Corvallis Willamette River Crossing / Van Buren Bridge Proposed Solutions
OR-34: NW Fourth Street to Corvallis Bypass
2009 Traffic Analysis

Prepared by:

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Prepared for:

Oregon Department of Transportation

City of Corvallis
Benton County
Linn County
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<td>Corvallis Area Metropolitan Planning Organization</td>
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<td>Corvallis Area Metropolitan Planning Organization’s Corvallis Area Metropolitan Transportation Plan: Destination 2030</td>
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EXECUTIVE SUMMARY

What is the Corvallis Willamette River Crossing (CWRC) Alternatives Project?

The Corvallis Willamette River Crossing (CWRC) Alternatives Project was developed to find a solution to congestion in downtown Corvallis in the vicinity of the Van Buren Bridge. The Van Buren Bridge, shown in Figure ES-1, is a one-lane bridge for eastbound traffic located on OR-34 at the east edge of downtown Corvallis. Westbound traffic uses the Harrison Bridge. When the analysis was started in 2005, it was envisioned that an eastbound two-lane bridge across the Willamette River near the existing Van Buren Bridge would adequately address congestion at the 2030 planning horizon. However, traffic analysis performed for the study shows that a much more extensive solution will be required to respond to the transportation needs.

Figure ES.1  Project Vicinity Map and Study Area Intersections
This Final Report summarizes the analyses, environmental evaluation, and community conversations that were undertaken to assess the transportation needs and the opportunities to address those needs. These efforts have resulted in a set of recommendations that include a near-term evaluation of an interchange to replace the existing at-grade OR-34/Corvallis Bypass intersection, and further evaluation of a set of transportation system management (TSM) and transportation demand management (TDM) actions. All technical memoranda completed as part of this project are presented in the appendices\(^2\) referenced in the report.

**What is the project history?**

The Van Buren Bridge was built in 1913. It is the oldest of two swing-spans in the state, but the bridge no longer opens. The bridge has one 16-foot lane with a 5-foot raised sidewalk on the south side of the bridge.

The bridge was considered to be functionally obsolete in the 1970s because it did not have adequate capacity to accommodate travel demand. Solutions to congestion in downtown Corvallis were evaluated through an Environmental Impact Statement (EIS) process that concluded in 1983. The East Alternative, a full bypass of downtown Corvallis, was selected. A Statewide Planning Goal Exception was secured for the full bypass and the full bypass is included in the Corvallis and Linn County Comprehensive Plans. In 1990, construction began on Phase 1 of the bypass project (the South Bypass). When the South Bypass opened for traffic in 1993, congestion in downtown Corvallis was significantly reduced because trips diverted from the downtown Willamette River bridges to the South Bypass. Volumes on the Van Buren and Harrison Bridges have only recently returned to 1989, or pre-bypass, volumes.

The structural stability of the Van Buren Bridge became a concern in 1990. Rust was showing through the paint, and there was concern that rust and corrosion were extensive. The bridge was assigned a low

\(^2\) Located on Reference CD
sufficiency rating (16 out of 100; 100 is the rating for a new bridge). The deck was replaced on the bridge in the mid-1990s.

In 2005, a bridge replacement alternatives study began. The study process included a Stakeholder Advisory Committee (SAC), a Project Management Team (PMT) and public meetings to provide public input and review. The committees developed a formal *Purpose and Need* statement in anticipation that their efforts would possibly result in a National Environmental Policy Act (NEPA) process on a selected project. The *Purpose and Need* statement references the functional and structural obsolescence of the Van Buren Bridge, and the community’s desire to bring the multimodal facilities crossing the Willamette River up to current standards. As part of this process, it was determined that the bridge had significant historic value and should remain in place. Two alternatives adjacent to the existing Van Buren Bridge were selected from several possible alternatives to provide additional capacity. An Environmental Baseline Report was developed that evaluated the expected degree of environmental impact of the bridge alignments. This report is included in the technical appendices to this document.

In 2006, the Corvallis Metropolitan Planning Organization (CAMPO) regional transportation model (the CAMPO model) became available. The model permitted, for the first time, a system-wide evaluation of the Corvallis transportation system at the 2030 planning horizon.

In 2007, the SAC and PMT committees were reconvened to find a solution to congestion in downtown Corvallis; a Technical Advisory Committee was also formed. Project issues that were considered included additional automobile and truck capacity, trip reduction techniques, and transportation system efficiencies. The need to improve on the existing pedestrian and bicycle facilities across the river also was identified.

Shortly after the study began, the lead paint on the bridge was removed and the bridge was repainted. During this upgrade, it was found that the bridge was structurally sound. This finding had a profound affect on the intent of the project because the stability of the structure had been a primary concern. The focus of the study changed from the necessity of an eventual bridge replacement to a focus on the vehicle carrying capacity of the bridge and improving transportation mobility.
What scenarios were evaluated and how will they perform in 2030?

This study evaluated capacity, transportation system management (TSM) and transportation demand management (TDM) measures to address traffic delay and mobility in downtown Corvallis and on major area highways. Capacity changes, shown in Figure ES-2, included the addition of more lanes across the Willamette River in the vicinity of the Van Buren Bridge (Downtown Alternative), the addition of an interchange at the OR-34/Corvallis Bypass intersection, and the addition of the North Leg of the Corvallis Bypass with connections at US 20 and OR 99W. The capacity changes were evaluated individually and in combination with one another.

All alternatives evaluated the evening peak hour traffic operations. Below are a summary of primary alternatives evaluated and the finding of the operational analyses.

Figure ES.2  Alternatives Evaluated
2007 Existing Conditions – This alternative is the 2007 roadway and traffic signal network analyzed with 2007 PM peak hour traffic volumes. The purpose of evaluating an existing conditions alternative is to confirm that the traffic model operates and evaluates the traffic system in the way that is expected.

- **Operations for Existing Conditions** – In the PM peak hour, long queues extend from intersections along Van Buren Avenue, Harrison Boulevard, and 2nd, 3rd, and 4th streets. Three intersections exceed capacity.

2030 No-Build Alternative – Includes the existing roadway geometry and the improvements identified in CAMPO’s “Corvallis Area Metropolitan Transportation Plan Destination 2030 (CAMPO Plan),” except it does not include a two-lane Van Buren Bridge. The No-Build Alternative assumes the Van Buren Bridge remains a single-lane bridge (refer to the Appendix for financially constrained CAMPO modeling assumptions).

- **Operations for 2030 No-Build Alternative** – In the 2030 No-Build Alternative, congestion is expected to worsen compared to the Existing Conditions. Four intersections are expected to exceed capacity, and the queues on the roadways would be extensive, exceeding ¾ mile on 2nd, 3rd and 4th Streets, Van Buren Avenue, and on Harrison Boulevard.

2030 Downtown Alternative – In this alternative, a new two-lane eastbound bridge across the Willamette River adjacent to and north of the Van Buren Bridge is added to the No-Build Alternative. This bridge is a financially constrained project in the CAMPO Plan (refer to the Appendix for financially constrained CAMPO model assumptions).

- **Operations for Downtown Alternative** – Initially, it was thought that a two-lane bridge in the Van Buren Avenue corridor would resolve congestion in downtown Corvallis. However, four intersections are expected to exceed capacity, including 2nd Street/Van Buren Avenue and the OR-34/Corvallis Bypass Junction. Long queues extend along 2nd, 3rd, and 4th streets, on Van Buren Avenue and Harrison Boulevard.

2030 Flyover to Corvallis Bypass Alternative – To address the congestion caused by the OR-34/Corvallis Bypass signalized intersection, a partial interchange was evaluated at this location. This is the only capacity improvement for this alternative.

- **Operations for the Flyover to Corvallis Bypass Alternative** – The flyover (partial interchange) improves operations at the OR-34/Corvallis Bypass Junction, and eastbound traffic across the Van Buren Bridge is cleared approaching the junction. However, traffic volumes through the 2nd Street/Van Buren Avenue intersection and the 2nd Street/Harrison Boulevard intersection would exceed intersection capacity, causing queues greater than ¾ mile in length to be created on 2nd, 3rd, and 4th Streets, Van Buren Avenue and Harrison Boulevard. This is primarily because the traffic signal would remain, allowing the northbound-to-westbound left turn and the southbound-to-eastbound left turn.

2030 North Corvallis Bypass Alternative (Option 2 TSM) – This alternative adds a north leg of the Corvallis Bypass with connections at US-20 and OR-99W and an interchange at OR-34. The Van Buren Bridge would remain a one–lane facility. While two TSM alternatives were initially evaluated, TSM Option 2 was identified as the optimal modification package. The TSM improvements include the addition of dedicated turn lanes at 3rd Street/Van Buren Avenue and 4th Street/Van Buren Avenue. TDM improvements are also included.

- **Operations for North Corvallis Bypass Alternative (Option 2 TSM)** – This alternative would meet mobility standards for all study area intersections. The queue lengths along
Van Buren Avenue entering the downtown study area are expected to be substantial (greater than ¾-mile), but queues on other roads would be short (only minor queuing into adjacent intersections would still occur). The interchange itself is not expected to generate queues or experience spillback from adjacent intersections.

**2030 Downtown + North Corvallis Bypass Alternative** – This alternative combines the Downtown and North Corvallis Bypass alternatives.

- *Operations for Downtown + North Corvallis Bypass Alternative* – All intersections would meet mobility standards for this alternative. The queue lengths along all roadways entering the downtown study area except northbound 3rd Street are expected to be relatively short (0.10 mile or less). Queue lengths on 3rd Street are anticipated to be substantial (greater than ¾-mile) south of Van Buren Avenue.

**2030 3-Lane Van Buren and 3-Lane Harrison Bridges** – An additional travel lane would be added to the Harrison Bridge and a new, three-lane bridge for eastbound traffic would be constructed.

- *Operations for 3-Lane Van Buren and 3-Lane Harrison Bridges Alternative* – Mobility standards would be exceeded at 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 3rd Street/Van Buren Avenue, and 2nd Street/Van Buren Avenue. The OR-34/Corvallis Bypass Junction would have free-flow movements as a result of the interchange. The vehicle queues along Van Buren Avenue and 3rd Street entering the downtown study area would be substantial (generally greater than ¾-mile), and the queue on the southbound 4th Street approach to Harrison Boulevard is expected to be greater than 1/3 mile. Other roadway would only have minor queuing (less than ½-mile).

**What scenarios solved the transportation problem?**

Analysis shows that only two alternatives would meet mobility standards in 2030. Both alternatives would have an interchange at the OR-34/Corvallis Bypass Junction:

- Downtown Alternative + North Bypass Alternative,
- North Bypass + TDM/TSM measures

Table E-1 presents the operational performance for existing (2007) conditions, the 2030 No-Build Alternative, 2030 Corvallis Bypass Flyover only, and the two alternatives that would meet the mobility standards in 2030. Both of these alternatives rely upon an interchange at the OR-34/Corvallis Bypass Junction (the OR-34/Corvallis Bypass Interchange). This common component needs to be provided before, or at the same time as, the other infrastructure components, or heavy demand at the bypass intersection would result in substantial congestion extending along Van Buren Avenue to at least 2nd Street. The interchange would address safety and operational problems occurring at the existing signalized intersection and can be constructed separately from the other infrastructure components. Building it first would allow subsequent improvements to be constructed without causing major congestion problems at the OR-34/Corvallis Bypass Junction.
# Table ES.1 Operational Results of Alternatives

<table>
<thead>
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<th>Project Intersection</th>
<th>Critical Movement</th>
<th>2007 Existing</th>
<th>2030 No Build</th>
<th>2030 OR-34 Flipper to Corvallis Bypass</th>
<th>2030 N. Bypass + Interchange + TSW/TSW Option 2</th>
<th>2030 Downtown + N. Bypass + Interchange</th>
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Notes:
- NA: Intersection does not exist for this scenario
- None: This is not the controlling operational standard for this location
- Lane group does not stop or need to yield; no HCM LOS calculated
- HDM: Highway Design Manual
- V/C: Volume to Capacity Ratio
- LOS: Level of Service
- Controlling operational standards are shown shaded in gray
- V/C ratios exceeding the applicable operational standards are shown shaded in black
- Existing Alignment-no geometric changes
How much do the projects cost?

Cost estimates were prepared based on 2009 construction costs. Future inflation in the cost of materials, right-of-way, and relocation expenses were not included in the estimates. Detailed cost estimate sheets are included in the Appendix.

Table ES.2 Component Cost Estimates

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<td></td>
<td></td>
<td>$23</td>
<td>$231</td>
<td>$255</td>
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</tbody>
</table>

*Estimates do not include ROW, earthwork balancing, or utilities.

The flyover would be a portion of the complete interchange, thus the cost must be added to achieve the complete estimate.

Two alternatives would produce operations that meet mobility standards at all study area intersections and reduce queue lengths along most study area roadways. Both alternatives include the construction of an interchange at the OR-34/Corvallis Bypass Junction. The alternatives and their expected construction costs in 2009 dollars are:

- Downtown Alternative (2-lane bridge) with North Corvallis Bypass Alternative: the project cost estimate is $200 M if a typical roadway design is used on the North Bypass, but would be $2799 M if a viaduct is included in the design.

- North Corvallis Bypass with US-20 + TSM/TDM Alternative (excluding TSM/TDM costs); the project cost estimate is $176 M if a typical roadway design is used on the North Bypass, but would be $255 M if a viaduct is included in the design.

The TSM and TDM improvements are an important component in the second alternative to reduce queue lengths and maintain mobility benefits, especially during the later analysis years. The TSM and TDM costs are not included in the construction estimate. Implementation will require coordination with and action by local jurisdictions. Pedestrian and bicycle mobility across the Willamette River will also require continued coordination. A separate bicycle/pedestrian bridge across the Willamette River would be one way to provide a facility for these modes that meets ODOT standards.

What is the timeline for implementation?

Fall 2009 – As the cornerstone for any future river crossing improvement, ODOT is proposing to move forward with scoping and NEPA analysis of the OR-34/Corvallis Bypass Interchange. If highway construction funding becomes available for the project, it would be the first construction step ODOT takes to meet the 2030 capacity needs. The interchange would improve safety and operations. It would not depend upon other components of the long-term transportation solution and, to the extent feasible, would be built to accommodate later highway projects such as the North Corvallis Bypass.
Scoping and environmental analysis of the interchange project are planned for the fall of 2009. A program to involve the public will be included in this effort. The following elements are expected to be included in the interchange project:

- Public involvement
- Project scoping
- Environmental evaluation
- Traffic, mobility, and multi-modal analysis
- Engineering design
- Cost estimation
- Project phasing

**Fall 2009 to 2010** – Further work on Transportation Demand Management (TDM) and Transportation System Management (TSM) measures is anticipated in 2009 to 2010.

**After 2010** – Possible solutions for a new CWRC that address the travel needs of all modes will be re-evaluated. The following alternatives are expected to be re-evaluated. Other possible solutions may be identified in the future:

- North leg of the Corvallis Bypass – a new bridge and highway alignment north of downtown Corvallis, extending from the OR-34/Corvallis Bypass Junction to OR-99W with a connection at US 20
- Downtown Alternative - a two-lane downtown bridge for eastbound traffic adjacent to the existing Van Buren Bridge
1. **WHAT IS THE CORVALLIS WILLAMETTE RIVER CROSSING ALTERNATIVES PROJECT?**

The Corvallis Willamette River Crossing (CWRC) Alternatives Project was developed to find a solution to congestion in downtown Corvallis in the vicinity of the Van Buren Bridge. When the analysis was started in 2005, it was envisioned that a two-lane bridge across the Willamette River near the existing Van Buren Bridge would adequately address congestion at the 2030 planning horizon. However, traffic analysis performed for the study shows that a much more extensive solution will be required to address the mobility challenges. This report provides a summary of the analyses, environmental evaluation, and community conversations that were undertaken to assess the transportation needs and the opportunities to address those needs. These efforts resulted in a set of recommendations that include:

- The near-term evaluation of a partial or full interchange project at the existing OR-34/Corvallis Bypass Junction,
- Further assessment of a set of transportation system management (TSM) enhancements in downtown Corvallis, and of transportation demand management (TDM) enhancements for the Corvallis, Albany, Lebanon area

Additional opportunities for future consideration are summarized in the document. All technical memoranda completed as part of this project are presented in the appendices referenced in the report.³

### 1.1 How Is This Report Organized?

The report is organized into the following sections:

**Section 1 – What Is the CWRC Alternatives Project?**

This section includes the report organization, a summary of the problems the project is trying to solve, solutions considered, project history including findings in the Environmental Baseline

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³ Appendices are located on Reference CD
Report, project coordination, and public outreach. This section also documents how the preferred location of the Downtown Bridge was identified during 2005-2006.

