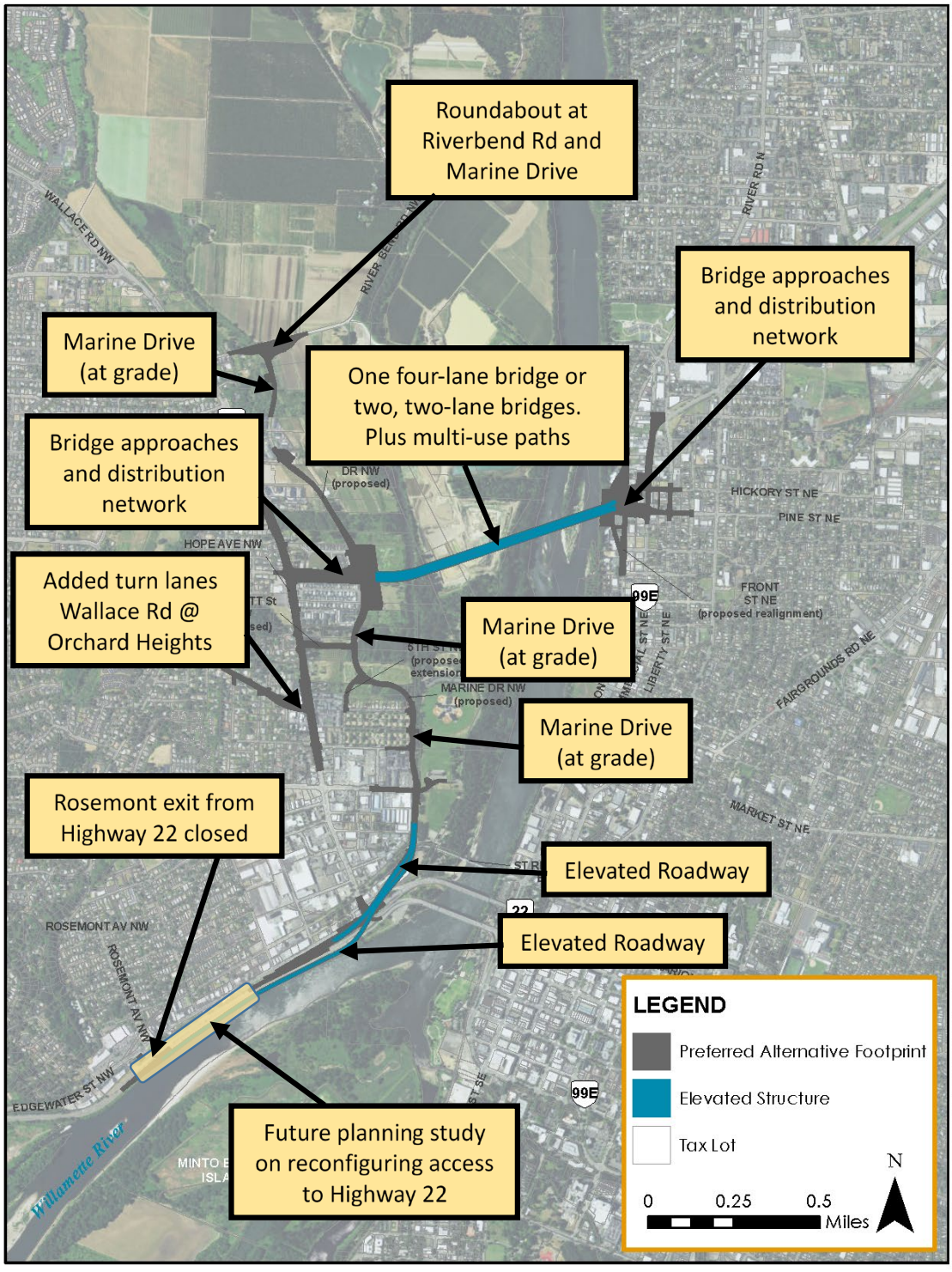
CITY OF Salem AT YOUR SERVICE

SALEM RIVER CROSSING PROJECT

QUESTIONS AND ANSWERS



Overview of Salem River Crossing Preferred Alternative – Annotated (Figure 1 of Report)

Salem River Crossing Project
Questions and Answers

Prepared for Salem City Council
Work Session
January 30, 2019

Date of Report

For the purposes of referencing, the publication date of the original report is January 18, 2019.

If this report is subsequently updated, the publication date will be changed accordingly to reflect the date of the later revision.

Purpose of the Salem River Crossing Project:

To improve mobility and safety for people and freight for local, regional, and through travel across the Willamette River in the Salem-Keizer metropolitan area while alleviating congestion on the Center Street and Marion Street Bridges and on the connecting highway and arterial street systems.

Salem River Crossing Draft Environmental Impact Statement, Page 1-2

Preface

This report is provided to Salem City Council in preparation for a January 30, 2019, work session regarding the Salem River Crossing Project. Council called for this work session at its November 26, 2018, meeting during which the following motion was passed.

> *That City Council hold a work session to discuss all potential issues concerning the Environmental Impact Statement for the third bridge, including but not limited to its effect on neighborhoods, Wallace Marine Park, Edgewater Drive, the Rosemont exit, projected congested areas and travel times under Build and No Build options, and financing options.* [1]

The immediate issue before Council is the incomplete Final Environmental Impact Statement (FEIS) for the Salem River Crossing Project. The next step toward completing the FEIS requires City action to address a 2017 remand issued by the Oregon Land Use Board of Appeals and City action to concur with the finding of the Federal Highway Administration (FHWA) regarding the impacts of the project on Wallace Marine Park. Depending on how Council chooses to proceed and the subsequent actions of the Oregon Department of Transportation (ODOT) and FHWA, it is anticipated that FHWA will *either* issue a Record of Decision (ROD) that will support construction of a new bridge and related approaches and roadways—currently the "Preferred Alternative"—or issue a ROD stating nothing is to be constructed, the "No Build Alternative."

The purpose of this report is to provide Councilors the information needed to make informed decisions regarding the Salem River Crossing Project. It is organized using a question/answer format. Approximately one-third of the questions were submitted in advance by Councilors. Additional questions were generated by staff to meet the intention of the November 26 Council motion.

Councilors have indicated an interest in being told "just the facts" regarding the Salem River Crossing Project. In answering the questions posed in this report, over 70 different studies, reports, books, papers, articles, memoranda, letters, and other sources of information are cited. Many of the answers, particularly those predicting future conditions under various scenarios, are based on historic trends, current data, computer analysis, and reasonable assumptions. Providing such information to Councilors is not the same as citing facts.

It is a fact, for example, that the geographic boundary of Salem, Oregon, currently includes the Willamette River and it is a fact that Marion Street and Center Street bridges are the only bridges currently in regular use in Salem for vehicular traffic crossing the river. By contrast and to illustrate the point, it is *not* a fact that the number of vehicles crossing the Willamette River over the Marion Street and Center Street bridges will continue to increase into the future. While there is no dispassionate reason to disagree with this statement, it remains nevertheless a prediction. Consider, for example, that the trend of Average Annual Daily Traffic (AADT) for the two bridges—an average count of vehicles crossing in both directions each year—has *not* consistently increased over the past 18 years. AADT peaked at 88,800 crossings in 2006. This peak was then followed by a general downward trend for the next five years with a low of 83,800 in 2011 followed by only slight increases over the next two years. This decline and general leveling of AADT between 2006 and 2013 was cited by some as a reason to

favor the No Build Alternative.[2] However, beginning with the small increases in 2012 and 2013, AADT continued to rise and in 2017 was 94,800–a 13.1 percent increase over a five-year period.

Contributors to this report have made every effort to answer all questions by faithfully reporting on information contained in a wide range of sources. We recognize some of the references may not be the seminal work or the latest on the topic. In a few instances, we had to conduct supplementary research and analyses to answer, or more fully answer questions posed by Councilors.[3] Where we have done so, the results should be considered as illustrative but not definitive on the subject until further review has been conducted.

Providing in a single document the information necessary to discuss "all potential issues" regarding the Salem River Crossing Project is a daunting undertaking and this report is submitted in full knowledge that it may fall short of the charge we received. Given the limitations of time and space, our answers compress into a relatively short space information that, in some cases, spans multiple reports and several shelf-feet of reference material. Notwithstanding our best efforts and the multiple reviews and edits this report has received prior to publication, we recognize and take full responsibility for any errors of commission or omission or selection or truncation or oversimplification, and we welcome feedback to correct the record.

Acknowledgement

This report was prepared by the staff of City of Salem Public Works and the Salem-Keizer Area Transportation Study (SKATS), with the support of staff from the City of Salem, Oregon Department of Transportation, and the Federal Highway Administration. The principal contributors are:

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Glossary of Key Terms

Alternatives Analysis

Alternatives analysis indicates why and how the particular range of project alternatives was developed. Alternatives analysis also explains why and how some alternatives were eliminated from consideration and what criteria were used to eliminate these alternatives and the measures for assessing the alternatives' effectiveness.[4]

Summarizing for the Salem River Crossing Project:[5]

- The Draft Environmental Impact considered nine alternatives.
- The Salem River Crossing Project Oversight Team recommended Alternative 4D as the Preliminary Preferred Alternative.
- The City of Salem rejected Alternative 4D and proposed a hybrid alternative recommendation, the "Salem Alternative."
- The Oversight Team endorsed, with minor changes, the alternative recommended by the City of Salem as the Preferred Alternative.
- The Preferred Alternative and the No Build Alternative are being analyzed in the Final Environmental Impact Statement.

De minimis

The term *de minimis* is an abbreviated form of the Latin maxim *de minimis non curat lex*. In law it refers to something that is so small or trivial that it should not be considered.[6] In the context of the Salem River Crossing, the Federal Highway Administration has made a preliminary determination that the impacts of the project to Wallace Marine Park are *de minimis* under Section 4(f) of the U.S. Department of Transportation Act of 1966. This section requires consideration of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development. For publicly owned parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely impact the activities, features, or attributes of the property.

Environmental Impact Statement

Completing an Environmental Impact Statement (EIS) is a requirement of the National Environmental Policy Act (NEPA). "The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the federal government. It shall provide full and fair discussion of significant environmental impacts and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." [7]

The EIS process includes:[8]

- Publication of a notice of intent to prepare an Environmental Impact Statement (EIS);
- Preliminary analysis and consultation to determine the scope of the EIS;
- Analysis of selected alternatives;
- Publication of a Draft Environmental Impact Statement (DEIS);
- Public review and comment, and response to comments on the DEIS;
- Publication of a Final Environmental Impact Statement (FEIS); and
- Publication of a record of decision (ROD).

The ROD, as the final step of the EIS process, informs the public of the decision, the agency's rationale for it, and any mitigation measures the agency will carry out.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) establishes the broad national framework for protecting the environment. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment. (42 U.S.C. §4321 et seq. (1969))[9]

Record of Decision

A Record of Decision states that an agency (in this case, the Federal Highway Administration) has determined the requirements of the National Environmental Policy Act (NEPA) have been satisfied for the construction and operation of the selected alternative and provides findings on other environmentally-related federal statutory requirements. [10] A Record of Decision: (a) States the decision; (b) Identifies all alternatives considered in reaching the decision; and (c) States whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not.[11]

Salem-Keizer Area Transportation Study

The Salem-Keizer Area Transportation Study, or SKATS, is the designated Metropolitan Planning Organization (MPO) for the Salem-Keizer area. A MPO is a federally-mandated body for any urban area over 50,000 in population. SKATS focuses on transportation planning activities, plans, and studies within the Salem-Keizer urban area for transportation facilities of regional significance.[12]

Abbreviations and Acronyms

AADT ..... Average Annual Daily Traffic
AAGR ..... Average Annual Growth Rate
ADT ..... Average Daily Traffic
API ..... Area of Potential Impact
AWDT ..... Average Weekday Traffic
CBD ..... Central Business District
CFR ..... Code of Federal Regulations
CO ..... Carbon Monoxide
DEIS ..... Draft Environmental Impact Statement
EIS ..... Environmental Impact Statement
FEIS ..... Final Environmental Impact Statement
FHWA ..... Federal Highway Administration
LUBA ..... Land Use Board of Appeals
MPO ..... Metropolitan Planning Organization
MWACT ..... Mid-Willamette Area Commission on Transportation
MWVCOG ..... Mid-Willamette Valley Council of Governments
NAAC ..... Noise Abatement Approach Criteria
NOI ..... Notice of Intent
NOx ..... Oxides of Nitrogen
O-D ..... Origin-Destination
ODOT ..... Oregon Department of Transportation
OR22 ..... Oregon Route 22 or Highway 22
PA ..... Preferred Alternative
PE ..... Preliminary Engineering
PM10, [PM2.5] ..... Particle Matter with diameters 10 [2.5] micrometers and smaller
PRC ..... Population Research Center (at PSU)
PSU ..... Portland State University
ROD ..... Record of Decision
ROW ..... Right-of-Way
SKATS ..... Salem-Keizer Area Transportation Study
SRC ..... Salem River Crossing [Project]
STIP ..... State Transportation Improvement Program
TDM ..... Transportation Demand Management
TIFIA ..... Transportation Infrastructure Finance and Innovation Act
UGB ..... Urban Growth Boundary
v/c ..... volume/capacity ratio
VHD ..... Vehicle Hours of Delay
VOCs ..... Volatile Organic Compounds
VMT ..... Vehicle Miles Traveled

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1. OVERVIEW: THE SALEM RIVER CROSSING PROJECT

a. What is the Salem River Crossing Project?

The Salem River Crossing (SRC) Project is a multi-agency, multi-jurisdictional endeavor. It is currently in the environmental process required under the federal National Environmental Policy Act.

b. What is the stated purpose of the Salem River Crossing Project?

The purpose of the Salem River Crossing Project is to "improve mobility and safety for people and freight for local, regional, and through travel across the Willamette River in the Salem-Keizer metropolitan area while alleviating congestion on the Center Street and Marion Street Bridges and on the connecting highway and arterial street systems."[13]

c. What is the City's role in the Salem River Crossing Project?

The City is a co-lead agency with Oregon Department of Transportation and the Federal Highway Administration.

d. Who are the members of the Oversight Team for the Salem River Crossing Project?

The Oversight Team for the Salem River Crossing Project includes elected or appointed officials of local agencies and jurisdictions with regulatory responsibility for, or strong interest in, the project. The voting members of the Oversight Team for the Salem River Crossing Project are the representatives from City of Salem, City of Keizer, Marion County, Polk County, Salem-Keizer Transit District, and the Oregon Department of Transportation. A representative from the Federal Highway Administration is a non-voting member of the Oversight Team.[14]

e. What are the key milestones in the environmental process for the Salem River Crossing Project?

The environmental process for the Salem River Crossing Project began with the issuance of a Notice of Intent, which was published in the Federal Register November 13, 2006.[15] The project's environmental process is organized around nine key milestones, as listed below.

- Management structure and decision process – Completed September 2006
- Purpose and need – Completed March 2007
- Evaluation framework – Completed March 2007
- Range of alternatives – Completed August 2007
- Alternatives for the Draft Environmental Impact Statement – Completed early 2008
- Draft Environmental Impact Statement – April 2012
- Preferred Alternative – February 2014
- Final Environmental Impact Statement – To Be Determined
- Record of Decision – To Be Determined

f. Is the Salem River Crossing Project the same as the Third Bridge?

The Salem River Crossing Project involves more than constructing a third bridge, although a third bridge crossing the Willamette River is the central feature of the project. (See Section 4 for additional information on the Preferred Alternative and the primary components of project.) The Salem River Crossing Project is also a decision making process by which the alternatives are identified and a preferred alternative is agreed upon by the involved agencies. Lastly, the Salem River Crossing project is an environmental impact process conducted per the requirements of the National Environmental Policy Act and culminating with a Record of Decision issued by the Federal Highway Administration.

g. Is adding another bridge over the Willamette River a recent idea?

The community has been discussing whether, where, and how to construct a third vehicular bridge across the Willamette River for decades. According to an article in the August 15, 1972, edition of the *Statesman Journal*, "Had all of the talking and writing about a third Salem bridge been stored up, traffic could probably be floated across the river for the rest of this year on cushions of brain waves and hot air."[16]

The 1996 version *Regional Transportation Systems Plan* of the Salem-Keizer Area Transportation Study, or SKATS (see Glossary of Terms), specifically identified the need to develop additional transportation capacity across the Willamette River as an "outstanding issue" that required further detailed analysis and consensus building to evaluate and select a preferred package of alternatives.[17] In 1997, SKATS initiated the *General Corridor Evaluation* to address long-term capacity needs and to provide the analysis and process necessary to evaluate a wide range of potential solutions.[18] This study was initiated as a Major Investment Study pursuant to the federal regulations that applied at the time. The *General Corridor Evaluation* (2002) concluded that a bridge in the Tryon and Pine Street corridors was the most promising location for a new bridge and recommended pursuing an Environmental Impact Statement under the National Environmental Policy Act.[19] The Salem River Crossing Project is the name given to the subsequent project.[20]

h. How long has the Salem River Crossing Project being going on?

The Salem River Crossing Project was formally initiated in 2006 with the publication of a Notice of Intent in the Federal Register. [21]

i. How much money has been invested in the Salem River Crossing Project since 2006?

Overall, between approximately $9 million and $10 million has been invested in the Salem River Crossing Project since 2006. Through October 2018, the Oregon Department of Transportation (ODOT) has invested about $8.1 million on consultant support. [22] An estimated additional $700,000 has been spent for ODOT staff time. ODOT's totals include about $3.9 million from the Salem-Keizer Area Transportation Study. The City of Salem has invested approximately $740,000 of which about $325,000 is a cash match paid to ODOT.

2. THE PREFERRED ALTERNATIVE PROCESS

a. What does the term "Preferred Alternative" mean?

The term "Preferred Alternative" in the context of the National Environmental Policy Act is the alternative the involved agencies believe would best meet the project goals and objectives, giving consideration to economic, environmental, technical, and other factors evaluated during the process leading to a Final Environmental Impact Statement.

b. Was there a "Preferred Alternative" in the Draft Environmental Impact Statement?

The Draft Environmental Impact Statement (DEIS) for the Salem River Crossing Project did not suggest a preferred alternative but presented a range of alternatives from which to select the preferred. This is consistent with federal requirements, which states that if the lead agency does not have a preferred alternative at the DEIS stage, then it may use the DEIS to help determine its preferred alternative. The lead agency must identify its preferred alternative from the range of alternatives evaluated in the DEIS by the time it prepares the Final Environmental Impact Statement (see 40 CFR 1502.14(e)).

c. How was the "Preferred Alternative" developed and approved?

The process of selecting the Preferred Alternative—the alternative to be evaluated in the Final Environmental Impact Statement along with the No Build Alternative—can be summarized in four phases:

Draft Environmental Impact Statement to Four Alternatives. The Draft Environmental Impact Statement (DEIS) was published on April 20, 2012, and the public comment period lasted through June 18, 2012. The Salem River Crossing Task Force reviewed the contents of the DEIS and received public comment. Based on this review, the Task Force advanced four alternatives to the Oversight Team for its consideration. The alternatives were: the No Build Alternative; Alternative 2A (Widen Existing Bridges); Alterative 4A (New Bridge from Hope to Pine/Hickory Couplet); and Alternative 4D (New Bridge from Hope to Pine/Hickory Couplet and Direct Connections to Salem Parkway and Highway 22). The specific vote tally of the Task Force is provided in Question 2h.

Four Alternatives to Preliminary Preferred Alternative. The Oversight Team, in its decision making process, considered the Task Force feedback, the analysis contained in the DEIS, and public comments. On August 23, 2012, the Oversight Team recommended Alternative 4D as the Preliminary Preferred Alternative. The recommendation of the Oversight Team was passed to the governing bodies of the City of Salem, City of Keizer, Polk County, Marion County, and Salem-Keizer Transit District for feedback.

Preliminary Preferred Alternative to Salem Alternative. The Salem City Council, after hearing concerns from residents about potential impacts caused by Alternative 4D, concluded that it preferred a scaled-down version of Alternative 4D that would have fewer overall impacts, most notably to homes and businesses. The "Salem Alternative" that was developed included many design elements of Alternative 4D, but minimized potential impacts by doing the following:

- Removing the viaduct above the future Marine Drive in west Salem to reduce cost, property impacts, and visual impacts;
- Removing the elevated "flyover" ramps from the new bridge to Salem Parkway in north Salem to reduce cost, property impacts, and visual impacts;
- Reducing the size and extent of local road modifications to reduce cost and property impacts; and
- Reducing the number of travel lanes on the bridge from six to four (two lanes in each direction) to reduce cost.

Salem Alternative to Preferred Alternative. The Salem Alternative was presented to the Oversight Team on July 31, 2013. The Project Management Team (the professional staff supporting the Oversight Team) analyzed the input and refined it to a level of detail needed by the Oversight Team for a decision. The refined Salem Alternative was presented to the Oversight Team on October 31, 2013, and approved by the Oversight Team on February 6, 2014. [23] The Oversight Team adopted the following project-related policy statements in tandem with the selection of the Preferred Alternative: [24]

- Separate, wherever possible, high volume vehicle traffic from bike/pedestrian facilities in the project area for safety and improved traffic mobility.
- Seek a better solution for providing access from Highway 22 to west Salem other than closing the westbound Rosemount exit ramp; however, the closure of this exit ramp is more acceptable than the "braided weave" design presented in Alternative 4D.
- Reduce, to the greatest extent possible, the amount of bridge structure associated with the eastbound Highway 22 ramp to Marine Drive, dependent upon further study in the Expressway Management Plan that ODOT will conduct for Highway 22.
- Encourage the development of a bike/pedestrian loop between the existing and new bridges on the east and west sides of the river, with minimal fiscal impact to roadway funding sources.
- Coordinate with Salem-Keizer Transit District on bus stop locations and construction to avoid additional costs and design conflicts. In addition, other public transportation supportive amenities such as park-and-ride lots, transit centers, bus queue jump lanes, and transit signal priority will be considered as part of the design of the project.

d. What is the relationship between Alternative 4D, the Salem Alternative, and the Preferred Alternative?

Following publication of the Draft Environmental Impact Statement, Alternative 4D was initially recommended by the Project Oversight Team as the Preliminary Preferred Alternative from among a total of nine alternatives presented in the Draft Environmental Impact Statement.[25] Alternative 4D provided the largest increase in vehicle carrying capacity, but it also created larger environmental, land use, and visual impacts and had a higher cost than some of the other alternatives.

The Salem City Council rejected Alternative 4D, having concluded the social, economic, and fiscal costs of Alternative 4D outweigh the benefits. Council instead proposed a hybrid option named the "Salem Alternative." The Salem Alternative was intended to focus on transportation improvements that were most important to Salem while minimizing the negative impacts associated with the

project. Following refinements to the "Salem Alternative," the Project Oversight Team endorsed the refined "Salem Alternative" as the Preferred Alternative for the Final Environmental Impact Statement on February 6, 2014. The Salem Alternative and the Preferred Alternative are often used interchangeably.

e. Will the Salem Alternative be in the Final Environmental Impact Statement as the "Preferred Alternative"?

The full analysis of the Salem Alternative (as refined by the Oversight Team, see above) will be included in the Final Environmental Impact Statement. It is currently considered the Preferred Alternative.

f. Why has the Final Environmental Impact Statement with the Preferred Alternative not yet been published?

The Oregon Department of Transportation (ODOT) cannot recommend that the Federal Highway Administration (FWHA) publish the Final Environmental Impact Statement (FEIS) until all local land use decisions are approved. This prohibition is based on ODOT's State Agency Coordination agreement and administrative rule requirements:

> *The Department shall rely on affected cities and counties to make all necessary land use decisions necessary to achieve compliance with the statewide planning goals and compatibility with local comprehensive plans after completion of the Draft Environmental Impact Statement or Environmental Assessment and before completion of the Final Environmental Impact Statement or Revised Environmental Assessment. These shall include adoption of general and specific plan provisions necessary to address applicable statewide planning goals. (See OAR 731-015-0075(3))*

g. Who served on the Salem River Crossing Task Force?

