



whatcom council of governments

# **Whatcom Region Transportation Performance Report 2020**

October 2020

## Introduction

With the U.S. Congress's passage of the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21) in 2012, states and metropolitan planning organizations were given updated requirements to adopt performance-based planning and programming (PBPP). The updated planning rules included both an overall expectation for PBPP as well as specific requirements for adoption of performance metrics and targets. The overall expectation is that planning activities, decision processes, and selection of investments (programming) document a data-based link between established planning goals, chosen strategies, and expected outcomes. This expectation is introduced in the MAP-21 regulations as follows.

**23 CFR § 450.306 (d)(1) – Performance-based approach.** *The metropolitan planning process shall provide for the establishment and use of a performance based approach to transportation decision making to support the national goals described in 23 U.S.C. 150(b) and the general purposes described in 49 U.S.C. 5301(c).*

Specific MAP-21 PBPP requirements cover are introduced in the MAP-21 regulations as follows.

**23 CFR § 450.306 (d)(2) – Establishment of performance targets by metropolitan planning organizations.** *Each metropolitan planning organization shall establish performance targets that address performance measures or standards established under 23 CFR part 490 (where applicable), 49 U.S.C. 5326(c), and 49 U.S.C. 5329(d) to use in tracking progress toward attainment of critical outcomes for the region of the metropolitan planning organization.*

Subsequent rule-making under the above regulations groups state and MPO performance target-setting requirements into three categories.

- **Safety:** fatalities and serious injuries (number and rate) on all public roads.
- **System performance:** on the National Highway System (NHS) – congestion & travel time reliability for both personal vehicles and freight and on-road mobile source emissions (within larger urban areas).
- **Preservation:** Pavement and bridge condition on the NHS.

In addition to requiring that MPOs adopt general PBPP practices and specific metrics and targets with respect to the above categories (safety, NHS system performance, and preservation), MAP-21 also added the requirement that metropolitan transportation plans (MTPs) include a system performance report.

**23 CFR § 450.324 (f)(4) –** *The metropolitan transportation plan shall at a minimum include...**A system performance report** and subsequent updates evaluating the condition and performance of the transportation system with respect to the performance targets described in §450.306(d)...*

This document is the *Whatcom Region Transportation Performance Report* (TPR). It will be incorporated by reference into WCOG's five-year updates to the MTP. It is WCOG's intention to update the TPR every two years.

## Connection to WCOG's planning strategies

This Whatcom Region TPR presents performance trends in two complementary ways. In accordance with the specific MAP-21 measures as well as WCOG's adopted alignment with Washington State's adopted MAP-21 metrics and targets, this document will report on those trends and resulting regional planning

and programming implications. Secondly, this TPR will document WCOG’s regional performance approach. In its 2017 MTP update, *Whatcom Mobility 2040*, WCOG adopted the PBPP strategy of developing and tracking measures of *interjurisdictional corridors* – sub-groupings of multi-modal facilities and systems that serve trips and goods-movement between the urbanized centers in the Whatcom planning area.

## Report organization

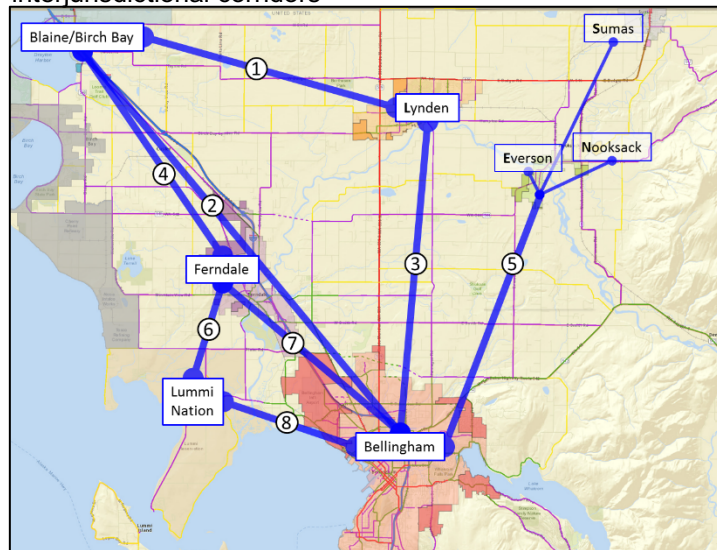
WCOG’s TPR is organized by the region’s adopted transportation system goals in order of priority: safety, mobility, multi-modal, environmental quality, access, preservation, and freight.

Each regional-goal section will first discuss implications of the specific MAP-21 measures and trends, the regional observations with implications for programming decisions, and implications for how regional strategies might be improved to better support achievement of state-wide MAP-21 targets. Secondly, each regional goal section will evaluate selected interjurisdictional corridor performance using a variety of available data pertaining to each goal.

## WCOG Interjurisdictional Corridors – overview

As part of its efforts to adopt performance-based planning practices, WCOG has identified interjurisdictional corridors between two or more communities in Whatcom County. For each of these corridors a generalized geography was established, inclusive of all modes and system components that provide access and influence mobility (roads, transit, trails, etc.). Identification of regional corridors is intended to provide a framework to support coordination between jurisdictions and agencies with operational responsibilities on each corridor (cities, Whatcom County, WTA, WSDOT, etc.). The purpose of developing performance measures for these corridors is to better enable WCOG and its partners to track progress toward operational goals and more clearly identify system needs and the investments necessary to meet them.

**Figure 1:** Concept map of eight Whatcom interjurisdictional corridors



## Safety

*Whatcom Mobility 2040* identifies safety as the region's highest priority goal of investing in the regional transportation system. Additionally, in accordance with federal law, the Whatcom Transportation Policy Board (WTPB) has adopted the State of Washington's safety performance measures and targets. Specifically, (as detailed in the Strategies/Planning/Performance Based Planning and Programming section of *Whatcom Mobility 2040*), the WTPB agreed to:

- Align with WSDOT's adopted Highway Safety Improvement Program target, Target Zero (zero fatal crashes by 2030) and
- Plan and program projects so that they contribute toward the accomplishment of the state-wide, Target Zero goal.

