW	King	11/09/1982		COVINGTON WATER DISTRICT
Mainline	516	13.77	13.78	K4261	UP	O	0	Telephone Cable	A	NW	King	08/16/1982		U S WEST COMMUNICATIONS. INC.
Mainline	516	13.78	13.78	0000010403	UP	O	0	Natural Gas Line	A	NW	King			PUGET SOUND ENERGY - merge
Mainline	516	13.80	13.80	K4215	UP	O	0	Water Line	A	NW	King			COVINGTON WATER DISTRICT
Mainline	516	13.85	13.85	K4114	UP	O	0	Natural Gas Line	A	NW	King	11/30/1978		PUGET SOUND ENERGY
Mainline	516	13.85	13.85	06337	UF	O	17	Telephone Cable	I	NW	King			Qwest
Mainline	516	13.85	13.85	0000016329	UP	O	0	Telephone Cable	A	NW	King	08/30/1994		U S WEST COMMUNICATIONS. INC.
Mainline	516	13.85	13.96	10585	UF	O	1	Power Cable	A	NW	King	07/25/2008	06/16/2011	Puget Sound Energy
Mainline	516	13.85	14.41	10585	UF	O	0	Power Cable	A	NW	King	06/16/2006	06/16/2011	Puget Sound Energy
Mainline	516	13.87	13.87	K3986	UP	O	0	Telephone Cable	A	NW	King	05/30/1978		U S WEST COMMUNICATIONS. INC.
Mainline	516	13.89	14.69	05610	UF	O	2	Power Cable	A	NW	King	04/29/1977	01/21/1999	PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.90	13.90	0000018265	UP	O	0	Miscellanous	A	NW	King			
Mainline	516	13.90	16.22	05610	UF	O	1	Power Cable	A	NW	King	05/21/1976	01/21/1999	PUGET SOUND POWER & LIGHT CO.
Mainline	516	13.92	13.95	0000011569	UP	O	0	Power Cable	A	NW	King	10/24/1984		PUGET SOUND ENERGY - merge
Mainline	516	13.93	13.93	K4550	AC	O	0	Residential Approach	A	NW	King	03/02/1981		WSDOT TEMP. HOLDER NO.
Mainline	516	13.94	13.94	0000011483	UP	O	0	Water Line	A	NW	King	08/20/1984		COVINGTON WATER DISTRICT
Mainline	516	13.95	13.95	K4573	AC	O	0	Residential Approach	A	NW	King	03/02/1981		WSDOT TEMP. HOLDER NO.
Mainline	516	13.99	13.99	K4165	AC	O	0	Unknown	A	NW	King	04/06/1979		WSDOT TEMP. HOLDER NO.
Mainline	516	14.00	14.00	K4094	UP	O	0	Power Cable	A	NW	King	12/18/1978		PUGET SOUND ENERGY - merge
Mainline	516	14.00	14.00	K3953	UP	O	0	Water Line	A	NW	King	04/18/1978		COVINGTON WATER DISTRICT
Mainline	516	14.01	14.01	K3992	AC	O	0	Residential Approach	A	NW	King	06/07/1978		WSDOT TEMP. HOLDER NO.
Mainline	516	14.04	14.12	03945	UF	O	0	Water Line	I	NW	King	05/20/1968	05/20/1993	AQUAVISTA WATER CO.
Mainline	516	14.04	14.16	10582	UF	O	0	Telephone Cable	A	NW	King	06/19/2006	06/19/2031	Qwest Communications
Mainline	516	14.05	14.05	K4124	UP	O	0	Water Line	A	NW	King	02/14/1979		COVINGTON WATER DISTRICT
Mainline	516	14.05	14.05	K4433	AC	O	0	Unknown	A	NW	King	07/05/1981		WSDOT TEMP. HOLDER NO.
Mainline	516	14.09	14.09	0000010878	UP	O	0	Water Line	A	NW	King	05/04/1983		COVINGTON WATER DISTRICT
Mainline	516	14.10	14.10	0000015335	UP	O	0	Water Line	A	NW	King	04/16/1992		WSDOT TEMP. HOLDER NO.
Mainline	516	14.11	14.11	0000015200	AC	O	0	Commercial Approach	A	NW	King	01/02/1992		WSDOT TEMP. HOLDER NO.

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516 Mainline	14.12	14.12	K3999	UP	O	0	Water Line	A	NW	King	06/07/1978		WSDOT TEMP. HOLDER NO.
516 Mainline	14.15	14.15	K3530	UP	O	0	Power Cable	A	NW	King	04/03/1975		PUGET SOUND ENERGY - merge
516 Mainline	14.15	14.15	EN-S-2123	AC	O	0	Residential Approach	A	NW	King	08/06/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	14.17	14.17	0000017786	UP	O	0	Water Line	A	NW	King	08/07/2000		COVINGTON WATER DISTRICT
516 Mainline	14.18	14.18	0000015772	AC	O	0	Unknown	A	NW	King			WSDOT TEMP. HOLDER NO.
516 Mainline	14.23	14.23	EN-S-1936	AC	O	0	Residential Developme	A	NW	King	08/15/1967		WSDOT TEMP. HOLDER NO.
516 Mainline	14.25	14.25	0000017958	GP	O	0	Water Line	A	NW	King	05/30/2001		COVINGTON WATER DISTRICT
516 Mainline	14.26	14.31	0000018065	UP	O	0	Miscellanous	A	NW	King			Cornerstone United Church
516 Mainline	14.27	14.27	EN3333	UP	O	0	Water Line	A	NW	King	03/15/1973		COVINGTON WATER DISTRICT
516 Mainline	14.31	14.51	06337	UF	O	12	Telephone Cable	A	NW	King	09/22/1994	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	14.32	14.32	0000010095	UP	O	0	Water Line	A	NW	King	11/09/1982		COVINGTON WATER DISTRICT
516 Mainline	14.32	14.32	EN-S-2295	UP	O	0	Natural Gas Line	A	NW	King	09/30/1969		PUGET SOUND ENERGY
516 Mainline	14.32	14.32	K4432	UP	O	0	Water Line	A	NW	King	06/18/1980		COVINGTON WATER DISTRICT
516 Mainline	14.33	14.33	0000014997	GP	O	0	Unknown	A	NW	King	11/29/1994		WSDOT TEMP. HOLDER NO.
516 Mainline	14.33	14.37	K4336	AC	O	0	Commercial Approach	A	NW	King	06/14/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	14.34	14.34	0000015884	UP	O	0	Natural Gas Line	A	NW	King	08/20/1993		PUGET SOUND ENERGY
516 Mainline	14.35	14.35	K4439	UP	O	0	Power Cable	A	NW	King	05/27/1980		PUGET SOUND ENERGY - merge
516 Mainline	14.36	14.36	0000013852	AC	O	0	Residential Approach	A	NW	King	05/01/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	14.48	14.48	0000015153	GP	O	0	Unknown	A	NW	Unknown	10/30/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	14.50	14.50	0000016440	GP	O	0	Unknown	A	NW	Unknown	12/14/1994		WSDOT TEMP. HOLDER NO.
516 Mainline	14.62	14.62	0000015547	UP	O	0	Storm Sewer Lines	A	NW	King	04/14/1993		Cherokee Bay Community Club
516 Mainline	14.63	14.63	EN-S-2043	AC	O	0	Unknown	A	NW	Unknown	08/06/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	14.63	14.63	0000016313	AC	O	0	Residential Approach	A	NW	King			CHEROKEE BAY COMMUNITY CLUB IN
516 Mainline	14.63	14.63	0000013248	GP	O	0	Unknown	A	NW	Unknown	03/17/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	14.63	14.63	0000014891	GP	O	0	Unknown	A	NW	Unknown	05/14/1991		WSDOT TEMP. HOLDER NO.
516 Mainline	14.63	14.63	0000012363	GP	O	0	Unknown	A	NW	Unknown	07/17/1986		WSDOT TEMP. HOLDER NO.
516 Mainline	14.68	14.68	EN3061	GP	O	0	Unknown	A	NW	Unknown	03/29/1971		WSDOT TEMP. HOLDER NO.
516 Mainline	14.69	14.69	K4091	GP	O	0	Unknown	A	NW	Unknown	11/08/1978		WSDOT TEMP. HOLDER NO.
516 Mainline	14.70	14.72	K4377	GP	O	0	Unknown	A	NW	Unknown	02/01/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	14.75	14.75	K4310	GP	O	0	Unknown	A	NW	Unknown	10/30/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	14.75	14.75	K4175	GP	O	0	Unknown	A	NW	Unknown	04/24/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	14.75	14.75	UC 2976	GP	O	0	Unknown	A	NW	Unknown	04/21/1993		WSDOT TEMP. HOLDER NO.
516 Mainline	14.76	14.76	0000013389	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	14.80	14.80	K4296	GP	O	0	Unknown	A	NW	Unknown	10/03/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	14.81	14.81	0000016332	GP	O	0	Unknown	A	NW	Unknown	09/19/1994		WSDOT TEMP. HOLDER NO.
516 Mainline	14.81	14.81	0000015825	GP	O	0	Unknown	A	NW	Unknown	06/22/1993		WSDOT TEMP. HOLDER NO.
516 Mainline	14.85	14.85	K4300	GP	O	0	Unknown	A	NW	Unknown	10/04/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	14.85	15.85	05396	UF	O	0	Telephone Cable	I	NW	King	12/20/1971	12/20/1996	U S WEST COMMUNICATIONS, INC.
516 Mainline	14.87	14.87	EN-S-2275	GP	O	0	Unknown	A	NW	Unknown	07/25/1969		WSDOT TEMP. HOLDER NO.
516 Mainline	14.88	14.88	0000013192	GP	O	0	Unknown	A	NW	Unknown	05/09/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	15.00	15.00	EN-S-2020	GP	O	0	Unknown	A	NW	Unknown	04/05/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	15.01	15.01	K4226	GP	O	0	Unknown	A	NW	Unknown	08/09/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	15.01	15.01	K4187	GP	O	0	Unknown	A	NW	Unknown	05/10/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	15.01	15.04	K4542	GP	O	0	Unknown	A	NW	Unknown	01/05/1981		WSDOT TEMP. HOLDER NO.
516 Mainline	15.03	15.03	K4363	GP	O	0	Unknown	A	NW	Unknown	01/04/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	15.03	15.03	0000015548	UP	O	0	Storm Sewer Lines	A	NW	King	04/14/1993		Cherokee Bay Community Club
516 Mainline	15.04	15.04	K4164	GP	O	0	Unknown	A	NW	Unknown	04/17/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	15.04	15.04	0000011391	AC	O	0	Commercial Approach	A	NW	Unknown			GRADDON CONSULTING & LAND DEVE
516 Mainline	15.05	15.05	K4379	GP	O	0	Unknown	A	NW	Unknown	02/13/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	15.06	15.06	K4416	GP	O	0	Unknown	A	NW	Unknown	04/03/1980		WSDOT TEMP. HOLDER NO.

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516 Mainline	15.06	15.07	0000015501	GP	O	0	Unknown	A	NW	Unknown	08/19/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	15.07	15.07	0000010927	GP	O	0	Unknown	A	NW	Unknown			LEE, CHI HONG
516 Mainline	15.08	15.08	0000010912	UP	O	0	Water Line	A	NW	King	07/05/1983		COVINGTON WATER DISTRICT
516 Mainline	15.08	15.08	K3610	GP	O	0	Unknown	A	NW	Unknown	02/02/1976		WSDOT TEMP. HOLDER NO.
516 Mainline	15.08	15.32	06337	UF	O	6	Telephone Cable	A	NW	King	10/24/1988	04/25/2004	U S WEST COMMUNICATIONS, INC.
516 Mainline	15.10	15.10	0000014455	GP	O	0	Unknown	A	NW	Unknown	06/13/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	15.10	15.10	EN-S-1969	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.10	15.10	EN-S-2164	GP	O	0	Unknown	A	NW	Unknown	11/19/1968		WSDOT TEMP. HOLDER NO.
516 Mainline	15.10	15.28	02811	UF	O	0	Water Line	I	NW	King	10/22/1958	10/22/1983	CITY OF KENT
516 Mainline	15.10	16.19	06022	UF	O	1	Water Line	I	NW	King	09/13/1982	12/16/2002	COVINGTON WATER DISTRICT
516 Mainline	15.11	15.11	EN-S-2271	GP	O	0	Unknown	A	NW	Unknown	07/17/1969		WSDOT TEMP. HOLDER NO.
516 Mainline	15.11	15.22	10052	UF	O	0	Sanitary Sewer Line	A	NW	King	06/06/1988	06/06/2013	SOOS CREEK WATER AND SEWER DIS
516 Mainline	15.11	15.38	10052	UF	O	3	Sanitary Sewer Line	A	NW	Unknown	01/06/1997	06/06/2013	SOOS CREEK WATER AND SEWER DIS
516 Mainline	15.12	15.38	UC 2566	GP	O	0	Unknown	A	NW	Unknown	09/09/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	15.13	15.22	10052	UF	O	2	Sanitary Sewer Line	A	NW	King	09/24/1991	06/05/2013	SOOS CREEK WATER AND SEWER DIS
516 Mainline	15.14	15.23	0000015203	GP	O	0	Unknown	A	NW	Unknown	01/28/1992		WSDOT TEMP. HOLDER NO.
516 Mainline	15.21	15.21	0000016663	GP	O	0	Unknown	A	NW	Unknown	11/06/1995		WSDOT TEMP. HOLDER NO.
516 Mainline	15.21	15.21	0000016885	GP	O	0	Unknown	A	NW	Unknown	11/04/1996		WSDOT TEMP. HOLDER NO.
516 Mainline	15.24	15.24	0000013178	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.25	15.25	EN3326	GP	O	0	Residential Approach	A	NW	King	03/05/1973		WILLIAMSON, MURRAY
516 Mainline	15.36	15.36	0000016982	UP	O	0	Natural Gas Line	A	NW	King	05/16/1997		WASHINGTON NATURAL GAS CO.
516 Mainline	15.37	15.86	06337	UF	O	13	Telephone Cable	A	NW	King	11/09/1994	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	15.38	15.38	0000010190	AC	O	0	Commercial Approach	A	NW	King	08/12/1981		SOUSHEK, ERAL
516 Mainline	15.38	15.38	0000013177	GP	O	0	Unknown	A	NW	Unknown	03/03/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	15.38	15.38	0000013321	GP	O	0	Unknown	A	NW	Unknown	06/02/1988		WSDOT TEMP. HOLDER NO.
516 Mainline	15.38	15.38	0000014454	GP	O	0	Unknown	A	NW	Unknown	05/23/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	15.38	15.38	UC 2825	GP	O	0	Unknown	A	NW	Unknown	06/27/1990		WSDOT TEMP. HOLDER NO.
516 Mainline	15.38	15.38	0000018565	UP	O	0	Power Cable	A	NW	King			Puget Sound Energy
516 Mainline	15.38	15.38	K3636	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.38	15.38	K3754	GP	O	0	Unknown	A	NW	Unknown	03/10/1977		WSDOT TEMP. HOLDER NO.
516 Mainline	15.46	15.46	K4116	GP	O	0	Unknown	A	NW	Unknown	12/28/1978		WSDOT TEMP. HOLDER NO.
516 Mainline	15.46	15.46	0000010243	UP	O	0	Telephone Cable	A	NW	King	10/21/1981		U S WEST COMMUNICATIONS, INC.
516 Mainline	15.54	15.54	EN3264	UP	O	0	Water Line	A	NW	King			HIGHLINE WATER DISTRICT
516 Mainline	15.60	15.60	K3540	GP	O	0	Unknown	A	NW	Unknown	05/15/1975		WSDOT TEMP. HOLDER NO.
516 Mainline	15.63	15.63	K3792	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.63	15.63	K4169	GP	O	0	Unknown	A	NW	Unknown	05/17/1979		WSDOT TEMP. HOLDER NO.
516 Mainline	15.63	15.63	K4312	GP	O	0	Unknown	A	NW	Unknown	01/30/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	15.73	15.73	0000010031	UP	O	0	Water Line	A	NW	King	12/15/1981		COVINGTON WATER DISTRICT
516 Mainline	15.74	15.74	K4227	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.75	15.75	0000010201	UP	O	0	Telephone Cable	A	NW	King	09/30/1981		U S WEST COMMUNICATIONS, INC.
516 Mainline	15.77	15.77	K3856	GP	O	0	Unknown	A	NW	Unknown	09/06/1977		WSDOT TEMP. HOLDER NO.
516 Mainline	15.82	15.82	EN-S-2190	GP	O	0	Unknown	A	NW	Unknown	01/06/1969		WSDOT TEMP. HOLDER NO.
516 Mainline	15.85	16.22	06337	UF	O	14	Telephone Cable	A	NW	King	05/04/1995	04/25/2005	U S WEST COMMUNICATIONS, INC.
516 Mainline	15.85	16.22	05230	UF	O	0	Telephone Cable	I	NW	King	07/20/1970	07/20/1995	U S WEST COMMUNICATIONS, INC.
516 Mainline	15.86	15.86	0000015786	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516 Mainline	15.86	16.21	06022	UF	O	0	Water Line	I	NW	King	12/16/1977	12/16/2002	COVINGTON WATER DISTRICT
516 Mainline	15.87	15.87	0000016766	GP	O	0	Unknown	A	NW	Unknown	04/29/1996		WSDOT TEMP. HOLDER NO.
516 Mainline	15.87	16.15	05062	UF	O	1	Natural Gas Line	A	NW	King	04/19/1988	08/18/1994	WASHINGTON NATURAL GAS CO.
516 Mainline	15.88	15.88	K4444	GP	O	0	Unknown	A	NW	Unknown	10/01/1980		WSDOT TEMP. HOLDER NO.
516 Mainline	16.05	16.05	0000015848	GP	O	0	Unknown	A	NW	Unknown	07/12/1993		WSDOT TEMP. HOLDER NO.

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516	Mainline	16.05	16.05	0000016166	UP	O	0	Natural Gas Line	A	NW	King	04/19/1994		WSDOT TEMP. HOLDER NO.
516	Mainline	16.07	16.07	0000015787	GP	O	0	Unknown	A	NW	Unknown	08/06/1993		WSDOT TEMP. HOLDER NO.
516	Mainline	16.09	16.09	0000014334	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	16.11	16.11	0000012865	GP	O	0	Unknown	A	NW	Unknown			WSDOT TEMP. HOLDER NO.
516	Mainline	16.11	16.11	0000010322	AC	O	0	Commercial Approach	A	NW	King			JOHNSON, KARL G.
516	Mainline	16.13	16.13	0000011559	GP	O	0	Unknown	A	NW	Unknown	10/11/1984		WSDOT TEMP. HOLDER NO.
516	Mainline	16.14	16.15	0000011517	GP	O	0	Unknown	A	NW	Unknown	10/11/1984		WSDOT TEMP. HOLDER NO.
516	Mainline	16.15	16.15	0000011336	UP	O	0	Water Line	A	NW	King	05/14/1984		COVINGTON WATER DISTRICT
516	Mainline	16.15	16.15	0000013238	GP	O	0	Unknown	A	NW	Unknown	03/22/1988		WSDOT TEMP. HOLDER NO.
516	Mainline	16.16	16.16	K4162	GP	O	0	Unknown	A	NW	Unknown	04/17/1979		WSDOT TEMP. HOLDER NO.
516	Mainline	16.18	16.18	K4121	GP	O	0	Unknown	A	NW	Unknown	02/05/1979		WSDOT TEMP. HOLDER NO.
516	Mainline	16.18	16.21	0000012274	GP	O	0	Unknown	A	NW	Unknown	05/30/1986		WSDOT TEMP. HOLDER NO.
516	Mainline	16.19	16.19	0000010530	AC	O	0	Commercial Approach	A	NW	King	08/10/1982		SAFEWAY STORES
516	Mainline	16.19	16.19	K3913	GP	O	0	Unknown	A	NW	Unknown	01/05/1978		WSDOT TEMP. HOLDER NO.
516	Mainline	16.20	16.20	K4078	GP	O	0	Unknown	A	NW	Unknown	10/12/1978		WSDOT TEMP. HOLDER NO.
516	Mainline	16.20	16.20	0000011334	UP	O	0	Water Line	A	NW	King	05/14/1984		COVINGTON WATER DISTRICT

Appendix D - Traffic Analysis

SR 516 Corridor Study

Transportation Analysis: Methodologies, Assumptions, and Outcomes

Submitted by:
Traffic & Toll Modeling Group
WSDOT Urban Planning Office

401 Second Avenue S. Suite 300
Seattle, WA 98104

February, 2012

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EXECUTIVE SUMMARY

This chapter provides the description of technical analysis, results and draft recommendations for SR 516 corridor improvements. The project team used the Puget Sound Regional Council's (PSRC) regional travel demand model (EMME software) and the VISUM models from the cities of Kent and Maple Valley for forecasting travel demand. The team used SYNCHRO software and Highway Capacity Software (HCS) tools based on Highway Capacity Manual for detailed traffic analyses. All analyses focused on the AM and PM peak hours of existing condition (2009) and three future year conditions (2016, 2022 and 2030). Based upon this analysis, of 26 signalized intersections studied, 13 would operate below LOS E in 2030. Conceptual solutions identified for these intersections were estimated to cost between $39 and $51 million (2011 dollars). The recommendation and assumed application of specific Transportation Demand Management (TDM) techniques resulted in a reduction of 5% of the 2030 peak demand and reduced the number of intersections listed as being deficient in the 20 year timeframe to eight. The project team proposes widening of the roadway segment between Jenkins Creek and 216th Avenue SE by adding a lane in each direction at an estimated cost of $31 million to $42 million (2011 dollars). Intersection improvements are also recommended at the eight intersections operating below LOS E within the 20 year planning horizon.

INTRODUCTION

WSDOT worked with local agencies and communities in south-east King County on a transportation corridor study along a segment of SR 516 between the cities of Kent and Maple Valley. This effort has resulted in a plan that includes a list of short and long-term recommendations addressing mobility and safety needs along this corridor. This report documents the analysis, the geographic limits of the study area, forecasting and modeling methodologies, traffic analysis methods, and the performance measures used in the analysis.

Project Description

The SR 516 corridor study area is 11.7 miles in length between SR 181 (SR MP 4.52/ ARM 4.79) and SR 169 (SR MP 16.22/ARM 16.49). This portion of the corridor runs through the cities of Kent, Covington, King County and Maple Valley in south King County. The corridor serves urban and suburban areas with a multitude of land uses including: Central Business Districts, strip developments, gated communities, single family and multi-family homes, grocery stores, retail businesses, and fast food restaurants. WSDOT Urban Planning Office Staff (i.e., the project team) conducted this

study under the guidance and direction of the corridor working group (CWG) representing the local agencies along the corridor.