The Salem River Crossing Task Force was composed of citizen members and staff representing the regional partners. There were no elected officials on the Task Force.

h. What was the vote of the Salem River Crossing Task Force among the alternatives presented in the Draft Environmental Impact Statement?

On August 15, 2012, the Salem River Crossing Task Force voted on what set of preferred alternatives from among nine alternatives in the Draft Environmental Impact Statement should be taken to the Oversight Team for consideration. (Note that this vote did not include the Salem Alternative, which had not yet been formulated by the City of Salem.) The Task Force vote was not recorded by member, only by total number of votes, which were as follows: [26]

i. How many members of the Salem River Crossing Oversight Team voted in favor of the Salem Alternative, which (with minor modifications) became the current Preferred Alternative?

At the February 6, 2014, the Salem River Crossing Oversight Team, which is composed of elected and appointed officials, voted unanimously in favor of the Salem Alternative as the locally preferred alternative.[27]

3. THE PREFERRED ALTERNATIVE

There are a number of sources describing the Preferred Alternative, among them: "Findings Report: Salem River Crossing Preferred Alternative" (2016),[28] "Salem River Crossing Project – Description of the Preferred Alternative" (2017),[29] and "Salem River Crossing Project: Description of Preferred Alternative" (2019).[30] This last document is an update of an earlier version published in 2016[31] and is provided as Appendix A to this report.

The design of the Preferred Alternative is at a very preliminary stage and was based on GIS aerial imagery. No survey work has been conducted. At this early stage of design, assumptions have been made that will need to be refined once the project proceeds into the design phase. The work completed for the EIS will be based on best available information while recognizing there remain unknowns. At this stage, where there is uncertainty, the design incorporates more rather than fewer impacts. When the project enters the design phase, impacts will be both clarified and reduced to the maximum extent practicable.

a. What is included in the Preferred Alternative?

Very generally, the Preferred Alternative includes the following features:

- A four-lane bridge, constructed as a single structure or two side-by-side structures crossing the Willamette River, connecting Pine and Hickory Streets on the east and Hope Avenue at Wallace Road on the west;
- Multi-use paths along the outer edge(s) of the bridge(s);
- Bridge approaches and distribution networks in the vicinity of western approaches to the bridge;

- Bridge approaches and distribution networks in the vicinity of the eastern approaches to the bridge;
- Widening of the intersection of Wallace Road at Orchard Heights with added turn lanes to and from Orchard Heights;
- Marine Drive, leading from the western landing of the bridge at grade and running at grade north to Riverbend Road where there is envisioned a roundabout intersection;
- Marine Drive, leading from the western landing of the bridge at grade and running along the edge of Wallace Marine Park to Glen Creek Road; and
- Two, one-lane elevated (flyover) roadways connecting Marine Drive at Glen Creek Road to Highway 22.

These features are illustrated in Figure 1.[32] When fully constructed, the Preferred Alternative will require closing the Rosemont Avenue exit from Highway 22. A planning study is required to determine how best to connect the southern portion of west Salem to Highway 22, including the possibility of creating a new interchange at Eola Drive. The need for this planning study and possible reconfiguration of access to, and from Highway 22 is acknowledged but is considered outside the scope of the EIS study area. (See Question 3f for additional details.)

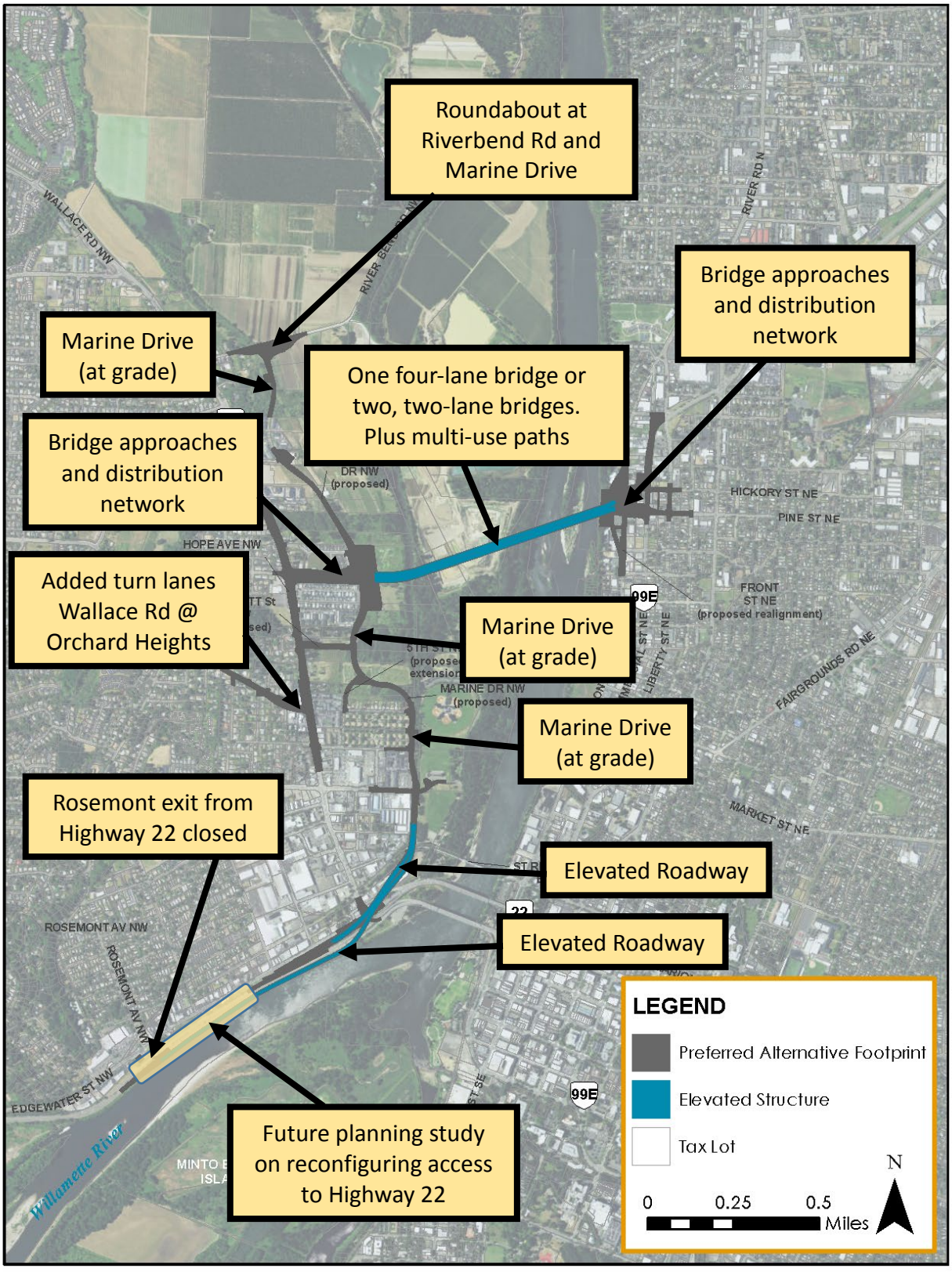

Figure 1: Overview of Salem River Crossing Preferred Alternative - Annotated

b. How many lanes are on the bridge in the Preferred Alternative?

The Preferred Alternative includes two travel lanes on each of two bridges crossing the Willamette River, totally two eastbound and two westbound lanes. For the purposes of the EIS, it was assumed that this would be in the form of two side-by-side bridges, each carrying two travel lanes, shoulders, and space for multi-use paths. The assumed cross-section is shown in Figure 2. [33]

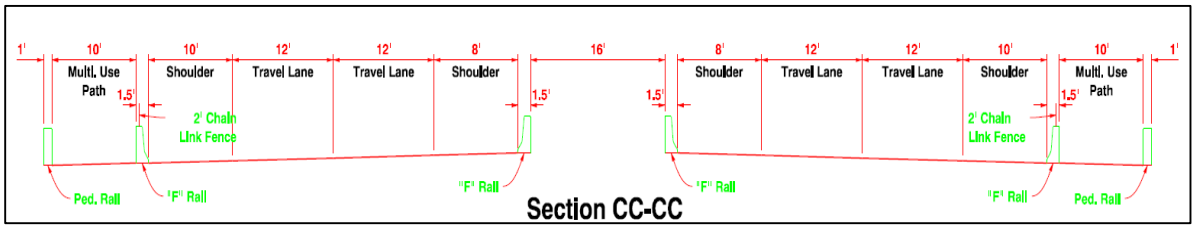

Figure 2: Cross-Section of the Preferred Alternative New Bridge (Main Span)

A visual simulation of the bridge is shown in Figure 3.[34] A Plan/Profile of the bridge is shown in Figure 4.[35]

Figure 3: Visual Simulation of Segmental Precast Concrete Box Bridge Type

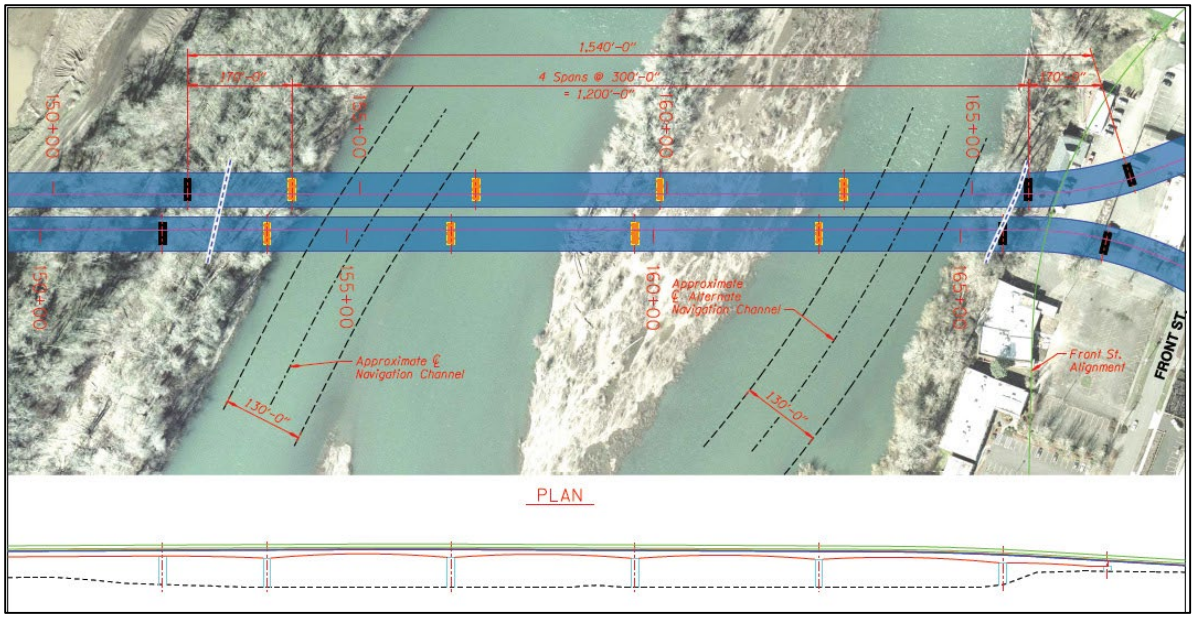

Figure 4: Plan/Profile of Segmental Precast Concrete Box Bridge Type

c. Does the Preferred Alternative include a future Marine Drive that would be located along the edge of Wallace Marine Park?

The Preferred Alternative includes the future Marine Drive as a collector street north of the new bridge landing and a minor arterial south of the new bridge landing. Marine Drive generally follows the alignment in the Council-approved *Salem Transportation System Plan* and for most of its length would consist of one travel lane in each direction with a multi-use path along the east side of the road. Additional lanes would be added at the intersection with the new bridge approach. The portion of Marine Drive located along the edge of Wallace Marine Park north of Glen Creek Road would be at grade and one lane in each direction. This is the same configuration currently included in the *Salem Transportation System Plan*.[36] Typical cross sections of Marine Drive, taken from Appendix G of the *Salem Transportation System Plan*, are provided as Figure 5. Figure 6 shows Marine Drive and the multi-use path in relation to Wallace Marine Park.[37]

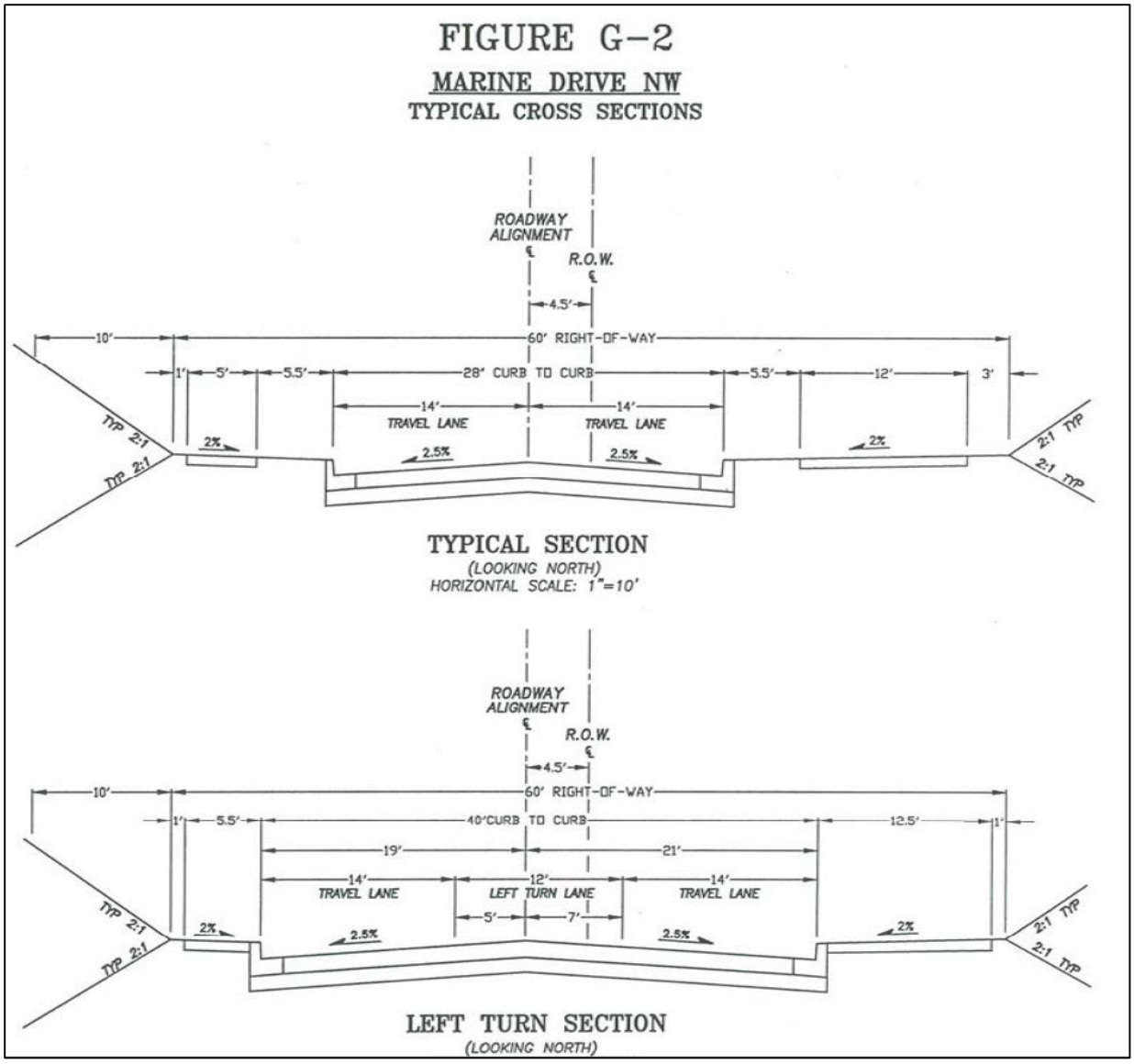

Figure 5: Typical Cross Sections of Marine Drive NW

Figure 6: Preferred Alternative – Marine Drive, Multi-use Path, Wallace Marine Park, and Flyover

d. Does the Preferred Alternative include flyovers crossing over the Center and Marion Street bridges and connecting Marine Drive with Highway 22?

The Preferred Alternative would include two ramps, one in each direction, connecting Marine Drive to Highway 22. Each ramps consists of a single travel lane and a shoulder. The ramps would start at grade just south of Glen Creek Road along the western border of Wallace Marine Park. The ramps begin to elevate to cross over the Union Street Pedestrian Path with a minimum of 10 feet vertical clearance. There would be a multi-use path adjacent to the southbound ramp; this multi-use path would connect the Union Street Path to the Edgewater bicycle/pedestrian path. See Figure *6* above. [38]

e. What would the elevated roadway look like as it passes over the Union Street Pedestrian/Bike Bridge and continues to Highway 22?

The Visual Resources Technical Report includes visual simulations from the Union Street Bridge and from Riverfront Park looking west towards the ramps adjacent to Wallace Marine Park.[39] Two sets of these figures illustrating before/after views are reproduced as Figure 7, Figure 8, Figure 9, and Figure 10.

Figure 7: View from Riverfront Park (Existing Conditions)

Figure 8: View from Riverfront Park with Preferred Alternative

Figure 9: View from Union Street Railroad Bridge (Existing Condition)

Figure 10: View from Union Street Railroad Bridge with Preferred Alternative

f. Why would the Preferred Alternative include closing the Rosemont Avenue exit from Highway 22?

The Preferred Alternative includes closing the Rosemont exit from Highway 22 because the connecting ramp from Marine Drive merges onto Highway 22 too close to the exit for Rosemont. This would lead to a safety problem with merging and weaving traffic. Additional information regarding the need for the closure can be found in the notes and presentations from the Project Oversight Team meeting of October 31, 2013, and on Page 30 of the Salem River Crossing Project: Supplemental Findings Report.[40,41]

Several of the other alternatives studied in the Draft Environmental Impact Statement had instead started the exit ramp for Rosemont Avenue prior to the new ramp merging onto Highway 22 (referred to as the "braided ramp" design). Alternative 4D, the Preliminary Preferred Alternative, had a significant impact on the south side of Edgewater Street, which is one of the reasons why the Salem City Council rejected this alternative. Council proposed, instead, that the entire Rosemont Interchange be relocated closer to Eola Drive, which would allow more room for merging and would better align with the arterial street network in west Salem. Details and analysis related to relocating the interchange was determined to be outside the scope of the Salem River Crossing Project; however, the intent of this Council's proposal was captured in the following policy statement adopted by the Oversight Team in in February 2014:

> *Seek a better solution for providing access from Highway 22 to west Salem other than closing the westbound Rosemont exit ramp through development of the Highway 22 Expressway Management Plan (Doaks Ferry to Marion and Center Street bridges) by ODOT; however, the closure of this exit ramp is more acceptable than the "braided ramp" design presented in Alternative 4D (due to its significant impact on the Edgewater Street greenway and business district).* [Salem Alternative Description & Oversight Team Policy Statements, DRAFT 1/28/2014, approved 2/6/2014][42]

This was further reinforced with the following language proposed to be included in the *Salem Transportation System Plan*, the approval of which remains subject to Council action responding to the LUBA remand:

> *Access to OR 22: The City will not support closure of the exit at Rosemont Avenue NW until a facility plan has been adopted that addresses access to the southwest portion of west Salem from westbound OR 22. The City further supports design efforts to reduce the length of bridge structure along the riverbank associated with the eastbound OR 22 ramp to Marine Drive NW.*[43]

g. How would the ramps from the proposed new Marine Drive to Highway 22 impact both Edgewater Street and the Willamette River Greenway?

The ramp from Marine Drive to Highway 22 would impact properties along the south side of Edgewater Street between Patterson Street and Wallace Road. According to the Right-of-way Technical Report prepared for the FEIS, property acquisition in this area would displace seven business located at 610, 908, 940, and 958 Edgewater Street NW.[44] The ramp from Highway 22 to

Marine Drive would encroach into the Willamette River Greenway. This is addressed in the Findings Report, Chapter 5, "Findings in Support of the Greenway Goal Exception," starting on page 183.[45]

h. How would the new bridge intersect with Front Street?

The new bridge would not intersect with Front Street and there would not be any on or off ramps to or from Front Street. Front Street needs to be shifted to the west (towards the river) so that it can continue as a through street. Front Street would also need to be lowered in order to have adequate clearance (approximately 18 feet) under the bridge approach. The bridge would be at grade when it reaches the intersection of Commercial Street at Pine Street. Figure 11 and Figure 12 illustrate the eastside distribution network.[46]

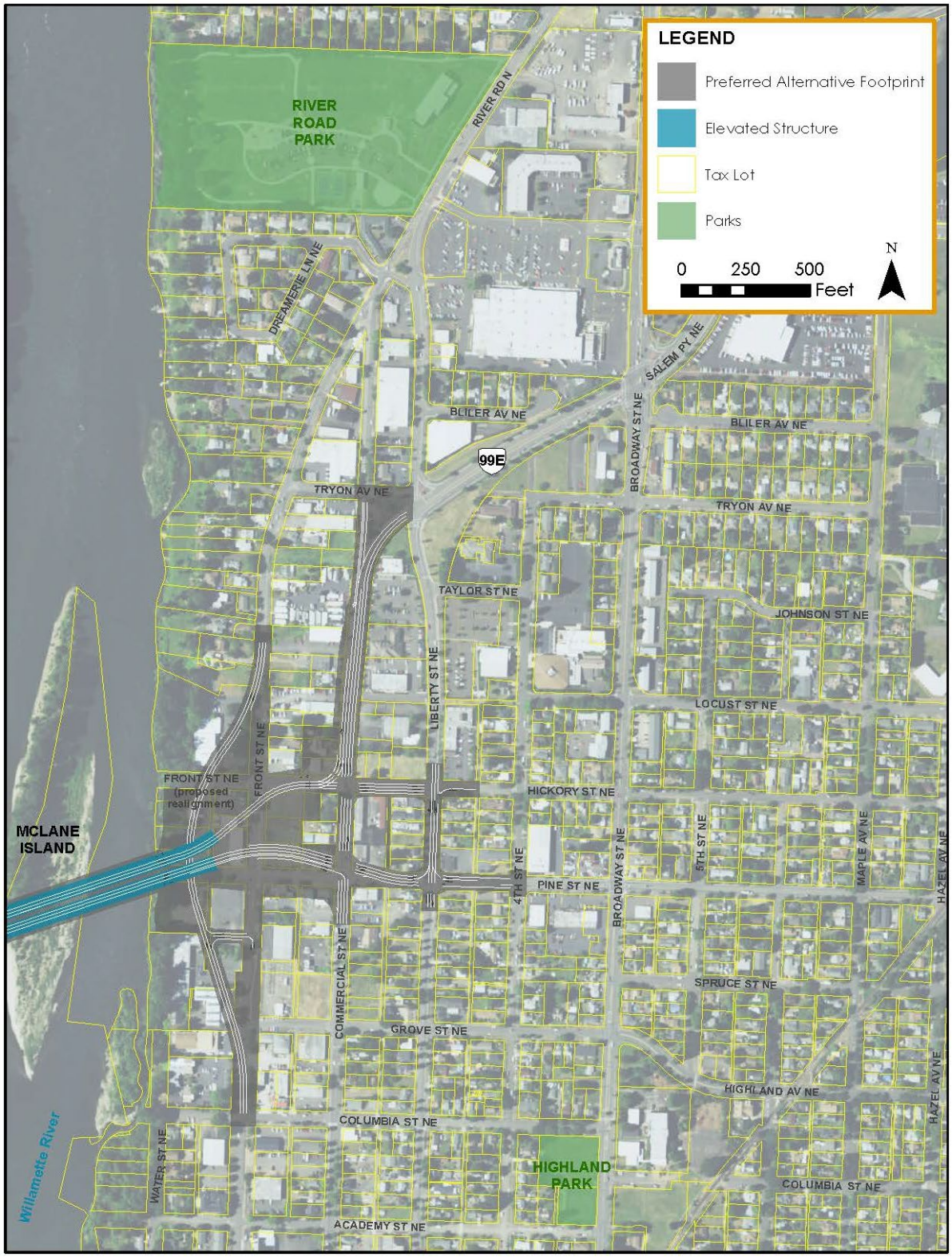

Figure 11: Preferred Alternative – Eastside Bridgehead and Distribution Network

Figure 12: Preferred Alternative – Eastside Bridgehead and Distribution Network (Multi-Use Path Shown in Blue Outline)

A visual simulation was prepared for Front Street north of Hickory Street looking south (Viewpoint 13) in the Salem River Crossing Project – Visual Resources Technical Report Addendum. This shows a section of Front Street that will be re-routed and the embankment for the approach leading onto the Bridge. The figures from the report are reproduced as Figure 13 and Figure 14. [47]

Figure 13: View on Front Street (Existing Condition)

Figure 14: View on Front Street with Preferred Alternative

i. How would the intersection and bridge approaches be configured at Wallace Road and the proposed Marine Drive?

