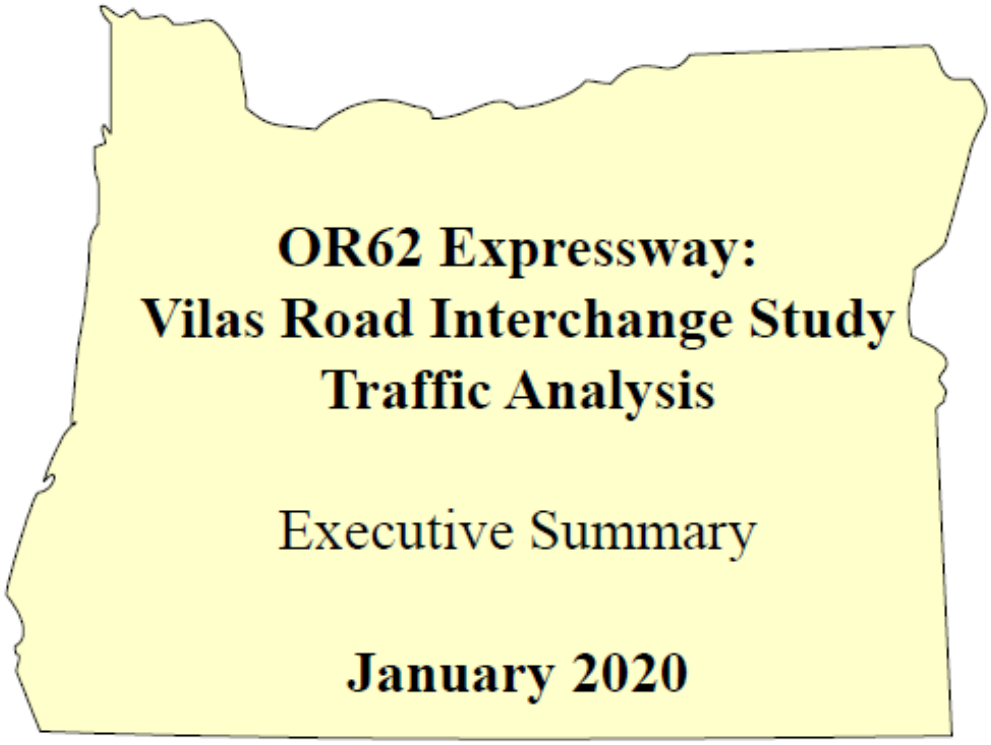
Oregon Department of Transportation



OR62 Expressway: Vilas Road Interchange Study Traffic Analysis

Executive Summary

January 2020

Transportation Planning Analysis Unit
Transportation Development Division, Salem, Oregon

FINAL
EXECUTIVE SUMMARY

OR62 Expressway:
Vilas Road Interchange Study
Traffic Analysis

Oregon Department of Transportation
Transportation Development Division
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BACKGROUND INFORMATION

The purpose of the OR 62 Expressway: Vilas Road Interchange Study Traffic Analysis is to analyze potential traffic impacts created by a new interchange on the OR 62 Expressway at East Vilas Road (aka Vilas Interchange), and identify necessary transportation improvements needed to support it.

This analysis was performed in a manner to remain consistent with the 2012 "I-5 to Dutton Road Final Environmental Impact Statement" (FEIS), including the Access Management Strategy. The Jobs and Transportation Act (JTA) funds were insufficient to construct the entire OR 62 Expressway, so for the purpose of this analysis just the JTA funded segment of the OR 62 Expressway (aka JTA Expressway) is analyzed.

OR 62 Expressway

In 2009, the Oregon Legislature enacted the JTA which earmarked funds to construct the OR 62 Expressway. The purpose of the OR 62 Expressway is to reduce traffic congestion and improve traffic safety on Crater Lake Highway (CLH) in Medford and White City by redirecting traffic to the expressway.

In the 2012 **FEIS,** the Preferred Alternative selected is a new expressway to bypass CLH beginning at I-5 Exit 30 (North Medford Interchange) to approximately Dutton Road located just north of White City in Jackson County.