**Section 2 – How Were the Transportation Problems Evaluated?**
Section 2 provides an overview of the key findings, traffic analysis methodology, a description of all alternatives and scenarios studied, traffic volumes and analysis results for the 2007 and 2030 No-Build Alternative, and traffic volumes and analysis results for the 2030 build scenarios.

**Section 3 – What Land Use Requirements Are Associated with the Project?**
A summary of the land use implications and goal exception requirements in each jurisdiction potentially affected by the project is covered in Section 3.

**Section 4 – What Are the Estimated Alternative Costs?**
Section 4 compares estimated costs for each alternative and provides a breakdown for potential phasing elements.

**Section 5 – What Are the Conclusions and Recommendations?**
Recommendations for further action are summarized in Section 5.

**Section 6 – What Are the Next Steps?**
Section 6 includes the actions that ODOT believes are appropriate to implement in the near term.

### 1.2 What Is This Project Trying to Solve?

The CWRC Alternatives Project was developed to find a solution to congestion in downtown Corvallis in the vicinity of the Van Buren Bridge. Improvements to pedestrian and bicycle movements across the river, and additional automobile and truck capacity were desired. The project was also initiated because of concerns that the bridge was nearing the end of its structural life. In 2007, it was found that the bridge was structurally sound. However, capacity concerns are still relevant.

#### 1.2.1 What Is the History of the Van Buren Bridge?

The Van Buren Bridge was constructed between 1912 and 1913 by the Coast Bridge Company. The Van Buren Bridge was the first bridge constructed over the Willamette in Corvallis and was an important development in the local economy and transportation network. When opened, the bridge provided 102 feet of clearance to either side of the span pivot. The bridge was determined eligible for listing on the National Register of Historic Places in 1993 by the Oregon State Historic Preservation Office (SHPO). The bridge is the oldest swing-span bridge in Oregon and is the only pin-connected steel through truss swing span on the West Coast. It is the last remaining pin-connected swing span on an Oregon highway. However, the bridge’s swing mechanism has been removed and the bridge cannot be opened anymore.

In the 1970’s the bridge was characterized as “functionally obsolete” because its single lane did not provide enough capacity for peak period traffic volumes. Congestion in downtown Corvallis was evaluated as part of an environmental impact statement (EIS) process in the 1980’s, resulting in some important actions:

- The East Alternative, a full bypass of downtown Corvallis east of the Willamette River, was selected in the 1983 final EIS as providing the greatest congestion relief to downtown congestion.

- A Statewide Planning Goal Exception was approved for the full bypass.
The full bypass was included in the City of Corvallis and Linn County Comprehensive Plans. The Corvallis Area Metropolitan Planning Organization (CAMPO) Regional Transportation Plan adopted the full Corvallis Bypass as an illustrative project. The plan also includes a two-lane Van Buren Bridge as part of the financially constrained plan.

Construction on the South Corvallis Bypass, Phase 1 of the full bypass, was initiated in 1990.

The structural integrity of the Van Buren Bridge became an issue in 1990. Rust was showing through the paint, and there was concern that rust and corrosion were extensive. In response, the bridge was assigned a low sufficiency rating (16 out of 100; 100 is the rating for a new bridge). The deck was replaced on the bridge in the mid-1990s. When the lead paint was removed in 2005, limited corrosion was found, only minor repairs were required, and the superstructure of the bridge was determined to be sound. The current bridge sufficiency rating is 47.6 (June, 2008).

The Van Buren Bridge is weight restricted. Loads over 80,000 pounds must detour to use the South Corvallis Bypass Bridge, about 4.89 miles of additional travel and 10 additional traffic signals.

1.2.2 What Downtown Bridge Solutions Have Been Considered?

The location of a preferred bridge alignment for a second bridge crossing in the vicinity of downtown Corvallis was developed based on stakeholder process, preliminary design, and consideration of environmental impacts. A key finding of the effort was that the Van Buren Bridge has significant value as a historic structure and should be retained in its current location. Therefore, any new bridge capacity in the Van Buren Avenue corridor is proposed to be adjacent to the existing Van Buren Bridge. The process for developing these ideas is documented below.

Beginning in 1990, ideas about how to solve congestion on the Van Buren Bridge have been developed, evaluated, and refined. In 2004, a Stakeholders Advisory Committee (SAC) and Project Management Team (PMT) were initiated to bring public input and review to the project. The activities of these committees are described in detail in Section 1.3. Seven alternatives were developed. The committees recommended the following five alternatives to be evaluated in an environmental baseline report.4

**Alternative 1:** Remove/replace existing bridge; connect at 1st Street.

**Alternative 3:** Build a new bridge parallel and adjacent to the Van Buren Bridge; connect at 1st Street; option to rehabilitate existing structure.

**Alternative 3A:** Build a new bridge parallel and adjacent to the Van Buren Bridge; connect at 2nd Street; option to rehabilitate existing structure.

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4 The two alternatives eliminated before the environmental baseline report were Alternatives #2 and #4. Alternative #2 proposed use of the Harrison Bridge and Harrison Boulevard as a six lane facility. The alternative was eliminated because it required high construction and high right-of-way costs with significant disruption to Downtown Corvallis. Alternative #4 proposed a bridge design in the Van Buren corridor that would allow the existing bridge to operate as a swing span bridge. However, the alternative was eliminated because the mechanism to open the bridge no longer exists and there is no transportation need that requires the bridge to be opened.
Alternative 5: Build a new bridge adjacent to the Van Buren Bridge with standard curve connecting at 1st Street; option to rehabilitate existing structure.

Alternative 5A: Build a new bridge adjacent to the Van Buren Bridge with standard curve connecting at 2nd Street; option to rehabilitate existing structure.

The alternatives studied in the environmental baseline report were developed to an approximately 20 percent design level and presented in a document titled, “Bridge and Roadway Alternatives Concepts Report.” The 2005 Environmental Baseline Report identified and characterized resources in the project area that may be impacted by the alternatives described in the Bridge and Roadway Alternatives Concepts Report. Visual simulations were also prepared that showed how the different bridge concepts would look. The committees voted to forward Alternatives 3 and 5 into the National Environmental Policy Act (NEPA) process. Alternatives 3A and 5A were dropped because they involved lowering 1st Street about 15 feet, a significant impact. Alternative 1 was discarded because it did not retain the historic bridge.

Alternatives 3 and 5 ultimately became known as the “Downtown Alternative.” Throughout this report the Downtown Alternative will be used to refer to a new two-lane bridge for eastbound travel in the Van Buren Avenue corridor adjacent to the existing Van Buren Bridge on OR-34. No decision between Alternative 3 and Alternative 5 has been made as of the publication of this report.

1.2.3 What Did the Environmental Baseline Report Find About the Downtown Alternative Alignment Solutions?

The Environmental Baseline Report evaluated environmental effects of different alignments of a new bridge in the vicinity of Van Buren Avenue. It does not include any evaluation involving routings for the North Section of the Corvallis Bypass. A summary of findings from the report is presented below.

Air Quality

Because the project is located in an air quality attainment area, there are no air quality conformity requirements for the project.

Archaeology

There is a high potential for historic archaeological resources throughout the project area. Additional study of the project area by subsurface exploratory probes and remote sensing techniques, such as ground-penetrating radar, should be conducted to determine the presence and nature of archaeological resources.

Biology

All of the alternatives have the potential to affect listed fish species in the Willamette River: Chinook salmon (*Onchorhynchus tshawytscha*) and Oregon chub (*Oregonicthys crameri*). Due to the high degree of disturbance to terrestrial habitats within the project area, it is very unlikely that any listed plant species would be affected by the project.
Hazardous Materials

The potential for encountering hazardous materials during project construction activities is high. Additional hazardous materials investigation is recommended. Among the properties with the potential for hazardous materials in the project area, D&B Bear Auto Repair and Bell Transmission could be impacted by Alternatives 3 and 3A, and access to M.E. Woodcock & Sons (Abbey’s Furniture Store) could be impacted by Alternatives 3A and 5A.

Historic Resources

Fourteen historic resources are located within the project area. The Van Buren Bridge was previously determined to be eligible for the National Register of Historic Places. The project area also contains a portion of the Corvallis Downtown Historic District that has been determined potentially eligible for the National Register. The contributing historic resources within the district that could be impacted by the project alternatives include the Van Buren Bridge, Riverfront Park, the D&B Bear Service Auto Repair building, the Abby’s Furniture Warehouse building, and the Brands Chevrolet building. The D&B Bear Service Auto Repair Building could be impacted under Alternatives 3 and 3A. The Abbey’s Furniture Warehouse Building and the Brands Chevrolet Building could also be impacted under Alternative 5A.

Two historic archaeological sites may be impacted by the project: Orleans Townsite and the Marysville Archaeological District. Both sites may be eligible for the National Register.

Hydrology

Although a hydraulic model was not developed, it is unlikely that the backwater produced by new bridge piers (with or without removing the existing bridge) would extend upstream to the East Channel, exacerbating OR-34 flooding.

Noise

The differences in noise impacts between each alternative were found to be negligible.

Recreation and Section 4(f)

Other than temporary construction-related impacts, there would be no long-term impacts on bicycle and pedestrian circulation for all alternatives. For all alternatives except Alternative 1, the old bridge would remain open for bicycle and pedestrian use, providing a second connection across the river from Corvallis. Construction-related impacts from the new bridge would temporarily limit park access to the north of the western bridge approach.

A 6(f) evaluation would not be required because no Land and Water Conservation Funds have been used in public outdoor recreation facilities potentially affected by the proposed alternatives; however, further evaluation of the alternatives was recommended to determine whether a 4(f) evaluation would be required.

A Section 4(f) evaluation is required if a “use” (as defined in the Federal Highway Administration (FHWA) Regulations at 23 C.F.R. 771.135(p)) occurs as a result of this project. A Section 4(f) evaluation would not be required for temporary construction easements as long as construction occupancy on the Section 4(f) resource is less than the full construction duration, ownership of the resource does not change, no adverse changes to the resource function occurs, and only a minor amount of land is involved. No further studies would be required if the project is constructed entirely within ODOT right-of-way.
Socioeconomics and Environmental Justice

None of the proposed alternatives would require residential displacement or residential land acquisition, and they would not have an adverse impact to any residential areas. Because no residential impacts are anticipated, no Environmental Justice impacts were anticipated. All improvements would occur in commercial and agricultural areas, and typical Environmental Justice impacts, such as increased traffic, air quality or noise impacts, if they were to occur, would occur only within those areas. Alternatives 1, 3A, 5, and 5A would affect access to the Econo Lodge, while Alternative 3 would result in alteration or demolition of the structure.

Wetlands

The ODOT Wetlands and Waters Scoping Report for the Van Buren Bridge identified the Willamette River as the only water of the state or United States in the project area. Wetlands in the project area include a sliver of riverine wetlands on either side of the Willamette River in between the two bridges, as identified by the location of debris/drift lines. Because the riverine wetlands on both banks of the Willamette River are continuous in the project area, all of the alternatives under consideration have the same potential for impact to these wetlands.

1.3 How Was the Project Coordinated and the Public Involved?

Several public involvement and public outreach activities have been conducted to gather the community’s thoughts on the CWRC Alternatives Project. The formal public outreach and involvement activities that occurred since the onset of the project in fall of 2004 were wide ranging. Such activities included project coordination, public outreach, and public information (including a project website and media releases), which are described in the following sections. In addition to these activities, ODOT provided regular updates to the Oregon Transportation Commission and local public officials. ODOT made special presentations to the Bike/Pedestrian Advisory Committee, the regional Mayor’s group, and the Area Commission on Transportation (ACT).

1.3.1 Project Coordination

Project coordination has occurred with federal and state regulatory agencies and at the local and regional level. Coordination with state and federal agencies occurred at the CETAS ⁵ and through agency participation in the project committees and teams. The proposed project was presented to CETAS in April 2006 to provide information and an opportunity to identify concerns about the project. CETAS decides whether it wants to track project development. The CETAS members determined that the expected project impacts would not be of such significance as to warrant tracking by CETAS. Instead, CETAS decided coordination with individual regulatory agencies would need to continue as the project progresses.

Local Coordination

Local coordination occurred throughout the project and involved the following groups:

- Stakeholders Advisory Committee (SAC)

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⁵ CETAS consists of 11 federal and state regulatory agencies that work to streamline the environmental review process for ODOT projects.
A Stakeholders Advisory Committee (SAC) was assembled to ensure that the project considered the community’s interests and conveyed these sentiments to the Project Management Team. The SAC consisted of the following groups and organizations:

- The Corvallis Area Metropolitan Planning Organization
- The City of Corvallis
- The Historic Preservation Advisory Board
- The Parks and Recreation Advisory Board
- The Riverfront Commission
- The Corvallis Area Chamber of Commerce
- The Bike and Pedestrian Commission
- Oregon State University
- Hewlett-Packard
- The Downtown Strategic Planning Committee
- Corvallis-Albany Farmers Markets
- Good Samaritan Hospital

The SAC met eight times from March 2005 through June 2009. Meetings were held at the Osborn Aquatic Center and Fire Station 5 in Corvallis. The SAC’s role is to collaborate with ODOT and other stakeholders on project alternatives and to give feedback at different milestones throughout the project. The SAC helped identify project issues and gave input on purposes and need, goals and objectives, project alternatives, and other design issues related to transportation capacity needs for the area currently served by the Van Buren Bridge. The SAC’s initial focus was on the location of a new downtown bridge. In 2008 the focus expanded to include transportation system management (TSM), transportation demand management (TDM), and the North Leg of the Corvallis Bypass.
**Project Management Team**

The Project Management Team (PMT) was assembled to represent the interests of the public and local governing bodies, including ODOT and the Federal Highway Administration (FHWA). The PMT is responsible for making project decisions after evaluating the SAC’s recommendations. The PMT consisted of the following groups and organizations:

- City of Corvallis
- Benton County
- Linn County
- ODOT

PMT meetings were also attended by technical representatives from ODOT and consultants who provided technical assistance to the voting members. These resource members consisted of the following groups and organizations:

- FHWA
- Oregon State Historic Preservation Office
- City of Corvallis, Public Works
- CAMPO
- ODOT
- Transportation Planning and Analysis Unit (TPAU)
- David Evans and Associates, Inc.
- JLA Public Involvement

The PMT met nine times from April 2005 through June 2009. The initial focus was the location of a new downtown bridge, but the focus expanded in 2008 to include transportation system management (TSM), transportation demand management (TDM), and the North Leg of the Corvallis Bypass.

PMT meetings typically corresponded with SAC meetings and were held in the same locations.

**Technical Advisory Committee**

A Technical Advisory Committee (TAC) was formed in 2008 to provide input and guidance throughout the traffic study. This committee provided analysis support for the traffic study Alternatives. The TAC met eight times between January 2008 and April 2009. Meetings were held at the ODOT offices in Salem and at the ODOT Albany Maintenance Facility.