Goals and Objectives

The WSDOT project team conducted this technical analysis in order:

- to Identify mobility needs along the corridor;
- to develop conceptual solutions to the identified near term mobility needs (if any);
- to identify where safety needs (if any) exist; and
- to perform an evaluation of railroad crossing impacts on the performance of the SR 516 corridor.

Study Area

The study covers the portion of SR 516 corridor from SR 181 on the west end (Kent) to SR 169 in Maple Valley on the east end as shown in **Exhibit 1**. This corridor segment goes through the cities of Kent, Covington and Maple Valley. The analysis focuses on the travelled way in general, the at-grade railroad crossing in the vicinity of SR 167/SR181/SR516, and a total of 26 signalized intersections within the study area.

In this study the SR 516 corridor between SR 181 and SR 169 has been divided into six segments as shown in **Exhibit 2**. The segments are:

- West of SR 181 to Jason Avenue N,
- Jason Avenue N to 101st Avenue SE,
- 101st Avenue SE to Kent/Covington City Limit,
- Kent/Covington City Limit to Jenkins Creek,
- Jenkins Creek to 216th Avenue SE, and
- 216th Avenue SE to SR 169.

Exhibit 1: SR 516 Study Area

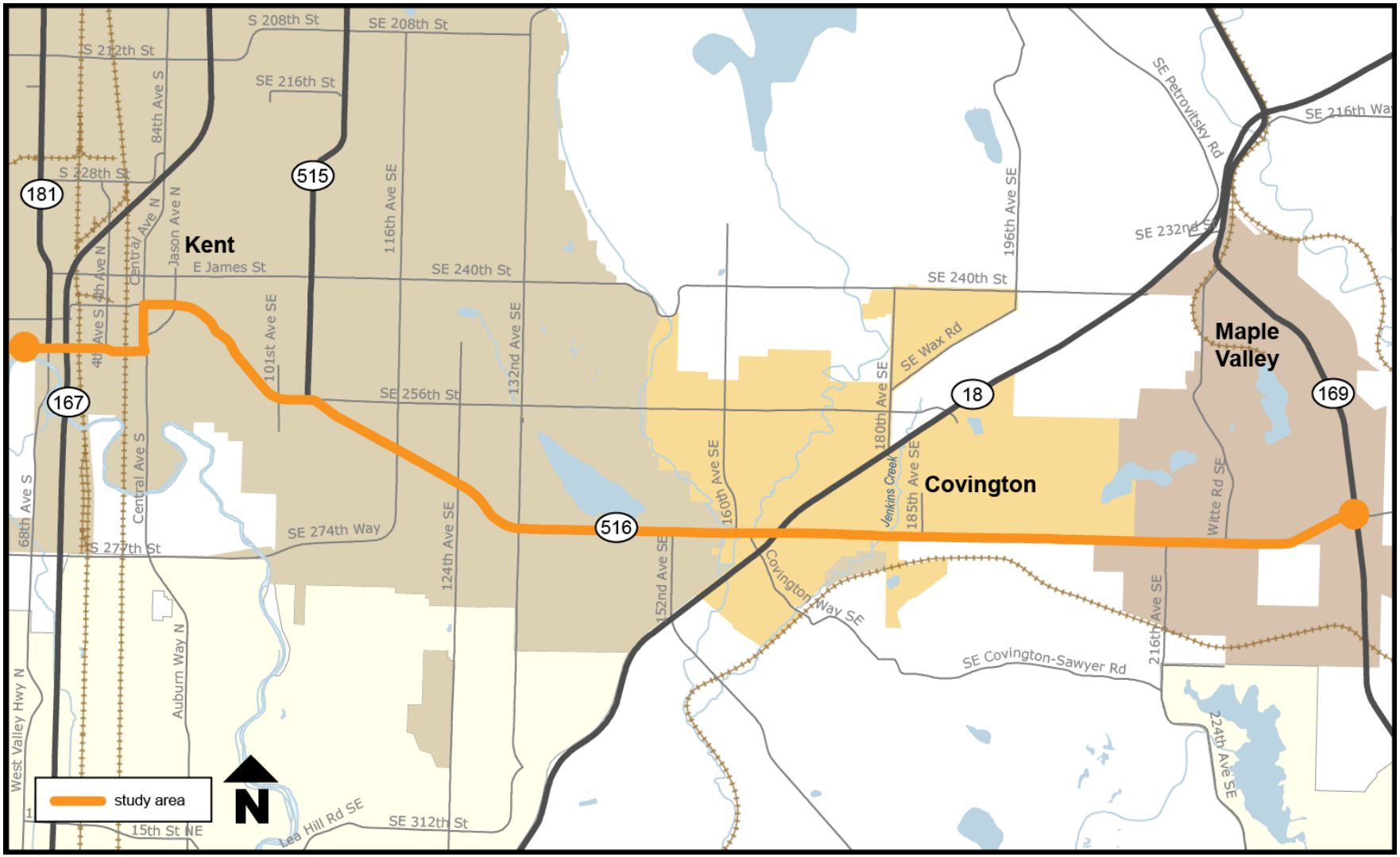
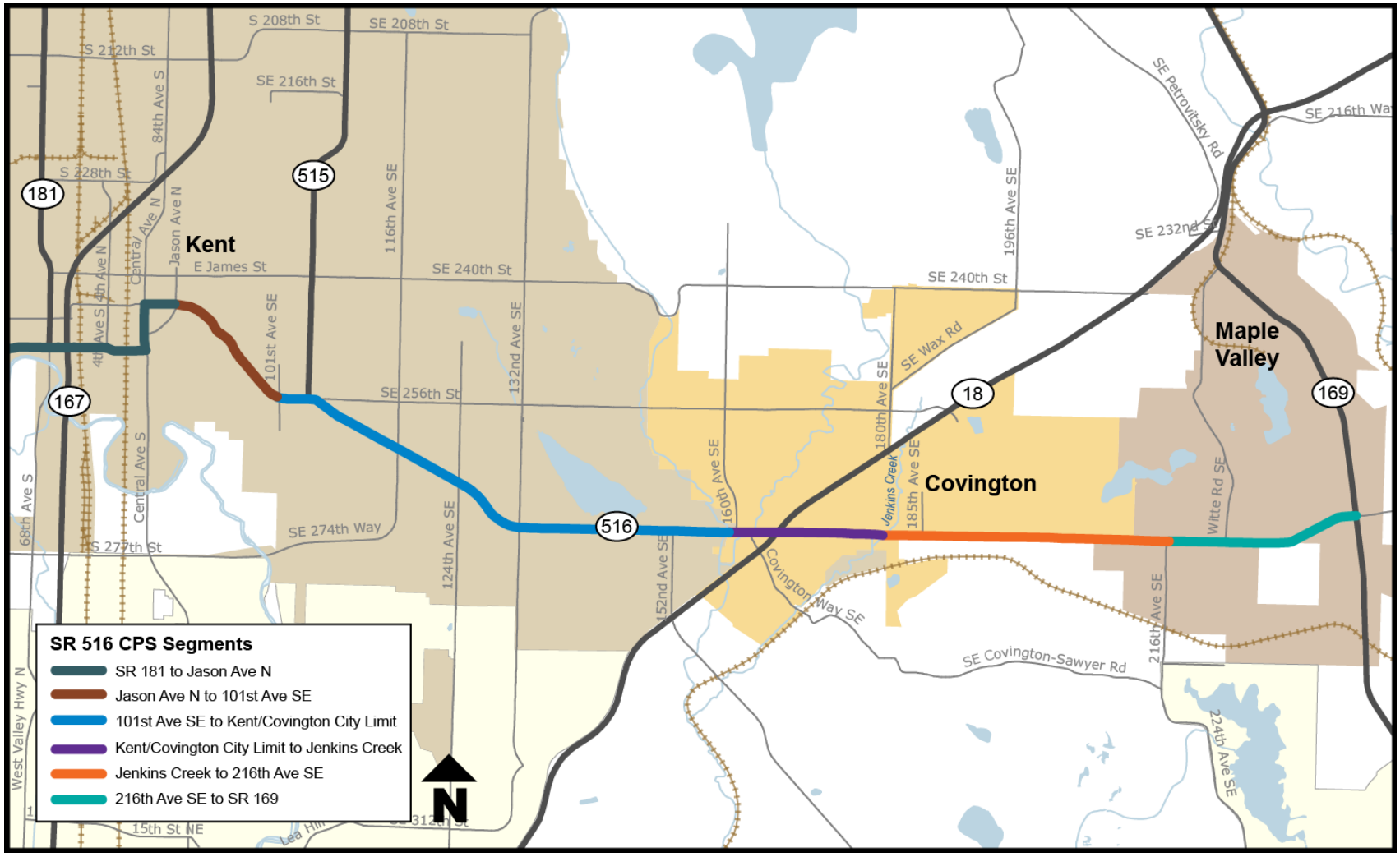


Exhibit 2: SR 516 Corridor Segments



MODEL DEVELOPMENT / METHODOLOGY

Analysis Years and Time Periods

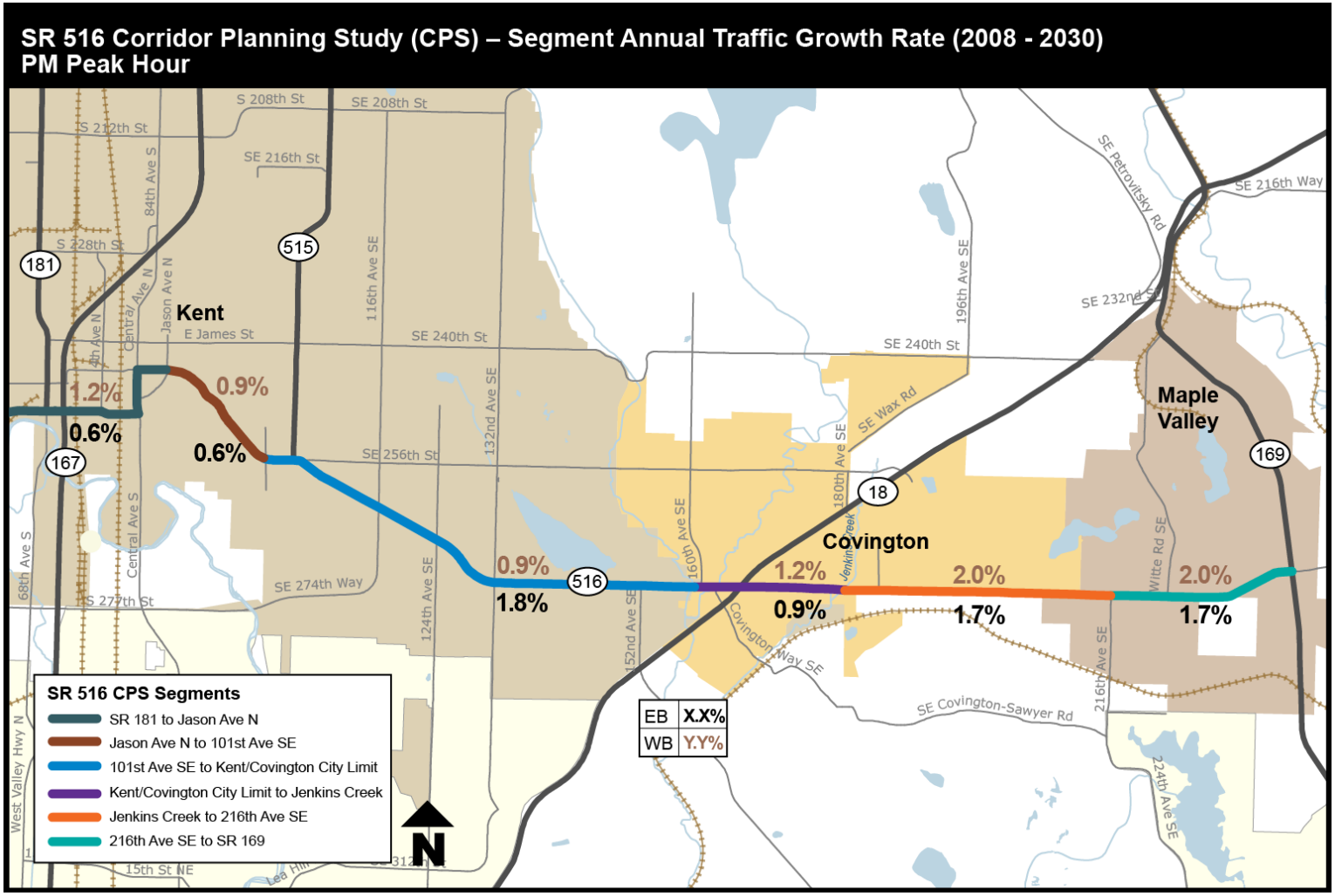
The study team performed traffic analyses for existing condition (2009) and three future year conditions (2016, 2022 and 2030). All analyses are focused on the AM and PM peak demand hours.

Model Used/Growth Assumption

The project team used the PSRC's regional travel demand model (in EMME software) along with the Kent and Maple Valley models (in VISUM software) from the cities of Kent and Maple Valley for forecasting travel demand. The team used these models primarily to forecast traffic growth for the intersections and roadway segments along this corridor. The future year road networks were constrained to only include funded projects. The growth rate by direction for six segments is shown in **Exhibit 3**.

Between the period of 2008 and 2030, PM peak hour demand grows as high as 1.8% annually in the eastbound direction of SR 516 in Kent. Covington and Maple Valley segments in the eastbound direction show relatively high growth (1.7% annually). In the westbound direction, the highest growth (2% annually) is forecasted for the segment in Covington and Maple Valley.

Exhibit 3: Traffic Growth Rate along the Corridor (2008-2030 PM Peak Hour)



In this study the team analyzed both the AM and PM peak hours to identify needs (if any) in both morning and evening periods of high demand. The team used the PSRC model to arrive at AM growth factors. The project team used SYNCHRO and SIMTRAFFIC simulation modeling software packages to analyze the intersections, and the Highway Capacity Manual (HCM) methodologies to analyze the roadway segments.

Origin and Destination of Trips

This corridor plays an important role in the lives of the communities and people living along the corridor. The major north-south routes intersecting SR 516 are State Routes 181, 167, 18 and 169, with no other east-west arterials connecting them in the study area. The corridor is predominantly used for local accesses with very few trips traveling all the way through.

The team conducted an origin-destination study of vehicular trips for a number of locations on SR 516. The team performed select-link analysis using the PSRC's regional travel demand model. This study included only 2030 PM peak demand hour. For a location on SR 516 just east of SR 167, about 72% of trips come from I-5 and SR 509, and 28% comes from north and south on SR 167. For the same location, about 70% of trips end in Kent and the rest end in south Kent and Auburn.

At the intersection of SR 516 and SR 515, 60% trips come from within Kent and 40% comes from north via SR 167, SR 181, I-5 and SR 99. 70% of trips that passes through this location end in Kent, whereas remaining 30% go to Black Diamond and south-east King County. **APPENDIX A** of this traffic analysis report shows origin and destination of trips traveling on SR 516 for a number of locations.

TRAFFIC ANALYSIS

The project team conducted traffic analysis for existing and 2030 future conditions. The following sections provide an overview of this analysis.

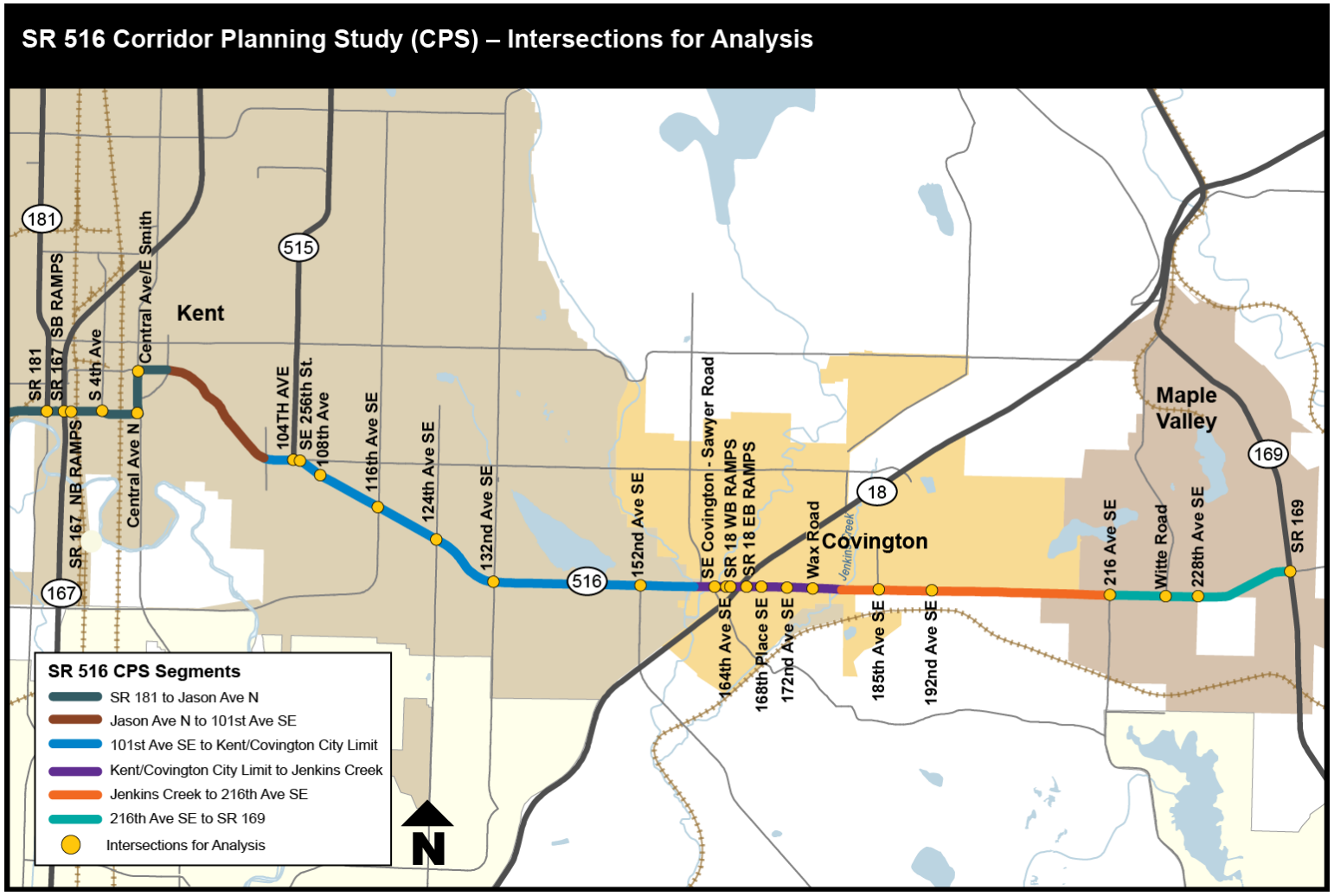
Existing Condition

The project team carried out an existing conditions analysis for the SR 516 corridor for AM and PM peak hour conditions to identify current safety and mobility needs along the corridor within study limits. This includes field observation and data collection at railroad crossing, calculation of intersection level of service (LOS), and calculation of corridor level LOS and travel time for all segments on the corridor. In addition, the team conducted a collision analysis to identify if and where safety problems may exist.

Intersection LOS

The project team analyzed 26 intersections along the corridor. These intersections are shown in **Exhibit 4**. All of these are signalized intersections.

Exhibit 4 : Major Intersections along the Corridor



AM Peak Hour

All intersections studied operate at LOS D or better during AM peak hour of operation (see **APPENDIX B** of this traffic analysis report for details). Other than the Union Pacific Rail Road (UPRR) crossing impacts on the intersections near the SR 167 interchange, all the intersections on SR 516 between SR 181 and Central Avenue N operate at LOS D or better in existing conditions. This is consistent with the results obtained from the SYNCHRO model developed by the City of Kent.

PM Peak Hour

Most intersections operate at or above LOS D during PM peak hour in existing condition with only three intersections operating at LOS E and one operating at LOS F. The intersections operating at LOS E or LOS F include:

SR 516 and 104th Avenue SE (LOS E)
SR 516 and 172nd Avenue SE (LOS E)
SR 516 and SR 169 (LOS E)
SR 516 and SE Wax Rd (LOS F)

Except the intersections in the vicinity of the railroad crossing, all of the intersections on SR 516 between SR 181 and Central Avenue N operate at LOS D or better during the PM peak hour in existing condition. These results are consistent with the results of SYNCHRO model from the City of Kent.

Segment Travel Speed

WSDOT uses a threshold target of 70% for the ratio of operating speed to the posted speed in order to identify roadway segments that may need more analysis and/or improvements. For the purpose of performing a 70% speed study, WSDOT used ARTPLAN of HCS 2000 (version 5.3) that implements the procedures defined in the 2000 Highway Capacity Manual (HCM 2000). The inputs for this analysis include roadway classification; geometric information of segments including number of lanes, segment length and left turn channelization; free flow speed; annual average daily traffic (AADT); directional distribution; saturation flow rate; peak hour factor; and other information.

The segment analysis reflects speed on the roadway segments only and does not account for delay incurred due to intersection operations. To calculate speed ratio, average travel speed for a segment is divided by the free flow/posted speed for the same segment. The calculated speed ratio is then compared against the 70% speed threshold to identify needs of a segment.

AM Peak Hour

The project team calculated the speed ratio for both directions of the roadway. The speed ratio of existing operating condition is presented in **Exhibit 5**. The posted speed limits on these segments vary from 30 to 50 mph.

During the AM peak hour operation in existing condition, three segments fall below the 70% speed threshold. These segments are:

- SR 181 to Jason Avenue N,
- 101st Avenue SE to Kent/Covington City Limit, and
- Kent/Covington City Limit to Jenkins Creek.

PM Peak Hour

The speed ratio of existing PM peak hour operating condition is presented in **Exhibit 6**. Like AM peak hour analysis, the project team calculated speed ratios by direction.

During PM peak hour operation in existing condition, the same three segments as in AM peak hour operation fall below the 70% speed threshold.

- SR 181 to Jason Avenue N,
- 101st Avenue SE to Kent/Covington City Limit, and
- Kent/Covington City Limit to Jenkins Creek.