The westside bridgehead and distribution network are shown in Figure 15.[48] These are both at-grade intersections with no elevated ramps.

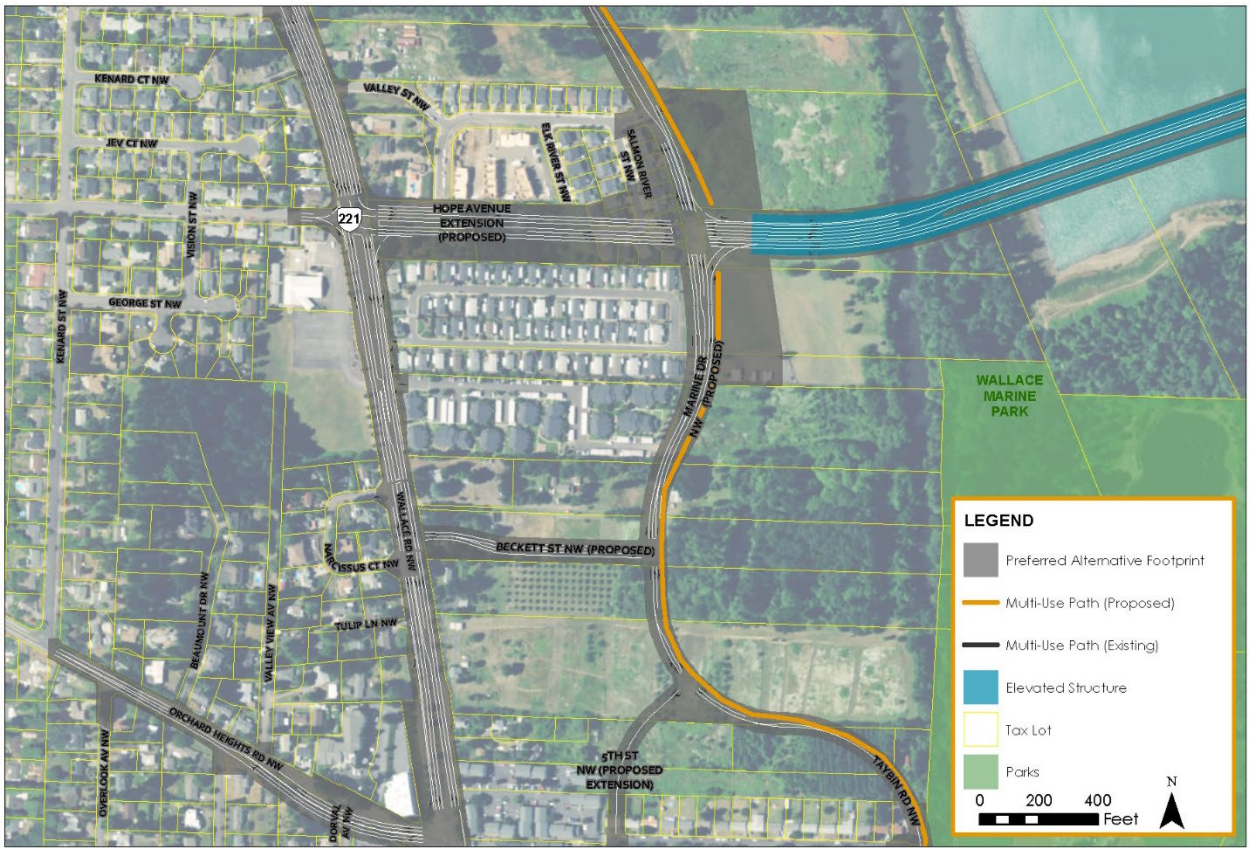

Figure 15: Preferred Alternative – Westside Bridgehead and Distribution Network

j. How would any new roadways be configured along Highway 22 and Edgewater Street to the Rosemont Exit?

Figure 16 illustrates the roadway from the current bridges along Highway 22 and Edgewater Street to the Rosemont exit.[49] Edgewater Street would not change with the Preferred Alternative. The ramp from Marine Drive would come in over the intersection of Wallace Road and Edgewater Street and return to grade east of Murlark Avenue. Properties on the south side of Edgewater between Wallace Road and Patterson Street would be acquired to accommodate the ramp and the lane to merge onto Highway 22. Some of the green space would be impacted while other areas would be available for new landscaping. The design also includes a new connection from the new multi-use path to the Edgewater path. The westbound exit from Highway 22 at Rosemont would be closed.

Figure 16: Preferred Alternative – Edgewater Street

k. How would changes at Edgewater Street impact the historic West Salem City Hall?

Changes will not have any direct impact on the historic West Salem City Hall or the usefulness of the former City Hall.

l. Would the Rosemont Avenue entrance to Highway 22 be closed?

The entrance from Rosemont Avenue onto Highway 22 would not be closed. The entrance would remain as it is today. Cars entering Highway 22 from Rosemont would not be able to access the exit ramp to Marine Drive, but they would be able to proceed east onto the Center Street Bridge.

m. How would the Eola Drive exit be reconfigured if the Rosemont Avenue interchange is relocated?

The possibility of relocating the Rosemont Avenue interchange to Eola Drive would be studied in the future when ODOT develops a facility plan for the section of Highway 22 between Doaks Ferry and the Marion and Center Street bridges.

n. Is funding for the reconfiguration at Eola/Rosemont and Highway 22 included in the estimated cost for the Salem River Crossing Project?

There is no current proposal for how such an interchange would be configured nor has there been an estimate made for the associated costs. Funding for relocating the Rosemont Avenue exit is not included in the cost estimate for the Salem River Crossing Project.

4. ACTION UNDER CONSIDERATION BY COUNCIL

a. What was the motion made at Council on November 26, 2018, regarding the Salem River Crossing and what was the outcome?

At the City Council meeting of November 26, 2018, Councilor Lewis (Ward 8) moved that:

> *City Council direct staff to prepare an ordinance and all other necessary land use actions to respond to the issues raised in LUBA's remand of the City's UGB expansion decision concerning the Salem River Crossing. The ordinance and other actions shall be presented for City Council's consideration prior to June 2019.* [50]

A substitute motion was made, seconded, and carried that:

> *City Council hold a work session to discuss all potential issues concerning the Environmental Impact Statement for the third bridge, including but not limited to its effect on neighborhoods, Wallace Marine Park, Edgewater Drive, the Rosemont exit, projected congested areas and travel times under build and No Build options, and financing options.*[51]

b. What City actions are needed prior to issuance of the Record of Decision?

A summary of the City's actions necessary to complete the Environmental Impact Statement was provided in an October 30, 2018, memorandum from the Oregon Department of Transportation to the Salem Keizer Area Transportation Study Policy Committee.[52] See Appendix B of this report. In short, a Final Environmental Impact Statement (FEIS) must be completed before the Federal Highway Administration (FWHA) can issue a Record of Decision for the Preferred Alternative. Completing the FEIS requires two actions by the City: (1) Respond to the remand issued by the Land Use Board of Appeals in 2017;[53] and (2) Concur with the FHWA preliminary finding that the anticipated impacts of the Preferred Alternative to Wallace Marine Park are *de minimis.*[54]

A memorandum was provided by the City's Legal Department to City Council at the November 26, 2018, Council meeting summarizing the actions necessary to address the remand. [55]

c. What will Council vote on next?

Following the January 30, 2019, work session, Council may choose to take up the original motion of November 26, 2018, or take other action(s) related to proceeding with the Salem River Crossing Project. The Federal Highway Administration and Oregon Department of Transportation, as co-leads with the City of Salem on this NEPA process, require a clear indicator of the official direction from

the City whether to proceed with the Preferred Alternative as approved in February 2014 or to pursue a No Build Record of Decision. This direction is needed in a matter of weeks to meet the September 30, 2019, deadline to complete the process.[56]

d. What is expected to happen if Council approves a motion to complete the remaining land use actions need for the Final Environmental Impact Statement?

City staff will address the issues identified in the LUBA remand and return to Council with an ordinance for consideration. City staff will also return to Council with a recommendation regarding the FHWA preliminary findings of *de minimis* impacts of the Preferred Alternative to Wallace Marine Park.[57][58] (For a definition of *de minimis*, see Glossary of Terms. For more information regarding impacts of the Salem River Crossing on Wallace Marine Park, see Section 17.)

e. Is a vote for the motion to respond to the Land Use Board of Appeals remand and *de minimis* recommendation the same as a vote to complete the Salem River Crossing Project?

A vote in favor of a motion comparable to the one made by Councilor Lewis on November 26, 2018, would be a vote to finish the process necessary for the Final Environmental Impact Statement (FEIS) to be completed and issued. Issuing the FEIS is expected to result in the Federal Highway Administration (FHWA) issuing a Record of Decision (ROD) for the Preferred Alternative.

The ROD will document that the FHWA has determined the requirements of the National Environmental Policy Act (NEPA) have been satisfied for the construction and operation of the alternative contained in the FEIS.[59] Further, the ROD also indicates that FHWA has a clear indication that ODOT and partner agencies are committed to proceeding with right-of-way acquisition and project construction.

f. After a Record of Decision is issued, what are some of the subsequent actions that Council will need to take?

Completion of the Preferred Alternative of Salem River Crossing Project is expected to be accomplished in phases. There will remain a number of actions that this, or a future Council(s) will have to take following the issuance of the ROD before any construction of any phase of the Salem River Project can commence. Among the actions awaiting this or future Councils if a ROD is issued for the Preferred Alternative:

- Vote in favor, as a member of the SKATS Policy Committee, to include the project, or project phase(s) in the Regional Transportation Systems Plan (RTSP). In order to be included in the RTSP, a reasonably likely source of funding needs to be identified. (Note: Vote must be unanimous among all SKATS Policy Committee members for an action to be approved.);
- Vote in favor, as a member of the SKATS Policy Committee, to include funding for the project (or project phase) in the SKATS Metropolitan Transportation Improvement Program. (Note: Vote must be unanimous among all SKATS Policy Committee members for an action to be approved.)

- Approve the strategy, or strategies necessary to fund construction of one or more phases of the Salem River Crossing Project;
- If using City funds, approve funding in the City's Capital Improvement Program budget for construction of one or more phases of the Salem River Crossing Project; and
- If using City funds, approve funding in the City's Capital Improvement Program budget related to property acquisition and, if necessary, approve condemnation.

g. What is expected to happen if Council does not take the necessary land use actions to complete the Final Environmental Impact Statement?

If the City does not take action to complete all necessary land use decisions, the Oregon Department of Transportation (ODOT) cannot complete the Final Environmental Impact Statement (FEIS) with the current Preferred Alternative. This is because of the ODOT State Agency Coordination Agreement and associated administrative rule.[60] In its October 30, 2018, memorandum to the SKATS Policy Committee, ODOT summarized the potential actions that could be taken should the City not resolve the Land Use Board of Appeals remand issues and the *de minimis* determination in time for the FEIS and Record of Decision for the Preferred Alternative to be completed by the FHWA-stated deadline of September 30, 2019.[61] The two available pathways:

1. FHWA issue a No Build ROD; or
2. FHWA require ODOT and SKATS to repay all of the federal funds expended on the project.

Note that if the City Council chooses not to complete the land use actions, ODOT and FHWA require time to complete the process necessary to issue a No Build ROD. If time runs out and no ROD is issued, the EIS process will be considered incomplete and FHWA will require repayment by ODOT and SKATS of all federal funds expended during the process since 2006. (See Question 4i, 4j, and 4k.)

h. If a Record of Decision is issued for the No Build Alternative, what would that mean for future planning for another bridge in the region?

Before any bridge spanning the Willamette River can be constructed, a Record of Decision (ROD) must be issued by the Federal Highway Administration (FWHA) stating the requirements of the National Environmental Policy Act have been satisfied for that project. Assuming FHWA issues a ROD for the No Build Alternative without publication of an FEIS, there are at least two scenarios available at some point in the future:

1. FWHA, ODOT, SKATS, Salem-Keizer Transit District, Marion County, Polk County, City of Keizer, and the City of Salem can all agree to revive the most recent EIS process. In this case, the alternatives would include only the No Build and Preferred Alternative. Supplemental findings and updates to material prepared in the earlier EIS process may be required. Depending on the time elapsed since issuance of the No Build ROD, the process might require completion of a new Draft Environmental Impact Statement and a new public review and comment process prior to issuing a Final Environmental Impact Statement (FEIS). After publication of the FEIS, FHWA can then issue a new Record of Decision.

2. FWHA, ODOT, SKATS, Salem-Keizer Transit District, Marion County, Polk County, City of Keizer, and the City of Salem can all agree to start a new EIS process for a new range of alternative crossings. In this case, the alternatives under consideration would still include the No Build alternative. Further, the process would require a publication of a Notice of Intent, completion of a new Draft Environmental Impact Statement, public review and comment processes, land use actions, and a Final Environmental Impact Statement before a new Record of Decision could be issued.

i. If the Environmental Impact Statement process is stopped without a Record of Decision, can the Federal Highway Administration require repayment of federal funds that have been expended?

FHWA has the authority to require payback for all or a portion of the federal funds expended on a project that has not been completed.[62] Further, FHWA has stated the repayment provision is written into law and FHWA has no authority to waive this requirement.[63] The only viable options to avoid repayment are either: (1) the FEIS process is completed prior to September 30, 2019, or (2) FHWA has issued a No Build Record of Decision prior to September 30, 2019.

Should FHWA require repayment, it would be a "substantial impact" on ODOT and SKATS – the agencies that have provided the majority of funds for the project. [64]

j. What are the consequences if a Record of Decision is issued for the Preferred Alternative and nothing is constructed or acquired?

If a Record of Decision is issued and neither right-of-way acquisition nor project construction has been commenced, the FHWA will require repayment of federal funds expended on the project.

k. What provides the authority for FHWA to demand repayment of federal funds for projects?

The repayment of Preliminary Engineering (PE) costs for Federal-aid projects that do not proceed to the acquisition of right-of-way (ROW) or on-site construction has been a requirement since the early 1960s. In 1991 the Intermodal Surface Transportation Efficiency Act (ISTEA) codified repayment provision in Title 23 of the Code of Federal Regulations (CFR). On June 8, 2018, the Federal Highway Administration (FHWA) issued Order 5020.1A and published supplementary guidance. The FHWA Order 5020.1A is provided as Appendix C to this report.

Federal-aid funds for the Salem River Crossing Project were first authorized on March 1, 2006. As described in FHWA Order 5020.1A, the provisions of 23 CFR 630.112(c)(2) require repayment of Federal-aid reimbursements for PE expenditures when ROW acquisition or on-site construction has not started by the end of the 10th fiscal year following the fiscal year when Federal-aid funds for PE were first authorized. For the Salem River Crossing project, this date was September 30, 2016. The repayment provision is written in law and FHWA has no authority to waiver this requirement. However, FHWA may approve a state department of transportation's request for a time extension for justified reasons. On August 3, 2017, ODOT's request for an extension to the provisions of 23 CFR 630.112(c)(2) was approved by FHWA, establishing September 30, 2019, as the date by which the

Salem River Crossing Project would be required to advance to the ROW acquisition or construction phase under 23 CFR 630.112(c)(2). See Appendix C, FHWA Order 5020.1A, for additional information.

l. Once a Record of Decision is issued, what obligations does the City of Salem have to complete the project?

As described in 23 CFR 630.112(c)(2) and FHWA Order 5020.1A, ODOT as the state transportation department would have to demonstrate to FHWA that ROW acquisition or construction has commenced to avoid being required to repay PE costs. Because the acquisition of ROW is within Salem's jurisdictional limits, it is foreseeable that the City would be expected to fund some portion of ROW acquisition or work with SKATS to allocate funds in the State Transportation Improvement Program (STIP). See Appendix C, FHWA Order 5020.1A, for additional information. (See Question 4m regarding available funding.)

m. Is there any funding available now for either property acquisition or construction for the Salem River Crossing Project?

Yes. The voter-approved Streets and Bridges Bond Measure (2008) includes funding to be used to purchase street right-of-way for a future Willamette River Bridge, Marine Drive, and associated street and approach connections. There is approximately $3.6 million in the City's adopted Construction Fund to acquire property and construct an initial phase of Marine Drive from Glen Creek Road to Cameo Drive. About $100,000 of this amount has already been invested in survey work in advance of acquisition.[65]

5. ENVIRONMENTAL IMPACT STATEMENTS AND RECORDS OF DECISION

a. What is an Environmental Impact Statement?

An Environmental Impact Statement (EIS) is one of three basic "classes of action" for complying with the National Environmental Policy Act of 1969. An EIS is required for major federal actions that significantly impact the quality of the human environment. Less than five percent of all FHWA projects involve an EIS.[66] An EIS is a full disclosure document that details the process through which a project was developed. It includes consideration of a range of reasonable alternatives, analyzes the potential impacts resulting from the alternatives, and demonstrates compliance with other applicable environmental laws and executive orders.

b. What is a Record of Decision?

The Record of Decision, or ROD, is the final step in the Environmental Impact Statement (EIS) process and may not be issued sooner than 30 days after the approved final EIS is distributed. The ROD identifies the selected alternative; presents the basis for the decision; identifies all the alternatives considered; specifies the "environmentally preferable alternative;" and provides information on the adopted means to avoid, minimize, and compensate for environmental impacts.

c. What is the relationship between the Notice of Intent, the Draft Environmental Statement, the Final Environmental Statement, and the Record of Decision?

The EIS process consists of the following four major steps in the order listed: [67]

- Notice of Intent;
- Draft Environmental Impact Statement;
- Final Environmental Impact Statement; and
- Record of Decision.

6. LIKELY CITY ACTIONS AFTER THE RECORD OF DECISION IS ISSUED

a. If the City successfully addresses the remand by the Land Use Board of Appeals and the *de minimis* determination what is expected to happen next?

After the Oregon Department of Transportation and Federal Highway Administration (FWHA) have determined all land use actions have been addressed by the City, the Final Environmental Impact Statement (FEIS) with the Preferred Alternative would be published. After the FEIS is published, FHWA would be able to issue a Record of Decision.

b. After the Record of Decision is issued, what additional City review or approval - other than seeking and obtaining funding - would be needed to allow the Salem River Crossing Project (or elements of the project) to be constructed?

After the Record of Decision is issued by Federal Highway Administration, actions by City Council (not related to funding) will depend on what phase of the project is moving forward. Several examples. (See also Question 4f on post-ROD Council actions.)

- If the phase involves work within the Willamette River Greenway, then a Greenway Development Permit will be required. If the work requires a Class 2 permit, then it requires a public hearing before the Hearings Officer, which can be appealed to the Salem Planning Commission. Council may subsequently choose to call up the decision by the Hearings Officer or the Planning Commission for a public hearing at Council.[68]
- It is likely that an Intergovernmental Agreement will be required with ODOT. Such agreements require Council approval.
- Project phase(s) need to be included in the Regional Transportation Systems Plan and the Transportation Improvement Program. Both of these actions are taken by SKATS and require unanimous approval of the SKATS Policy Committee, which includes a member of the Salem City Council.
- The language proposed for the *Salem Transportation System Plan* (TSP) regarding the Rosemont exit would need to be addressed prior to any action to add the ramp phase to the *Regional Transportation System Plan* (RTSP). Stated differently, the RTSP must be consistent with the Salem TSP. Therefore, if the Salem TSP states that the Rosemont exit must be addressed prior to the flyover ramps being address, then the RTSP cannot say otherwise.

7. OPTIONS IF A RECORD OF DECISION IS ISSUED TO CONSTRUCT THE SALEM RIVER CROSSING PROJECT WITH THE PREFERRED ALTERNATIVE

a. Can the Salem River Crossing Project be constructed in phases?

The Salem River Crossing Project can be constructed in phases. This is common for major transportation projects. If constructed in phases, each phase must have independent utility.

For example, the Final Environmental Impact Statement (FEIS) for the Kuebler Boulevard – Cordon Road Project was distributed in 1985. This FEIS and subsequent ROD provided the environmental approval for constructing Kuebler Boulevard east of Commercial Street, constructing the interchange with I-5 and connecting to Cordon Road. The project has been constructed in several phases, including the 2016 widening of Kuebler Boulevard between Commercial and I-5 (which was part of the selected alternative from 30 years prior). Some aspects of the selected alternative for this project have yet to be constructed – most notably the interchange of Cordon Road and Santiam Highway (OR 22).

Note that specific phases for the Salem River Crossing Project will not be identified in the Final Environmental Impact Statement because a specific phasing plan has not been developed. However, one possible approach to phasing is described in the Project Funding Strategy Memorandum.[69]

b. Can a project smaller in size, scope, and impact than that contained in the Final Environmental Impact Statement be constructed under a Record of Decision for a larger project?

A project smaller in size, scope, and impact can be constructed under a Record of Decision for a larger project. For example, the Preferred Alternative in the Final Environmental Impact Statement assumes two bridges side-by-side, each with two lanes. One phase of the Salem River Crossing Project could be to construct one of the two-lane bridges, leaving construction of the second bridge for a later phase.

c. Can there be assurances that the bridge will start as two-lanes or that it will be constructed in phases?

Neither the Final Environmental Impact Statement nor the Record of Decision for the Preferred Alternative will explicitly state a phasing plan for the Salem River Crossing Project. Council may, however, control the scale, scope, and/or phasing of the Salem River Crossing Project by incorporating one or more policies in the *Salem Transportation System Plan.* Council may also enter into one or more Intergovernmental Agreements with other partner agencies that establish Council's requirement(s) for phasing or scale or scope.

For example, at the City Council meeting of April 24, 2017, City staff recommended Council authorize the City Manager to execute an intergovernmental agreement (IGA) with the Oregon

Department of Land Conservation and Development relating to the Salem River Crossing Project. This IGA included a provision specific to phasing the project.[70] Specifically:

> The City would only design and construct the first phase of the Project until January 1, 2030, the expiration date of the IGA. This first phase did not include elevated ramps other than those necessary approaches for the one, single span bridge. Additionally, the first phase did not include any new connections to Highway 22. The first phase of the project consisted of constructing:
>
> - One two-way bridge span, with a single travel lane in each direction and with separated bicycle and pedestrian facilities;
> - Marine Drive NW between Glen Creek Road NW and Riverbend Road NW;
> - An extension of Hope Avenue NW between Wallace Road NW and Marine Drive NW, with separated bicycle and pedestrian facilities; and
> - Other transportation improvements necessary to support the first phase, including pedestrian and bicycle facilities, transit facilities, turn lanes, and intersections.

