City of Longview

1525 Broadway
Longview, WA 98632
www.ci.longview.wa.us

City Council

Mayor MaryAlice Wallis
Mayor Pro Tem Michael Wallin
Council Member Ruth Kendall
Council Member Chet Makinster
Council Member Steve Moon
Council Member Christine Schott
Council Member Hillary Strobel

Thursday, March 11, 2021 **6:00 PM** **Virtual Meeting**

NOTICE IS HEREBY GIVEN, in accordance with RCW Chapter 42.30, that the City Council of the City of Longview, Washington, will conduct a virtual Zoom meeting on Thursday, March 11th, at 6:00 p.m.

For information about Zoom accessibility, please contact the City Clerk's Office at 360-442-5041.

Please click the link below to join the meeting:
https://us02web.zoom.us/j/84727549328

Telephone options (you may need to try more than one number if you receive a busy signal):

Dial any of the following numbers:

1-253-215-8782
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1-301-715-8592
1-312-626-6799

Meeting ID: 847 2754 9328

1. **CALL TO ORDER**
2. **ROLL CALL**
3. **WORKSHOP**

21-000606 SR4 CORRIDOR PLANNING STUDY PRESENTATION

RECOMMENDED ACTION:
NONE

4. ADJOURNMENT

NEXT REGULAR COUNCIL MEETINGS:
THURSDAY, MARCH 25, 2021- 7:00 P.M.
THURSDAY, APRIL 8, 2021- 7:00 P.M.

City of Longview

Agenda Summary

SR4 CORRIDOR PLANNING STUDY PRESENTATION

RECOMMENDED ACTION:
NONE

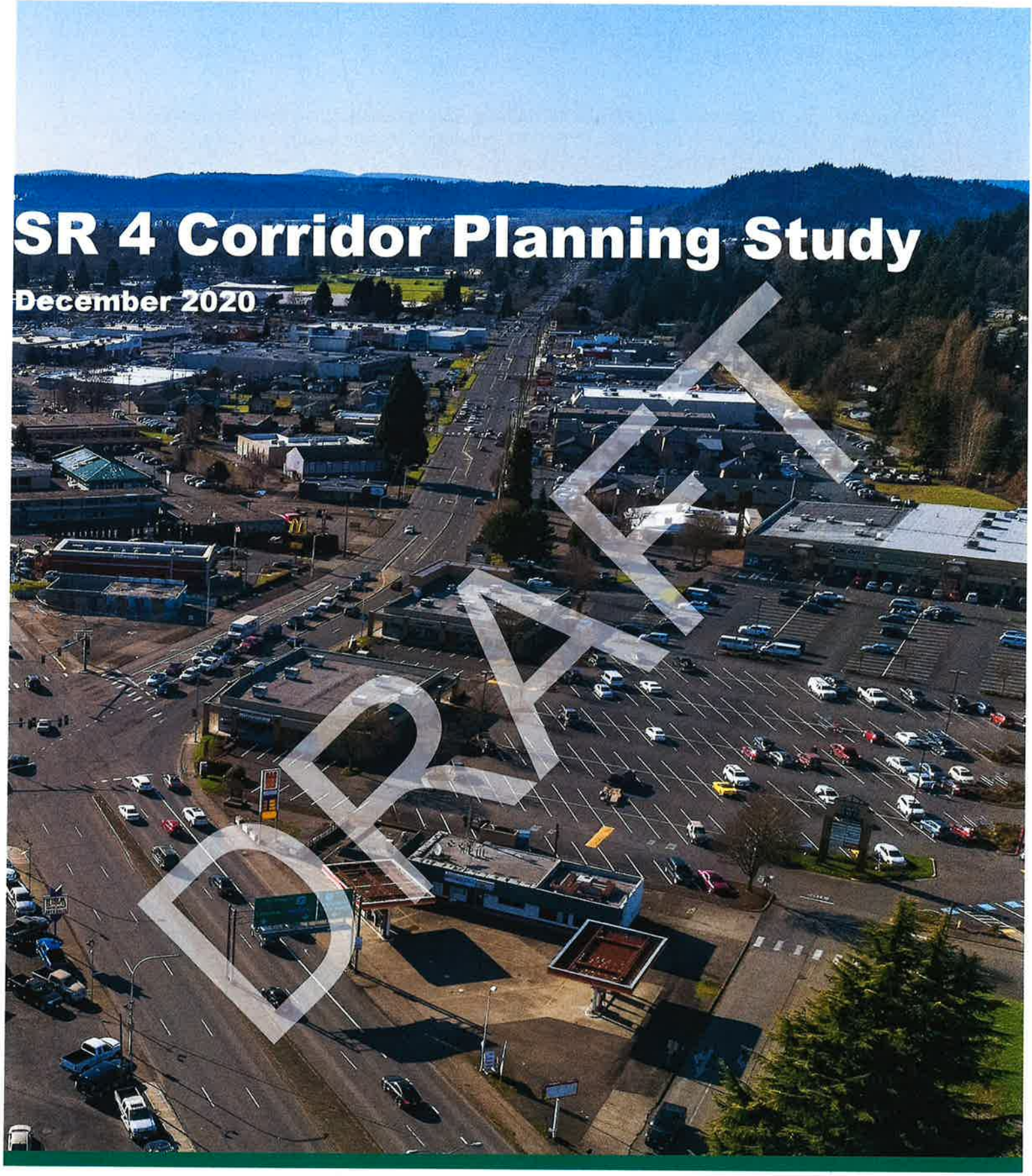
COUNCIL STRATEGIC INITIATIVE ADDRESSED:
Improve transportation systems.

SUMMARY STATEMENT:
Washington State Department of Transportation is in the final stages of completing their SR4 Corridor Planning Study. This study represents almost 18 months of cooperative planning between WSDOT and local government. The plan will layout a vision for improvements for the corridor, from Kelso High School through Coal Creek Road. The plan is a long-range vision for this very important corridor through our City. Attached you will find the study and a PowerPoint presentation.

STAFF CONTACT:
Ken Hash, Public Works Director

Attachments:

1. OBH Study - KH
2. Longview Council Meeting slides 2021-03-11



WSDOT

Cowlitz-Wahkiakum Council of Governments

The City of Longview Washington

KELSO

Cowlitz County

RiverCities Transit

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I. SR 4 Couplet Vicinity Study – Synchro Reports
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L. SR 4 Ocean Beach Highway Study – Access Management
M. Ocean Beach Highway: Cowlitz Way to 32nd Avenue
N. SR 4 Corridor Query Tool User Guide

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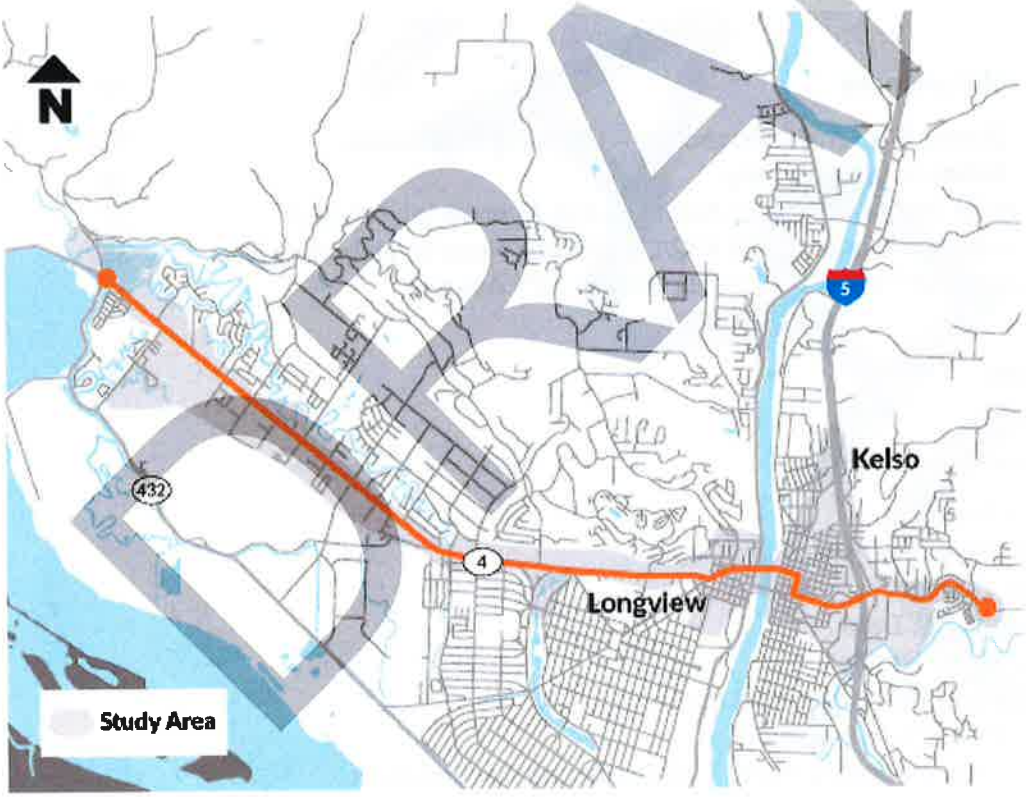
1. Introduction

WSDOT's State Route 4 Corridor Planning Study is intended to define, support and prioritize strategic and actionable outcomes for the long-term economic development of the corridor. The planning study aims to improve the overall connectivity and mobility in the study area, improve safety by reducing potential conflicts between modes, and enhance economic vitality.

The study area extends from Crescent Drive on the east to Coal Creek Road on the west, passing through the City of Kelso, the City of Longview and unincorporated Cowlitz County. In Kelso, State Route 4 includes Allen Street, North 4th Avenue, North 5th Avenue, and Cowlitz Way. In Longview, State Route 4 is Ocean Beach Highway. See Figure 1 for an overview of the study area. For a detailed map of the study area, see Appendix A.

The current comprehensive plans adopted by Cowlitz County, Kelso and Longview address and support the goals of the SR4 Corridor Planning Study. All three comprehensive plans envision a local transportation system with improved connectivity, mobility, safety and economic vitality. Specific comprehensive plan policies as they relate to the study goals are listed in Appendix B.

Exhibit 1 – Study Area



Map Source: WSDOT Communications

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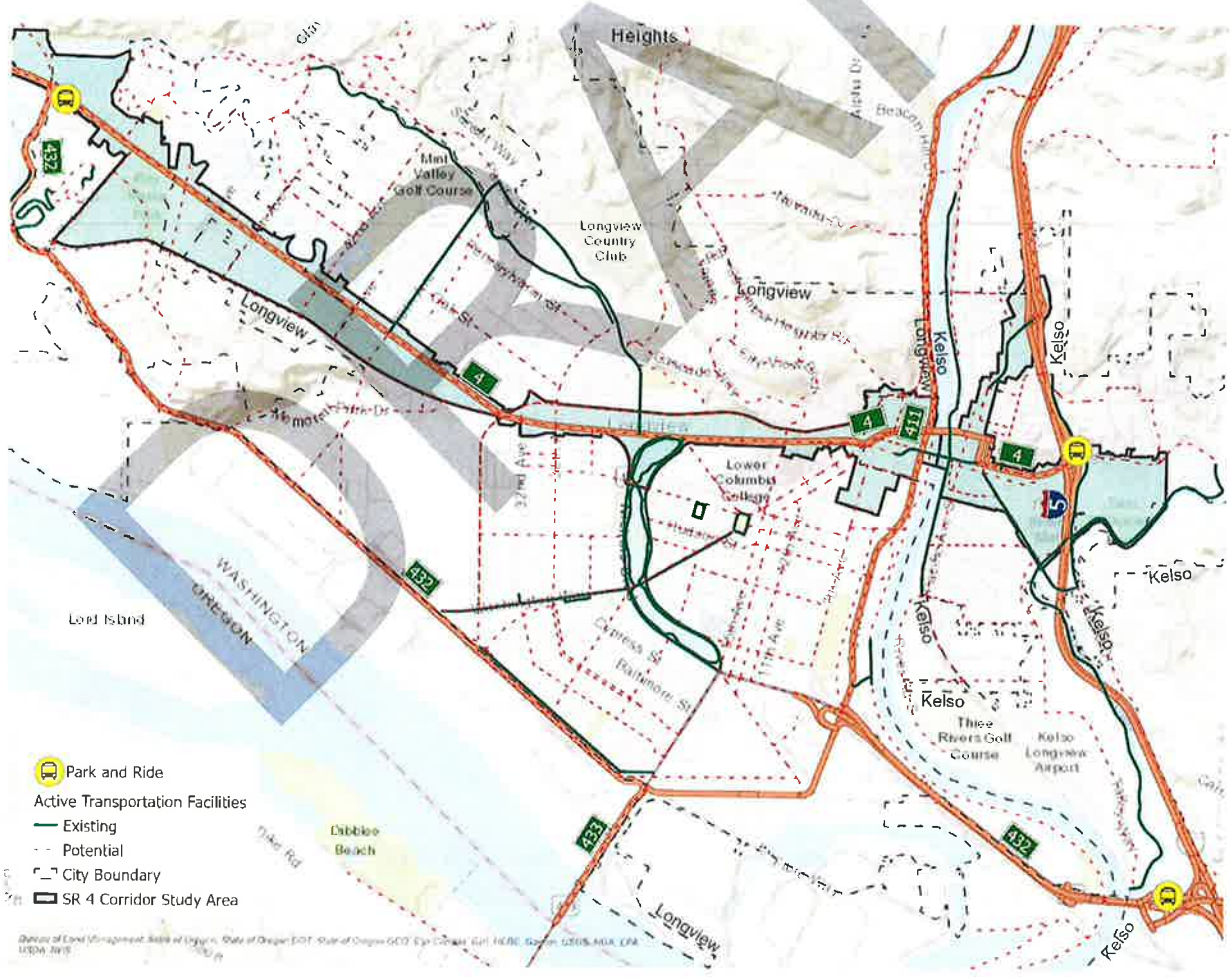
2. Existing Conditions

2.1 Overview of Existing Transportation Infrastructure

The SR 4 corridor between I-5 and Coal Creek Road is a major principal arterial serving the urban city centers of both Longview and Kelso. From SR 432 to I-5, SR 4 is 7 miles long. Within the study area, the Level of Service (LOS) standard for SR 4 is D. WSDOT, CWCOG, Longview and Kelso have all conducted traffic counts for this planning study. Average daily traffic volumes vary from approximately 10,000 vehicles per day at the west end, to over 25,000 vehicles per day near I-5. See Appendix C for traffic counts on SR 4 within the study area.

Traffic volumes along the majority of the study corridor are well under the carrying capacity of the roadway, with volume-to-capacity ratios at or below 0.6. The notable exceptions are Allen Street between 4th and 8th Avenues, Ocean Beach Highway between Olympia Way and 32nd Avenue – both with ratios ranging from 0.7 to 0.8 – and the Cowlitz Way Bridge, which operates very near its maximum capacity. More V/C information is available via the SR 4 Corridor Query Tool (see Section 3.4 and Appendix N for details).

Exhibit 2 – Existing and Proposed Active Transportation Infrastructure



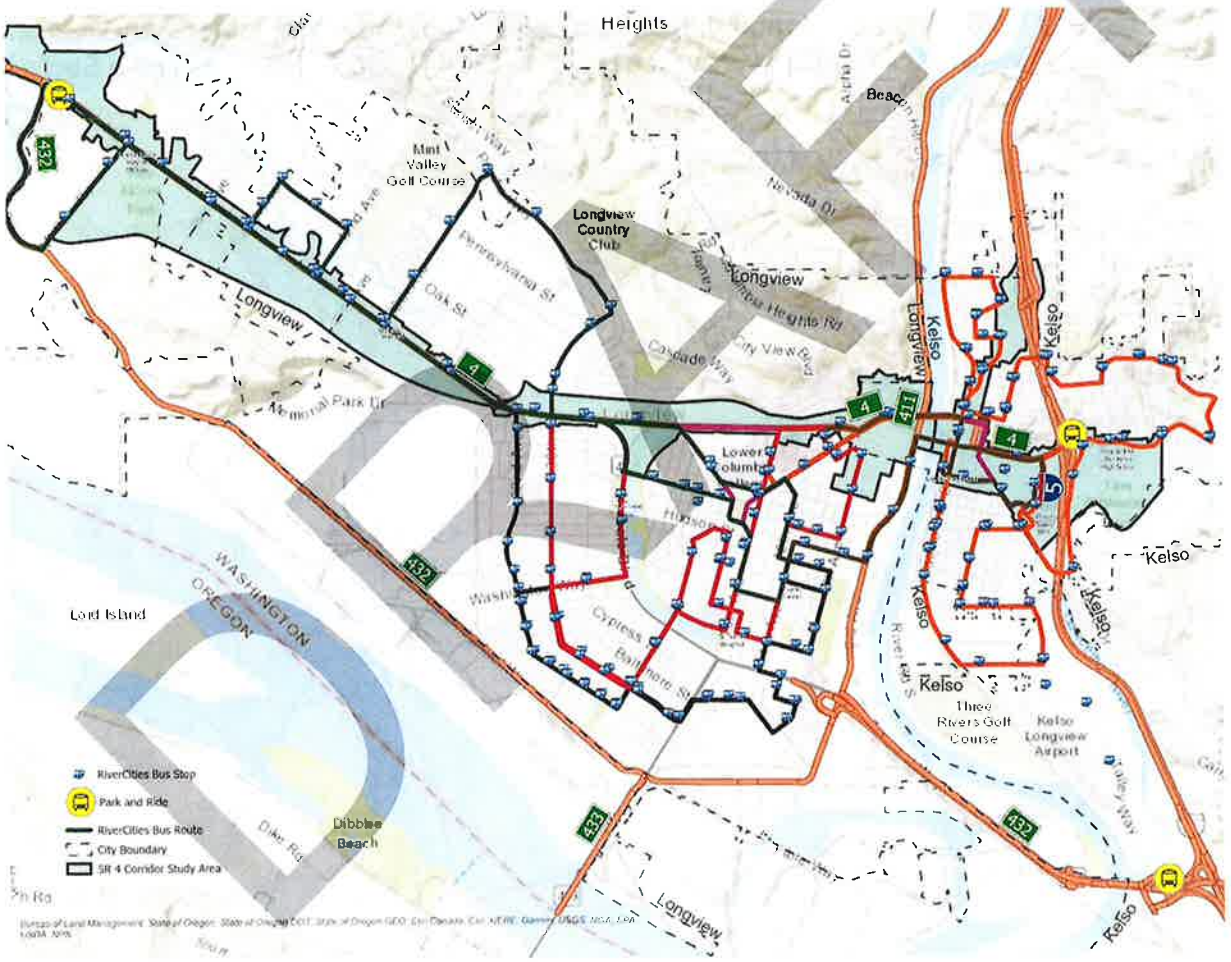
Map Source: CWCOG

The street networks of Kelso and Longview were intentionally designed with relatively small blocks, which are ideal for walking and biking. Areas with newer development, especially in the western half of the study area, are designed in a more auto-oriented manner. This segment of the study area lacks roadways running parallel to SR 4 (Ocean Beach Highway).

As of 2017, the Longview-Kelso-Rainier Metropolitan Planning Organization (MPO) area has 28.34 miles of existing bicycle facilities, according to CWCOG's Bicycle & Pedestrian Assessment. A map of existing and proposed active transportation infrastructure in the Longview-Kelso area is below.