Exhibit 5: Ratio of Operating Speed to Posted Speed (AM Peak Hour)

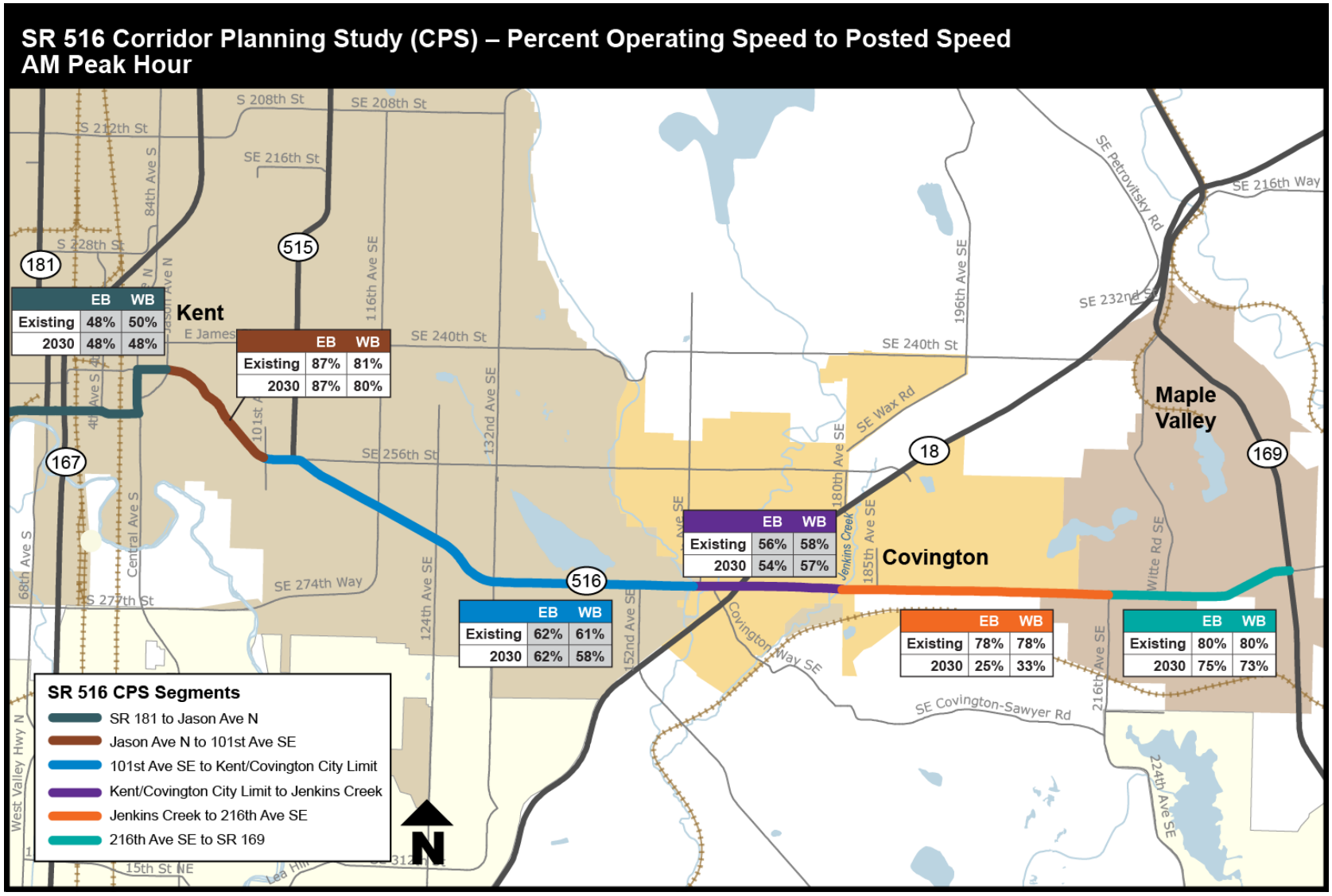
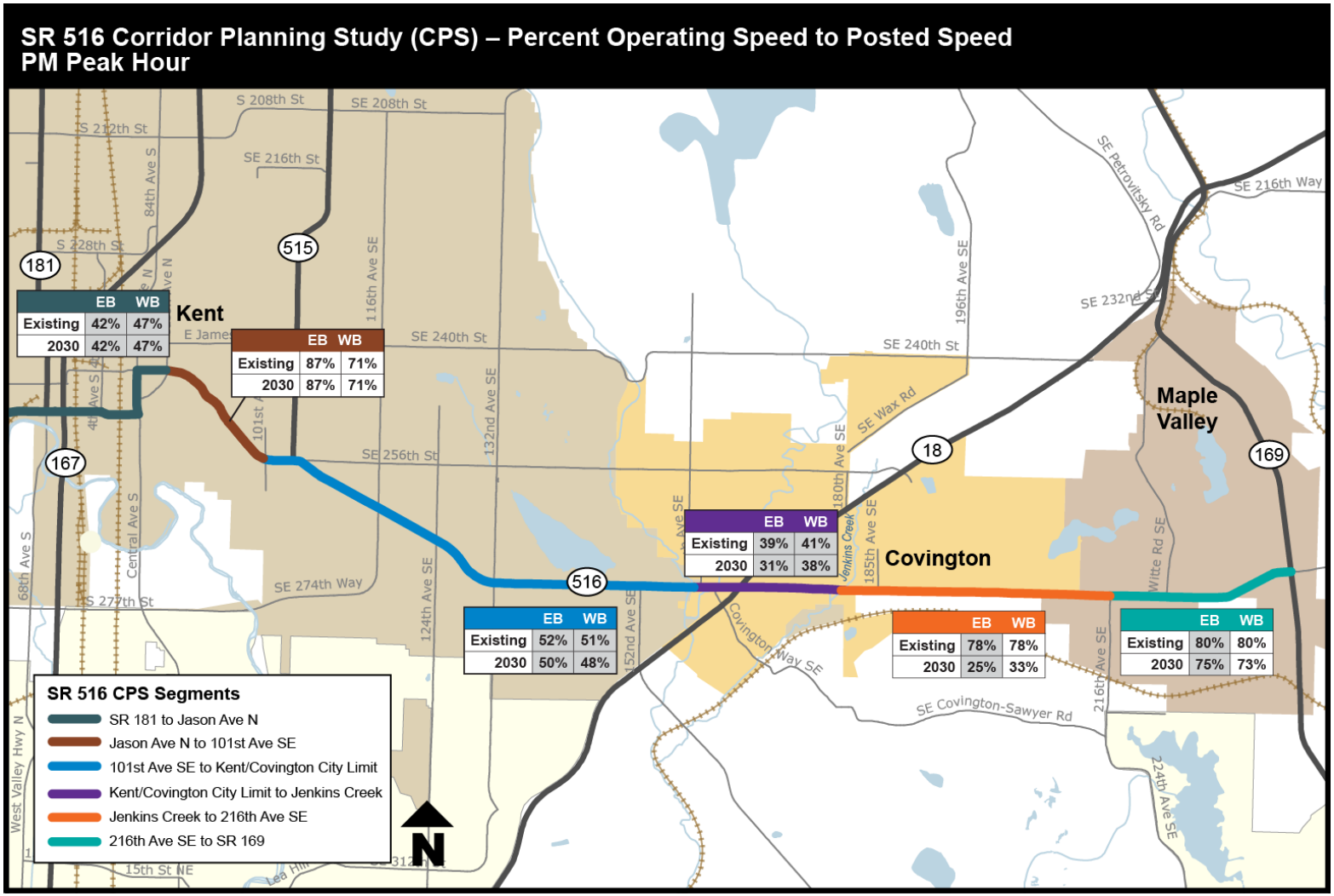


Exhibit 6: Ratio of Operating Speed to Posted Speed (PM Peak Hour)



Railroad Crossing Analysis

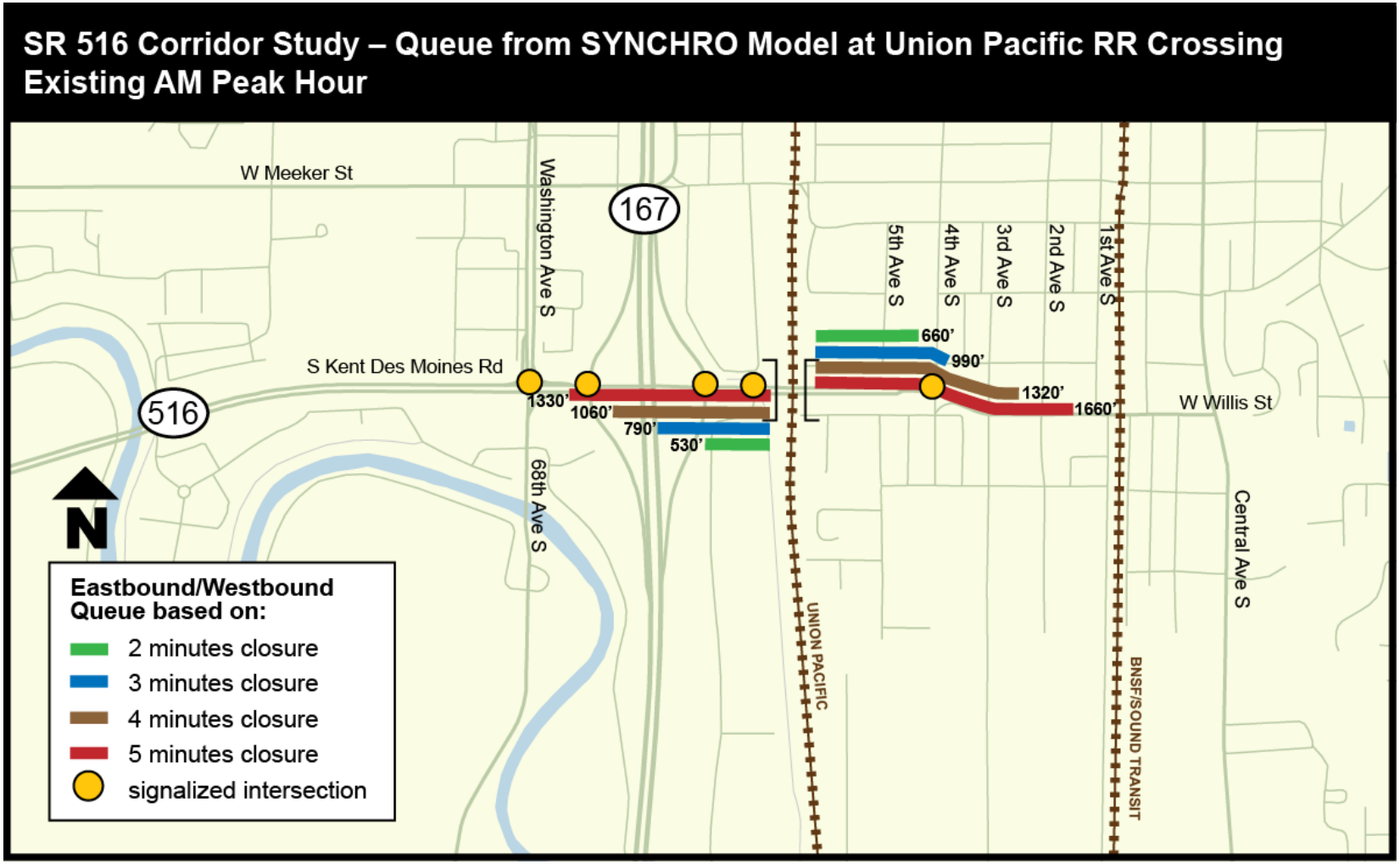
Field observation is one of the best methods of assessing railroad crossing roadway impacts. Another way to analyze railroad crossing is using a traffic micro-simulation modeling tool such as VISSIM. Since VISSIM modeling is a data-intensive, time consuming, and expensive approach, the project team resorted to a more inexpensive and faster alternative, in order to stay within a relatively small budget for the project. The project team used the traffic analysis tool SYNCHRO to analyze railroad crossing impacts on roadway traffic. The needed inputs for the analysis include segment length, number of lanes, left turn channelization, turning movement counts, speed, number of train crossings during the peak hour, and a peak hour factor.

In developing the traffic model using SYNCHRO, the WSDOT project team assumes the railroad crossing operates as a pre-timed signalized intersection with signal turning red during train crossing. However, due to the software limitations the team had to make several simplifying assumptions including a 15 minutes cycle length and different green time for different length of trains.

AM Peak Hour

The number of trains crossing SR 516 was based on a sample data received from the city of Kent for May, 2010. The data reveals that, on an average, one train crosses SR 516 during AM peak hour. Trains are of various lengths and run at different speeds. To capture impacts of trains with various lengths and speeds, the project team assumed a railroad gate closure for 2, 3, 4, and 5 minutes. For each of these closure durations, the project team developed a model to estimate traffic queue length and travel time. Exhibit 7 shows traffic queue lengths obtained from this modeling effort.

Exhibit 7: Traffic Queue at Union Pacific Railroad Crossing (AM Peak Hour)



Modeling data indicates that the traffic queue in existing AM peak hour of operation extends on eastbound direction from about 500 feet (west of NB SR 167 ramp intersection) to over 1,300 feet (west of NB SR 167 ramp intersection).

During existing AM peak hour, the average eastbound travel time from SR 181 to Central Avenue S increases up to 1.3 minutes per vehicle for the worst case scenario with five minutes closure time (**Exhibit 8**). Westbound traffic experiences little more than one minute of delay per vehicle for the five minutes closure.

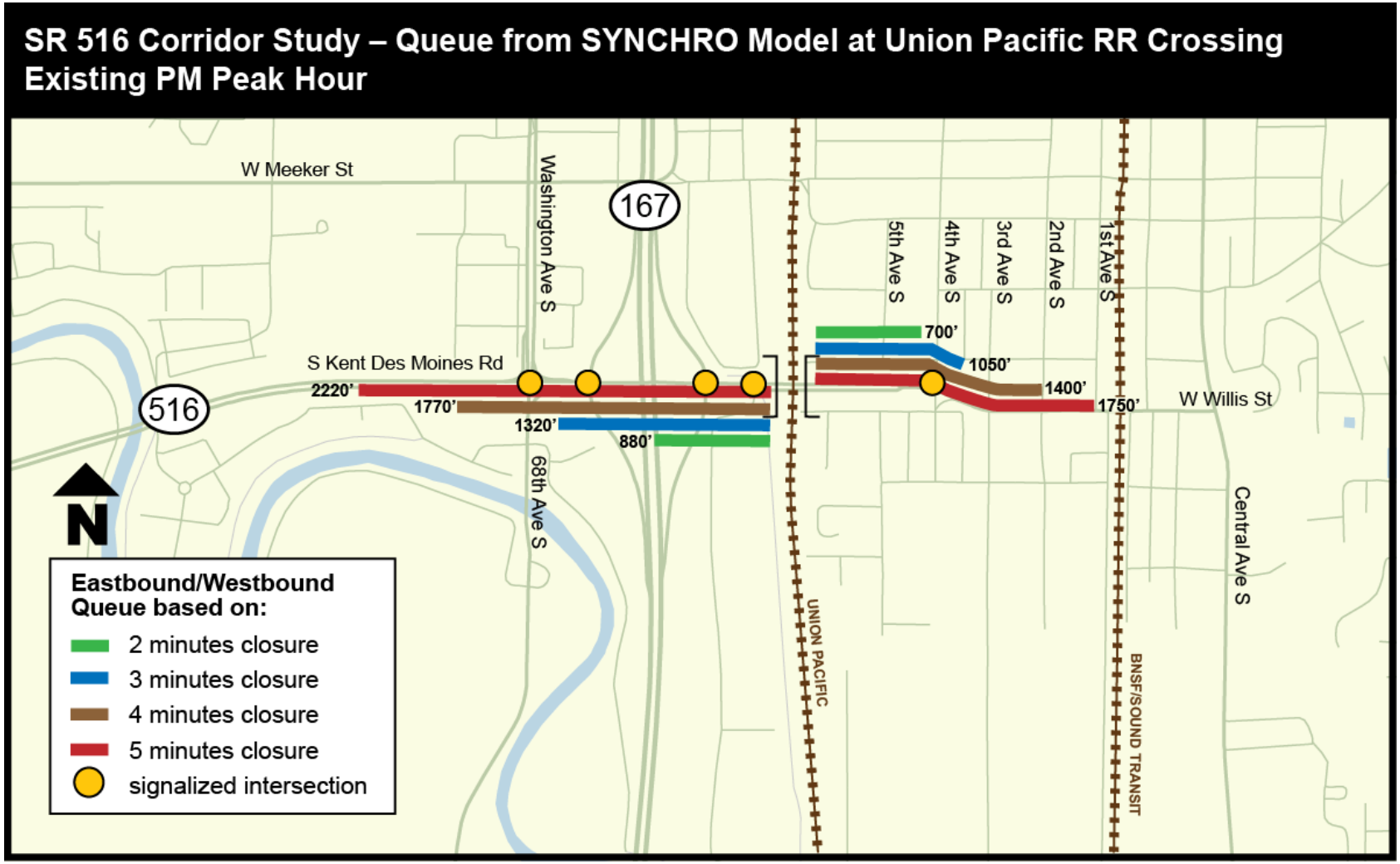
Exhibit 8: Travel Delay on SR 516 at Union Pacific RR Crossing (AM Peak).

Travel direction	Eastbound	Westbound
Average delay (min/vehicle)	1.30	1.06
Number of peak hour vehicles	830	980
Approach delay (hours)	18	17
Estimated peak period delay (hours)	105	

PM Peak Hour

Like AM peak hour, Kent provided the PM peak hour train crossing data for May, 2010. The data reveals crossing of one train during two-hour PM peak period on an average. The project team assumed a gate closure of 2, 3, 4, and 5 minutes to allow for crossing of trains with different lengths and speeds. **Exhibit 9** shows traffic queue length resulting from train passing.

Exhibit 9: Traffic Queue at Union Pacific Railroad Crossing (PM Peak Hour)



Modeling data indicates that existing traffic queues on eastbound direction during PM peak hour extends from about 880 feet to 2220 feet (West of SR 181). During existing PM peak hour, the average eastbound travel time from SR 181 to Central Avenue S increases up to 0.7 minutes per vehicle during the worst case scenario with five minutes closure duration (**Exhibit 10**). For the same closure duration, westbound traffic experiences moderate delay of about 0.2 minutes per vehicle.

Exhibit 10: Travel Delay on SR 516 at Union Pacific Railroad Crossing (PM Peak).

Travel direction	Eastbound	Westbound
Average delay (min/vehicle)	0.71	0.21
Number of peak hour vehicles	1,190	1,020
Approach delay (hours)	14	4
Estimated peak period delay (hours)	54	

Future Condition

The project team conducted future year analysis for three different years - 2016, 2022 and 2030.

The analysis focused only on AM and PM peak demand periods. The project team developed future year growth rates for each of the 26 intersections (**Exhibit 4**) by approach and by movement. The team conducted a growth rate reasonableness check before using the rates. The team applied growth rates to the traffic counts to develop future traffic demand for analyzing both segments and intersections. For the update of the future year road network, the team included only funded projects that affect the SR 516 study area corridor. Like existing condition analyses, future condition analyses focused on evaluation of intersection LOS, segment travel speed and railroad crossing.

Intersection LOS

The project team performed intersection LOS calculations using SYNCHRO as a modeling tool. An overview of the analysis results are provided below.

2016 AM Peak Hour

Traffic analysis indicates that all the intersections studied operate at LOS D or above in 2016 AM peak hour (Exhibit 11). The number of intersections operating at LOS A, LOS B and LOS C are five, ten and nine, respectively. Only two intersections operate at LOS D.

Exhibit 11: Intersection Level of Service in 2016.

LOCATION	2016* - LOS	
	AM	PM
SR 516 & SR 181	C	C
SR 516 & SR 167 SB RAMPS	A	B
SR 516 & SR 167 NB RAMPS	C	B
SR 516 & S 4th Ave	B	B
SR 516 & Central Ave N	B	B
SR 516 (E Smith) & Central Ave	C	D
SR 516 & 104TH AVE	C	E
SR 516 & SE 256th St.	B	B
SR 516 & 108th Ave	A	B
SR 516 & 116th Ave SE	B	C
SR 516 & 124th Ave SE	C	C
SR 516 & 132nd Ave SE	C	D
SR 516 & 152nd Ave SE	D	C
SR 516 & SE Covington - Sawyer Road	B	C
SR 516 & 164th Ave SE	C	C
SR 516 & SR 18 WB RAMPS	B	C
SR 516 & SR 18 EB RAMPS	B	B
SR 516 & 168th Place	B	C
SR 516 & 172nd Ave SE	A	D
SR 516 & Wax Road	D	D
SR 516 & 185th Place	A	A
SR 516 & 192nd Ave SE	A	A
SR 516 & 216 Ave SE	B	B
SR 516 & Witte Road	C	C
SR 516 & 228th Ave SE	B	B
SR 516 & SR 169	C	C

*** Traffic is assumed to grow only 5% between 2010 and 2016 given the current recession; and The signal timings for 2016 conditions are assumed to be optimized.**

2016 PM Peak Hour

Most intersections show lower level of service during PM peak hour operation in 2016 compared to AM peak hour (**Exhibit 11**). One intersection operates at LOS E.

2022 AM Peak Hour

All 26 intersections studied operate at LOS D or above in 2022 AM peak hour. The number of intersections operating at LOS A, LOS B and LOS C are three, eleven and eight respectively. Four intersections would operate at LOS D. (**Exhibit 12)**

Exhibit 12: Intersection Level of Service in 2022.

LOCATION	2022* - LOS	
	AM	PM
SR 516 & SR 181	C	C
SR 516 & SR 167 SB RAMPS	B	B
SR 516 & SR 167 NB RAMPS	C	B
SR 516 & S 4th Ave	B	C
SR 516 & Central Ave N	B	C
SR 516 (E Smith) & Central Ave	D	E
SR 516 & 104TH AVE	C	F
SR 516 & SE 256th St.	B	C
SR 516 & 108th Ave	A	D
SR 516 & 116th Ave SE	B	C
SR 516 & 124th Ave SE	C	D
SR 516 & 132nd Ave SE	D	E
SR 516 & 152nd Ave SE	D	E
SR 516 & SE Covington - Sawyer Road	B	C
SR 516 & 164th Ave SE	C	C
SR 516 & SR 18 WB RAMPS	C	C
SR 516 & SR 18 EB RAMPS	B	C
SR 516 & 168th Place	B	C
SR 516 & 172nd Ave SE	B	D
SR 516 & Wax Road	D	E
SR 516 & 185th Place	A	A
SR 516 & 192nd Ave SE	A	B
SR 516 & 216 Ave SE	B	B
SR 516 & Witte Road	C	C
SR 516 & 228th Ave SE	B	C

*** The signal timings for 2022 conditions are assumed to be optimized.**

2022 PM Peak Hour

Of the 26 intersections analyzed, four intersections operate at LOS E and one intersection operates at LOS F during PM peak hour operation in 2022 (**Exhibit 12**).

2030 AM Peak Hour

All intersections studied operate at an acceptable level of service during the 2030 AM peak hour of operation (see **APPENDIX A** of this report for details). Other than the Union Pacific Railroad crossing impacts on the intersections near the SR 167 interchange, all the intersections on SR 516 between SR 181 and Central Avenue N operate at LOS D or better during the AM peak hour in 2030 conditions. This is consistent with the SYNCHRO model results from the City of Kent.