**Transportation Demand Management (TDM) Workgroup**

The Transportation Demand Management (TDM) workgroup met on January 6, 2009, at the ODOT Albany Maintenance Facility to identify a reasonable level of TDM/Transit for inclusion in the proposed project alternatives. The TDM workgroup members also attended the February 17, 2009 TAC meeting to discuss the results of the analysis. The TDM workgroup consisted of representatives from the cities of Corvallis, Albany, and Lebanon, and from CAMPO and ODOT.
1.3.2 Public Involvement

Public outreach and involvement occurred during the scoping, alternatives development, and traffic study phases beginning in November 2004 and continuing through May 2009. The following public outreach and involvement methods were coordinated in addition to the committee meetings. All committee meetings were open to the public:

Stakeholder Interviews: Initial public comments were collected from early stakeholder interviews in November of 2004.

- Open House #1: The first public meeting was held on November 8, 2004.
- Open House #2: A second public meeting was held on April 12, 2006.
- Open House #3: A final public meeting on May 19, 2009.

1.3.3 Stakeholder Interviews

In an effort to learn more about community issues and concerns regarding replacement of the Van Buren Bridge, interviews were conducted with representatives of various stakeholder groups, local businesses, institutions, and elected officials in Corvallis. During October and November 2004, 13 individuals were interviewed. Each interviewee (see section below) was asked a standard list of questions. A compilation of the interviewee responses and comments is presented in the Appendix.

Stakeholders expressed concerns about the construction impacts to the economy, the community, and the river, as well as about how the bridge would connect to the west side of the river, and that the project design should improve safety for all users of the bridge. Other comments included:

- The bridge is an important bicycle and pedestrian link to the east side.
- Traffic congestion at the bridge is a problem that needs to be addressed.
- The project needs to integrate with the Riverfront Park plans and maintain the continuity and character of the riverfront.
- The process should be open and inclusive and work toward a solution that everyone can live with, that will not divide the community.
- Preserving the existing structure is important. The bridge has historic value, and aesthetic value to the community.
- The bridge impacts downtown and the local economy in terms of access points and traffic flow.

1.3.4 Open House #1

The first public meeting was held November 8, 2004, at the Corvallis Public Library. Fifty-eight people attended. The purpose of the open house was to notify citizens that the project was starting, to present alternatives developed in the previous project development process (in the early 1990s), and to gather feedback about issues and concerns related to the project, preferred alternatives, and any new ideas for alternatives. There were seven options for the public to
Alternatives to Carry Forward

The attending public was asked to identify which of the early alternatives should be carried forward into the current process for consideration. (Note that alternative 1A was not previously identified as it was a newly developed alternative). Responses are shown in Table 1.1, ranked in order.

Table 1.1 Open House #1: Response to Alternatives

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<th># of Votes</th>
<th>Alternative</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>30</td>
<td>Alternative 5</td>
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</tr>
<tr>
<td>16</td>
<td>Alternative 4</td>
<td>Build new bridge adjacent to Van Buren Bridge, with curve to allow swing span to operate; option to rehabilitate existing structure</td>
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<td>Alternative 3A</td>
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</tr>
<tr>
<td>9</td>
<td>Alternative 3</td>
<td>Build new bridge parallel and adjacent to Van Buren Bridge; connect at 1st Street; option to rehabilitate existing structure</td>
</tr>
<tr>
<td>9</td>
<td>Alternative 2</td>
<td>Widen existing Harrison Street Bridge; reroute traffic through downtown Corvallis; option to rehabilitate existing structure</td>
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<tr>
<td>4</td>
<td>Alternative 1</td>
<td>Remove/replace existing bridge; connect at 1st Street</td>
</tr>
<tr>
<td>4</td>
<td>Alternative 1A</td>
<td>Remove/replace existing bridge; connect at 2nd Street</td>
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1.3.5 Open House #2

A public open house was held on Wednesday, April 12, 2006, from 3 p.m. to 7 p.m. at the Corvallis Public Library. The purpose of the open house was to present the recommended set of alternatives for further study in the Environmental Assessment and the alternatives considered but dismissed, as well as to obtain public feedback.

The sign-in sheets recorded 133 meeting attendees, including 45 students from Oregon State University. (A civil engineering class at Oregon State University was studying the bridge project.)

Alternatives for Further Study

Attendees were asked to rate the acceptability of each alternative for further study in an Environmental Assessment. The results are summarized in Table 1.2 below. The responses indicate overall support for Alternative 5, mixed support for Alternative 3, and rejection of Alternatives 1, 3A, and 5A.
### Table 1.2 Open House #2: Response to Alternatives

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<tr>
<th>Alternative</th>
<th>Yes, Definitely Worth More Study</th>
<th>Probably Worth More Study</th>
<th>Neutral</th>
<th>Probably Not Worth More Study</th>
<th>No, Definitely Not Worth More Study</th>
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<td>Alternative 5 - Curve Away from Existing; 1st Street Connection</td>
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<tr>
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<td>7</td>
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<td>22</td>
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<tr>
<td>Alternative 5A - Curve Away from Existing, with 2nd Street Connection</td>
<td>6</td>
<td>8</td>
<td>6</td>
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### 1.3.6 Open House #3

The Oregon Department of Transportation (ODOT) held the third and final public open house for the Corvallis Willamette River Crossing/Van Buren Bridge project on May 19, 2009 from 6:00 to 8:30 p.m. at the Corvallis Public Library. Forty-one people signed in at the open house (approximately 5 people chose not to sign in). The purpose of the event was to explain the alternatives ODOT evaluated to improve traffic flow and safety, maintain connectivity, and meet multimodal transportation needs for the area served by the Van Buren Bridge. The community was invited to provide feedback on the alternatives being considered and other issues ODOT should explore while evaluating the various alternatives. Comments were collected through a comment form, flip charts located at each information station, and an online survey available on the project website at: [http://www.oregon.gov/ODOT/HWY/REGION2/VanBurenStreetBridge.shtml](http://www.oregon.gov/ODOT/HWY/REGION2/VanBurenStreetBridge.shtml).

The open house was a drop-in style event which included various display boards and stations providing information about the purpose and background of the project, public process, proposed alternatives, traffic study, next steps and approximate cost of construction. Staff from ODOT, David Evans Associates, Inc. and JLA Public Involvement was on hand to help direct people, answer questions, and collect comments.

Overall, there was not overwhelming support generated by the public for or against the project or the direction that ODOT has proposed. The majority of comments received was related to bike and pedestrian safety, access, and improved facilities. There was support for using the Van Buren Bridge as a bike/pedestrian facility in the future.
1.3.7 Public Information

A project website was created and maintained by ODOT throughout the course of the project. The project website can be found at http://www.oregon.gov/ODOT/HWY/REGION2/VanBurenStreetBridge.shtml. Project contact information and committee meeting information, including agendas and summaries, were available for review on the website.

2. **HOW WERE THE TRANSPORTATION PROBLEMS EVALUATED?**

2.1 **Summary of Key Findings**

The traffic analysis shows that heavy congestion initially thought to be a result of the Van Buren Bridge is actually a more extensive issue that involves the capacity of the signalized intersections in downtown Corvallis and at the OR-34/Corvallis Bypass Junction. The solution does not appear to be solely providing a two-lane Van Buren Bridge (Downtown Alternative).

Findings for the No-Build Alternative show that by 2030, extreme congestion is to be expected during the PM peak period across the Harrison Bridge and Van Buren Bridge and on the Corvallis Bypass. The No-Build Alternative operations at the intersections of 2nd Street/Harrison Boulevard, 2nd Street/Van Buren Avenue, and the OR-34/Corvallis Bypass Junction would result in long queues along Van Buren Avenue, Harrison Boulevard, 3rd Street, and 4th Street. Long northbound queues would also extend along the S. Corvallis Bypass. During the evening rush hour, there will be congestion along all roadways entering and exiting the downtown area. A range of candidate alternatives and scenarios were evaluated to address the problem. See Section 2.2.2 for a definition of alternatives versus scenarios. These are described in more detail in Section 2.4 through 2.7:

- **2030 No-Build Alternative** – Includes the existing roadway geometry as well as those improvements identified in the Corvallis Area Metropolitan Transportation Plan: Destination 2030 financially constrained project list, except for the two-lane Van Buren Bridge (not included in No-Build analysis).) The No-Build Alternative assumes the Van Buren Bridge remains a single-lane (refer to the Appendix for financially constrained CAMPO modeling assumptions).

- **2030 Downtown Alternative** – A new two-lane eastbound bridge adjacent to and north of the Van Buren Bridge with increased capacity across the Willamette River. The two-lane bridge identified in this alternative is listed as a financially constrained project in the CAMPO model (refer to the Appendix for financially constrained CAMPO model assumptions).

- **2030 North Corvallis Bypass Alternative** – A new bridge/connection serving Corvallis north of downtown that would link the OR-34/Corvallis Bypass Junction to OR-99W and
US-20. This alternative retains the existing one-lane Van Buren Bridge. The alternative adds the North Corvallis Bypass as an illustrative project from CAMPO’s illustrative project list into the CAMPO model. The Appendix provides the Financially Constrained and Illustrative Project Lists assumed in the CAMPO Plan.

- **2030 Downtown Alternative + North Corvallis Bypass Alternative** – This alternative combines the elements from the Downtown and North Corvallis Bypass alternatives.

- **2030 3-Lane Van Buren and 3-Lane Harrison Bridges** – An additional travel lane would be added to the Harrison Bridge and a new three-lane bridge for eastbound traffic would be constructed.

- **Various Alignments at the OR-34/Corvallis Bypass Junction** – The OR-34/Corvallis Bypass Junction is currently a signalized intersection. A flyover and an interchange alignment were evaluated depending on the alternative or scenario. At least one of the three alignments was tested with each of the candidate alternatives.

- **TSM/TDM enhancements** – TSM enhancements would involve lane modifications at various downtown locations. TDM enhancements would provide substantial increases in transit service, park-and-ride facilities, and bike lockers to result in single-occupancy-vehicle trip reductions by 2030. These were grouped and tested as one scenario, and added as a group to other scenarios as an enhancement.

When the project was initiated, it was expected that the Downtown Alternative would solve the identified congestion and mobility challenges. The analyses show that more extensive infrastructure will be needed and that only two scenarios would meet mobility standards in 2030:

- **Downtown Alternative with North Corvallis Bypass Alternative, plus an interchange at the OR-34/Corvallis Bypass Junction Scenario**

- **North Corvallis Bypass Alternative with US-20 + TSM/TDM Scenario, plus an interchange at the OR-34/Corvallis Bypass Junction Scenario**

All of the solutions were evaluated with a flyover or interchange connection at the OR-34/Corvallis Bypass Junction. Additional analysis will be performed to determine the appropriate configuration of such a connection. Throughout the document the terms flyover (or partial interchange) and interchange are used to reflect the specific scenarios that were analyzed.

This common component needs to be provided before, or at the same time as, the other infrastructure components. Otherwise, the heavy demand at the intersection would result in substantial congestion extending along Van Buren Avenue from the bypass intersection to at least 2nd Street. The interchange connection would address safety and operational problems.
occurring at the existing signalized intersection and can be constructed separately from the other infrastructure components.

Funding for the overall project dictates that phasing of the components be considered, if possible. ODOT is of the opinion that a partial- or full-interchange connection at the OR-34/Corvallis Bypass Junction should be undertaken as the first phase of the CWRC Alternatives Project. The full- or partial-interchange is a cornerstone to operations for the North Corvallis Bypass Alternative and the Downtown Alternative. In the interim, the TSM improvements evaluated in the project could be implemented to improve traffic operations in downtown, and the TDM improvements could expand transportation options for commuters.

The North Corvallis Bypass Alternative has the advantage, when combined with the studied TSM/TDM actions, of meeting all applicable mobility standards.\(^6\) An advantage associated with the Downtown Alternative is that it can be constructed at a lower cost than the North Corvallis Bypass Alternative. However, even when combined with the studied TSM/TDM actions, the Downtown Alternative would not meet mobility standards at two key downtown intersections. Substantial congestion throughout the project area would continue.

Table 2.1 provides a summary of the operating conditions for the existing condition and the 2030 No-Build Alternative, and the two scenarios that would meet 2030 mobility standards—(1) Downtown Alternative + North Corvallis Bypass Alternative, plus an interchange at the OR-34/Corvallis Bypass Junction Scenario and (2) North Corvallis Bypass + TSM/TDM Scenario, plus an interchange at the OR-34/Corvallis Bypass Junction Scenario, as previously discussed.

Sections 2.4 through 2.7 provide greater detail on the alternatives and scenarios studied, as well as detail on the operational results associated with the analyses. Complete descriptions and summaries of the analyses performed for this study are provided in the technical memoranda collected in the appendices at the end of this report.

\(^6\) Primary evaluation criteria based on volume to capacity ratios as presented in the Oregon Highway Plan and Highway Design Manual.
## Table 2.1 Operational Results of Alternatives

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>2007 Existing</th>
<th>2030 No Build</th>
<th>2030 OR-34 Flyover to Corvallis Bypass</th>
<th>2030 N. Bypass + Interchange + TTM/TDM - Option 2</th>
<th>2030 Downtown + N. Bypass + Interchange</th>
<th>Operational Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
<td>LOS</td>
</tr>
<tr>
<td>9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.50</td>
<td>C</td>
<td>0.74</td>
<td>C</td>
<td>0.74</td>
<td>C</td>
</tr>
<tr>
<td>3rd St. at North Bypass/Buchanan</td>
<td>EBL</td>
<td>0.28</td>
<td>C</td>
<td>0.63</td>
<td>F</td>
<td>0.63</td>
<td>F</td>
</tr>
<tr>
<td>4th St. at North Bypass/Buchanan</td>
<td>WBT</td>
<td>0.99</td>
<td>F</td>
<td>1.45</td>
<td>F</td>
<td>1.45</td>
<td>F</td>
</tr>
<tr>
<td>5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.45</td>
<td>B</td>
<td>0.46</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
</tr>
<tr>
<td>4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.59</td>
<td>B</td>
<td>0.88</td>
<td>C</td>
<td>0.89</td>
<td>C</td>
</tr>
<tr>
<td>3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.63</td>
<td>A</td>
<td>0.77</td>
<td>A</td>
<td>0.77</td>
<td>B</td>
</tr>
<tr>
<td>2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.79</td>
<td>C</td>
<td>1.05</td>
<td>D</td>
<td>1.03</td>
<td>D</td>
</tr>
<tr>
<td>5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.37</td>
<td>B</td>
<td>0.46</td>
<td>B</td>
<td>0.44</td>
<td>B</td>
</tr>
<tr>
<td>4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.57</td>
<td>B</td>
<td>0.74</td>
<td>B</td>
<td>0.61</td>
<td>B</td>
</tr>
<tr>
<td>3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.89</td>
<td>D</td>
<td>0.96</td>
<td>C</td>
<td>0.95</td>
<td>C</td>
</tr>
<tr>
<td>2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.08</td>
<td>F</td>
<td>1.35</td>
<td>F</td>
<td>1.28</td>
<td>F</td>
</tr>
<tr>
<td>OR-34 at Bypass</td>
<td>Overall</td>
<td>1.28</td>
<td>F</td>
<td>1.67</td>
<td>F</td>
<td>0.95</td>
<td>B</td>
</tr>
<tr>
<td>N. Bypass at US-20</td>
<td>SBR</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>NBL</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Notes:

- **NA**: Intersection does not exist for this scenario
- **None**: This is not the controlling operational standard for this location
- **-**: Lane group does not stop or need to yield; no HCM LOS calculated
- **HDM**: Highway Design Manual
- **V/C**: Volume to Capacity Ratio
- **LOS**: Level of Service
- **Controlling operational standards are shown shaded in gray**
- **v/c ratios exceeding the applicable operational standards are shown shaded in black**
- **Existing Alignment-no geometric changes**

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2.2 **What Types of Tools and Analyses Were Used?**

The methodology, standards and tools for the traffic methodology are covered in the following paragraphs. Study area roadways and intersections, the definition of important terms, discussion of traffic volume development and the use of the Corvallis Area Metropolitan Planning Organization (CAMPO) transportation model are provided, in addition to the analysis software used and the applicable standards. The individual intersection analysis relies upon output from Synchro, a traffic analysis program. The system-type analysis was performed using the SimTraffic micro-simulation analysis program.