The study area is served by multiple public transportation providers. RiverCities Transit provides both fixed route and on-demand transit service. The study area is served by all seven RiverCities fixed routes. A current RiverCities system map is shown below in Figure 3.

Exhibit 3 – RiverCities Transit System Map



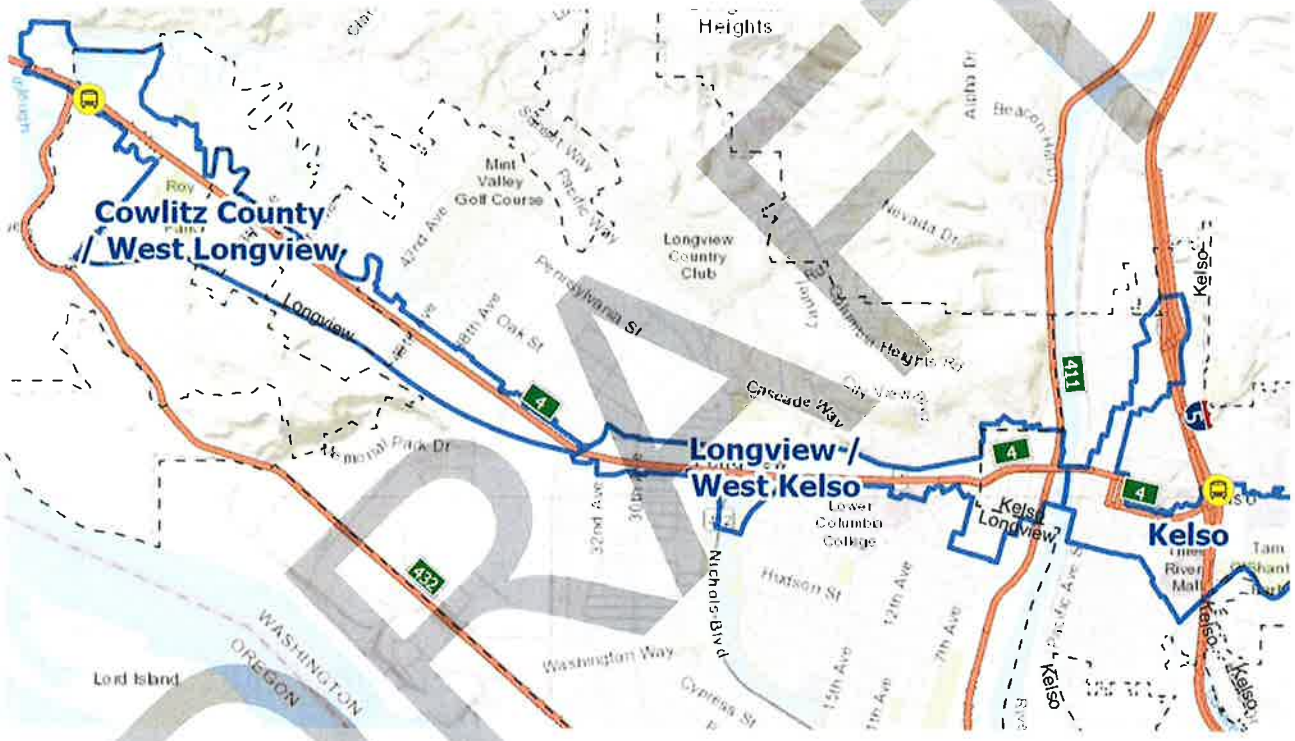
Map source: CWCOG

In addition to RiverCities Transit, the Cowlitz Tribe, Lower Columbia CAP, Catholic Community Services and Disabled American Veterans all provide on-demand transportation services in the study area. Wahkiakum on the Move provides bus service Monday through Friday from Cathlamet to Longview and Kelso for residents of Wahkiakum County. CC Rider provides bus service for Columbia County, Oregon residents to Longview and Kelso. The Kelso-Longview Amtrak station and

Greyhound station are located within the study area in downtown Kelso, and provide both regional and long-distance transportation connections.

Two Park-and-Ride facilities are located within the study area – one at Minor Road and Allen Street in Kelso and one at Coal Creek Road and Ocean Beach Highway in Cowlitz County, west of Longview. The Kelso facility is often at or near capacity on weekdays, but the Coal Creek facility is mostly underutilized. The locations of these facilities are shown in Figure 4. The 2045 Regional Transportation Plan, which is available on CWCOG's website, inventories all Park and Ride facilities within the Southwest Regional Transportation Planning Organization area.

Exhibit 4 – Park & Ride Facilities



Map Source: CWCOG

The study area is challenged by frequent access connections, especially along SR 4 (Ocean Beach Highway) in Longview. These frequent access connections lead to conflicts between vehicles, as well as conflicts between modes. 80% of all crashes on SR 4 from Coal Creek Road to Interstate 5 were related to an intersection or driveway.

Throughout the study area, SR 4 is classified as a T-3 freight corridor, which indicates that it carries between 300,000 and 4 million tons of truck freight per year. Much of the freight traffic directed to or from the Port of Longview is routed onto SR 432, which is outside of the study area and is considered a strategic freight corridor.

For more details on the area's transportation infrastructure, please refer to the 2045 Regional Transportation Plan, which is available on CWCOG's website.

2.2 Safety Context

From January 2014 – December 2018 there were 970 crashes on SR 4 between MP 55.24 and MP 62.23, Coal Creek Rd to end of SR 4 near I-5, including the couplet in Kelso. In that time there were two fatal crashes and 11 serious injury crashes. Of these 13 fatal and serious crashes, six involved pedestrians and four involved bicyclists. Exhibit 5 shows crash frequency data on SR 4 between 2014 and 2018, organized by the severity of the crash.

Exhibit 5 - Crash Frequency by Severity

Description	2014	2015	2016	2017	2018	Total	%
Fatal (K)	0	1	0	0	1	2	0.2%
Serious Injury (A)	1	4	3	1	2	11	1%
Evident Injury (B)	17	12	9	19	10	67	7%
Possible Injury (C)	60	50	65	62	55	292	30%
Property-Damage-Only(O)	114	137	103	132	112	598	62%
Total Crashes (KABCO)	192	204	180	214	180	970	100%

Source: WSDOT Collision Data Warehouse

The largest portion of crash types on SR 4 in the study area are rear end crashes. There are several intersections throughout the corridor, signalized and unsignalized, where vehicles must stop for

Exhibit 6 – Crashes by Time of Day

Source: WSDOT Collision Data Warehouse

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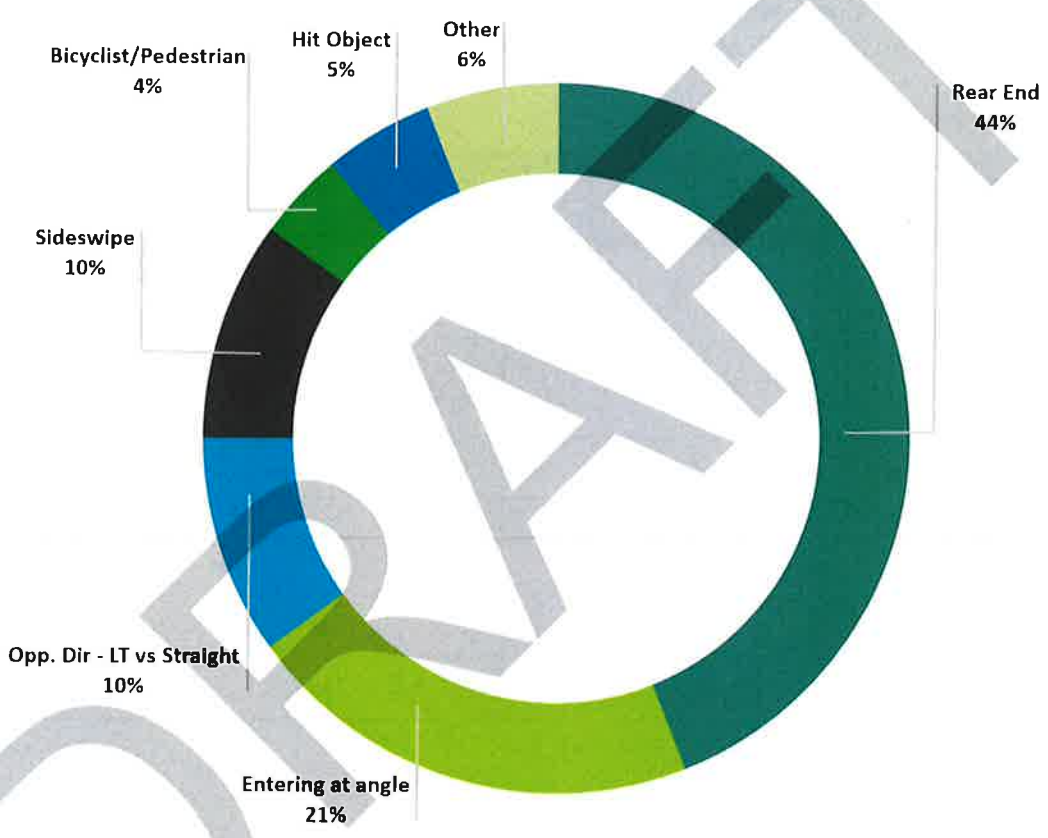
traffic control or grant right of way to others that causes them to slow or come to a complete stop. Nearly three quarters of the 428 rear end crashes were at or related to a driveway or intersection. This crash type is most common in the afternoon and evening. Figure 5 shows crashes by time of day on SR 4 within the study area.

At angle crashes account for about 21% of crashes. Of those, just over half are attributed to not granting right of way or disregarding a traffic signal. The other major contributing circumstance is driver inattention. Figure 6 shows crashes by type on SR 4 within the study area.

Exhibit 7 – Crashes by Type



Source: WSDOT Collision Data Warehouse

There were 41 reported bicycle and pedestrian crashes on SR 4 in the five year crash history. These resulted in the following severities: 2 fatal, 8 suspected serious injury, 12 suspected minor injury, 17 possible injury, and 2 property damage only.

Intersection and driveway crashes account for 85% of the crashes with bicyclists and pedestrians (7 at driveways and 28 at intersections). 21 of the 28 crashes at intersections were signalized, and nearly half of these were caused by the pedestrian or bicyclist crossing against the WALK signal. Of all bicyclist and pedestrian crashes, 24 of the 41 were not caused by the driver of the vehicle.

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2.3 Demographics Overview

A key component of all WSDOT planning efforts is an analysis of potential project impacts as they relate to historically underserved community members. Compared to the State of Washington as a whole, the jurisdictions impacted by the SR4 planning study have a notably higher share of the population that is disabled and/or experiencing poverty. Additionally, the study area population is growing at a much slower rate than the state as a whole.

WSDOT's four-factor analysis found that 3% of the study area population has limited English proficiency. WSDOT will make all reasonable attempts to accommodate language access needs if requested by residents or stakeholders. A description of WSDOT's four-factor demographics analysis is contained in Appendix C. Detailed demographics data can also be found in Appendix C. Exhibit 8 provides an overview of the study area demographics.

Exhibit 8 – Demographics Overview

	State of Washington	Study Area	Kelso	Longview	Cowlitz County
Population growth (2010 to 2018)	12.1%	3.4%	3.2%	3.5%	6.4%
Disabled population (younger than 65)	9.0%	Data not available	17.1%	19.0%	15.9%
Persons in poverty	11.0%	28.8%	28.7%	23.0%	16.4%
Median household income	$66,174	$37,352	$35,680	$38,689	$49,804
Residents 65 and over	15.4%	20.2%	12.6%	20.5%	18.9%
Residents under 18	22.1%	22.6%	24.9%	22.9%	23.0%

Sources: US Census, American Community Survey and Esri

2.4 Land Use

Land use along the SR 4 corridor is largely commercial, with pockets of residential land use in the study area. The commercial nature of the corridor is evidenced by the higher daytime population of the study area – the total daytime population is 9,029 people as compared to the resident population of 6,916 (Community Profile, Appendix C). A profile of business types within the study area boundaries can be found in Appendix F.

Although most of the land within the study area is developed to some extent, individual parcels are underutilized. The largest pockets of vacant land within the study area are located in Kelso and the far western end of the study area. See Appendix G for a map of all vacant and underutilized land in the vicinity of the SR 4 corridor.

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2.5 Economic Development

All three partner jurisdictions prioritize economic development in the transportation sections of their comprehensive plans. The stakeholders involved in the SR 4 Corridor Planning Study process have emphasized the importance of facilitating economic development when making decisions impacting the transportation network.

The City of Longview 2019 Comprehensive Plan Update prioritizes livability as an economic development issue for the City (Policy TR-D.2.5). This is also an issue for the City of Kelso and Cowlitz County as a whole, although their comprehensive plans do not explicitly address livability as a component of economic development. All three jurisdictions are growing at a notably slower rate than the state as a whole, with Kelso growing at the slowest pace. Attracting new residents and retaining current residents is a potential economic development objective that this planning study can address.

The West Kelso Subarea Plan, adopted by the City of Kelso in 2016, envisions West Kelso as a vibrant, attractive, safe and walkable commercial area. Currently, high vacancy rates present both challenges and opportunities for future development. Improvements to the Main Street alignment are ongoing, and streetscape improvements have been completed. Recommendations from the West Kelso Subarea Plan have been incorporated into a list of potential projects, which is intended as a starting point for stakeholder brainstorming and ongoing discussions.

As a whole, the study area benefits from proximity to family-wage jobs at the Port of Longview and adjacent industrial areas. Improving connections to existing job centers is identified in all three local jurisdictions' comprehensive plans. The City of Longview's most recent comprehensive plan update states that the city aims to "improve pedestrian links to transit stops and urban area activity centers" (Policy TR-B.2.6). The City of Kelso Comprehensive Plan states that the City would like to "improve multimodal access to commercial areas" (Transportation Policy 4) and "encourage high-density housing opportunities near employment centers with sufficient access to public transit services and walking/bike paths" (Economic Development Policy 6). The Cowlitz County Comprehensive Plan states that the County intends to "preserve and expand transportation services that support and foster economic activity" (Policy TC 2.6). A summary of local comprehensive plans as they relate to the planning study goals is included in Appendix B.

2.6 Environmental Assessment

WSDOT staff conducted an initial environmental assessment for the study area, which can be viewed in Appendix H. The goal of this assessment was to inventory potential environmental issues that may factor in to future transportation project decisions in the study area. In West Longview and the adjacent areas of unincorporated Cowlitz County, several wetlands and shoreline areas are present near SR 4. In addition, the majority of the study area is located within a 500-year floodplain. Historical sites, most notably Lake Sacajawea, are also present within the study area.

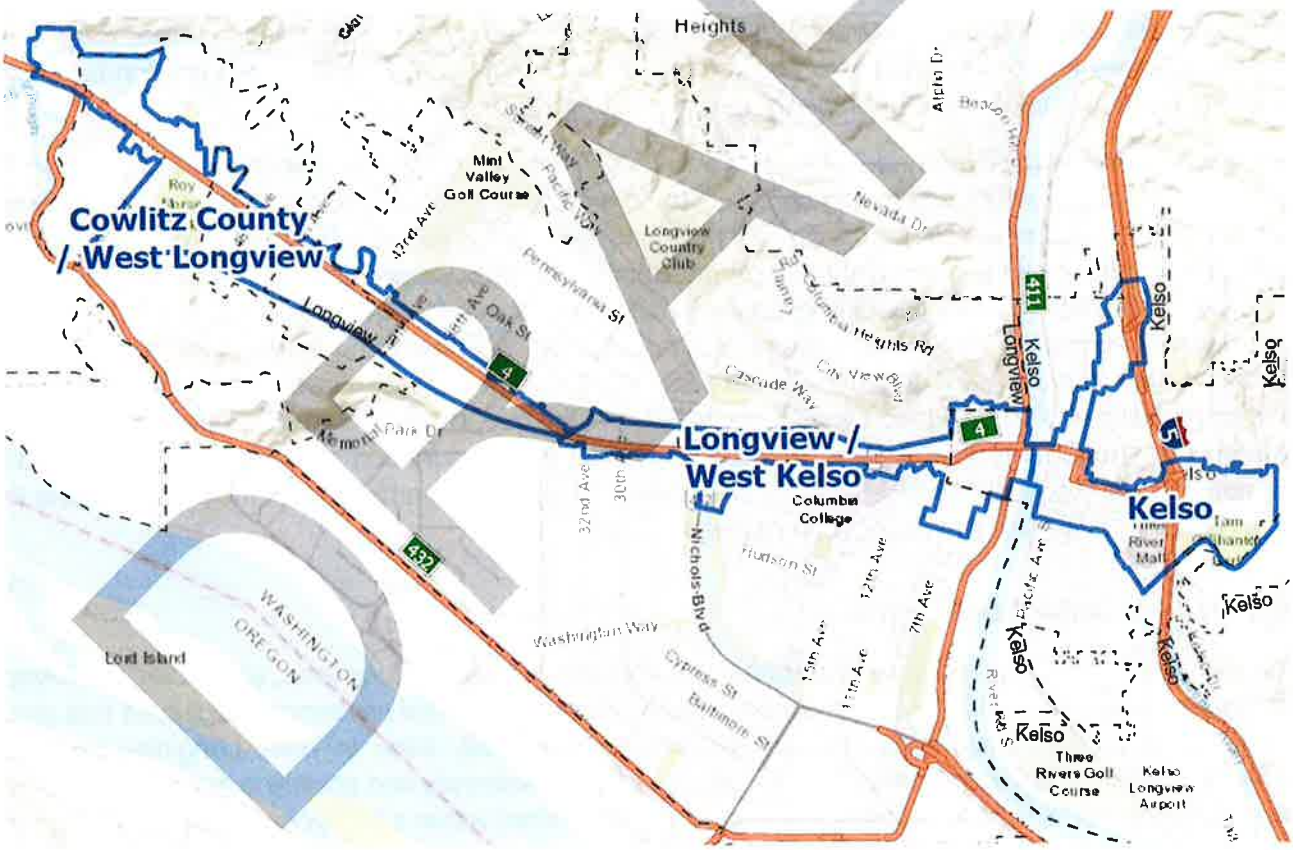
3. Concepts

Staff from WSDOT, City of Kelso, City of Longview, Cowlitz County, Cowlitz-Wahkiakum Council of Govertnments and RiverCities Transit developed a list of initial improvement concepts for the SR 4 corridor at a brainstorming meeting in December 2019. This section discusses how concepts were developed, describes the metrics used to evaluate these concepts, and summarizes the concepts that will be analyzed in this planning study.

3.1 Concept Identification

A brainstorming session was held in December 2019 to generate ideas for the corridor. Stakeholders were asked to think of ideas for three different segments of the SR 4 corridor: Cowlitz County / West Longview, Longview / West Kelso, and Kelso east of the Cowlitz River. The study area segments used for the brainstorming exercise can be seen below in Figure 7.

Exhibit 9 – Study Area Segments



Source: CWCOG

The goal of the brainstorming exercise was to generate ideas that were not bound by perceived political realities or budget constraints. Stakeholders were encouraged to share any and all ideas that they felt would improve the corridor and address the goals of the planning study.

3.2 Evaluation Metrics

At the December stakeholder meeting, WSDOT staff presented evaluation metrics intended to narrow down the list of ideas for concepts. Each metric is intended to address one of the study goals of improving safety, mobility or economic vitality. These evaluation metrics were then refined based on stakeholder feedback. Exhibit 10 provides a list of the final evaluation metrics that were approved by stakeholders.