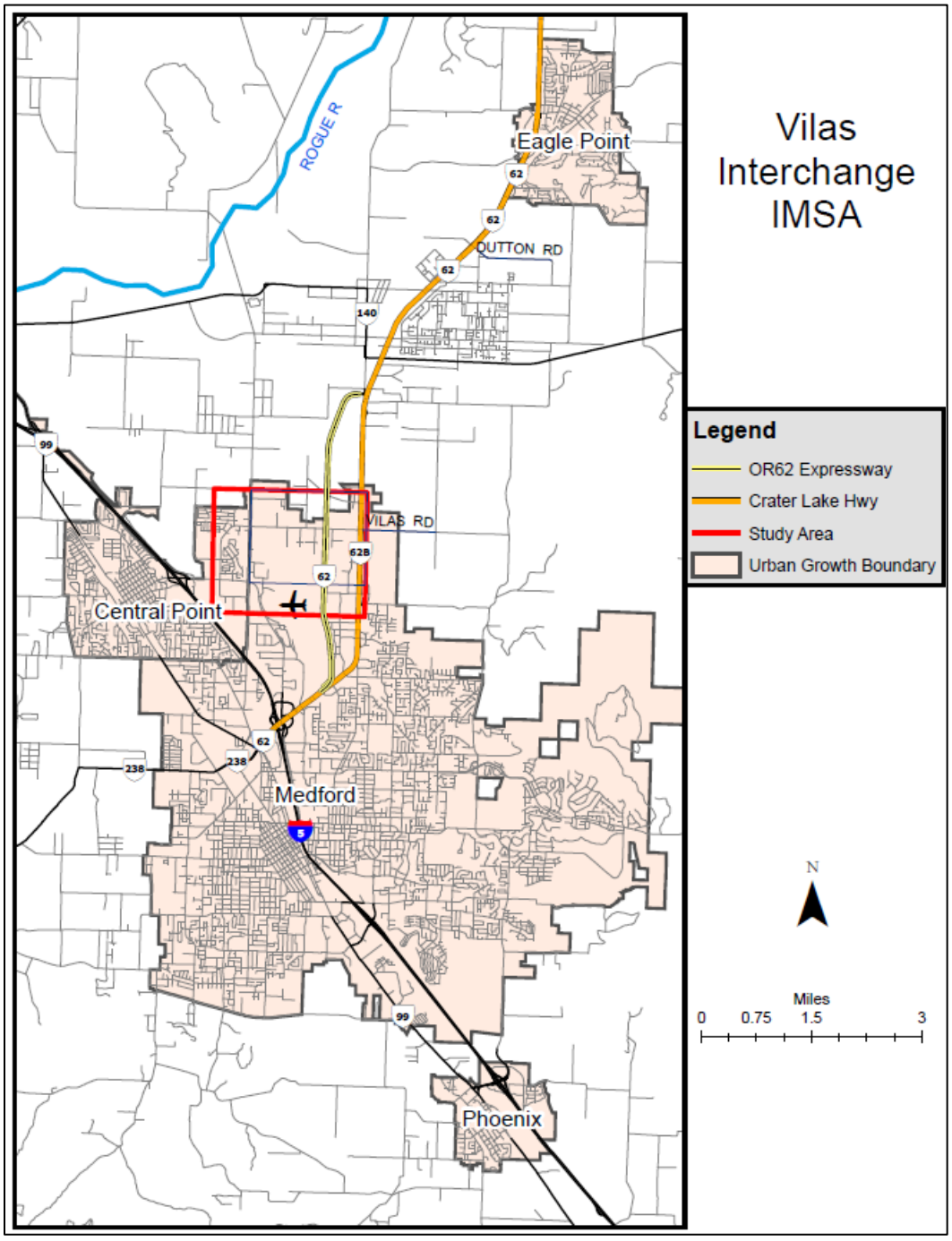
JTA Expressway

Construction of the JTA Expressway was completed in May 2019 and since its opening has proven to successfully meet the goal of redirecting traffic from CLH to the OR 62 Expressway. The JTA Expressway includes a four-lane, access-controlled expressway at the southern terminus extending north from a grade separated directional interchange on CLH located just east of I-5 Exit 30 (North Medford Interchange) in Medford. At the northern terminus, the JTA Expressway connects to CLH with an at grade intersection located just south of White City.

Vilas Interchange

The proposed Vilas Interchange would be located on the OR 62 Expressway at East Vilas Road in the northern edge of Medford's Urban Growth Boundary (UGB). The Vilas Interchange Management Study Area (IMSA) is bounded to the west by Hamrick Road, to the east by Crater Lake Avenue, to the north by Wilson Road, and to the south by Commerce Drive (See Figure ES-1).

Figure ES-1: Vicinity Map



SCENARIO DEFINITIONS & DESCRIPTIONS

IMSA Baseline Conditions

For the purpose of comparison, a No-Build/No-Mitigation Scenario (Scenario 0) was prepared to represent the JTA Expressway existing traffic conditions within the IMSA. This scenario is essentially "do-nothing" to the JTA Expressway representing today's conditions. No modifications were made. The lane geometry, intersection control type, and bike/pedestrian facilities were left as-is. **"**No-Build" only indicates that no Vilas Interchange is built on the JTA Expressway.