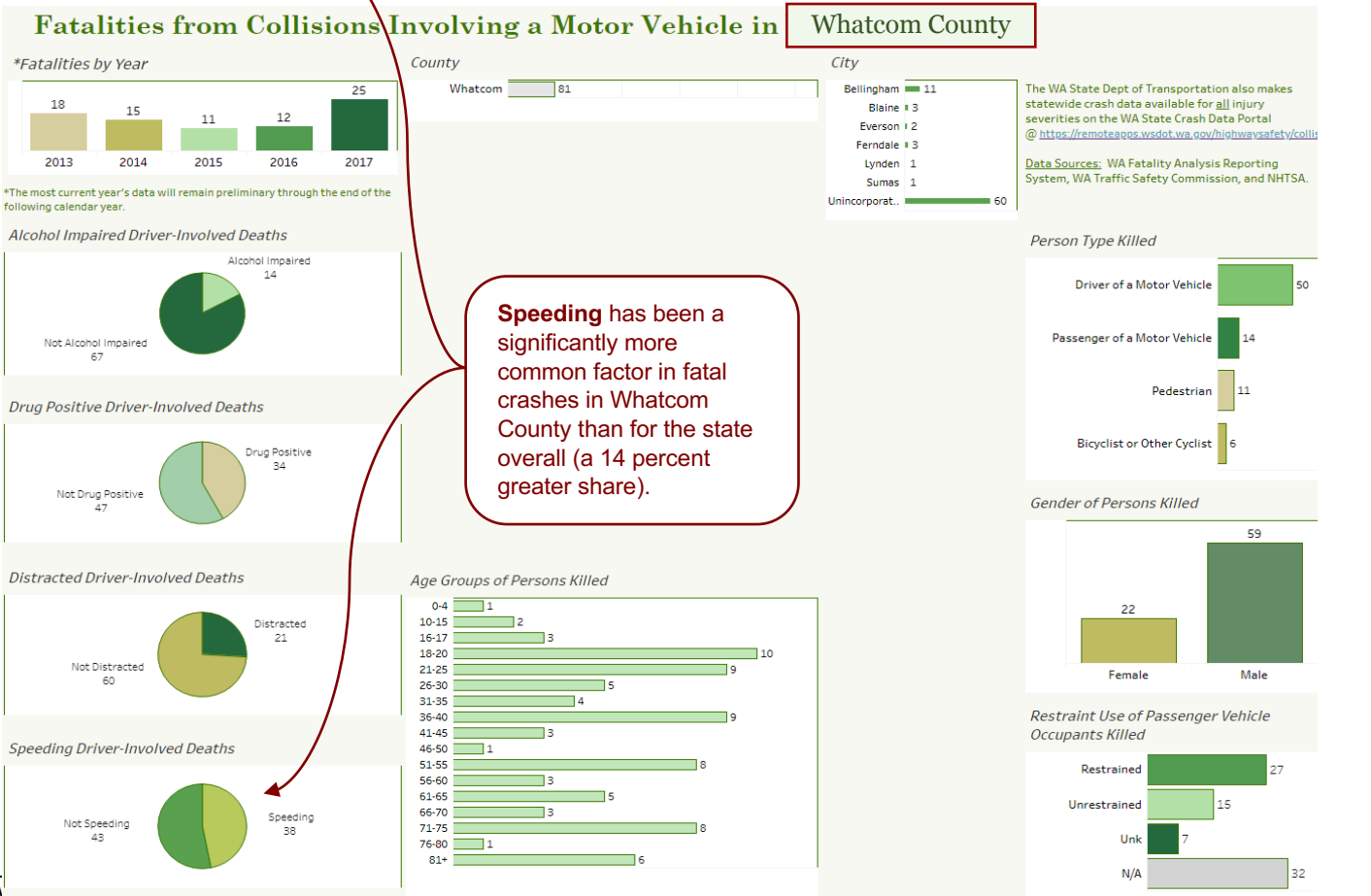
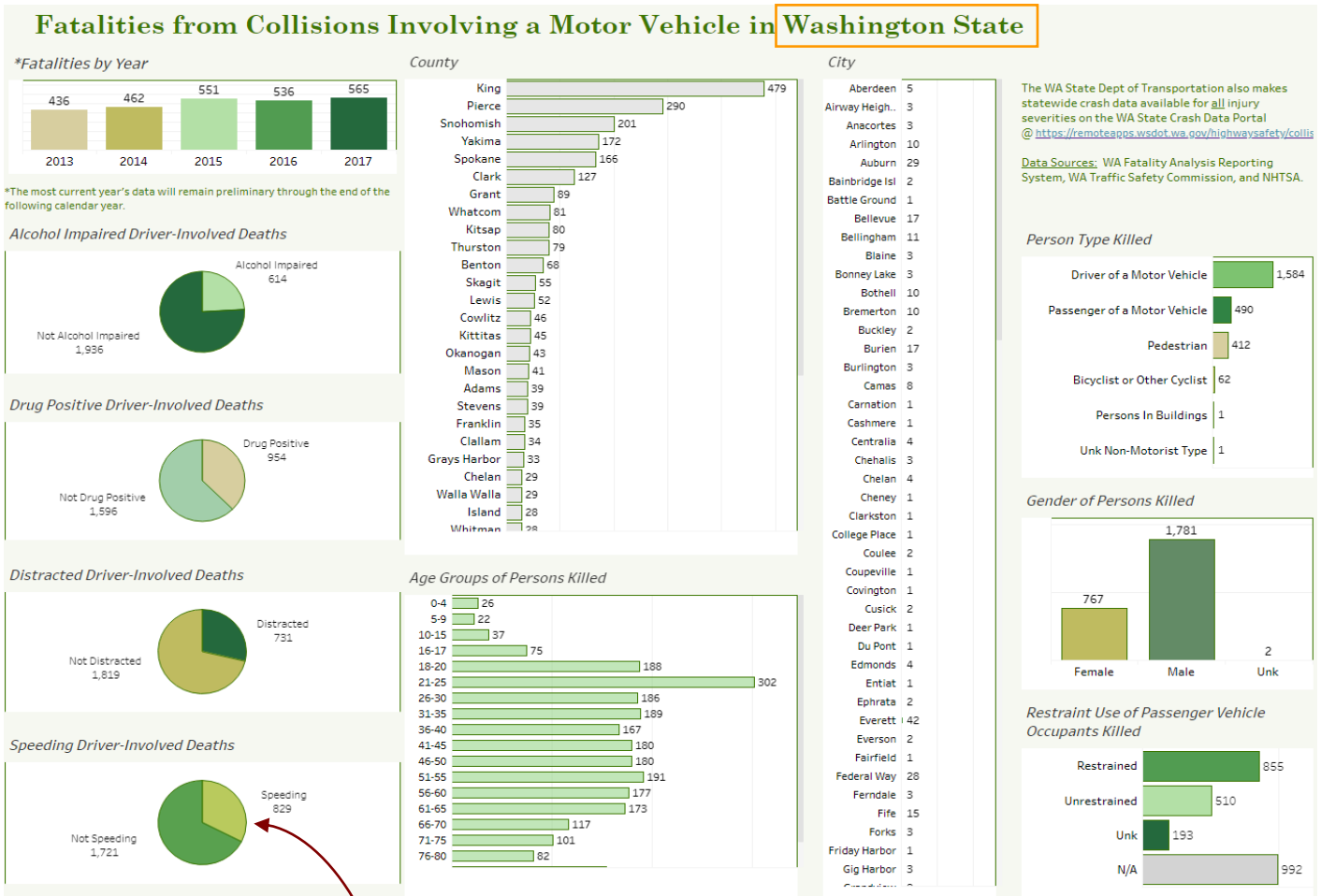
This analysis draws on two data sources. First, the Washington Traffic Safety Commission's (WTSC) Research & Data Division (<https://wtsc.wa.gov/research-data/>) avails quarterly crash data on fatal and serious injury crashes at the county level. This information does not include latitude-longitude (lat-long) location of crashes but the reporting includes numerous attributes (high risk behaviors, road user types) of crashes (Target Zero emphasis areas) over time and is a useful first iteration towards understanding what strategies may deserve more focus in Whatcom County than the state overall.

Second, WSDOT's [Crash Data and Reporting Branch](#) provides WCOG with a monthly jurisdiction data feed. This data, for *all crash types* (not only fatal and serious injury), includes Target Zero attribute data along with lat-long coordinates. The second iteration of this analysis will use GIS to filter and summarize this data for each of the interjurisdictional corridors identified in *Whatcom Mobility 2040* as part of WCOG's Performance-based Planning and Programming strategy. WSDOT's coverage of all crash types will allow for subsequent inclusion of more crash data if and when corridor-specific evaluation of fatal and serious-injury crashes points to strategies that could be refined with information from a broader spectrum of crash-types.

## Countywide Fatal Crash Trends

Looking at WSTC's fatal-crash data dashboard for both Washington State and Whatcom County (figure 1 below), in most ways, Whatcom County's fatal crash attributes from 2013-2017 have been similar to the state as a whole. One notable exception is fatalities where speeding was involved. Over this time period, Whatcom County's share of fatal crashes involving speeding was 14 percent higher than the statewide share.

**Figure 1: WTSC Data Dashboard – Annotated – Statewide & Whatcom**



## Whatcom County Target Zero Trends

Four of the five MAP-21 safety performance measures (listed to the right) assess numbers and rates of fatal and serious-injury (F&SI) crashes separately. The measure of bicycle and pedestrian crashes combines fatal and serious injury crashes into one number. The following comparisons of Whatcom County and statewide F&SI crash trends (again, using data from the WSTC Research and Data Division) combines annual counts of fatal and serious-injury crashes into one F&SI number. The rationale for this approach is based on the perspective that most serious injury crashes could have been fatal but for small circumstantial differences or simple chance. Thus, the following summary comparisons treat both crash types as equally relevant for guiding analysis, and planning and programming of responsive strategies.

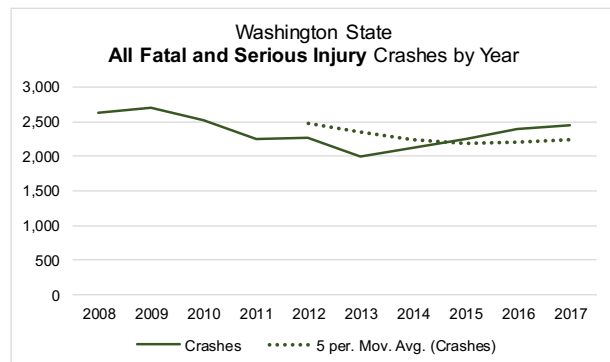
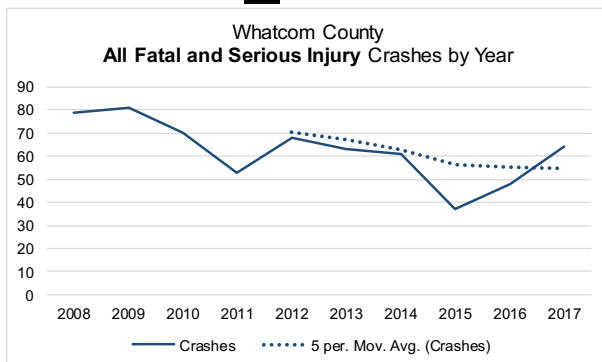
**MAP-21 Safety Performance Measures.** (excerpted from WSDOT *MAP-21 & Safety* folio – January 2019)

### Summary of required performance measures

Rule #1 requires all State DOTs to report targets and performance with respect to the following safety performance measures:

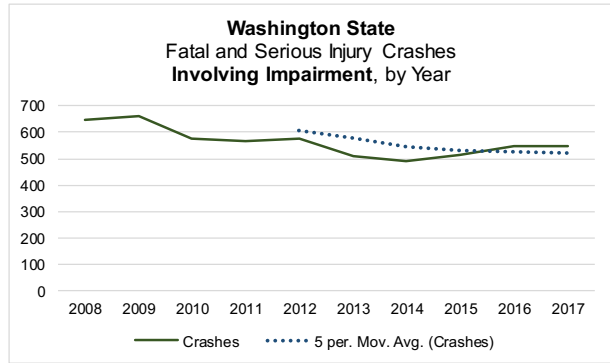
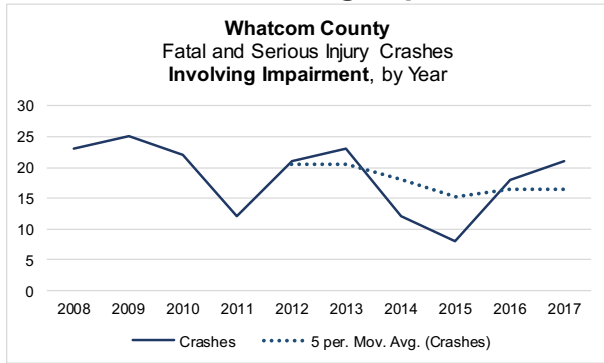
- No. 1 - Number of fatalities on all public roads (due July 1/Aug. 31)
- No. 2 - Number of fatalities per 100 million vehicle miles traveled (VMT) on all public roads (due July 1/Aug. 31)
- No. 3 - Number of serious injuries on all public roads (due July 1/Aug. 31)
- No. 4 - Number of serious injuries per 100 million VMT on all public roads (due Aug. 31)
- No. 5 - Number of non-motorist fatalities and serious injuries on all public roads (e.g. bicyclists and pedestrians) (due Aug. 31)

### F&SI crashes – all



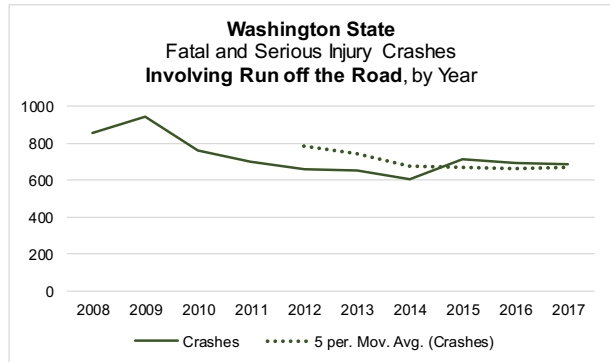
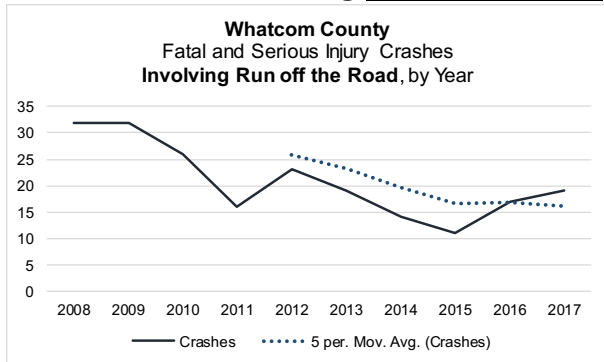
Overall, Whatcom County and the state have both experienced an increase in fatal and serious injury crashes over the last few years – both after some years of declining numbers. The five-year rolling average, while still on a slight downward trend for Whatcom County, has flattened out at the state level.

**F&SI crashes involving impairment**



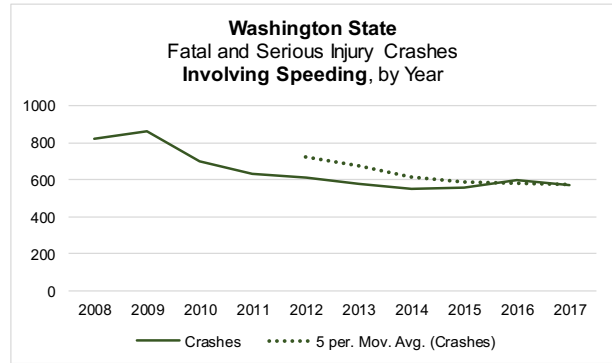
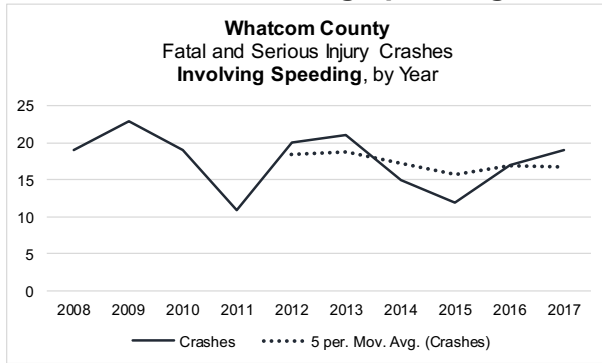
As with all measures, the larger number of data points at the state level smooths out the year-to-year volatility that shows up at the mid-size county level. Nevertheless, the most recent five-year rolling average trend line is similar for Whatcom County and the state – visible decrease in crashes involving impairment until 2015. Since 2015, the five-year average line has looked flat.

**F&SI crashes involving run off the road**



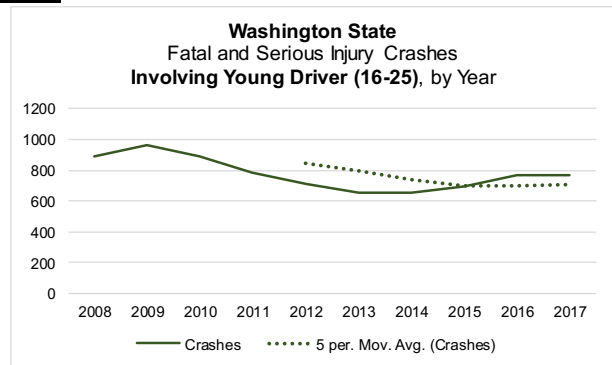
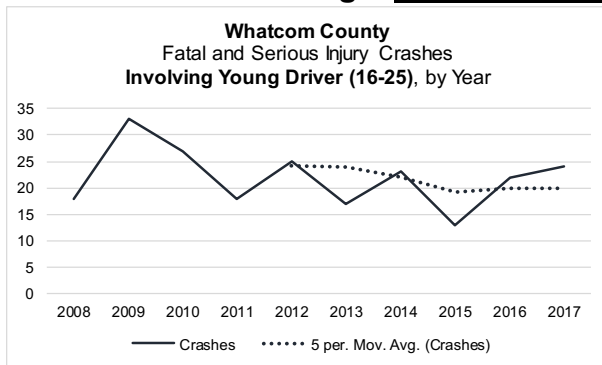
While both Whatcom County and the state have seen a slowing rate of reductions in run-off-the-road crashes in the last two years, Whatcom County reductions in this crash-type over five years has been much better than the state’s overall experience with this metric.

### F&SI crashes involving speeding



Looking at the five-year rolling average, while the state overall has experienced a steady and modest decline in speeding-involved crashes, Whatcom County has experienced a proportionately smaller and less consistent reduction.

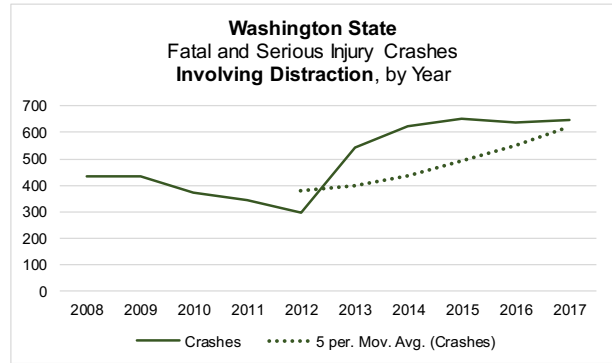
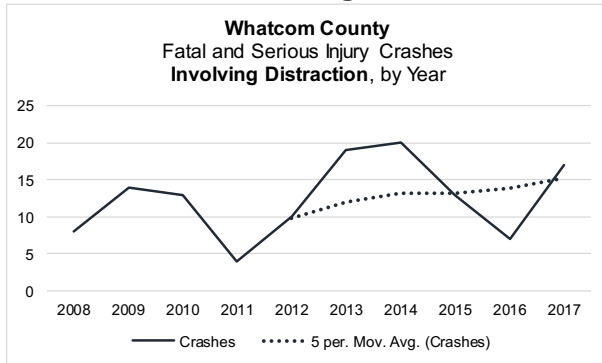
### F&SI crashes involving a young driver (16-25)



Whatcom County and the state overall have had very similar five-year trends with modest and consistent reductions in young-driver-involved crashes. Both the county and the state also saw a leveling off in 2017.