Exhibit 10 – Concept Evaluation Metrics

Safety Metrics	Mobility Metrics	Economic Vitality Metrics
Reduction in severe, fatal and total number of crashes?	Improved travel time and reliability along the corridor?	Improved access to jobs and destinations for all households?
Reduction in total crashes or conflict points for bicyclists and/or pedestrians?	Improved system-wide circulation and connectivity?	Improved access to family-wage jobs?
Increase of safe crossing opportunities for bicyclists and/or pedestrians?	Improved bicycle and/or pedestrian availability, connectivity, and/or accessibility?	Maintained or enhanced freight access?

3.3 Concept Summary

After meeting with stakeholders in December 2019 to brainstorm ideas for the corridor, WSDOT staff reviewed the list of concepts generated by the meeting. Each concept was reviewed in relation to each evaluation metric. Some concepts did not meet any evaluation metrics. Some concepts meet the evaluation metrics, but due to staff capacity, concept locations that are included on WSDOT's Intersections Analysis Location (IAL) list are prioritized.

The highlighted concepts in Exhibit 11 are the concepts that will be analyzed in the scope of this planning study.

Exhibit 11 – Concept Evaluation

Concept description	Evaluation outcome
Install flashers/RRFB/flaggers at mid-block crossing on N Kelso Ave near Huntington Middle School	Addresses safety and mobility metrics
Incorporate green spaces, curb planters, landscaping, micro parks throughout corridor	Does not relate to evaluation metrics
Accessible pedestrian signals throughout corridor	Addresses safety, mobility, and economic vitality metrics
Signal priority for transit and signal coordination throughout corridor	Addresses mobility and economic vitality metrics
Multiuse path on existing rail corridor parallel to Ocean Beach Hwy	Addresses safety, mobility, and economic vitality metrics

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Exhibit 11 – Concept Evaluation (continued)

Concept description	Evaluation outcome
Improvements to park and ride facilities, including marketing campaign & bike storage	Does not relate to evaluation metrics
Improve existing sidewalks at signalized intersections	No locations provided when suggested in brainstorming exercise – without locations, cannot determine if it addresses metrics
Roundabout at SR 411 and Fishers Ln	Addresses safety and mobility metrics, but is not feasible because of location – intersection is located on top of a dike
Roundabout at Long Ave and Fishers Ln	Addresses safety and mobility metrics
Add bike lanes or multiuse path: Kelso Ave (I-5 to N Pacific Ave), N Pacific Ave (Kelso Ave to Cowlitz Way), 1st Ave (Allen St bridge to Kelso city limits south), Allen St (Grade St to bridge & 5th Ave N to Crescent Dr), Cowlitz Way (N Pacific Ave to 5th Ave N)	Addresses safety, mobility, and economic vitality metrics
Add bike and pedestrian access from downtown Kelso to Cowlitz River multiuse trail	Addresses safety, mobility and economic vitality metrics
I-5 interchange improvements – roundabouts at Minor Rd, Three Rivers Dr	Addresses safety, mobility and economic vitality metrics, but is not within the capacity of this study
Install speed feedback signs west of 32nd Ave on Ocean Beach Hwy	Addresses safety metric
Installation of a hybrid signal and crosswalk improvements at S 8th Ave & Allen St	Addresses safety and mobility metrics
Improvements in the vicinity of the Kelso couplet (4th Ave N, 5th Ave N, Cowlitz Way) - Consider converting 4th Ave N and 5th Ave N to two-way from Allen St to Cowlitz Way or reducing from three to two travel lanes on each street - Add a pedestrian refuge island half block east of Cowlitz Way/Pacific Ave intersection - Add bike lanes and bulbouts on 4th Ave N and 5th Ave N	Addresses safety, mobility, and economic vitality metrics

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Exhibit 11 – Concept Evaluation (continued)

Concept description	Evaluation outcome
Improvements in the vicinity of the Cowlitz Way and Long Ave intersection in West Kelso - Close Grant St at NW 5th Ave - Close SW 6th Ave at Cowlitz Way - Implement traffic calming measures on Long Ave between Cowlitz Way and Fishers Ln - Restrict W Main St at Cowlitz Way to right in / right out turning movements	Addresses safety, mobility, and economic vitality metrics
Road diet on Ocean Beach Hwy - Including median access restrictions, reduced lane widths, reduced speed, add bike lanes west of 32nd Ave - For entire length of Ocean Beach Hwy, consider traffic calming measures including reduced lane widths, narrower corner radii, reduced building setbacks, street trees, gateway treatments, bulbouts, pinchpoints, chicanes and lane shifts, medians and refuge islands	Addresses safety, mobility, and economic vitality metrics

3.4 SR 4 Corridor Query Tool

In an effort to assist in brainstorming and assessing corridor improvement concepts for SR 4 and future study corridors, OTAK Inc and CWCOG developed the SR 4 Corridor Query Tool. This tool is an online, GIS-based, interactive platform that centralizes and visualizes multimodal transportation, safety and traffic operations data with economic data such as zoning and planned growth. Among the many layers of included data are the following:

- Crash data for SR 4 and surrounding arterials, from the Washington State Patrol database via WSDOT and CWCOG.
- Current, 2025 and 2045 travel demand model data, including volume-to-capacity ratios.
- Select link runs using 2045 data for the central link of each SR 4 study segment, shown in bandwidth format. Volumes are peak hour for both directions of each selected link.
- General Assessor use class, general zoning and comprehensive plan classes
- Transportation Analysis Zone level data showing those TAZs which are forecast to grow by 25% or more in households or employment between today and 2045.

One of this study's objectives is to make the query tool transferable to other corridors for practical solutions applications throughout the State. See the user guide in Appendix N for additional information.

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4. Analysis of Concepts

4.1 Allen St and S 8th Ave Intersection – Crossing Evaluation

SR 4 Milepost 61.90

A. Purpose

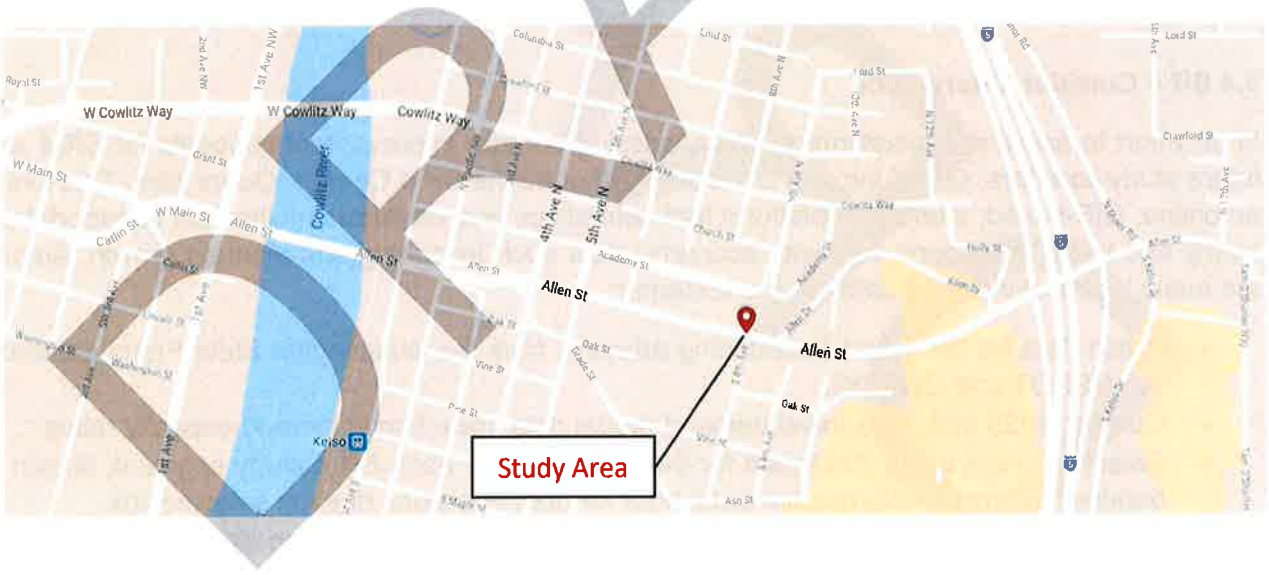
At the request of the City of Kelso and the public, WSDOT was asked to determine countermeasures at the intersection of State Route 4 (Allen Street) & S 8th Avenue that would improve pedestrian safety and promote use at the crossing.

B. Study Area

The existing crosswalk stretches north to south across Allen St in Kelso, WA. Allen St is a 4-lane state highway that carries nearly 18,000 vehicles daily and is a principle arterial connecting the City of Kelso to Longview and Interstate 5. The posted speed limit 25 MPH.

Between City Center and I-5, there are few side streets that intersect Allen St. This make the number of marked crossing limited and does not provide desirable access for pedestrians. The context of the roadway allows for parallel parking on the south. There is commercial to the south of the roadway and residences to the north.

Exhibit 12 – Allen St at S 8th Ave Study Area



C. Existing Conditions

The current crossing at 8th Ave includes a marked crosswalk with a raised median island. The crossing is supplemented with regulatory and warning signs. East-west traffic on Allen St are free-flow whereas northbound traffic from 8th Ave is stop-controlled. From a count taken in April 2020, a total of 6 bikes and pedestrians used the crossing. This was the average of the daytime counts over two days.

D. Performance Metrics

The consideration for different types of traffic control devices were based on these key components: safety, complexity, and cost. Safety relates to the safety for all users, which includes pedestrians, cyclists, and motorists alike. Complexity would be considered due to the fact that different devices function in different ways. It was important to weigh how users would interpret and use the device to cross the roadway. Lastly, a high-level benefit-to-cost analysis was used to compare the outcomes based on the investment.

E. Proposed Alternatives

WSDOT proposed three different traffic control devices as countermeasures at the crossing. The alternatives included a conventional traffic signal, HAWK signal, and RRFB. In addition to the performance metrics used to assess each alternative, some devices have rules that require it to meet warrants in order for it to be used.

A conventional traffic signal would provide dedicated phases and timing for pedestrian crossings. All three approaches would be signalized and full equipped with pedestrian pushbuttons and signals.

High intensity activated crosswalk (abbreviated as HAWK) signal is a type of pedestrian hybrid beacon. Although the side street would remain stop-controlled, the major roadway would be controlled by the HAWK signal when activated by a pedestrian. HAWK signals have multiple phases that display flashing yellow, solid yellow, solid red, flashing red, and blank indications. Each phase tells the driver what to do in order to provide a protect movement for pedestrians.

A rectangular rapid-flashing beacon (RRFB) is a warning device that is commonly used at crosswalks. Also activated by pedestrians, the flashing lights warn drivers of the presence of pedestrians in the crossing.

F. Proposed Alternative Evaluation

1. Traffic Signal

The pedestrian crosswalk with a traffic signal would function like any other traffic light on a roadway. In order to cross safety, pedestrians would press the push button to initiate a call to the signal. This is one of the most recognizable traffic control devices and would fit within the context of Allen St making it easy to understand by all users.

A new traffic signal requires its own signal controller cabinet, poles, signal displays, along with other signal components. The estimated cost for a new system is estimated around $250,000.

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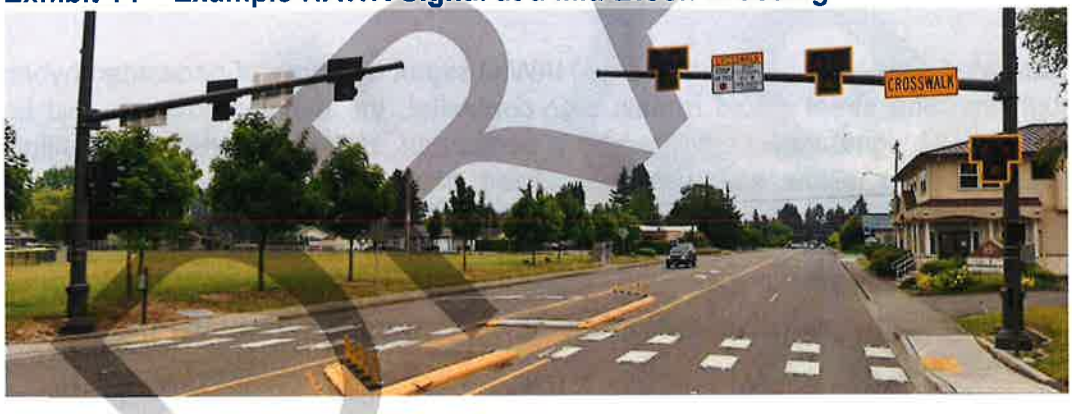
As described in Chapter 4C of the Manual for Uniform Traffic Control Devices (MUTCD), traffic control signals shall meet warrants in order to be installed. A traffic signal warrant analysis was performed for this intersection. The analysis shows that the hourly volume of major and minor road (Warrants 1-3) and pedestrian volume (Warrant 4) do not justify the placement of a traffic signal.

Exhibit 13 - Conventional Traffic Signal
Installed for all three approaches, creates a dedicated pedestrian phase and provides a protected crossing for users.

2. HAWK Signal

This type of pedestrian hybrid beacon operates similar to a traffic signal but is not widely used like a traffic signal which means users, particularly motorists do not always know how to navigate through an intersection controlled by a HAWK. The 3-section display is also unique in that many jurisdictions and locales have yet to use these types of displays and has the potential for confusing unfamiliar motorists.

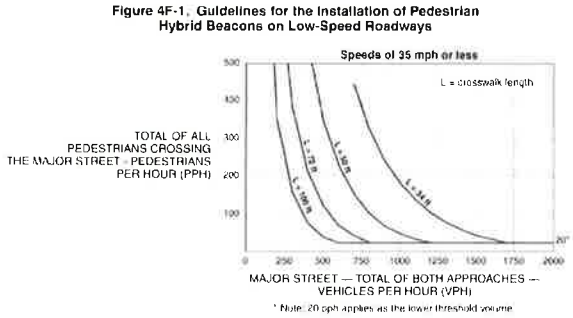
Exhibit 14 – Example HAWK Signal at a Mid-Block Crossing



HAWK signals run on its own traffic signal controller and is enclosed in a cabinet adjacent to the intersection. Like a traffic signal, it also has signal poles and signal displays which bring the estimated cost of a HAWK signal to $150,000.

HAWK signals do provide protected movements for pedestrians crossing the roadway but is only just as safe as how drivers react to it. The nature of the system is complex in both interpretation and infrastructure. These systems are proven to be beneficial but studies show best results in high-volume, high-speed facilities.

Exhibit 15 – Graphical Representation for HAWK Signal Warrants from MUTCD



Similar to traffic control signals, HAWK signals also have guidance on placement and require warrant analysis. Based on the collected intersection data, context of the roadway, and direction provided in Chapter 4F of the MUTCD, a HAWK signal does not meet the minimum requirements at this intersection.

3. RRFB

Rectangular rapid-flashing beacons are devices commonly used at uncontrolled crossings. The traffic control device does not assign right-of-way, rather it is a warning system that alerts motorists of potential conflict within the crosswalk. The system is actuated by pedestrians and flashes lights which as associated with the crosswalk signing for emphasis.

State law calls for vehicles to stop of pedestrians in the crosswalk. With enhanced signing and flashing lights, see a conflict in the crossing can be easily recognized. The warning lights are similar to other warning devices. Drivers shall process with caution and grant right-of-way where necessary. Systems such as these are identifiable and commonly used throughout the state.

With upgrades made to the existing intersection, the cost of adding RRFB's would be $20,000.

Exhibit 16 - Example of RRFB at Marked Crossing

Source: NACTO

G. Decision Matrix

In order to evaluate each proposed alternatives and compare benefits each of the devices provide, a decision matrix was created to score and rate each metric.

The three metrics used to assess each alternative were given a score from 1 to 3; 1 being the highest rated, 3 being the lowest. Another key consideration was whether or not the proposed alternative is justified through a warrant analysis or engineering study.

Exhibit 17 – Proposed Alternative Decision Matrix

Alternative	Safety	Complexity	B/C Ratio	Justification
Traffic Signal	1	1	3	No
HAWK Signal	1	3	2	No
RRFB	1	1	1	Yes

H. Recommended Alternative

Each of the three proposed alternatives were evaluated and score on overall safety, system complexity, and benefit-to-cost.

All three solutions showed a safety benefit, however only one proved to meet the minimum design criteria for installation. The analysis shows that at this low-speed crossing with low-to-moderate use, the safest and most cost-effective solution is the RRFB.

Exhibit 18 – Recommended Alternative

Includes the installation of RRFBs on new poles on both sides of the roadway and in the median. The recommended solution would also include enhanced street lighting to illuminate the crossing.

Along with the recommendation of installing an RRFB system, further countermeasures at the crossing should consider the improvements of pavement markings, permanent signing, and illumination. These enhancements together will create a visible crosswalk, both day and night, and provide clear and obvious direction for both motorists and pedestrians that will improve safety for all.

I. Cost Estimate

As part of the study and crosswalk evaluation, the potential cost was calculated for the crosswalk improvements. The scoping-level estimate includes the cost for the RRFB light bars and components, new poles, signs and pavement markings, improvements to the pedestrian refuge island, and additional street lighting at the crossing.

Such improvements are estimated around $65,000 for implementation.

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4.2 SR 4 Kelso Couplet Vicinity

SR 4 Milepost 61.4 – 61.8

A. Purpose

Improving safety and mobility for all road users have been identified as primary needs for State Route 4 in the vicinity of the Kelso couplet. Two SR 4 intersections within the study area (Cowlitz Way at Pacific Avenue [MP 61.43] and Allen Street at 5th Avenue [MP 61.71]) were included on WSDOT's 2018 Pre-Intersection Analysis Location (IAL) list. This list uses crash history to identify locations with high potential for safety improvements based on comparisons to similar intersections. In light of the crash history and local and regional stakeholders' desire to promote safety, mobility and economic vitality, the study team zeroed in on improving bicycle and pedestrian safety and access as means of achieving all three study goals.

Exhibit 19 – State Route 4 in the Kelso Couplet Vicinity

Map Source: Google Maps

B. Study Area

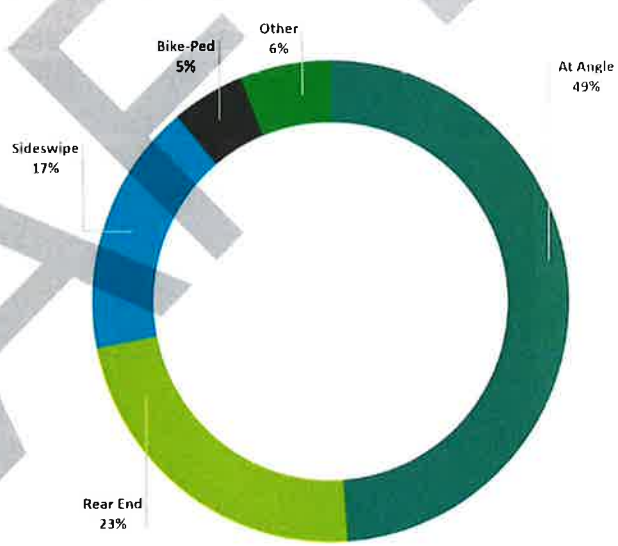
The State Route 4 Kelso couplet is a one-way road pair of 4th and 5th Avenues between Cowlitz Way and Allen Street. In the couplet vicinity, SR 4 is an urban principal arterial with total daily volumes between 8000 and 20,000 and a posted speed limit of 25 MPH. Within the couplet itself, 4th Ave is one-way southbound and 5th Ave is one-way northbound. Both 4th and 5th Avenues include three 12-foot travel lanes; an additional parking lane is provided along the west side of 4th Ave. Cowlitz Way in the couplet vicinity is 56 feet wide and consists of five lanes while Allen Street has two 12-foot lanes in each direction for a 48-foot width. Attached sidewalks are present throughout the study area and dedicated bicycle facilities are absent.