Note: Council denied authorization for the City Manager to execute the IGA.[71]

d. During the entire process to develop the Environmental Impact Statement, to what degree was the possibility a smaller bridge studied?

One of the alternatives considered, but dismissed, consisted of two smaller-scale bridges that would each serve as an independent bridge. Referred to as the "Forest Alternative," this alternative was dismissed because one of the bridges would have significant and adverse impacts to Wallace Marine Park. The conclusion was that any two-bridge alternative that would provide adequate transportation performance would have also have similarly significant impacts to Wallace Marine Park.[72]

Another alternative considered, but dismissed, would have converted both of the existing bridges to two-way bridges. With this alternative, one bridge would have been for local traffic and the other for regional or through traffic. This alternative was deemed technically impractical owing to the configuration of bridge connections and the street grid system.[73]

8. THE BRIDGE LOCATION IN NORTH SALEM

a. Why and how was the location for the bridge selected?

Traffic analysis completed at the beginning of the Salem River Crossing Project identified the study area for a new bridge crossing. The analysis determined that the transportation corridors providing the most benefits are those serving demands in west Salem and downtown. This resulted in a study area roughly bound by Tryon Street to the north and the existing bridges to the south.[74] This analysis supported previous conclusions from the *Willamette River Crossing Capacity Study: General Corridor Evaluation*.[75] Figure 17 shows 13 potential bridge corridors evaluated in this study.

Once the study area was selected, a range of alternatives were developed and screened for analysis in the Draft Environmental Impact Study (DEIS).[76] The alternatives advanced for analysis in the DEIS were either in the northern portion of the study area, or immediately adjacent to the existing bridges. Alternatives between these two locations were primarily eliminated because of their impacts to Wallace Marine Park.

b. If the Council wants to advance a third bridge, but not this one at this location, what process would be needed to arrive at a new Preferred Alternative?

At this point in the process, the Salem River Crossing Project has identified the location for the Preferred Alternative. To build a bridge at a different location would require a decision by all participating agencies and municipalities (FHWA, ODOT, SKATS, Salem-Keizer Transit District, Marion County, Polk County, City of Salem, and City of Keizer) to fund and participate in a new EIS process. This EIS process would require publication of a new Draft Environmental Impact Statement; completion of a new public processes; selection of a new Preferred Alternative, completion of all required land use actions; and publication of a Final Environmental Impact Statement. (See also Question 4h.)

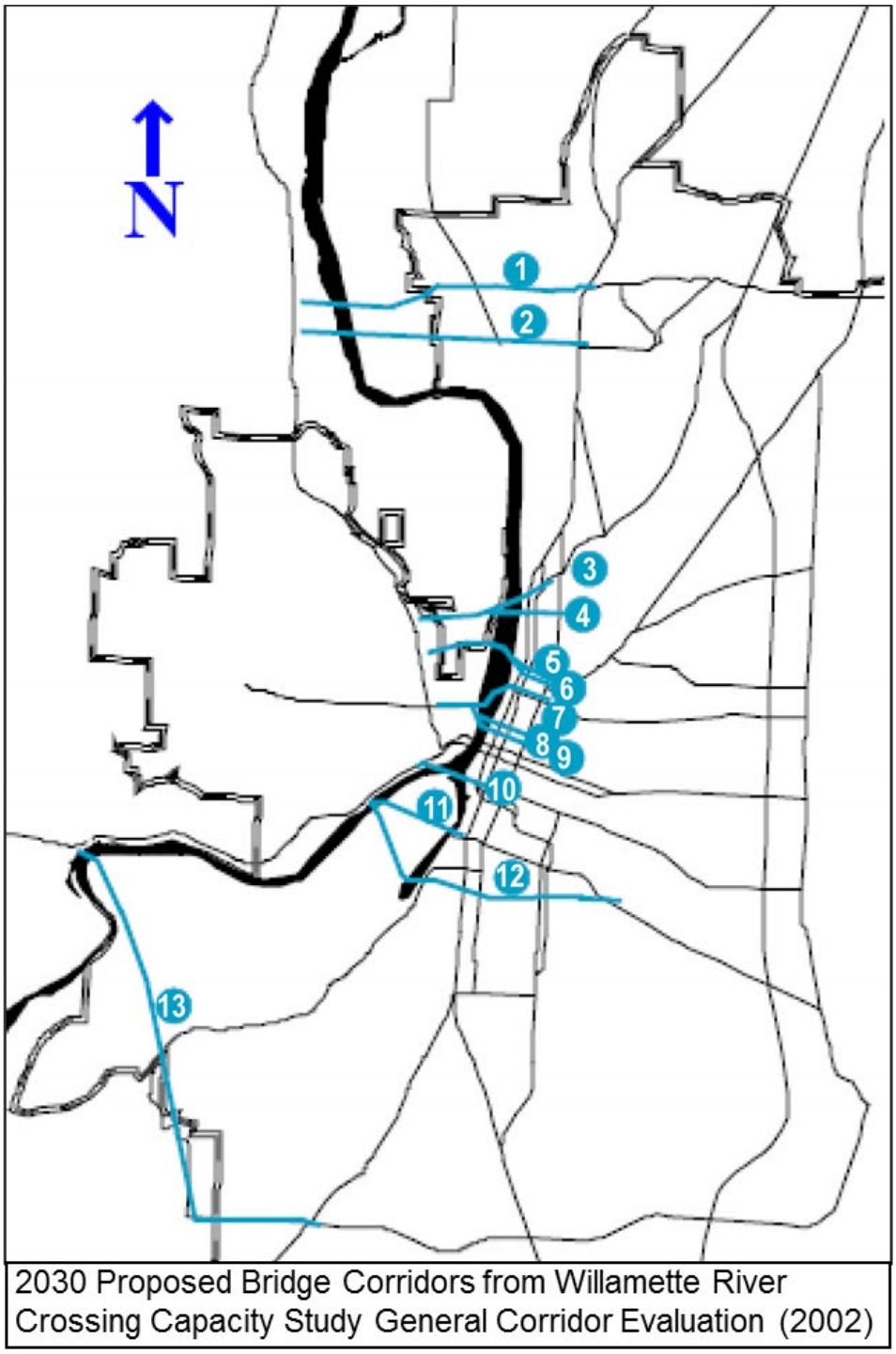

Figure 17: The 13 Bridge Corridors Evaluated in 2002

9. ESTIMATED COSTS FOR THE SALEM RIVER CROSSING PROJECT

a. What is estimated cost for the Salem River Crossing Project?

The "planning level estimate" contained in the Findings Report for the Preferred Alternative is $425 million (in year 2020 dollars).[77] In the "Project Funding Strategy Memorandum" dated March 6, 2015, the estimated cost for the project is given as $430 million (with a footnote indicating this cost "will be refined and updated for the Final Environmental Impact Statement"). [78]

Both cost estimates are for the complete project, including four lanes crossing the Willamette River (two lanes eastbound and two lanes westbound), two bridgeheads with associated connections, widened intersections and roadways, and a completed Marine Drive that will be constructed at grade from Riverbend Road to Glen Creek Road with a connection to Highway 22 south of Glen Creek Road via elevated flyover ramps.

b. What is the basis for the cost estimate for the Salem River Crossing Project?

Generally, cost estimating during early stages of a proposed project involves identifying the major components to be constructed, determining the units and measures of each component, and applying unit prices and quantities to calculate the cost for each component.[79] For example, if the Preferred Alternative includes 1.6 lane-miles of separated multi-use paths and the unit cost per lane mile is estimated to be $160,900 then the total estimated cost for the multi-use path is $257,440.

The total cost estimated for all the major project components is then increased to account for construction activities such as surveying, mobilization, and erosion control. A contingency factor (typically 40%) is applied owing to the uncertainty in the estimate. Additional multipliers are used for design engineering, and project management. Cost items such as right-of-way acquisition and price escalation are added to the total cost of the construction.

The estimated cost for the Salem River Crossing Project was prepared by the Project's consultant, ch2m.[80] The City hired a consultant, T.Y. Lin International, to conduct a peer review of the estimate.[81] A copy of the T. Y. Lin report is provided at Appendix D to this report.

Because the costs are estimated using unit prices, the current planning level estimate does not specifically incorporate site-specific factors, such as contaminated soils, archeological considerations, geological conditions, or geotechnical variations (soil properties such as compaction, porosity, void ratios, compressibility, etc.). The intent of the contingency is to account for these unknowns and more.

c. Can the cost estimate be further broken down by its major elements?

The results of the December 11, 2014, meeting of the Project Oversight Team are documented in a "Project Funding Strategy Memorandum" dated March 6, 2015, which contains "the conceptual funding strategy" for the Preferred Alternative.[82] In this memorandum, the estimated cost for the project is given as $430 million and this cost is further broken down into the following elements:

Phase B Key Elements (Approximate Cost: $300 million)

- Construct a new bridge and approaches connections on both east and west sides of river
- Realign Front Street and other street modifications in North Salem
- Widen Wallace/Hope Avenue intersection
- Widen Wallace/Orchard Heights intersection

Phase M-South Key Elements (Approximate Cost: $20 million)

- Construct southern section of Marine Drive (from Hope Avenue Extension to Glen Creek Road)
- Construct Beckett Street (new street opposite Narcissus Court)
- Extend 5th Avenue NW between Cameo Street and Marine Drive

Phase M-North Key Elements (Approximate Cost: $10 million)

- Construct northern section of Marine Drive (from Hope Avenue Extension north to Riverbend Road)

Phase R-Key Elements (Approximate Cost: $100 million)

- Construct flyover ramps from Marine Drive to Highway 22
- Construct Marine Drive at-grade section south from Glen Creek Road to flyover ramps
- Modify Highway 22, including closure to westbound off-ramp at Rosemont Avenue (to be coordinated with possible relocation of this exit further west)

An illustration of the potential phases as described above is provided in Figure 18.[83]

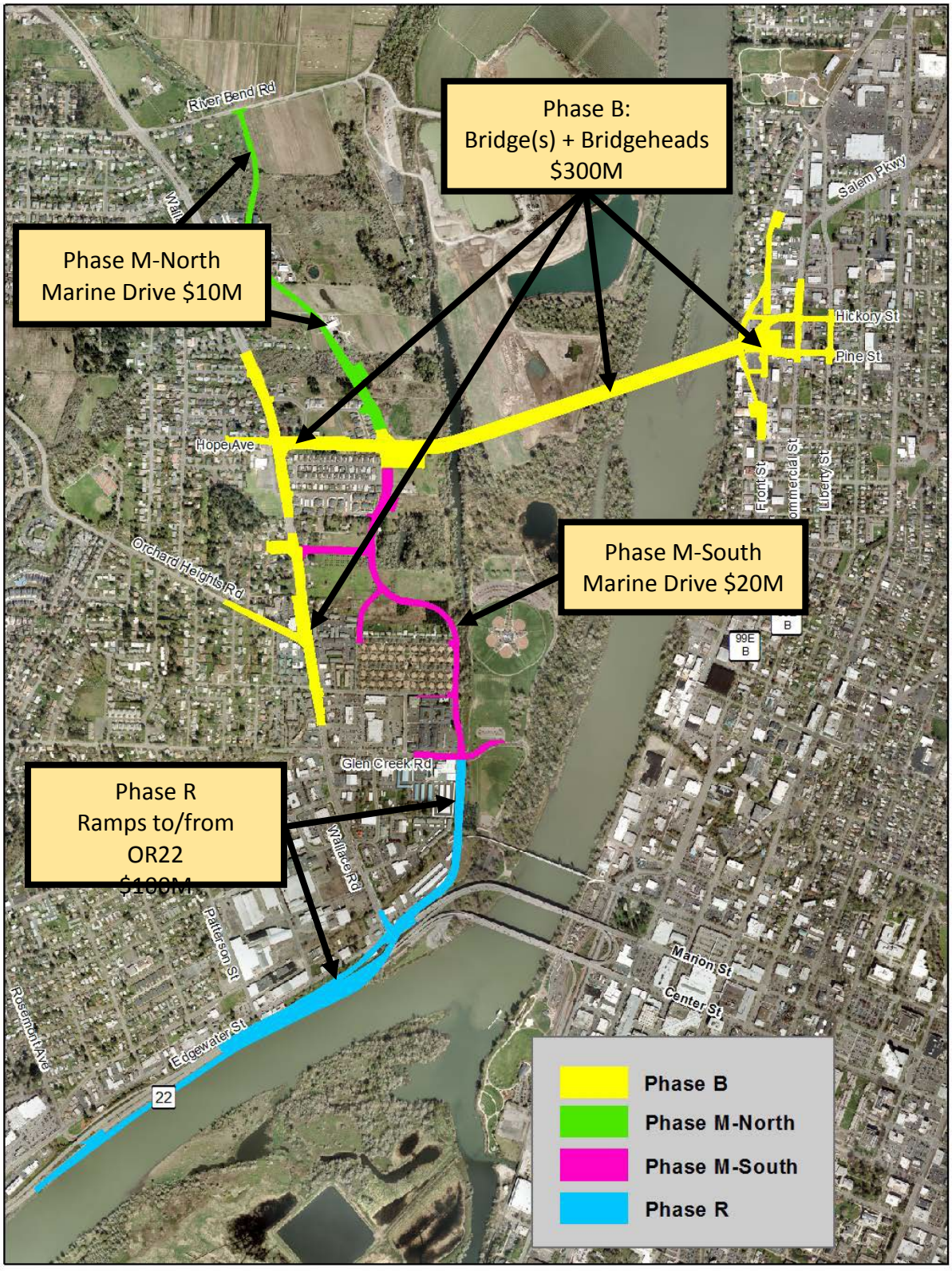

Figure 18: Four Potential Phases of the Preferred Alternative

d. Does the estimated cost include estimated costs for acquiring property and relocating businesses?

Yes. The below is quoted from the "Salem River Crossing Project Right-of-Way Draft Technical Report Addendum." [84]

> *The Preferred Alternative would require approximately 56.1 acres of new right-of-way consisting of 139 property parcels (256 individual tax lots). A specific final count will depend upon final design details and the current ownership status of multiple tax lots. The estimated right-of-way cost for the Preferred Alternative is $54.9 million; this estimate includes land acquisition, property improvements, relocation, personnel, and contingencies. Costs associated with any potential need for contamination cleanup are not considered in this analysis. This estimate is based on gross estimation, not actual appraisals.*

e. How would cost estimates for the Salem River Crossing Project change if construction is delayed beyond 2020?

Projecting future costs requires an estimate on how construction and building costs will change over time. Based on the average Construction Cost Index (CCI) published by the *Engineering News Record* for Seattle, San Francisco, and Los Angeles, the annual CCI increased an average of 2.7% between 1988 and 2017. Based on this long-term average and rounding up gives 3% annual increase. This rate, compounded annually, is applied to the 2020 planning level cost estimate for the complete Salem River Crossing Project of $425 million. The projected future cost is shown in Table 1:

Table 1: Salem River Crossing Project Cost Estimate to 2040

Year	Cost Estimate
2020	$425,000,000
2025	$493,000,000
2030	$571,000,000
2035	$662,000,000
2040	$768,000,000

Note: Values rounded to nearest $100,000

10. FUNDING OPTIONS FOR THE SALEM RIVER CROSSING PROJECT

a. In what ways can construction of the Salem River Crossing be funded?

Major transportation projects such as the Salem River Crossing can be funded through a mix of federal, state, and local sources. At the federal level, grants include the competitive BUILD (Better Utilization Investments in Leverage Development) grants.[85] A source for federal loans could be the TIFIA (Transportation Infrastructure Finance and Innovation Act), which typically provides loans and/or credits up to 33% of the total project cost with low interest rates and deferred payments. Other types of federal loans are also available, depending on the loan program's criteria. Federal

funds are also available from the SKATS Transportation Improvement Program. Approximately every three years, SKATS has an application process for the federal funds that SKATS has discretionary authority to award to projects from local governments in the SKATS area. The amount available varies depending on federal appropriations. In the next call for projects in 2019, SKATS has approximately $15 million total to be used on the regional transportation system within the SKATS boundary during 2021-2024.

At the state level, state grants for modernization projects would go through ODOT's Enhance Funds, which is part of the Oregon State Transportation Improvement Program (STIP). The Oregon Transportation Commission can award federal freight funds for projects on the Critical Urban Freight Corridors. The Oregon Legislature has the ability to earmark funds to projects in a future act if they choose. For example, the Oregon Jobs and Transportation Act (2009) included $960 million in earmarks (eight earmarks between $25 - $80 million, and three from $100 to $200 million. The "Keep Oregon Moving Act" (2017) included $640 million in earmarks, plus at least $500 million for the I-5 Rose Quarter project in Portland. Low interest loans can also come from ODOT's State Infrastructure Bank.[86]

Four local or regional funding sources have been identified as most likely to be applicable to the Salem River Crossing Project: (1) gas tax; (2) vehicle registration fee; (3) property tax; and (4) tolls.[87]

b. Is there a recommended funding strategy?

On December 11, 2014, the Project Oversight Team met to consider funding feedback provided by participants at a December 3, 2014, workshop and to discuss funding strategies. The results were documented in a "Project Funding Strategy Memorandum" dated March 6, 2015.[88] Table 2 is from this memorandum.

Table 2: Conceptual Funding Strategy

Project Phase	Cost	Funding Source					
		FEDERAL	STATE	LOCAL	LOCAL	City of Salem	LOCAL
				Gas Tax	Vehicle Reg. Fee	Property Tax	Tolling
Phase B	$300,000,000	$20 M*	$5 M* $75 M**	$65 M	$65 M	--	$175 M
Phase M-South	$20,000,000					$20 M	
Phase M-North	$10,000,000					$10 M	
Phase R	$100,000,000	$20 M*	$75 M**	$20 M	$20 M		
Total Project Cost	**$430,000,000**	**$40 M***	**$5 M* $150 M****	**$85 M**	**$85 M**	**$30 M**	**$175 M**
Tax/Fee/Toll necessary to generate revenue shown				$.06/Gallon	$25/Year	$0.37/$1K	$1.50/crossing

M = Million

*Potential MWACT STIP allocation
** Would require legislative action

Source: Table 2 of "Project Funding Strategy Memorandum." March 6, 2015. [89]

"Recommended Funding Strategy" is the title of the heading of the section in which this table is contained and is also the title of the table itself. However, the goal of the December meeting was "to develop a conceptual funding strategy that would serve as a guiding framework for future funding efforts and decision-making." Text within the memorandum and notes provided in the Oversight Team meeting summary both indicate that this strategy is far from a settled matter.[90] In the memorandum it is noted "the development of financial plans for large transportation infrastructure projects such as this is an iterative process where the funding strategies are often modified based on the success or failure in securing funding." Additionally, "the point was emphasized that this is a conceptual funding strategy and no decision regarding actual funding commitments are being made. The funding strategy being developed is just a framework to move forward."

c. Was there a funding strategy in which it was estimated the federal government could provide about $40 million and the state could provide $150 million, leaving at least $240 million to be covered by local funding sources?

The funding strategy developed by the Oversight Team in December 2014 and memorialized on March 6, 2015 (see above) essentially contains these elements, but with caveats. The $150 million in state funding "would require legislative action." Using Statewide Transportation Improvement Program (STIP) funding would likely require money be accumulated over a number of years and set aside for the project, and doing this would require a decision that would adversely impact other projects of other jurisdictions and unrelated to the Salem River Crossing. Implementing a local gas

tax would require approval by voters. Tolling requires approval of the Federal Highway Administration and might require state legislative action as well. A more expansive discussion of potential revenue sources can be found in "Salem River Crossing – Revenue Projections" (ECONorthwest 2014), which is provide as Appendix E of this report.[91]

d. What happens if there are insufficient funds to pay for the complete Salem River Crossing Project?

The Salem River Crossing Project does not have to be constructed in its entirety as a single project. Further, the Salem River Crossing Project, or a phase the project, will not be started unless there are funds available to pay for the project or project phase. Project construction will not commence until the necessary property has been acquired. Question 10b illustrates one funding strategy reviewed by the Project Oversight Team in 2014 that divided the project into four possible major construction phases.[92] Note that the bridge itself can be constructed in two phases, a first bridge with two lanes followed at some point later with a second bridge with two lanes.

e. What kind of funding strategy or plan does the FHWA require as part of the Final Environmental Impact Statement?

The Final Environmental Impact Statement does not require a financial plan and FHWA does not require a financial plan as a prerequisite to issuing a Record of Decision.

Financial plans are required for major projects (where the estimated cost exceeds $500 million) as well as for projects between $100 million and $500 million. The initial financial plan must be approved prior to the first authorization of federal funds for construction. The FHWA will not approve a major project financial plan until the selected alternative for the project has been identified in the NEPA decision document for the project.[93]

f. Does this FHWA requirement change depending on the size, in dollars, of the project?

Major projects with an estimated total cost of $500 million or greater are required to submit a project management plan in addition to the financial plan discussed in the previous answer. [94]

g. If there is tolling on the new bridge, would there also have to be tolling on the current bridges?

The analysis of potential revenue from tolling assumes all bridges are tolled at the same rate, since all three bridges are close enough to act as substitutes for each other.[95]

h. Does the transportation system funding package approved by the Oregon legislature in 2017 include any funding for the Salem River Crossing?

During development of House Bill 2017, the Salem River Crossing Project was identified as a needed project, but no funds were allocated in the bill. (Note: Funds for seismic upgrades to the Center Street Bridge were included in HB 2017.)

i. What is the "Financially Constrained Plan" of SKATS and does it include funding to support constructing the Salem River Crossing Project?

The SKATS Regional Transportation System Plan (RTSP) is required by federal regulations to exhibit "financial constraint," meaning that that the cost of the identified capital projects must not exceed the forecasted financial resources available over the next 20 years. Revenues must be from "reasonably anticipated" sources. Additionally, federal regulations require demonstration that adequate funding is expected to be available to maintain and operate the existing transportation facilities and services during the time frame of the RTSP.

For the 2019-2043 RTSP update that is being prepared for public review and adoption in 2019, the MPO has worked with ODOT, the Salem-Keizer Transit District, and local jurisdictions on forecasts of federal, state, and local revenues. Revenues are subdivided in four revenue categories: transit capital projects; transit operation and maintenance; roadway operation and maintenance; and roadway capital projects and programs. For the years 2019 to 2043, roadway operation and maintenance revenues are estimated to be $500 million; roadway capital projects and programs are estimated to be $693 million. About $206 million in federal funds that are awarded by the SKATS MPO Policy Committee is included in the forecast for roadway capital projects and programs. State gas taxes that are allocated to local jurisdictions are included in the revenue forecasts, but the forecast does not include other federal and state earmarks or grants as they cannot be reasonably anticipated. Notwithstanding the above, in recent years the Salem-Keizer area has received both state and federal earmarks and grants, including federal grants for widening I-5; project development on Highway 22 west of Doaks Ferry Road; state earmarks for the Kuebler/I-5 interchange; Aumsville Highway; Center Street Bridge seismic upgrades; and other state competitive grants.

The currently adopted 2015-2035 RTSP does not include funding for the entire cost of the Salem Crossing Project. It does include project "R001," which is $20 million from the roadway capital revenue forecasts to be available for the "Willamette River Crossing Corridor" with the following project description: "Design, right-of-way and/or construction for a component identified in the Local Preferred Alternative from the Salem River Crossing EIS." Like the many projects in the RTSP, the specific source of funds is not identified, as sources can be from local, state, or federal funds (either solely or a combination).

j. Is it possible that the federal government might earmark funds for the Salem River Crossing Project?