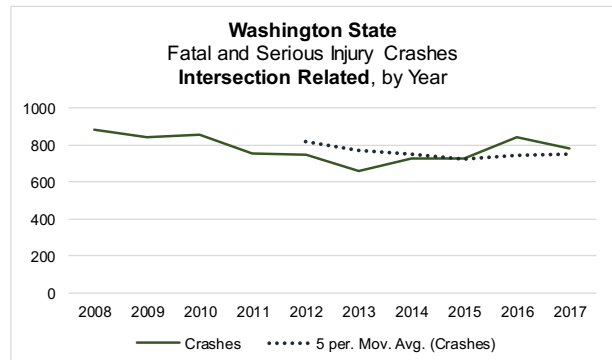
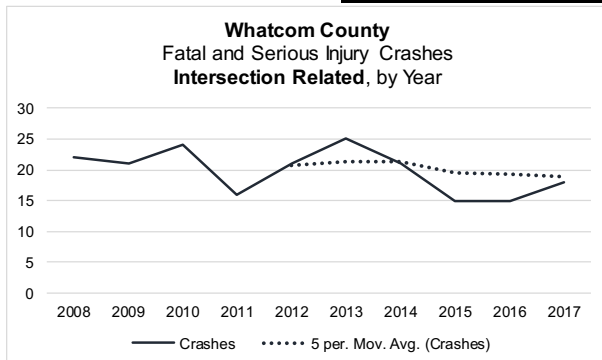


### F&SI crashes involving distraction



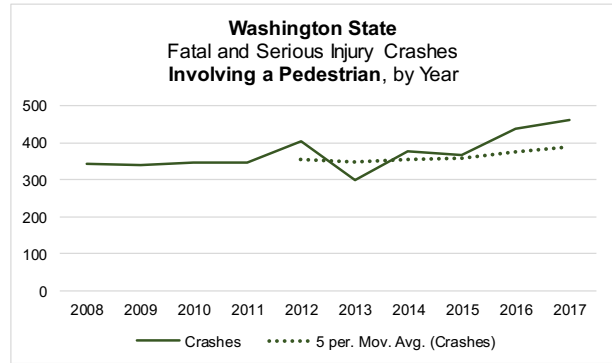
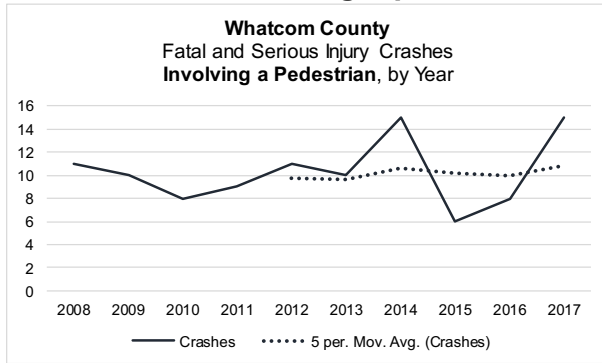
Noting the 2014-2014 uptick on the state chart, it is worth pointing out that the reported increased incidence of distraction is much more a function of serious injury crashes. This is similarly the case for Whatcom County (post 2010). While WSTC documentation doesn't mention any coincident change in reporting or attribution methods, the state's Target Zero plan does note the challenges of obtaining full and accurate reporting regarding various types of distraction. The bottom line is that distraction is an increasingly observed associated factor in fatal and serious injury crashes. Whatcom County and the state share a similar five year rolling average trend.

### F&SI crashes that are intersection related



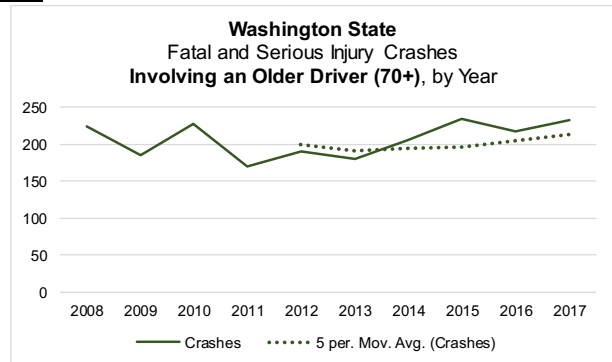
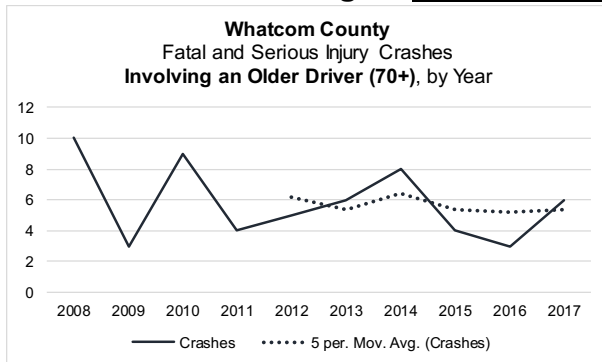
Neither the state nor the county has seen much change over the nine years charted on intersection-related serious and fatal crashes. The five-year rolling average shows a slightly reversed experience with Whatcom County seeing some small increases followed by small decreases and the state seeing small decreases followed by small increases. This metric indicates a likely similar role of intersections at the state and Whatcom County geographies.

### F&SI crashes involving a pedestrian



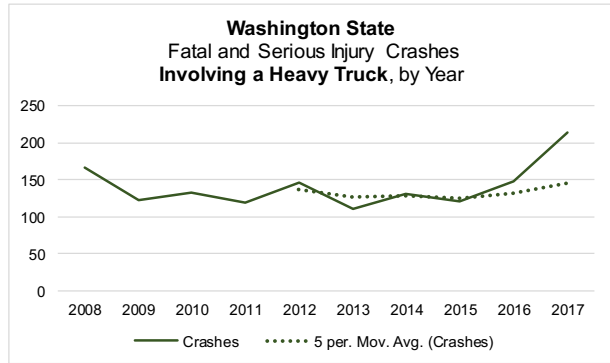
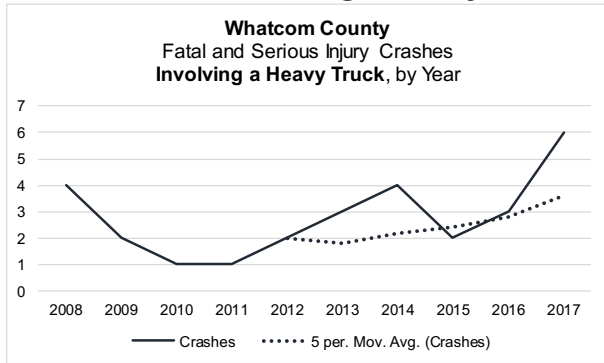
While the five-year rolling average for pedestrian involved crashes is trending slightly up, the comparatively volatile year-over-year incidence since 2014 in Whatcom County and the steady uptick at the state level since 2013 are not encouraging short term trends. This crash type should be watched as data becomes available and overlapping behavioral and vehicle type factors examined to inform a responsive set of strategies.

### F&SI crashes involving an older driver (70 +)



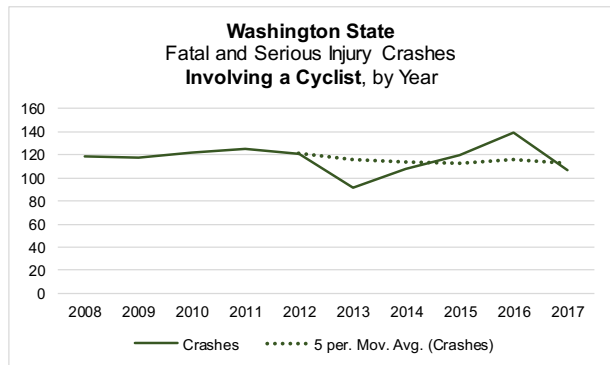
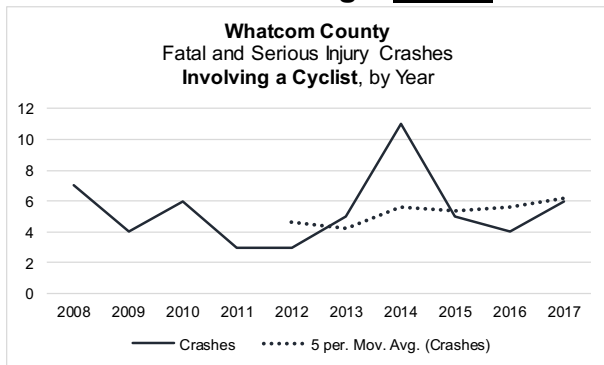
The five-year rolling average trend line for older-driver involvement points slightly upward for the state overall and is mostly flat for Whatcom County. The aging baby-boomer cohort will increase the probability of older-driver involvement for the next many years. The current trends don't suggest that there are different, regional aspects or preponderance of older-driver crashes.

### F&SI crashes involving a heavy truck



While the numbers are small, the upward trends over the last few years for both the state and Whatcom County are steep. In addition to looking at overlapping crash factors, sources of regional truck counts should be checked to assess how regional truck volume has changed over the last decade.

### F&SI crashes involving a cyclist



With a large spike in 2014, Whatcom County’s five-year rolling average of cyclist-involved crashes is trending upward. This contrasts with the state’s very slight downward five-year trend.

## Mobility (efficiency, effectiveness, and system sustainability)

Whatcom Mobility 2040’s second-priority [regional goals for the regional transportation system](#) are mobility, multimodal, and access. This section will cover mobility – qualitative measures of travel and goods movement that include such attributes as travel time, reliability, congestion, and comfort.