C. Safety

WSDOT Traffic Office staff examined the crash history within the study area for the five year period between 2014 and 2018. Of 109 total crashes analyzed, almost three quarters were either at-angle or rear ends, with half being at-angle. Nearly one third of couplet vicinity crashes resulted from motorists running red lights.

Two crashes resulted in suspected serious injuries; both of these involved pedestrians. Six total crashes involved bicyclists or pedestrians. Because five of the six bicycle/pedestrian crashes occurred in marked crosswalks, increasing safety within crosswalks was an area of emphasis for the couplet study.

Exhibit 20 – Crash Types Within the SR 4 Couplet Vicinity



D. Strategies and Recommendations

1. 4th and 5th Avenues

Volumes on both 4th and 5th Avenues are relatively light, with each road averaging approximately 4000 vehicles daily and 400 during the evening peak hour. With three travel lanes each through the couplet, both roads have excess carrying capacity. In light of this, we propose a road diet for 4th and 5th Avenues between Allen and Cowlitz with one lane on both streets converted to a buffered bike lane. Both roads would retain two travel lanes; the existing lane of street parking along 4th Ave would also remain in place.

The proposed road diet addresses multiple safety and mobility needs. Reducing the number of vehicle lanes promotes lower speeds along 4th and 5th Avenues, which are within a school zone and include several unsignalized intersections and crosswalks. Lowering speeds typically

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reduces the severity of crashes, particularly those involving pedestrians or bicyclists. Another study recommendation is reducing the curb radius on the southwest corner of the 4th Avenue and Cowlitz Way intersection in order to slow vehicles turning onto the couplet. Decreasing speeds at this location will improve safety for crosswalk users as well as cyclists in the new bike lane on 4th Ave.

The couplet currently lacks dedicated bicycle facilities. Installing bike lanes with traffic buffers and green pavement markings through intersections will enhance motorists' awareness of the bike facilities and promote cyclist comfort and safety. In addition to safety and mobility benefits, road diets can improve the integration of roadways with surrounding uses, enhancing quality of life and economic vitality.

Exhibit 21 – SR 4 Couplet Concept with Road Diet, Buffered Bicycle Lanes, Modified Curb Radius and RRFBs

Another alternative raised during the improvement brainstorming process was returning 4th and 5th Avenues to two-way operations, as they functioned prior to the mid-1980s. As with the road diet concept presented above, one travel lane on each road would be converted to a buffered bicycle lane (northbound on 5th and southbound on 4th); one traffic lane would also switch directions, resulting in one lane of vehicular traffic traveling in each direction.

According to Synchro/SimTraffic traffic modeling and simulation, both the one-way and two-way concepts function well. As shown in Figure 4, similar delays and levels of service occur at all four

couplet signals in the 2045 horizon year regardless of configuration. Each scenario comes with distinct potential benefits, including:

One-way operations

- Pedestrians require gaps in only one direction, making for safer and easier crossings away from signalized locations.
- One way streets simplify signal timing and can improve throughput while reducing delay. However, this advantage is mitigated by the low volumes on 4th and 5th Avenues.

Two-way operations

- Vehicle circulation improves.
- Lower maximum speeds, as slower traffic cannot be passed without multiple lanes in the direction of travel.
- Lower speeds increase safety, encourage greater pedestrian and cycling mode share and enhance livability.

Exhibit 22 – SR 4 Couplet Concept with Road Diet, Buffered Bike Lanes, Modified Curb Radius and RRFBs

Map Source: Google Maps

Although the two-way configuration functions well and offers considerable benefits, it would function optimally with additional reconfiguration south of Allen Street that is outside the scope of this study. While the two-way conversion is not currently recommended, it remains a promising operational concept which should be revisited as funding and developmental opportunities allow.

Local stakeholders identified two couplet crosswalks that would benefit from safety enhancements: 4th Ave at Church Street where visitors to the county building frequently park across 4th in the church's lot, and on 5th Ave at Academy Street where preschoolers regularly cross between a school and nearby playground. Rectangular rapid-flashing beacons (RRFB) are the recommended solution at each intersection. RRFBs are warning devices commonly used to improve crosswalk safety at uncontrolled crossings. Pedestrians activate the flashing lights to warn motorists of pedestrians' presence in the crosswalk. Although they do not assign right-of-way, RRFBs enhance safety by alerting drivers to potential conflict within the crosswalk. Supplementary signing augments the flashing beacons to further increase pedestrian visibility.

Installation of bicycle signals in the couplet vicinity is another strategy that may be considered in future years as cycling volumes and the nearby bike lane networks grow. These signals are similar to and should only be used in combination with conventional traffic signals. They make crossing intersections safer for bicyclists by clarifying when to enter an intersection and by restricting conflicting vehicle movements. By protecting cyclists and improving real and perceived safety at high-conflict areas, bicycle signals reduce user stress and delays while discouraging illegal and unsafe crossing maneuvers.

2. Cowlitz Way

Stakeholders identified the intersection of Cowlitz Way and Pacific Avenue as a candidate for crosswalk enhancements due to the intersection's volumes and wide crossing distances, as well as its history of pedestrian-involved crashes. The recommended improvement for this location is a leading pedestrian interval (also known as an LPI or pedestrian queue jump).

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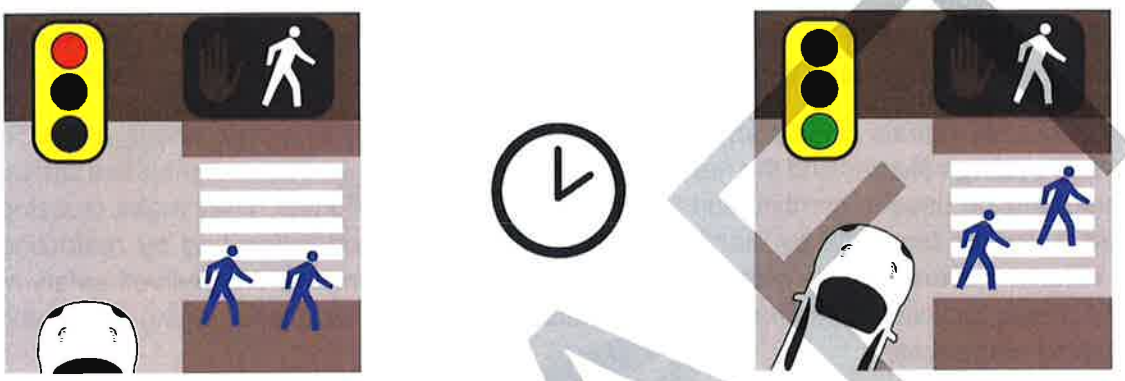
LPIs are low-cost measures that can improve intersection and crosswalk safety. As the queue jump nickname implies, LPIs give pedestrians entering a crosswalk a head start on vehicles entering from the same direction. They signal crosswalk users to proceed three to seven seconds before the adjacent lane of traffic receives its green signal, reducing conflicts with right-turning vehicles. LPIs enhance the visibility of crossing pedestrians and give them priority within the intersection, reinforcing their right-of-way over turning vehicles. LPIs typically require adjustments to existing signal timing that are relatively low cost compared to other countermeasures and they have been shown to reduce pedestrian-vehicle collisions as much as 60% at treated intersections.

Exhibit 23 – Leading Pedestrian Interval Operations



1 **Pedestrian walk signs signal while the traffic light remains red. This gives pedestrians a "head start" to establish their presence in the crosswalk.**

2 **3 - 7 seconds of walk time is given to pedestrians prior to the traffic light changing.**

3 **The traffic light changes to green after pedestrians are fully established in the crosswalk and in full sight of drivers.**

Source: City of Columbus (OH)

The installation of a center pedestrian refuge island at the marked, unsignalized crosswalk at 3rd Avenue is another recommended Cowlitz Way crossing enhancement. The pedestrian island would allow crosswalk users to cross traffic from one direction at a time, significantly reducing crossing complexity by making it easier to determine acceptable gaps. Crossing one direction of traffic at a time also reduces the crossing distance as pedestrians cut across two lanes at a time rather than four. Supplemental crosswalk signing would combine with the refuge island to increase pedestrian visibility, further improving safety.

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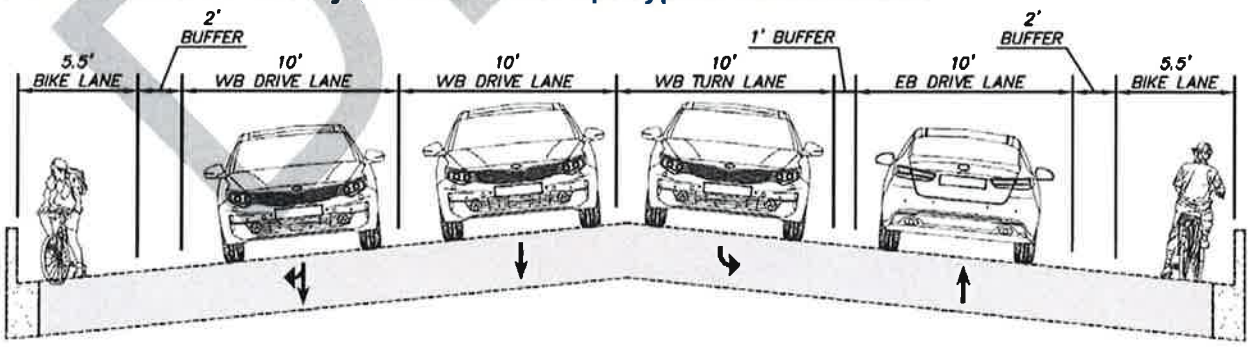
Exhibit 24 – Cowlitz Way Concept with Road Diet, Bike Lanes and Pedestrian Refuge Island

The final proposed Cowlitz Way improvement is a road diet with bicycle lanes between Pacific and 5th Avenues, similar and complementary to the couplet bike lanes on 4th and 5th. One eastbound travel lane would be removed between Pacific and 4th with the remaining lanes shifted and narrowed to create buffered eastbound and westbound bike lanes. With elimination of the existing on-street parking lane, no traffic lane removal would be necessary for the placement of bike lanes on the block between 4th and 5th. A road diet for Cowlitz Way shares many of the benefits of the couplet road diet, including increased livability and non-motorized mobility and mode share. Because the Cowlitz Way travel lane widths would narrow to 10 feet, the modifications would also promote lower speeds and correspondingly increased safety.

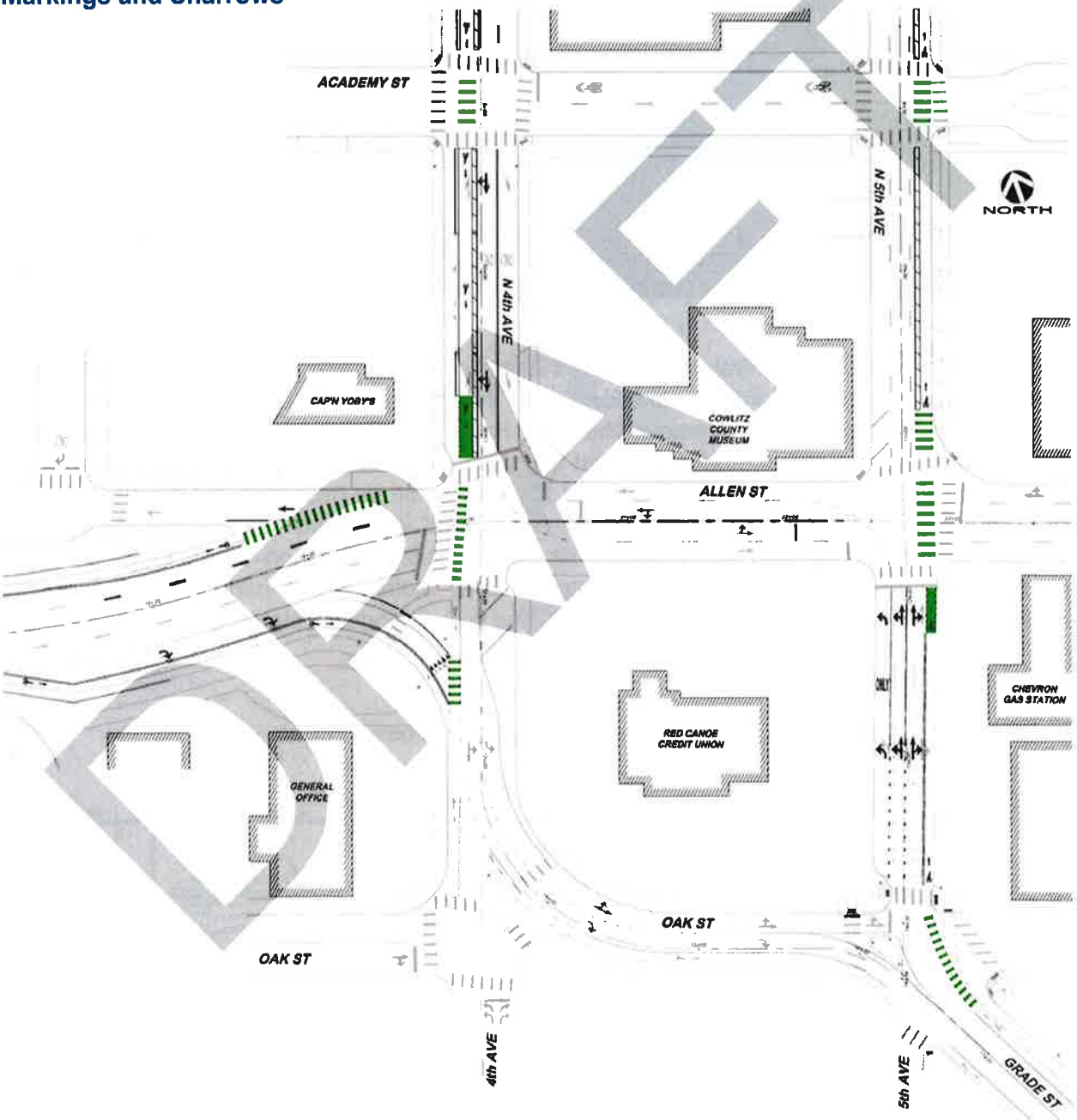
Exhibit 25 – Cowlitz Way Road Diet Concept Typical Cross Section



Source: City of Kelso

As with 4th and 5th Avenues, the Cowlitz Way road diet and LPI were analyzed with the Synchro and SimTraffic modeling and simulation suite. The traffic models support the viability of the road diet and LPI; following the addition of both improvements, Highway Capacity Manual levels of service were unchanged and intersection delays increased by one second or less.

Exhibit 26 – Allen Street Vicinity Concept with Bicycle Lanes, Green Intersection Markings and Sharrows



Source: City of Kelso

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3. Allen Street and Vicinity

In order to improve active mobility and mode share within the SR 4 corridor and the broader Kelso-Longview community, we propose installing buffered bike lanes across the Allen Street Bridge between 1st Avenue (SR 411) and 4th Avenue. There are currently no dedicated, marked bicycle facilities on either of the Cowlitz River bridges connecting Kelso and West Kelso. The narrow shared-use walkways on the SR 4 Cowlitz Way Bridge limit bicycle mobility due to their restricted widths and adjacent, unscreened vertical bridge truss members. The Allen Street Bridge better accommodates non-motorized use with attached, unobstructed sidewalks and five-foot shoulders that serve cyclists. Formalizing the shoulders as marked bike lanes, adding a one-foot buffered separation from vehicle traffic, and installing green pavement markings at the 1st and 4th Avenue intersections will enhance mobility, visibility and awareness.

The new Allen Street bicycle lanes will tie directly into the proposed 4th Avenue bike lane within the couplet to the north and the recently installed lanes on South 4th Ave, Oak Street and Grade Street to the south, expanding and integrating Kelso's active transportation network. To provide contiguous links for cyclists headed north or west from Grade Street, additional enhancements are proposed: traffic lane narrowing and creation of a new bike lane on South 5th Avenue between Oak/Grade and Allen Streets, as well as the installation of wayfinding signs and shared-lane markings ("sharrows") to direct users to the Allen Street Bridge via 5th Avenue, Academy Street, and 4th Avenue. Connecting the proposed Allen St and couplet bike lanes to the recently completed Grade St improvements provides a seamless link to the developing Six Rivers Trail, a public, multi-use trail spanning Cowlitz County that generally follows the I-5 corridor.

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4.3 W Cowlitz Way and NW 5th Avenue/Long Avenue Intersection

SR 4 Milepost 60.99

A. Purpose

This project intends to improve the safety of the SR 4 (Cowlitz Way) at NW 5th Ave/ Long Ave Intersection located at MP 60.99 in West Kelso in Cowlitz County. The intersection was identified on the 2018 Pre-Intersection Analysis Location (IAL) list for WSDOT. Intersections on the Pre-IAL list are identified and ranked on potential for safety improvement based on historic crash data at the location compared to intersections with similar characteristics (i.e. volume, number of legs, traffic control type, etc.). W Cowlitz Way & NW 5th Ave/Long Ave ranked 7 on the 2018 Pre-IAL for urban signalized intersection in Southwest Region.

B. Study Area

This four-leg signalized intersection is on a major urban arterial. This segment of SR 4 receives about 18,000 – 21,000 vehicles per day. Long Ave and NW 5th Ave have about 8,800 and 2,000 vehicles per day, respectively. The Cowlitz Way bridge to the east of the intersection has a roughly 5% grade down approaching NW 5th/Long. The posted speed limit is 35 MPH. Left turn movements have a protected phase. Grant St is a one-way street eastbound. The lanes are approximately 12 feet wide. There are existing crosswalks on all legs of the intersection except for the west leg crossing W Cowlitz Way.

Exhibit 27 – Aerial of Cowlitz Way and Long Avenue Project Location

Map Source: Google Earth

C. Performance Metrics

The purpose of this project is to improve safety for all users including motorists, pedestrians, and bicyclists. In order to maintain funding as a safety project, the benefit/cost ratio must also be greater than 1.0. Benefits are based on the saved societal costs for fatal and all injury crashes at the location.