Traffic Analysis Scenarios

State and federal (for the FEIS) law require ODOT's traffic analysis to be consistent with local government's comprehensive plans. The following scenarios analyzed the JTA Expressway traffic conditions with all planned Regional Transportation Plan (RTP) and Transportation System Plans' (TSP) Tier 1 (funded) and Tier 2 (unfunded) improvements located within the IMSA. This was done to keep the analysis consistent with the Rogue Valley Metropolitan Plan Organization (RVMPO) 2017-2042 RTP, 2018 City of Medford TSP update[1], the Central Point TSP, and the Jackson County TSP.

Scenario 1 (No Build): JTA Expressway Without Vilas Interchange – This scenario analyzes the JTA Expressway with no East Vilas Road Interchange. This scenario includes:

1. Construction of all RTP Tier 1 and 2 projects within the IMSA, and four lanes on East Vilas Road.

2. The lane geometry and bike/pedestrian facilities were modified attempting to meet city and county performance standards. These recommended improvements are above and beyond the RTP Tier 1 and 2 improvements, and will need to be amended into the local government TSPs.

3. Traffic signals were added to unsignalized intersections within the IMSA where Preliminary Signal Warrants (PSW) have been met.

Scenario 2 (Build): JTA Expressway with Vilas Interchange – This scenario analyzes the JTA Expressway with an East Vilas Road Interchange. The scenario includes:

[1] Adopted by Medford City Council December 6, 2018

1. Construction of a grade separated Tight Diamond Interchange on the OR 62 Expressway at East Vilas Road.

2. The lane geometry and bike/pedestrian facilities were modified attempting to meet city and county performance standards. These recommended improvements are above and beyond the RTP Tier 1 and 2 improvements, and will need to be amended into the local government TSPs.

3. Industry Drive is cul-de-sac'd with construction of the Vilas Interchange (per the FEIS Access Management Strategy).

Additional Mitigations

As an additional mitigation in both Scenario 1 and Scenario 2, Peace Lane has been realigned to intersect with East Vilas Road at Airway Drive. This is driven by a few key issues.

- First, the City of Medford / Jackson County Tier 2 Project (#632 / #R91) widens East Vilas Road from two through lanes to four through lanes. This creates two lane changes when traveling east on East Vilas Road from Airway Drive to make an eastbound left onto Peace Lane, which requires more distance than is available between the two intersections.

- Second, City Tier 2 Project (#629) constructs a major collector from Coker Butte Road to Airway Drive or Industry Drive. This increases traffic volume at this intersection.

- Third, with a Vilas Interchange, Industry Drive will be cul-de-sac'd and the traffic re-routed through Airway Drive. This creates more interactions between Peace Lane and Airway Drive which further validates the need for the realignment. Without realignment, the individual intersections would cease to function because there is not enough space between the two intersections to accommodate the required turn lanes and legal turning movements from one street to the other (See Appendix E for details of this analysis).

MODEL NETWORK

The travel demand model was used to further investigate the travel patterns within the IMSA.

Figure ES-2 uses the model network to depict the volume change with the presence of the proposed Vilas Interchange. Grey is a volume increase and blue is a volume decrease.

Note that the large grey bars at the ramps exist because it is a 100% increase due to the ramps previously not existing.

- There is greater change north of Vilas Road than south of it. Traffic is pulled away from not only CLH, but also from outside of the study area: to the east from McLoughlin Drive and Foothill Road and to the west from Gregory Road and Antelope Road.

- On East Vilas Road, west of the Vilas Interchange volume increases (reallocation from Table Rock Road, Gregory Road and Antelope Road).

- To the east of the Vilas Interchange, the volume on East Vilas Road decreases because traffic uses the Vilas Interchange to travel north or south instead of continuing further east to CLH.

- At the southern terminus of the JTA Expressway traffic is pulled off of CLH and reallocated to the expressway.

