TECHNICAL MEMORANDUM

DATE: October 27, 2016

TO: Steve Adams, P.E., City of Wilsonville

FROM: Scott Mansur, P.E., PTOE
       Jordin Ketelsen, EIT

SUBJECT: Boones Ferry to Brown Road Connector Study – Existing and Future Conditions

Existing and future conditions analysis was performed to set the stage in the comparison for two east-west connector alternatives located between Brown Road (to the west) and Boones Ferry Road (to the east) in Wilsonville, Oregon. This memorandum documents the related background information, existing traffic conditions, and future network conditions. A summary of the memorandum findings is then provided.

Background

Brown Road runs north-south and is located on the west side of the City of Wilsonville. North of Wilsonville Road, Brown Road provides connectivity to the Villebois development and several other residential areas and is classified as a Collector. It extends a few hundred feet south of Wilsonville Road and provides access to existing apartment complexes. The east-west connector alignments would be south of Wilsonville Road and connect the south end of Brown Road to Boones Ferry Road, but would connect to Boones Ferry Road at either Bailey Street or 5th Street as shown Figure 1 at the top of the next page.

Both connection options are included in the City’s Transportation System Plan (TSP) and are identified as Project RE-04A. The TSP indicates that the Boones Ferry Road to Brown Road connector will provide north to south street connections at both Kinsman Road and Montebello Drive. It will be a two-lane roadway and classified as a collector. The extension will be approximately one-half mile in length and passes through existing undeveloped properties. This new roadway is important because it will provide a parallel route to Wilsonville Road that will relieve congestion (particularly at the Wilsonville Road/Boones Ferry Road intersection), provide a secondary access to Old Town, and accommodate new development south of Wilsonville Road.

The northern segment of Industrial Way that currently intersects Wilsonville Road (classified here as a minor arterial) does not meet City access spacing standards and will be removed or may be converted into a bicycle and pedestrian path once the southern Kinsman Road extension is completed. The existing Wilsonville Road/Kinsman Road intersection is signal controlled and the south leg was recently constructed and serves as the main access to the industrial development south of Wilsonville Road.

1 City of Wilsonville Transportation System Plan, Adopted June 17, 2013.
2 The City of Wilsonville Comprehensive Plan currently designates these properties as residential and industrial uses.
Figure 1: East-West Connector Alignment Alternatives Concept Drawing

The Montebello Drive extension will run north-south and connect Wilsonville Road to the Boones Ferry Road to Brown Road connector. The existing Wilsonville Road/Montebello Drive intersection is signal controlled and has three existing active legs and an inactive south leg stub, which were constructed as part of the Wilsonville Road Phase 2A construction.

Existing Traffic Conditions
Key roadways in the study area are summarized in Table 1 at the top of the next page along with their existing roadway characteristics. The following sections include discussion on the existing traffic volumes and operations.
### Table 1: Study Area Roadway Characteristics

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Classification</th>
<th>Number of Lanes</th>
<th>Posted Speed</th>
<th>Sidewalks</th>
<th>Bike Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilsonville Road</td>
<td>Minor Arterial/Major Arterial&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2-4</td>
<td>25-35</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Boones Ferry Road</td>
<td>Collector</td>
<td>2-4</td>
<td>25</td>
<td>West side only from 4&lt;sup&gt;th&lt;/sup&gt; St to Bailey St, Both sides north of Bailey St</td>
<td>West side only from Tauchman St to Bailey St, Both sides north of Bailey St</td>
</tr>
<tr>
<td>Brown Road</td>
<td>Collector</td>
<td>2</td>
<td>35</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Montebello Drive</td>
<td>Local Road</td>
<td>2</td>
<td>25</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Kinsman Road</td>
<td>Minor Arterial/Collector&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2</td>
<td>40</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bailey Street</td>
<td>Collector</td>
<td>2</td>
<td>None</td>
<td>Yes&lt;sup&gt;c&lt;/sup&gt;</td>
<td>No</td>
</tr>
<tr>
<td>5th Street</td>
<td>Local Road/Collector</td>
<td>2</td>
<td>None</td>
<td>West of Boones Ferry Rd</td>
<td>West of Boones Ferry Rd</td>
</tr>
</tbody>
</table>