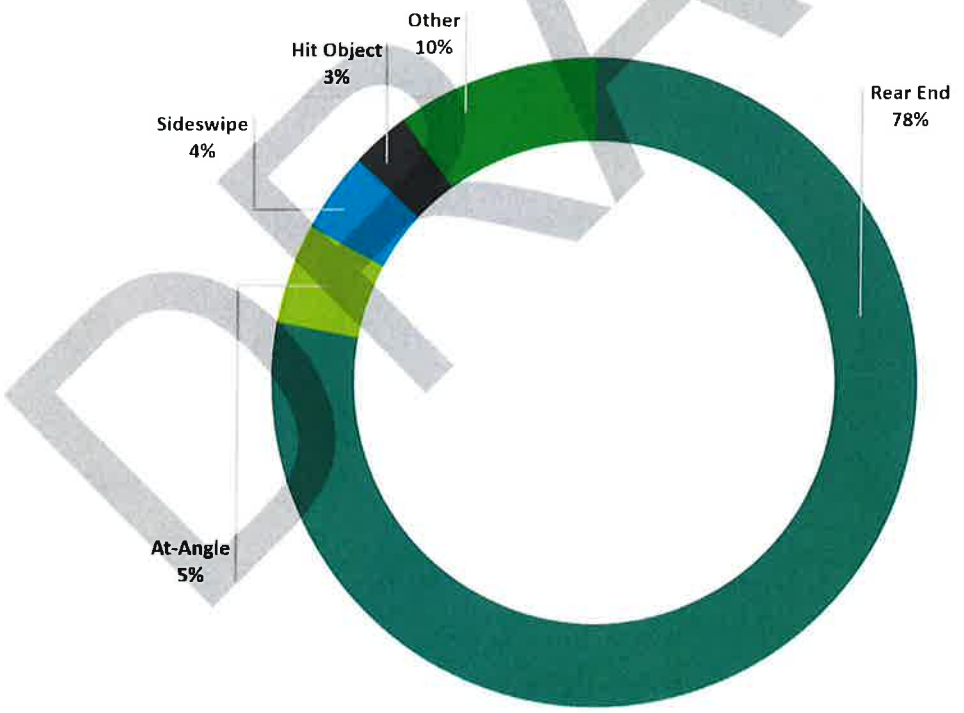
Although this project's purpose is safety, it is important that the intersection is also operationally acceptable. The operations analysis is based on turn count data from 2018, specifically the PM peak when the turn counts are highest for almost all movements at the intersection.

D. Safety

Crashes were evaluated from 1/1/2013-12/31/2017. During this time, there were 67 crashes at or related to the intersection. There were no fatal or serious injury crashes in this time period, however, about 42% of crashes did result in injury. The most common crash type was rear end, accounting for 78% of crashes at or related to the intersection. Of those rear end crashes, 79% of them occurred in the westbound direction. These crashes frequently occurred during the evening commute times as queues from the traffic signal backup.

Other crash types included at-angle, fixed object, and sideswipe crashes seen in Exhibit 28 below.

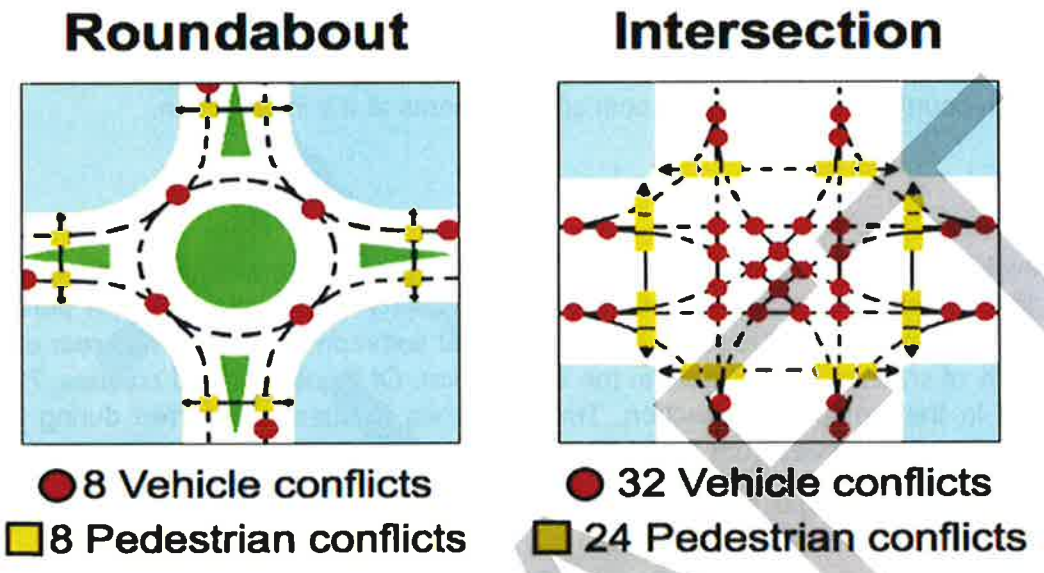
Exhibit 28 – Crash Types at or Related to the Cowlitz Way and Long Avenue Intersection



Rear ends are the most frequently occurring crash types at signalized intersections, followed by angle crashes and sideswipes. Converting a signalized intersection to a roundabout has several safety benefits. One of the safety benefits of roundabouts is the number of conflict points, as seen

in Exhibit 29. Standard four-leg intersections have 32 vehicles conflict points and 24 conflict points while roundabouts have only 8 vehicle conflict points and 8 pedestrian conflict points.

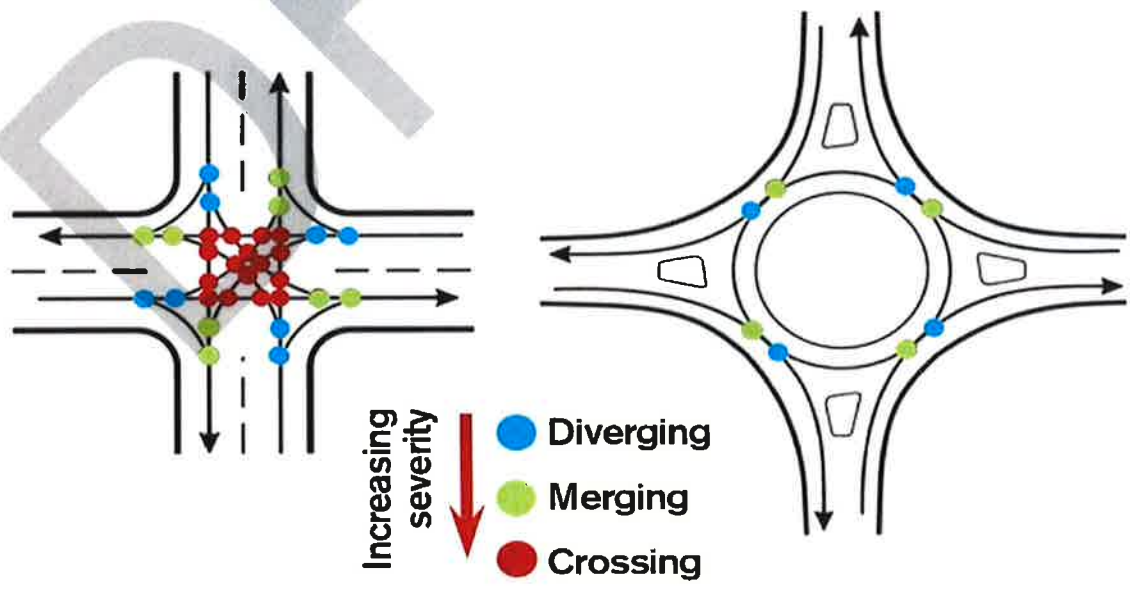
Exhibit 29 – Conflict Points in Roundabouts Compared to Intersections



Source: Road Commission for Oakland County (MI)

Roundabouts also eliminate crossing or angle crashes that typically result in more severe crashes than sideswipes and rear ends, shown in Exhibit 30.

Exhibit 30 – Conflict Types in Intersections Compared to Roundabouts



Source: Arizona State University

Due to the reduction in conflict points and elimination of crossing-type crashes, converting a standard signalized intersection to a roundabout can reduce fatal and injury crashes by 55% to 66% for single lane and multilane roundabouts, respectively.

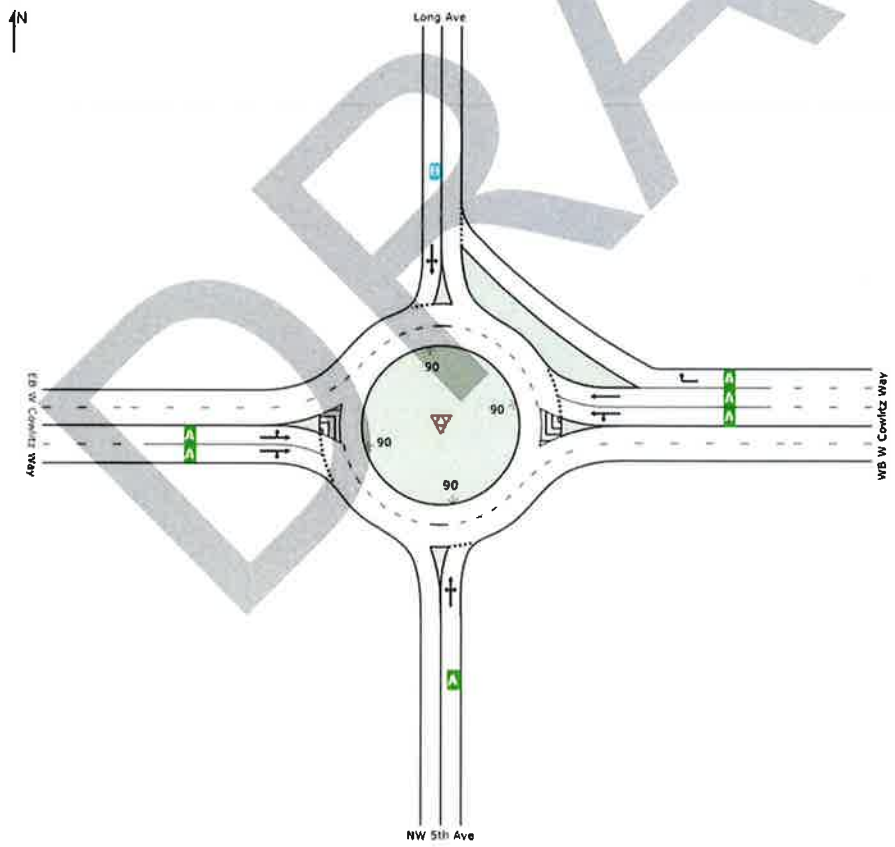
E. Operations

The roundabout configuration used for initial operational analysis has four legs and includes two circulating lanes from W Cowlitz Way and one circulating lane from W 5th Ave and Long Ave. The roundabout also includes a right slip lane from westbound W Cowlitz Way to northbound Long Ave. This intersection layout was modeled in SIDRA with 2018 PM Peak turn counts as these volumes were generally higher than the AM peak. As shown in Exhibit 31, this configuration resulted in the intersection as a whole and three out of four approaches operating at Level of Service (LOS) A; the lone approach performing at a non-A level of service was southbound on Long Ave, with a still impressive LOS B.

Exhibit 31 – SIDRA Output for Level of Service (LOS) with Initial Proposed Configuration

All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	B	A	A



Source: Sidra Intersection

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The intersection was also modeled to include the signalized intersection at Main St to check if westbound queues from the signal would backup into the roundabout during red phases. The model showed that the back of queue did not reach the roundabout due to the left turn phasing and the amount of green time allotted to mainline traffic. It was therefore determined that the preliminary roundabout configuration would operate within acceptable metrics.

F. Proposed Alternative

The proposed alternative is to convert the signalized intersection into a four-leg roundabout with the same configuration that was modeled in SIDRA. The proposed roundabout will also include removing access to Grant St on the south side of the intersection. The proposed conceptual design for the roundabout is shown in Exhibit 32. There are several aspects of the roundabout that still need to be considered and are not shown in the current proposed concept, such as pedestrian and bicyclist crossing locations, right of way, ability of large vehicles (ex. fire trucks) to navigate the roundabout, and how to restrict access to Grant St. These will be evaluated in later design phases and will seek concurrence from stakeholders.

Exhibit 32 – Preliminary Conceptual Roundabout Design

G. Additional Alternatives

In addition to the roundabout, four other proposed alternatives were discussed for further consideration and evaluation. These alternatives are proposed to be done in conjunction with the proposed roundabout or are a variation of the proposed roundabout.

The first is to convert the signalized intersection at Main St to a Right-In Right-Out (RIRO). There are several benefits to converting a signalized intersection to a RIRO. RIRO restrict all left turn movements and through movements on the side streets. This eliminates left turn conflicts and at at-angle crash types, which typically result in more severe injury crashes. The RIRO configuration also removes the need for mainline traffic to stop for cross street traffic, eliminating queue buildups that could potentially back into the roundabout. The traffic model, however, did not show traffic backing up from the signal at Main St into the roundabout due to the large amount of green time allotted to W Cowlitz Way. Removing traffic signals also reduces maintenance costs and need to retime the signal.

There are some considerations for converting the signal at Main St to a RIRO, though. One is to evaluate how traffic, specifically left turning and side street vehicles, will reroute trips. Eliminating movements at one intersection could result in vehicles diverting trips to nearby intersections and affecting the safety and operations at those locations. The other consideration is how a RIRO would affect the existing signalized pedestrian crossing W Cowlitz Way. Installing an enhanced pedestrian crossing such as a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon (HAWK) could address the crossing. Further analysis would need to be performed to determine the best crossing alternative for this location.

The second additional proposed alternative is to restrict access on Grant St and 6th Ave NW to the northwest of the roundabout. This would reduce conflicts between vehicles from the roundabout and Grant St or 6th Ave NW which are within close proximity to the roundabout. Similar to restricting movements with the RIRO, restricting access on Grant St and 6th Ave NW could result in vehicles rerouting to other intersections. Further analysis would need to be done to determine likely alternative routes and the effect on those locations.

The third additional proposed alternative is to remove the right slip lane on the proposed roundabout from southbound Long Ave to westbound W Cowlitz Way. Removing the right slip lane would eliminate weaving movements between the right and center lane on W Cowlitz Ave as the right lane turns into the right turn lane to get onto Ocean Beach Highway. SIDRA was used to analyze feasibility of this alternative using 2018 PM Peak volumes. The model showed that removing the right slip lane would result in the Long Ave approach operating as a whole at LOS B with a volume to capacity ratio of 0.87, average delay of 14.4 seconds, and about 9 cars in the queue. The other approaches of the roundabout would continue to operate at LOS A.

The fourth additional proposed alternative is to convert the westbound center lane on W Cowlitz Way to a thru/right lane west of the roundabout to allow vehicles to utilize the right two lanes to get to Ocean Beach Highway. This assumes there is a right slip lane from Long Ave. Converting the center lane to a thru/right lane would reduce the need for weaving maneuvers for the right and center lanes between the proposed roundabout and Ocean Beach Highway which could contribute to sideswipe and rear end crashes. Further analysis may need to be completed to evaluate how many thru vehicles on westbound W Cowlitz Way and vehicles from Long Ave turn right onto Ocean Beach Highway.

4.4 Ocean Beach Highway, SR 432/Coal Creek Road to Nebraska St

SR 4 Milepost 55.2 – 58.6

A. Purpose

The three central goals of the State Route 4 Corridor Planning Study, supported by the comprehensive plans of Longview, Kelso and Cowlitz County, are to: improve overall connectivity and mobility in the study area; improve safety by reducing potential conflicts between modes; and enhance economic vitality opportunities. Because of the diversity of land uses (a mix of commercial, residential, light industrial and underutilized) and urbanization (transitioning from semi-rural in the west to suburban in the east), stakeholders sought out strategies to improve safety and mobility for all road users while maintaining access and connectivity for the western Longview study corridor.

Exhibit 33 – SR 4 in the SR 432/Coal Creek Road to Nebraska St Study Corridor

Map Source: Google Maps

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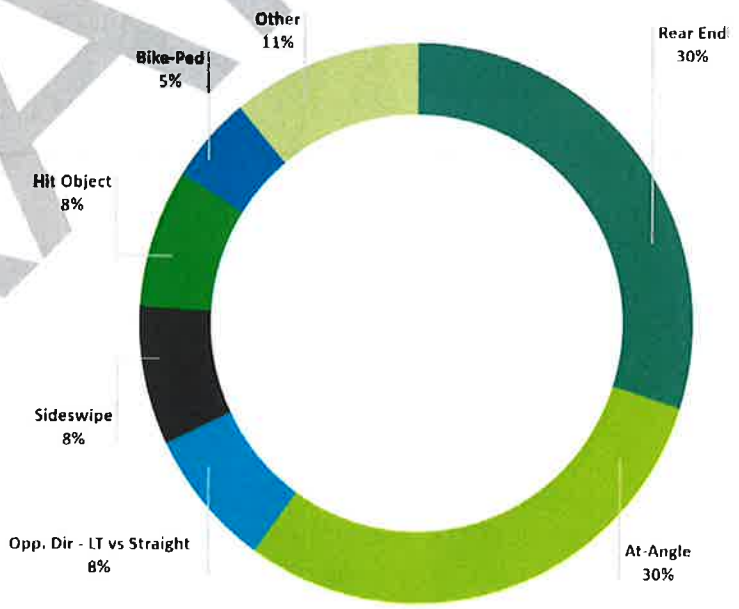
B. Study Area

State Route 4 (also known as Ocean Beach Highway) is classified as an urban principal arterial within the western Longview study corridor, between SR 432/Coal Creek Road and Nebraska Street. The route classification changes to rural principal arterial at the corridor's western study boundary, an indication of the transitional urbanization character of the area. As with urbanization, traffic volumes typically increase moving from west to east along the corridor; average daily volumes range from approximately 7000 at the west end to 20,000 at the eastern limit, nearer the Longview urban core. The highway is typically 64 feet wide with two traffic lanes in each direction and a center two-way left-turn lane. Speed limits change from 50 mph between Coal Creek Rd and Mt Solo Rd to 40 from Mt Solo to 38th Avenue, and again reduce to 35 east of 38th. Continuous attached sidewalks are present in the majority of the study area (east from Robbins Street near the western study limits) while dedicated bicycle facilities are absent. The corridor includes five existing traffic signals at SR 432/Coal Creek Rd, Mt Solo Rd, and 46th, 42nd, and 38th Avenues. The Walmart Supercenter at 38th Ave is the largest individual trip generator along the study corridor and the 38th Ave intersection experiences the highest intersectional volumes. As a result, 38th Ave is the worst-performing intersection by a variety of metrics.

C. Safety

WSDOT Traffic Office staff examined the crash history within the study area for the five year period between 2014 and 2018. Of 171 total crashes analyzed, nearly 60 percent were rear-end or at-angle. Fourteen crashes (8%) involved left-turning motorists colliding with vehicles traveling straight in the opposing direction – a frequently serious crash type that would be minimized by removal two-way turn lanes and placement of center curb barriers. Nine crashes involved bicyclists or pedestrians, an area of emphasis for the study.