Figure ES-2: Volume Impacts with the Vilas Interchange

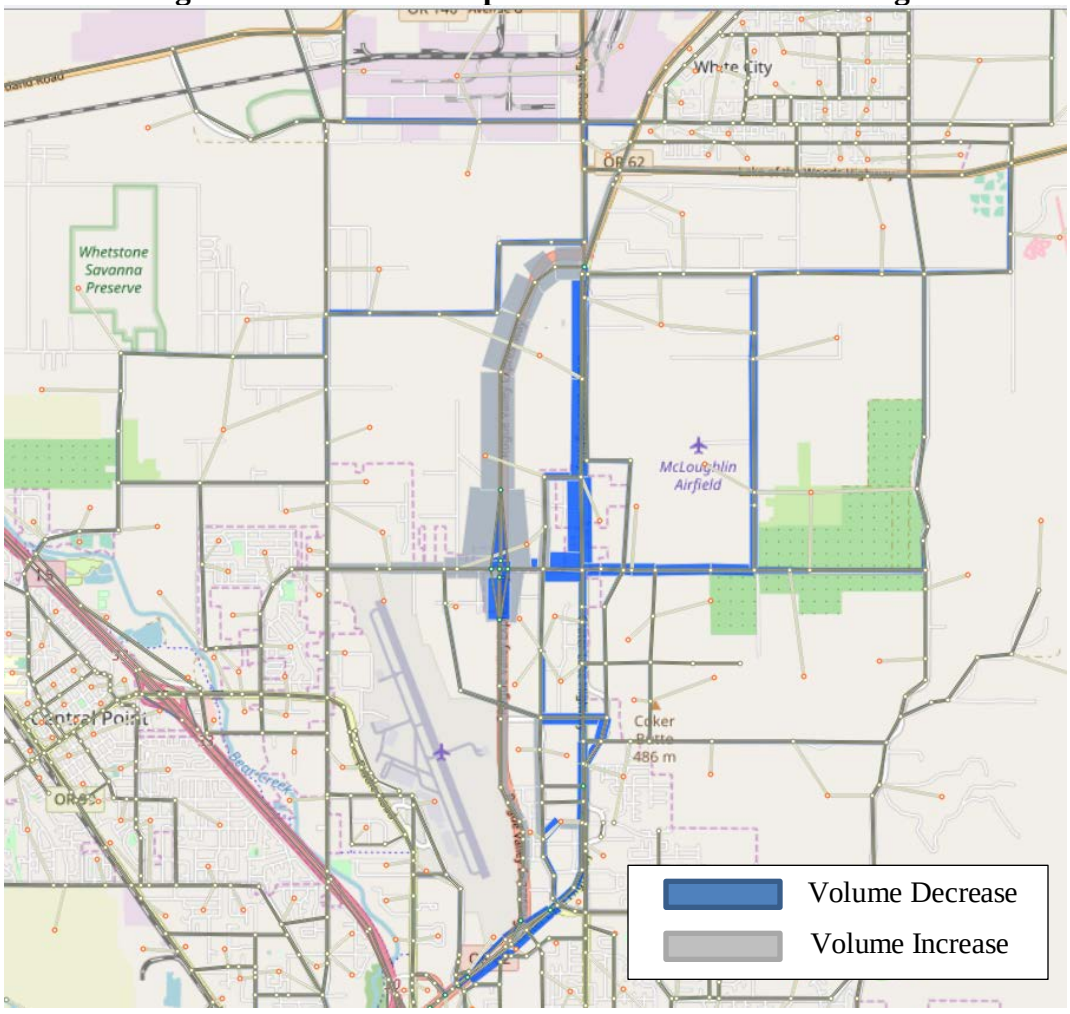


Figure ES-3 depicts all of the traffic using the proposed Vilas Interchange northbound on-ramp (i.e. – where it is coming from and where it is going to). It can be seen that the traffic is coming from the southwest and headed to the northeast. Specifically noteworthy is that none of the traffic originates from the area southeast of the proposed Vilas interchange.

Figure ES-3: Origin and destination of traffic using northbound on-ramp

Similarly, Figure ES-4 depicts all of the traffic using the proposed Vilas Interchange southbound off-ramp. The traffic pattern was further validated demonstrating that the movement is from the northeast to the southwest and no traffic using the southbound off-ramp is destined to the area southeast of the Vilas interchange. The model shows that it is not Medford residents using the proposed Vilas interchange; traffic using the Vilas Interchange is travelling from further southwest (Central Point area) to areas northeast of Medford (Eagle Point area).

Figure ES-4: Origin and destination of traffic using southbound off-ramp

The model was also used to identify traffic flows at a larger scale. The presence of the interchange increases shorter trips between the southwest and the northeast (Figure ES-5). This increase in local trips increases congestion and increases travel times. This results in the regional through trips diverting away from the expressway causing an increase in volume on Table Rock Road, Hamrick Road, East Vilas Road, and CLH (Figure ES-6). This traffic flow pattern change undermines the reason that the expressway was originally built by putting longer distance trips on local roadways and

shorter local trips on the highway system. Additionally, on a high scale it can be seen that the interchange does decrease traffic on CLH north of East Vilas Road, but south of East Vilas Road it is actually increased (Figure ES-7). This is specifically detrimental because this stretch of CLH is where the densest retail is located.