2.2.1 **Study Area Roadways**

The study area is roughly bounded by the following: Circle Boulevard to the north, Corvallis-Newport Highway to the south, Peoria Road to the east, and 9th Street to the west. This area encompasses the roadways significantly affected by trips using the Van Buren Bridge or North Corvallis Bypass as studied in the traffic analysis. In addition to the Van Buren Bridge over the Willamette River, the study area includes the following roadways shown in Figure 2.1:

- OR-34/Corvallis-Lebanon Highway (Van Buren Avenue and Harrison Boulevard)
- Buchanan Avenue
- OR-34/US-20/Corvallis-Newport Highway (Corvallis Bypass)
- US-20/Albany-Corvallis Highway (2nd Street)
- OR-99W/US-20/Pacific Highway (3rd Street)
- OR-99W/US-20/Pacific Highway (4th Street)
- 5th Street
- 9th Street

2.2.2 **Definition of Terms**

Throughout the document, the term *alternative* is used when describing a future capacity change to the roadway network (including TSM lane modifications) that results in a traffic pattern shift in the study area. The term *alignment* is used when discussing the evaluated modifications of the OR-34/Corvallis Bypass Junction. When an alternative is combined with an alignment it refers to a scenario. The No-Build Alternative will be referred to as an alternative (without TSM/TDM) and as a scenario (with TSM/TDM).

For a complete list of alternatives and scenarios analyzed see Section 2.6.4.
Figure 2.1 Study Area and Vicinity Map

Legend:
- Project Target Intersection
2.2.3 Volume Development

Volume development is the practice of taking traffic counts at individual intersections and “smoothing” them out across a system of intersections. Seasonal adjustment factors may also be applied because traffic volumes vary throughout the year. Finally, growth factors are applied so that 2030 traffic volumes can be estimated from 2007 traffic counts.

The balanced 2030 design hour volumes are based on the traffic volumes used in the existing conditions analysis (see Section 2.4) and the predicted growth from forecast models provided by ODOT. All of the base 2030 traffic volumes within the study area were developed using the transportation model for the “Corvallis Area Metropolitan Transportation Plan, Destination 2030.” Methods for developing future condition volumes were performed in collaboration with the ODOT Transportation Planning and Analysis Unit (TPAU). Year 2030 volumes were calculated by applying growth adjustment estimates to the existing volumes. Then, the future system volumes were balanced between intersections. Volume balancing occurred prior to running the simulation models.

For detailed information on volume development and balancing, see the Appendix (Complete Documents Traffic Volumes – Technical Reports). An additional scenario was investigated that removed the US-20 connection from the North Corvallis Bypass Alternative for all three alignments. For more information, see the 2030 Future Conditions Technical Memorandum (Appendix).

2.2.4 CAMPO Model Assumptions

The Corvallis Area Metropolitan Transportation Plan Destination 2030 (CAMPO Plan) proposes financially constrained changes to the transportation system that should occur by the years 2010, 2020, and 2030. The preferred alternative assumes all of the projects and policies outlined in the financially constrained CAMPO Plan will be completed by the year 2030. Within the framework of the CAMPO Plan Preferred Alternative, projects and policies were developed to match the visions and goals.

The CAMPO model is a traffic model developed as part of the CAMPO Plan. It provides information regarding traffic patterns and distribution of vehicles on the transportation roadway network for the 2030 scenarios. The model bases traffic patterns and distribution of vehicles on travel times. If a new route provides a shorter travel time, the model shifts vehicles to the new route until the system reaches equilibrium. When a new route is added to the CAMPO model, such as the North Corvallis Bypass, the model indicates whether travel patterns would change based on the availability of route options.

CAMPO Transit Component

The CAMPO Plan includes changes to transit service by adding buses, creating more transit routes, and constructing a new bus maintenance and operation facility. Buses will be added to

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7 The CAMPO model is based in the JEMnR travel demand modeling software.

8 CAMPO includes the Cities of Corvallis, Philomath, and Adair Village, and a portion of Benton County
routes 1, 2, 3, 4, 7, and 8, increasing the total number of routes from today’s 8 routes to 11 routes in 2030. Three new routes will be created, each with its own bus: an Adair Village Commuter Route, Downtown Corvallis Circulator, and Philomath/Bellfountain/Airport. By 2030, Corvallis will have a total of 18 city buses, 10 more than the city has today. The model includes an increase in service hours from 22,000 hours per year to 83,000 hours per year: a net increase of 61,000 hours per year.

**CAMPO Travel Demand Management Component**

The CAMPO model includes an aggressive travel demand management component to encourage the reduction of drive-alone trips. The following are elements in the model:

- New park-and-ride lots will be established at five locations:
  - South 15th Street and Applegate Street in Philomath
    - City of Adair Village,
    - US-20/OR-34 split (Transportation Analysis Zone [TAZ] 327),
    - Airport Road at OR-99W (TAZ 319), and
    - Harrison Boulevard at Walnut/53rd Street.
  - Construction and promotion of bicycle and pedestrian facilities
  - An on-site carpool/vanpool station and communal bicycle program

There will continue to be construction and promotion of bicycle and pedestrian facilities. An on-site carpool/vanpool station and communal bicycle program will also be developed.

**CAMPO Roadway Component**

The following roadway changes and improvements in the 2030 transportation model are within the study area and may impact travel behavior:

- Circle Boulevard at 9th Street – add eastbound right turn lane
- Van Buren Bridge – add a second lane of capacity
- OR-99W, railroad over-crossing to Circle Boulevard – widen to four lanes with left-turn refuges
- Buchanan Avenue at 9th Street – construct left-turn lanes on Buchanan Avenue (eastbound)

### 2.2.5 TSM and TDM Alternative Design

TSM projects are proposed within the CAMPO area, but they are not specifically included in the CAMPO model. The TDM projects studied for the CWRC Project are not included in the CAMPO model because they are outside the analysis area boundary. These TSM and TDM projects would result in additional traffic benefits (vehicular reductions) to downtown Corvallis. To analyze the traffic benefits that could result, a separate scenario was created to analyze the sole effects of additional TSM and TDM projects.
A team including ODOT and the cities of Albany, Corvallis, and Lebanon, collaborated to identify several TDM projects that could reduce the single occupant trips during the PM peak commute. The team was directed to consider optimistic but realistic alternatives. These projects include additions to regional transit service, park and ride lots, and bicycle facilities described in Section 2.6.3.

For each of the identified TSM projects, the lane modifications were incorporated into the traffic analysis for the scenario. For the identified TDM projects, the jurisdictions outside the MPO with the projects in their plans provided trip reduction estimates that were then incorporated into the project’s traffic model. As noted in Section 2.2.4, City of Corvallis transit service enhancements are already accounted for in the CAMPO regional model. The projects in the CAMPO model are accounted for in the analysis volumes used for the No-Build Alternative and all Build Alternatives.

### 2.2.6 Traffic Operations Procedures and Standards

Traffic operations for intersections and roadways were evaluated and compared using three general measures: volume-to-capacity (v/c) ratio, level of service (LOS), and system-wide queue. Volume-to-capacity measures the number of vehicles that an intersection or roadway can accommodate in the same way that a pipe can accommodate a certain amount of water (see illustration below). LOS measures the average delay that driver will experience at an individual intersection. For signalized intersections, LOS is measured from A to F with A representing an average delay of less than 10 seconds, LOS B representing an average of between 10 and 20 seconds, and LOS F representing an average delay of greater than 80 seconds. LOS is depicted graphically on the right.

In addition to the operations of an individual intersection, the entire roadway network is influenced by vehicle queuing (or cars stacking up behind one another). Queuing is shown in the LOS F graphic provided. During congested periods, heavy queuing can impact adjacent intersections. All three measures, v/c, LOS, and queuing, are used to...
evaluate the alternatives considered in this study. Mobility standards are based upon the roadway classification, land use type, and the posted speed of the highway. A summary of mobility standards for study area intersections can be found in Table 2.2.

The methodology used to evaluate the LOS and v/c is outlined in the 2000 Highway Capacity Manual (HCM). Synchro analysis software was used to generate the HCM reports from which the v/c ratios and LOS were derived, and SimTraffic, a microsimulation computer model, was used to obtain results for 95th percentile queuing (a design parameter). The SimTraffic results were based upon five randomly seeded simulation model runs. All Synchro and SimTraffic output sheets can be found in the Appendix (Analysis Results-Synchro/SimTraffic).
### Table 2.2 Study Area Intersection Inventory and Mobility Standards

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Street One:</th>
<th>Street Two:</th>
<th>Posted Speed</th>
<th>Lanes</th>
<th>HDM Mobility Standard</th>
<th>OHP Mobility Standard</th>
<th>City/County Operational Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR-34 at Bypass</td>
<td>Statewide, FR&lt;sup&gt;8&lt;/sup&gt;, NHS&lt;sup&gt;9&lt;/sup&gt;, Outside UGB&lt;sup&gt;10&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>45/55</td>
<td>4/2</td>
<td>0.60</td>
<td>0.70</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; St. at Harrison Blvd.</td>
<td>Regional Hwy, Principal Arterial</td>
<td>District Hwy, FR, Principal Arterial</td>
<td>25/25</td>
<td>2/2</td>
<td>0.85</td>
<td>0.85</td>
<td>D-peak, C-all other</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; St. at Harrison Blvd.</td>
<td>Regional Hwy, FR, STA&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>25/25</td>
<td>2/3</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; St. at Harrison Blvd.</td>
<td>Regional Hwy, FR, STA&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>25/25</td>
<td>3/3</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; St. at Harrison Blvd.</td>
<td>-</td>
<td>Minor Arterial</td>
<td>-</td>
<td>25/25</td>
<td>2/3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; St. at Van Buren Ave.</td>
<td>Regional Hwy, STA&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>25/25</td>
<td>3/2</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; St. at Van Buren Ave.</td>
<td>Regional Hwy, FR, STA&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>25/25</td>
<td>3/3</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; St. at Van Buren Ave.</td>
<td>Regional Hwy, FR, STA&lt;sup&gt;11&lt;/sup&gt;</td>
<td>Principal Arterial</td>
<td>Principal Arterial</td>
<td>25/25</td>
<td>3/3</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; St. at Van Buren Ave.</td>
<td>-</td>
<td>Minor Arterial</td>
<td>-</td>
<td>25/25</td>
<td>2/3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt; St. at Buchanan Ave.</td>
<td>-</td>
<td>Minor Arterial</td>
<td>-</td>
<td>35/25</td>
<td>4/2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; St. at Buchanan Ave.</td>
<td>Regional Hwy, FR</td>
<td>Principal Arterial</td>
<td>-</td>
<td>40/25</td>
<td>2/2</td>
<td>0.85</td>
<td>0.85</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; St. at Buchanan Ave.</td>
<td>Regional Hwy, FR</td>
<td>Principal Arterial</td>
<td>-</td>
<td>40/25</td>
<td>2/2</td>
<td>0.85</td>
<td>0.85</td>
</tr>
</tbody>
</table>

**Notes:**
1. Posted speed on “Street One/Street Two”
2. Number of lanes on a typical section of “Street One/Street Two” (including both directions)
3. Values shown are volume to capacity (v/c) ratios.
4. Source: 2003 Highway Design Manual (HDM) Table 10-1
5. Source: 1999 Oregon Highway Plan (OHP) Table 6 (Amended in 2005).
6. Values shown are Levels of Service (LOS)
7. Source: City of Corvallis Comprehensive Plan Section 11.3.9, except for the Bypass intersection where the Benton County Transportation System Plan is used.
8. FR: Freight Route
9. NHS: National Highway System
10. UGB: Urban Growth Boundary
11. STA: Special Transportation Area
2.3 Pedestrian and Bicycle Mobility across the Willamette River

Bicycling is an important form of travel in Corvallis. According to survey data, approximately 22% of Corvallis residents commute regularly by bike and 8% commute regularly by walking. The Van Buren and Harrison Bridges are important east-west connections for bicyclists accessing the OSU crew docks, OSU Agricultural Experiment Farm, OSU laboratories, and Peoria Road. An alternative bicycle route across the Willamette River is available via the South Bypass.

The bridges do not meet standards in terms of providing sufficient width for cyclists and pedestrians. ODOT standards for a shared-use shoulder or a bicycle lane and for sidewalks call for a width of six feet. Currently, pedestrian and bicycle mobility across the river is provided on the Van Buren Bridge via a 5-foot-wide wooden sidewalk and on the Harrison Bridge via a 4-foot-wide shoulder. At the June 2, 2009 PMT and SAC meetings, the Committees recommended that future projects be designed to include bicycle and pedestrian facilities that meet applicable standards from the west side of the Willamette River through any future OR-34/Corvallis Bypass Interchange. The new pedestrian and bicycle facilities must provide for safe and efficient operations.

Bicycle and pedestrian facilities meeting ODOT standards would be part of the Downtown Alternative or the North Bypass Alternative and have been included in the costs for those facilities (Section 4.0). A separate bicycle/pedestrian bridge across the Willamette River also could provide a facility meeting ODOT standards. A cost estimate for such a bridge is provided in Section 4.0.

2.4 2007 Existing Conditions: How Is the Transportation System Working Today?

Two types of analysis were performed – an individual intersection analysis and a system-type analysis – to evaluate the alternatives. During the existing (2007) PM peak hour, traffic demand exceeds available capacity (ability to process every vehicle wanting to pass through the intersection) at two intersections: 2nd Street/Van Buren Avenue, and OR-34/Corvallis Bypass Junction). In addition, the performance at one other intersection (4th Street/Buchanan Avenue) fails to meet the operational standard. Table 2.3 shows the existing operations and applicable standards at each of the studied intersections. The v/c ratios exceeding the applicable operational standards are highlighted in Table 2.3. Figure 2.2 shows the traffic operations associated with the 2007 existing conditions.
Table 2.3 Existing (2007) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>V/C</th>
<th>LOS</th>
<th>Operational Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.50</td>
<td>C</td>
<td>None</td>
</tr>
<tr>
<td>2 3rd St. at Buchanan Ave.</td>
<td>EBL</td>
<td>0.28</td>
<td>C</td>
<td>0.85</td>
</tr>
<tr>
<td>3 4th St. at Buchanan Ave.</td>
<td>WBT</td>
<td>0.99</td>
<td>F</td>
<td>0.85</td>
</tr>
<tr>
<td>4 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.45</td>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>5 4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.59</td>
<td>B</td>
<td>0.95</td>
</tr>
<tr>
<td>6 3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.63</td>
<td>A</td>
<td>0.95</td>
</tr>
<tr>
<td>7 2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.79</td>
<td>C</td>
<td>0.85</td>
</tr>
<tr>
<td>8 5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.37</td>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>9 4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.57</td>
<td>B</td>
<td>0.95</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.89</td>
<td>D</td>
<td>0.95</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.08</td>
<td>F</td>
<td>0.95</td>
</tr>
<tr>
<td>12 OR-34 at Bypass</td>
<td>Overall</td>
<td>1.28</td>
<td>F</td>
<td>0.60 Not None</td>
</tr>
</tbody>
</table>

Number of Failing Intersections: 3

Notes:
- None: This is not the controlling operational standard for this location
- HDM: Controlling operational standards are shown shaded in gray
- City: v/c ratios exceeding the applicable operational standards are shown shaded in black

The operation of individual intersections affects how the system operates as a whole. The two over-capacity intersections are consecutive signals that impact all vehicles leaving downtown in the eastbound direction. The cumulative effect of these signals operating over capacity during the PM peak period results in queuing that exceeds the vehicle storage capacity between signalized intersections. Queuing therefore extends through other signalized intersections, compounding the congestion of much of the surrounding downtown system, because vehicles cannot move through these intersections even though the light is green. This issue occurs along each of the highways in the study area. Figure 2.2 shows the results of this system queuing analysis. In this figure, queues appear as dashed lines extending from the intersections.

2.5 2030 No-Build Alternative: How Will the Transportation System Work in 2030 If We “Do Nothing”?