### MAP-21 measures related to mobility

The measures developed under MAP-21 related to mobility are bundled under the category of highway system performance. These measures apply to the National Highway System – all public roads with the federal functional classification of primary arterial or higher.

MAP-21 planning rules require states to adopt the federally developed measures or submit their own measures (contingent on approval by the Federal Highway Administration (FHWA)) and then set targets under those measures. Metropolitan planning organizations (like WCOG) are required to either align with the state’s adopted measures and targets or develop their own (contingent on FHWA approval). The state of Washington has adopted the FHWA measures. WCOG has agreed to align its planning and programing with the state’s pursuit of its state-wide targets under those measures.

The Washington State Department of Transportation (WSDOT) periodically publishes a folio that describes each of the adopted measures in detail and tracks progress toward the targets it has set. The summary table of measures and targets from the state’s May 2018 system-performance folio is inserted below as Figure 2.

**Figure 2: WSDOT System Performance Folio table of measures and targets – May 2018**

MAP-21 performance measures by program area		Current data	2-year target <sup>1,2</sup>	4-year target <sup>1,2</sup>
Combined Rule (PM3) 23 CFR Part 490 ID No. 2125-AF54				
<b>Highway System Performance (Congestion)</b>				
Percent of person-miles traveled on the Interstate System that are reliable		73%	70%	68%
Percent of person-miles traveled on the Non-Interstate NHS System that are reliable		77%	N/A <sup>3</sup>	61%
<b>National Freight Movement Program</b>				
Truck Travel Time Reliability (TTTR) Index		1.63	1.70	1.75
<b>Congestion Mitigation &amp; Air Quality Program</b>				
Non-Single Occupancy Vehicle (SOV) travel in Seattle urbanized area (NHS)		32%	32.8%	33.2%
Peak hours of Excessive Delay per capita in Seattle urbanized area (NHS)		23	N/A <sup>3</sup>	28
All Pollutants (kg/day) <sup>2</sup>		1,658.640	366.285	658.300
Carbon Monoxide (CO) (kg/day) <sup>2</sup>		313.160	309.000	309.060
Particulate Matter less than 10 microns (PM <sub>10</sub> ) (kg/day) <sup>2</sup>		435.690	0.305	224.000
Particulate Matter less than 2.5 microns (PM <sub>2.5</sub> ) (kg/day) <sup>2</sup>		36.820	2.100	8.700
Nitrogen Oxides (NOX) (kg/day) <sup>2</sup>		872.970	54.880	116.540

Notes: Federal rule allows state and MPOs to adjust four-year targets during the mid-performance progress report. There are no monetary penalties involved with PM3. <sup>1</sup> Two- year and four-year target periods for PM3 end October 1, 2020, and October 1, 2022. <sup>2</sup> Base emissions are for the four-year period 2013-2016 as reported in the CMAQ Public Access System. <sup>3</sup> These targets are not required for the 2-year Mid-Performance Period Progress Report.

The current, full WSDOT system performance folio (along with other MAP-21 performance measures folios, with information on each of the system-performance measures, can be found at <https://www.wsdot.wa.gov/accountability/map-21>.

## MAP-21 system-performance measures of the Whatcom region

FHWA system performance measures are developed from vehicle probe data collected under the National Performance Management Research Data Set ([NPMRDS](#)).

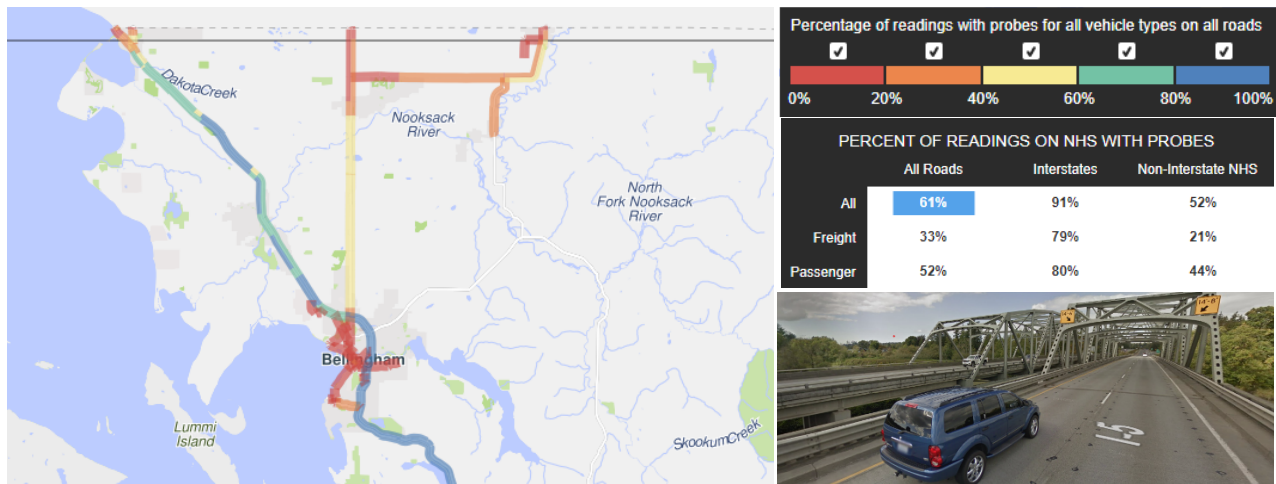
FHWA currently contracts with the company INRIX to supply both personal vehicle and freight vehicle probe data (location-based speed readings related to roadway segments). For segment-specific calculation of measures for each of the defined metrics, FHWA contracts with the Regional Integrated Transportation Information System (RITIS), a program of the University of Maryland’s Center for Advanced Transportation Technology Laboratory (CATT Lab). A subscription based RITIS on-line dashboard is available to states and MPOs. WSDOT has purchased a base subscription which it shares with MPOs. Below are RITIS-generated visualizations of annual measures for Whatcom County NHS routes.

It is first notable that, for Whatcom County, the NPMRDS probe-data coverage is thin for NHS road-segments other than those of Interstate 5. A map layer of Whatcom County’s NHS routes can be found on [WCOG’s on-line GIS map](#).

Figure 3 below is a coverage map for Whatcom County generated by RITIS. It indicates the percentage of 5-minute periods within the designated hours of the day (in this case, 6 AM to 8 PM) that each road segment (Traffic Management Channel or TMC) had one or more vehicles pass through it generating probe data that INRIX recorded. It is likely that as more vehicles with data-generating features enter the regional vehicle mix (or if personal device location data is added to the data set), the level of coverage on non-interstate routes will increase. For now, it seems better coverage on non-interstate routes in Washington is seen in denser, urban areas. As a result, not all system performance measures defined in

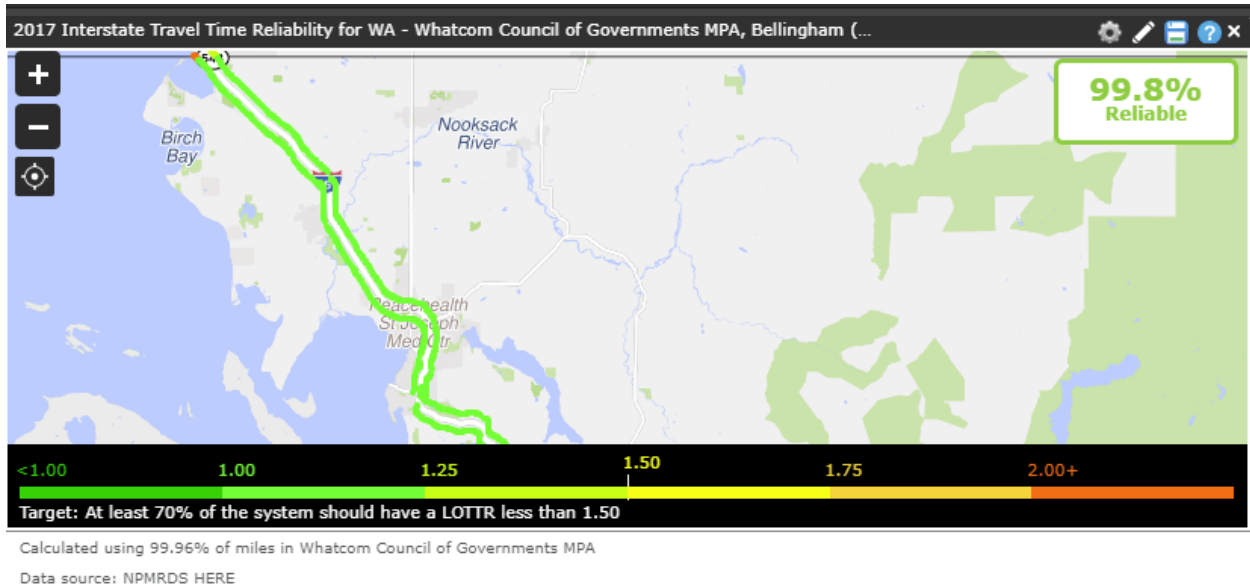
**Figure 3:** RITS MAP-21 probe-data coverage of NHS routes in Whatcom County (6AM-8PM Mon-Fri, October 2019)

MAP-21 can be confidently generated for the Whatcom planning area’s NHS roads.