Figure ES-5: Origin and destination of traffic from southwest of study area

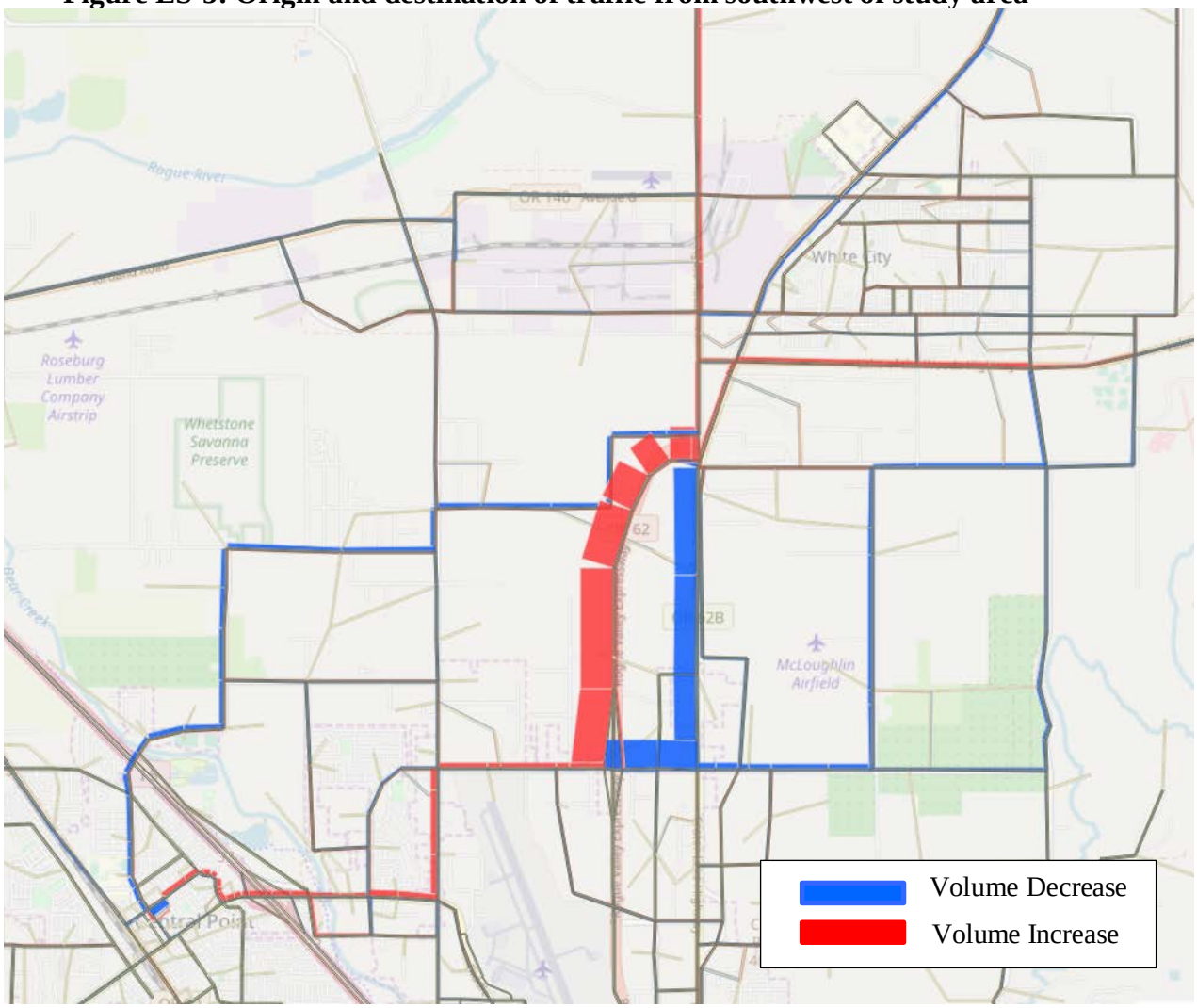