<sup>a</sup> Minor arterial west of Kinsman Road, Major arterial east of Kinsman Road  
<sup>b</sup> Minor Arterial north of Wilsonville Road, Collector south of Wilsonville Road  
<sup>c</sup> There are no sidewalks west of Boones Ferry Road on south side

### Existing Traffic Volumes

Existing 2016 PM Peak Hour traffic volumes were collected from intersection turn movement counts conducted on June 7, 2016 at the following study intersections:

- Wilsonville Road/Brown Road  
- Wilsonville Road/Montebello Drive  
- Wilsonville Road/Boones Ferry Road  
- Wilsonville Road/Kinsman Road  
- Boones Ferry Road/Bailey Street  
- Boones Ferry Road/5<sup>th</sup> Street

The existing volumes utilized for the existing conditions analysis can be seen in Figure 2. Also shown in this figure are the existing condition volumes from a previous alignment study<sup>3</sup> conducted by OBEC in 2009.<sup>4</sup> A comparison between the 2016 motor vehicle volumes and the 2009 motor vehicle volumes can also be found in Figure 2. This comparison shows the changes that have occurred on Wilsonville Road and Boones Ferry Road since 2009.

Since traffic counts were taken in 2009, the Fred Meyer development, several Villeboise neighborhoods, Coca Cola expansion, and Wilsonville Business Park were constructed. Other developments in the study area include the SMART/TriMet Transit/WES Commuter Rail Center, Fred Meyer Gas conversion (from Chevron), Wilsonville Endodontics, Sherlock Mini Storage, and Wilsonville Self-Storage.

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<sup>3</sup>OBEC Alternative Analysis Summary, April 16, 2009  
<sup>4</sup> Wilsonville Road/Boones Ferry Road intersection traffic volumes were from 2008 as part of the 2009 Fred Meyer Transportation Impact Study
Road

Built alongside these developments were road extensions that diverted some east-west traffic from Wilsonville Road. Tooze Road was extended to Boeckman Road and opened to traffic in June 2008; this made Boeckman Road an available east-west route option. Later, Villebois Drive was extended north to Tooze Road/Boeckman Road and likely decreased east-west traffic on Wilsonville Road even further. The Barber Street extension was completed in 2015, which created an additional connection to Villebois.

These changes have similarly presented in predictable ways; less through traffic on Wilsonville Road due to the Tooze Road extension, Villebois Drive extension, and Barber Street extension, as well as greater vehicle volumes on Boones Ferry Road due to the Fred Meyer development and other developments along that road. As shown, motor vehicle volumes near 5th Street and Bailey Street remain relatively similar from 2009 to 2016.

**Existing Intersection Operations**

Existing traffic conditions at the study intersections were analyzed to understand existing study area traffic operations and to provide a baseline for comparing the future Boones Ferry Road to Brown Road connector alternatives. The existing PM Peak Hour traffic operations at the study intersections were determined based on the 2000 Highway Capacity Manual methodology\(^5\) for signalized intersections and 2010 Highway Capacity Manual\(^6\) methodology for unsignalized intersections. The estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio of each study intersection are shown in Table 2. As shown in the table, all intersections currently meet the City of Wilsonville LOS D operating standard.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Operating Standard</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Delay</td>
</tr>
<tr>
<td><strong>Signalized</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilsonville Rd/Brown Rd</td>
<td>LOS D</td>
<td>19.2</td>
</tr>
<tr>
<td>Wilsonville Rd/Montebello Dr</td>
<td>LOS D</td>
<td>6.1</td>
</tr>
<tr>
<td>Wilsonville Rd/Kinsman Rd</td>
<td>LOS D</td>
<td>24.6</td>
</tr>
<tr>
<td>Wilsonville Rd/Boones Ferry Rd</td>
<td>LOS D</td>
<td>40.1</td>
</tr>
<tr>
<td><strong>Unsignalized</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boones Ferry Rd/Bailey St</td>
<td>LOS D</td>
<td>12.8</td>
</tr>
<tr>
<td>Boones Ferry Rd/5th St</td>
<td>LOS D</td>
<td>10.3</td>
</tr>
</tbody>
</table>