2030 PM Peak Hour

During the 2030 PM peak hour, operations at twelve of the intersections fall below LOS D (four intersections at LOS E and eight intersections at LOS F).

Intersections with LOS E are:

- SR 516 and 124th Avenue SE
- SR 516 and SE Covington-Sawyer Road
- SR 516 and 168th PL SE
- SR 516 and SR 169

Intersections with LOS F are:

- SR 516 and Central Avenue N/E Smith St
- SR 516 and 104th Avenue SE
- SR 516 and SE 256th St
- SR 516 and 108th Avenue SE
- SR 516 and 132nd Avenue SE
- SR 516 and 152nd Avenue SE
- SR 516 and 172nd Avenue SE
- SR 516 and SE Wax Road

With the exception of the intersections in the vicinity of the railroad crossings, all the intersections on SR 516 between SR 181 and Central Avenue N operate at LOS D or better during the PM peak hour of 2030 operational conditions. The SYNCHRO model from the City of Kent shows comparable results.

Segment Travel Speed

For the segment travel speed and speed ratio calculation, the project team applied the same methodologies and tools as explained in the "Segment Travel Speed" section of the existing condition analysis. A brief overview of the analysis results follows.

2016 and 2022 Peak Hour

Only two segments, #'s 5 & 6, were analyzed for the 2016 and 2022 mid-term conditions. The results are in Exhibit 13. Both the segments operate above the WSDOT's speed threshold during 2016. The segment between Jenkins Creek and 216th Ave SE operate below the speed threshold during 2022.

Exhibit 13: Ratio of Operating Speed to Posted Speed (PM Peak Hour).

SR 516 Arterial Planning Analysis Summary							
Segments		Seg #5			Seg #6		
Year	Dir	Average Speed (mph)	Posted Speed (mph)	Operating / Posted Speed	Average Speed (mph)	Posted Speed (mph)	Operating / Posted Speed
Existing	EB	31	40	78%	32	40	80%
	WB	31	40	78%	32	40	80%
2016*	EB	31	40	78%	32	40	80%
	WB	31	40	78%	32	40	80%
2022	EB	18	40	45%	30	40	75%
	WB	24	40	60%	32	40	80%
2030	EB	10	40	25%	30	40	75%
	WB	13	40	33%	29	40	73%

*** Traffic is assumed to grow only 5% between 2010 and 2016 given the current recession**

2030 AM Peak Hour

The team calculated travel speed and speed ratio for both directions of SR 516 in 2030 conditions. The results are presented in **Exhibit 5**. During the AM peak hour operation in 2030 conditions, three segments fall below the 70% speed threshold target. These segments are:

- SR 181 to Jason Avenue N,
- 101st Avenue SE to Kent/Covington City Limit, and
- Kent/Covington City Limit to 185th Avenue SE.

2030 PM Peak Hour

The directional speed ratios in 2030 PM peak hour conditions are presented in **Exhibit 6**. During PM peak hour operations in 2030 conditions, the same three segments as in AM peak hour operation, as well as the eastbound segment between 185th Avenue SE and SR 169 fall below the 70% speed threshold. The westbound segment between 185th Avenue SE and SR 169 is slightly above the threshold.

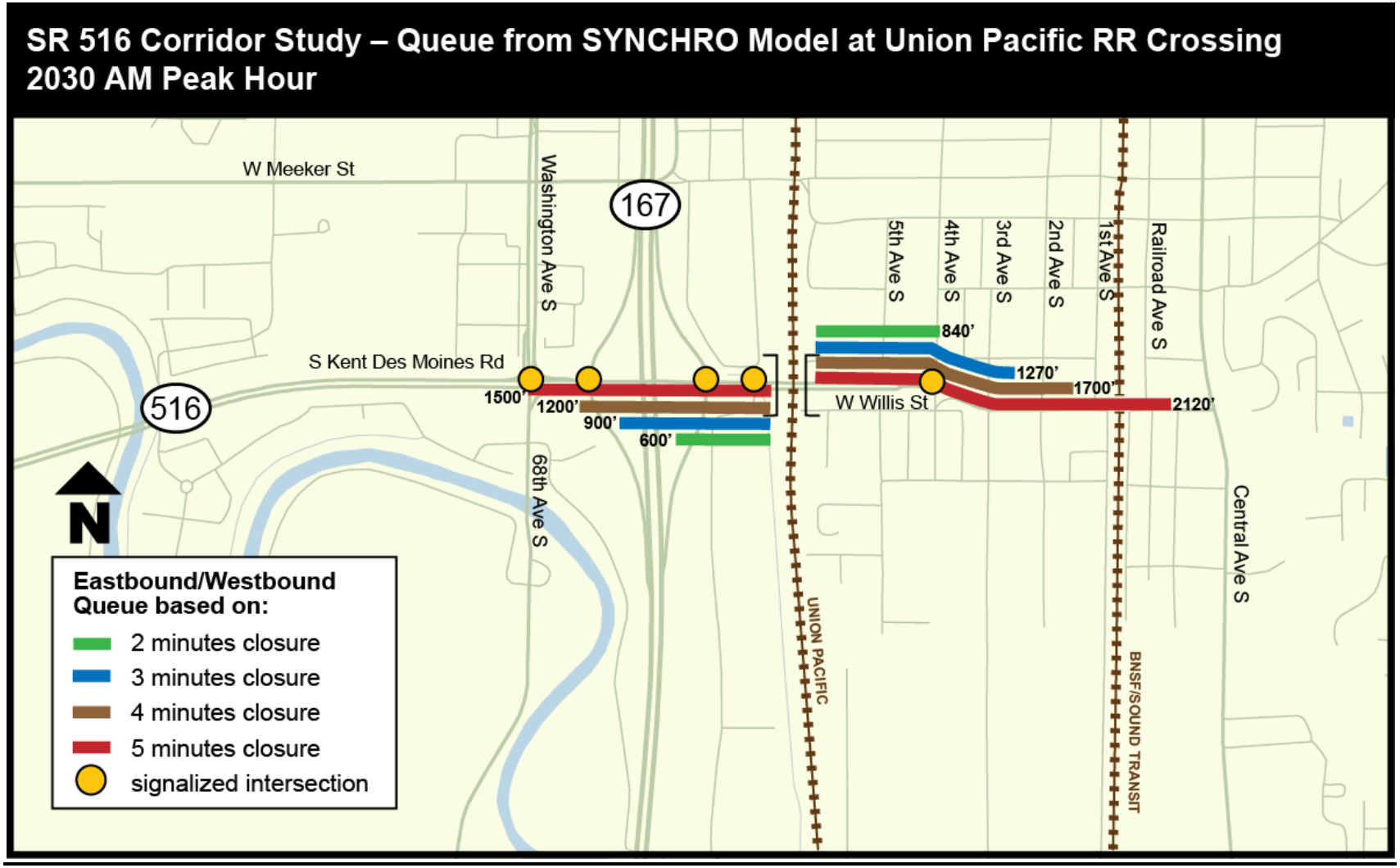
Railroad Crossing Analysis

The project team conducted railroad crossing analysis for future year conditions using the same methodology as explained in the existing condition analysis. The following sections provide a brief overview of analysis results.

2030 AM Peak Hour

Eastbound queue length during 2030 AM peak hour is expected to range between 600 feet and 1500 feet depending on the length of railroad gate closure time. The westbound traffic queue might grow about 840 feet for two minutes closure and 2120 feet for five minutes closure for train crossing. **Exhibit 14** shows the estimated queue lengths for different length of railroad gate closures.

Exhibit 14: Traffic Queue at Union Pacific Railroad Crossing (2030 PM Peak Hour).



In the worst case scenario of five minutes closure time, the average travel time from SR 181 to Central Avenue S could increase up to 2.25 minutes in the eastbound direction and 2.45 minutes in the westbound direction, respectively (**Exhibit 15**). The eastbound traffic incurs over 100 hours of delay during the AM peak period, while the westbound traffic experiences about 40% more delay during the same period.

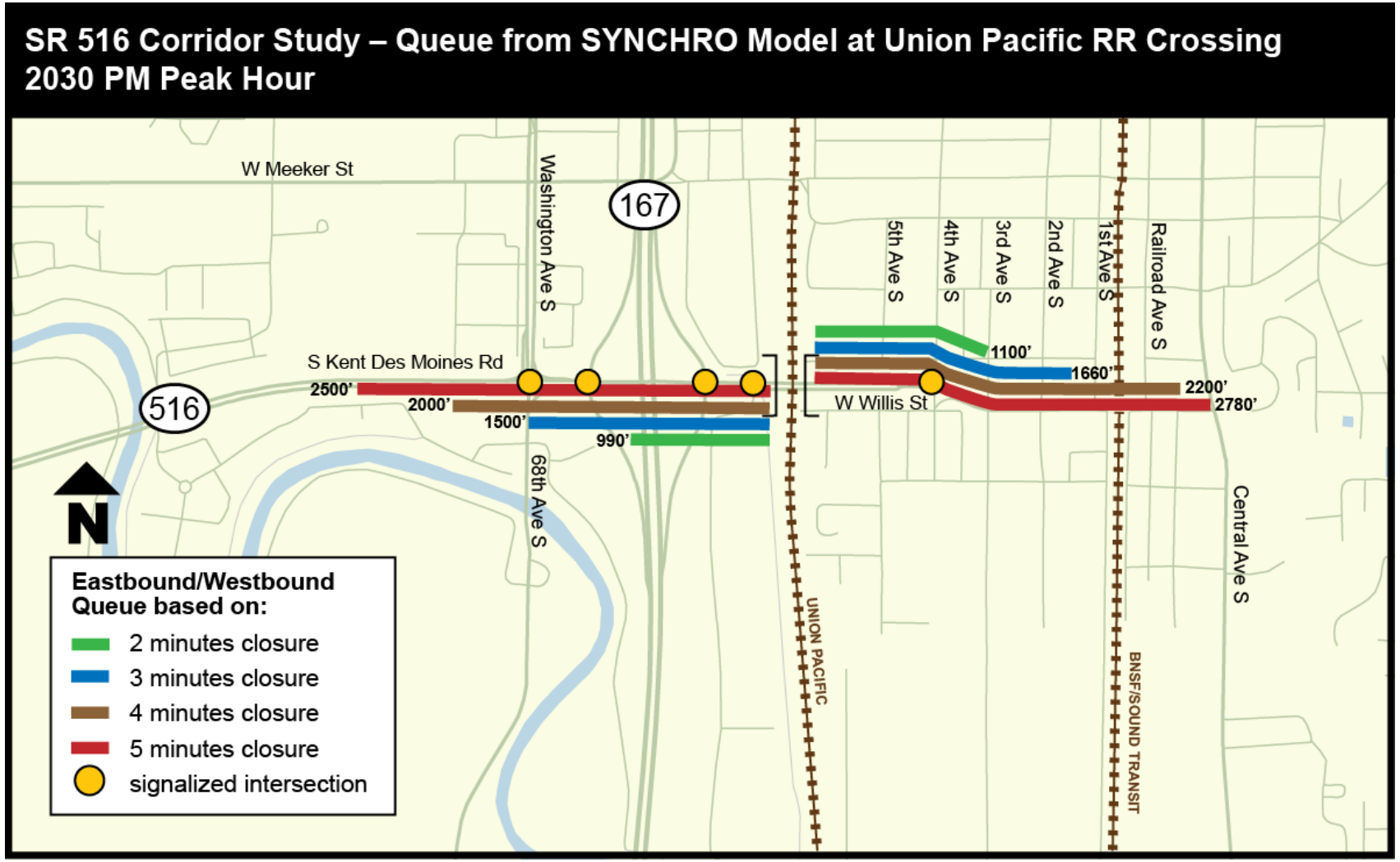
Exhibit 15: Travel Delay on SR 516 at Union Pacific Railroad Crossing (2030 AM Peak).

Travel direction	Eastbound	Westbound
Average delay (min/vehicle)	2.25	2.45
Number of peak hour vehicles	915	1,155
Approach delay (hours)	34	47
Estimated peak period delay (hours)	102	141

2030 PM Peak Hour

During the 2030 PM peak hour operation, the eastbound traffic queue extends from 990 feet to 2500 feet (well beyond SR 181) depending on the railroad gate closure times (**Exhibit 16**). The eastbound queue would be long enough to negatively impact four signalized intersections including SR 167 ramp junctions. The westbound traffic queue is estimated to range between 1100 feet and 2780 feet.

Exhibit 16: Traffic Queue at Union Pacific Railroad Crossing (2030 PM Peak Hour).



During the five minutes of closure time at the railroad crossing in the 2030 PM peak hour condition, the average travel time from SR 181 to Central Avenue S could increase up to about 1.90 minutes in eastbound direction and more than three minutes in westbound direction (Exhibit 17). Total peak period delay is about 120 hours for both eastbound and westbound directions.

Exhibit 17: Travel Delay on SR 516 at Union Pacific Railroad Crossing (2030 PM Peak).

Travel direction	Eastbound	Westbound
Average delay (min/vehicle)	1.91	3.19
Number of peak hour vehicles	1,280	1,365
Approach delay (hours)	41	73
Estimated peak period delay (hours)	123	219

RECOMMENDATIONS

The project team conducted traffic analyses to identify needs along the SR 516 corridor, compared the analysis results with the study criteria and developed conceptual solutions for the identified near term needs. The solutions fall into two categories: intersection and roadway segment recommendations.

Study Criteria

WSDOT maintains separate operational standards for roadway segments and intersections. According to WSDOT practice, any highway segment that operates below 70% of the assigned posted speed is assumed to have some operational issues that demands further investigation to identify potential needs. WSDOT's analysis of intersections is more conservative than that of local agencies. The threshold determination used for intersection analysis is LOS E. For any intersection that operates below LOS E, the project team developed near term recommendations to improve these operations to LOS D or better. The project team provided additional recommendations for the signalized intersections. In providing these recommendations the project team reviewed the existing signal cycle length, phasing and in order to confirm that they are operating optimally-

- We assumed the signals would be optimized and coordinated (where possible) to allow for maximum throughput for the future traffic demand conditions
- We considered mitigation only when the facility operated below the study criteria after exhausting efficiency measures for the future conditions.

Recommended Transportation Demand Management measures are assumed to reduce future peak hour volumes by five percent.

LOS for all analyzed intersections

The project team conducted traffic analysis to evaluate the intersection operations without improvements. **Exhibit 18** shows intersection LOS.

Exhibit 18: LOS of Intersections

Int. #	LOCATION	Existing - LOS	2016 - LOS	2022 - LOS	2030 - LOS
		PM	PM	PM	PM
1	SR 516 & SR 181	D	C	C	D
2	SR 516 & SR 167 SB	D	B	B	B
3	SR 516 & SR 167	C	B	B	C
4	SR 516 & S 4th Ave	C	B	C	D
5	SR 516 & Central	C	B	C	D
6	SR 516 (E Smith) & Central Ave	D	D	E	F
7	SR 516 & 104TH	E	E	F	F
8	SR 516 & SE 256th	C	B	C	F
9	SR 516 & 108th Ave	D	B	D	F
10	SR 516 & 116th Ave	C	C	C	D
11	SR 516 & 124th Ave	C	C	D	E
12	SR 516 & 132nd	D	D	E	F
13	SR 516 & 152nd	D	C	E	F
14	SR 516 & SE Covington -	C	C	C	E
15	SR 516 & 164th Ave	C	C	C	C
16	SR 516 & SR 18 WB	C	C	C	D
17	SR 516 & SR 18 EB	B	B	C	C
18	SR 516 & 168th	D	C	C	E
19	SR 516 & 172nd	E	D	D	F
20	SR 516 & Wax Road	F	D	E	F
21	SR 516 & 185th	B	A	A	C
22	SR 516 & 192nd	A	A	B	B
23	SR 516 & 216 Ave	B	B	B	C
24	SR 516 & Witte	C	C	C	D
25	SR 516 & 228th Ave	C	B	C	C
26	SR 516 & SR 169	D	C	D	E

Intersection Recommendations

By 2016, the project team found all intersections operate at or above LOS E.

By 2022, the intersection of SR 516/SR 515/104th Ave SE operates below LOS E. To bring this intersection back to LOS D, the project team recommends improvements for this intersection. Improvements can range from capacity improvements between 101st

and 104th, coupled with additional channelization, or a roundabout, or local improvements to 108th with a closure of 256th at the intersection, or a combination of various elements of all the options mentioned. For this reason, nothing specifically is recommended for implementation and the estimated cost range varies widely.

By 2030, eight of the 26 intersections analyzed operate below LOS E. The project team identified needs and recommended improvements be considered for each of these intersections in order to address these needs and improve operations. The eight intersections operating below LOS E by 2030 are:

SR 516 (E Smith) & Central Ave
SR 516 & SR 515 & 104TH Ave.
SR 516 & SE 256th St.
SR 516 & 108th Ave.
SR 516 & 132nd Ave. SE
SR 516 & 152nd Ave. SE
SR 516 & 172nd Ave. SE
SR 516 & Wax Road

Intersection Improvement Cost Estimate

The project team developed a planning level cost estimate of the proposed near term intersection improvements. The estimates are based on conceptual solutions with no design work done. It utilizes unit price approach that accounts for cost differences by land use types, development density, size of the improvement, etc. The intersection improvement cost estimate is given as a range, with potential low and high values for different improvement scenarios. The low end estimate range would provide for a roundabout configuration, the high end estimate would represent widening between 101st and 104th, with channelization improvements on all four legs, and an additional westbound through lane between 256th and 104th . The cost estimate range for improving the intersection at 104th Ave SE and SR 516 is between $3.5 million to $11.1 million in 2011 dollars.

Longer term needs for the other seven intersections were identified but no conceptual solutions are offered at this time to allow for greater flexibility in the future. As a result, no cost estimates are given.

Segment Mitigation

The projected traffic volume on the roadway segment between Jenkins Creek and 216th Avenue SE is much higher than available capacity. The 70% operating speed threshold is not met on the eastbound segment and is 71% on the westbound segment. Because of this, and coupled with safety concerns near the existing Jenkins Creek culvert (with the existing two lane roadway configuration), the project team proposed widening of the 2.4 mile long segment by adding a single lane each direction.

All the analyses are carried out using forecasted growth are for the year 2030. These forecasts are based on the growth rate assumed for different segments by direction. Given the fixed demand, it is assumed that adding a capacity improvement at a location will not have the latent demand that may contribute to congestion downstream. Given the nature of the land use in the downstream locations, coupled with the study area being located in a more rural environment, this is a valid assumption. The growth rate in the City of Maple Valley area of SR 516 assumes city's comprehensive plan's land use. Other growth from Black Diamond is also assumed in the growth rate.

The widening is recommended to be carried out in stages, with the segment between Jenkins Ck and 185th Ave SE being identified as a near term need (2016), the segment between 185th Ave SE and 192nd Ave SE is identified as a mid term need (2022), and the segment between 192nd Ave SE and 216th Ave SE being identified as a long term need (2030).

The planning level cost estimates for the near term and mid term of this conceptual solution, including the Jenkins Creek culvert replacement is as follows:

Jenkins Ck and 185th Ave SE	$ 10.6M to $15.2M (2011 dollars).
185th Ave SE and 192nd Ave SE	$ 10.2M to $ 13.5M (2011 dollars).