Figure ES-6: Origin and destination of traffic from northeast of study area

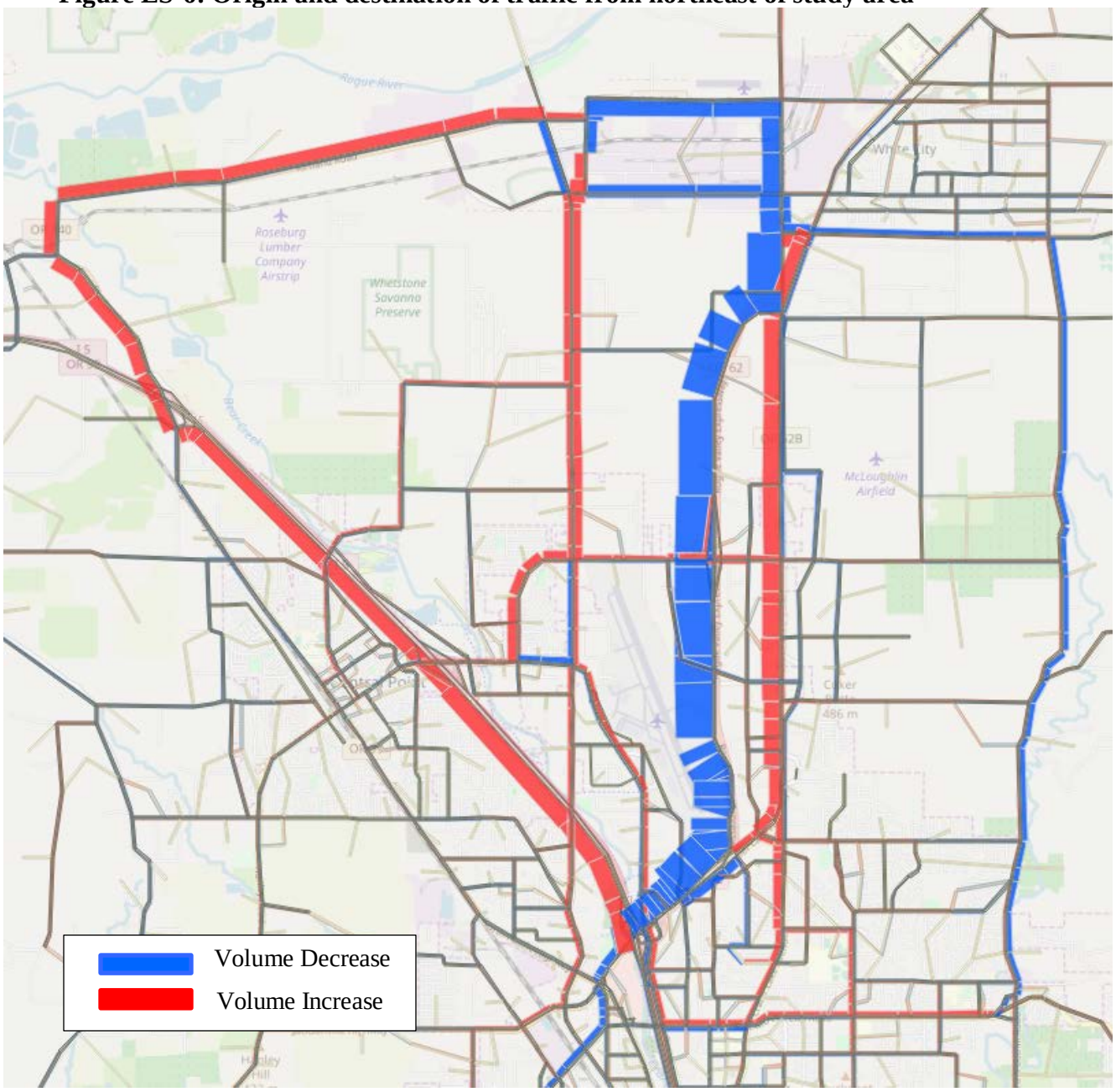
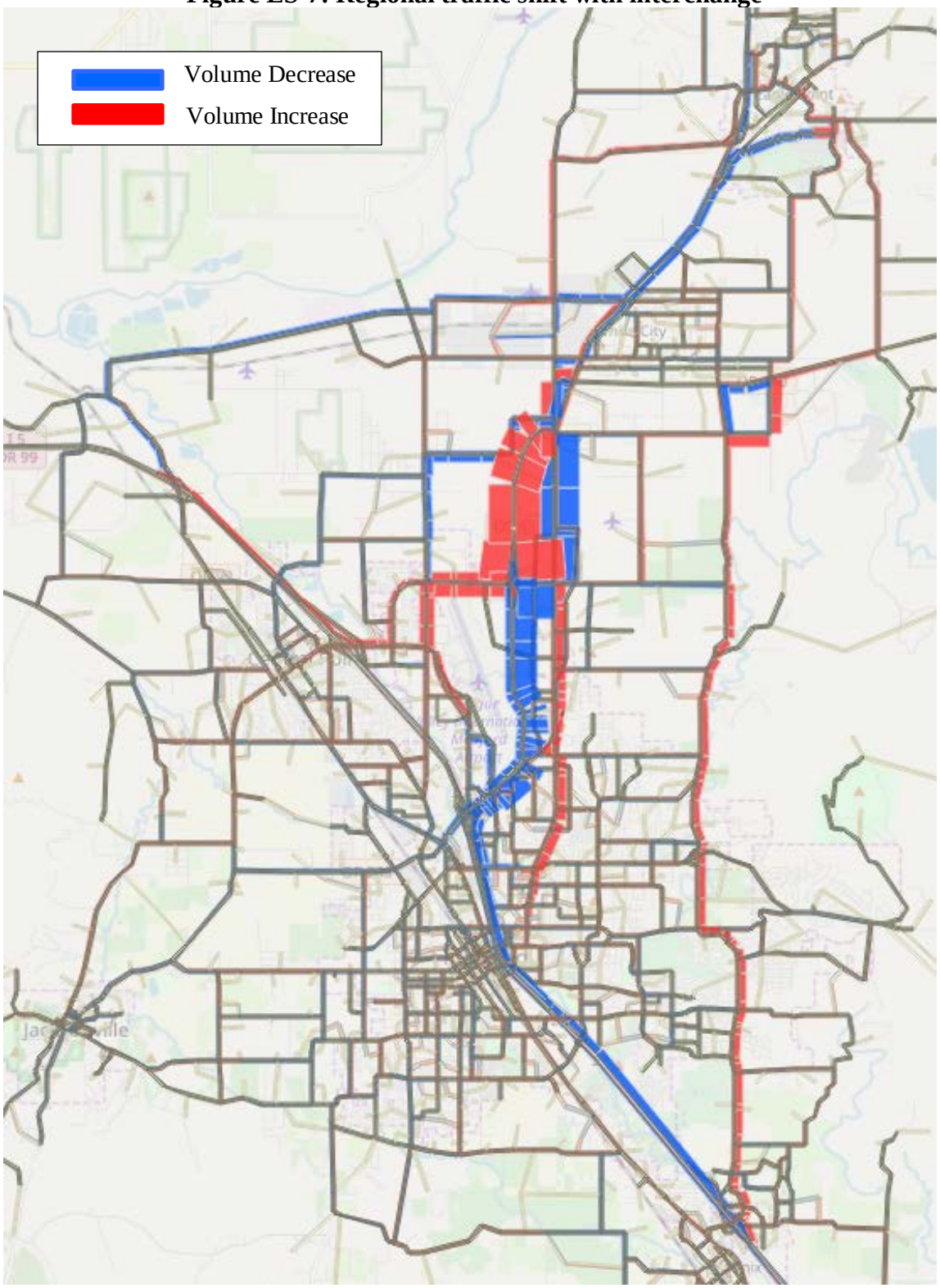