**Signalized Intersections:**
- Delay = Average Stopped Delay per Vehicle (sec)
- LOS = Level of Service of Intersection
- V/C = Volume-to-Capacity Ratio of Intersection

**Unsignalized Intersections:**
- Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement
- LOS = Level of Service of Major Street/Minor Street
- V/C = Volume-to-Capacity Ratio of Worst Movement

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It is important to note that when traffic incidents occur on I-5 and I-205 such that the additional traffic exceeds the existing ramp meter capacity or the I-5 mainline falls below the threshold required to accommodate the existing levels of traffic, the I-5/SW Wilsonville Road interchange area (which includes the Wilsonville Road/Boones Ferry Road intersection) is significantly impacted and vehicles experience traffic delays similar to level of service “F” (greater than 80 seconds of delay).
**Access Spacing**

To improve traffic flow and safety, the City of Wilsonville limits access to higher classification roadways to reduce conflicts between vehicles on the roadway and vehicles entering or exiting the roadway. Table 3-2 in the TSP lists the City’s desired and minimum spacing for a Minor Arterial road as 1,000 feet and 600 feet, respectively. Spacing between Brown Road, Montebello Road and Kinsman Road along Wilsonville Road are all above the City’s minimum spacing standards. However, it is recommended that the City remove the curb cut just west of Montebello Road intersection because it is only approximately 350 feet away from the Montebello Road intersection and therefore does not meet access spacing requirements. Furthermore, spacing for a Collector Road such as Boones Ferry Road is 300 feet.

**Pedestrian and Bicycle Facilities**

Currently, there are 5-foot bicycle lanes and sidewalks present in both the eastbound and westbound directions on Wilsonville Road from Brown Road to Boones Ferry Road. Boones Ferry Road also has standard 6-foot bicycle lanes and sidewalks in both directions from Wilsonville Road to Bailey Street. At Bailey Street, there is only a bicycle lane and sidewalk in the southbound direction.

The City plans to build a network of bicycle lanes and shared-use paths within the study area which will provide important connections to destinations throughout the city. Planned shared-use facilities in the study area include the Ice Age Tonquin Trail continuation. As shown in the figure to the right, the Tonquin Trail currently terminates at the bridge on Arrowhead Creek Lane but is planned to run along the new Boones Ferry Road to Brown Road Connector to SW Boones Ferry Road. The City is currently looking for funding to upgrade or replace the bicycle/pedestrian path under the I-5 bridge connecting Kalyca Terrace subdivision to Boones Ferry Park. The proposed extension of the Tonquin Trail is anticipated to connect to this crossing.

The Boones Ferry Road to Brown Road connector will be a Collector roadway that includes bicycle lanes and sidewalk (see Collector Street Standards figure from the City’s TSP). However, the existing portion of Brown Road just south of Wilsonville Road does not include bicycle lanes, lacks sufficient width to accommodate three lanes and two bike lanes, and will require modification to include bicycle facilities.
Future Traffic Conditions
The following sections include discussion on the future 2035 traffic volumes and operations.

Future Traffic Volumes
Future traffic forecasts were performed for a 2035 horizon year based on the Metro Gamma Model that was refined for the City of Wilsonville. Within the study area, the model used HCM node delays at the intersections and travel times on the roadway links to perform the traffic assignment. The raw model volumes were post-processed to estimate 2035 turn movement volumes at the future study intersections which are shown in Figure 3 on the next page. As shown, the majority of traffic growth between 2016 and 2035 is expected to occur at the Boones Ferry Road/Wilsonville Road intersection with moderate traffic volume increases at the remaining study intersections.