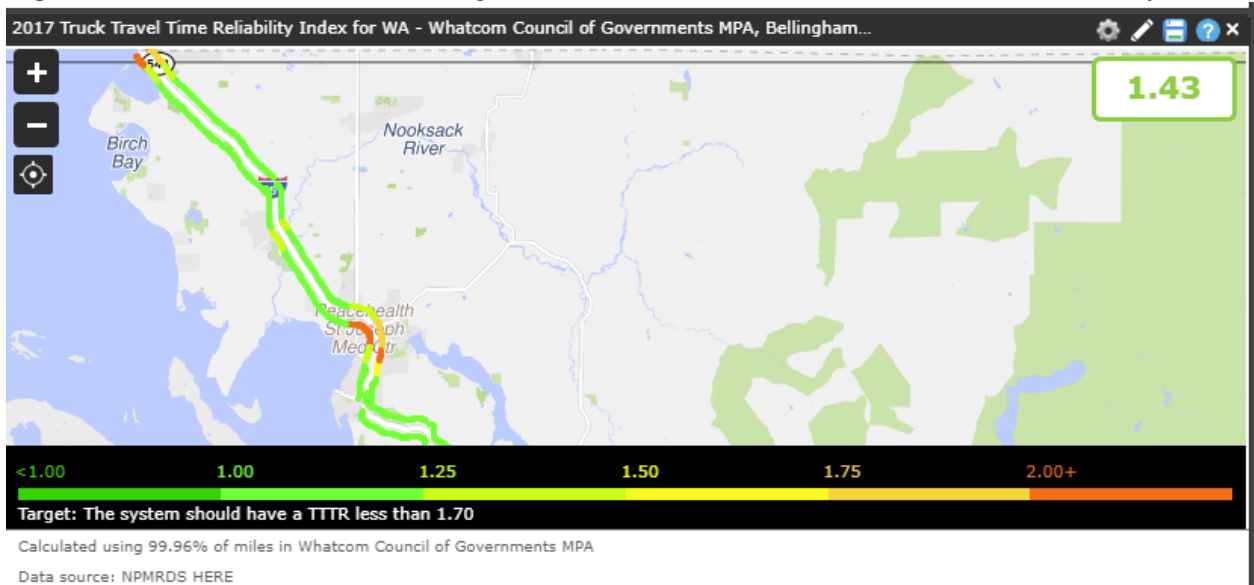


For annual measures, the RITIS MAP-21 dashboard currently stops at 2017. For MPOs with urbanized-area populations under 200,000 (like WCOG), only two measures factor into the state total – Interstate Travel-time Reliability (LOTTR) and Truck Travel-time reliability (TTTR). These are shown below for 2017.

**Figure 4:** RITS MAP-21 dashboard widget for 2017, Whatcom MPA, **Interstate Travel Time Reliability**



**Figure 5:** RITS MAP-21 dashboard widget for 2017, Whatcom MPA, **Truck Travel Time Reliability**



### Observations regarding regional MAP-21 system performance measures

Interstate LOTTR: In 2017, 99.8% of the Interstate in the Whatcom MPA had a LOTTR less than 1.5 – well above the state-wide target of 70% or less.

Truck TTR: In 2017, annual TTTR on the Interstate in the Whatcom MPA was 1.43 – below the state-wide target of 1.7. I-5 through the City of Bellingham shows TTTR index values above 1.75.

## WCOG interjurisdictional corridor mobility measures

This section will list estimated, peak-hour (weekdays 4-6 PM), personal vehicle travel times for a sample route through each interjurisdictional corridor. This information is taken from Google Maps' directions tools. Based on user-selected origin, destination, and arrival or departure time, this tool generates a fastest route, next-best alternative routes, and estimated travel times based on historical travel speed data.

### Bellingham–Ferndale

Figure X at right is based on the following parameters and queried in November 2019.

- Trip origin:** Viking Union Building at Western Washington University (a very large regional employment center)
- Trip destination:** Intersection of Siddle Lane and Legoe Ave. in Ferndale.
- Mode:** Personal vehicle.
- Departure time:** Wednesday, 5:00 PM.

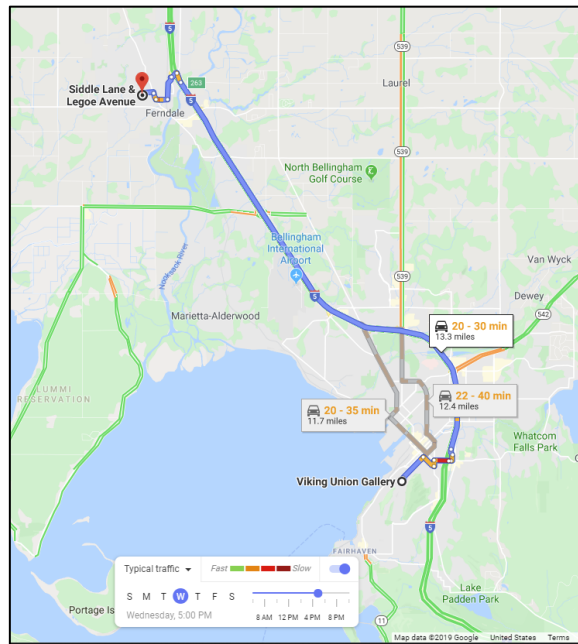
The resulting measures for November 2019 are:

- Est. travel time (TT):** 20-30 minutes.
- Est. average route speed:** 39 mph
- Buffer time (BT):** 10 minutes.
- BT / low TT:** 50%.

Observations:

- The buffer time on the typically fastest route (10 min) is a large percentage (50%) of the low-end of the estimated travel time range (20 min.). This suggests that the corridor is sensitive to variation in demand and/or incidents (weather, crashes, construction, events, etc.)
- Next best route options are not only between 2 and 15 minutes slower, the buffer times are higher, too.
- If congestion and travel times rise in Bellingham and the alternative routes become equally attractive or preferred, I-5 interchange volume will shift from the Lakeway interchange to the Guide Meridian and Northwest Ave. interchanges.

**Figure X:** Google Maps result for Bellingham-Ferndale personal vehicle travel time



## Bellingham–Lynden

Figure 2 at right is based on the following parameters and queried in November 2019.

**Trip origin:** Viking Union Building at Western Washington University (a very large regional employment center)

**Trip destination:** Intersection of Depot Rd. and Springview Drive in Lynden.

**Mode:** Personal vehicle.

**Departure time:** Wednesday, 5:00 PM.

The resulting measures for November 2019 are:

**Est. travel time (TT):** 30-50 minutes.

**Est. average route speed:** 34 mph

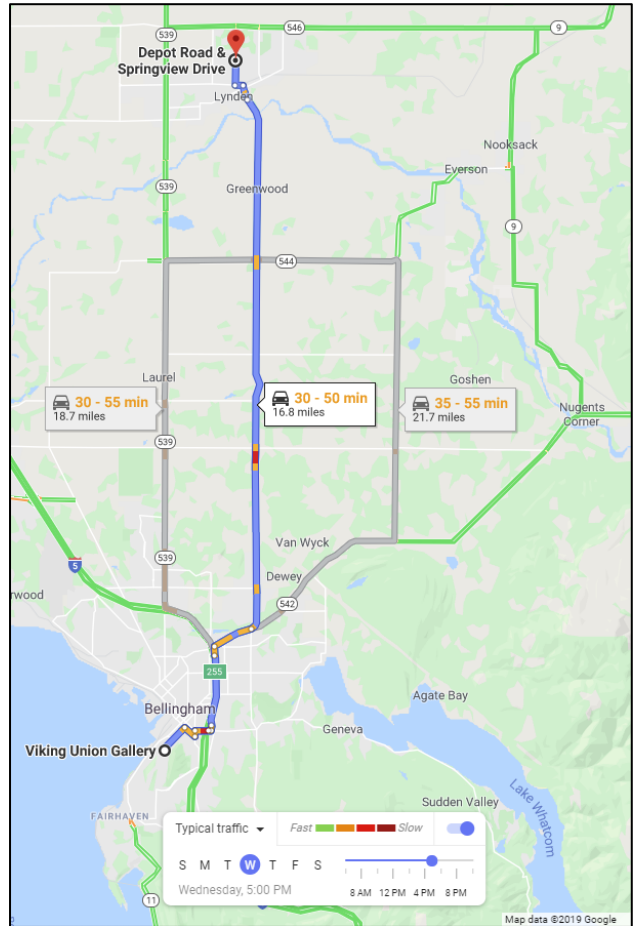
**Buffer time (BT):** 20 minutes.

**BT / low TT:** 67%.

Observations:

- The buffer time on the typically fastest route (20 min) is a very large percentage (67%) of the low-end of the estimated travel time range (30 min.). This suggests that the corridor is sensitive to variation in demand and/or incidents (weather, crashes, construction, events, etc.)