Figure ES-7: Regional traffic shift with interchange



ANALYSIS RESULTS

Traffic Network Impacts

1. In Scenario 0 (IMSA Baseline Conditions) - Traffic queuing problems are mainly westbound on East Vilas Road across most of the IMSA. The Crater Lake Highway (CLH) and East Vilas Road intersection does not meet the ODOT v/c standard in either scenario. However, if jurisdiction is transferred to the City of Medford, the LOS standard is met with the presence of the proposed Vilas Interchange. This is due to about 50% of the traffic volume moving away from CLH and onto the JTA Expressway with the presence of the proposed Vilas Interchange.

2. In Scenario 1 (No Vilas Interchange) - The construction of the RTP Tier 1 and Tier 2 projects improves traffic conditions within the IMSA. There are fewer blocked intersections and turn storage bays than Scenario 0 (IMSA Baseline Conditions). The realignment and signalization of the Airway Drive/Peace Lane and East Vilas Road intersection significantly reduces the northbound and southbound turn lane percent time blocked on those roadways.

3. In Scenario 2 (With Vilas Interchange) - all of the JTA Expressway mainline free-flow segments, ramps, and merge/diverge sections are projected to meet the ODOT Highway Design Manual (HDM) volume-to-capacity (v/c) standards, except for the Vilas Interchange northbound on-ramp. This is an analysis of an afternoon peak period, so a higher v/c may be caused by the increased afternoon JTA Expressway northbound commuter traffic to White City. Additionally, with the proposed Vilas Interchange, the v/c is reduced at most non-ODOT intersections (although in some cases it is a minimal change), but worsens at the two East Vilas Road intersections at Table Rock Road and Lear Way. The volume at Table Rock Road increases because the proposed Vilas Interchange creates a route that is faster than using Gregory Road or Antelope Road to access the White City area. Similarly, at Lear Way the proposed Vilas Interchange creates a faster north-south route so the volume increases moving through the East Vilas Road intersection.

4. The addition of the proposed Vilas Interchange (Scenario 2) causes significant traffic queuing extending east and west across East Vilas Road. The eastbound traffic queue begins at the proposed Vilas Interchange northbound ramps and extends all the way through the East Vilas Road/Table Rock Road intersection, and continues along Hamrick Road approximately three-quarters of a mile. The westbound queue on East Vilas Road begins at Table Rock Road and continues all the way across the IMSA to CLH. The proposed Vilas Interchange introduces significant traffic to East Vilas Road causing intersection blockage.

5. The additional intersections and higher volumes introduced by Scenario 2 (With Vilas Interchange) result in higher crash frequencies within the IMSA. The crash frequency is increased by about 13%.

Multimodal Analysis

A Multimodal Level of Service Analysis was used to determine the need and potential for multimodal mitigations.

In Scenario 0 (IMSA Baseline Conditions) - Adding sidewalk to all roadways within the IMSA generally improves the pedestrian LOS to C or better, except for along Pine Street/Biddle Road, Table Rock Road, and Crater Lake Highway.

In Scenario 2 (With Vilas Interchange), pedestrian LOS declines along East Vilas Road. A separated multi-use path is suggested for all roadways located within the IMSA which are not brought to an acceptable LOS level with just a sidewalk.