Future Intersection Operations
Transportation demand modeling of the future roadway network in the vicinity of the east-west connector was performed for the 2035 horizon year for a no build scenario. The purpose of the modeling was to estimate the future traffic volumes under the existing road network.

The future no build PM Peak Hour traffic operations at the study intersections were determined based on the 2000 Highway Capacity Manual methodology for signalized intersections and 2010 Highway Capacity Methodology for unsignalized intersections. The estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio of each study intersection are shown in Table 2. As shown in the table, all intersections currently meet the City of Wilsonville LOS D operating standard but have higher delays and v/c ratios than the existing operating conditions. However, if congestion issues caused by traffic incidents and the capacity of I-5 across the Boone Bridge are not resolved, it is important to note that the interchange area LOS and V/C will continue to degrade as traffic demand increases and vehicles are likely to more often experience traffic delays similar to level of service “F” (greater than 80 seconds of delay).

Table 3: 2035 Future No Build PM Peak Hour Study Intersection Operating Conditions

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Operating Standard</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td>Signalized</td>
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<td></td>
</tr>
<tr>
<td>Wilsonville Rd/Brown Rd</td>
<td>LOS D</td>
<td>23.2</td>
</tr>
<tr>
<td>Wilsonville Rd/Montebello Dr</td>
<td>LOS D</td>
<td>7.3</td>
</tr>
<tr>
<td>Wilsonville Rd/Kinsman Rd</td>
<td>LOS D</td>
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<td>Wilsonville Rd/Boones Ferry Rd</td>
<td>LOS D</td>
<td>56.5</td>
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<tr>
<td>Boones Ferry Rd/Bailey St</td>
<td>LOS D</td>
<td>13.9</td>
</tr>
<tr>
<td>Boones Ferry Rd/5th St</td>
<td>LOS D</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Signalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec)  
LOS = Level of Service of Intersection  
V/C = Volume-to-Capacity Ratio of Intersection

Unsignalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement  
LOS = Level of Service of Major Street/Minor Street  
V/C = Volume-to-Capacity Ratio of Worst Movement
Corridor Travel Times on Wilsonville Road

The corridor travel times for Wilsonville Road were observed to be approximately 2 minutes and 15 seconds in both directions under existing conditions. These travel times are expected to increase an average of 10 seconds going eastbound and an average of 35 seconds traveling westbound in the year 2035. The implementation of either alternative is expected to alleviate much of the travel time increase from existing conditions to 2035 no-build conditions. However, when incidents and congestion on I-5 impact Wilsonville Road, the east-west travel times will be affected. A Boones Ferry Road to Brown Road connector south of Wilsonville Road will provide an alternative route from the Boones Ferry Road commercial districts to residential areas in west Wilsonville.
Summary
Below is a summary of the findings in this technical memorandum:

- An east-west connector between Brown Road to Boones Ferry Road is being considered in order to alleviate congestion on Wilsonville Road create access to new development south of Wilsonville Road, and provide a secondary route to access the Old Town neighborhood. This connector would satisfy the City of Wilsonville’s goal to improve connectivity by constructing parallel facilities spaced at regular intervals to provide alternative routes and choices for all modes even where significant barriers exist such as the Willamette River and I-5.

- The PM peak hour traffic operations for the existing conditions meet the City of Wilsonville operating standard of LOS D when not influenced by congestion or an incident on I-5.

- The proposed Boones Ferry Road to Brown Road connector would meet the access spacing standards outlined in the City’s TSP. The future intersection on the south side of Wilsonville Road approximately 350 feet west of Montebello Road should be removed as it would not meet access spacing standards.

- The PM peak hour traffic operations for the future no-build conditions also meet the standard LOS D, but indicate increased congestion in the six study intersections.

- When traffic incidents occur on I-5 and I-205 such that the additional traffic exceeds the existing ramp meter capacity or the I-5 mainline cannot deliver the existing traffic flow, the I-5/SW Wilsonville Road interchange area (which includes the Wilsonville Road/Boones Ferry Road intersection) is significantly impacted and vehicles experience traffic delays similar to level of service “F” (greater than 80 seconds of delay).