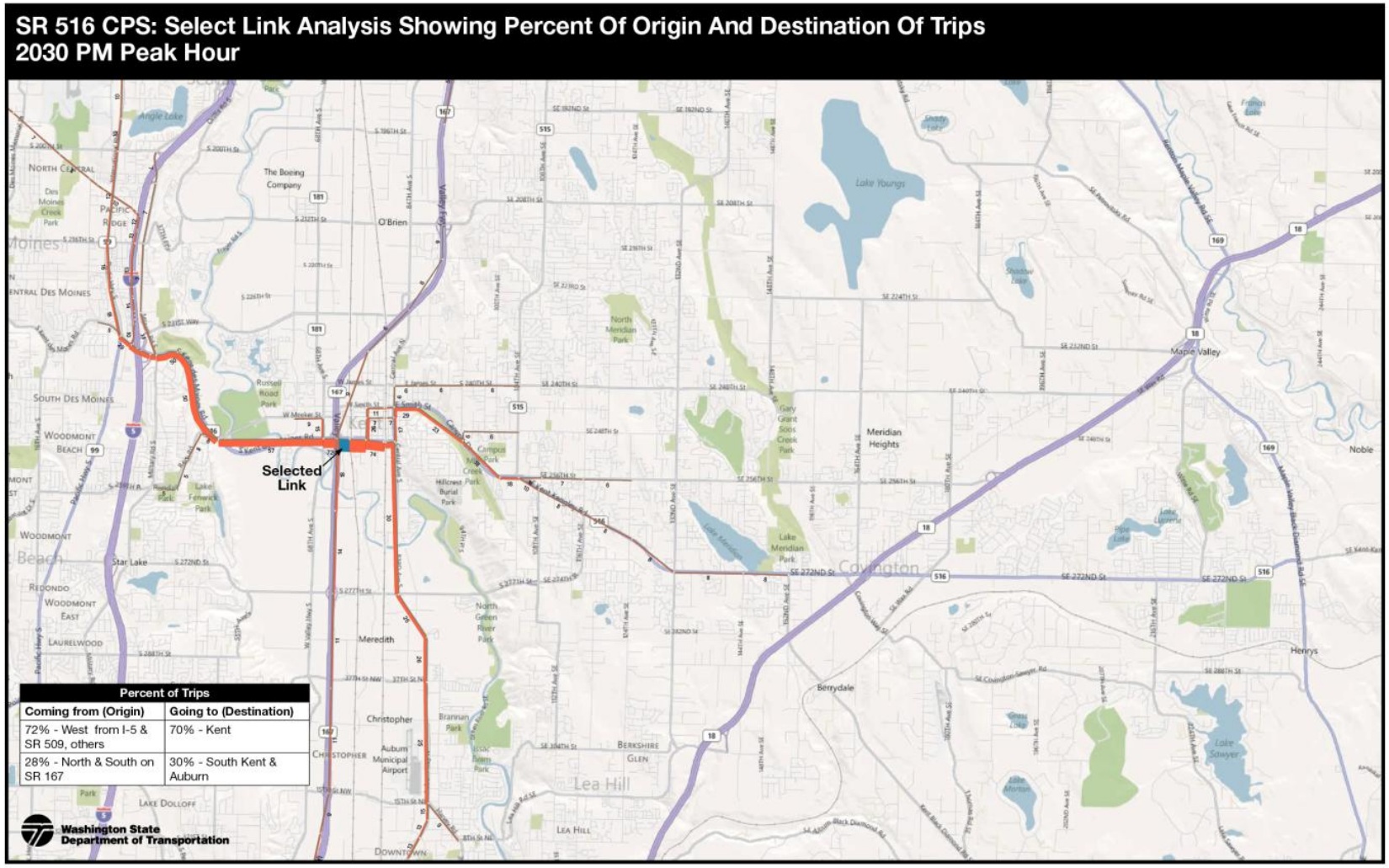
RECOMMENDATIONS

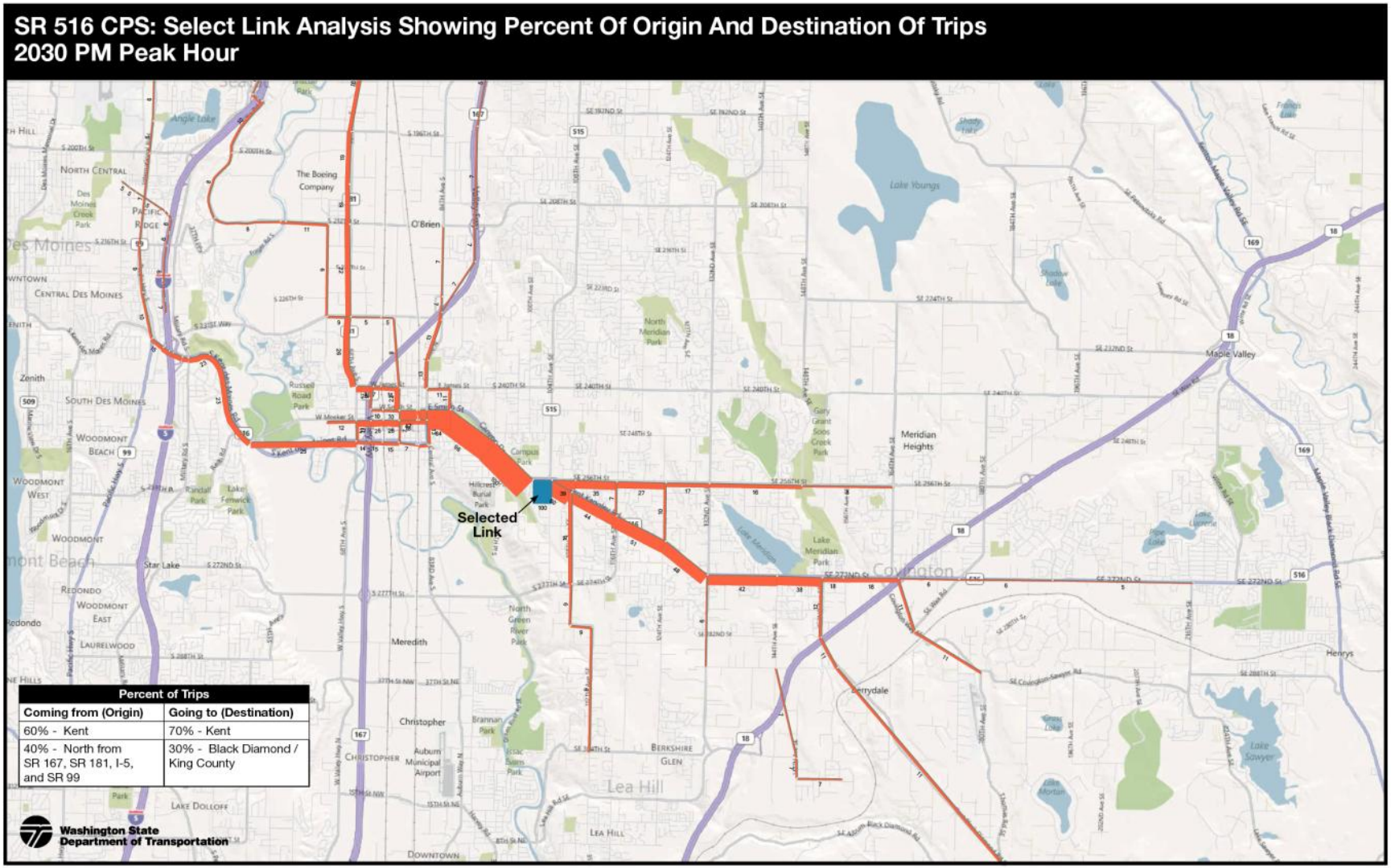
The primary focus of the technical analysis is to identify potential mobility or safety needs and develop conceptual near and mid term solutions. Based on detailed analyses of the AM and PM peak hour of traffic in existing and future year conditions, the project team recommends the following:

- Provide improvements to one intersection mid-term (cost estimates in the range of $3.5 to $11.1 million: (2011 dollars); and
- Widen the roadway segment between Jenkins Creek and 216th Avenue SE by adding a lane in each direction (cost estimates in the range of $31 to $42 million: 2011 dollars).

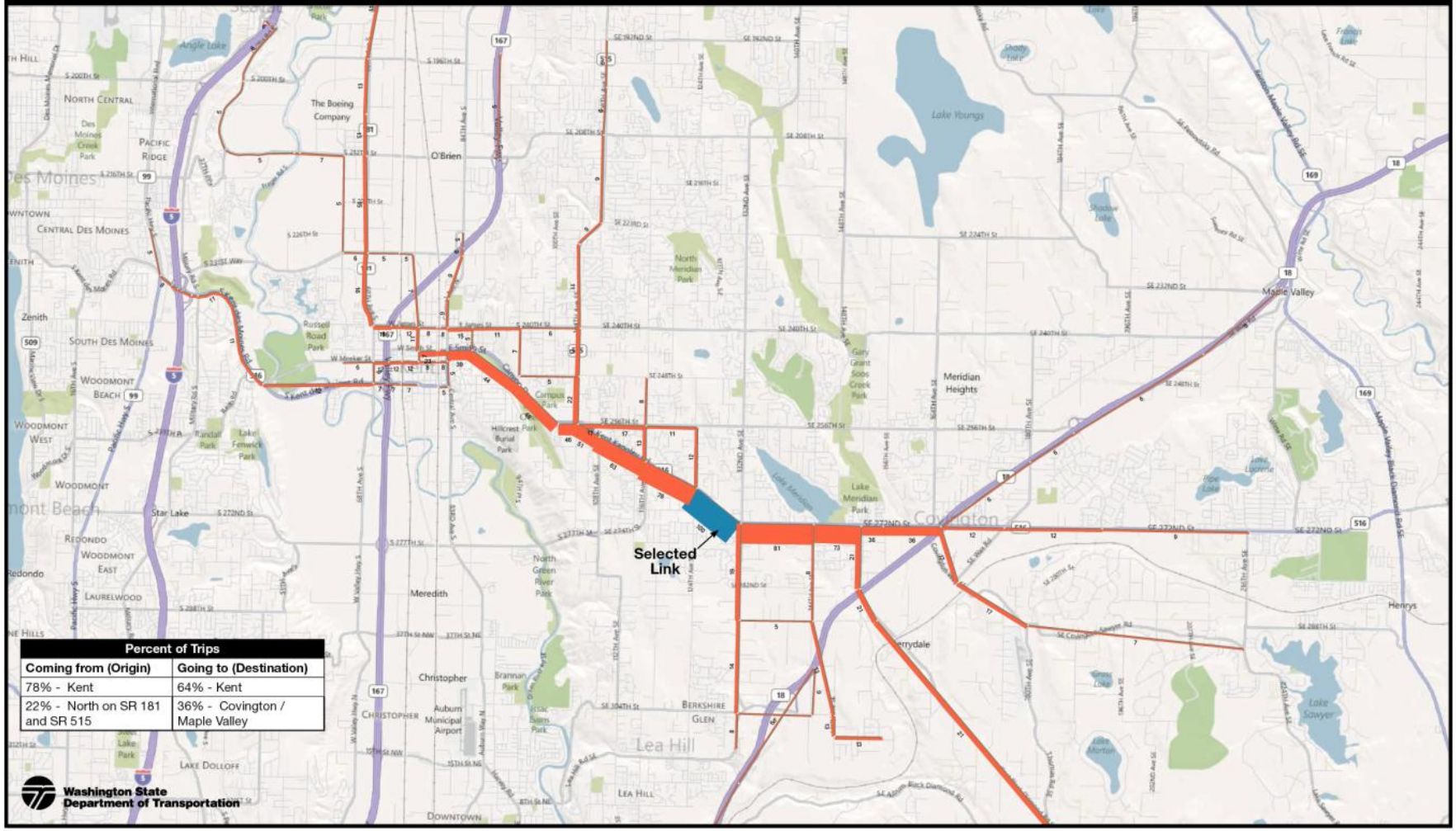
APPENDICES

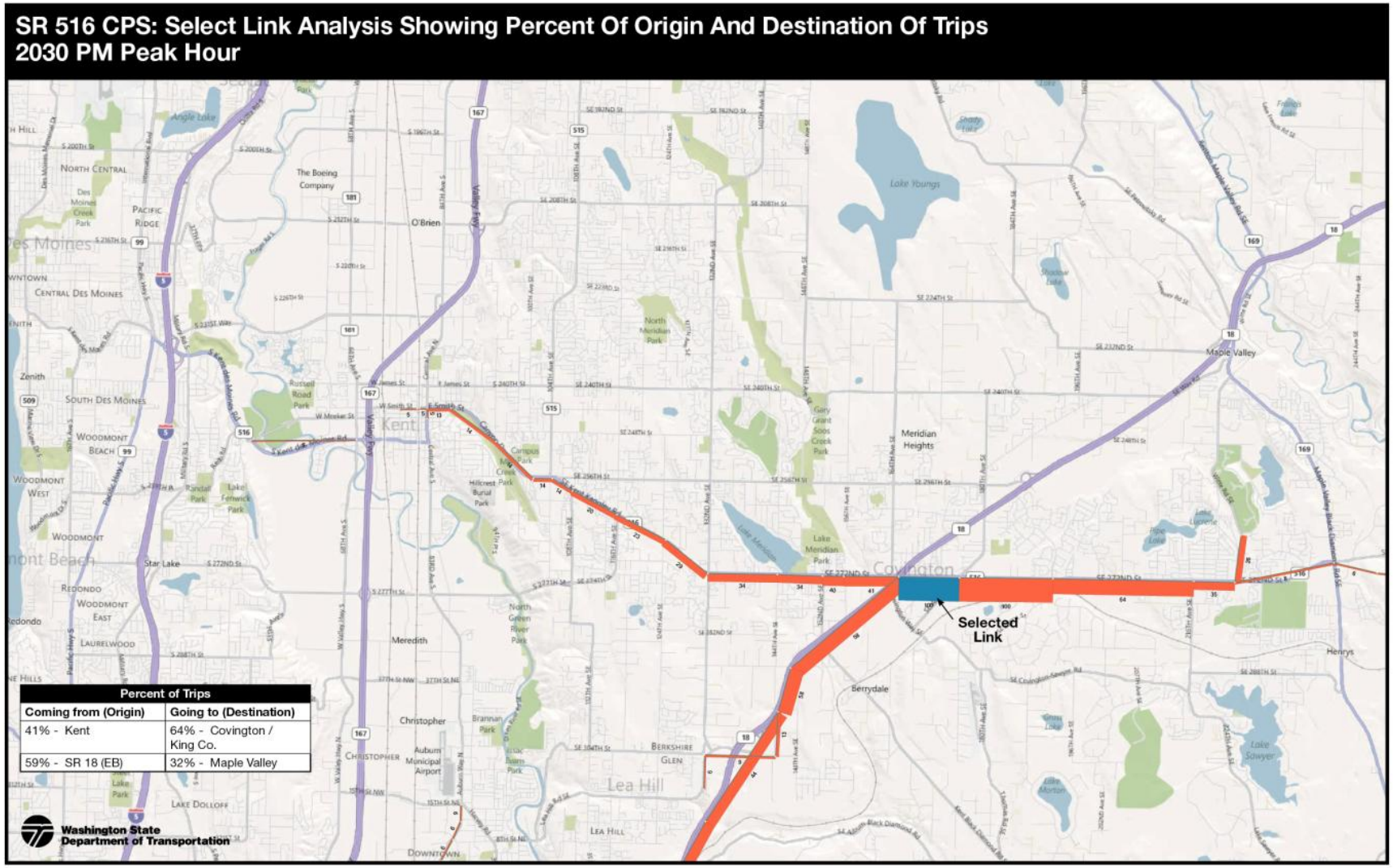
APPENDIX A: Origin and Destination of Trips.

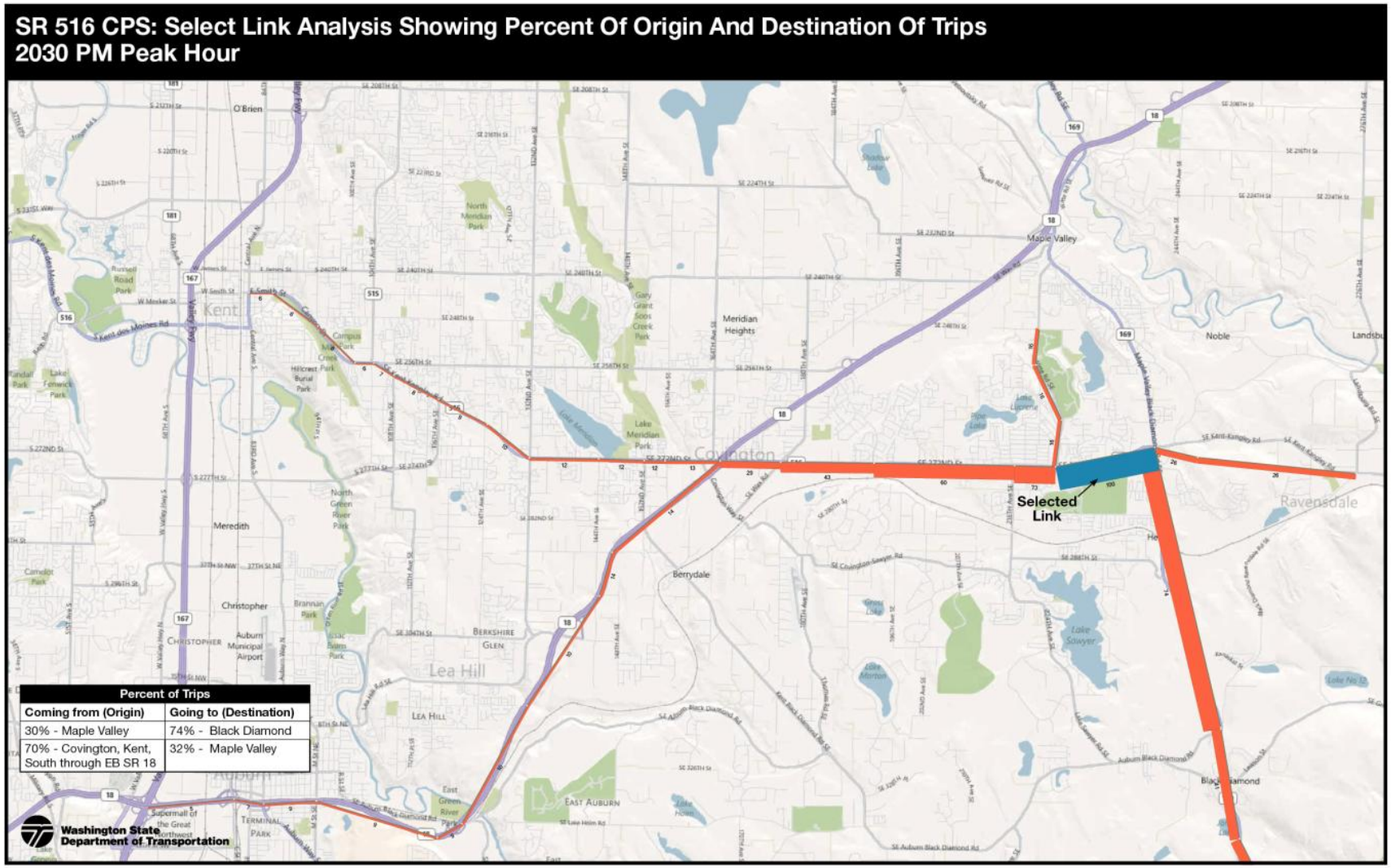



SR 516 CPS: Select Link Analysis Showing Percent Of Origin And Destination Of Trips
2030 PM Peak Hour
Selected Link
Percent of Trips
Coming from (Origin)
Going to (Destination)
60% - Kent
70% - Kent
40% - North from SR 167, SR 181, I-5, and SR 99
30% - Black Diamond / King County
Washington State Department of Transportation

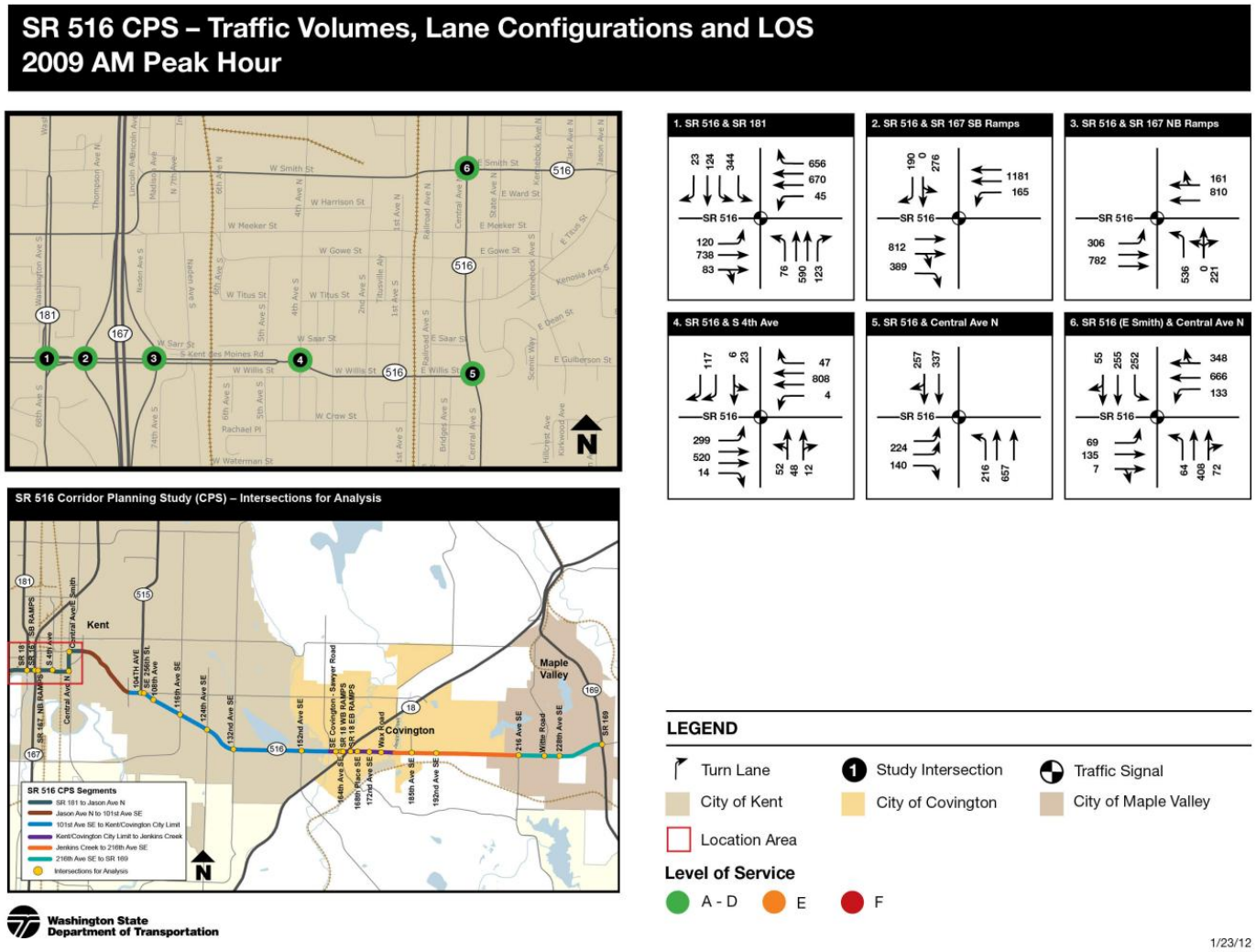
SR 516 CPS: Select Link Analysis Showing Percent Of Origin And Destination Of Trips
2030 PM Peak Hour



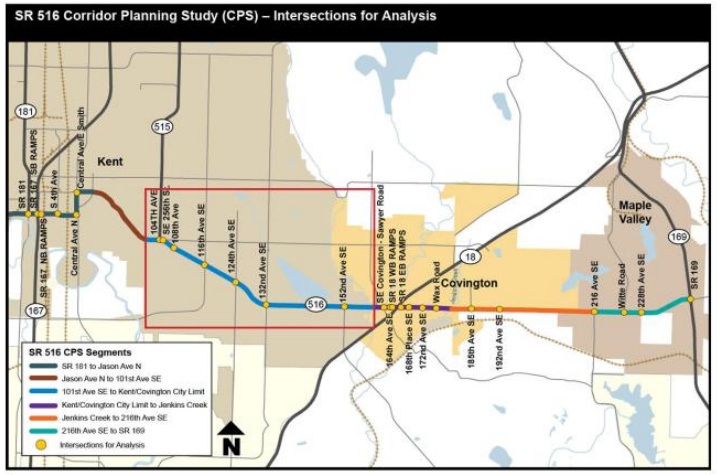

SR 516 CPS: Select Link Analysis Showing Percent Of Origin And Destination Of Trips
2030 PM Peak Hour
Selected Link
Percent of Trips
Coming from (Origin)
Going to (Destination)
41% - Kent
64% - Covington / King Co.
59% - SR 18 (EB)
32% - Maple Valley
Washington State Department of Transportation


SR 516 CPS: Select Link Analysis Showing Percent Of Origin And Destination Of Trips
2030 PM Peak Hour
Selected Link
Percent of Trips
Coming from (Origin)
Going to (Destination)
30% - Maple Valley
74% - Black Diamond
70% - Covington, Kent, South through EB SR 18
32% - Maple Valley
Washington State Department of Transportation
Kent
Covington
Maple Valley
Meridian Heights
Noble
Ravensdale
Berrydale
Meredith
Christopher
Auburn Municipal Airport
Lea Hill
Berkshire Glen
East Auburn
Terminal Park
O'Brien

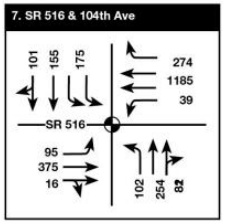
APPENDIX B: Traffic Volume and Intersection LOS.