The No-Build Alternative analysis assumes the existing roadway geometry as well as the financially-constrained transportation projects identified in the Corvallis Area Metropolitan Transportation Plan: Destination 2030 (CAMPO Plan)\(^9\) except for the two-lane Van Buren Bridge. Instead, eastbound traffic continues to use the existing single-lane bridge. Two types of analysis have been undertaken – an individual intersection analysis and a system-type analysis.

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\(^9\) For a complete list of financially constrained CAMPO modeling assumptions refer to the Appendix
The 2030 No-Build Alternative conditions show that traffic volumes projected at four intersections would exceed the available capacity (ability to process every vehicle wanting to pass through the intersection). In addition the performance at an additional intersection would fail to meet the mobility standard. Table 2.4 shows the operations that would be expected in year 2030 and the applicable standards at each of the studied intersections. The v/c ratios exceeding the applicable mobility standards are highlighted in Table 2.4. Figure 2.3 shows the expected operations associated with this alternative.

The system analysis evaluated how the operation of individual intersections can be expected to affect the system in 2030. The majority of the over-capacity intersections are signalized and adjacent to the two east-west bridge structures. These over-capacity intersections would result in queuing greater than the vehicle storage capacity between signalized intersections and extending through other signalized intersections. This queuing would compound the congestion in the system because vehicles would not be able to move through intersections even though the light is green. Each of the highways in the study area would be affected by this condition. Figure 2.3 shows the results of this system queuing analysis.

### Table 2.4 No Build Future (2030) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>V/C</th>
<th>LOS</th>
<th>Operational Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HDM</td>
</tr>
<tr>
<td>1 9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>C</td>
<td>None</td>
</tr>
<tr>
<td>2 3rd St. at Buchanan Ave.</td>
<td>EBL</td>
<td>0.63</td>
<td>F</td>
<td>0.85</td>
</tr>
<tr>
<td>3 4th St. at Buchanan Ave.</td>
<td>WBT</td>
<td>1.45</td>
<td>F</td>
<td>0.85</td>
</tr>
<tr>
<td>4 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.46</td>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>5 4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.88</td>
<td>C</td>
<td>0.95</td>
</tr>
<tr>
<td>6 3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.77</td>
<td>A</td>
<td>0.95</td>
</tr>
<tr>
<td>7 2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>1.05</td>
<td>D</td>
<td>0.85</td>
</tr>
<tr>
<td>8 5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.46</td>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>9 4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>B</td>
<td>0.95</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.96</td>
<td>C</td>
<td>0.95</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.35</td>
<td>F</td>
<td>0.95</td>
</tr>
<tr>
<td>12 Hwy 34 at Bypass</td>
<td>Overall</td>
<td>1.67</td>
<td>F</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Number of Failing Intersections: 5

**Notes:**
- **None** This is not the controlling operational standard for this location
- **HDM** Highway Design Manual
- **Gray** Controlling operational standards are shown shaded in gray
- **Black** v/c ratios exceeding the applicable operational standards are shown shaded in black
Figure 2.3 No-Build Alternative 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions
Operational Analysis Results
PM Peak Hour
No-Build Alternative

Legend:
- Level of Service (LOS)
- Critical Movement (CM): Unsignalized Intersection Only
- Volume to Capacity Ratio (v/c)

- Blue: v/c<HDM and LOS<City (D)
- Orange: HDM< v/c< 1, or City (D)<LOS<F
- Red: v/c>1, or LOS=F

- 95th Percentile Queue
- Q = XX mi. represents length of queue beyond nearest study area intersection

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2.6 How Did the 2030 Build and TSM/TDM Alternatives Perform?

The transportation study evaluated multiple elements for the 2030 design year including six alternatives, three alignments at the OR-34/Covallis Bypass Junction, and Transportation System Management (TSM) and Transportation Demand Management (TDM) enhancements. These elements can be combined in different ways to address the transportation need. The following sections describe each element (alternatives, alignments, and TSM/TDM enhancements) in more detail. Section 2.6.4 provides a summary of all alternatives, alignments, and scenarios that were evaluated for the 2030 PM peak hour.

2.6.1 Build and TSM/TDM Alternatives

The Build and TSM/TDM alternatives listed below include all of the transportation projects included in the CAMPO Plan list of financially-constrained transportation projects except the two-lane Van Buren Bridge. The two-lane Van Buren Bridge is included when specifically stated.

- **OR-34 Flyover to Corvallis Bypass Alternative** – Includes a northbound-to-eastbound slip ramp and a westbound-to-southbound flyover alignment at the OR-34/Corvallis Bypass Junction.

- **Downtown Alternative** – Includes a two-lane eastbound bridge with increased capacity across the Willamette River, adjacent to and north of the Van Buren Bridge. This is a financially constrained project in the CAMPO model. The Appendix provides the listing of financially constrained CAMPO transportation projects.

- **North Corvallis Bypass Alternative** – Includes the North Corvallis Bypass – a new bridge/connection serving Corvallis north of downtown that would link the OR-34/Corvallis Bypass Junction to OR-99W and US-20. This alternative retains the existing one-lane Van Buren Bridge. The alternative adds the North Corvallis Bypass (one lane in each direction plus auxiliary lanes as warranted) as an illustrative project from CAMPO’s illustrative project list into the CAMPO model. The Appendix provides the CAMPO list of illustrative projects.

- **Downtown Alternative + North Corvallis Bypass Alternative** – Combines the elements from the Downtown and North Corvallis Bypass alternatives.

- **Three-Lane Van Buren / Three-Lane Harrison Bridges** – Includes an additional travel lane on the Harrison Bridge and a new, three-lane bridge for eastbound traffic would be constructed.

- **TSM/TDM** – Includes Transportation System Management and Transportation Demand Management enhancements inside and outside the City of Corvallis (More detail in Section 2.6.3).
2.6.2 Alignments at OR-34/Corballis Bypass Junction and Associated Turning Restrictions

The alignments described below involve different conditions at the OR-34/Corballis Bypass Junction. Although each of the alternatives would affect travel patterns differently, the three alignments analyzed at the OR-34/Corballis Bypass Junction would not have noteworthy shifts in travel associated with them. Instead, the alignments principally affect traffic operations at and near the Corballis Bypass Junction. The alignment options are (see the 2030 Future Conditions Technical Memorandum in the Appendix for more details):

- **At Grade** – Maintain existing at-grade intersection with signalized control.
- **Flyovers (partial interchange)** – Maintain existing at-grade intersection with signalized control. Remove the westbound-left turn from intersection control via a westbound-to-southbound flyover. A second flyover will be needed for the southbound-left turns associated with the North Corballis Bypass with US-20 Alternative. Both flyovers would be single-lane structures. Some minor movements may be removed from the design for operational efficiency.
- **Interchange** – Build an interchange that will provide free-flow (unsignalized) movements through the OR-34/Corballis Bypass Junction. Providing free-flow operations would require in part:
  - Downtown Alternative: A designated receiving lane (add-lane) for four of the movements – the northbound-to-eastbound (right) turn, westbound-to-northbound (right) turn, westbound-to-southbound (left) turn, and eastbound-to-southbound (right) turn.
  - North Corballis Bypass with US-20 Alternative – A designated receiving lane (add-lane) for four movements: the northbound-to-eastbound (right) turn, westbound-to-northbound (right) turn, westbound-to-southbound (left) turn, and southbound-to-eastbound (left) turn.
- In some cases, minor movements were removed from the design for operational efficiency. The 2030 Future Conditions Technical Memorandum in the Appendix identifies the traffic movements excluded from analysis.

2.6.3 TSM/TDM Enhancements

Traffic operations and volume management methods such as TSM and TDM were explored to determine whether additional transportation benefits could be generated by the project. TSM/TDM is evaluated as a stand-alone alternative and as an enhancement that can be added to alternatives and alignments to create different scenarios.

The TSM improvements included in the operational analyses are expected to enhance circulation and operations within the downtown network of intersections. TSM enhancements evaluated include lane modifications that balance and optimize the available capacity for each traffic movement.

The type and number of TSM enhancements depend on the number of travel lanes provided by the Van Buren and Harrison Bridges. In general, six intersections were considered for lane modifications associated with TSM. These intersections include: 2nd Street/Van Buren Avenue,
3rd Street/Van Buren Avenue, 4th Street/Van Buren Avenue, 5th Street/Van Buren Avenue, 2nd Street/Harrison Boulevard, and 4th Street/Harrison Boulevard. Table 2.5 lists the TSM enhancements used in this study. TSM numbers 1b, 3a, 5a, and 6 were discarded prior to the analysis and thus not included in this table. For specific information regarding the TSM modifications applied in, or discarded prior to, this study, see the TSM/TDM Operations Technical Memorandum in the Appendix.

Table 2.5 TSM Lane Modification Assumptions by Scenario

<table>
<thead>
<tr>
<th>TSM #/Location</th>
<th>Proposed Lane Modifications</th>
<th>Scenario-Specific Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No-Build (with TSM/TDM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-lane Van Buren Bridge</td>
</tr>
<tr>
<td>1a: Van Buren Ave. (between 4th and 5th St.)</td>
<td>From: Eastbound: 3 through lanes, 1 dedicated right-turn lane To: Eastbound: 2 through lanes, 1 shared through/right lane, and 1 dedicated right-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>2: 2nd St. (approach to Harrison Blvd.)</td>
<td>Extend southbound right turn lane</td>
<td>X</td>
</tr>
<tr>
<td>3b: 4th St. (between Harrison Blvd. and Van Buren Ave.)</td>
<td>From: Southbound: 2 through lanes, 1 shared through/left To: 2 through lanes, 1 shared through/left, and 1 dedicated left-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>3c: 4th St. (between Harrison Blvd. and Van Buren Ave.)</td>
<td>From: Southbound: 2 through lanes, 1 shared through/left To: Southbound: 3 through lanes, 1 dedicated left-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>4: 5th St. (approach to Van Buren Ave.)</td>
<td>Extend northbound right-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>5b: 3rd St. (approach to Van Buren Ave.)</td>
<td>From: Northbound: 2 through lanes, 1 shared through/right lane To: Northbound: 2 through lanes, 1 shared through/right, and 1 dedicated right-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>5c: 3rd St. (approach to Van Buren Ave.)</td>
<td>From: Northbound: 2 through lanes, 1 shared through/right lane To: Northbound 3 through lanes, 1 dedicated right-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>7: 2nd St. (approach to Van Buren Ave.)</td>
<td>From: Southbound: 1 through lane, 1 dedicated left-turn lane To: Southbound: 1 shared through/left lane, and 1 dedicated left-turn lane</td>
<td>X</td>
</tr>
<tr>
<td>8: Harrison Blvd. (approach to 4th St.)</td>
<td>From: Westbound: 2 through lanes and 1 shared through/left lanes To: Westbound: 1 through lane, 1 shared through/left, and 1 dedicated left-turn lane</td>
<td>X</td>
</tr>
</tbody>
</table>

Note: TSM numbers 1b, 3a, 5a, and 6 were discarded prior to the analysis and thus are not included in this table.
TDM methods were analyzed in conjunction with the TSM enhancements previously described. The primary method of demand management focuses on transit enhancements, additional park-and-ride facilities, and bike lockers. Six TDM projects were identified for inclusion in the analysis:

- Increased transit service on the Linn Benton Loop to 20-minute headways,
- Increased transit service on the Albany Transit System to 20-minute headways,
- New transit service to Lebanon,
- Park-and-ride lot located in North Albany,
- Park-and-ride lot located in Lebanon, and
- Additional bike lockers in North Albany.

As noted in Section 2.2.4, City of Corvallis transit service enhancements are already accounted for in the CAMPO Plan financially constrained project list and thus included in all of the alternatives. See the TSM/TDM Operations Technical Memorandum in the Appendix for more information.

The identified level of TDM/Transit (determined by the TDM Workgroup) was included in the following alternatives for evaluation: a standalone TSM/TDM only alternative, the Downtown Alternative (two-lane Van Buren Bridge) and the North Corvallis Bypass Alternative (two different variations). The same identified transit service level was applied to each of the studied TDM alternatives.

### 2.6.4 Scenarios Evaluated for PM Peak Hour

In addition to the existing conditions analysis, the following 14 combinations of alternatives, alignments, and TSM/TDM enhancements were developed into scenarios for evaluation for the 2030 PM peak hour.

- No-Build Alternative
- TSM/TDM Only Alternative
- Downtown Alternative + At-Grade Scenario
- North Corvallis Bypass Alternative with US-20 + At-Grade Scenario
- OR-34 Flyover to Corvallis Bypass Scenario
- Downtown Alternative + Flyover Scenario
- North Corvallis Bypass Alternative with US-20 + Flyover Scenario
- Downtown Alternative + Interchange Scenario
2.7 2030 Future Conditions: How Will the Transportation System Operate in the Future If We Increase Efficiency, Improve Travel Options, or Add Capacity?

Individual intersection analyses and system-wide analyses were developed for the 2030 alternatives. Alternatives that include an at-grade intersection at the OR-34/Corvallis Bypass Junction are presented first. Analyses indicate that these alternatives would not meet mobility standards. Next, a flyover or partial interchange was evaluated at the OR-34/Corvallis Bypass Junction. These alternatives would also fail to meet mobility standards. Finally, a full interchange was evaluated at the OR-34/Corvallis Bypass Junction. Some of these alternatives would meet mobility standards, in part because the North Bypass was included which draws trips out of downtown Corvallis.

2.7.1 At-Grade Intersection at the OR-34/Corvallis Bypass Junction

All alternatives that retain an at-grade signalized intersection at the OR-34/Corvallis Bypass Junction would result in intersections failing to function, thereby impacting the performance of the entire system. Table 2.6 summarizes the operational results of the at-grade alignments.

At-Grade alignments maintain the existing at-grade intersection with signalized control. The operational results for each of the at-grade alignments (the No-Build Alternative and three build alternatives) suggest that, depending upon the alternative, two to five intersections would fail to meet applicable mobility standards. This failing condition would likely affect overall system performance. Table 2.6 summarizes operations for the at-grade alignments and provides corresponding standards for each intersection. The v/c ratios exceeding the applicable operational standards are highlighted.