The transit LOS for all scenarios is poor throughout the IMSA due to limited transit frequencies within the IMSA. Transit frequencies are partly determined by funding and land use density, so this reflects the best available service. None of the scenarios evaluated modify the transit service, so it remains poor.

Cost Effectiveness Assessment

A high-level annual cost estimate is created for each traffic scenario (in 2017 dollars). This captures the savings (or deficit) in annual costs with and without the proposed Vilas Interchange. The annual cost change from the Scenario 0 (IMSA Baseline Conditions) to a mitigated scenario 1 (No Vilas Interchange) is considered, as well as the change from the Scenario 0 (IMSA Baseline Conditions) to Scenario 2 (With Vilas Interchange).

The annual cost generated by delay, fuel use, emissions, and crash with associated costs (added delay, fuel, and CO_2) is estimated. This net "year of construction" cost is compared for Scenario 1 (No Vilas Interchange) and Scenario 2 (With Vilas Interchange) compared to Scenario 0 (IMSA Baseline Conditions).

Additional savings (or cost) are created when the current transportation network within the IMSA is mitigated with construction of the RTP Tier 1 and the Tier 2 projects, or when the proposed Vilas Interchange is constructed in addition to constructing the RTP Tier 1 and Tier 2 projects. The results of this analysis can be seen in Table ES-1.

Mitigating the current transportation network creates a savings of about $45 million as the transportation network improvements reduce delay, fuel usage and related emissions. Crashes increase within the IMSA because of an expanded roadway network creating additional conflict points. The addition of the proposed Vilas Interchange (Scenario 2) to the IMSA Baseline Conditions (Scenario 0) only precipitates an annual savings of about

$25 million which is $20 million less savings to the community than Scenario 1 (No Vilas Interchange).

As shown in Table ES-1, the annual cost is primarily driven by delay. Further details are in Appendix R.

Table ES-1: Change in Net Cost between Progressive Scenarios

	Scenario Step	
Parameter	Baseline to Scenario 1	Baseline to Scenario 2
Delay	$46,000,000	$28,800,000
Fuel	$270,000	-$2,300,000
Emissions	$18,700	-$157,000
Crash[1]	-$920,000	-$1,700,000
Annual Savings with Mitigations:	$45,400,000	$24,600,000

[1]The Crash category includes the cost of the crash as well as the added delay, fuel, and CO_2 caused by the crash. These conversions were gleaned from the National Highway Traffic Safety Administration and The Economic and Social Impact of Motor Vehicle Crashes.

Another pertinent economic measure to evaluate is to quantify the cost of TSP projects and required intersection mitigations needed to support the proposed Vilas Interchange, broken out by jurisdiction. Although all of the city and county Tier 2 TSP projects within the IMSA were included in the analysis, some of the Tier 2 projects proved to be more critical than others. For that reason, the total cost is expressed as a range to capture this variation (Table ES-2). These are high level estimates (in 2019 dollars) and actual costs may vary. Even with the lower cost range, this represents a significant local investment that will need to be weighed against current goals and project priorities.

Table ES-2: Cost Range of Necessary Projects and Mitigations to Support Vilas Interchange

Jurisdiction	Low Total Cost	High Total Cost
Central Point	$4,100,000	$5,500,000
Medford	$30,800,000	$55,300,000
Jackson County	$10,700,000	$10,700,000

FINDINGS

With no additional mitigation, the entire study area will have extensive queuing and congestion.

The network functions better without the Vilas Interchange. With additional mitigations and no Vilas Interchange, the study area has only one location over standard which indicates the overall demand is not greater than the capacity. Also, the shortest overall network travel time, and the lowest number of intersections blocked by queues are all indicative of a more efficient network. Furthermore, without the interchange there is about half the delay on the expressway than with the interchange.

The addition of the Vilas Interchange allows Crater Lake Highway to meet the City of Medford LOS standard (assuming future jurisdictional transfer from ODOT) and also increases the overall average network speed slightly. However, extensive queuing causes intersection blockage both eastbound and westbound across East Vilas Road. Additionally the interchange increases the shorter local trips on the expressway increasing congestion and diverting the regional through trips away to Table Rock Road, CLH, etc. which undermines the original purpose of the expressway.

Furthermore the annual savings precipitated by additional delay, fuel consumption, emissions, and crashes compared to the baseline conditions is $20 million less than the savings created by Scenario 1 (even excluding the cost of the Vilas Interchange itself). Also, the Tier 1 and 2 projects and necessary intersection mitigations required to support the interchange require a substantial financial investment of future funds that will have to be weighed against other local priorities. The JTA Expressway No-Build Vilas Interchange scenario (Scenario 1) is the best overall scenario with the most efficient and cost-effective transportation network.