According to the budget watchdog groups Taxpayers for Common Sense and Citizens Against Government Waste, support for bringing back so-called earmarks — line-item appropriations for specific projects, typically requested by lawmakers for their home state — is at its highest since the earmark ban was enacted in 2011.[96] [97] Based on this findings, it is possible that the federal government might earmark funds for the Salem River Crossing Project; however, making a statement as to what the federal government might, or might not do regarding funding and the potential source(s) of that funding is beyond the scope of this report.

k. What funding is available now for the Salem River Crossing Project?

The voter-approved Streets and Bridges Bond Measure in 2008 including funding to be used for acquiring properties along the alignment of Marine Drive. There is approximately $3.6 million in the City's adopted Construction Fund to acquire property along the alignment of the future Marine Drive. About $100,000 of this amount has already been invested in survey work in advance of acquisition.[98]

11. CURRENT AND PROJECTED POPULATION IN THE SALEM-KEIZER AREA

a. What is Salem's current population?

165,265.....The latest estimate (July 1, 2018) for the population of the City of Salem.
201,825.....The latest estimate (July 1, 2017) for the combined populations of the City of Salem and the City of Keizer.
246,577.....The latest estimate (July 1, 2017) for the Salem/Keizer Urban Growth Boundary

Additional details follow.

The population estimates in Table 3 are from the Population Research Center at Portland State University.[99] The table shows the population for the city limits of Salem and city limits of Keizer. The combined Salem/Keizer Urban Growth Boundary (UGB) includes the two cities plus unincorporated areas in Marion and Polk County that are also inside the Salem/Keizer UGB.

Population Estimates, Population Research Center (PSU) – June 30, 2018

Table 3: Population Estimates, Population Research Center (PSU) – June 30, 2018

	City of Salem	City of Keizer	Total for Salem + Keizer (cities)	Salem/Keizer UGB
Population (July 1, 2017)	163,480	38,345	201,825	246,577
Population (July 1, 2018)	165,265	38,505	203,770	n/a

b. What is the projected population in Salem-Keizer Urban Growth Boundary over the next 40 or more years?

246,577 .....The 2017 population in the Salem-Keizer Urban Growth Boundary (UGB).
303,562 .....The 2035 projected population in the Salem-Keizer UGB.
407,263 .....The 2067 projected population in the Salem-Keizer UGB.

Official population forecasts for every county in Oregon and their cities and urban growth boundaries are now provided by the Population Research Center (PRC) at Portland State University.

Information about this is on the PRC's website.[100] Forecasts that included Marion and Polk counties and their UGBs were completed in 2017 and will be next updated in 2021. Table 4 combines data from the separate reports for Marion County and Polk County.[101] This table also shows the population forecast for west Salem (i.e., the portion of the Salem-Keizer UGB in Polk County) and the Average Annual Growth Rates (AAGR).

Table 4: Coordinated Population Forecasts, Population Research Center (PSU)

	2000	2010	AAGR (2000-2010)	2017	2035	2040	2067	AAGR (2017-2035)	AAGR (2035-2067)
Polk County	62,380	75,403	1.9%	81,089	105,217	111,991	149,203	1.5%	1.1%
Marion County	284,834	315,335	1.0%	337,773	405,352	421,508	513,142	1.0%	0.7%
Salem-Keizer UGB (Polk) – [west Salem]	19,919	26,139	2.8%	27,888	36,936	39,644	54,045	1.6%	1.2%
Salem-Keizer UGB (Marion)	183,579	203,995	1.1%	218,689	266,626	279,724	353,218	1.1%	0.9%
Salem-Keizer UGB (Marion + Polk)	**203,498**	**230,134**	**1.24%**	**246,577**	**303,562**	**319,368**	**407,263**	**1.16%**	**0.92%**

Summarizing the PRC forecast:

1. The Salem-Keizer UGB population is forecast to increase from 246,577 (in 2017) to 407,262 (in 2067), an increase of 160,686 over a 50-year period. This increase is approximately the current populations of Bend, Woodburn, McMinnville, and Dallas combined.
2. West Salem (i.e., the portion of the Salem-Keizer UGB in Polk County) is forecast to approximately double in population between 2017 and 2067 (from 27,888 to 54,045; an increase of 94%).
3. The remainder of Polk County (subtracting the "west Salem UGB" population), which includes the cities of Dallas, Independence, Monmouth, Falls City, Willamina, and the county's rural areas, is forecast to grow from 53,201 in 2017 to 95,158 in 2067 (an increase of 79%).

12. THE CONGESTION RELIEF TASK FORCE OF 2018

a. What was the Congestion Relief Task Force?

The Congestion Relief Task Force was created by a City Council motion on November 13, 2017. The Task Force consisted of the Mayor and Councilor Kaser (Ward 1), Councilor Hoy (Ward 6), and Councilor Lewis (Ward 8). The purpose of the Congestion Relief Task Force was "to evaluate options for reducing traffic congestion and improving vehicular mobility around the Marion and Center Street bridges."[102] The Congestion Relief Task Force established a study area that encompassed downtown, the two bridges, and the contributing roadways east and west of the bridges. [103]

A work session concerning the results of the Congestion Relief Task Force was provided to City Council on November 5, 2018.[104]

b. Did the Congestion Relief Task Force consider only short-term solutions?

No. The work scope outlined in the City Council motion that created the Congestion Relief Task Force charged the group with developing a list of recommendations that included "projects that facilitate improved traffic congestion and vehicular mobility in the short-, medium-, and long-term."[105]

c. What were the conclusions of the Congestion Relief Task Force?

The full set of conclusions of the Congestion Relief Task Force is provided in Section 3 of the final report.[106] Among the conclusions:

- "Existing traffic congestion is directly related to vehicle flows to, from, and across the Center Street and Marion Street bridges."
- During morning and evening peak traffic commuting hours, traffic on and near the bridges "nears or exceeds capacity in many areas" resulting in long vehicle queues.
- Among the challenges to addressing congestion is "there are no nearby alternative routes to cross the Willamette River."
- The population in Salem and the region is projected to grow and with the increase in population, "vehicle congestion in the study area is also projected to increase" and "vehicle delays and travel times will continue to degrade if nothing is done to relieve the congestion." [107]

d. What were the recommendations of the Congestion Relief Task Force?

The full set of recommendations of the Congestion Relief Task Force is provided in Section 4 of the final report. [108] The Task Force "did not reach consensus on recommending any long-term major capital improvements." [109] The Task Force did produce a list of short-term and medium-term projects, policies, and programs that included: modifying intersections; providing additional guide signage; enacting turn restrictions at certain times of day; providing a park and ride/walk/shuttle facility at Wallace Marine Park; creating a circulator/trolley program; and implementing Intelligent Traffic System technologies.

e. To what degree would implementing the recommendations of the Congestion Relief Task Force alleviate downtown congestion?

The recommendations of the Congestion Relief Task Force "may provide benefits at specific locations or to a limited number of users."[110]

f. Why not just widen the Center Street and Marion Street bridges?

Various options for widening the Center Street and Marion Street bridges were considered by the Congestion Relief Task Force. The Task Force concluded that widening the bridges would not provide the needed additional capacity unless a set of additional projects was completed at the approaches and roadways leading to and from the bridges, which collectively were called "Solutions Packages"

in the report. Of the Solution Packages discussed, the following were the most preferred, but were not recommended by the Task Force:

The Center Street Bridge Solution Package involved:

- Widening Wallace Road NW to three lanes southbound;
- Adding a fifth lane on the Center Street Bridge;
- Widening the eastbound bridge approach structure;
- Modifying the north and southbound off-ramps to Front Street NE; and
- Addressing downstream bottlenecks at intersections of Front/Commercial/Division streets and Front/Commercial/Trade streets.

The Marion Street Bridge Solution Package involved:

- Widening Wallace Road NW to three northbound lanes.
- Adding a fifth lane on the Marion Street Bridge;
- Widening the westbound bridge approaches;
- Adding a third right turn lane on Commercial Street;
- Adding an additional westbound lane on Marion Street NE by removing parking; and
- Removing the pedestrian sidewalk on the bridge.

Figure 19 shows the two solution packages. The estimated cost for the two Solution Packages was between $155 million and $202 million, which included right-of-way acquisition. If enacted, the Solution Packages would initially reduce travel times by up to 50 percent; travel times would return to their pre-construction levels within approximately ten years.[111] The Task Force did not recommend advancing either of the Solution Packages.

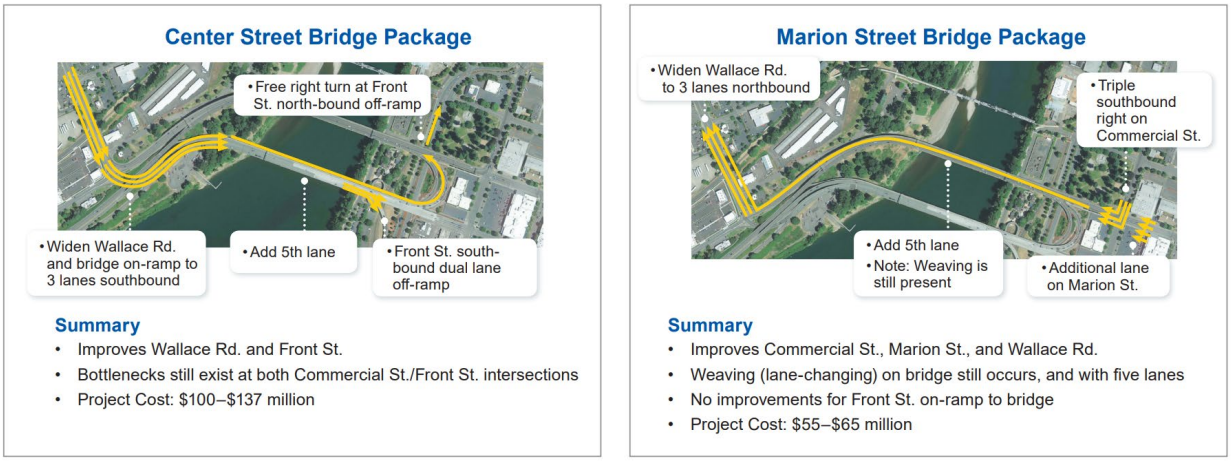

Figure 19: Marion and Center Street bridge Packages (not recommended by Task Force)

g. What actions have already been taken to improve the approaches to the two existing bridges?

Over the last 24 years, there have been multiple improvements to the bridges and connecting roadways in downtown and west Salem -- plus improvement to bicycle and pedestrian facilities in the area -- that were constructed (in part) to reduce congestion on the bridges. Figure 20 shows 16 multimodal improvements (14 constructed, two in the planning stages) in the bridge area since 1994. These improvements are summarized below. Three of the completed improvements (numbers 5, 12, and 14) were identified in the *Bridgehead Engineering Study* (1998)[112] which evaluated a range of options to improve the capacity and safety of the existing bridges.

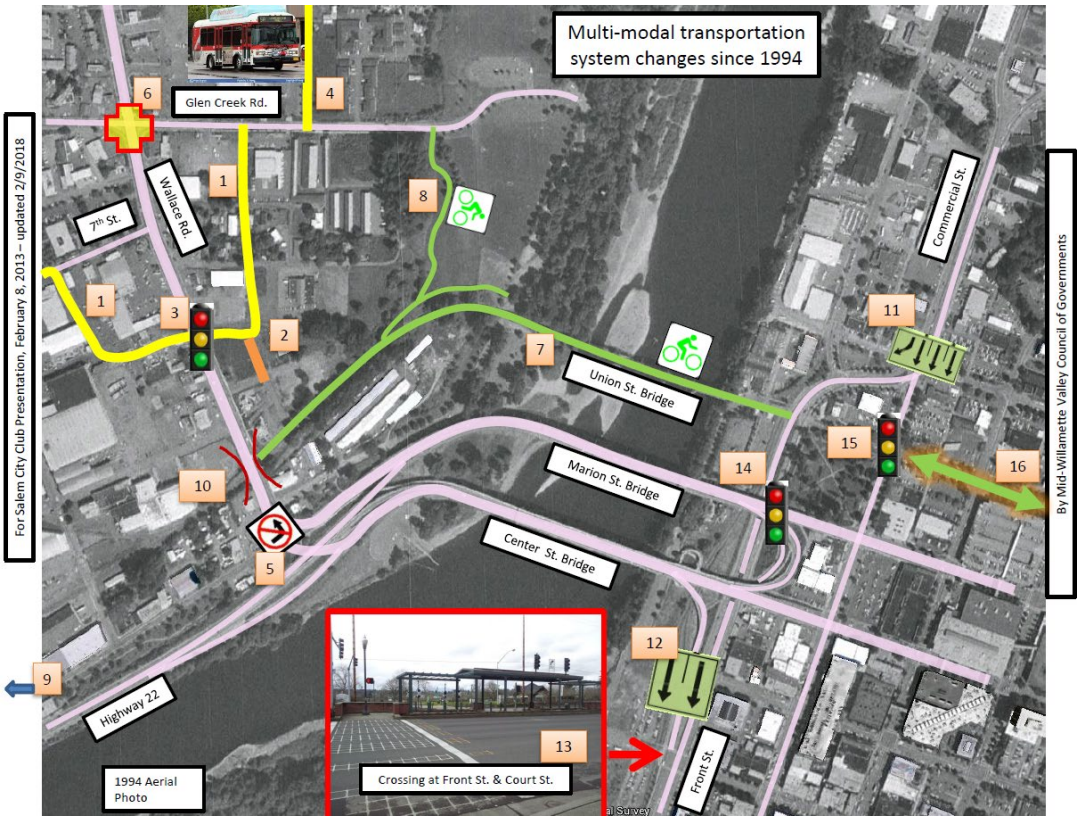

Figure 20: Multimodal Improvements in Bridge Area since 1994

West Side Multi-modal Transportation System Changes

1. Taggart Drive (east of Wallace) and Bartell Drive (west of Wallace) built to improve local circulation and reduce traffic on Wallace Road. (2004/2005)
2. City acquired public access easement east of McDonalds to provide properties to the south (apartments, businesses) access to the new signal at Taggart Drive NW. (~2003)
3. Traffic signal on Wallace Rd. relocated from 7th Street to Taggart Dr. (2005)
4. Cornucopia St. constructed, bus bays added as West Salem's transit hub (2003)
5. Left-turn from Edgewater Street onto Wallace Road removed for safety and to improve traffic flow on Wallace Road. (2006)

6. Reconstruction of Glen Creek @ Wallace Road. Extra turning lanes added. Project opened the previously closed crosswalk on the south leg of the intersection. (2014/2015)
7. Union Street Railroad Bridge converted to a pedestrian and bicycle bridge; trail connections built to Wallace Road and to Wallace Marine park. (2009)
8. Multi-use trail from Union St. trail to Glen Creek Road (2014)
9. Intersection of Edgewater Street NW and Rosemont Ave. reconstructed with added turn lanes. This helps the traffic flow on the Highway 22 exit ramp to Rosemont. (2013)
10. Adopted 2015 West Salem Business District Action Plan recommends a grade separated crossing of Wallace. Feasibility studies for either an underpass or overpass have been done.

East Side Multi-modal Transportation System Changes

11. Commercial Street at Division Street intersection reconfigured to allow 3 through-lanes southbound. (prior to 2005)
12. Ramp from Center Street Bridge to southbound Front St. widened to two lanes. (~2003)
13. On Front Street, pedestrian crossing islands added to medians at Court Street and State Street to improve pedestrian safety and minimize traffic delay to ramp traffic. (2003)
14. Traffic signal replaces the stop sign at the end of Center St. bridge ramp to northbound Front Street to allow eastbound to northbound traffic to transition off of the bridge more safely and efficiently.
15. New signal added at Union St. @ Commercial Street. Includes other bicycle/ pedestrian safety elements at the intersection. Activated November 2017.
16. Union Street Family Friendly Bikeway (Commercial Street to 12th Street). Construction in 2021.

h. Are there any projects identified in the 1998 Bridgehead Study that are yet to be completed?

The *Bridgehead Engineering Study* (1998)[113] evaluated a range of options to improve the capacity and safety of the existing bridges. At five locations (three on the east side, two on the west side) the study developed a "minimum build solution" (less costly) and a "maximum build solution" (more costly). Projects were completed at three of the five locations (#1, #3, part of #5) as listed below:

1. End of Center Street bridge exit to Front Street (northbound)– replaced the stop sign with a traffic signal;

2. Commercial St NE/Marion St NE – minor lane configuration for right turns from Commercial St to Marion Street bridge (not implemented);
3. Center St. bridge exit ramp to Front Street (southbound) – widened the exit ramp and build the pedestrian crossing at Front Street and Court Street;
4. Marion Street bridge exit ramp – the study looked at two options: (1) Widening to provide an option lane where the bridge lanes divide into two lanes for westbound Highway 22 and two lanes for the ramp to Wallace Road; and (2) A new off-ramp from Marion Street bridge connecting to Marine Drive. Neither option was pursued because of the anticipated extra weaving on the bridge should the option lane be built;
5. Wallace Rd NW/Edgewater NW – the roundabout option was considered but later dismissed. The other option would change the radius of the ramp to Wallace Road in order to provide two westbound lanes at Wallace/Edgewater intersection. This second option is included in the Salem Transportation System Plan and is assumed as part of the No-Build and Preferred Alternative. The City did construct a median to prevent left turns from Edgewater St. to Wallace Road (primarily for safety reasons) and which also provided more green time to Wallace Rd southbound at the Wallace/Edgewater intersection.

13. THE SALEM RIVER CROSSING PROJECT AND CONGESTION

a. Generally, how does congestion with the Preferred Alternative compare to the No Build Alternative in 2040?

Traffic and Transportation Technical Report Addendum compares the impacts of the No Build Alternative to the Preferred Alternative in 2040. The following are quotes from that report.[114]

No Build Alternative

The No Build Alternative would add to the expected cumulative impact because congestion would continue to increase at the east and west bridgeheads, as well as at the connecting arterials in west Salem and downtown Salem. The peak congestion period is spreading into the hours before and after the current peak hour. Frustration related to the traffic situation would eventually impact people's decisions relating to where to live, where and how often to shop, and where to locate businesses and industrial facilities.

Preferred Alternative

In the future, although the Preferred Alternative would have slightly less congestion in the CBD area than the No Build Alternative, it would still lead to some concentrated traffic at the existing bridgeheads on either side of the river.

On the west side, the Preferred Alternative would introduce more capacity and redistribute traffic to reduce congestion on Wallace Road. While limiting access to right-in/right-out along Wallace Road would enable traffic to move more efficiently, it would also increase out-of-direction travel. High levels of traffic, as experienced with the No Build Alternative, can create a de facto access limitation. Therefore, in practice, out-of-direction travel may already occur with

No Build Alternative conditions, especially during peak-hour traffic. With the Preferred Alternative, however, the access control would be permanent, and during all hours.

Overall, traffic conditions with the Preferred Alternative would be better than with the No Build Alternative. The increased traffic flow and mobility achieved through access management with the Preferred Alternative would overcompensate for the out-of-direction travel that might result.

b. Comparing the Preferred Alternative and the No Build Alternative, how will areas of congestion change in 2040?

There are six figures in the Traffic and Transportation Technical Report Addendum that illustrate the results of congestion analysis at a number of intersections for existing conditions (2012) and the No Build and Preferred Alternatives for AM and PM peak travel times.[115] The figures for PM peak travel times for the existing conditions and 2040 No Build and Preferred Alternative are reproduced on the following three pages. Figure 21 shows the existing Peak PM intersection mobility. Figure 22 and Figure 23 show the modeled Peak PM intersection mobility for the No Build and Preferred Alternative, respectively. Summarizing these three figures for PM Peak Travel Times:

<u>Current Conditions 2012 (Peak PM)</u>

- 4 of 27 intersections do not meet mobility targets
- 2 of the 8 downtown intersections do not meet mobility targets

<u>No Build Alternative 2040 (Peak PM)</u>

- 16 of 32 intersections do not meet mobility targets
- 5 of the 8 downtown intersections do not meet mobility targets

<u>Preferred Alternative 2040 (Peak PM)</u>

- 17 of 33 intersection do not meet mobility targets, but 4 of those intersections "show improvement from the 2040 No Build mobility results."
- 2 of the 8 downtown intersections do not meet mobility targets, "but show improvement from the 2040 No Build mobility results."