Operations along the key roadways for each at-grade alternative are described below. Figures 2.4 through 2.6 show queuing and operations for the Downtown, North Corvallis Bypass with US-20, and the TSM/TDM Only Alternatives. Figure 2.3, shows the No-Build Alternative 2030 PM future conditions operational analysis results.
### Table 2.6 At-Grade Scenario: (2030) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>No-Build</th>
<th>TSM/TDM Only</th>
<th>Downtown</th>
<th>N. Bypass with US-20</th>
<th>Operational Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td>v/c LOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.74 C</td>
<td>0.74 C</td>
<td>0.77 C</td>
<td>0.75 C</td>
<td>None D</td>
</tr>
<tr>
<td>2  3rd St. at North Bypass/Buchanan</td>
<td>EBL</td>
<td>0.63 F</td>
<td>0.63 F</td>
<td>0.47 E</td>
<td>NA NA</td>
<td>0.85 D</td>
</tr>
<tr>
<td>3  4th St. at North Bypass/Buchanan</td>
<td>WBT</td>
<td>1.45 F</td>
<td>1.45 F</td>
<td>1.06 F</td>
<td>NA NA</td>
<td>0.85 D</td>
</tr>
<tr>
<td>4  5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.46 A</td>
<td>0.45 A</td>
<td>0.45 A</td>
<td>0.50 A</td>
<td>None D</td>
</tr>
<tr>
<td>5  4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.88 C</td>
<td>0.89 C</td>
<td>0.87 C</td>
<td>0.63 B</td>
<td>0.95 D</td>
</tr>
<tr>
<td>6  3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.77 A</td>
<td>0.77 B</td>
<td>0.78 A</td>
<td>0.62 A</td>
<td>0.95 D</td>
</tr>
<tr>
<td>7  2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>1.05 D</td>
<td>1.03 D</td>
<td>1.08 E</td>
<td>0.58 B</td>
<td>0.85 D</td>
</tr>
<tr>
<td>8  5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.46 B</td>
<td>0.44 B</td>
<td>0.49 B</td>
<td>0.50 B</td>
<td>None D</td>
</tr>
<tr>
<td>9  4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.74 B</td>
<td>0.61 B</td>
<td>0.79 B</td>
<td>0.92 C</td>
<td>0.95 D</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.96 C</td>
<td>0.95 C</td>
<td>1.00 D</td>
<td>0.83 B</td>
<td>0.95 D</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.35 F</td>
<td>1.28 F</td>
<td>1.13 E</td>
<td>0.97 C</td>
<td>0.95 D</td>
</tr>
<tr>
<td>12 OR-34 at Bypass</td>
<td>Overall</td>
<td>1.67 F</td>
<td>1.64 F</td>
<td>1.29 F</td>
<td>1.59 F</td>
<td>0.60 None</td>
</tr>
<tr>
<td>13 N. Bypass at US-20</td>
<td>SBR NA NA NA</td>
<td>SBR NA NA NA</td>
<td>SBR NA NA</td>
<td>0.51 -</td>
<td>0.85 D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NBL NA NA NA</td>
<td>NBL NA NA NA</td>
<td>NBL NA NA</td>
<td>0.02 A</td>
<td>0.85 D</td>
<td></td>
</tr>
</tbody>
</table>

**Number of Failing Intersections:**
- 5
- 4
- 5
- 2

**Notes:**
- **NA**: Intersection does not exist for this scenario
- **None**: This is not the controlling operational standard for this location
- **-**: Lane group does not stop or need to yield; no HCM LOS calculated
- **HDM**: Highway Design Manual
- **Controlling operational standards are shown shaded in gray**
- **v/c ratios exceeding the applicable operational standards are shown shaded in black**
2030 No-Build Alternative (At-Grade)

There are four intersections where traffic demand would exceed the available capacity (v/c ratio is greater than or equal to 1.0): 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 2nd Street/Van Buren Avenue, and the OR-34/Corvallis Bypass Junction. In addition, the performance at one other intersection (3rd Street/Van Buren Avenue) would fail to meet the operational standard (See Table 2.6).

The majority of the over-capacity intersections are signalized and adjacent to the two east-west bridge structures. These over-capacity intersections would result in queuing exceeding the vehicle storage capacity between signalized intersections and extending through other signalized intersections. This compounds congestion in the system, because vehicles would not be able to move through intersections even though the light is green. This issue is anticipated along each of the highways in the study area. Figure 2.3 shows the results of the expected queuing and operations associated with this alternative.

2030 Downtown Alternative (At-Grade)

Traffic demand at five intersections would exceed the available capacity (ability to process every vehicle wanting to pass through the intersection, or v/c ≥ 1.0) based on projected traffic volumes for this scenario: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 3rd Street/Van Buren Avenue, 2nd Street/Van Buren Avenue, and the OR-34/Corvallis Bypass Junction (See Table 2.6). The intersection of 3rd Street/Van Buren Avenue would experience a higher demand (higher v/c ratio), because of the two-lane Van Buren Bridge attracting additional traffic, when compared to the No-Build Alternative.

This scenario would result in queuing lengths greater than ¾-mile along ODOT facilities in all directions. Queuing would occur along 5th Street because gaps in the flow of traffic on Van Buren Avenue would not be large enough for traffic to merge into the traffic stream. Figure 2.4 shows the expected queuing and operations associated with this alternative.

2030 North Corvallis Bypass Alternative with US-20 (At-Grade)

Performance at two intersections would fail to meet the controlling operational standards in this scenario: 2nd Street/Van Buren Avenue and the OR-34/Corvallis Bypass Junction. The OR-34/Corvallis Bypass Junction would also operate over capacity (See Table 2.6).

Substantial queuing (greater than ¾-mile) in all directions would result for ODOT facilities in this scenario. The only exception is Harrison Boulevard west of the bridge, where minimal queuing would occur. Queuing would also occur along 5th Street in the northbound and southbound directions due to vehicles attempting to merge into queued traffic along eastbound Van Buren Avenue. Figure 2.5 shows the expected queuing and operations associated with this scenario.

2030 TSM/TDM Only Alternative (At-Grade)

Traffic demand at four intersections would exceed the available capacity (ability to process every vehicle wanting to pass through the intersection, or v/c ≥ 1.0) for this alternative: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 2nd Street/Van Buren Avenue, and the OR-34/Corvallis Bypass Junction. While operations at some intersections would improve with
the TSM/TDM Only Alternative, when compared to the No-Build Alternative, only one of the failing intersections (3rd Street/Van Buren Avenue) would improve to meet operational standards (See Table 2.6).

The TSM/TDM Only Alternative would result in substantial queuing (approximately ¾- mile or greater) along ODOT facilities in all directions. Queuing also would occur along 5th Street as vehicles would attempt to merge into queued eastbound traffic on Van Buren Avenue. Figure 2.6 shows the expected queuing and operations associated with this scenario.

**Conclusions about 2030 alternatives with an At-Grade alignment**

Across all at-grade scenarios, v/c ratios are expected to be near or exceeding 1.0 at the 2nd Street/Van Buren Avenue intersection and the OR-34/Corvallis Bypass Junction. The OR-34/Corvallis Bypass Junction is expected to operate at a LOS F for each of the alternatives. The intersections expected to fail are at key locations within the network and system-wide failure is anticipated if the OR-34/Corvallis Bypass Junction remains at-grade in year 2030.

Analyses for each of the scenarios with at-grade alignments indicate that queuing greater than ¾ of a mile would be expected throughout the analysis area. These results indicate system-wide failure. All of the at-grade alternatives are expected to have intersections operating near or exceeding capacity. This type of queuing would create conditions in which vehicles could not traverse intersections even though the light is green. Each of the highways in the study area would be affected by this condition.
Figure 2.4 Downtown Alternative: At-Grade Alignment 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions
Operational Analysis Results
PM Peak Hour

Downtown Alternative:
At-Grade Alignment at OR-34/Bypass

Legend:
- Level of Service (LOS)
- Critical Movement (CM):
  - Unsualigned Intersection Only
- Volume to Capacity Ratio (v/c)
  - Blue: v/c<HDM and LOS<City (D)
  - Orange: HDM< v/c< 1, or City (D)<LOS<F
  - Red: v/c≥1, or LOS=F

- 95th Percentile Queue
- Q = XX mi. represents length of queue beyond nearest study area intersection

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Figure 2.5 N. Bypass Alternative with US-20: At-Grade Alignment 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions Operational Analysis Results
PM Peak Hour

N. Bypass Alternative (with US-20):
At-Grade Alignment at OR-34/Bypass

Legend:
- Level of Service (LOS)
- Critical Movement (CM):
  Unsignalized Intersection Only
- Volume to Capacity Ratio (v/c)
- Blue: v/c<1 HDM and LOS<City (D)
- Orange: HDM< v/c< 1, or City (D)<LOS<F
- Red: v/c≥1, or LOS=F
- 95th Percentile Queue
  Q = XX mi. represents length of queue
  beyond nearest study area intersection

Legend:
- LOS
- CM
- V/C

N. Bypass Alternative with US-20:
At-Grade Alignment 2030 PM Future Conditions Operational Analysis Results

June 2009
Figure 2.6  TSM/TDM Only Alternative 2030 PM Future Conditions Operational Analysis Results
2.7.2 Flyover (Partial Interchange) Alignments at the OR-34/Corvallis Bypass Junction

Flyover (partial interchange) alignments at the OR-34/Corvallis Bypass Junction maintain the existing traffic signal at the intersection; however, the westbound-left turn is removed from the intersection and replaced with a westbound-to-southbound ramp that “flies over” the interchange. In the case of the North Corvallis Bypass Alternatives, a second flyover ramp will be needed to facilitate the southbound-to-eastbound movements.

The operational results shown for the three flyover alignment scenarios indicates that, depending upon the scenario studied, two to five intersections would fail to meet applicable mobility standards, likely affecting overall system performance. Operations would improve at the OR-34/Corvallis Bypass Junction when compared to at-grade alignments, but traffic signal operations would prevent all of the scenarios from meeting the HDM v/c mobility standard of 0.60. However, the LOS at the OR-34/Corvallis Bypass Junction is expected to operate at a LOS D or better for each of the flyover alignment scenarios. Operations in the downtown network would remain substandard. Because the intersections that are expected to fail are at key locations within the network, failure within the downtown system is anticipated with these alignment scenarios in year 2030. Table 2.7 summarizes operations for the flyover alignment scenarios and provides corresponding standards for each intersection. The v/c ratios exceeding applicable operational standards are highlighted.
### Table 2.7 Flyover Alignment Scenarios: (2030) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>No-Build</th>
<th>2030 Flyover to Corvallis Bypass</th>
<th>Downtown</th>
<th>N. Bypass Alternative (without US-20)</th>
<th>Operational Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
<td>LOS</td>
<td>v/c</td>
</tr>
<tr>
<td>1 5th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>C</td>
<td>0.74</td>
<td>C</td>
<td>0.78</td>
</tr>
<tr>
<td>2 3rd St. at North Bypass/Buchanan</td>
<td>EBL</td>
<td>0.63</td>
<td>F</td>
<td>0.63</td>
<td>F</td>
<td>0.47</td>
</tr>
<tr>
<td>3 4th St. at North Bypass/Buchanan</td>
<td>WBT</td>
<td>1.45</td>
<td>F</td>
<td>1.45</td>
<td>F</td>
<td>1.06</td>
</tr>
<tr>
<td>4 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.46</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.45</td>
</tr>
<tr>
<td>5 4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.68</td>
<td>C</td>
<td>0.89</td>
<td>C</td>
<td>0.87</td>
</tr>
<tr>
<td>6 3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.77</td>
<td>A</td>
<td>0.77</td>
<td>B</td>
<td>0.78</td>
</tr>
<tr>
<td>7 2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>1.05</td>
<td>D</td>
<td>1.03</td>
<td>D</td>
<td>1.08</td>
</tr>
<tr>
<td>8 5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.46</td>
<td>B</td>
<td>0.44</td>
<td>B</td>
<td>0.49</td>
</tr>
<tr>
<td>9 4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>B</td>
<td>0.61</td>
<td>B</td>
<td>0.79</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.96</td>
<td>C</td>
<td>0.95</td>
<td>C</td>
<td>1.00</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.35</td>
<td>F</td>
<td>1.28</td>
<td>F</td>
<td>1.13</td>
</tr>
<tr>
<td>12 OR-34 at Bypass</td>
<td>Overall</td>
<td>1.67</td>
<td>F</td>
<td>0.95</td>
<td>B</td>
<td>0.89</td>
</tr>
<tr>
<td>13 N. Bypass at US-20</td>
<td>SBR</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>NBL</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Notes:**
- NA: Intersection does not exist for this scenario
- None: This is not the controlling operational standard for this location
- Lane group does not stop or need to yield; no HCM LOS calculated
- Controlling operational standards are shown shaded in gray
- v/c ratios exceeding the applicable operational standards are shown shaded in black
- Existing alignment for reference only - no geometric changes
The anticipated queuing patterns for each of the flyover alignment scenarios differ between alternatives, but substantial queuing (generally greater than ¾-mile) would primarily be observed in routes heading toward or across the Van Buren Bridge. Queuing would be substantial (generally greater than ¾-mile) within the downtown network for each of the alternatives, but would be minor to moderate (generally less than ½-mile) surrounding the OR-34/Corvallis Bypass Junction. These results indicate system-wide failure. At several intersections downtown, this type of queuing would create conditions in which vehicles could not traverse through intersections even though the light is green. Each of the highways in the study areas are affected by this condition.

In summary, traffic signal operations for the flyover (partial interchange) scenarios at the OR-34/Corvallis Bypass would not provide adequate capacity for 2030 traffic conditions, but would provide an improvement over No-Build conditions. The following sections describe operations along each of the key roadways by scenario. Figures 2.7 through 2.9 summarize queuing and operations for the OR-34 Flyover to Corvallis Bypass, Downtown Alternative with Flyover, and North Corvallis Bypass with US-20 and Flyover Scenarios, respectively.

**OR-34 Flyover to Corvallis Bypass Scenario**

Four intersections would exceed the operational standards for this scenario: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 2nd Street/Van Buren Avenue, and the OR-34/Corvallis Bypass Junction. The three downtown intersections would be over capacity (v/c ratio greater than or equal to 1.0 (See Table 2.7).

Except for Harrison Boulevard west of the bridge, substantial queuing (greater than ¾-mile) in all directions would result for ODOT facilities in this scenario. Minimal downtown queuing (less than ¼-mile) would occur on Harrison Boulevard. Queuing would also occur along 5th Street in the northbound and southbound directions as a result of vehicles attempting to merge into queued traffic on eastbound Van Buren Avenue. Figure 2.7 shows the expected queuing and operations associated with this scenario.

**Downtown Alternative (Flyover)**

Three downtown intersections would operate over capacity: 2nd Street/Harrison Boulevard, 3rd Street/Van Buren Avenue, and 2nd Street/Van Buren Avenue. Operations at two additional intersections would fail to meet the operational standards for this scenario: 4th Street/Buchanan Avenue, and the OR-34/Corvallis Bypass Junction (See Table 2.7). Substantial queuing (generally greater than ¾-mile) in all directions would result in this scenario. Queuing along Harrison Boulevard would be slightly less for this alignment compared to the at-grade alignment. Failing operations would result in this scenario because, with no alternative route provided, there would be a greater traffic demand at intersections in the downtown system than available capacity. Figure 2.8 shows the expected queuing and operations associated with this scenario.

**North Corvallis Bypass Alternative with US-20 (Flyover)**

In this scenario, two intersections would exceed the controlling operational standards: 2nd Street/Van Buren Avenue and OR-34/Corvallis Bypass Junction (See Table 2.7).

Queuing in the downtown network would be substantial (greater than ¾-mile) for 3rd Street, 4th Street and Van Buren Avenue, while moderate queuing (generally less than ½-mile) would be
experienced along Harrison Boulevard and 2\textsuperscript{nd} Street. Queuing at the OR-34/Corvallis Bypass Junction is expected to be minor/moderate (generally less than ½-mile) along all approaches. Figure 2.9 shows the expected queuing and operations associated with this scenario.

\textbf{Flyover (Partial Interchange) Alignment at the OR-34/Corvallis Bypass Junction}

Conclusions

Operational results for each of the three flyover alignment scenarios suggest that, depending upon the alternative, between two and five intersections would fail to meet applicable mobility standards, and operations in the downtown network would remain substandard. Operations would improve at the OR-34/Corvallis Bypass Junction when compared to at-grade alignments, but none of the alternatives would meet the HDM v/c standard of 0.60. Because the intersections that are expected to fail are at key locations within the network, failure within the downtown system is anticipated with this scenario in year 2030. Although the anticipated queuing patterns for each of the flyover alignment scenarios differ between alternatives, substantial queuing would generally be observed in routes heading towards or across the Van Buren Bridge. For each of the flyover scenarios, queuing would be substantial (greater than ¾-mile) within the downtown network. At several intersections downtown, this type of queuing would impose conditions in which vehicles could not traverse intersections even though the light is green. This issue would be observed along each of the highways running through the study area.
Figure 2.9 N. Bypass Alternative with US-20: Flyover Alignment 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions Operational Analysis Results
PM Peak Hour
N. Bypass Alternative (with US-20):
Flyover Alignment at OR-34/Bypass

Legend:
- Level of Service (LOS)
- Critical Movement (CM):
  - Unsignalized Intersection Only
  - Volume to Capacity Ratio (v/c)
- Blue: v/c=HDM and LOS=City (D)
- Orange: HDM< v/c< 1, or City (D)=LOS=F
- Red: v/c<1, or LOS=F
- 95th Percentile Queue
- Q = XX mi. represents length of queue beyond nearest study area intersection
- Flyover Alignment
2.7.3 Full Interchange Alignments at the OR-34/Corvallis Bypass Junction

This section presents results for the scenarios containing a full-interchange alignment at the OR-34/Corvallis Bypass Junction. Since the OR-34/Corvallis Bypass Junction would be designed to provide free-flow operations, operational results are not provided for this study location. Results are presented for scenarios with and without TSM/TDM enhancements. Tables 2.8 and 2.9 summarize operations for the interchange alignment scenarios and provide corresponding standards for each intersection without and with TSM/TDM enhancements, respectively. In each table, the v/c ratios exceeding the applicable operational standards are highlighted.