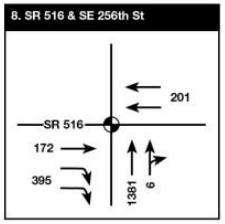


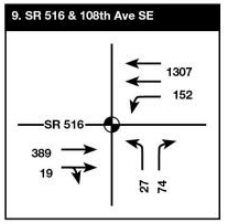
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 AM Peak Hour

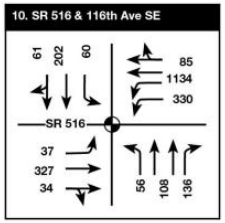


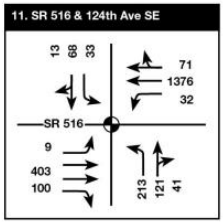
Washington State Department of Transportation











LEGEND

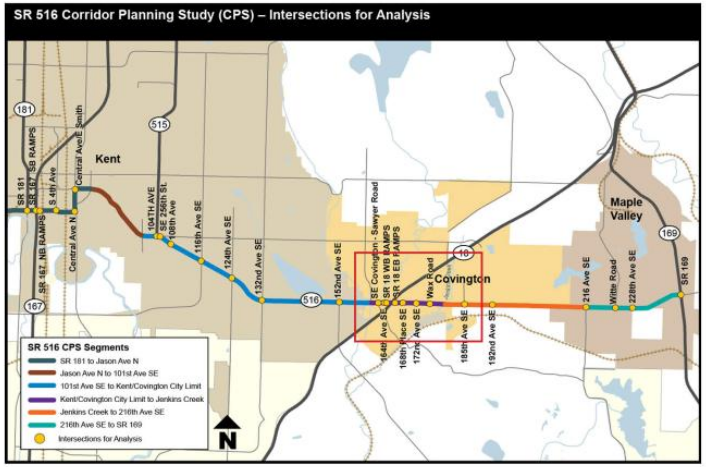
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

Level of Service

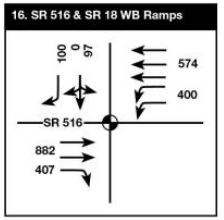
A - D E F

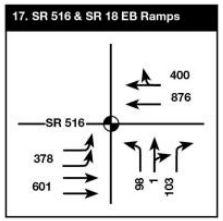
1/23/12

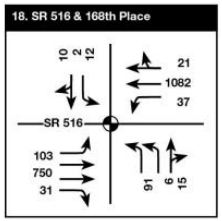
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 AM Peak Hour

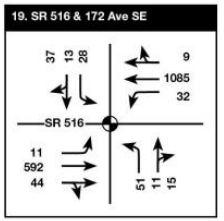


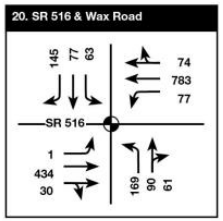
Washington State Department of Transportation

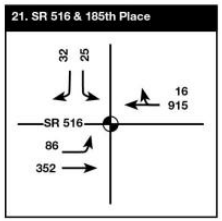












LEGEND

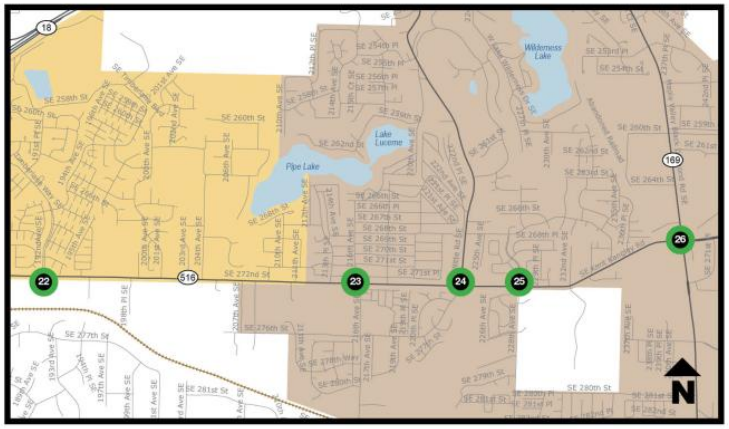
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

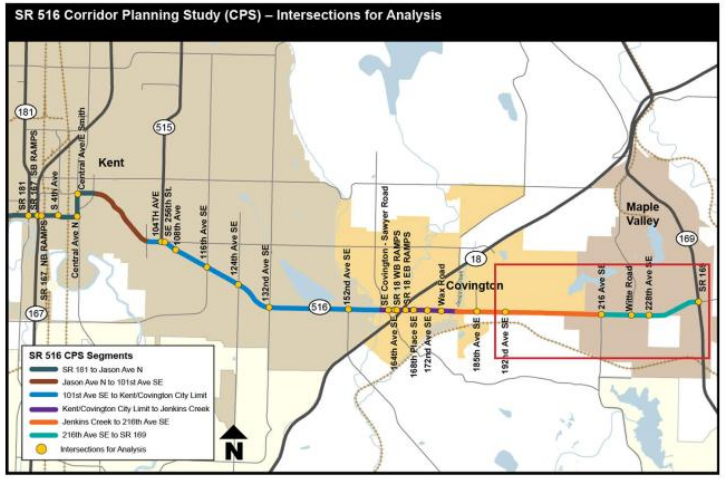
Level of Service

A - D E F

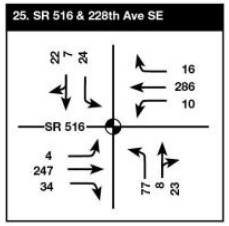
1/23/12

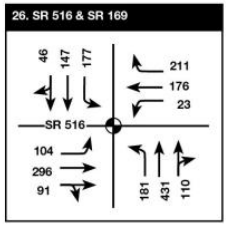
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 AM Peak Hour





Washington State Department of Transportation





LEGEND

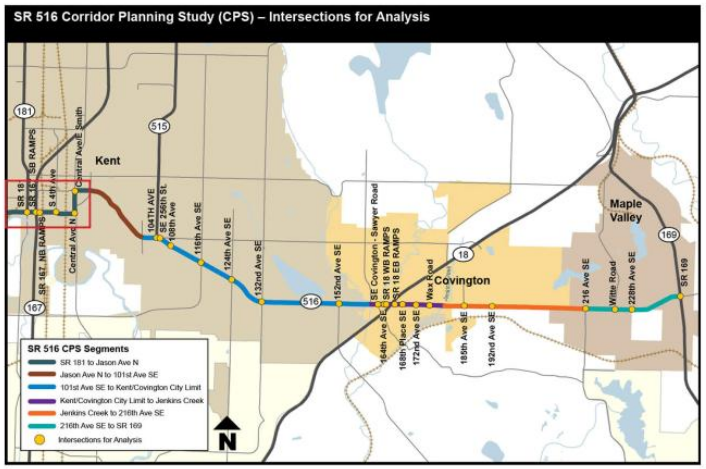
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

Level of Service

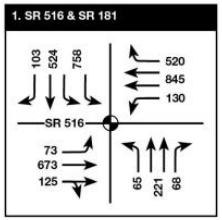
- A - D
- E
- F

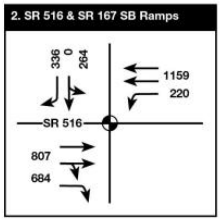
1/23/12

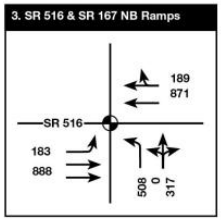
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 PM Peak Hour

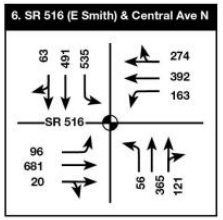


Washington State Department of Transportation









LEGEND

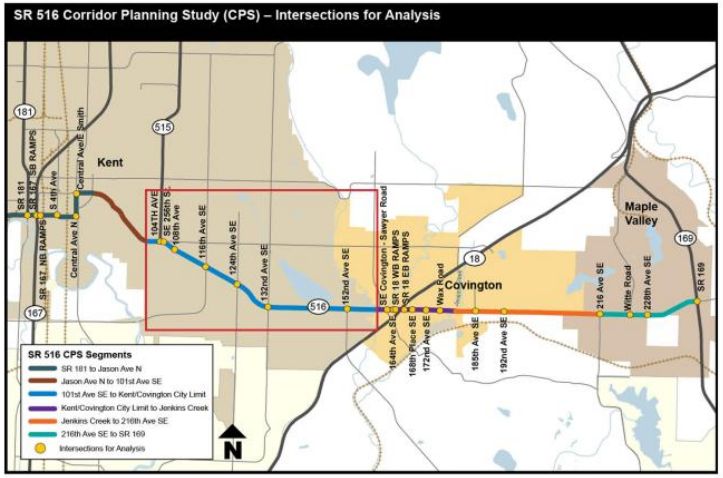
- Turn Lane
- City of Kent
- Location Area
- Study Intersection
- City of Covington
- Traffic Signal
- City of Maple Valley

Level of Service

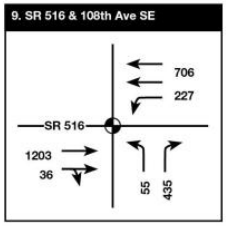
- A - D
- E
- F

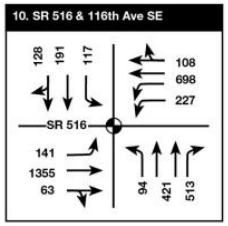
1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 PM Peak Hour



Washington State Department of Transportation





LEGEND

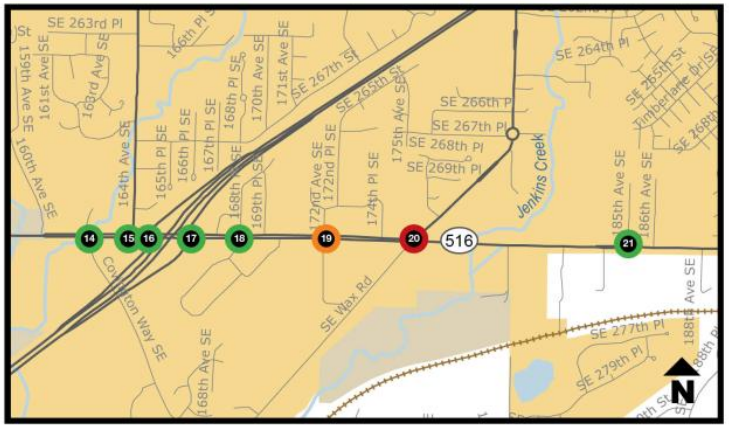
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

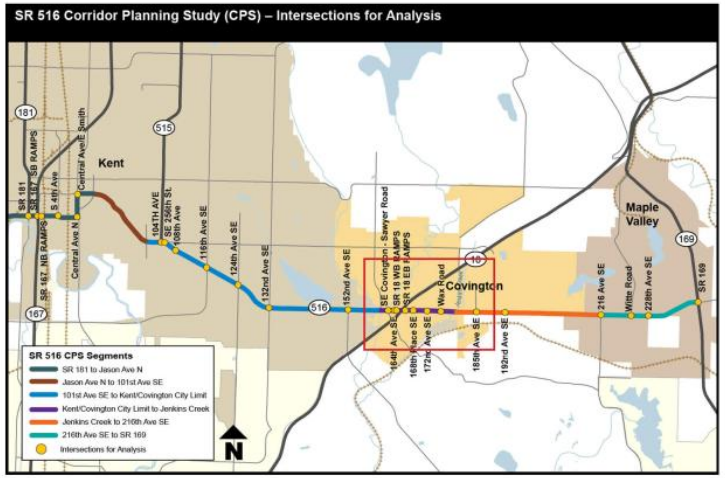
Level of Service

- A - D
- E
- F

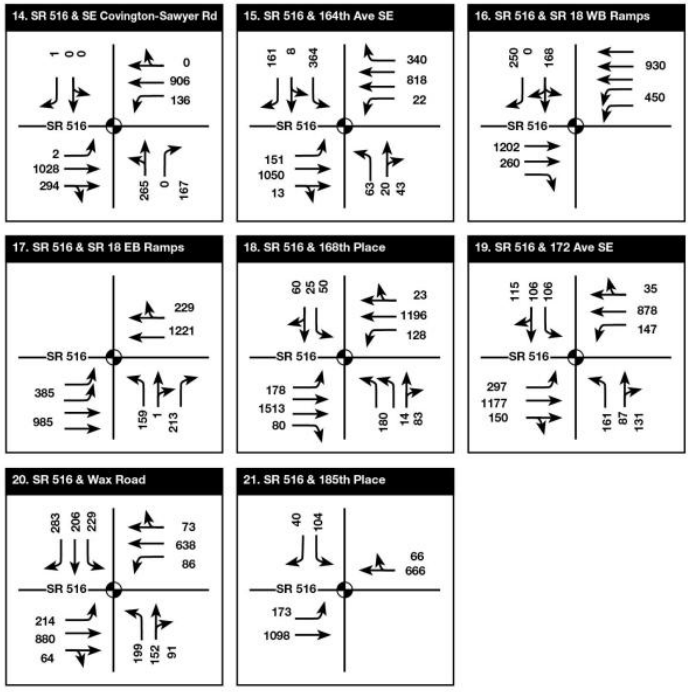
1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 PM Peak Hour





Washington State Department of Transportation



LEGEND

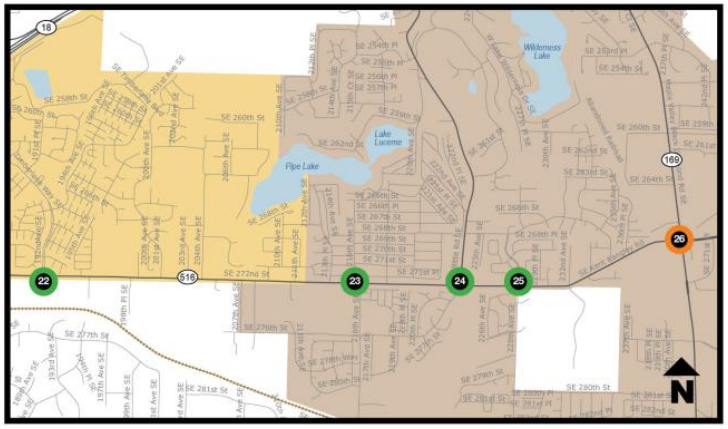
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

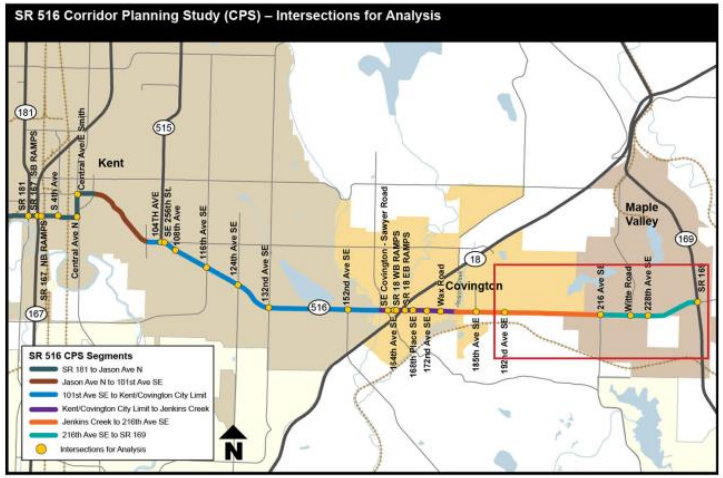
Level of Service

A - D E F

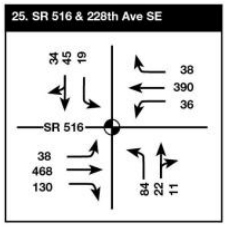
1/23/12

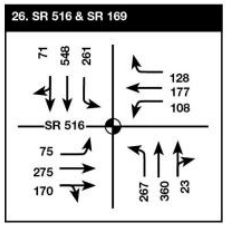
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2009 PM Peak Hour





Washington State Department of Transportation





LEGEND

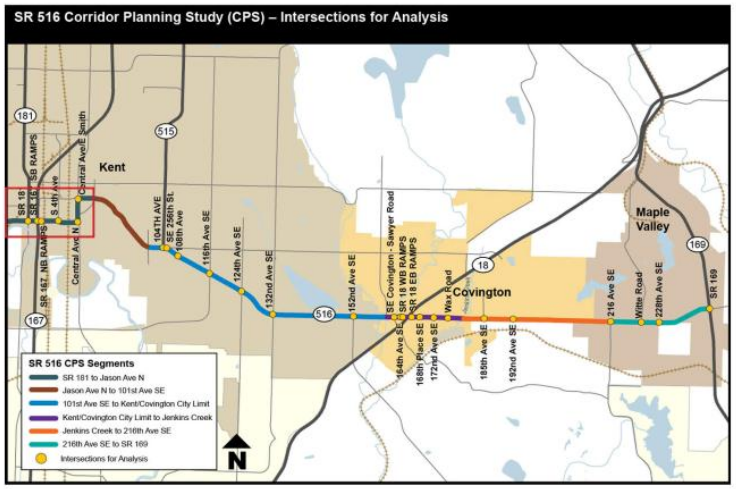
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

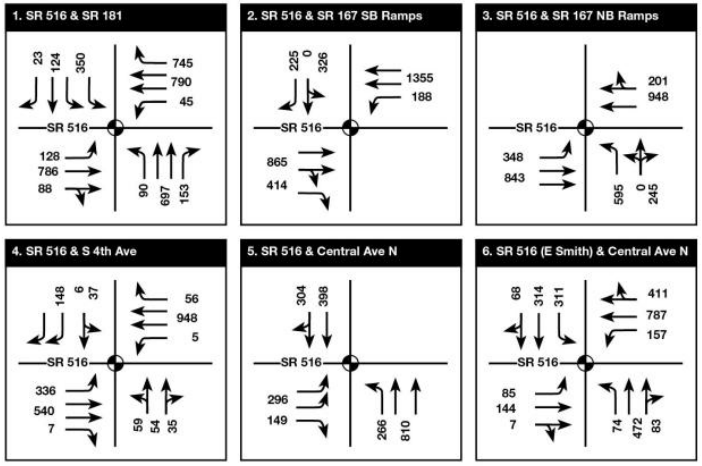
Level of Service

- A - D
- E
- F

1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 AM Peak Hour





LEGEND

- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

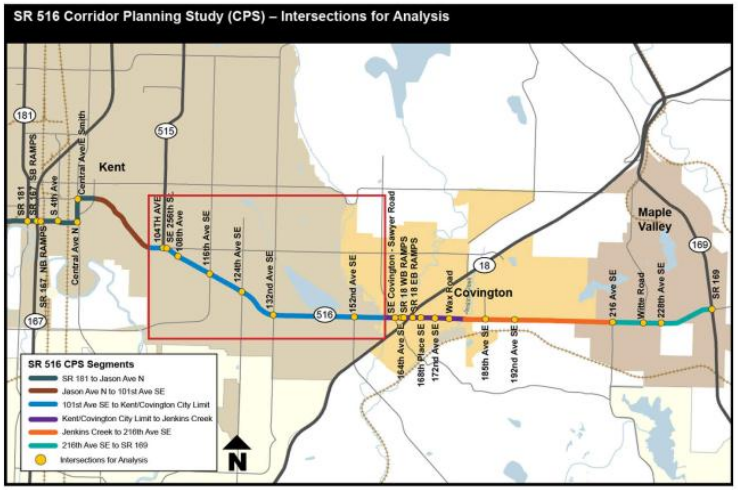
Level of Service

- A - D
- E
- F

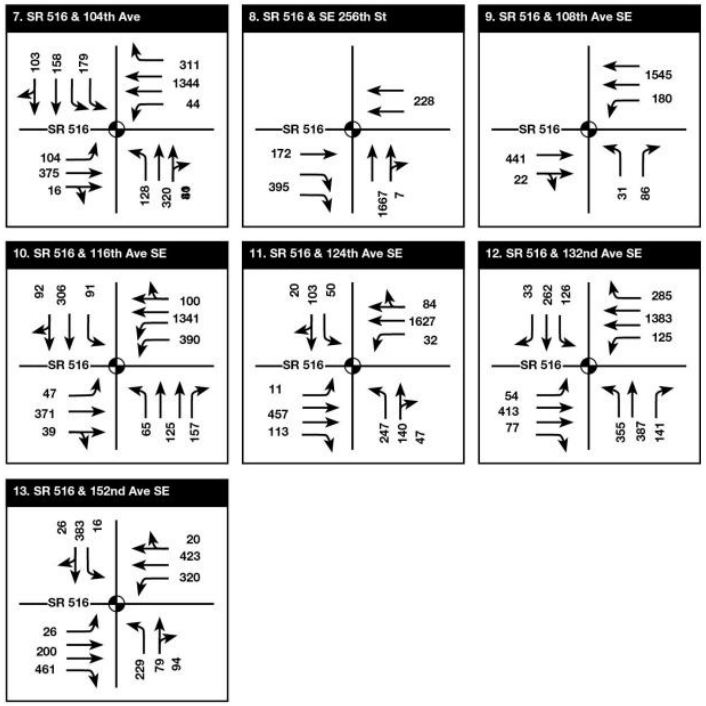
Washington State Department of Transportation

1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 AM Peak Hour



Washington State Department of Transportation



LEGEND

- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
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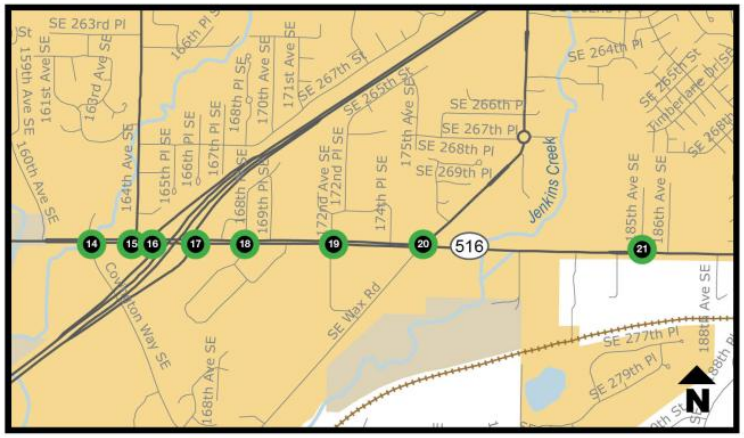
- Location Area