Exhibit 34 – Crash Types in the OBH Study Corridor



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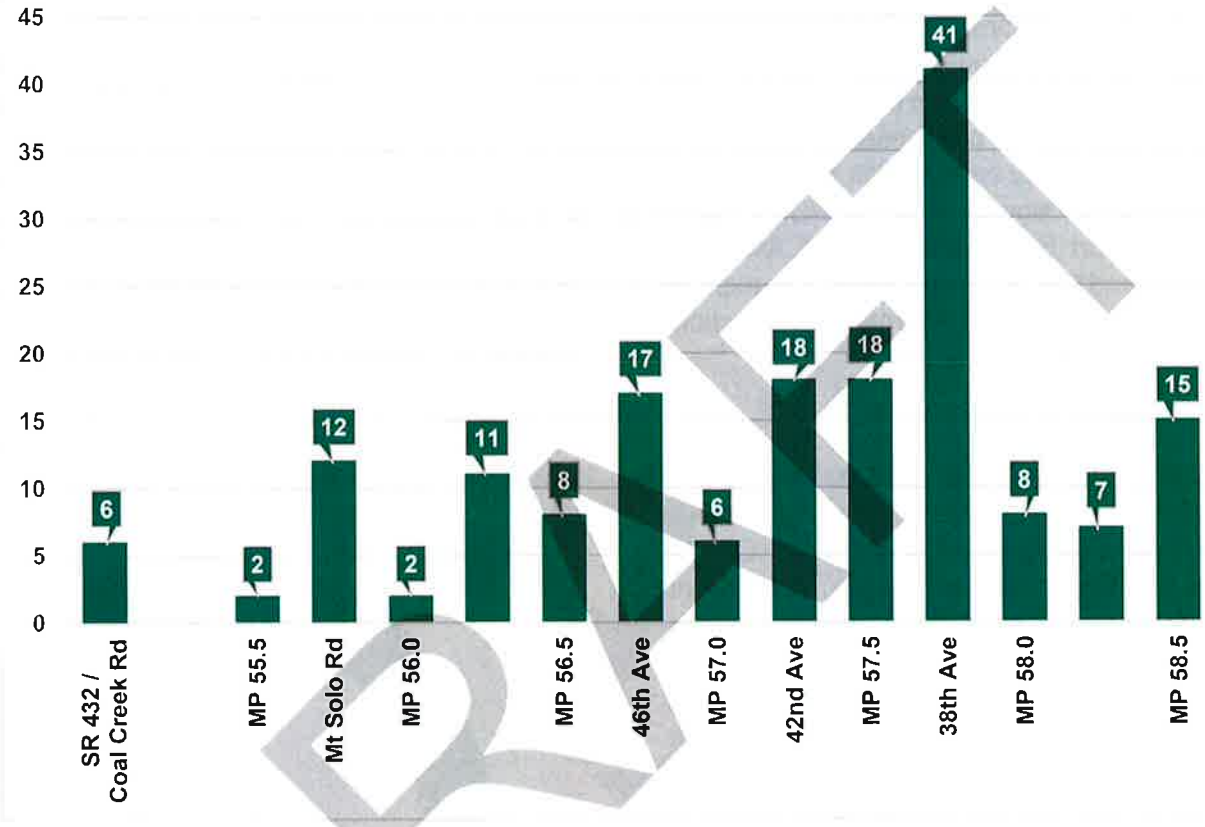
Similarly to traffic volumes and congestion, crashes are highest in the eastern portion of the study corridor. Over half of analyzed crashes occurred in the eastern third of the corridor; 27 percent took place within a quarter mile of the 38th Avenue intersection.

Exhibit 35 – Crash Locations in the OBH Study Corridor, 2014 – 2018



D. Strategies

A number of strategies were considered for improving connectivity and mobility, reducing inter-modal conflicts, and enhancing economic vitality along Ocean Beach Highway. The following sections list the considered strategies and discuss the advantages and disadvantages of each.

1. Roundabouts Advantages

Roundabouts are generally safer, more efficient, less costly and more aesthetically appealing than conventional intersection designs. They are designed to improve safety for all users, including pedestrians and cyclists.

Because they reduce the number and severity of conflict points, and because they lower vehicle speeds, roundabouts are significantly safer than traditional stop sign- or signal-controlled

intersections. According to studies by the Insurance Institute for Highway Safety and the Federal Highway Administration, when compared to traditional intersections, roundabouts typically achieve:

- A 37 percent reduction in overall crashes,
- A 75 percent reduction in injury crashes,
- A 90 percent reduction in fatality crashes,
- And a 40 percent reduction in pedestrian crashes.

In addition to increasing safety, roundabouts also improve intersection efficiency. By promoting a continuous flow of traffic and without creating delays while drivers wait for green lights, roundabouts move traffic through intersections more quickly – with less congestion on approaching roads – than traffic signals. Because traffic is not required to stop, only yield, the intersection can handle more traffic in the same amount of time. IIHS studies in three states, including Washington, found that roundabouts contributed to an 89 percent reduction in delays and a 56 percent reduction in vehicle stops.

Furthermore, roundabouts are an excellent choice to complement other transportation objectives – including Complete Streets, multimodal and active transportation networks, and corridor access management – without compromising the ability to keep people and freight moving.

2. Roundabouts Disadvantages

- Yield confusion – motorists in multi-lane roundabouts may experience confusion about yielding upon entry and the appropriate vehicle path for turning movements. This issue is largely avoided with single lane roundabouts.
- Emergency vehicle priority – some traffic signals prioritize emergency vehicles via signal preemption, halting conflicting traffic and allowing the emergency vehicle a green light. This strategy is not applicable to roundabouts.
- Pedestrian crossings – pedestrians with low vision or blindness may have difficulty determining when vehicles are yielding to them to cross. Other roundabout traits are advantageous for pedestrians (lower vehicle speeds, fewer vehicle/pedestrian conflict points, simplified and shortened crossings where splitter islands are used as pedestrian refuges, etc).

3. Buffered Bike Lanes Advantages

Buffered bike lanes are very similar to conventional bike lanes but with an added degree of separation, typically an 18- to 36-inch space between the bike lane and car traffic. Improving safety and reducing crashes – both for bicycles and motor vehicles – are the key benefits of buffered bike lanes. Buffered bike lanes increase safety for cyclists by making them more visible and separating them from and providing greater shy distance between vehicle traffic streams, as well as by creating space for cyclists – to pass one another without encroaching into travel lanes and to avoid potential obstacles like drainage inlets, manholes or debris. Motorists also experience safety benefits. Bike lanes increase vehicle turning radii at intersections and driveways, improving right-turn safety; they create additional open space in which motorists can

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maneuver to avoid crashes; and they increase clear zone widths for adjacent vehicle lanes, improving motorists' fixed object avoidance.

Additional benefits of buffered bike lanes include:

- Increasing active mode share by making cyclists feel safer and appealing to a wider cross-section of bicycle users.
- Improving pedestrian safety and walkability. Dedicated bike lanes reduce cycling on sidewalks, freeing pedestrians from potential conflicts with bikes and improving mobility for a variety of sidewalk users (stroller and wheelchair users, etc). The resulting increase in foot traffic is also a boon for businesses and restaurants.

4. Buffered Bike Lanes Disadvantages

- Require additional roadway space.
- Buffer striping may require additional maintenance when compared to conventional bicycle lanes; debris collection in the bike lane also increases.
- Motorists turning right must cross paths with bicyclists proceeding straight. Striping and signing configurations which encourage crossings in advance of the intersection, in a merging fashion, are preferable to those that force the crossing in the immediate vicinity of the intersection.

5. Road Diets Advantages

A road diet strategy involves restriping a stretch of road to remove at least one lane and turning that pavement over for other purposes in order to achieve systemic improvements. The primary benefits of road diets include enhanced safety, mobility and access for all road users and a Complete Streets environment that better accommodates the needs of a variety of transportation modes. Road diet installations can:

- Reduce crashes by 19 to 47 percent.
- Promote traffic calming and more consistent speeds, reducing vehicle speed differential.
- Improve mobility and access for motorists and active transportation users.
- Increase pedestrian safety by reducing crossing widths and the number of lanes.
- Integrate the roadway into surrounding uses, enhancing quality of life.

Another feature of road diets is the creation of reclaimable space that may be reallocated to other uses, such as bike lanes, turn lanes, bus lanes and shelters, pedestrian refuge islands, sidewalks, parking or landscaping. Such improvements to the walking and bicycling environment tend to increase foot traffic, supporting stores and restaurants and boosting economic vitality.

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6. Road Diets Disadvantages

- Buses or mail trucks can block traffic when stopped in single lane sections. Bus stops along Ocean Beach Highway are equipped with pullouts, partially mitigating this drawback.
- Motorists have restricted abilities to pull over and make way for emergency vehicles where the roadway is reduced to one travel lane in each direction. This difficulty is reduced by the presence of buffered bike lanes, as motorists may pull into the bike lane during emergency responses.
- May reduce roadway capacity.
- New street trees, landscaping, and delineator buffers necessitate ongoing maintenance.

7. Corridor Access Management Advantages

Corridor access management is an approach that seeks to balance the safety and mobility of a roadway facility with its access needs, helping ensure the free flow of traffic and minimizing crashes while allowing access to businesses and other land uses. Access management includes several strategies designed to increase the capacity of roads, manage congestion, and reduce crashes. Some of these strategies are:

- Increasing spacing between traffic signals;
- Managing driveway location, spacing, and design;
- Median treatments such as raised medians that prevent movements across a roadway;
- Minimizing or eliminating left turns. Replacing a two-way left-turn lane with raised median curb can reduce all crashes by 23 percent;
- Use of exclusive turning lanes.

National and local studies consistently show that access management notably improves traffic flow and safety for travelers; strong evidence also shows that it can ultimately improve business in many cases by making it easier to get to and from destinations.

8. Corridor Access Management Disadvantages

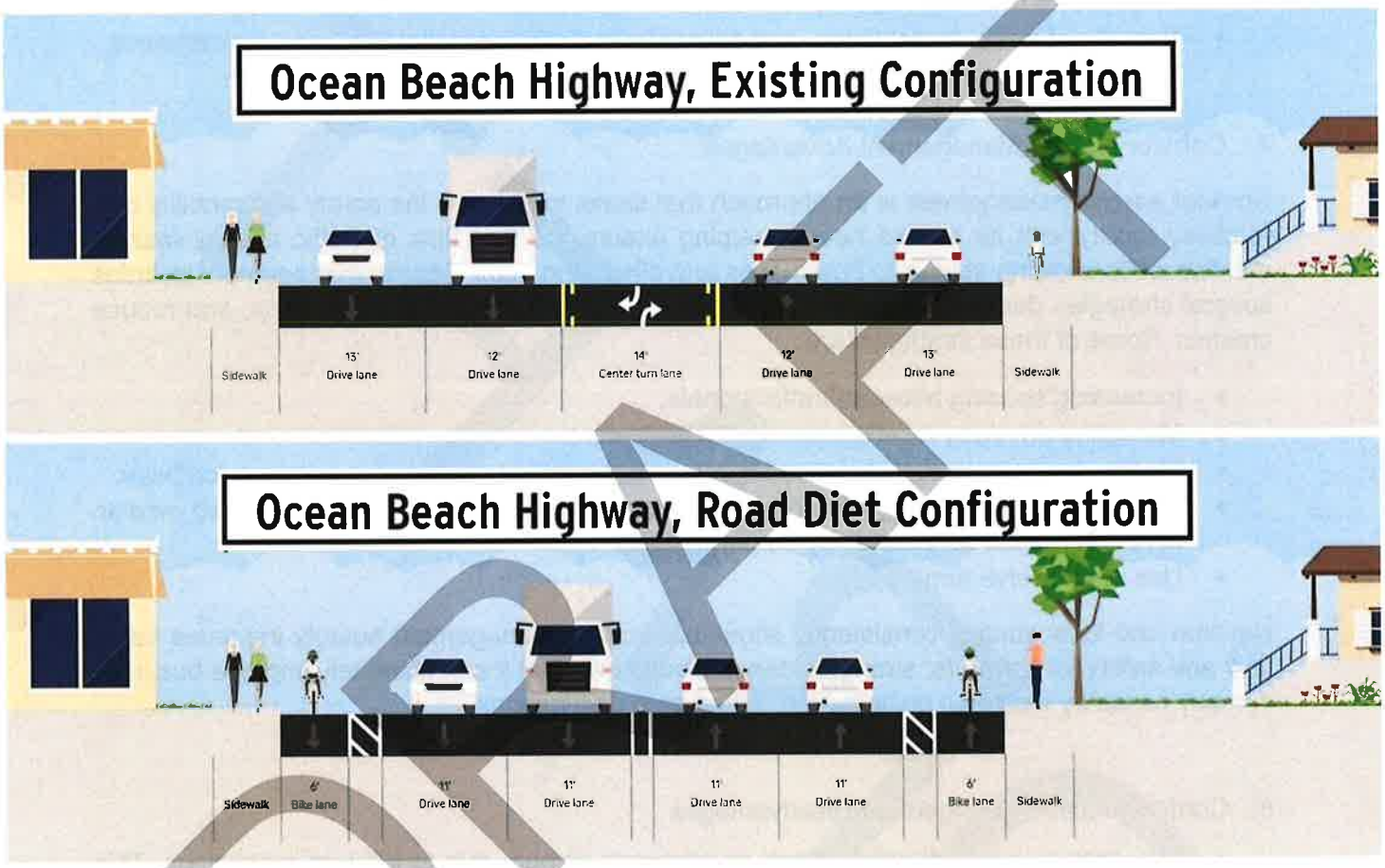
- May require out-of-direction travel as motorists reroute due to left turn restrictions. This issue is lessened for corridors with multiple roundabouts and the U-turn opportunities they provide.
- Business owners may fear that access management improvements will negatively impact their businesses. However, when surveyed after an access management project, most property owners do not report long-term adverse effects on their property value or business. Making locations easier and safer to access may actually have positive effects.

E. Recommendations

The recommended improvements to the Ocean Beach Highway study corridor involve many elements from the strategies discussed above: a road diet with buffered bike lanes, access management and roundabouts at prominent intersections. The existing two-way left-turn lane would be removed throughout the corridor, as would one lane of travel in each direction in the

lower-volume section west of approximately 44th Avenue; the eastern end of the corridor would retain two traffic lanes each way (as shown in Exhibits 36 and 37). In order to improve safety and reduce crash severity, vehicle speeds would be reduced by lowering speed limits to 35 mph and by narrowing travel lane widths from 12 or 13 feet to 11. The space created by narrowing and removing lanes would be reallocated to new eastbound and westbound buffered bike lanes throughout the corridor.

Exhibit 36 – Ocean Beach Highway Scenarios Cross Sections East of 42nd Avenue



Source: Streetmix

In addition to removal of the center turn lane, median curb barriers would be placed along the Ocean Beach Highway corridor, restricting cross-traffic left turns at most minor roads and driveways. A complementary strategy is the construction of roundabouts at ten intersections, providing access to all cross streets and parcels via U-turns at roundabouts with minimal out-of-direction travel. Roundabouts would replace the signals at 38th, 42nd and 46th Avenues, Mt Solo Road and SR 432/Coal Creek Road, as well as the stop-controls at 34th, 40th, 44th and 48th Avenues and Robbins Street. Due to the lower traffic volumes in the study corridor's less densely developed section, the proposed roundabouts from 46th Ave westward would include a single circulating lane. Those at 34th, 38th, 40th and 42nd would have dual lanes; the proposed configuration for 44th is a hybrid roundabout with two lanes for westbound through traffic and single lanes elsewhere. In order to accommodate the heavy turning volumes from the Walmart Supercenter, a two-lane south approach from 38th Avenue is recommended.

Exhibit 37 – Ocean Beach Highway Recommended Scenario

Additional traffic calming strategies and features that may be pursued as development opportunities allow include:

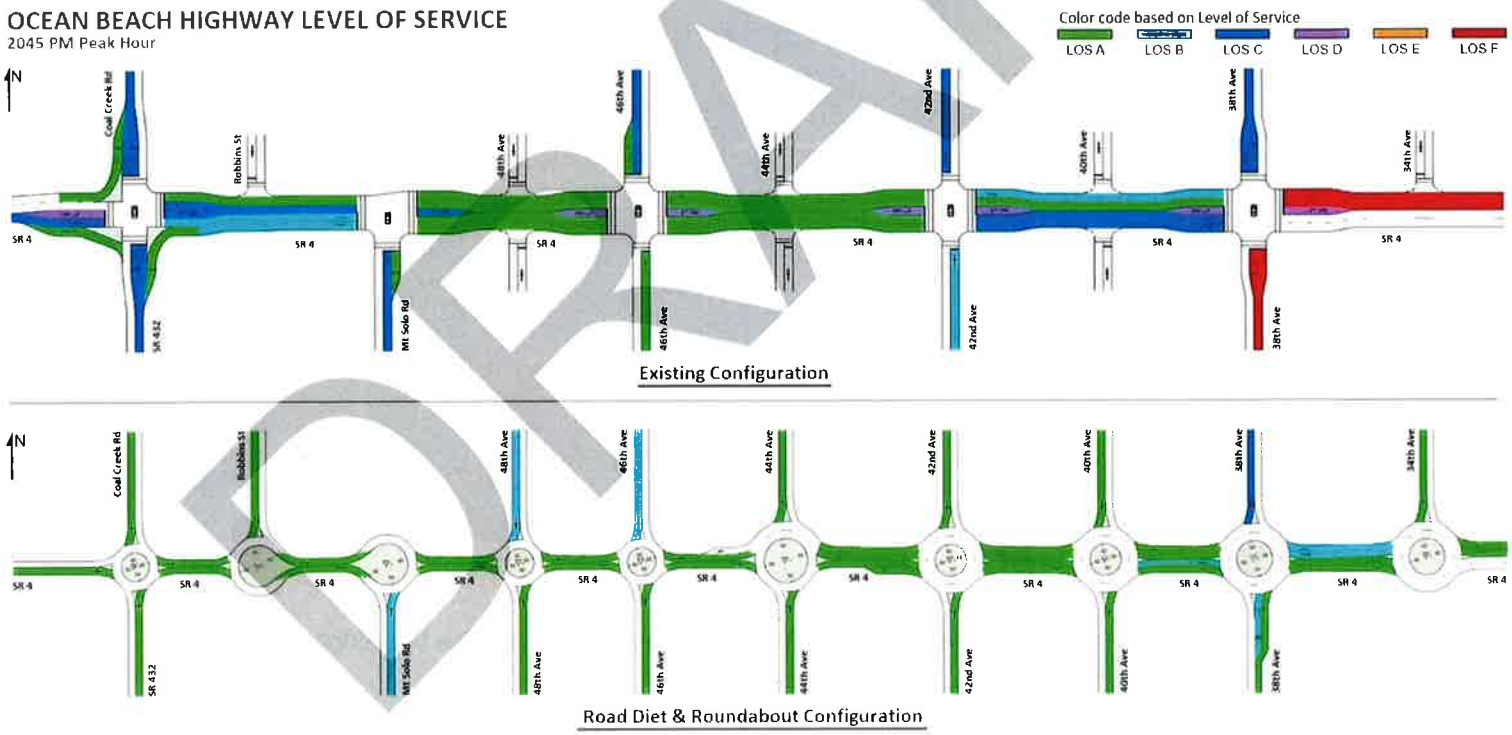
- Closing driveways for parcels with multiple access points (see Appendix L)
- Narrowing corner radii
- Reducing building setbacks
- Establishing street trees and landscaping
- Installing gateway treatments, bulbouts, pinchpoints, and chicanes
- Introducing pedestrian refuge islands.

F. Performance of Recommended Improvements

In order to measure the performance of the recommended strategies, the existing configuration of Ocean Beach Highway and the proposed built-out configuration were modeled and compared using the Sidra Intersection software package. Sidra Intersection is a macroscopic modeling tool capable of lane-by-lane analysis of roundabouts and traffic signals. A 2045 horizon year was selected to match CWCOG's travel demand model, the basis of the scenario traffic volumes used in the Sidra analysis. Additional modeling methods and assumptions are included in the report appendices.