The interchange alignments would remove the traffic signal at the OR-34/Corvallis Bypass Junction, resulting in free-flow traffic operations at that location. Westbound traffic would potentially queue from the 2nd Street/Harrison Boulevard intersection through the interchange due to the capacity constraints at the downtown intersections. Of the seven interchange scenarios, three would meet operational standards at all intersections, including the Downtown Alternative with the North Corvallis Bypass, and the North Corvallis Bypass with US-20 (TSM/TDM Options 1 and 2) Scenarios. The remaining four scenarios would have between one and four intersections failing to meet operational standards. Compared to the non-TSM/TDM Scenario, the TSM/TDM enhancements would improve the efficiency of the downtown system.

The anticipated queuing patterns for each of the interchange alignment scenarios differ significantly between alternatives. Each alternative would have free-flow operations at the OR-34/Corvallis Bypass Junction, unless influenced by 2nd Street/Harrison Boulevard. At several intersections downtown, the type of queuing expected (for most alternatives) would impose conditions in which vehicles could not traverse intersections even though the light is green. Figures 2.10 through 2.16 summarize queuing and operations for all of the interchange alignment scenarios.

The following sections describe operations along each of the key roadways by interchange alignment scenario.
### Table 2.8 Interchange Scenario (no TSM/TDM enhancement): (2030) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>v/c</th>
<th>LOS</th>
<th>v/c</th>
<th>LOS</th>
<th>v/c</th>
<th>LOS</th>
<th>v/c</th>
<th>LOS</th>
<th>v/c</th>
<th>LOS</th>
<th>HDM</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>C</td>
<td>0.76</td>
<td>C</td>
<td>0.76</td>
<td>B</td>
<td>0.70</td>
<td>B</td>
<td>0.75</td>
<td>B</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>2 3rd St. at North Bypass/Buchanan</td>
<td>EBL</td>
<td>0.63</td>
<td>F</td>
<td>0.47</td>
<td>E</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.49</td>
<td>E</td>
<td>0.85</td>
<td>D</td>
</tr>
<tr>
<td>3 4th St. at North Bypass/Buchanan</td>
<td>WBT</td>
<td>1.45</td>
<td>F</td>
<td>1.06</td>
<td>F</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1.23</td>
<td>F</td>
<td>0.85</td>
<td>D</td>
</tr>
<tr>
<td>4 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.46</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>0.50</td>
<td>A</td>
<td>0.50</td>
<td>A</td>
<td>0.45</td>
<td>A</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>5 4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.88</td>
<td>C</td>
<td>0.87</td>
<td>C</td>
<td>0.63</td>
<td>B</td>
<td>0.64</td>
<td>B</td>
<td>0.87</td>
<td>C</td>
<td>0.95</td>
<td>D</td>
</tr>
<tr>
<td>6 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.77</td>
<td>A</td>
<td>0.76</td>
<td>A</td>
<td>0.62</td>
<td>A</td>
<td>0.62</td>
<td>A</td>
<td>0.76</td>
<td>C</td>
<td>0.95</td>
<td>D</td>
</tr>
<tr>
<td>7 2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>1.05</td>
<td>D</td>
<td>1.02</td>
<td>D</td>
<td>0.58</td>
<td>B</td>
<td>0.60</td>
<td>B</td>
<td>0.88</td>
<td>C</td>
<td>0.85</td>
<td>D</td>
</tr>
<tr>
<td>8 5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.46</td>
<td>B</td>
<td>0.49</td>
<td>B</td>
<td>0.50</td>
<td>B</td>
<td>0.51</td>
<td>B</td>
<td>0.50</td>
<td>B</td>
<td>None</td>
<td>D</td>
</tr>
<tr>
<td>9 4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>B</td>
<td>0.79</td>
<td>B</td>
<td>0.92</td>
<td>C</td>
<td>0.65</td>
<td>A</td>
<td>0.76</td>
<td>B</td>
<td>0.95</td>
<td>D</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.96</td>
<td>C</td>
<td>1.04</td>
<td>C</td>
<td>0.83</td>
<td>B</td>
<td>0.84</td>
<td>B</td>
<td>1.04</td>
<td>D</td>
<td>0.95</td>
<td>D</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.35</td>
<td>F</td>
<td>1.13</td>
<td>E</td>
<td>0.97</td>
<td>C</td>
<td>0.72</td>
<td>B</td>
<td>0.97</td>
<td>C</td>
<td>0.95</td>
<td>D</td>
</tr>
<tr>
<td>12 OR-34 at Bypass</td>
<td>Overall</td>
<td>1.67</td>
<td>F</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.60</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>13 N. Bypass at US-20</td>
<td>SBR</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.51</td>
<td>-</td>
<td>0.51</td>
<td>-</td>
<td>NA</td>
<td>NA</td>
<td>0.85</td>
<td>D</td>
</tr>
<tr>
<td>NBL</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.02</td>
<td>A</td>
<td>0.02</td>
<td>A</td>
<td>NA</td>
<td>NA</td>
<td>0.85</td>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- **NA** Intersection does not exist for this scenario
- **None** This is not the controlling operational standard for this location
- **HDM** Highway Design Manual
- **Controlled operational standards are shown shaded in gray**
- **v/c ratios exceeding the applicable operational standards are shown shaded in black**
- **Existing alignment for reference only - no geometric changes**
### Table 2.9 Interchange Scenario (with TSM/TDM): (2030) PM Peak Hour Intersection Operations

<table>
<thead>
<tr>
<th>Project Intersection</th>
<th>Critical Movement</th>
<th>No-Build</th>
<th>Downtown (TSM/TDM)</th>
<th>N. Bypass with US-20 (TSM/TDM-Option 1)</th>
<th>N. Bypass with US-20 (TSM/TDM-Option 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 9th St. at Buchanan Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>C</td>
<td>0.77</td>
<td>C</td>
</tr>
<tr>
<td>2 3rd St. at North Bypass/Buchanan</td>
<td>EBL</td>
<td>0.63</td>
<td>F</td>
<td>0.47</td>
<td>E</td>
</tr>
<tr>
<td>3 4th St. at North Bypass/Buchanan</td>
<td>WBT</td>
<td>1.45</td>
<td>F</td>
<td>1.06</td>
<td>F</td>
</tr>
<tr>
<td>4 5th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.46</td>
<td>A</td>
<td>0.44</td>
<td>A</td>
</tr>
<tr>
<td>5 4th St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.88</td>
<td>C</td>
<td>0.90</td>
<td>C</td>
</tr>
<tr>
<td>6 3rd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>0.77</td>
<td>A</td>
<td>0.75</td>
<td>B</td>
</tr>
<tr>
<td>7 2nd St. at Harrison Blvd.</td>
<td>Overall</td>
<td>1.05</td>
<td>D</td>
<td>1.01</td>
<td>D</td>
</tr>
<tr>
<td>8 5th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.46</td>
<td>B</td>
<td>0.47</td>
<td>B</td>
</tr>
<tr>
<td>9 4th St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.74</td>
<td>B</td>
<td>0.66</td>
<td>B</td>
</tr>
<tr>
<td>10 3rd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>0.96</td>
<td>C</td>
<td>0.89</td>
<td>C</td>
</tr>
<tr>
<td>11 2nd St. at Van Buren Ave.</td>
<td>Overall</td>
<td>1.35</td>
<td>F</td>
<td>1.00</td>
<td>C</td>
</tr>
<tr>
<td>12 OR-34 at Bypass</td>
<td>Overall</td>
<td>1.67</td>
<td>F</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>13 N. Bypass at US-20</td>
<td>SBR</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Notes:**

- **NA**: Intersection does not exist for this scenario
- **None**: This is not the controlling operational standard for this location
  - Lane group does not stop or need to yield; no HCM LOS calculated
- **HDM**: Highway Design Manual
- **SBR**: Controlling operational standards are shown shaded in gray
- **v/c ratios exceeding the applicable operational standards are shown shaded in black**
- **Existing alignment for reference only - no geometric changes**

Number of Failing Intersections:

<table>
<thead>
<tr>
<th></th>
<th>No-Build</th>
<th>Downtown (TSM/TDM)</th>
<th>N. Bypass with US-20 (TSM/TDM-Option 1)</th>
<th>N. Bypass with US-20 (TSM/TDM-Option 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
**Downtown Alternative (no TSM/TDM enhancement) (Interchange)**

In this scenario, four intersections would exceed the operational standard: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 3rd Street/Van Buren Avenue and 2nd Street/Van Buren Avenue. These four intersections would be over capacity, causing substantial queuing (generally greater than ¾-mile) along ODOT facilities. The OR-34/Corvallis Bypass Junction would no longer be a bottleneck or critical intersection, because it would have free-flow movements as a result of the interchange alignment (See Table 2.8).

Queuing along Harrison Boulevard would be less for this alignment compared to the at-grade and flyover alignments. Queuing would also occur along 5th Street in the northbound and southbound directions as vehicles attempt to merge into queued traffic on eastbound Van Buren Avenue. Figure 2.10 shows the expected queuing and operations associated with this alternative.

**North Corvallis Bypass Alternative with US-20 (no TSM/TDM enhancement) (Interchange)**

One intersection would exceed the controlling operational standard in this scenario: 2nd Street/Van Buren Avenue. The OR-34/Corvallis Bypass Junction would no longer serve as a bottleneck or critical intersection because it would have free-flow movements as a result of the interchange (See Table 2.8).

In this scenario, queuing in the downtown network would be substantial (greater than ¾-mile) along Van Buren Avenue and 3rd Street, while moderate queuing (generally less than ½-mile) would be expected along 4th Street, and minor (less than ¼ mile) along Harrison Boulevard and 2nd Street. The interchange alignment at the OR-34/Corvallis Bypass Junction is expected to operate with free-flow movements. This scenario would result in reduced system queuing when compared to the at-grade and flyover alignments. Figure 2.11 shows the expected queuing and operations associated with this scenario.

**Downtown Alternative + North Corvallis Bypass Alternative (no TSM/TDM enhancement) (Interchange)**

All intersections would meet the controlling operational standards for this scenario (See Table 2.8).

The queue lengths along all roadways entering the downtown study area are expected to be relatively short (1/10 mile or less), except along northbound 3rd Street, where the queue length is anticipated to be substantial (greater than ¾-mile) south of Van Buren Avenue. Figure 2.12 shows the expected operations associated with this scenario.

**Three-Lane Van Buren/Three-Lane Harrison Bridges (no TSM/TDM enhancement) (Interchange)**

Four intersections would exceed the controlling operational standards for this scenario: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, 3rd Street/Van Buren Avenue, and 2nd Street/Van Buren Avenue. Two of these intersections would operate over capacity. The OR-34/Corvallis Bypass Junction would no longer be a bottleneck or critical intersection because it would have free-flow movements as a result of the interchange (See Table 2.8).
The queue lengths along Van Buren Avenue and 3rd Street entering the downtown study area would be substantial (generally greater than ¾-mile), and the queue on the southbound 4th Street approach to Harrison Boulevard is expected to be greater than ½-mile. Other roadways would only have minor queuing (less than ½-mile) into adjacent intersections. Figure 2.13 shows the expected operations associated with this scenario.

**Downtown Alternative (with TSM/TDM enhancements) (Interchange)**

For this scenario, the Downtown Alternative was evaluated with TSM/TDM enhancements for the full-interchange alignment at the OR-34/Corvallis Bypass Junction. Three intersections would operate at or over capacity: 4th Street/Buchanan Avenue, 2nd Street/Harrison Boulevard, and 2nd Street/Van Buren Avenue (See Table 2.9).

With the interchange alignment at the OR-34/Corvallis Bypass Junction, vehicles would flow freely; however, westbound traffic could potentially queue through the interchange due to capacity constraints at 2nd Street/Harrison Boulevard. As a result of the projected operations, the queue lengths along Van Buren Avenue, 3rd Street, and 2nd Street entering the downtown study area would be substantial (generally greater than ¾-mile). Queuing along 4th Street and Harrison entering the downtown area would be moderate (between 1/3 and ½ mile). Figure 2.14 shows the expected operations associated with this scenario.

**North Corvallis Bypass Alternative with US-20 (with TSM/TDM enhancements-Option 1) (Interchange)**

This scenario was analyzed with a single-lane Van Buren Bridge and an interchange alignment at the OR-34/Corvallis Bypass Junction, in addition to the TSM/TDM enhancements. The results show that all study area intersections would meet mobility standards under this scenario. The intersections of 4th Street/Van Buren Avenue and 2nd Street/Van Buren Avenue show the greatest operational improvement, while 4th Street/Harrison Boulevard show a loss in available capacity due to the proposed enhancement (See Table 2.9).

The queue lengths along Van Buren Avenue and 3rd Street entering the downtown study area would be substantial (generally greater than ¾-mile); other roadway queues would be short to moderate (only minor spillback into adjacent intersections would still occur). The interchange itself is not expected to generate queues or experience spillback from adjacent intersections. Figure 2.15 shows the expected operations associated with this scenario.

**North Corvallis Bypass Alternative with US-20 (with TSM/TDM enhancements-Option 2) (Interchange)**

This alternative adds dedicated turn lanes at 3rd Street/Van Buren Avenue and 4th Street/Van Buren Avenue. All study area intersections would meet mobility standards. The intersections of 4th Street/Van Buren Avenue, 3rd Street/Van Buren Avenue, and 2nd Street/Van Buren Avenue show the greatest operational improvement, while the 4th Street/Harrison Boulevard intersection shows a loss in available capacity due to the proposed enhancement (See Table 2.9).

The queue lengths along Van Buren Avenue entering the downtown study area would be substantial (greater than ¾-mile), but queues on other roads would be short (only minor queuing into adjacent intersections would still occur). The interchange itself is not expected to generate
queues or experience spillback from adjacent intersections. Figure 2.16 shows the expected operations associated with this scenario.

**Interchange Alignment Conclusions**

Three of the interchange scenarios would meet operational standards at all study area intersections: the Downtown Alternative (two-lane Van Buren Bridge) with North Corvallis Bypass Alternative and Interchange, the North Corvallis Bypass Alternative with US-20 (TSM/TDM-Option 1) + Interchange, and the North Corvallis Bypass with US-20 (TSM/TDM-Option 2) + Interchange. The remaining four scenarios would have between one and four intersections that fail to meet operational standards. When comparing the non-TSM/TDM and TSM/TDM scenarios, analysis results suggest that the TSM/TDM enhancements would offer an effective means for balancing and optimizing the available capacity for each traffic movement within the downtown system. This is particularly true for the dedicated northbound-right turn lane at 3rd Street/Van Buren Avenue: it would allow for a smoother northbound flow with fewer predicted lane changes within the study area.