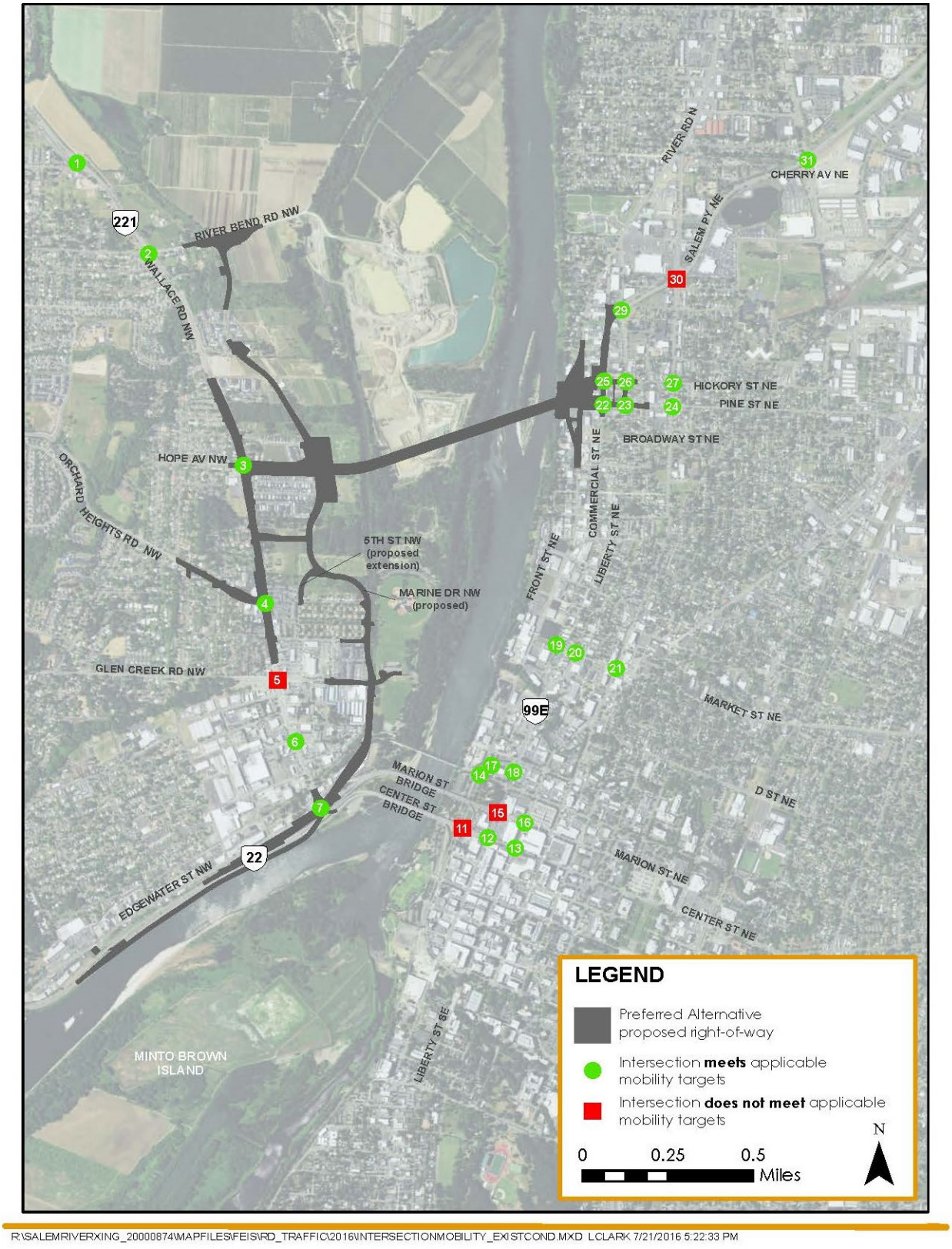

Figure 21: PM Intersection Mobility – Existing Conditions

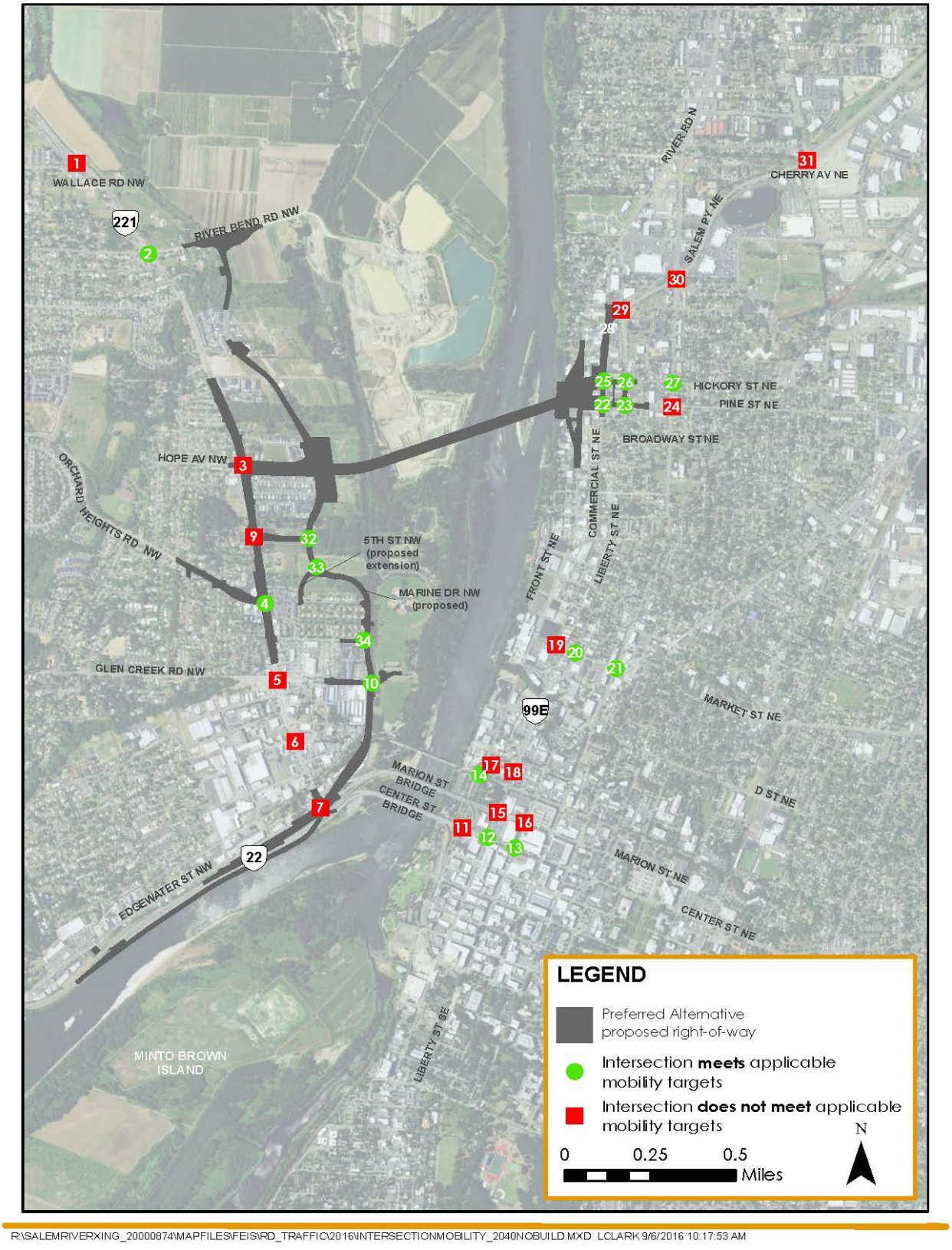

Figure 22: PM Intersection Mobility – No Build Alternative (2040)

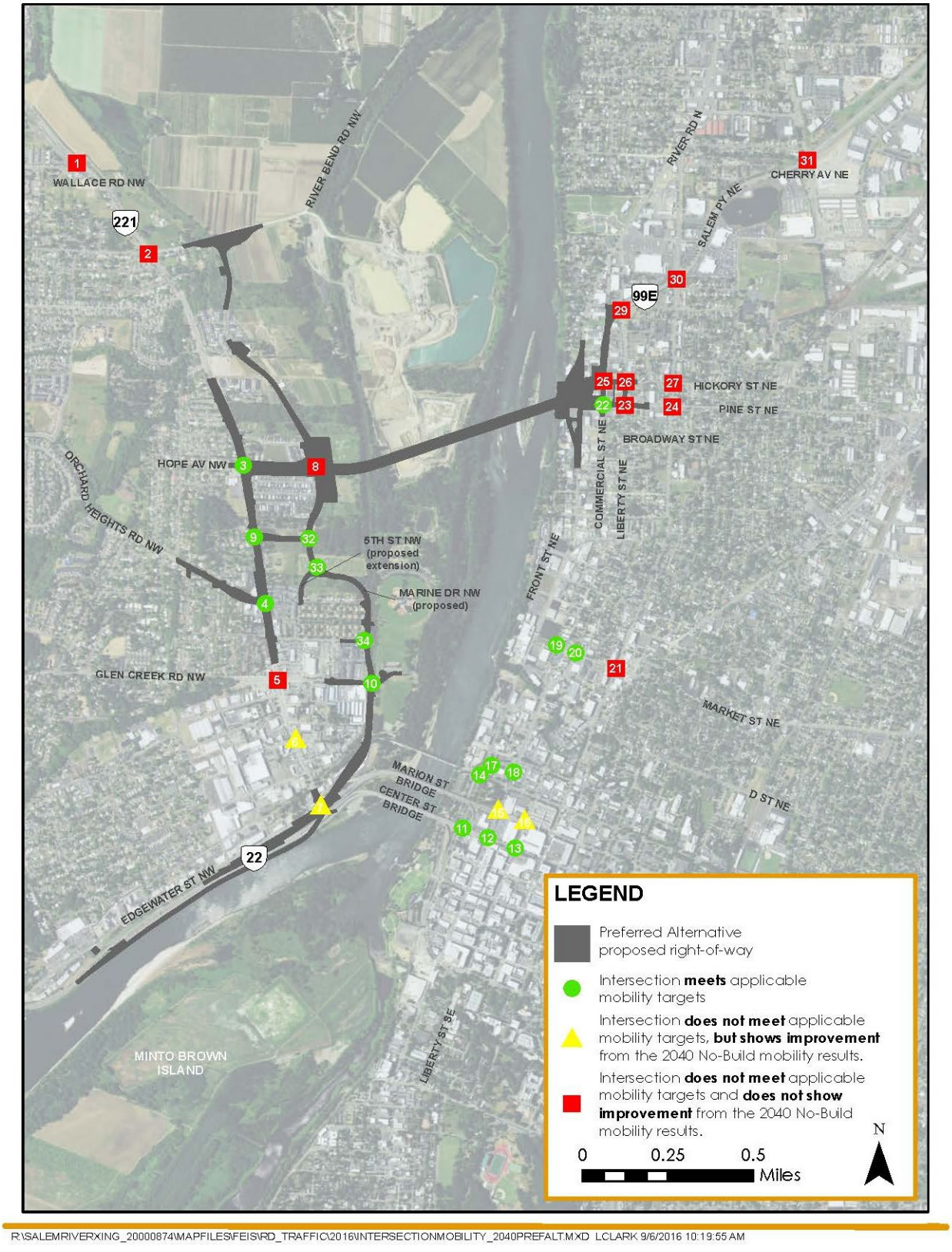

Figure 23: PM Intersection Mobility – Preferred Alternative (2040)

c. Will the Preferred Alternative result in more cars on the road compared to the No Build Alternative in 2040?

Based on modeling conducted by SKATS to determine Vehicle Miles Traveled (VMT), the 2040 Preferred Alternative increases regional VMT by less than 1% in the AM peak and by 1.5% in the PM Peak compared to the No Build. Additional details follow.

Vehicle use can be measured by the number of vehicle trips and/or the amount vehicle miles traveled (VMT). As part of its travel model, SKATS calculates the number of total trips per day in the SKATS area, which include both internal trips (i.e., both ends of the trip inside the SKATS boundary) and external (one or both trip-ends outside the SKATS boundary).[116] See Table 5.

Table 5: Daily and Peak Period Trips for Salem River Crossing, SKATS Model (2009 & 2040)[117]

	Total A.M. peak trips*	Total P.M. peak trips*	Total Daily Trips
2009	47,390	71,570	760,090
2040	66,890[a]	101,780[a]	1,090,550

[a] Note: As described in the EIS, the number of vehicle trips in 2040 crossing the river was reduced by 8% for all peak-period model runs, which assumes an increased share of ridesharing, bicycling, transit and telecommuting by 2040.

The SKATS model takes those generated trips, determines the origins and destinations, mode use (auto, transit, bike, and walk), the percent of trips during the AM or PM peak, and then assigns vehicles trips in the 1-hour AM peak or 1-hour PM peak to the road network. Table 6 shows the VMT for each peak period over the entire SKATS network summed for the two alternatives, showing percent difference between the two alternatives.[118]

Table 6: Change in VMT for region, 2040 No Build vs Preferred Alternative)

	No Build Alternative (2040)		Preferred Alternative (2040)		Percent Difference	
Metric	AM Peak	PM Peak	AM Peak	PM Peak	AM % Difference	PM % Difference
VMT	451,921	588,544	455,626	597,229	+0.8%	+1.5%

Whether the Salem River Crossing Preferred Alternative is built or not, there is expected to be more cars on the road in the future owing to the growth in population and employment in the Salem urban area and surrounding region. In addition, the advent of autonomous vehicles over the next decades has been predicted to significantly change driving behaviors.

Illustrating the challenges and uncertainty in predicting future vehicle trips, a recent policy brief from the University of California at Davis noted that an increase in automated vehicles would have both positive consequences (improved mobility for seniors, disabled persons, and under-aged drivers; improved safety; less parking demand) and negative consequences (increases in VMT and GHG emissions).[119]

d. In what ways can congestion be measured?

In transportation planning, there are at least three ways congestion is measured.

1. Congestion can be estimated at the system level. After running the SKATS model, for every link that represents a road a delay is calculated. This calculation is the difference in travel times between congested and uncongested conditions. For example, assume the AM Peak travel time on a section of Glen Creek Road NW is 30 seconds when the road is uncongested, but 70 seconds when there is congestion. Therefore, the road has a delay of 40 seconds in the AM Peak. Each road's (i.e., link in the model) delay is multiplied by the traffic volume during the AM Peak, then converted from seconds to hours, and then summed to get the system's vehicle hours of delay (VHD) for the AM Peak.

   Vehicle Hour Delay (VHD) for the AM Peak and PM peak is shown in Table 9, which shows the Preferred Alternative has lower VHD than the No Build scenario.

2. Congestion can be estimated at the individual intersection level. Congestion at individual intersections is described by either the delay (in seconds) for the intersection or by the ratio of volume at the intersection to the capacity of the intersection (volume/capacity or v/c). The Salem River Crossing EIS uses v/c ratios for 2012 and 2040 conditions when comparing alternatives.

3. Congestion can be estimated by queue lengths at specific intersections. When traffic volumes approach or exceed the capacity of an intersection, congestion occurs and vehicle queues form. The greater the volume is over the capacity, the greater the congestion with longer queues of vehicles. In the AM peak and PM peak time periods, there are significant queues on roadways that approach the bridges, particularly on the following eight locations: Wallace Road NW (southbound and northbound), Highway 22 (eastbound), Center Street Bridge exit ramps to Front Street; Marion Street NE (westbound); Commercial St NE (southbound); Front Street (southbound); Front Street approach to on-ramp to Marion Street bridge (westbound); and Ferry Street (westbound). These queues can frequently extend many blocks. Queue lengths are discussed further in the next question.

e. How will queue lengths change under the Preferred Alternative and No Build in 2040?

The Traffic and Transportation Technical Report Addendum compares the impacts of the No Build Alternative to the Preferred Alternative in 2040 for queue length. The following is quoted from the Report.[120] (Note: CBD is Central Business District.)

> *[The] queue lengths within the CBD at High Street for the preferred alternative are shorter in length compared to the No Build Alternative. During the PM Peak, the 95th percentile queue is significantly less, demonstrating a benefit of congestion relief with the preferred alternative.*

Additional details follow.

To augment volume analysis and demonstrate the level of congestion that occurs within the central business district due to congestion, traffic queues were modeled for westbound travel on Marion Street (across the Marion Street Bridge at High Street) in 2040. The results are shown in Table 7 for AM Peak and Table 8 for PM Peak. [121,122]

Table 7: Westbound Marion Street Queue Length, 2040 AM Peak No Build vs Preferred Alternative

Westbound Marion Street Queue Lengths (during AM Peak)			
	Existing Conditions	No Build Alternative (2040)	Preferred Alternative (2040)
Average Queue (feet)	70	70	65
95th % Queue (feet)	90	90	90

Table 8: Westbound Marion Street Queue Length, 2040 PM Peak No Build vs Preferred Alternative

Westbound Marion Street Queue Lengths (during PM Peak)			
	Existing Conditions	No Build Alternative (2040)	Preferred Alternative (2040)
Average Queue (feet)	135	245	215
95th % Queue (feet)	170[1]	350[2]	270
Notes: [1] 95th percentile volume exceeds capacity, queue may be longer [2] Queue shown is maximum after two traffic signal cycles			

Analysis was conducted for the 2018 Congestion Relief Task Force that modeled congestion and queuing on both sides of the Willamette River. Current conditions were compared to future conditions in 2035 under a scenario equivalent to the No Build Alternative. Based on the results presented to the Congestion Relief Task Force, under a No Build Scenario:[123124]

<u>During the AM Peak in 2035</u>

- On southbound Wallace Road, heavy congestion and backups will extend to Riverbend Road
- On eastbound Edgewater Road, heavy congestion and backups will extend to Eola Drive
- On northbound Liberty Street, heavy congestion and backups will extend to Owens Street

<u>During the PM Peak in 2035</u>

- On southbound Commercial Street, heavy congestion and backups will extend to the vicinity of Grove Street
- On westbound traffic on Marion Street, heavy congestion and backups will extend to 14th Street
- On northbound Liberty Street, heavy congestion and backups will extend to Miller Street

f. Is it true that the studies conducted for the Salem River Crossing Project indicate that traffic congestion in Salem will roughly triple between now and 2040 regardless of whether the Preferred Alternative is constructed?

The Traffic and Transportation Technical Report Addendum uses a variety of measures to evaluate traffic congestion, including queue lengths, volume/capacity ratios, vehicle miles traveled (VMT), vehicle hours traveled (VHT), and vehicle hours delay (VHD).[125] VHD is the most appropriate measure to report congestion at a regional level (which In this case is the full SKATS area).

The following compares projected VHD for the entire SKATS boundary in 2040 (No Build and Preferred Alternative) with 2012 VHD (with values rounded to the nearest tenth). [126]

The projected Vehicle Hours Delay (VHD) for the Preferred Alternative and No Build Alternative in 2040 are compared below to the VHD of 2012 (with values rounded to the nearest tenth). [127]

Projected 2040 AM peak hour VHD compared to 2012 VHD AM peak hour

- No Build: VHD for the AM peak hour is projected to increase by a factor of 3.1
- Preferred Alternative: VHD for the AM peak hour is projected to increase by a factor of 2.7

Projected 2040 PM peak hour VHD compared to 2012 VHD PM peak hour

- No Build: VHD for the PM peak hour is projected to increase by a factor of 3.9
- Preferred Alternative: VHD for the PM peak hour is projected to increase by a factor of 3.7

In summary, both 2040 scenarios will result in a significant increase in VHD at the regional level; however, VHD is greater for the No Build scenario compared to the Preferred Alternative.

Additional details follow.
Using VMT, VHD, and VHT measures provide an understanding of how overall travel distances and times may change from existing conditions (2012) to the year 2040 for the Preferred Alternative and the No Build. Table 9 provides the findings in the Traffic and Transportation Technical Report. [128] At a regional scale, (that is, the full SKATS area) it is common to report congestion on all roads by estimating the total vehicle hours of delay (VHD) on the system.

Table 9: Comparing Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours Delay

	Existing Conditions (2012)		No Build Alternative (2040)		Preferred Alternative (2040)	
Metric	AM	PM	AM	PM	AM	PM
VMT (miles)	321,630	412,961	451,921	588,544	455,626	597,236
VHT (hours)	8,711	13,233	14,549	27,102	14,093	26,875
VHD (hours)	1,342	3,256	4,100	12,584	3,588	12,153
Notes: VMT = Vehicle Miles Traveled; VHT = Vehicle Hours Traveled; VHD = Vehicle Hours of Delay Values are from Table 4.4-1 and 4.4-2 of the Traffic and Transportation Technical Report Addendum						

The technical report further notes: [129]

The preferred alternative VMT, VHD, and VHT measures provide an understanding of overall travel distances and times during the year 2040 and compared to the No Build Alternative (2040) [Table 9]. It is important to note, these are regional measures that are derived for the entire region, and trips, particularly those within east Salem, may not be influenced by the bridge. These measures, which offer a general comparison of regional travel between the No Build Alternative (2040) and the preferred alternative (2040), provide a proxy for indirect effects.

Of the three measures, VHD provides an indication of level of congestion system wide. Overall, the preferred alternative AM Peak VHD would experience a 12-percent reduction and a PM Peak 3-percent reduction compared to the No Build Alternative. VHT for the preferred alternative AM Peak would experience a 3-percent decrease and PM Peak would experience a 1-percent decrease compared to the No Build Alternative. VMT for the preferred alternative AM Peak and PM Peak would experience an increase of 1 percent.

VMT increases with the preferred alternative because the preferred alternative introduces more overall capacity, which accommodates more travel demand, resulting in more miles traveled. Specifically, VMT increases with the preferred alternative because the new bridge (and other infrastructure that is part of the preferred alternative) provides new routes. Some individual trips may be shorter (for example, a trip from Wallace at Hope to Keizer will be shorter using the new bridge as opposed to the existing bridge). Other individual trips will be longer, as the increased capacity of a new bridge may have a shorter travel time between locations but a longer travel distance. Both changes will occur, with the model forecasting an increase in VMT.

The greatest benefit of the preferred alternative crossing (in measures of VHD and VHT) is during the AM Peak. During the PM Peak, greater volumes cross the existing and preferred alternative crossing. The result is a smaller improvement over the No Build Alternative compared to the AM Peak. Note that these are regional measures that reflect traffic operations over the entire Salem metropolitan area and the bridge influence is relatively limited.

g. How are mobility standards (or mobility targets) determined?

ODOT determines the mobility standards for state-owned arterials.

The following summarizes Oregon state policy on mobility:[130]

ODOT measures vehicular highway mobility performance through volume to capacity (v/c) ratios. However, when making initial determinations of facility needs necessary to maintain acceptable and reliable levels of mobility on the state highway system, achieving v/c targets is not necessarily the determinant of a transportation solution(s). Through Policy 1F of the Oregon Highway Plan, the State acknowledges that achieving important community goals may impact mobility performance and that higher levels of congestion may result in certain areas.[131] For intersections with two intersecting highways, such as the Wallace Road (Oregon State Route 221 [OR 221]) and the Marion Street Bridge (OR 22) intersection, the highway with the lowest v/c target determines the applicable mobility target.

For City of Salem-owned roads:

The *Salem Transportation System Plan* Policy 2.5 dictates that traffic analysis being performed for non-state facilities use City of Salem mobility standards:[132]

- A v/c standard of 1.0 for all streets (applying to existing conditions and the future No Build Alternative) and
- Streets are to be designed to function at a v/c standard of 0.90 (applied to the Preferred Alternative).

h. Based on the mobility standards at intersections, how does the Preferred Alternative compare to the No Build in 2040?

In summary, for the 2040 No Build scenario congestion increases primarily along Wallace Road and downtown Salem. With the new Hope-Pine bridge, there is less congestion on Wallace Road (from Orchard Heights and south) and in downtown Salem and more congested intersections in northeast Salem along Commercial and Liberty and Broadway Streets.

Details follow.

The information presented in Table 10 are drawn from the Traffic and Transportation Technical Report and tallies the intersections in 2012 and 2040 above ODOT's or the City of Salem's mobility standards.[133] A higher volume/capacity (v/c) ratio means more congestion at the intersection. Also note that with the Preferred Alternative, the SKATS model forecasts a 15% increase in total bridge crossings, which would be distributed between the downtown bridges and the Hope-Pine bridge. [Note: In Table 10, NB = No Build and PA = Preferred Alternative.]

Table 10: Intersection Congestion – No Build vs. Preferred Alternative

Measure	2012 Existing	2040 NB[(a)]	2040 PA[(a)]	Notes
Total AM Peak + PM Peak bridge crossing volumes	16,150	22,630	26,020	Bridge crossing volumes are 15% higher for the Preferred Alternative due to the trip distribution algorithms in the SKATS model.
Total intersections analyzed	27	32	33	The No Build (which includes Marine Drive from the Salem TSP) adds five intersections on Marine Drive and one on Wallace Road that do not exist in 2012. The Preferred Alternative also adds the Hope Ave/Marine Drive intersection.
<u>AM Peak</u> Number of intersections over the mobility standard	5	7	13[(b)]	• In west Salem, more congestion is at Wallace/Hope and further north • South of Wallace/Hope, similar congestion except Wallace Rd/Edgewater is much less congested for PA. • In downtown and just north, v/c ratios are lower, especially at key bottlenecks • Along Commercial NE/Liberty NE/Broadway NE the No Build has zero intersections above the mobility targets. The Preferred Alternative has 6 intersections above mobility targets; 5 have v/c ratios between 0.94-1.01 (standard is 0.90).
<u>PM Peak</u> Number of intersections over the mobility standard	4[(c)]	16	17[(d)]	Though close in total number, there are differences between the No Build and Preferred Alternative on the location of congested intersections. • The following intersections in west Salem have far lower v/c ratios for the Preferred Alternative: Wallace/Hope, Wallace/Taggart, Wallace/Edgewater, Wallace/Becket • All the downtown intersections have lower v/c ratios for the Preferred Alternative. • The No Build has 3 intersections along Salem Parkway and 1 on Broadway above the mobility targets. The Preferred Alternative has those 4 intersections plus 4 additional intersections above mobility targets Commercial NE/Liberty NE/Broadway NE

Notes:
(a) NB = No Build, PA = Preferred Alternative
(b) Hope/Marine Drive is over the mobility standards in 2040 AM and PM peaks for the Preferred Alternative, but the intersection does not exist for the 2040 No Build
(c) Marion/Commercial v/c = 1.16; the other three are 0.90, 0.97, 1.01
(d) Hope/Marine Drive is over the mobility standards in 2040 AM and PM peaks for the Preferred Alternative, but the intersection does not exist for the 2040 No Build

Some additional notes about the intersection analysis:

1. When counting PM Peak intersections over the standard, the Preferred Alternative counts includes one additional intersection over the standard (Hope/Marine Drive) which is not an intersection in the No Build analysis.
2. When comparing the 2040 No Build and 2040 Preferred Alternative intersection and their v/c ratios, a few intersections are slightly over the standard for one alternative while either far under or far over the standard for the other alternative. This occurs for both the No Build Alternative and the Preferred Alternative at different locations in the analysis area.
3. At one intersection (Market St/Broadway) the v/c ratios for the PM peak are very close [at 0.94 (No Build) and 0.96 (PA)], but the standard is lowered from 1.0 to 0.90 and therefore counted as exceeding the standard only for the Preferred Alternative.
4. The most congested intersection in 2012 and 2040 continues to be Marion St/Commercial Street. In 2012, its v/c = 1.16; 2040 No Build v/c = 1.53; 2040 Preferred Alternative v/c = 1.33. The intersection includes no infrastructure changes with the Preferred Alternative; the improvement in 2040 v/c with the Preferred Alternative is due to a significant volume of traffic shifting from this downtown intersection to the new bridge at Hope-to-Pine.