**Figure 2:** Google Maps result for Bellingham-Lynden personal vehicle travel time





### Bellingham– Everson/Nooksack/Sumas

Figure 3 at right is based on the following parameters and queried in November 2019.

- Trip origin:** Viking Union Building at Western Washington University (a very large regional employment center)
- Trip destination:** Intersection of State Route 9 and Harrison Street in Nooksack.
- Mode:** Personal vehicle.
- Departure time:** Wednesday, 5:00 PM.

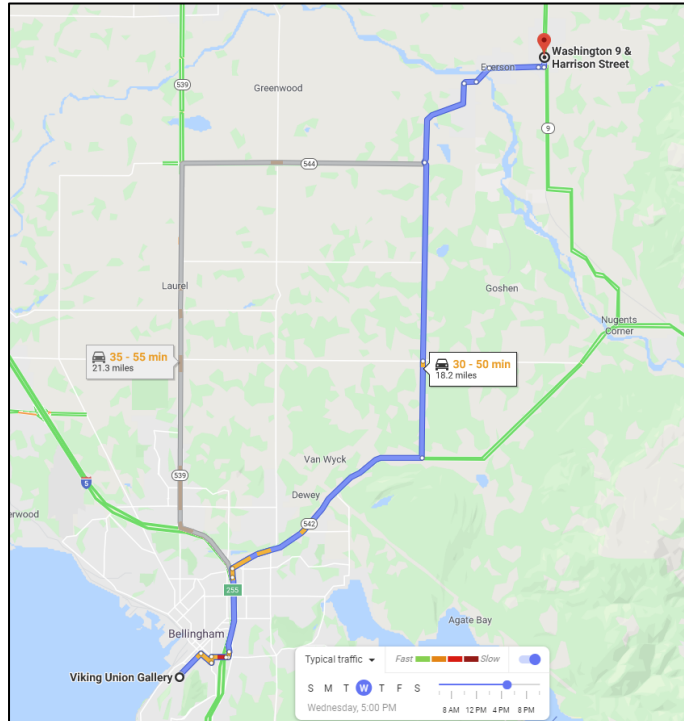
The resulting measures for November 2019 are:

- Est. travel time (TT):** 30-50 minutes.
- Est. average route speed:** 36 mph
- Buffer time (BT):** 20 minutes.
- BT / low TT:** 67%.

Observations:

- The buffer time on the typically fastest route (20 min) is a very large percentage (67%) of the low-end of the estimated travel time range (30 min.). This suggests that the corridor is sensitive to variation in demand and/or incidents (weather, crashes, construction, events, etc.)

**Figure 3:** Google Maps result for Bellingham–Everson/Nooksack/Sumas personal vehicle travel time



### Bellingham–Lummi Nation

Figure 4 at right is based on the following parameters and queried in November 2019.

- Trip origin:** Viking Union Building at Western Washington University (a very large regional employment center)
- Trip destination:** Lummi Nation Tribal Health Center.
- Mode:** Personal vehicle.
- Departure time:** Wednesday, 5:00 PM.

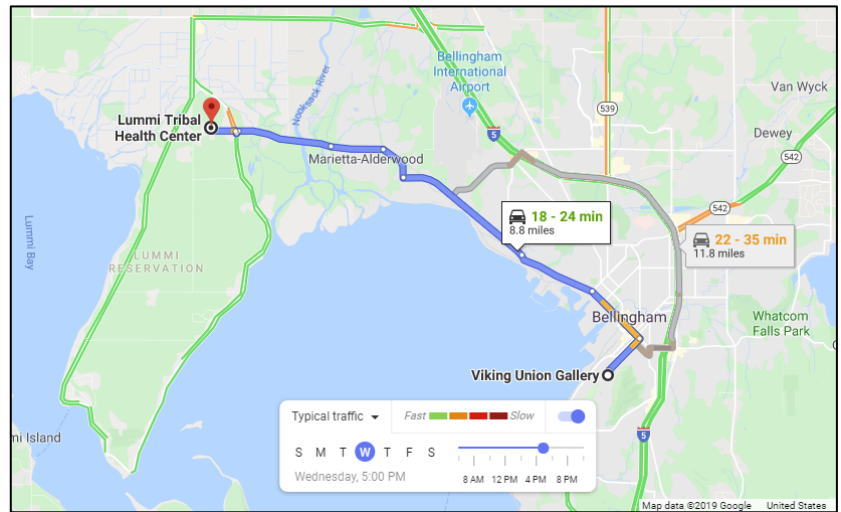
The resulting measures for November 2019 are:

- Est. travel time (TT):** 18-24 minutes.
- Est. avg route speed:** 29 mph
- Buffer time (BT):** 6 minutes.
- BT / low TT:** 33%.

Observations:

- The buffer time is low indicating that variable congestion is not a regular issue on this corridor.

Figure 4: Google Maps result for Bellingham-Lummi Nation personal vehicle travel time



## Multimodal

*Whatcom Mobility 2040*'s second-priority [regional goals for the regional transportation system](#) are mobility, multimodal, and access. This section will cover multimodal – quantitative and qualitative measures of travel and goods movement that include such attributes as transit trip time and the availability of non-personal-vehicle modes including transit, good bike routes, pedestrian connections, and transportation network services.

### MAP-21 measures related to multimodal

MAP-21 system performance measures include Non-single Occupancy Vehicle (SOV) Travel – the number or portion of *trips* on a corridor segment being made in a carpool, vanpool, public transportation, commuter rail, walking, biking, or telecommuting. This measure initially only applies to urbanized areas with a population over 1 million and then, in 2022, will apply to urbanized areas with a population greater than 200,000. Accordingly, the Whatcom planning area is *not* expected to be subject to this measure in the current planning horizon. The related goal however, serving significantly more *person trips* without adding significant *vehicle* capacity, is a regional priority.

### WCOG interjurisdictional corridor **multimodal** measures

Other than generating high-level estimates such as by multiplying vehicle volume counts by average vehicle occupancy statistics, WCOG does not currently have a viable method for estimating the number of people traveling on specific corridors. WCOG is evaluating emerging methods that would do a better job of both estimating regionalized trip volume and provide better insight into regionally specific potential for increasing the share of travel using non-SOV trips. Such methods could seek to integrate route and time specific transit vehicle volumes, private sources of location-based services (LBS) data (generated by geographic data from people's devices), and other connected-vehicle technologies that continue to come to market.

Without a current regional measure of non-SOV trips, WCOG's regional assessment of multimodal transportation options will, for each interjurisdiction corridor, assess and track the existence of multimodal options (public transit, bike/ped facilities, etc.) and the relative competitiveness with non-SOV options with that of SOV travel (e.g. travel times, indexed cost, time-of-day availability).

*The remainder of this section will evaluate transit options only. Measures of other non-SOV modes will be developed for the next issue of this report.*

## Bellingham-Ferndale

Figure 5 at right is based on the following parameters and queried in November 2019.

**Trip origin:** Viking Union Building at Western Washington University

**Trip destination:** Siddle Lane & Legoe Ave, Ferndale.

**Mode:** Public transit - bus.

**Departure time:** Wednesday, 5:00 PM.

The resulting measures for November 2019 are:

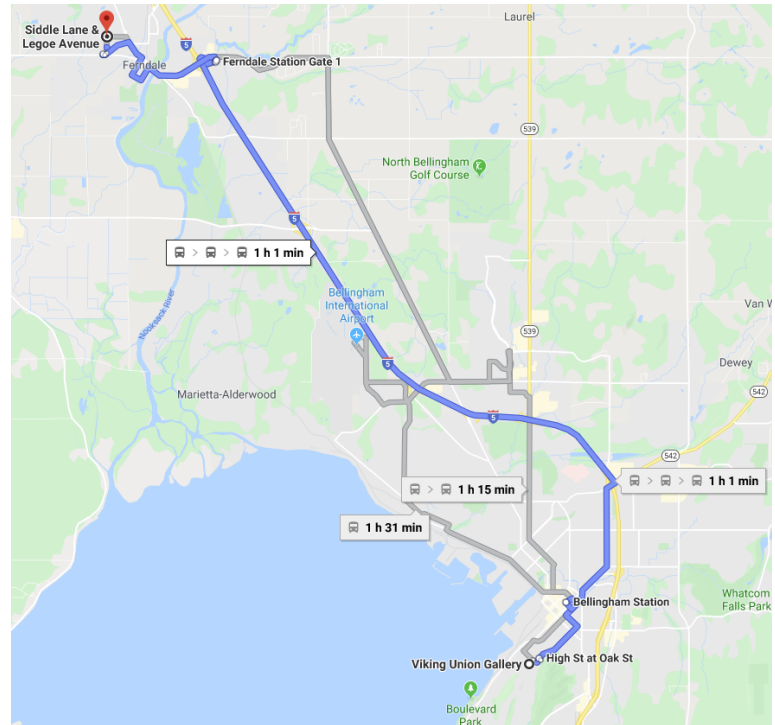
**Est. Bus Travel Time (bTT):** 61 minutes.