The anticipated queuing patterns for each of the interchange alignment scenarios differ significantly between alternatives. Each scenario would have free-flow operations at the OR-34/Corvallis Bypass Junction, unless influenced by queuing generated at 2nd Street/Harrison Boulevard. The Downtown Alternative shows the most congested conditions, with substantial queuing (generally greater than ¾-mile) approaching each downtown area intersection. The North Corvallis Bypass with US-20 Alternatives would show improvements in overall downtown queuing. The type of queuing expected for many of the scenarios would impose conditions in which vehicles could not traverse intersections even though the light is green.
Figure 2.11 N. Bypass Alternative with US-20: Interchange Alignment 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions
Operational Analysis Results
PM Peak Hour

N. Bypass Alternative (with US-20):
Interchange Alignment at OR-34/Bypass

Legend:
- Level of Service (LOS)
- Critical Movement (CM):
  - Unsignalized Intersection Only
  - Volume to Capacity Ratio (v/c)
- Blue: v/c<HDM and LOS<City (D)
- Orange: HDM<v/c<1, or City (D)=LOS<F
- Red: v/c>1, or LOS=F
- 95th Percentile Queue
  - Q = XX mi. represents length of queue beyond nearest study area intersection
- Interchange Alignment
- LOS and v/c not available
- See merge/diverge analysis
Figure 2.13 3-Lane Van Buren/Harrison Bridges: Interchange Alignment 2030 PM Future Conditions Operational Analysis Results

<table>
<thead>
<tr>
<th>2030 Future Conditions Operational Analysis Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM Peak Hour</td>
</tr>
<tr>
<td>3-Lane Van Buren/Harrison Bridges: Interchange Alignment at OR-34/Bypass</td>
</tr>
</tbody>
</table>

Legend:
- Level of Service (LOS)
- Critical Movement (CM)
- Unsignalized Intersection Only
- Volume to Capacity Ratio (v/c)
- Blue: v/c<HDM and LOS=City (D)
- Orange: HDM<v/c<1, or City (D)=LOS<F
- Red: v/c≥1, or LOS=F
- 95th Percentile Queue
- Q = XX mi. represents length of queue beyond nearest study area intersection
- Interchange Alignment
- Configuration to be determined
- LOS and v/c not available
- See merge/diverge analysis
Figure 2.16  N. Bypass Alternative with US-20 (TSM/TDM-Option 2): Interchange Alignment 2030 PM Future Conditions Operational Analysis Results

2030 Future Conditions - TSM/TDM Operational Analysis Results
PM Peak Hour

N. Bypass Alternative (with US-20):
Interchange Alignment at OR-34/Bypass Option 2

Legend:
- Level of Service (LOS)
- Critical Movement (CM):
  Unsignalized Intersection Only
  Volume to Capacity Ratio (v/c)
  Blue: v/c=HDM and LOS<City (D)
  Orange: HDM< v/c< 1, or City (D)<LOS<F
  Red: v/c>1, or LOS=F
- 95th Percentile Queue
  Q = XX mi. represents length of queue beyond nearest study area intersection
- Interchange Alignment
  *Configuration to be determined
- LOS and v/c not available
- See merge/diverge analysis

June 2009
3. WHAT LAND USE REQUIREMENTS ARE ASSOCIATED WITH THE PROJECT?

Land use approvals from the City of Corvallis and/or Linn County will be needed to construct components of the CWRC Alternatives. Review processes and approval requirements were identified from state and local regulations through coordination efforts with the Oregon Department of Land Conservation and Development (DLCD), the City of Corvallis, and Linn County.

3.1 Consistency with Statewide Planning Goal #15, Willamette River Greenway

Statewide Planning Goal #15 requires local governments to develop programs that protect the Willamette River Greenway (the Greenway). Goal #15 establishes that there are urban and rural sections of the Greenway. The Corvallis section is classified as urban, whereas the Linn County section is classified as rural. Bridge support structures, fill, and/or bridge approaches within the Greenway require a Greenway Compatibility Review. Specific Goal Exception provisions are applicable in urban areas for the development of uses that are not water-related or water-dependent [Oregon Administrative Rule (OAR) 660-004-0010(2) and OAR 660-004-0022(6)]. A Goal Exception for such uses can be authorized in rural areas by using the standard provisions for a reasons exception (OAR 660-004-0020).

3.2 Corvallis Land Use Requirements

The Corvallis Comprehensive Plan has been acknowledged as consistent with the Statewide Planning Goals. The Land Development Code calls for Conditional Development Approval to construct any bridge support structure, fill, or bridge approach within the Greenway boundary. The Code defines the location of the Greenway setback within the city and, within the setback, restricts the location of buildings that are not water-related or water-dependent. A public hearing before the Corvallis Planning Commission is required to obtain a Conditional Development Approval. If Goal Exception requirements become applicable to bridge support structures, fill, or bridge approaches within the Willamette River Greenway setback area, OAR 660-004-0022(6) would be used to determine whether a Goal Exception is warranted. The Corvallis Comprehensive Plan must be amended if a Goal Exception is necessary. Public hearings before the Corvallis Planning Commission and City Council would be needed to obtain a Plan Amendment and a Goal Exception.

If properties listed on the Corvallis Register of Historic Places would be affected by construction, a review by the Corvallis Historic Resources Commission would be required. A floodplain development permit may be needed for either the Downtown Alternative or the North Corvallis Bypass Alternative.

3.3 Linn County Land Use Requirements

Linn County’s Comprehensive Plan has been acknowledged as consistent with the Statewide Planning Goals. Linn County amended its Comprehensive Plan in 1982 to adopt a Goal 3, Agricultural Lands Goal Exception, for the entire North Corvallis Bypass Alternative. Construction of a four-lane highway, an interchange at the OR-34/Corvallis Bypass Junction, and
bridges across the Willamette River at the north and south ends of the project are part of the Plan Amendment and Goal Exception. State law establishes that Goal Exceptions taken before August 9, 1983, continue to be valid and are not subject to subsequent rules establishing the basis for Statewide Planning Goal exceptions (ORS 197.732(8)). A Greenway Conditional Use review would be needed for the Downtown Alternative, the North Corvallis Bypass Alternative, and the interchange, and additional permit decision criteria would apply if any of these facilities are constructed using new right-of-way. A Greenway Conditional Use Permit is a decision made by the Linn County Director of the Planning and Building Department after providing the public with an opportunity to comment. If any components of the Downtown Alternative, North Corvallis Bypass Alternative, or interchange would result in a bridge support structure, fill, or bridge approach within the Greenway setback area, a Willamette River Greenway Goal Exception would be needed and the Linn County Comprehensive Plan would have to be amended. Public hearings before the Planning Commission and the Board of Commissioners would be needed to obtain the Plan Amendment and Goal Exception.

Linn County’s Historic Resource Commission would review any proposed alteration or demolition of a property on the National Register of Historic Places or on the Linn County Register. A floodplain development permit would be required for the Downtown Alternative, North Corvallis Bypass Alternative, or interchange. Floodplain development review is accomplished to ensure that the development does not result in an increase in the height of floodwaters and does not result in a net increase in fill volume below the elevation of the base flood.

3.4 Corvallis Area Metropolitan Planning Organization

The Corvallis Area Metropolitan Transportation Plan: Destination 2030 (CAMPO Plan) was adopted in 2006, with a planning horizon of 2030. The CAMPO Plan is a financially constrained plan prepared to meet federal requirements. It includes only projects that are expected to be funded before 2030. A new two-lane Van Buren Bridge (Downtown Alternative) is included in the CAMPO Plan, whereas the North Corvallis Bypass (Alternative) is listed as an illustrative project. If funding becomes available to construct the North Corvallis Bypass, the CAMPO Plan would need to be amended to include the project. An interchange east of the Willamette River is outside the MPO area and does not need to be included in the financially constrained plan.

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10 An illustrative project is a project that responds to regional and state planning requirements, although a funding source has yet to be identified.
4. Cost Estimates

Estimates of cost have been prepared to provide a comparison between the evaluated alternatives. The estimates are segmented for flyover (partial interchange), the Downtown Alternative (two-lane Van Buren Bridge), the North Corvallis Bypass Alternative, and a separate pedestrian/bicycle Willamette River crossing. The North Corvallis Bypass Alternative assumes that the flyover would be built as a first phase. It includes the completion of the interchange at the OR-34/Corvallis Bypass Junction, from a partial interchange to a full interchange, as part of the North Bypass project. Therefore, to estimate the total construction costs of the North Corvallis Bypass, the flyover cost must be included.

The North Corvallis Bypass would traverse a flood plain. To avoid flood damage, the bypass was evaluated with two possible designs. First, it was estimated as a roadway with some elevated sections and culverts to allow water passage. The second estimate assumes the entire roadway/connection would be elevated as a viaduct. The viaduct roadway would cost significantly more to build, but would be more likely to withstand the impacts of periodic flooding.

The cost estimates are scoping-level with several key assumptions, as follows (other assumptions are provided on the detailed cost estimate sheets provided in the Appendix):

- Estimates are prepared in 2009 dollars, and are not adjusted for inflation to the year of construction.
- Estimates are based on construction costs only.
- Estimates do not include utilities.
- Right-of-way purchases or relocation costs are not included.
- Future construction cost could be impacted by increased costs of materials.
- Hydraulics could affect the projected cost significantly.
- Construction-related earthwork (balancing the amount of soil removed with the amount of soil brought in) is difficult to estimate and could affect cost.
The cost estimates are provided below in Table 4.1.

### Table 4.1 Component Cost Estimates

<table>
<thead>
<tr>
<th>2009 Construction Cost Estimates in Millions of Dollars*</th>
<th>Flyover (2-lane bridge)</th>
<th>Downtown (incl. interchange)</th>
<th>North Bypass (incl. interchange)</th>
<th>Ped/Bike Crossing (Separate Ped/Bike Bridge)</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>

*Estimates do not include ROW, earthwork balancing, or utilities.

1 The flyover would be a portion of the complete interchange, thus the cost must be added to achieve the complete estimate.

5. CONCLUSIONS AND RECOMMENDATIONS

The PMT and the SAC committees both supported the following conclusions to the Corvallis Willamette River Crossing/Van Buren Bridge Alternatives Study.

- Continue to pursue the goals and objectives adopted for the project.
- Building another Van Buren Bridge alone will not solve the congestion problem. It may however be part of the solution. Therefore, we support the following steps as a multi-pronged approach to solve the congestion problem:
  - Improve the OR-34/Corvallis Bypass Junction.
  - Develop bicycle and pedestrian facilities that meet standards from the west side of the river, through the OR-34/Corvallis Bypass Junction area.
  - Implement TDM measures to improve transportation options.
  - Implement TSM measures consistent with the City of Corvallis’s objectives.
  - Determine the best strategy for crossing the river – such as construction of a North Bypass and/or Downtown Alternative.
- When (if) the Downtown Alternative is pursued, build off of the consensus-based set of alternatives developed during 2005/2006 Van Buren Bridge study.

As the first steps to achieve these, ODOT and the partners will move forward in 2009/2010 with: analysis and design of improvements for vehicles, bicycles and pedestrians at the OR-34/Corvallis Bypass Junction; and further development of TDM and TSM measures that improve intercity transit, park-and-rides and downtown Corvallis intersection operations.

The PMT and SAC recognize that commitment of the regional partners of this effort is critical for the success of these strategies and will support exploring and pursuing funding options.

5.1 What Is the Solution?

The analysis conducted for this project shows that there are two alternatives that address the mobility problems in downtown Corvallis. Both alternatives include the construction of an
interchange at the OR-34/Corvallis Bypass Junction. The alternatives and their expected construction costs in 2009 dollars are:

- **Downtown Alternative (2-lane bridge) with North Corvallis Bypass Alternative**: The project cost estimate is $200 M if a typical roadway design is used on the North Bypass, but would be $279 M if a viaduct is included in the design.

- **North Corvallis Bypass with US-20 + TSM/TDM Alternative (excluding TSM/TDM costs)**: The project cost estimate is $176 M if a typical roadway design is used on the North Bypass, but would be $255 M if a viaduct is included in the design.

- **These alternatives would produce results that meet mobility standards at all study area intersections and reduce queue lengths along most study area roadways.** The TSM and TDM improvements are an important component for reducing queue lengths and maintaining/enhancing mobility benefits. The TSM and TDM costs have not been estimated. Implementation will require coordination with and action by local jurisdictions.

Issues that will require further coordination include:

- Pedestrian and bicycle mobility across the Willamette River
- Transportation Demand Management
- Transportation System Management

### 5.2 Phasing and Implementation Considerations

Funding for the overall project dictates that phasing of the components be considered, if possible. ODOT is of the opinion that a partial or full interchange at the OR-34/Corvallis Bypass Junction should be undertaken as the first phase of the CWRC Alternatives Project. The interchange connection is a common component to the two alternatives that meet mobility standards. It would improve safety and operational problems occurring at the existing signalized intersection and has “independent utility”, meaning the project can immediately benefit the transportation system without relying on other infrastructure. The interchange can be built without precluding other infrastructure from being constructed, such as the North Corvallis Bypass. In the interim, the TSM improvements evaluated in the project could be implemented to improve traffic operations in downtown, and the TDM improvements could expand transportation options for commuters.

#### 5.2.1 Transportation Demand Management

TDM is expected to extend capacity of the roadway facilities in Corvallis by providing alternative means of travel. This may delay the need to build additional phases, including the Downtown Alternative (two-lane Van Buren Bridge) across the Willamette River or the North Corvallis Bypass Alternative. It may also mean that the expansion of intersections is not required in order to meet mobility standards. Implementing TDM requires the partnerships of multiple agencies.
5.2.2 Transportation System Management

TSM in Corvallis could change the way traffic lanes are used and/or change signal timing and technologies to improve the efficiency of the system. Several projects could provide mobility benefits during the PM peak hour (Table 2.5). Further evaluation regarding parking and other community impacts is needed before deciding to implement TSM projects. Implementation of these projects requires coordination with the City of Corvallis and input from multiple stakeholders throughout the city. This analysis evaluated the TSM measures in aggregate, but it is more likely that the TSM measures will be implemented on a project-by-project basis.

Key TSM projects (Table 2.5) should be implemented if it is found that the mobility benefits are more valuable to the community than the impacts of lost parking or other challenges associated with the projects. As an alternative to permanent parking removal, peak hour parking restrictions should be evaluated.

5.2.3 Pedestrian and Bicycle Mobility across the Willamette River

The project advisory committees (SAC and PMT) advised that interchange analyses should continue to address bicycle and pedestrian mobility issues. Future projects should include developing bicycle and pedestrian facilities that meet applicable standards from the west side of the Willamette River through any future OR-34/Corvallis Bypass Interchange. The new pedestrian and bicycle facilities must provide for safe and efficient operations. A separate bicycle/pedestrian bridge across the Willamette River could be one way to provide a facility meeting ODOT standards.

6. Next Steps - What is the Timeline for Implementation?

Fall 2009

As a cornerstone for any future river crossing improvement, ODOT is proposing to move forward with scoping and NEPA analysis for an interchange at the OR-34/Corvallis Bypass Junction. The design would be developed as part of the scoping process. If highway construction funding becomes available for the project, it would be the first construction step ODOT takes to meet the 2030 capacity needs. The interchange would improve safety and operations. It does not depend upon other components of the long-term transportation solution and does not eliminate future solutions from being considered.

Scoping and environmental analysis of the interchange project will take place beginning in the fall of 2009. A program to involve the public will be included in this effort. The following elements are expected to be included in the interchange project:

- Public involvement
- Project scoping
- Environmental evaluation
- Traffic, mobility, and multi-use analysis
• Engineering design
• Cost estimation
• Project phasing

Fall 2009 - 2010

ODOT and the partners will move forward with analysis and design of improvements for vehicles, bicycles and pedestrians at the OR 34/Corvallis Bypass Junction; and further development of TDM and TSM measures that improve intercity transit, park-and-rides and downtown Corvallis intersection operations.

After 2010

Re-evaluate possible solutions for a new CWRC that address the travel needs of all modes. The following alternatives are expected to be re-evaluated together as part of the solution, though other possible elements of the solution may be identified in the future:

• North Corvallis Bypass Alternative – a new bridge and highway alignment north of downtown Corvallis, extending from the OR-34/Corvallis Bypass Junction to OR-99W with a connection at US 20.
• Downtown Alternative – a two-lane eastbound bridge, adjacent to the existing Van Buren Bridge River plus the No-Build Alternative

The CWRC Alternatives Project was developed to find a solution to congestion in downtown Corvallis in the vicinity of the Van Buren Bridge. The traffic analysis shows that a much more extensive solution will be required to respond to the transportation needs. This report presents the analysis results, environmental evaluation, and documents the community conversations that were undertaken to assess the transportation needs and opportunities to address those needs. Analyses show that only the alternatives previously bulleted would incorporate essential elements towards meeting mobility standards in 2030. Both alternatives would require an interchange to be constructed at the OR-34/Corvallis Bypass Junction.