Exhibits 38 and 39 graphically compare the performances of the existing and proposed scenarios using level of service (LOS) grades and volume-to-capacity ratios. For both metrics – especially at the study corridor's east end – the recommended road diet with roundabouts concept outperforms the existing signalized configuration. Because vehicles entering roundabouts yield rather than stopping, traffic progresses in a continuous flow; as a result, roundabouts operate more efficiently than signals, allowing intersections to handle more traffic in the same amount of time. The LOS and V/C results reflect this enhanced intersection efficiency.

Exhibit 38 – Ocean Beach Highway 2045 PM Peak Hour Scenario Level of Service



Source: Sidra Intersection

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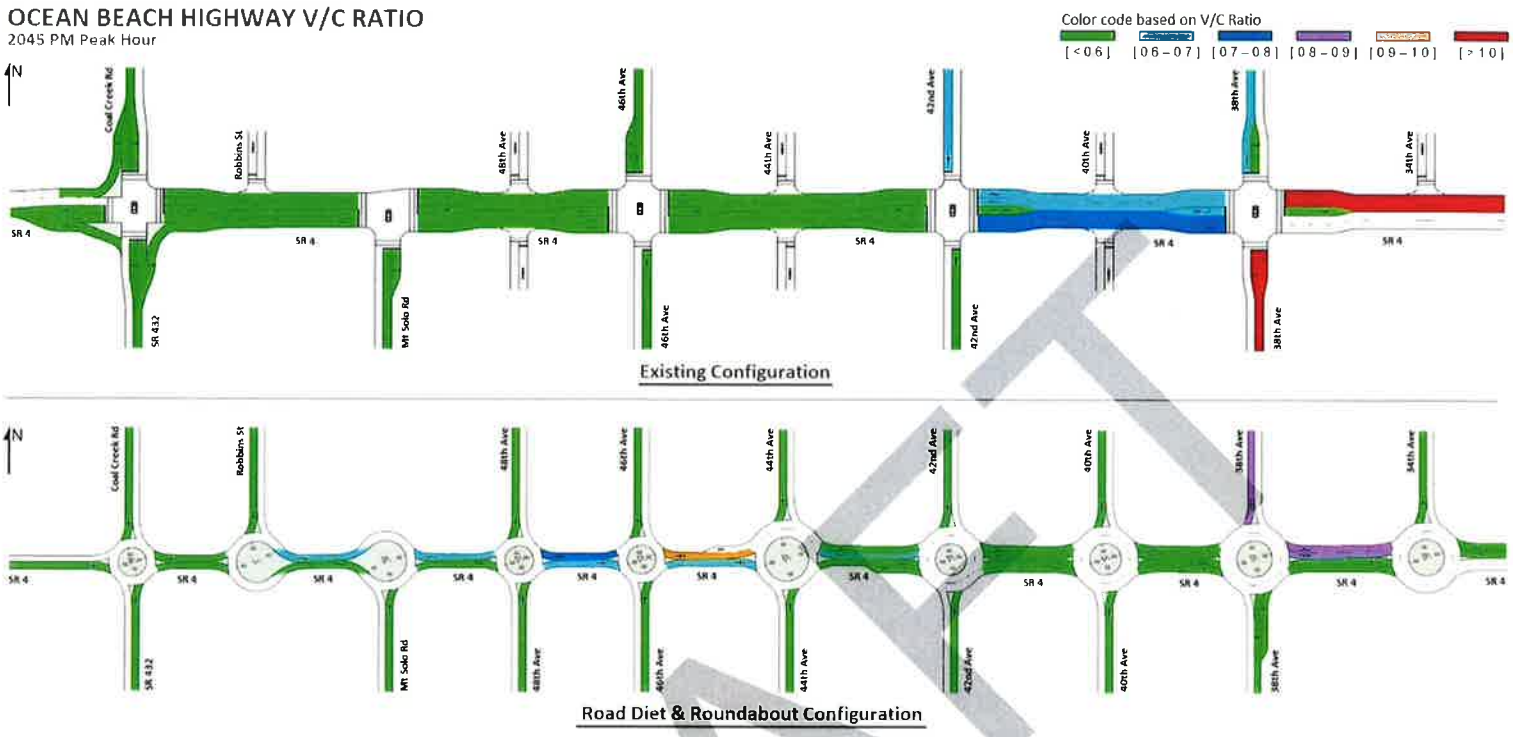
Exhibit 39 – Ocean Beach Highway 2045 PM Peak Hour Scenario Volume-to-Capacity Ratio



Source: Sidra Intersection

In additional to analyzing the scenarios' levels of service and V/C ratios, Sidra was used to compare travel times and delays along the study corridor. As shown in Exhibit 40, for the peak period and direction of travel (PM peak hour, westbound), 2045 corridor travel times are nearly identical for the two configurations. However, delay – the additional travel time experienced by motorists beyond that required to traverse the corridor at the desired speed – is roughly double for the signalized option. The roundabouts scenario boasts another positive side effect of reducing crashes and corridor delays: corresponding improvements in travel time reliability, the consistency in travel times from day-to-day and across different times of day. The result of switching from the existing signalized configuration to the road diet with roundabouts strategy is a changed driving experience in which motorists spend less time slowed or stopped by congestion or waiting at signals but move at lower speeds between intersections due to reduced speed limits and traffic calming techniques.

For off-peak times and travel direction, delays are again reduced when comparing the existing and proposed configurations, though less significantly. Because vehicle speeds are intentionally reduced by the recommended strategies, and because of the lower delay reductions experienced for non-peak conditions, travel times for the existing corridor are less than those under the proposed configuration.

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Exhibit 40 – OBH 2045 PM Peak Hour Travel Times and Delay, Nebraska St to SR 432

	Current Configuration (signals)	Road Diet & Roundabouts Configuration
Westbound		
Travel time	452 sec	450 sec
Delay	118 sec	57 sec
Eastbound		
Travel time	408 sec	435 sec
Delay	77 sec	53 sec

The road diet with roundabouts concept offers many advantages compared to the existing signalized, 5-lane configuration. Benefits include increased safety for all users, reduced delay and increased reliability, improved mobility and mode share for active transportation, and better roadway integration with adjacent uses, resulting in improved quality of life. Although the proposed strategies come with a drawback – except for the peak direction and time of day, total corridor travel times increase even as delays decrease – the overall upsides outweigh the downside.

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4.5 Ocean Beach Highway, Cowlitz Way to 32nd Avenue

SR 4 Milepost 58.7 – 60.8

In the fall of 2020 the City of Longview plans to upgrade the signals on Ocean Beach Highway at 10 intersections between 9th and 32nd Avenues. Improvements include updated software and communications as well as integrated signal timing plans. These improvements should increase safety and improve traffic flow on this portion of the SR 4 corridor.

In light of these ongoing improvements, the SR 4 Corridor Planning Study limited its analysis of Ocean Beach Highway between Cowlitz Way and 32nd Avenue to recommendations for improving corridor access management. Corridor access management is a strategy that seeks an appropriate balance between the safety and mobility of a roadway facility with its access needs, helping ensure the free flow of traffic and minimizing crashes while still allowing access to major businesses and other land uses. National and local studies consistently show that access management notably improves traffic flow and safety for travelers; strong evidence also shows that it can ultimately improve business in many cases by making it easier to get to and from destinations.

The following access management proposals are recommended:

- Convert eight (8) minor intersections to right-in right-out (RIRO) access, including 16th Avenue, 17th Avenue, 18th Avenue, 19th Avenue, Ocean Beach Place (two intersections), 28th Avenue, and Michigan Street.
- Close 22 driveways for parcels with multiple access points.

Please see Appendix M for additional information.

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5. Next Steps

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SR 4 Corridor Study

March 11, 2021

SR 4 Corridor Study

Study purpose:

Identify cost-effective and feasible concepts that improve safety, mobility and economic vitality along the SR 4 corridor through the Longview-Kelso area

SR 4 Corridor Study

Study Sites Analyzed:

- Allen St at S 8th Ave
- Kelso Couplet and Vicinity
- Cowlitz Way and NW 5th Ave/Long Ave
- Ocean Beach Highway, SR 432 to Nebraska St

Allen St & S 8th Ave

Purpose:

Reducing potential for pedestrian related crashes and improve overall roadway awareness at uncontrolled crosswalk

Recommendations:

- Install Rectangular Rapid-Flashing Beacons
- Widen pedestrian refuge island
- New signs and pavement markings

SR 4 Couplet

Purpose:

Improve safety and circulation for all road users

Recommendations:

- Road diets - reduce 4th & 5th Avenues to two lanes with buffered bike lanes
- Add pedestrian/bike improvements to Allen St and Cowlitz Way

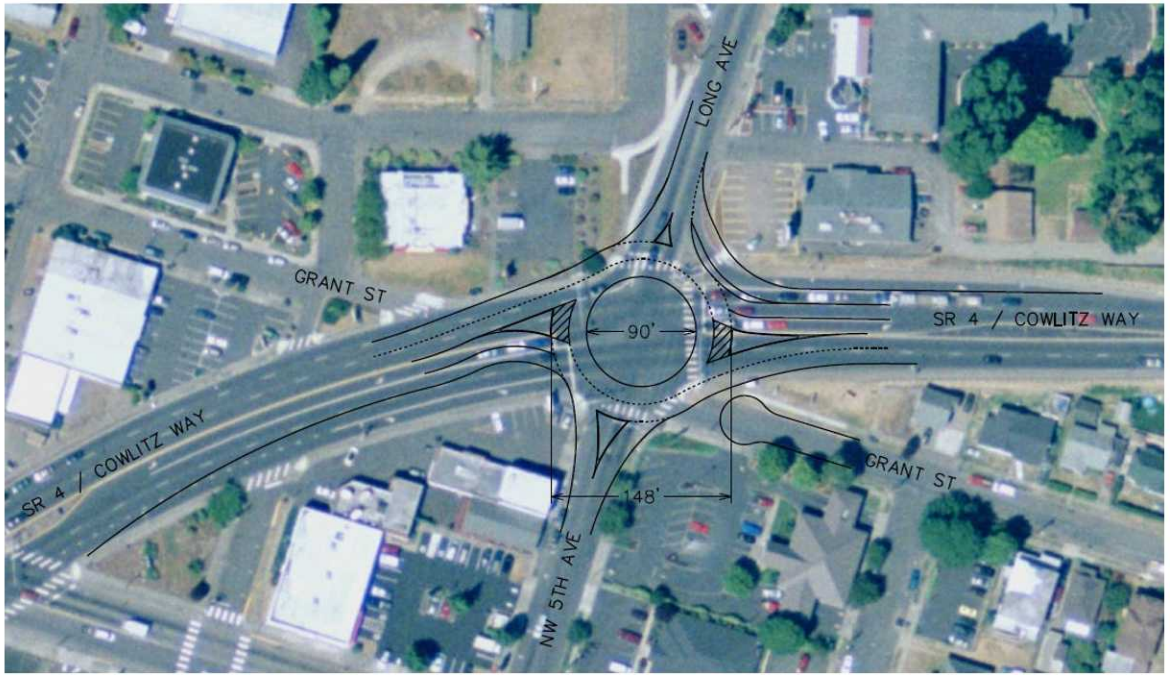
Cowlitz Way/ Long Ave & 5th Ave

Purpose:

Improve intersection safety

Recommendations:

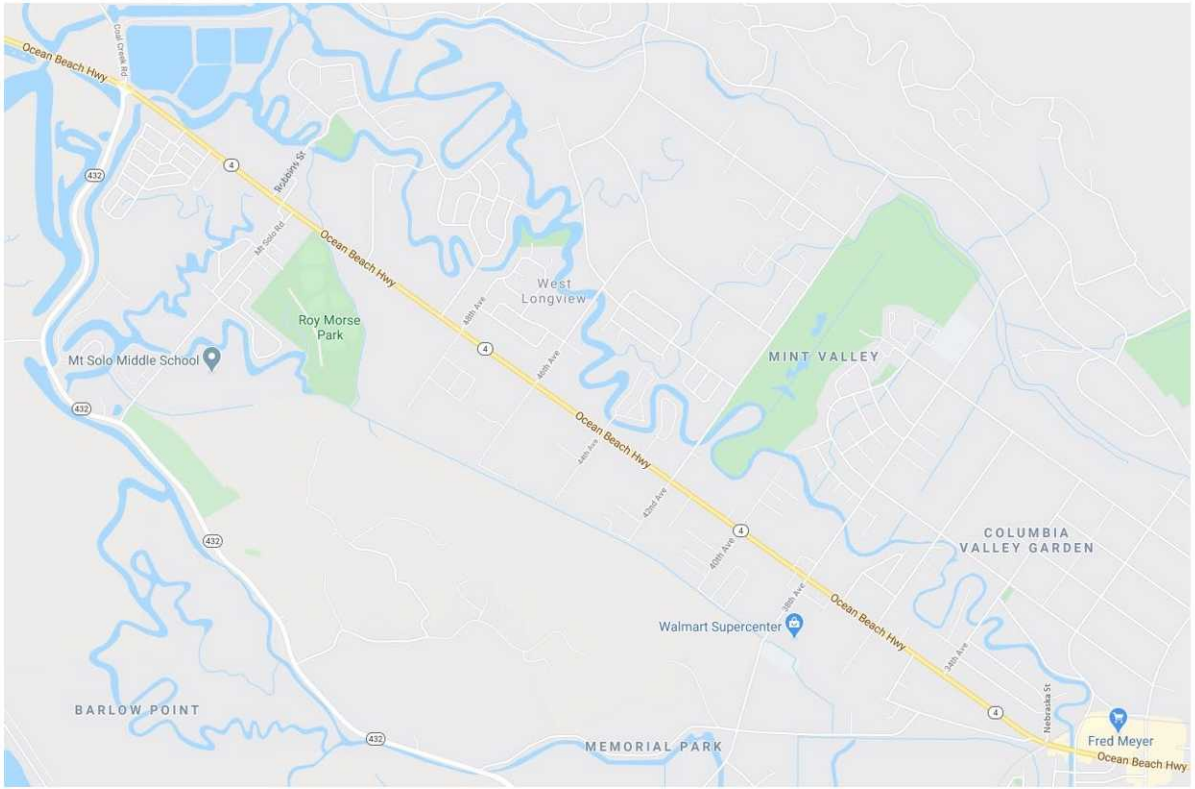
- Convert the signalized intersection to a four-leg roundabout
- Remove access to Grant Street to the south
- Provide pedestrian and bicycle crossing facilities



Ocean Beach Highway

Purpose:

Improve safety for all road users while maintaining connectivity and access



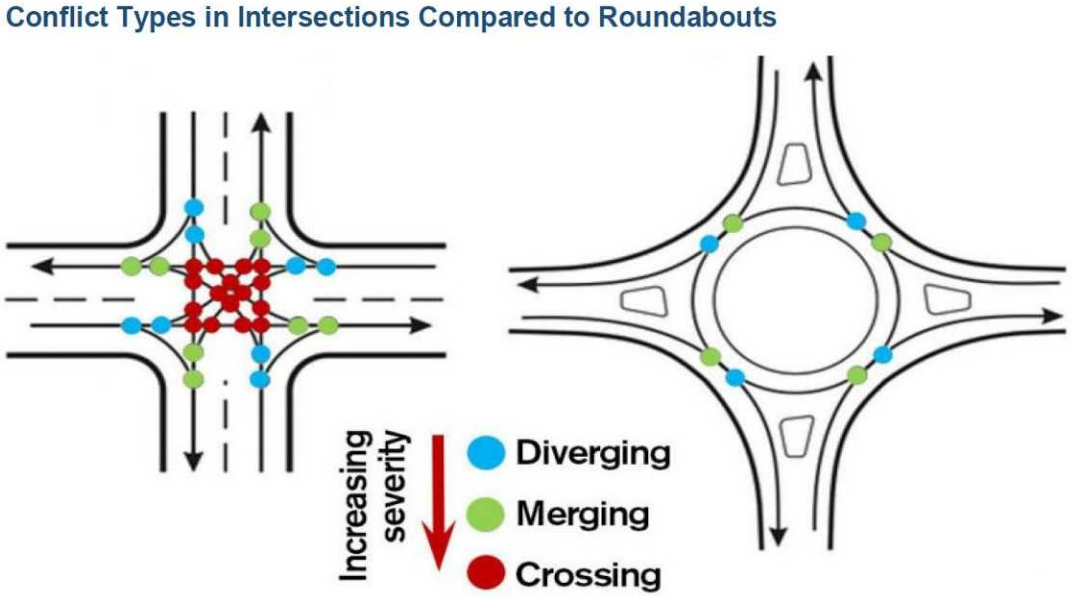
Recommendations:

Road diet between SR 432/Coal Creek Rd and Nebraska St

- Install buffered bike lanes
- Construct roundabouts at ten intersections and remove existing signals
- Calm traffic
  - Reduce lane widths & speeds
  - Median access restrictions
  - Other strategies
- Eliminate some left turns and accesses for properties with multiple driveways

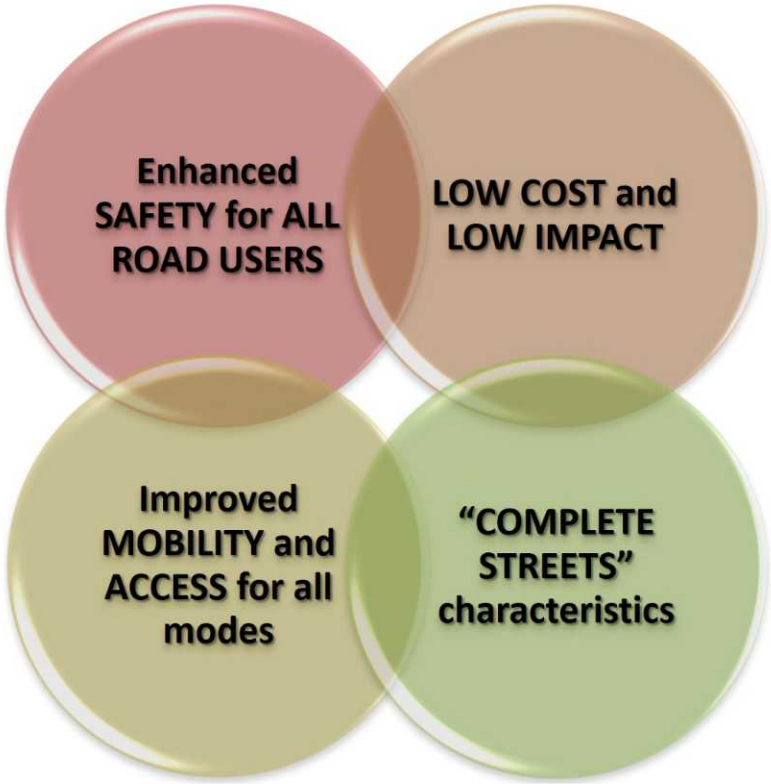
Benefits of Roundabouts

- Increased traffic safety
- Increased pedestrian safety
- Traffic calming
- Operational performance
- Ongoing operations and maintenance
- Approach roadway width
- Environmental factors
- Aesthetics