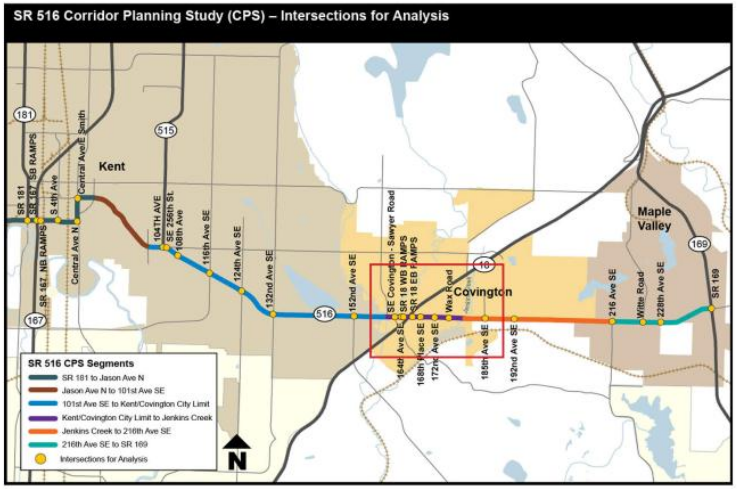
Level of Service

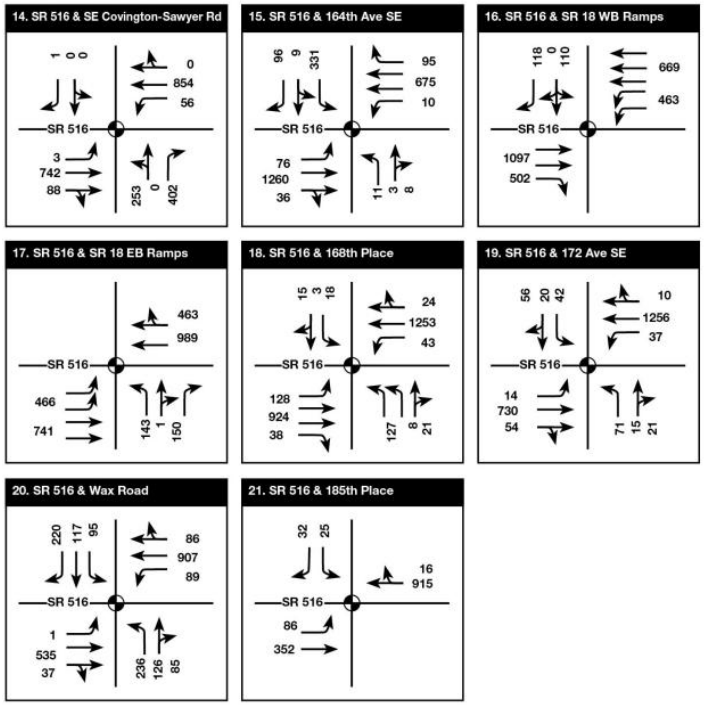
A - D E F

1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 AM Peak Hour







LEGEND

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- Traffic Signal
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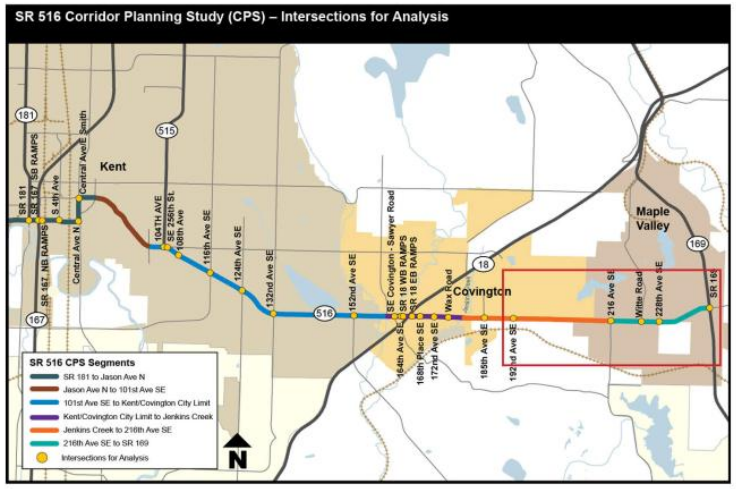
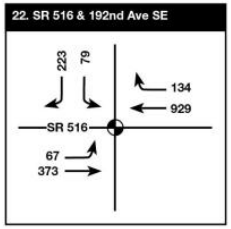
Washington State Department of Transportation

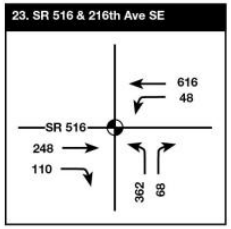
1/23/12

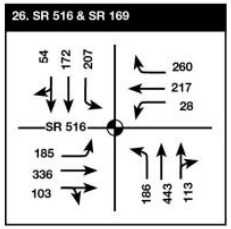
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 AM Peak Hour



Washington State Department of Transportation







LEGEND

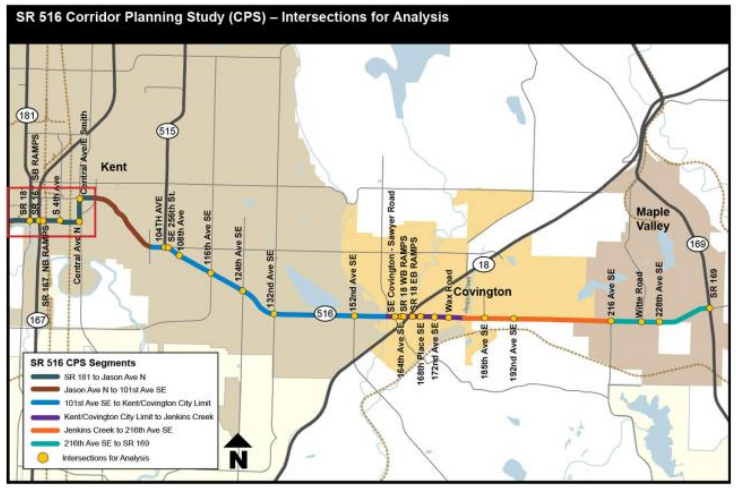
- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

Level of Service

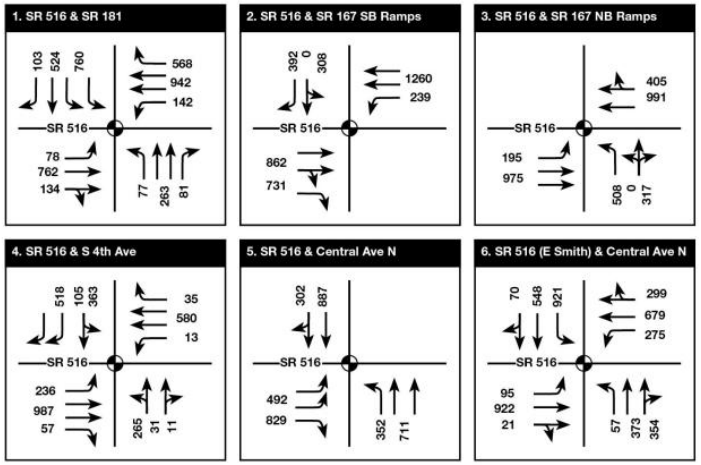
A - D E F

1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 PM Peak Hour



Washington State Department of Transportation



LEGEND

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Level of Service

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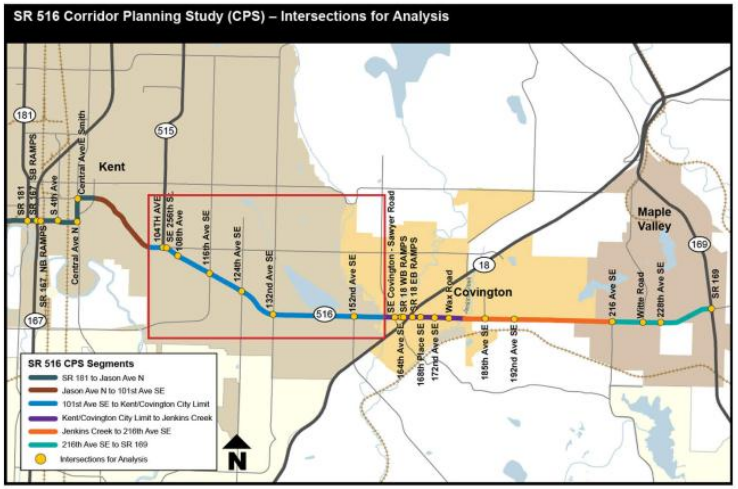
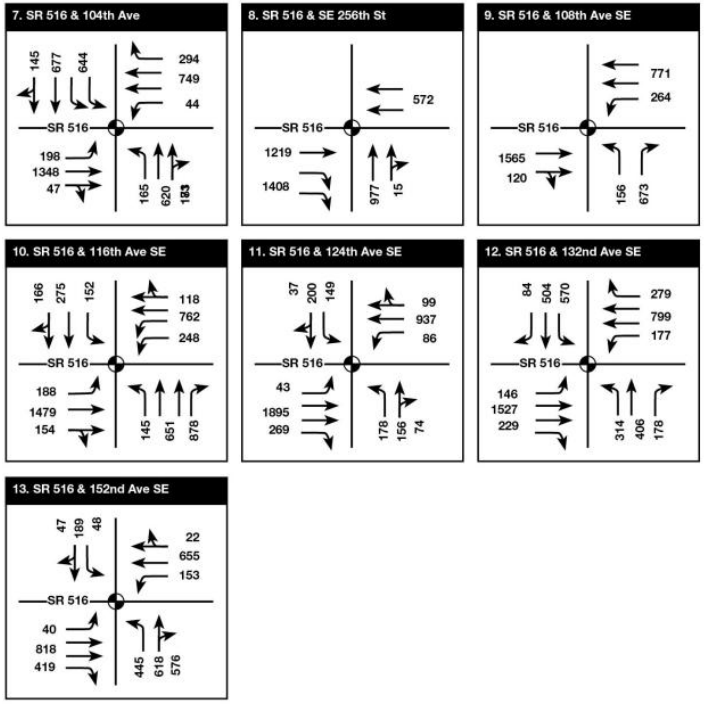
1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 PM Peak Hour



Washington State Department of Transportation



LEGEND

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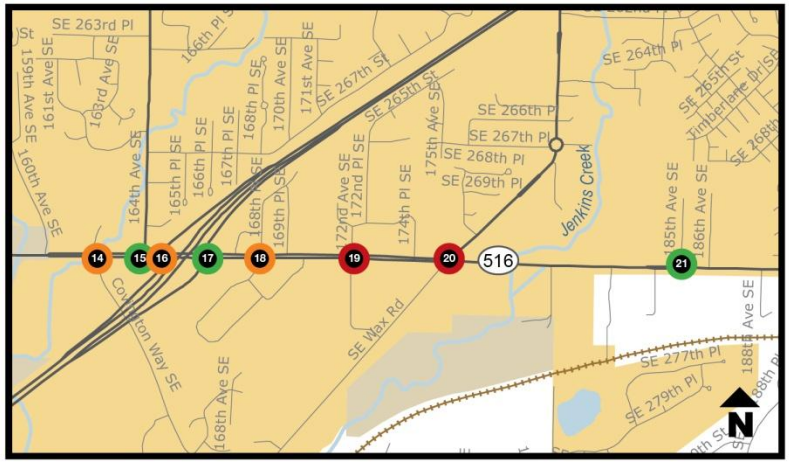
- Location Area

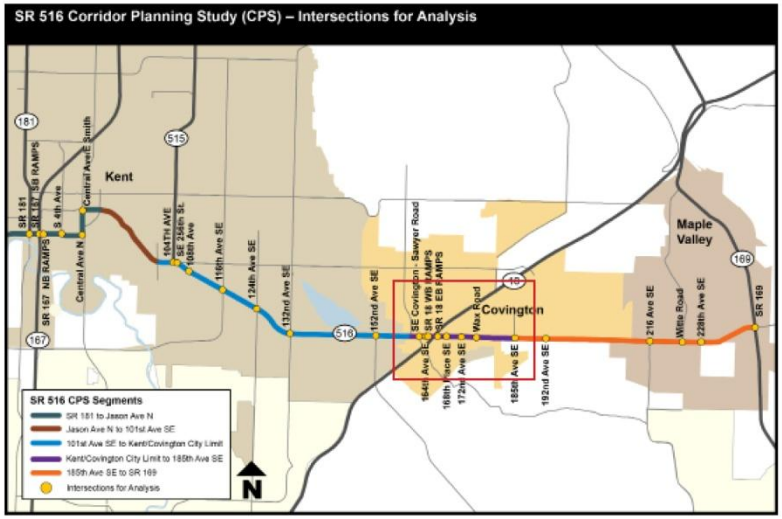
Level of Service

A - D E F

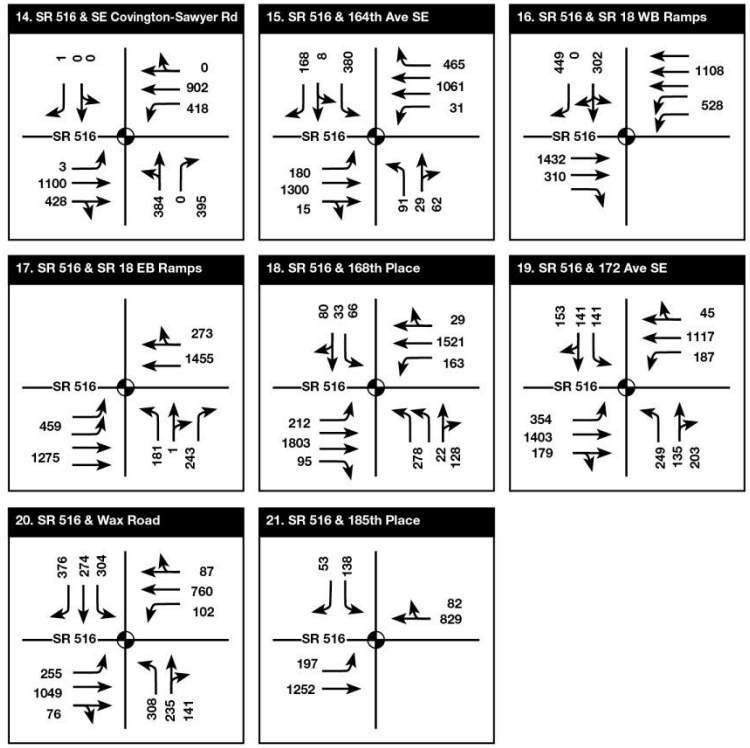
1/23/12

SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 PM Peak Hour





Washington State Department of Transportation



LEGEND

- Turn Lane
- Study Intersection
- Traffic Signal
- City of Kent
- City of Covington
- City of Maple Valley
- Location Area

Level of Service

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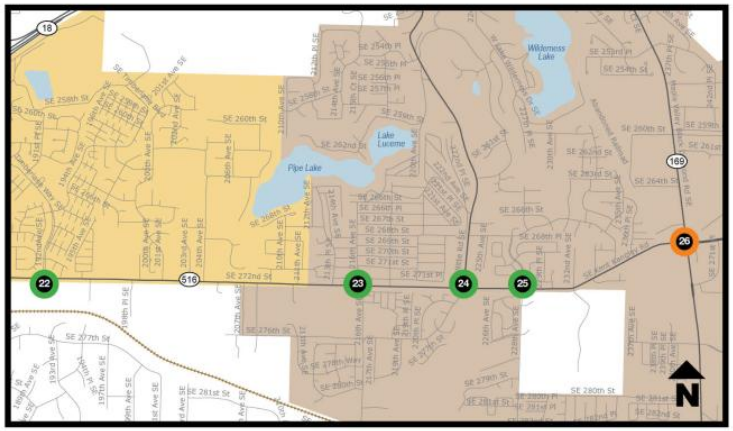
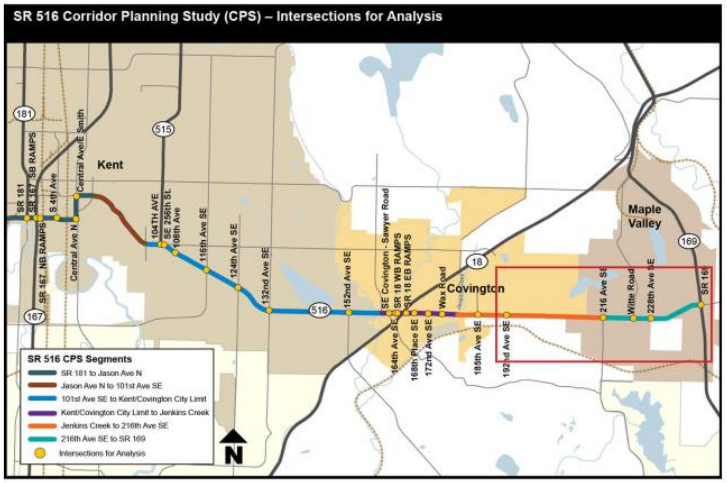
- E
- F

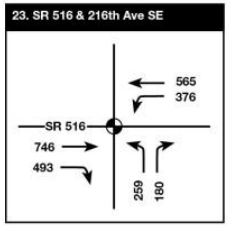
10/24/11

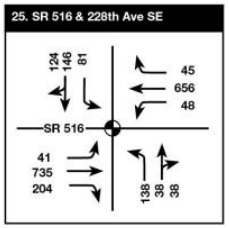
SR 516 CPS – Traffic Volumes, Lane Configurations and LOS
2030 PM Peak Hour

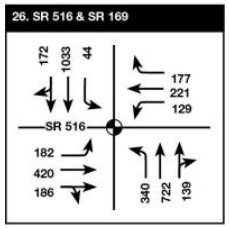




Washington State Department of Transportation







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1/23/12

SR 516: Evaluation of Potential Improvements for Impediments and Determination of Benefit Cost Ratio

Based on traffic analysis and inputs from local jurisdictions, the study team identified short-term (2016), mid-term (2022) and long-term (2030 and beyond) capacity improvement needs of this corridor. While most of the identified capacity improvement needs arise in 2030 and beyond, a few improvement needs arises in the short- and mid-term. These locations with short- and mid-term needs are:

- Jenkins Creek to 185th Ave SE (2016 needs)
- 185th Ave SE to 192nd Ave SE (2022 needs)
- Intersection at SR 516/104th Ave SE (2022 needs)

The study team looked into the potential solutions to address these needs. With collaboration from stakeholders, the team developed the following potential solutions that seem to be adequate to address the identified needs:

- Widening from Jenkins Creek to 185th Ave SE
- Widening from 185th Ave SE to 192nd Ave SE
- Intersection improvements at SR 516/104th Ave SE

The study team conducted field visits, analyzed aerial maps and prepared GIS maps to identify potential obstructions to implementing the solutions. Obstructions include commercial buildings, gas stations, residential units, wetlands, etc. Below are the potential constraints and impacts of possible solutions:

SR 516 and 104th Ave Intersection Improvement would impact:

- A portion of the parking lot of Key Bank at the northwest quadrant
- ARCO gas station at the northeast quadrant (space on the south side of the gas station would be reduced leading to possible relocation of gas station as shown in the image below)
- Starbucks building
- The parking lot of Jiffy Lube (this location has a potential for encountering hazardous materials)
- The drive through of Key Bank

SR 516 widening through Covington (Jenkins creek to 192nd Ave SE) would impact:

Wetlands
Residential properties

Access and egress points to and from SR 516

To figure out the additional right of way needs and the extent of impacts on adjacent properties, GIS maps were prepared showing state highway, and adjacent property lines and parcel numbers with aerial maps as background (examples are shown in **Exhibits 2 and 3**). For each parcel, property values (including land and structures) were obtained from the King County Department of Assessments website (http://info.kingcounty.gov/Assessor/eRealProperty/default.aspx). Right of acquisition cost was calculated by adding administrative cost to the property value obtained from the above website for each parcel.

The study team used WSDOT's planning level cost estimation tool, PLCE, for estimating costs of potential improvements. The tool comes with default quantities per lane-mile and unit costs from historical data of WSDOT's past projects. The default unit prices accounts for differences in area prices, terrain, ground conditions, and design assumptions. The underlying assumption of the methodology is that little or no geotechnical data is known during this early stage of the project development. The methodology and assumptions are documented in the Manual and posted in WSDOT's website (http://www.wsdot.wa.gov/mapsdata/travel/pdf/PLCE_Manual_1_6_2009.pdf).

The study team performed benefit-cost analysis using WSDOT's Mobility Project Prioritization Process Benefit-Cost (MP3BC) software. The tool helps to estimate benefits based on collision reduction and annual 24-hour user travel time savings for 20 years after implementing the project. Costs include right-of-way, engineering, construction, and operation and maintenance over the same 20 years of analysis horizon. A description of the background, benefit-cost calculations, assumptions, methodologies, and procedures is provided in WSDOT's website (http://www.wsdot.wa.gov/mapsdata/travel/pdf/Mobility_Users_Guide_2001.PDF).

A summary of the benefit-cost analysis is provided in **Exhibit 4** below. The potential intersection improvements at 104th Ave SE generates over six times of benefits for the dollar amounts needed to implement the potential improvements. The potential widening projects between Jenkins Creek and 192nd Ave SE would produce less benefits (travel time savings and collision reductions) compared to its costs.

Exhibit 1: 104th Ave SE (looking east).

Exhibit 2: SR 516 and 104th Ave SE Vicinity.