In conclusion, a simple tally of the total number of intersections over the mobility standard gives a simple comparison of the No Build and Preferred Alternative traffic impacts. A more complete understanding requires looking at where congestion is changing and by how v/c ratios are either increasing or decreasing, as described above and in Table 10.

i. In effect, does the Preferred Alternative merely move areas of traffic congestion elsewhere in the area?

Construction of a new bridge and the associated roadways, including Marine Drive will distribute traffic volumes. In general, a new bridge would reduce congestion on Wallace Road NW (south of Orchard Heights) and in the downtown Salem (compared to the No Build), but add traffic to Pine Street NE; at several intersections where Commercial NE, Liberty St. NE and Broadway NE intersect with Pine St NE and the Salem Parkway; and along the newly constructed Marine Drive NW.

While recognizing that traffic volumes will add congestion at intersections at Hope/Wallace and Brush College/Wallace and several intersections where Pine Street and Hickory Street intersect with Commercial/Liberty/Broadway (in northeast Salem), is also important to consider the congestion relief at those key intersections that are today's bottlenecks. As shown in the Table 11, for the majority of these key intersections, the Preferred Alternative is less congested than the No Build.[134]

Table 11: Comparison of Volume/Capacity Ratios at Bottleneck Intersections

Bold font if a 2012 v/c is over the mobility standard
Shaded cells show lower v/c (less congestion) at the intersection in 2040.
No shading if both scenarios have v/c <=0.70 or there is no difference in v/c between scenarios.

		AM Peak v/c			PM Peak v/c		
ID #	**Bottleneck intersection**	**Existing (2012)**	**No Build (2040)**	**Pref. Alt. (2040)**	**Existing (2012)**	**No Build**	**Pref. Alt.**
5	Wallace Rd/Glen Creek	**1.07**	1.18	1.26	**0.97**	1.00	1.00
6	Wallace Rd/Taggart Rd	0.92	1.46	1.40	0.94	1.46	1.33
7	Wallace Rd / OR 22 Edgewater	**1.01**	1.50	1.09	0.76	1.07	0.97
11	Center St. Off/NB Front Street	**0.88**	1.24	0.49	**0.90**	1.02	0.63
12	Center St/ Commercial	**0.88**	1.08	0.96	0.51	0.74	0.64
15	Marion St/Commercial St.	*0.55*	*0.64*	*0.66*	**1.16**	1.53	1.33
18	Division /Commercial St.	**0.90**	0.90	0.55	0.81	1.02	0.80
22	Commercial/ Pine St.	0.58	0.54	1.12	0.52	0.65	0.59
23	Liberty/Pine St.	0.38	0.47	0.83	0.56	0.67	1.20
30	Salem Pkwy / Broadway	0.83	0.80	0.91	**1.01**	1.21	1.42

Another way to see how traffic volumes change is to show a map of these changes. Figure 24 illustrates analysis conducted by SKATS staff and displays the differences in travel volumes between the 2040 No Build and 2040 Preferred Alternative.[135]

- **Roads in blue** show where 2040 traffic volumes increase due to the Preferred Alternative (compared to the 2040 No Build), such as Marine Drive, Wallace Road (north of Hope St.), Pine Street, sections of Broadway NE, and Salem Parkway, and the new bridge from Hope to Pine.
- **Roads in red** show where traffic volumes decrease with the Preferred Alternative, such as the Marion Street and Center Street bridges, Wallace Road (south of Hope St.), Commercial St NE, and most downtown arterials.

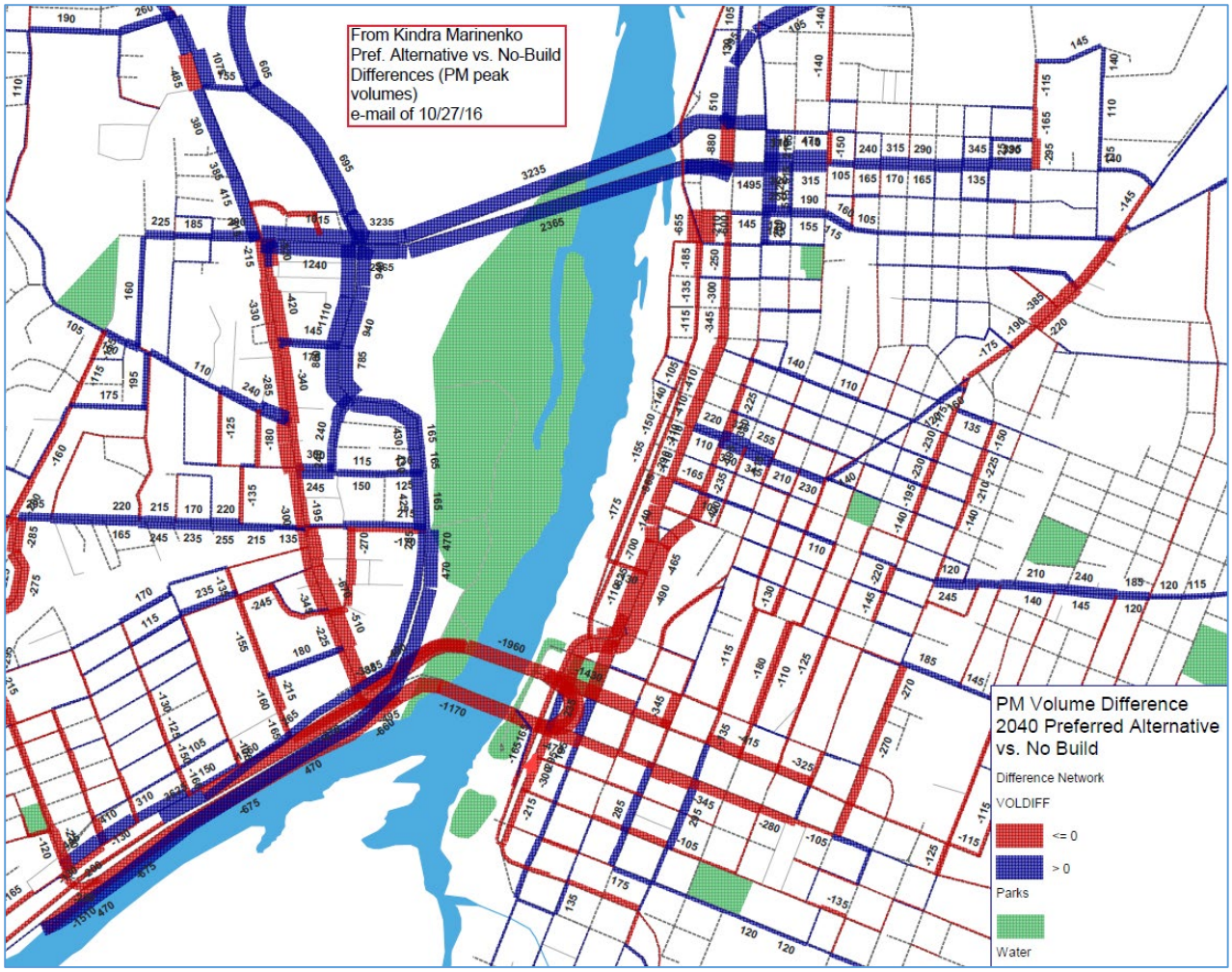

Figure 24: PM Travel Volumes – No Build vs. Preferred Alternative (2040)

14. LATENT DEMAND, INDUCED TRAFFIC DEMAND AND THE SALEM RIVER CROSSING PROJECT

a. What do "Latent Demand" and "Induced Demand" mean in transportation planning?

Both "latent demand" and "induced demand" generally refer to the increment of extra vehicle traffic that occurs as a result of a capacity increase, a phenomenon of supply and demand. As defined by Professor Patricia L. Mokhtarian of the University of California, Davis.[136]

Latent demand: Means *dormant*, or pent-up demand for travel that is desired but *unrealized* because of constraints.

Induced demand: Means *realized* demand that is generated (induced or "drawn out") because of improvements to the transportation system

ODOT's transportation modeling section prefers to use the term "latent demand" rather than "induced demand." Latent demand refers to trips that would occur (that is, trips that are desired), but these trips are not taken because of traffic congestion. For example, an individual might want to do some shopping after work. However, because of traffic congestion (i.e., a "constraint") coupled with constraints on time available to sit in traffic, that individual may choose to forego the shopping trip. If the congestion is decreased by widening a road, widening an intersection, reducing the number of vehicles on the roadways, or improving the signal timing, the same individual might then decide to do that shopping trip. This new trip would be a latent demand trip.

Induced demand implies that new trips (trips that would otherwise not occur) are generated ("induced") by the presence of the extra capacity provided by a road widening or new facility. For example, an individual might rarely go out to a movie theater owing to the distance involved. However, if the route to the theater is made shorter by a new road or bridge, that same person may might go to the theatre more often. This new trip is an example of an "induced demand" trip.

The difference is subtle but important, reflecting that road facilities do not by themselves create additional trips. Rather, it is specific situations and the behaviors of individuals combined with the changes in constraints that determine if a trip is latent or induced.

As stated by Professor Robert Cervero of the University of California, Berkeley:[137]

> *Many induced-demand studies have suffered from methodological problems that, I believe, have distorted their findings. The first pertains to causality: Are rising traffic volumes caused by more road capacity? Or, might added road capacity be even more strongly caused by historical growth in traffic? Most studies have dealt inadequately with the two-way relationship between road supply and demand.*

The phenomenon that traffic volumes increase when roads are widened (or additional capacity is added, such as new roads or bridges) involves more than latent or induced trips. Added capacity can also result in shifts in travel routes, travel modes, and travel times. This is commonly called a "triple convergence." As noted by Professor Cervero: [138]

> *In the near term and in reasonably congested settings, road improvements stimulate what [Anthony] Downs [in papers published in 1962 and 1992] termed "triple convergence" – motorists switch modes, routes, and times of day to exploit available capacity. Among these redistributions, only mode shifts add new trips and are thus bona fide contributors to induced demand. While route and schedule switches may reduce some of the travel-time savings conferred by a project, they do not represent new vehicle travel (assuming trips do not become more circuitous). Trips might also lengthen as motorists opt to travel farther because of freer flowing traffic. Added to this are suppressed (and presumably lower value) trips that are unleashed by faster-moving traffic, also known as "latent" demand.*

In summary, the extra traffic volumes that often occur when capacity is added come from multiple sources: latent trips, induced trips, shifts in travel time, shifts in route used, shift from one mode

(e.g., transit, bike) to automobiles, longer trips, and (over time) increased trips due to population growth or other land use changes.

Researchers and academics such as Professors Mokhtarian and Cervero have done extensive studies to determine if and how latent or induced demand occurs and to what level is new capacity absorbed due to population growth, shifts in use, or new "induced" trips. It can be extremely difficult to pinpoint causes and effects, even when using intricate models like Cervaro's Path Analysis that traces the chain of events (in particular, land use investments) between an intervention (for example, road expansion) and outcome (such as increased traffic) over a number of years.[139] Cervero's concluding remarks are reproduced below:[140]

> *ROADS AND DECISION-MAKING*
> *There's still a lot we don't know about the induced-demand phenomena, although recent research has filled some knowledge gaps. Nonetheless, highway critics have taken fairly firm positions on the issue, using past research to shoot down any and all road proposals. To the degree past studies have been problematic, so has policy advice.*
>
> *Over the last several decades and in many corners of America, claims of induced demand have stopped highway projects in their tracks. This is wrong-headed. Highway investment decisions should be based on a full accounting of costs and benefits over the service life of a facility. Induced-demand studies have told us only that some benefits of new or expanded highways get eroded over time. This is important to know, for it gives us a handle on the numerator of the benefit/cost ratio. However, induced-demand studies say nothing about other benefits conferred by highways—e.g., increased economic productivity or satisfaction of one's preference for suburban living.*

b. Does the model used to estimate future traffic volumes fully account for latent demand?

The short answer is that the SKATS model partly accounts for latent demand. (See preceding question for a discussion of the term.) For example, in the model trips across the river increase by 15% for the Preferred Alternative versus the No Build Alternative. Latent demand is not one of the separate sub-models in the SKATS 4-step model process, but characteristics of latent demand are demonstrated by the SKATS model in the following ways:

1. Redistribution and re-routing of origin-destination pairs of internal trips. As part of the 4-step model, the destinations of "internal trips" (trips with both ends inside SKATS) are recalculated when new capacity is added, which is particularly evident when a new bridge is added to the SKATS model network. With a new bridge added to the network, some origin-destination (O-D) pairs have routes that are shorter in distance or travel time and the model will change the destination of a trip (e.g., sending a shopping trip from west Salem to north Salem (e.g. Fred Meyers on Broadway) rather than keeping both trip-ends in west Salem). As a result of the model's redistribution of traffic, there is a 15% increase in trips crossing the Willamette River in the AM and PM peaks for the 2040 Preferred Alternative model

compared to the 2040 No Build model.[a] However, additional trips were not added to the model, but rather trips changed their destinations which have the result of increasing vehicle volumes on the bridges. This change in trip destinations is expected as part of the traffic model and demonstrates one part of latent demand.

2. Mode Choice model. The mode choice part of the model determines the number of internal trips by auto, transit, walk, or bike and is based on several factors including travel times. When new road capacity is added and travel times between O-D pairs are reduced for autos, it can result in some trips switching modes, for example from transit to autos. In the case of the Preferred Alternative, only 50 trips switch modes to the auto mode. However, a new bridge affords the potential of new transit routes over the new bridge. This could switch some trips from auto to transit, although new transit routes were not included in the Preferred Alternative. The Preferred Alternative also adds to a network of multi-use paths, which could result in mode switches from auto to bike or walk.

3. Routes of external trips. The origins and destinations of external trips (trips with one or both trip-ends outside SKATS) are not recalculated for the Preferred Alternative; the total number of these trips and the number that cross the Willamette River are fixed and identical for both the 2040 No Build and Preferred Alternative models.[b] However, with the extra capacity in the 2040 Preferred Alternative model network, external trips will be assigned to different routes. While some routes will continue taking the existing Center Street and Marion Street bridges, other routes will use the new bridge and new roadways (such as the new Marine Drive).

When the model is run, three of the four model steps (destination choice, mode choice, assignment to the road network) are calculated and run many times and there is feedback between the steps in the model sequence until a convergence is reached.

There are some factors of latent demand that cannot be evaluated with the SKATS model. These are discussed below:

- Shift in time of day. The SKATS model is set up to forecast travel demand changes in the 1-hour AM peak and the 1-hour PM Peak periods. However, based on traffic counts, the peak periods are extending beyond 1-hour in some areas of SKATS, particularly during the PM period and especially on the Marion Street Bridge where peak volumes are spread over two hours. By 2040 this spreading of peak traffic is expected to be even more pronounced. For example, the 2040 No Build PM peak forecasts a demand of 8,210 vehicles in the PM peak hour on the Marion Street Bridge, which is much higher that the capacity of approximately 5,000 vehicles per hour. One aspect of latent demand (part of the "triple convergence") is that when extra capacity is added to the network, one can expect trips to shift from the peak "shoulders" back into the peak

[a] 15% is the combined percentage ffor both AM and PM peaks. Separately, AM trips across the river increase 10% and PM trips across the river increase 18%.

[b] Another way to say this is that external trips are not run through a destination choice sub-model.

period. This would be true both for the scenario of building a new bridge at Pine Street or for widening the existing Marion and Center Street bridges.

- Change to total (and O-Ds) of external trips. As noted above, SKATS uses a fixed number of external trips in 2040 for both No Build and the Preferred Alternative travel models. However, there could be some increase in external trips (either latent trips or induced trips) that enter or go through the SKATS area because of a new bridge. However, SKATS has no methods or models for calculating this increase.

- ascLonger-term land use changes. Analyzing longer-term land use changes (within or outside of Salem) as a result of a new bridge is not part of the SKATS model. Those potential changes would require a calibrated land use model that is tied to transportation factors to see if housing or development in SKATS (or other areas such as Dallas or Monmouth/Independence) might change as a result of a new bridge. This was tested about 10 years ago with ODOT's first-generation land use model LUSDR (Land Use Scenario DevelopeR) which is no longer supported by ODOT. It showed a small increase in housing units by 2030 in west Salem owing to a new bridge compared to the No Build, but did not have the ability to estimate land use changes on other parts of Polk County.

None of the four-step travel models used in Oregon account for latent demand any more than the SKATS model. As noted in the earlier answer, the nature of latent or induced demand is complex and current best-practice models can only approximate some of that complexity.

c. Does the model used by SKATS underestimate the amount of congestion that would occur in the Preferred Alternative?

As noted in the previous answers, the SKATS model does partly account for latent demand. That is why total bridge crossings in the AM Peak and PM Peak are 15% more for the Preferred Alternative than the No Build. The extent that other travel changes may happen (e.g., shifts in travel time to take advantage of the added capacity) is beyond the current capabilities of the travel model.

Additional details follow.

Assuming travel behavior does not substantially change, growth in population and employment (and their trips within, into, and through the Salem area) will result in increased traffic and congestion by 2040.

For the No Build Alternative in 2040, the modeling forecasts a significant increase in travel over the existing bridges that will cause an increase in congestion along roads on both sides of the river. Compared to 2009, there will be:

- A 56% increase (2300 more vehicles) on the Center St bridge in the AM peak; and
- A 46% increase (2600 more vehicles) on the Marion St. bridge in the PM peak.

For the Preferred Alternative in 2040, because thousands of trips will use the new bridge, the growth in traffic volumes on the existing bridges will be lower. Compared to 2009, the model forecasts there will be:

- A 5% increase (190 more vehicles) on the Center St bridge in the AM peak;
- A 13% increase (710 more vehicles) on the Marion St. bridge in the PM peak;
- About 2600 vehicle trips in the AM Peak on the new bridge; and
- About 3100 vehicle trips in the PM Peak on the new bridge.

In summary, the model forecasts a 15% increase in trips crossing the river in 2040 with the Preferred Alternative, but the trips will be divided between the existing Marion and Center Street bridges and the new Pine-to-Hope bridge.

However, it is possible that the additional capacity will result in even more "extra" trips (either latent or induced trips) beyond the 15% forecast by the model.[141] If those extra trips occur, there will be fewer years of travel time benefits with a new bridge. In the case of a bridge in Salem, by 2040 all the bridges will be at or above their 1-hour capacity, so additional latent or induced demand would not be able to be accommodated on the bridges in a peak hour, and any latent/induced trips would expand the duration of congestion.

d. Does increasing roadway capacity reduce congestion and are there other actions that can be taken to slow the future rate of congestion?

Anthony Downs is an economist who has written on this subject for years and been quoted extensively by many. In his 2004 policy brief for the Brookings Institution, Downs writes about his principle of triple conversion (described in an earlier answer) and his views on congestion, including the following quotes from the policy brief:[142]

1. *Experience shows that if a road is part of a larger transportation network within a region, peak-hour congestion cannot be eliminated for long on a congested road by expanding that road's capacity.*
2. *The triple convergence principle does not mean that expanding a congested road's capacity has no benefits. After expansion, the road can carry more vehicles per hour than before, no matter how congested it is, so more people can travel on it during those more desirable periods. Also, the periods of maximum congestion may be shorter, and congestion on alternative routes may be lower. Those are all benefits, but that road will still experience some period of maximum congestion daily.*

3. *While it's practically impossible to eliminate congestion, there are several ways to slow its future rate of increase:*
    a. *Create High Occupancy Toll (HOT) lanes*
    b. *Respond more rapidly to traffic blocking accidents and incidents*
    c. *Build more roads in growing areas*
    d. *Install ramp metering*
    e. *Using Intelligent Transportation System devices to speed traffic flows*
    f. *Create more High Occupancy Vehicle lanes*
    g. *Adopt "parking cash-out" programs (replace free employee parking with a stipend for carpooling or transit)*
    h. *Restrict very low-density peripheral development*
    i. *Cluster high-density housing around transit stops*
    j. *Empower regionally focused transportation and land use planning*
    k. *Raise gasoline taxes*
4. *[Peak-hour traffic congestion] should not be regarded as a mark of social failure or misguided policies. In fact, traffic congestion often results from economic prosperity and other types of success.*
5. *Although traffic congestion is inevitable, there are ways to slow the rate at which it intensifies. Several tactics could do that effectively, especially if used in concert, but nothing can eliminate peak-hour traffic congestion from large metropolitan regions here and around the world. Only serious economic recessions—which are hardly desirable—can even forestall an increase*

e. Historically, what has been done in Salem to add road capacity to address congestion and an increasing population?

In the mid-1970s, Salem's transportation system was very different from what it is today. For example:

1. Commercial Street was largely four lanes south of downtown (two southbound, two northbound) with no center turn lane;
2. Hawthorne only existed between Monroe Avenue and Sunnyview Road.
3. Pringle Parkway did not exist;
4. The I-5/Salem Parkway interchange did not exist;
5. Salem Parkway did not exist;
6. The I-5/Kuebler Blvd interchange did not exist;
7. Kuebler Blvd did not exist;
8. Mission Street was two lanes with one lane in each direction between 25th Street and the railroad crossing at 14th Street; and
9. Mission Street crossed the railroad track at grade at 14th Street.

Over the past 40 years, Council has approved capacity-increasing projects throughout Salem. These have largely been funded through local bond measures. Figure 25 overlays the population of Salem with major transportation projects that added roadways, widened roadways, or widened intersections to address congestion caused by a growing population. A brisk summary about the

reprogramming of federal funding from the I-305 project into other local transportation projects is presented in "A Mission Street Retrospective," which is provided as Appendix F.[143]

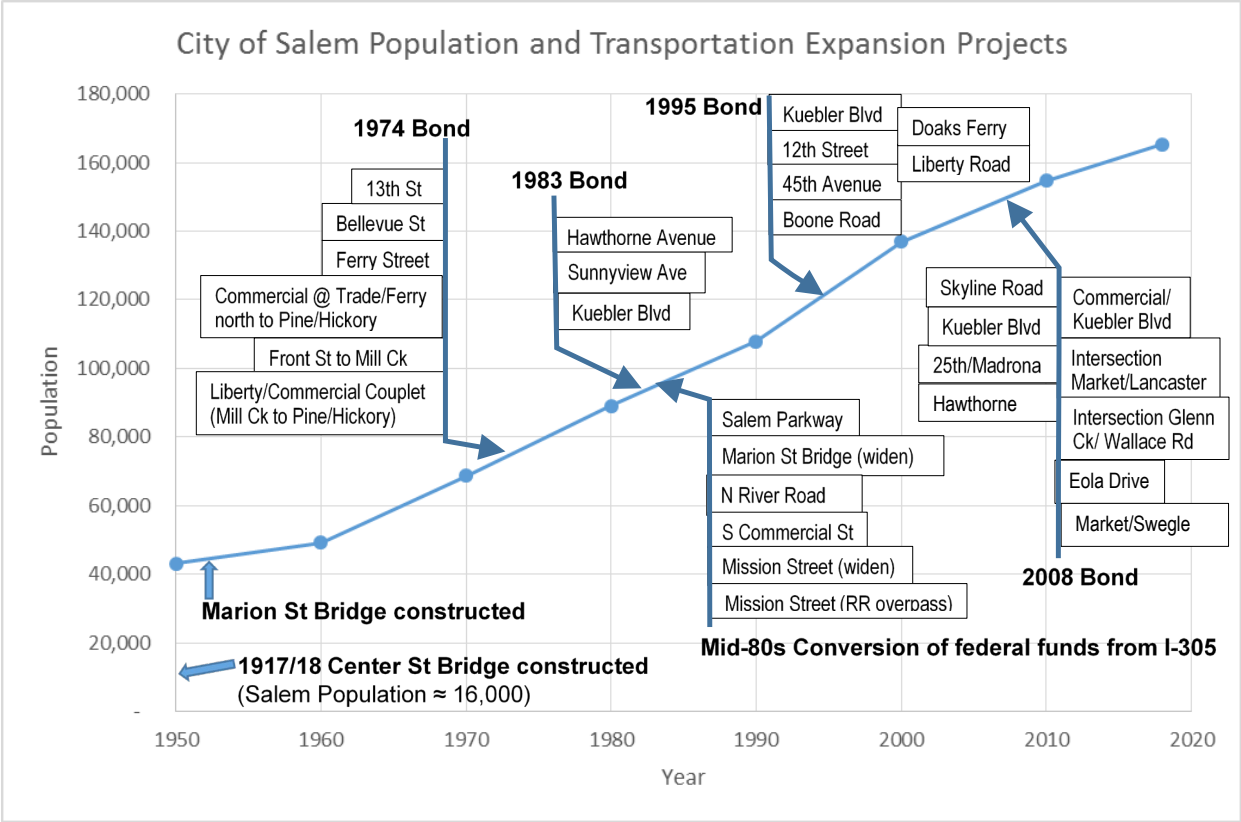

Figure 25: Salem Population and Major Transportation Projects over the Past 40 Years

15. THE SALEM RIVER CROSSING PROJECT AND DAILY TRAFFIC

a. What are some of the different ways to measure traffic?