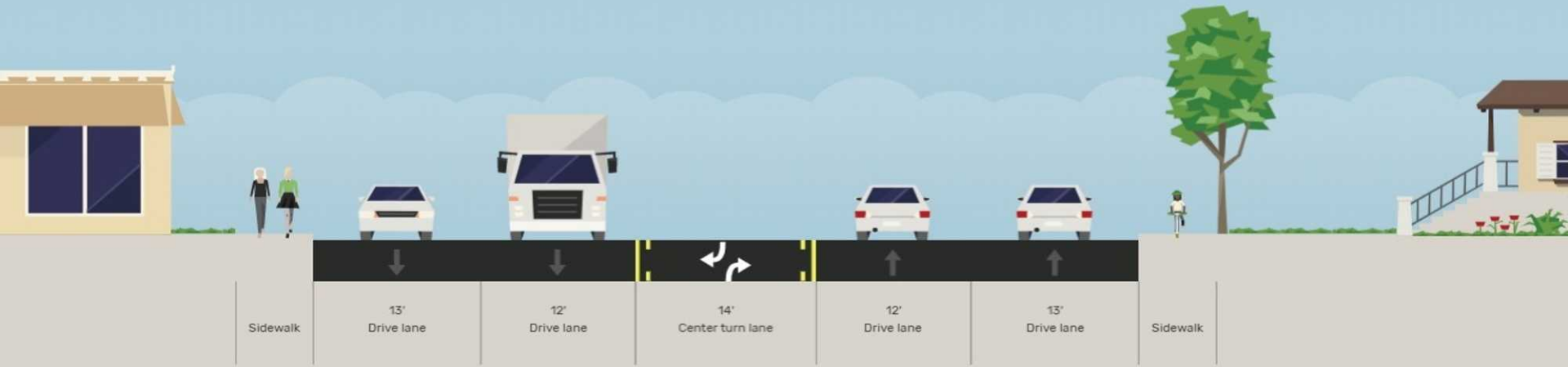


Benefits of Road Diets

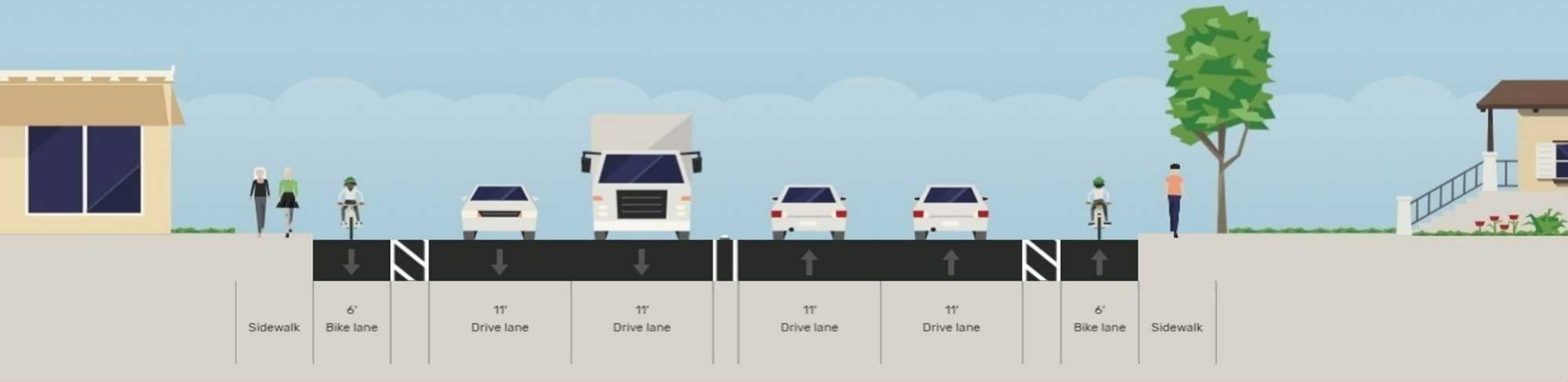
- Improve safety
- Reduce speeds and speed variance
- Mitigate left turn/through traffic conflicts
- Improve bicyclist accessibility
- Improve walkability
- Enhance transit service
- Fit the community context



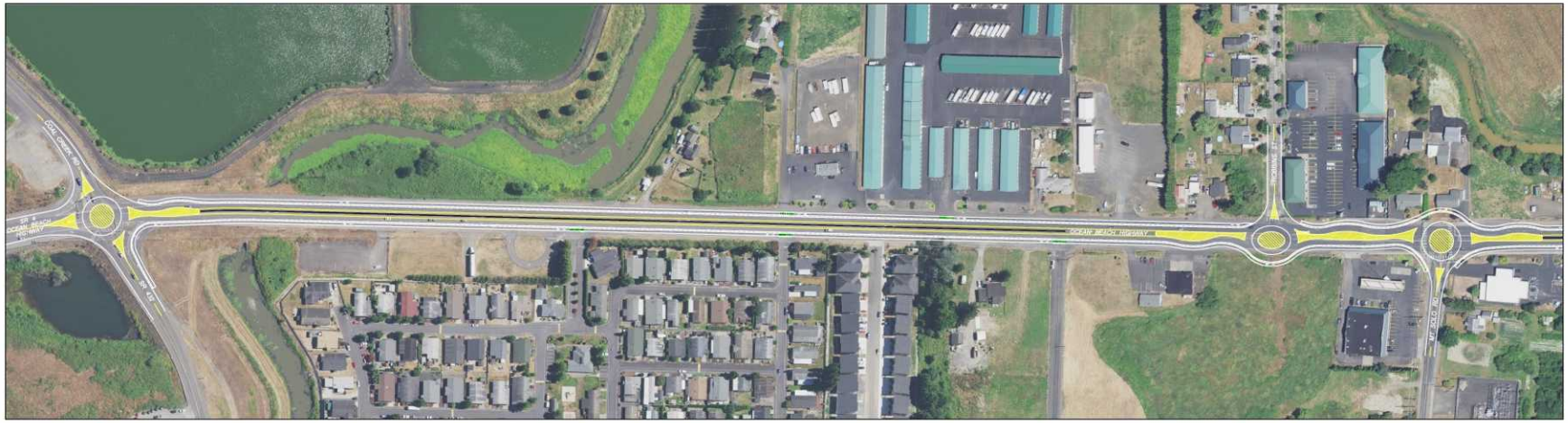
Ocean Beach Highway, Existing Configuration



Ocean Beach Highway, Road Diet Configuration



Ocean Beach Highway



4

COAL CREEK RD. TO MT. SOLO RD.
ONE VEHICLE LANE AND A
BUFFERED BIKE LANE IN EACH DIRECTION

PLAN NOT TO SCALE

Washington State
Department of Transportation

Ocean Beach Highway

LEGEND

CLOSE APPROACH

4

48TH ST. TO 42ND ST.
ONE VEHICLE LANE AND A
BUFFERED BIKE LANE IN EACH DIRECTION

PLAN NOT TO SCALE

Washington State
Department of Transportation

Ocean Beach Highway

LEGEND

CLOSE APPROACH

4

40TH ST. TO 34TH ST.
TWO VEHICLE LANES AND A
BUFFERED BIKE LANE IN EACH DIRECTION

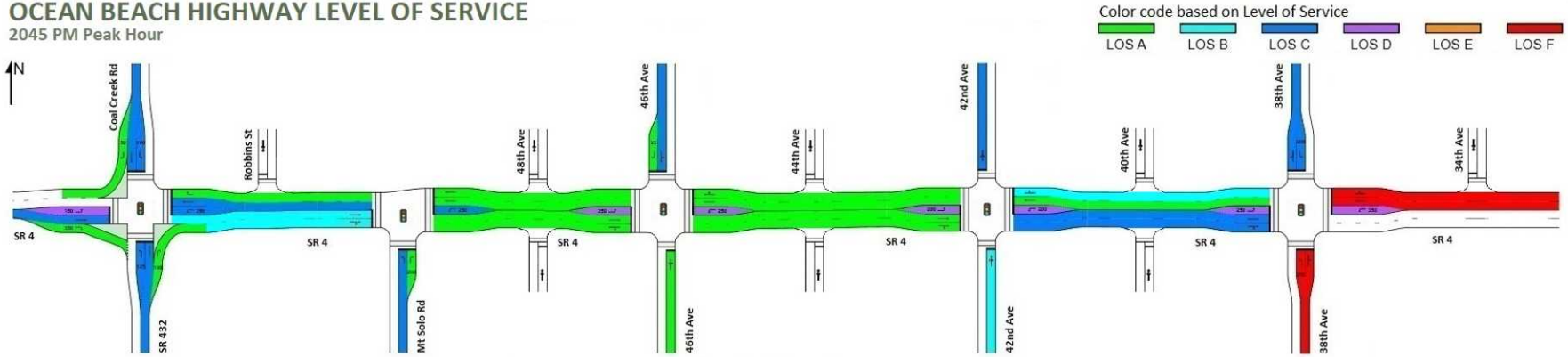
Washington State
Department of Transportation

PLAN NOT TO SCALE

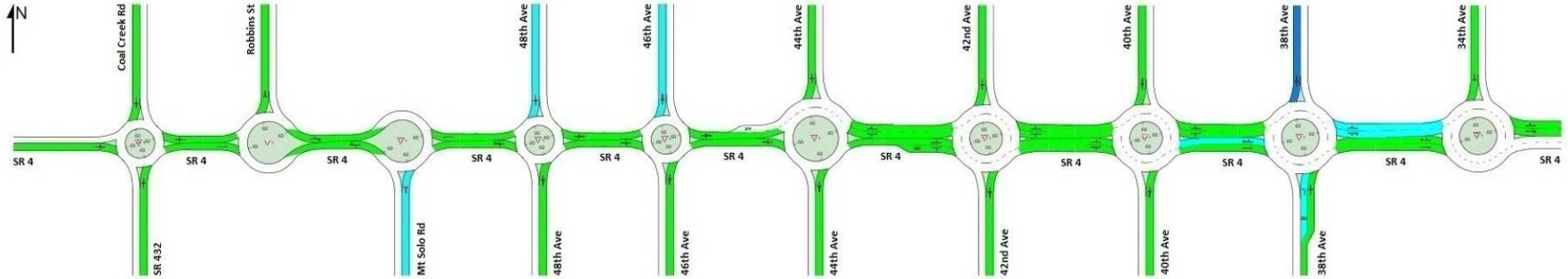
Ocean Beach Highway Performance

OCEAN BEACH HIGHWAY LEVEL OF SERVICE

2045 PM Peak Hour



Existing Configuration

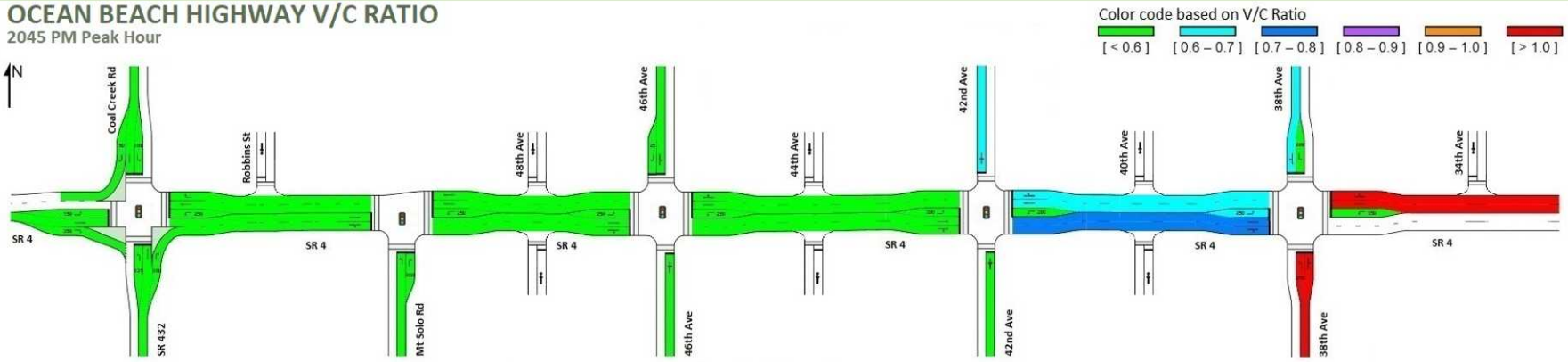


Road Diet & Roundabout Configuration

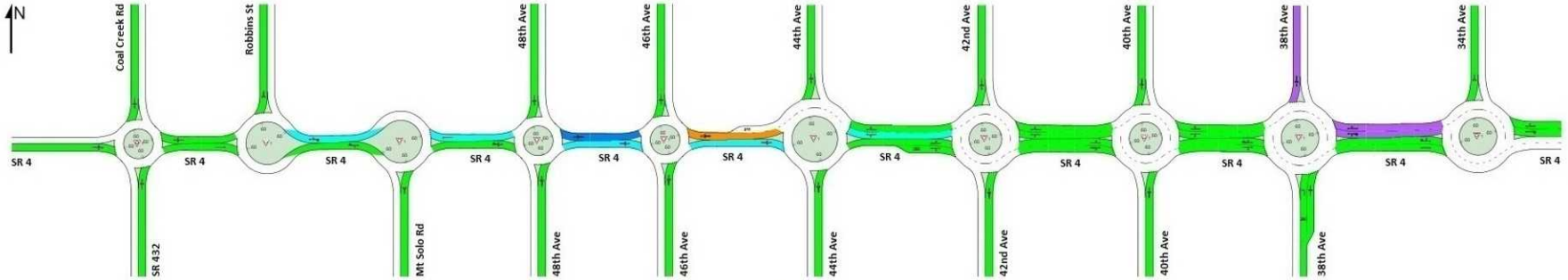
Ocean Beach Highway Performance

OCEAN BEACH HIGHWAY V/C RATIO

2045 PM Peak Hour



Existing Configuration



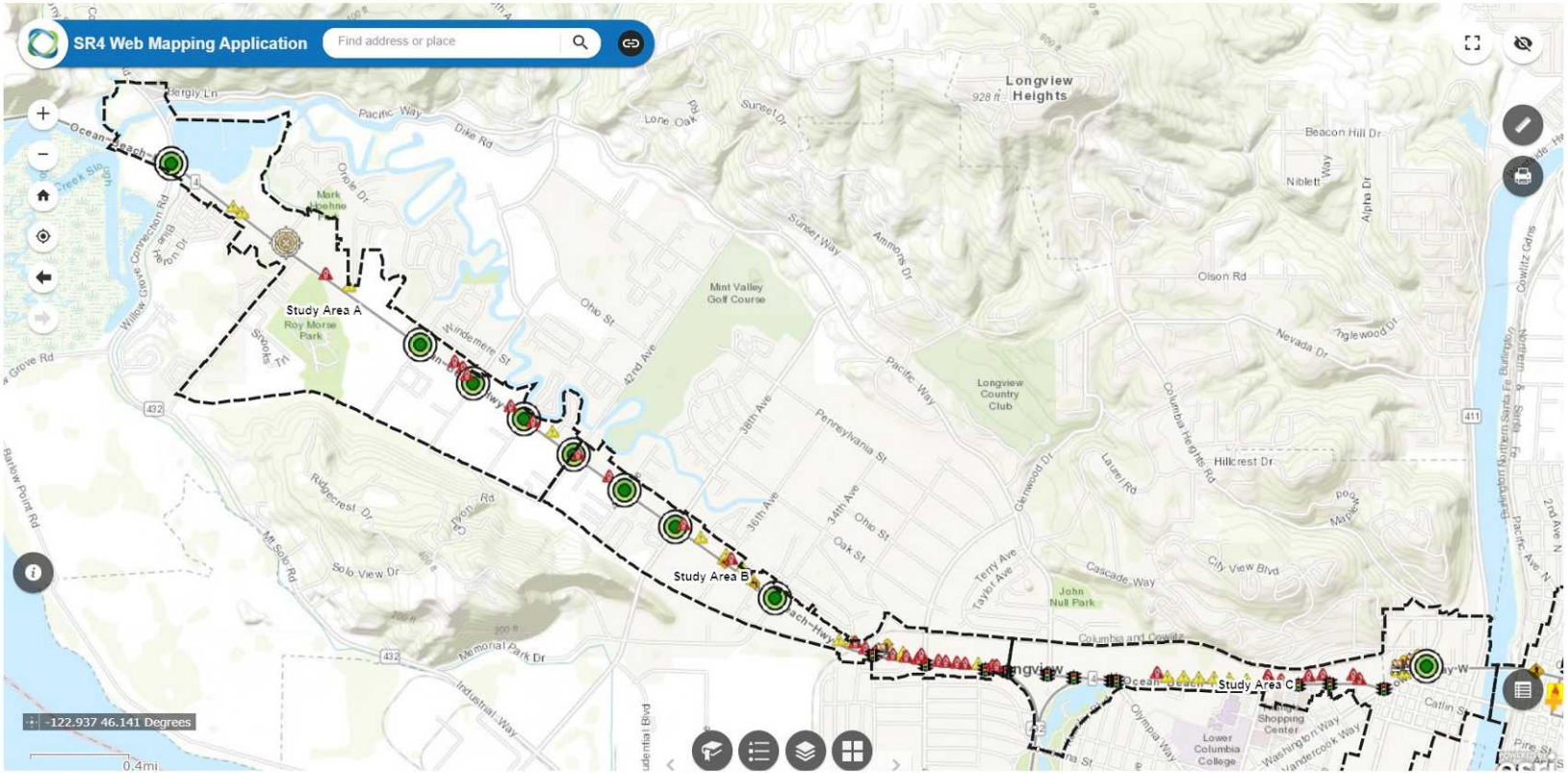
Road Diet & Roundabout Configuration

Ocean Beach Highway Performance

2045 PM Peak Hour

	Current Configuration (signals)	Road Diet & Roundabouts Configuration
Westbound		
Travel time	452 sec	450 sec
Delay	118 sec	57 sec
Eastbound		
Travel time	408 sec	435 sec
Delay	77 sec	53 sec

SR 4 Corridor Query Tool



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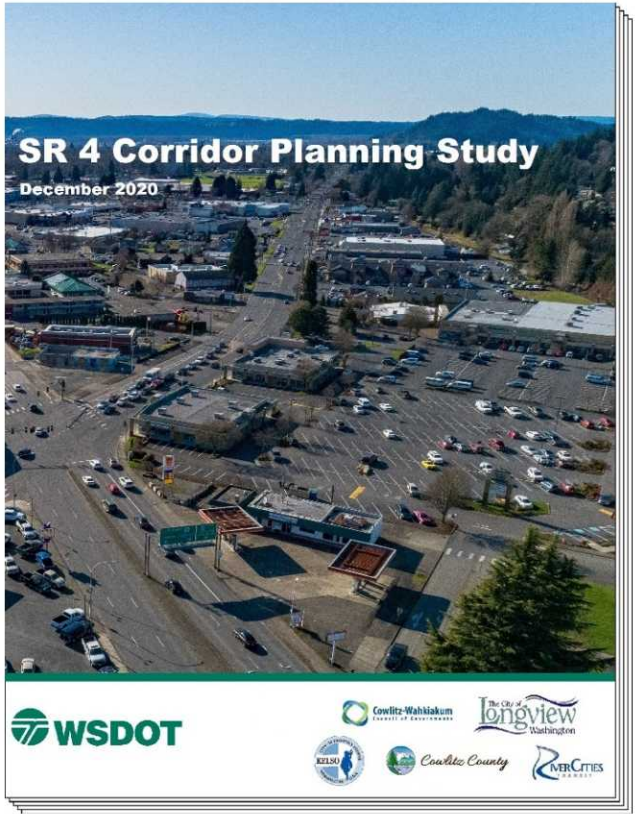

Questions?

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360 905-2087