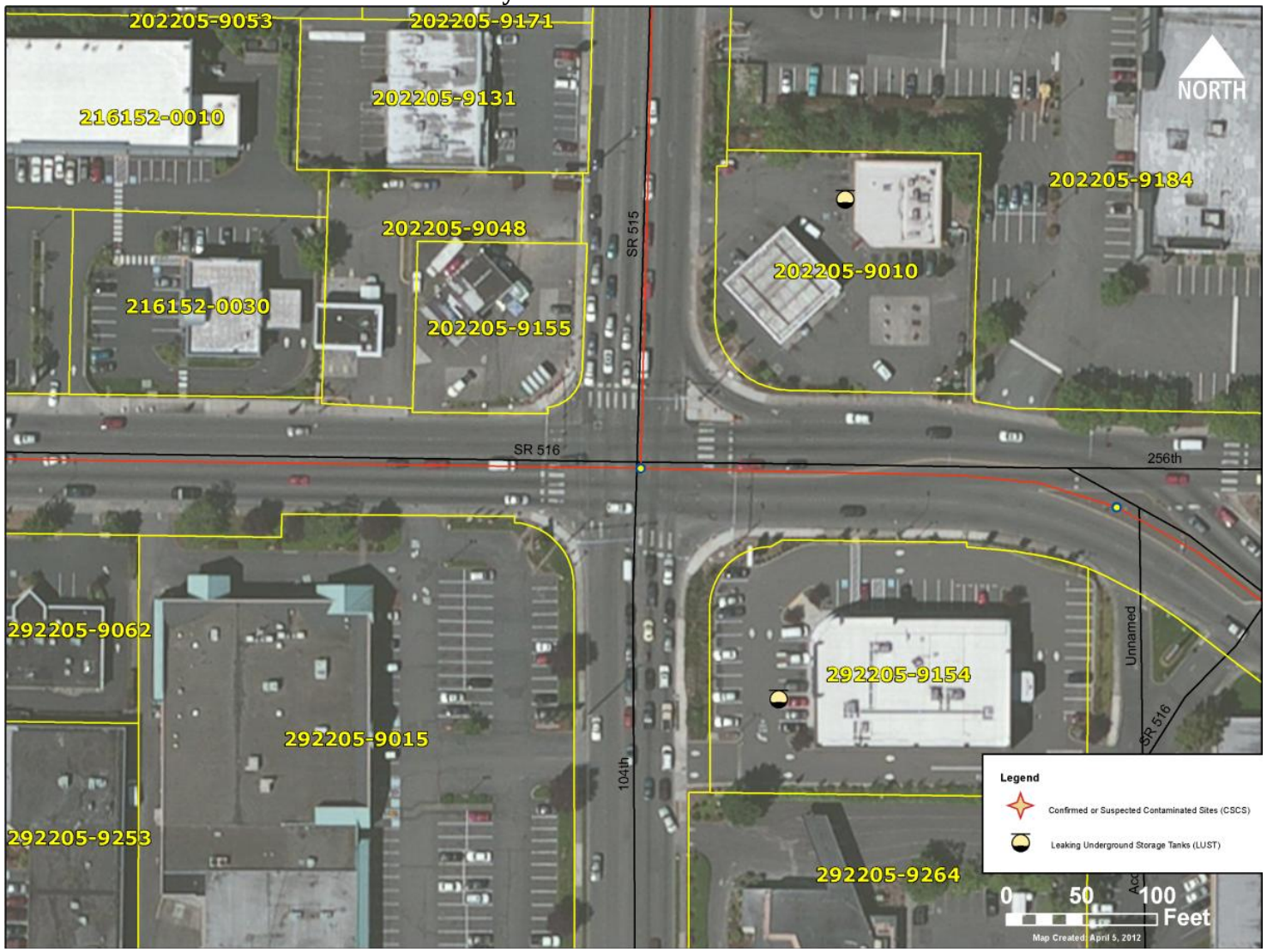

Exhibit 3: A Portion of SR 516 between Jenkins Creek and 185th Ave SE.

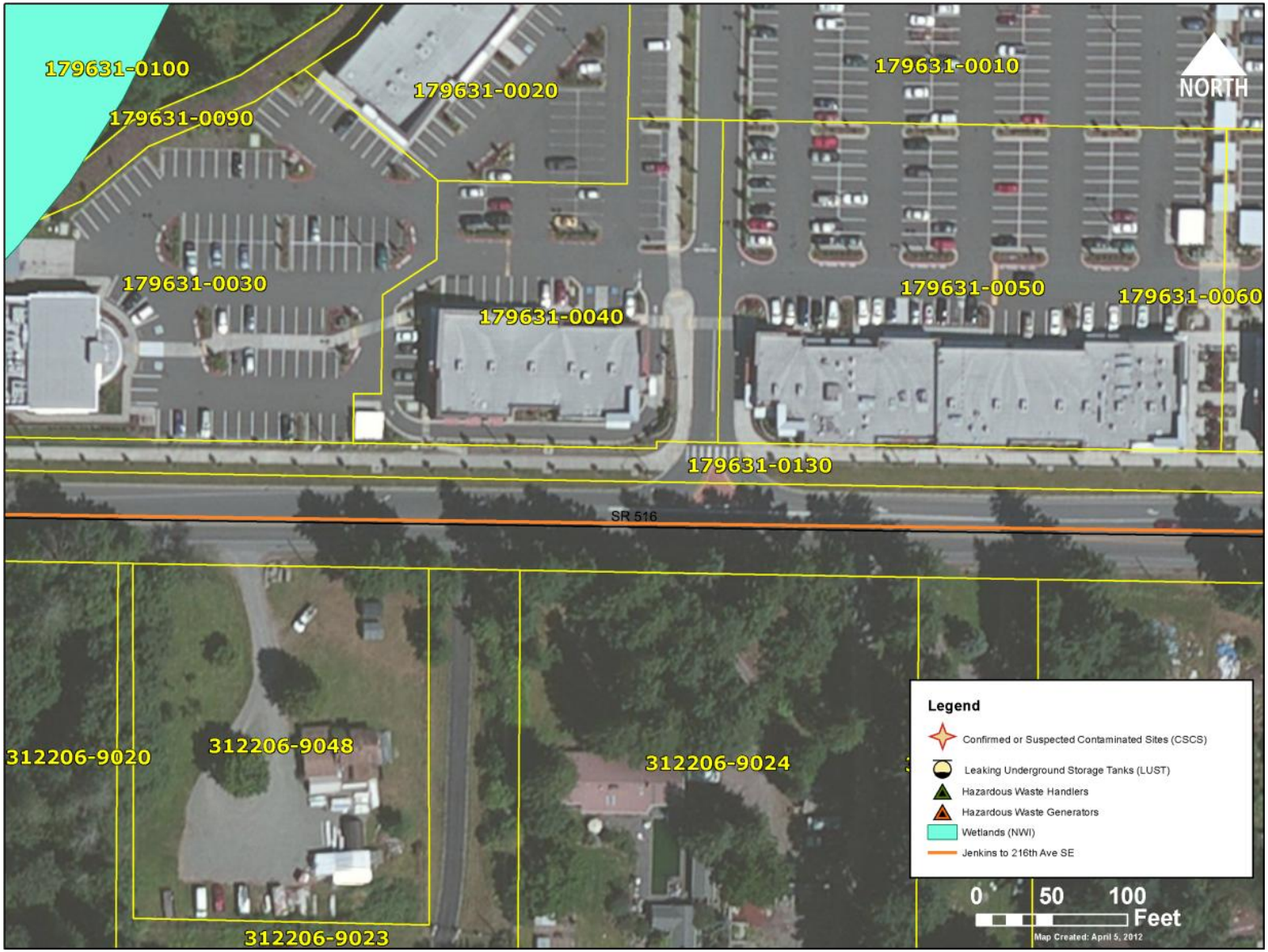

Exhibit 4: Benefit-Cost Analysis Summary.

SR	Begin ARM	End ARM	Location	Project Description	Cost Range	Project Cost (YOE$)							Benefits			B/C Ratio
						PE	ROW	Structures	Drainage/ Grading	Others	Total Project Cost	Cost during Analysis period	Safety Benefit	Travel Time Benefit	Benefit (Present Value)	
516	7.34	-	Intersection at 104th Ave SE	Widen between 101st and 104th to six lanes; add separate northbound, southbound and eastbound right turn lanes; and add a third westbound thru lane between 256th and 104th.	Low	$574,000	$5,813,000	$0	$980,000	$7,275,000	$14,642,000	$11,634,150	$2,423,000	$85,332,000	$87,755,000	7.54
					High	$765,000	$7,751,000	$0	$1,307,000	$9,700,000	$19,523,000	$15,512,250	$2,423,000	$85,332,000	$87,755,000	5.66
516	12.43	12.93	Jenkins Creek to 185th Ave SE	Add a lane each direction	Low	$423,000	$2,232,000	$0	$1,231,000	$6,743,000	$10,629,000	$9,132,200	$2,934,000	$5,092,000	$8,026,000	0.88
					High	$563,000	$2,977,000	$0	$1,641,000	$9,991,000	$15,172,000	$13,175,950	$2,934,000	$5,092,000	$8,026,000	0.61
516	12.93	13.38	185th Ave SE to 192nd Ave SE	Add a lane each direction	Low	$580,000	$676,000	$0	$1,378,000	$7,527,000	$10,161,000	$9,305,600	$2,124,000	$4,801,000	$6,925,000	0.74
					High	$773,000	$901,000	$0	$1,838,000	$10,037,000	$13,549,000	$12,408,350	$2,124,000	$4,801,000	$6,925,000	0.56

Appendix F – Stakeholder Meetings

Corridor Working Group Meetings. The agenda and meeting summaries for each Corridor Working Group are presented on the following pages.

SR 516 Corridor Planning Study Meeting Notes
September 27, 2010, 9:30 AM
Covington City Hall

Corridor Working Group (CWG) Attendees:
Chad Bieren (Kent)
Don Vondran (Covington)
Matt Torpey (Maple Valley)
Doug Johnson (METRO)
Sean Ardussi (PSRC)
Rick Roberts (WSDOT NW Region Traffic)
Thomas Noyes - Richard Warren - Tom Washington (WSDOT Urban Planning Office)

Tom Washington was introduced as the Corridor Planning Study Project Manager for WSDOT. After introductions, there was a brief overview on the study background. The initial funding request by the city of Kent was for $500,000 and was intended to study the SR 167/SR 516 interchange. The funding request went through several iterations in the legislature, and resulted in a $150,000 funding appropriation for the study of the SR 516 corridor from SR 167 (MP 4.92) to SR 169 (MP 16.49). The specific language of the legislation is as follows:

"$150,000 of the motor vehicle account--state appropriation is provided solely for a corridor study of state route number 516 from the eastern border of Maple Valley to state route number 167 to determine whether improvements are needed and the costs of any needed improvements."

WSDOT will conduct the SR 516 Route Development Plan (RDP) "in-house" owing to the limited funding provided by the legislature. Although no end date for the study was specified in the legislation, WSDOT anticipates draft recommendations will be completed by late spring 2011. The local partners in this study include the cities of Covington, Kent and Maple Valley along with involvement from King County (Metro) and the Puget Sound Regional Council. Sound Transit and other appropriate agencies will be consulted during the study process.

There is some traffic data available from the partner jurisdictions. The city of Kent has data from a traffic study conducted about three years ago. The city of Maple Valley has recent traffic data which is being refined and reviewed before it will be released. The final product will be made available for this study. The city of Covington has data from a traffic model update that is about two years old. Covington will also supply the study

with traffic data scheduled to be collected in the next couple of months. All of the local cities' traffic forecast model data sets utilize PSRC's regional model as the baseline for their models and have a horizon year of 2030. The Maple Valley model projections have included growth projections from both Maple Valley's "donut hole" development and a large proposed development within Black Diamond's urban growth area. The forecasts for Covington and Kent might not include this potential growth, but this will be looked into by the respective jurisdictions. The existing traffic data, as well as new data that will be collected in the near future, will be used in this RDP.

There was a question raised about what benefit/cost (B/C) ratio methodology will be used and whether the threshold value is still equal or greater than one in order to be considered. A B/C analysis is required for new projects, but the threshold values within B/C analysis is not entirely clear. This will be confirmed and clarified in advance of the next CWG meeting.

Another question was raised about the effect of PSRC removing the exempt status of SR 516 sections and including all SRs in the recently adopted PSRC's regional plan "Transportation 2040". Will any improvements proposed have to be in the regional plan (T-2040)? Sean Ardussi mentioned that the "Transportation 2040" regional plan updates will be ongoing. Any potential and/or proposed corridor improvements could be considered for inclusion in to the regional plan during the plan amendment process.

Doug Johnson indicated that Metro route #168 has recently increased service on the SR 516 corridor. However, the current Metro budget constraints make any additional future service improvements unlikely. The Metro #168 route service improvements are only funded for three years (through 2013) through a state regional transit mobility grant.

Chad gave an update on the SR 167/SR 516/SR181 interchange area. A Single Point Urban Interchange (SPUI) has been considered by the city of Kent for the SR 167/SR 516 interchange. SR 516, which is also known as "Willis Street" through Kent is also proposed to be grade separated over the Union Pacific Railroad tracks adjacent to the SR 167/ SR 516 interchange. The city Kent would like to see the study focus on the needs at and adjacent to the SR 167 / SR 516 interchange. The city has done traffic modeling of a SR 516 grade separation, but has not analyzed the interchange modifications. Kent does not plan to update their traffic model for several years.

Don expressed Covington's desire to have the SR 516 RDP focus on future transportation project needs to help in funding requests. Maple Valley agreed that the plan should serve to identify needs and focus attention on those potential solutions. Current WSDOT "Moving Washington" policy regarding the use of a three tiered focus for proposing solutions will need to be considered.
Tier 1: Low-cost solutions that deliver a high return on capital investment and have a short delivery schedule. Tier 1 projects include variable message signs, closed circuit traffic cameras, highway advisory radio, incident management, and 5-1-1 travel information.

Tier 2: Moderate-to-higher cost improvements providing lower returns on capital investment are generally considered after applicable Tier 1 solutions have been implemented. These solutions include adding auxiliary lanes, collector-distributor lanes, and HOV direct access ramps.
Tier 3: High-cost projects that deliver corridor-wide benefits. Generally considered after Tier 1 and 2 solutions have been implemented, Tier 3 includes projects adding HOV lanes, High Occupancy Toll (HOT) lanes, and new interchanges.

In an effort to identify current issues, discussion focused on current areas of concern within the corridor. Some of the locations included Jenkins Creek in Covington (lane reduction), Meridian HS area (pedestrian crossings mid block), the SR 18/SR 516 ramp termini, and the SR 167/SR 516 IC with the proximal, at-grade RR Xing's. It was noted the corridor was not currently listed as a Collision Analysis Corridor (CAC) or Collision Analysis Location (CAL), and the current standard for collision analysis was more focused on severity as opposed to frequency. Another traffic issue could involve a possible future logging haul route using the SR 516 in the Four Corners/Ravensdale area in and near Maple Valley. This logging operation is expected to generate approximately 30 to 100 truck trips per-day on the SR 516 corridor.

Next steps

Collect existing traffic data on the SR 516 corridor from WSDOT and local partners (Covington, Kent, Maple Valley).
Determine which model to use for traffic forecasting and existing conditions analysis.
Determine what additional traffic data is needed to complete the analysis.
Collect additional needed traffic data and inputs for the corridor traffic forecasting.

Tom Washington committed to sending out a draft Vision and Goals Statement as well as a draft Group Charter to all the participants for review and comment. After revisions are submitted, final documents will be produced and re-distributed for final approval and signature by the partners. A future meeting is tentatively scheduled for November/December.

SR 516 Corridor Planning Study Meeting Notes
June 16, 2011 1:00PM
Covington City Hall

Corridor Working Group (CWG) Attendees:

Seth Boettcher (Black Diamond)
Steve Clark (Maple Valley)
Glen Akramoff (Covington)
Don Vondran (Covington)
Doug Levy (Outcomes by Levy)
Doug Johnson (METRO)
Sean Ardussi (PSRC)
Matt Torpey (Maple Valley)
Rick Roberts (WSDOT NW Region Traffic)
Richard Warren, Tom Washington, Jana Janarthanan (WSDOT Urban Planning Office)
Faris Al-Memar, Matt Neely, Bill Bennet (WSDOT Programming)

After introductions, the first item covered was a recap of the revised Charter and Vision & Goals documents. Tom will send out copies of the final versions to the CWG next week. The group was also reminded that the study website was up and running (www.wsdot.wa.gov/planning/Studies/SR516Corridor/) and a one pager information sheet was available for distribution to the public via city offices. Some copies were distributed to the group and Tom will send electronic version to the CWG to reproduce and distribute as needed.

Tom reminded the group that, at the last meeting, we discussed areas of special concern along the corridor. Some of the issues/locations included development occurring at the eastern end of the corridor, Jenkins Creek in Covington (lane reduction), Meridian HS area (pedestrian crossings mid block), the SR 18/SR 516 ramp termini, and the SR 167/SR 516 IC with the proximal, at-grade RR Xing's were mentioned. When asked if there were any other areas of particular concern, no new locations or issues were identified.

There will be an outreach effort to elected officials and groups along the corridor to let them know that this study is underway. The group was asked if there should be any additions to the contact list that was distributed via e-mail. There was a question about the state legislature and Tom explained the state officials were also included in the contact list and would include Districts 5, 33, and 47. Tom also asked the CWG if there were other non-elected individuals or groups within their jurisdictions that might be interested in the plan that should be notified. Two groups that were mentioned were Cascade bicycle club and Middle Green River Coalition. They will be included in our outreach effort.

The draft Scope of Work and schedule were discussed and it was decided to allow an additional week for review and comments. Any comments on these drafts should be submitted before June 24th.

Steve asked if a budget will be developed and available to ensure the study is completed, despite the small allocation for the work. A line item budget sheet was not developed due to the assumption that all work will be performed in-house, and the realization that the study allocation will require the use of general planning monies to complete the study. The limited funding will restrict the scope of the work to be completed.

Jana presented the methods and assumptions that will be guide transportation analysis for this study. A methods and assumptions draft memo was distributed to the CWG a week prior to this meeting. Some questions asked were;
Were the Black Diamond MPD's taken into account? – Yes, through local land use plans' inclusion of the developments.
How were intersections identified? – All intersections with arterials were included for analysis. Covington asked that additional five intersections be added for analysis:. SR 516/164th Ave SE, SR 516/168th Place SE, SR 516/172nd Ave SE, SR 516/185th Ave SE, and SR 516/192nd Ave SE.
How did the housing and employment numbers get developed? – From the local comprehensive plans and PSRC projections.
How will sustainability, multimodality LOS standards, freight performance, GHG, and "whole streets" issues be addressed? – Standards do not exist currently that would allow a quantitative measurement of multi-modal LOS. Benchmarks do exist. An 18% reduction of green house gasses is included as a goal in PSRC's regional plan, but definitive ways to determine what strategies might get us there are not available. Some discussion of at least presenting a VMT comparison of past, present, and future may at least indicate an idea of what the proposed solutions might represent in these areas. This qualitative approach would be in keeping with the limited budget and still try to address these issues. Perhaps the model could identify potential "hot spots" along the corridor.
Can the method of "melding" the different models (local/regional/state) be better explained? – This will be carried out in the Transportation analysis report.
How will safety issues be looked at? – WSDOT has a new safety analysis software package named "Traffic Safety Analyst" and will be used in the analysis of this corridor.
Pavement condition graphic does not reflect recent work in Covington. – The graphic will be updated to reflect the recent work.

After discussion and questions, the methods and assumptions presented were accepted by the group for use in analyzing the corridor. The five additional intersections proposed by Covington will be incorporated into the study.

Doug was concerned that the draft schedule indicated that recommendations would not be available in time for the 2012 legislative session and potential funding. We will look into trying to compress the work schedule but the realities of coordination, review,

oversight, and final approval may present challenges for a faster turnaround. Faris also reminded the CWG that the planning process was intended to feed the Highway System Plan, and with that in mind, the SR 516 projects identified by the study will be assessed on a statewide basis of need and prioritized as appropriate.

Next steps-
Tom will send out the final charter, vision and goals to the CWG
The CWG will have written comments on the draft scope of work and Methods and Assumptions memo to Tom by June 24th.
The one-pager information sheet will be sent to the CWG for printing and distribution as needed.
Outreach and notification of the study will be sent electronically to the appropriate elected officials by the end of the month. Tribal outreach to the Muckleshoot and Yakama Tribes will be completed before the end of the month
Cascade and Middle Green River Coalition contacts will be made before the end of the month.
The next CWG meeting is tentatively scheduled for September but may be moved to an earlier date if feasible.
The scope of work will be modified to address GHG and complete streets issues.

Meeting adjourned at 3:00PM

SR 516 Corridor Planning Study Meeting Notes
November 16, 2011 1:00PM to 2:30PM
Covington Council Chambers

Participants
WSDOT – Stacy Trussler, Richard Warren, Jana Janarthanan, Tom Washington, Faris Al Memar, Rick Roberts, Janice Helmann
Kent – Chad Bieren
Covington – Don Vondran, Glenn Akramoff, Salina Lyons
Maple Valley – Steve Clark, Matt Torpey
Black Diamond – Seth Boettcher
KCMetro – Doug Johnson

Went through the history of the study, the method and assumptions, and timeframe. Earlier meeting with Kent (11/4) reviewed. JJ delivered the study analysis and results. TW covered the last CWG meeting on June 16th. Went over growth assumptions, analysis methodology, and WSDOT prioritization criteria. Areas of concern included SR 516/SR 167 IC area (RR Xings), Kent Meridian high school area ped crossing issues, SR 516/SR 18 ramp termini, Jenkins Ck structure replacement, and the timing of draft results being developed and released.

Meeting with Kent November 4th covered the findings of the RR crossing analysis. No project proposed, but we will make a recommendation for further study of the SR 516/SR 167 interchange area.

Our study results did not show a need for grade separations at the two RR crossings to the east of SR 167. One recommendation will be for an additional study of the SR 167/SR 516/ SR 181/ RR Xings area with a much more detailed analysis, i.e.-micro-simulation, should improvements to SR 167 be implemented. Our modeling efforts were more macro/corridor focused.

Reviewed collision data for the years 2005 thru 2009. Corridor is not on the CAC or CAL lists. Using SafetyAnalyst, most of the severe and fatal collisions seemed to be associated with DUIs and random in location, season, and time of day. No geometric solutions were indicated. No specific safety improvements were identified in the study corridor. Current safety project in Kent between 104th and 124th is aimed at pedestrian safety. The focus of the project is to the east of the high school by 0.2 miles. Alcohol related collisions may be targeted by enforcement and education. Additional lighting at bus stops would be a possible safety improvement as well as helping promote transit use.

Projections for 26 intersections and proposed improvements at 12 of those intersections were reviewed.

No widening projects were identified. Areas were identified as substandard in speed (under 70%) but they were either highly developed (and signalized) or marginally

deficient. DV- Surprised that the study did not show the need for widening between Jenkins Creek and 216th. Previous work done by the city indicates otherwise. More refined analysis may be needed to clarify if a project would be recommended. The city has a concern with the possible perception that WSDOT is not supporting local improvement efforts within the corridor. WSDOT will investigate further, perhaps with a refinement in the segment section to isolate a smaller portion for analysis.

TW Re-clarified the Moving Washington priorities and the fact that the recommendations will be subject to ranking against other projects throughout the state.

TDM thoughts
Telecommuting options, School ride sharing, DMU transit options should be included, transit must be efficient/reliable/etc to compete with SOV, increased transit service between four corners and Auburn, 100 stall P&R at four corners planned. TDM measures could reduce future traffic volumes by five percent over the next 20 years. A five percent reduction would eliminate the need for at least two intersection improvements.

General comments

SB- Urban centers focus- what can be done to make suburbia more attractive to industry? Can WSDOT advocate or purchase future ROW? (TW- Usually no- unless we have an actual project in the works, at least partially funded by the legislature. RDP's in the past were used by local jurisdictions to condition future development to dedicate ROW or require setbacks.) ST- rare occurrences have created budgets for advance ROW purchase, but only in exceptional cases - i.e.-SR 167 extension/SR 509 extension)

SC-The plan should have a vision of the corridor for the future. Layout, capacity improvements, geometrics, profiles, should be coordinated. Whole streets programs, sidewalks, separations, rebuild existing infrastructure to reflect "outside the box" thinking.

Draft report tentatively scheduled for release by February 2012. Chapters to be reviewed electronically as they become available. There were no objections raised to future communications being carried out electronically.

Adjourned