**Transfers:** 2

Observations:

- 

**Figure 5:** Google Maps result for Bellingham-Ferndale peak-hour transit options



## Bellingham-Lynden

Figure 6 at right is based on the following parameters and queried in November 2019.

**Trip origin:** Viking Union Building at Western Washington University

**Trip destination:** Siddle Lane & Legoe Ave, Ferndale.

**Mode:** Public transit - bus.

**Departure time:** Wednesday, 5:00 PM.

The resulting measures for November 2019 are:

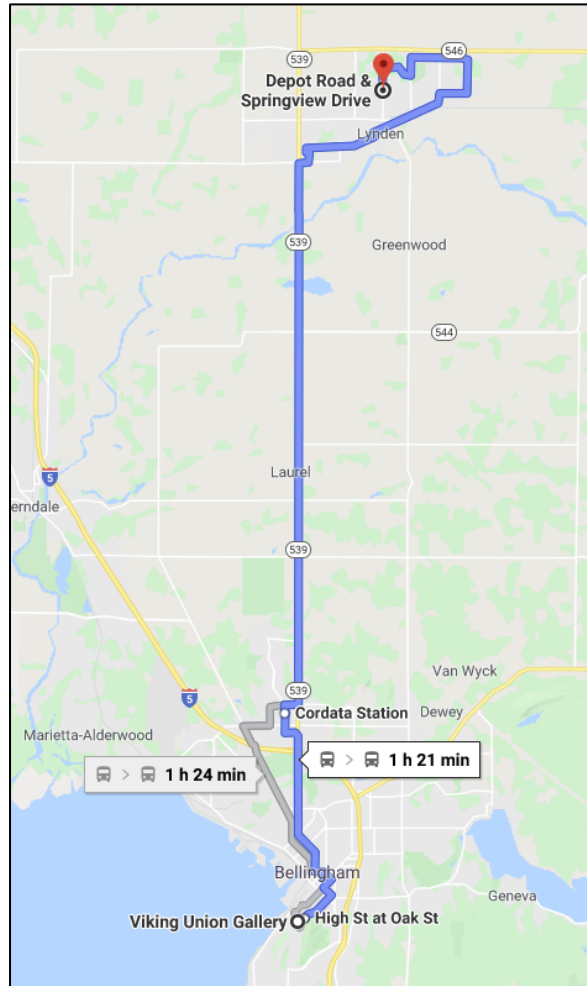
**Est. Bus Travel Time (bTT):** 81 minutes.

**Transfers:** 1

Observations:

- 

**Figure 6:** Google Maps result for Bellingham-Lynden peak-hour transit options



## Bellingham-Everson/Nooksack/Sumas

Figure 7 at right is based on the following parameters and queried in November 2019.

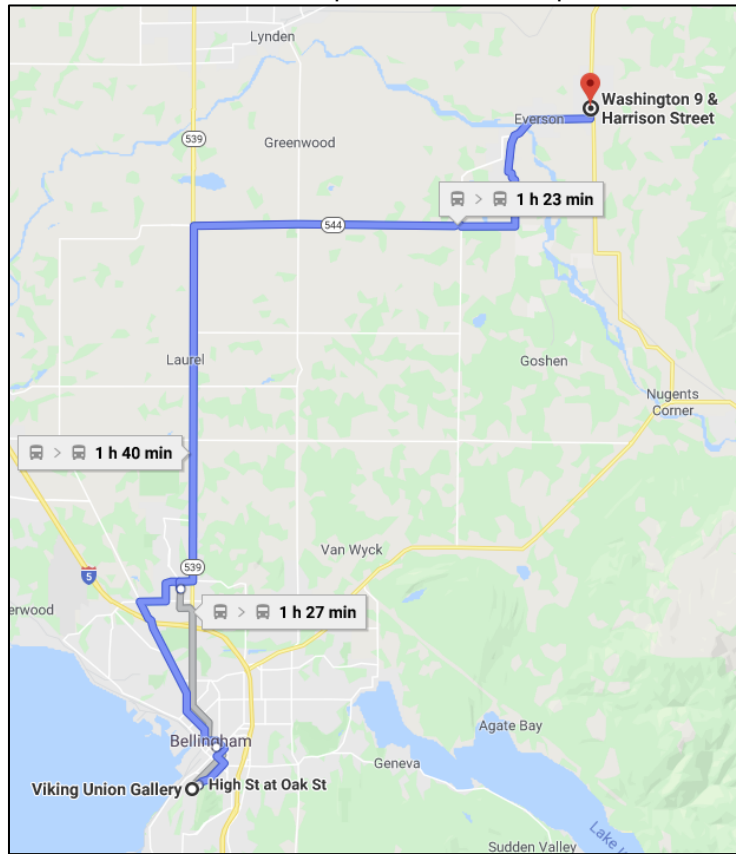
- Trip origin:** Viking Union Building at Western Washington University
- Trip destination:** SR 9 & Harrison Street, Everson.
- Mode:** Public transit - bus.
- Departure time:** Wednesday, 5:00 PM.

The resulting measures for November 2019 are:

- Est. Bus Travel Time (bTT):** 83 minutes.
- Transfers:** 2

Observations:

**Figure 7:** Google Maps result for Bellingham-Everson/Nooksack/Sumas peak-hour transit options



### Bellingham-Lummi Nation

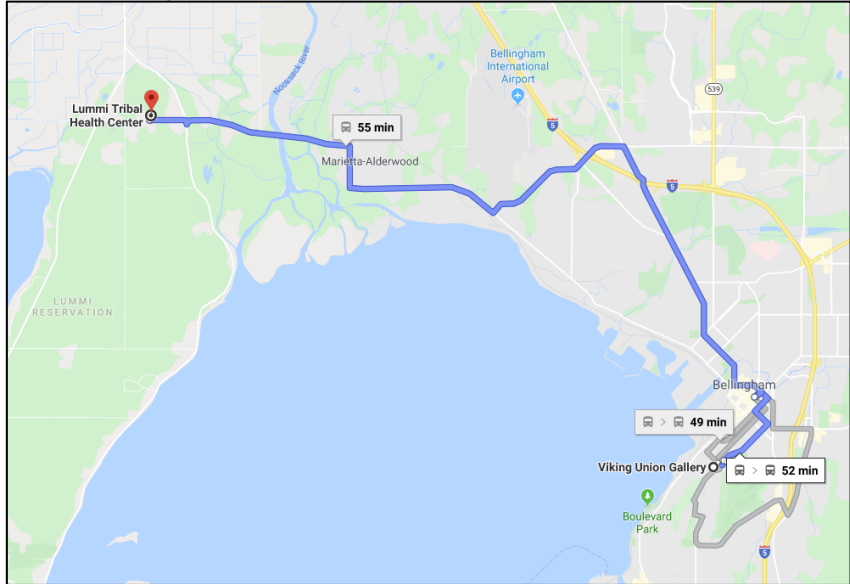
Figure 8 at right is based on the following parameters and queried in November 2019.

- Trip origin:** Viking Union Building at Western Washington University
- Trip destination:** Lummi Nation Tribal Health Center
- Mode:** Public transit - bus.
- Departure time:** Wednesday, 5:00 PM.

The resulting measures for November 2019 are:

- Est. Bus Travel Time (BTT):** 52 minutes.
- Transfers:** 1

**Figure 8:** Google Maps result for Bellingham-Lummi Nation peak-hour transit options



Observations:

### Public transit summary

Table 1 below summarizes observed and calculated measures from each of the above sample bus trips from interjurisdictional corridors alongside similar measures for vehicle trips between the same trip ends.

**Table 1:** Summary of Bus and Personal-Vehicle Measures on Whatcom Interjurisdictional Corridors

	Vehicle Travel Time (low est.) (vTTL)	Vehicle Travel Time (high est.) (vTTh)	Vehicle Travel Time (mid point) (vTTm)	Sampled Vehicle Trip Distance (vTD)	Avg. Vehicle Trip Speed (vTS)	Vehicle Trip Buffer Time (vBT)	Vehicle Buffer Index (vBI)	PM Peak Bus Travel Time (BTT)	Bus Travel Time Index (BTTI)	Bus Trip Speed
	min	min	min	miles	mph	min	vBT/vTTL	min	vTTm/BTT	mph
Bellingham-Ferndale	20	30	25	13.3	40	10	0.50	61	2.44	13
Bellingham-Lynden	30	50	40	16.8	34	20	0.67	81	2.03	12
Bellingham-Everson/Nooksack/Sumas	30	50	40	18.2	36	20	0.67	83	2.08	13
Bellingham-Lummi Nation	18	24	21	8.8	29	6	0.33	52	2.48	10

Observations:

- Of the four corridors analyzed above, Bellingham-Lynden and Bellingham-Everson/Nooksack/Sumas have the highest Vehicle Buffer Index (vBI) meaning that people traveling on those corridors need to plan for a larger range of possible travel times.
- In terms of travel time (Bus Travel Time Index – BTTI), bus travel is not competitive with vehicle travel time in any of the corridors – being at least twice as long of a trip time. There are of course other tradeoffs that are meaningful to travelers (e.g. time for other activities while not driving, fuel savings, parking savings, etc.)