There are three distinct ways to report traffic counts and each has a use depending on how the information is to be used:

1. Average Daily Traffic (ADT) means the average of a limited number of daily counts for a roadway. For example, count traffic for three days, add all three days of counts, and divide by three (e.g., 11,500 + 13,000 +12,500 = 37,000 / 3 = 12,333). An agency will typically apply a seasonal adjustment when reporting a short-duration count like this.

2. Average Annual Daily Traffic (AADT) means the average of one calendar year of counts including all seven days of the week. Roads that have permanent counters (loops in the pavement or video counters) provide the needed data for determining AADT.

For example, the AADT for 2017 for the combined Center Street and Marion Street bridges was 94,984.

3. Average Weekday Traffic (AWDT) means averaging the counts for weekdays only. ODOT includes Monday through Thursday counts in AWDT and excludes Fridays.

   For example, the AWDT for 2017 for the combined Center Street and Marion Street bridges was 99,841.

With robust data, there can be reporting of ADT for specific time periods, such as the monthly ADTs for the bridges shown in Table 12 later in this section. Two more examples:

1. Based on 2017 daily counts from ODOT's permanent counters, traffic on the Center Street and Marion Street bridges is usually highest on Fridays. An average of all the Friday counts results in an ADT of 106,820.

2. An analysis of Monday through Friday bridge traffic in 2017 showed that 72% of all the weekdays had a traffic count over 100,000 vehicles.

b. What is the average annual daily traffic across the Marion and Center Street bridges and how has it changed over time?

The Average Annual Daily Traffic for 2017 was 94,984 vehicles. This value was determined by adding the traffic on both the Marion Street and Center Street bridges.

Figure 26 shows how traffic volumes on the bridges have changed since 1993. Between 1993 and 2006 traffic volumes increased, peaking at approximately 88,000 largely due to housing growth in west Salem and Polk County. During and after the Great Recession of 2007/2008, there were large swings in gas prices, unemployment in Polk County peaked at 9%, and there was a sharp decline in new housing (west Salem building permits changed from over 400 units per year in 2004/2005/2006 to less than 50 per year in 2008 to 2011). [144] These factors caused traffic volumes to drop between 2007 and 2011. Traffic volumes have increased over the last seven years as the economy has improved and new housing units in west Salem have been constructed.

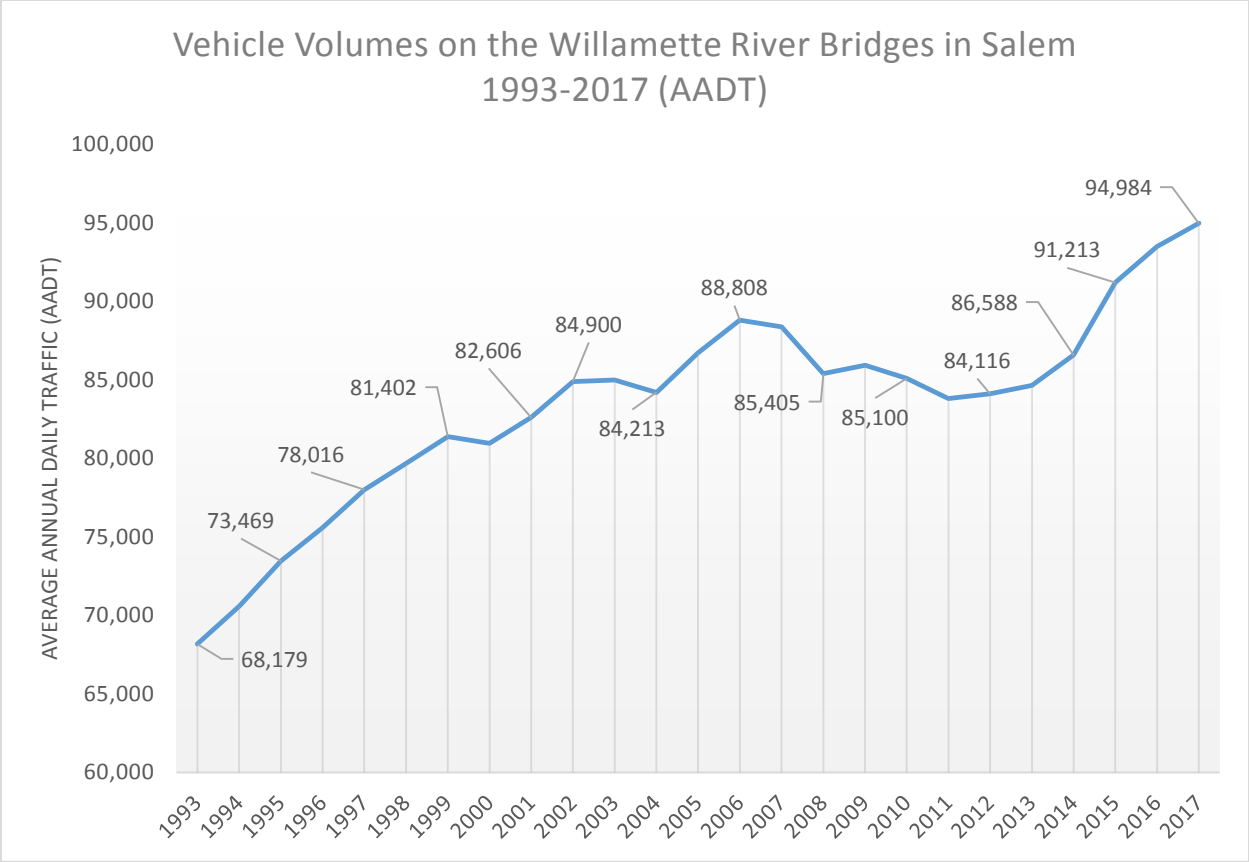

Figure 26: Average Annual Daily Traffic on Willamette River Bridges (1993-2017)

c. How does traffic over the bridges vary by month?

Traffic volumes vary during the year, as shown in the monthly bridge counts provided in Table 12 for the combined Marion and Center Street bridges. Counts on the bridges are always lower in the winter months and higher in the summer months. The seven months of April through October all have ADTs over 97,000.

Table 12: Average Daily Traffic over Willamette River Bridges by Month (2017)

Month	ADT
January	83,368
February	92,810
March	94,214
April	98,134
May	99,306
June	99,790
July	97,610
August	98,044
September	97,364
October	97,091
November	91,884
December	90,187

d. How is the average daily traffic across the bridges expected to change over the next 20 years?

Changes to future traffic are dependent on many factors, primarily the growth of housing and the rate of employment in the area, especially in west Salem and the rest of Polk County.

The SKATS model is designed to forecast travel demand in the AM Peak hour and PM Peak hour, not to forecast how ADT changes. Table 13 shows AM Peak and PM Peak traffic forecasts on the bridges from the SKATS models for the 2009 base-year, the 2040 No Build, and the 2040 Preferred Alternative.

The analysis for the Salem River Crossing Project assumes that efforts to increase transit, ridesharing, other demand management techniques, and bicycle and pedestrian use for trips across the bridge will reduce peak-hour vehicle volumes by eight percent compared to volumes if these efforts were not implemented. This reduction is just for trips across the bridges and was applied equally to all No Build and Preferred Alternative scenarios.

There are several points to note from the forecasts in Table 13:[145]

1. The AM traffic (eastbound) on the Center Street Bridge heading into downtown increases 56% in the No Build scenario, but with the Preferred Alternative scenario increases 5%.

2. The PM traffic (westbound) on the Marion Street Bridge heading into west Salem increases 46% in the No Build scenario, but with the Preferred Alternative scenario increases 13%.

3. Compared to 2009 traffic volumes, the No Build scenario forecasts a 40% increase in trips over the bridges during the peak periods, while the Preferred Alternative scenario forecasts a 61% increase.

Table 13: Total Bridge Trips – Increases from 2009 to 2040 No Build vs. Preferred Alternative during AM and PM Peaks

	2009 Model	**2040 No Build Model**	No Build changes from 2009	**2040 Preferred Alternative Model**	Preferred Alternative. changes from 2009
A.M. Peak (WB - Marion St.)	2490	3060	23%	2350	-6%
A.M. Peak (EB – Center St.)	4090	6400	56%	4280	5%
A.M. Peak (WB - **new bridge**)	-	-	-	1190	-
A.M. Peak (EB – **new bridge**)	-	-	-	2600	-
Total AM Peak Crossings	**6580**	**9460**	**44%**	**10,420**	**58%**
P.M. Peak (WB - Marion St.)	5620	8210	46%	6330	13%
P.M. Peak (EB – Center St.)	3950	4960	26%	3940	0%
P.M. Peak (WB - **new bridge**)	-	-	-	3140	-
P.M. Peak (EB – **new bridge**)	-	-	-	2190	-
Total PM Peak Crossings	**9570**	**13,170**	**38%**	**15,600**	**63%**
Total AM + PM peak crossings	**16,150**	**22,630**	**40%**	**26,020**	**61%**

e. How does today's average daily traffic across the bridges compare to average daily traffic on I-5 near Salem?

Table 14 compares the Average Annual Daily Traffic (AADT) for the bridges and several locations on I-5.[146] The AADT for the Center and Marion Street bridges is similar to the AADT on I-5 south of the Aurora-Donald Interchange.

Table 14: Average Annual Daily Traffic Comparisons – Salem Bridges vs. I-5

Location	2017 Annual Average Daily Traffic (AADT)
I-5 south of Market Street Interchange	99,800
I-5 south of Brooks Interchange	99,700
Center St. and Marion St. Bridges	**94,800**
I-5 south of Aurora-Donald Interchange	93,700
I-5 north of Kuebler Blvd Interchange (bridge over Turner Rd)	82,500
I-5 0.50 miles south of Kuebler Interchange	66,100
I-5 south of Commercial St Connection	67,800

f. Of the weekday traffic crossing the bridges, what percent of average daily traffic is considered "local"?

Differentiating between "local" (i.e., trips with both ends in Salem-Keizer), "regional" (i.e., trips with one end in SKATS and the other outside SKATS, such as Dallas to Salem), and "pass-through" (i.e., trips with both ends outside of SKATS) traffic has always been a challenge because data on the origins and destinations for all trips are not available. However there are sources of information such as surveys and traffic volume counts that can help answer this. As a generalization, the data show that between 55% and 60% of trips are local, with the remainder having either one trip ending outside Salem-Keizer (e.g., Dallas to Salem) or both trips ending outside Salem-Keizer (e.g., Stayton to the Oregon Coast).

Additional details follow.

1. SKATS Origin-Destination Study.[147] In 1994, ODOT and SKATS collaborated on an origin-destination survey where drivers were handed postcards to fill out and mail back. About 3,600 of the 10,000 surveys were returned. The survey results were as followed:

   Eastbound trips on the Center Street Bridge: 59% had an origin in west Salem and 41% had an origin outside of west Salem (originating, for example, from other areas of Polk County such as Dallas, Monmouth, and Independence), Yamhill County, the Oregon coast, and other regions). For destinations after crossing the bridge, 87% ended their trip in the Salem-Keizer (Marion County side) and 13% had destinations outside of Salem-Keizer (for example, Portland, Woodburn, Wilsonville, and Stayton).

   Westbound trips on the Marion Street bridge: 64% had a destination in west Salem, 30% had destinations further west on Highway 22 (Dallas, Monmouth/Independence and beyond), and 6% went to areas northwest (Amity, Dayton, McMinnville, etc.). For origins before crossing the bridge, 89% started their trip inside Salem-Keizer (Marion County side) and the other 11% had origins outside of Salem-Keizer.

2. ODOT Traffic Counts.[148] ODOT's traffic counts on the two bridges and other locations along Highway 22 and Highway 221 (Wallace Road) can provide a picture of travel over the bridges, although without the final origins and destinations some assumptions have to be made.

   Marion Street Bridge. Of the 47,300 daily vehicles on the Marion Street Bridge in 2017, an estimate of 29,000 (62%) go into west Salem, of which 7,500 use the Rosemont exit. About 13,000 to15,000 continue west on Highway 22 deeper into Polk County or further and 2,000 to 4,000 go north on Highway 221 (Wallace Rd NW) toward Dayton.

   Center Street Bridge. Of the 47,500 daily vehicles on the Center Street Bridge in 2017, an estimate of 29,000 (62%) come from west Salem (of which 6,500 use the Rosemont

entrance ramp). About 13,000 to 15,000 come from Highway 22 in Polk County, and about 2,000 to 4,000 come from Highway 221 north of the Salem city limits.

3. Census Transportation Planning Products, Journey to Work Data).[149] SKATS staff calculated journey-to-work Census data (2006-2010) looking specifically at trips over the bridges from the larger cities in Polk and Yamhill counties.

    a. Of 12,290 workers residing in west Salem: 7,353 (60%) work in Salem-Keizer east of the river and 655 (5%) work in north Marion County or the greater Portland area.
    b. Of 13,695 workers residing in Dallas, Independence, and Monmouth: 4,014 (29%) work in Salem-Keizer east of the river. An additional 245 (2%) work in north Marion County or the greater Portland area.
    c. Of 3,395 workers residing in McMinnville: 485 (14%) work in Salem-Keizer east of the river.

16. THE SALEM RIVER CROSSING PROJECT AND ITS EFFECT ON TRAVEL TIMES

a. How do vehicle miles traveled and travel times during peak hours compare between the No Build and the Preferred Alternative?

Average travel times in 2040 are lower (by about half) for the Preferred Alternative than for the No Build. Additional details are provided below.

The Salem River Crossing Project Air Quality Technical Report calculated year 2040 Vehicle Miles Traveled (VMT) and travel times for the 23 origin-destination (O-D) pairs.[150] Table 4.2-4 from the report compared Annual VMT and Average Travel Times forecasted for 2040. The table is reproduced as Table 15.

Table 15: Annual Vehicle Miles Traveled Comparison by Alternative (2040)

TABLE 4.2-4
Annual VMT Comparison by Alternative (2040)
Air Quality Technical Report Addendum, Salem River Crossing Project FEIS

Alternative	Forecasted Annual VMT for 2040 (millions)	Forecasted Average Speed (mph)	Forecasted Average Travel Time Along Each OD pairs (minutes)
Existing Conditions (2012)	42.38	25.0	13.9
No Build Alternative	53.26	13.1	27.7
Preferred Alternative	56.44	21.9	14.3
Preferred Alternative Change from No Build	6.0%	67.1%	-48.4%

Note: All VMTs are for 2040 except for the existing conditions, which is for 2012. The increase in VMT for the preferred alternative compared to the No Build alternative is offset by the increase in forecasted average speed and decrease in forecasted average travel time.

Source: CH2M, 2016.

For the 23 O-D pairs in the year 2040:

- Average travel times in 2040 for the Preferred Alternative are lower compared to the No Build Alternative.

  14.3 minutes (Preferred Alternative) versus 27.7 minutes (No Build).

- Vehicle Miles Traveled in 2040 for the Preferred Alternative are higher compared to the No Build Alternative.

  56.44 Million miles (Preferred Alternative) versus 53.26 million miles (No Build).

- Average travel times in 2040 for the Preferred Alternative are approximately equal to existing conditions in 2012.

  14.3 minutes (Preferred Alternative) versus 13.9 minutes (No Build).

- Average speeds in 2040 for the Preferred Alternative are higher compared to the No Build Alternative

  21.9 mph (Preferred Alternative) versus 13.1 mph (No Build).

b. How many minutes, on average, will actually be saved during peak times if the Salem River Crossing Project is completed?

According to the travel time savings calculated in the Air Quality Technical Report, the Preferred Alternative will save an average of 12.7 minutes per trip in the PM Peak in 2040. This is according to

the calculations of travel times for Origin-Destination (O-D) pairs. (See also the answer to the preceding question.)

Appendix D for the Air Quality Technical Report did not include travel time savings for the O-D Pairs during the AM Peak. The modeling for the Preferred Alternative forecasts 15,600 trips over the three bridges (Center Street, Marion Street, and Pine-Hope) in the 2040 PM peak. Multiplying the travel savings of 12.7 minutes per trip would equal a total savings of about 3,300 hours every weekday during the PM peak. Depending on the O-D pair, travel time savings ranges from 4.5 minutes to 24 minutes.

c. Have there been any traffic studies that show the impact in increased travel times for residents of west Salem if the Rosemont exit is closed?

To date, no analysis has been conducted to evaluate the impact on travel times owing to changes at the Rosemont intersection with Highway 22. Additional details are provided below.

As part of the Preferred Alternative, the existing westbound exit ramp from Highway 22 to Rosemont Avenue would be closed for safety reasons. This is required owing to the weaving that would occur otherwise with westbound traffic heading to the Rosemont exit and westbound traffic entering from the new onramp from Marine Drive.[151] The onramp from Rosemont Avenue onto eastbound Highway 22 will remain open and continue to function as it does today.

The long-range proposal for this interchange area is to determine if the westbound exit ramp to Rosemont Avenue can be replaced with an exit ramp near Eola Drive. There would need to be planning and engineering work to determine a design and connection for this new exit ramp.[152] Planning and engineering work must be done before any changes are made to the exit ramp to Rosemont. Moving the Highway 22 westbound exit to Eola Drive instead of Rosemont Avenue moves the exit about 900 feet to the west, so any extra time traveling to exit at Eola Drive is expected to be relatively small.

17. THE SALEM RIVER CROSSING PROJECT AND ITS IMPACTS ON WALLACE MARINE PARK

a. What would it mean if a Section 4(f) *de minimis* determination is made for the impacts of the Salem River Crossing Project on Wallace Marine Park?

Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 that requires consideration of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development. For publicly owned parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely impact the activities, features, or attributes of the Section 4(f) property. (See Glossary of Key Terms for a definition of *de minimis*.)

FHWA has made a preliminary determination that project actions will not adversely impact the features, attributes, or activities that qualify Wallace Marine Park for Section 4(f) protection. Accordingly, FHWA has preliminarily determined that project actions will result in a Section 4(f) *de minimis* impact to the Wallace Marine Park, consistent with 23 CFR Part 774.17. FHWA requires written concurrence from the City of Salem prior to making a final *de minimis* impact determination for Wallace Marine Park. [153] Findings regarding the de minimis determination are available in the 2016 Findings Report: Salem River Crossing Preferred Alternative.[154] A memorandum (Hoffmann 2016) provided to the City of Salem and the Oregon Department of Transportation on the subject is provided as Appendix G. [155]

b. How would constructing the Salem River Crossing impact Wallace Marine Park?

Marine Drive has been in the Salem *Transportation System Plan* (TSP) for 20 years, having been adopted by Council in the 1998 TSP. To a degree, therefore, the decision of when and how to construct Marine Drive is independent of a decision regarding the Salem River Crossing's Preferred Alternative or No Build Alternative.

The Preferred Alternative in the Salem River Crossing Project includes construction of Marine Drive NW that generally follows the alignment contained in the Salem TSP. In the TSP, Marine Drive is at grade its entire length. In the Preferred Alternative, the section of the Marine Drive extension located west of the softball complex will be at-grade. This section of roadway will generally be screened from views within the park by vegetation along the western edge of the park and would likely not be seen, or fully seen, by recreationists using the ball field facilities or visiting this part of Wallace Marine Park. Per the Salem River Crossing Project- Visual Resources Technical Addendum, the significance of the impacts of the Preferred Alternative on the visual quality of the view from Wallace Marine Park softball complex is considered to be negligible. [156,157]

c. What happened to the elevated roadway that was proposed to run along the western border of Wallace Marine Park?

An elevated roadway along the entire western border of Wallace Marine Park and over Marine Drive NW was a feature of the Alternative 4D, which is no longer under consideration. The Preferred Alternative selected for study in the Salem River Crossing Final Environmental Impact Statement significantly reduced the length of the elevated structure. As proposed, Marine Drive NW will be constructed at grade between Riverbend Road NW and Glen Creek Road NW. At Glen Creek Road NW the roadway would begin to elevate and eventually fly over the Union Street Pedestrian Path, the Marion Street Bridge exit ramp, and Wallace Road before descending back to grade near its connection with Highway 22.

d. To what degree would the noise levels at Wallace Marine Park be impacted by the Preferred Alternative?

An analysis was conducted in which the existing and modeled future noise levels were evaluated for the No Build and Preferred Alternative in the year 2040. A total of 114 locations, called "Representative Receptors," were evaluated within the potentially impacted area.[158] The modeled future noise levels were compared to noise levels contained in the Noise Abatement Approach

Criteria (NAAC) of the Oregon Department of Transportation.[159] If the anticipated future noise level exceeded the criteria of the NAAC, the location was considered "impacted" by the project. Five locations in Wallace Marine Park were evaluated for noise levels projected in 2040 from both the No Build and Preferred Alternative. Of the ten modeled results, seven saw an increase in noise levels and three remained unchanged from existing (2016) values. None of the locations were identified as exceeding the NAAC impact criteria. [160]

e. Will there be sound walls at any point along the elevated roadways? If so, how high and for how long?

The Findings Report makes no mention of sound walls along the elevated roadways. [161] Noise abatement is discussed in Section 3.16 (Noise) of the Draft Environmental Impact Statement, but there is no text in this section regarding sound walls.[162] To date, no citations have been identified indicating an intent to construct sound walls along the elevated roadway adjacent to Wallace Marine Park.

f. What would be the visual impacts to Wallace Marine Park?

The portion of the Marine Drive extension west of the softball complex would be at-grade and would generally be screened from views within the park by vegetation along the western edge of the park. Marine Drive would likely not be seen, or fully seen, by recreationists using the ball field facilities or visiting this part of Wallace Marine Park.[163]

An analysis was conducted of the visual impacts of the Preferred Alternative at four locations related to Wallace Marine Park. The locations were collectively called the "Willamette Shores Landscape Unit." Three features of the Preferred Alternative would potentially be seen within this landscape unit by "sensitive viewers" (defined in the analysis as "people with high and medium viewer sensitivity"): (1) The bridge and eastside bridgehead in the northern part of the landscape unit; (2) Parts of the Marine Drive extension that would transition from at-grade to elevated flyover and back to at-grade at Highway 22; and (3) The expansion of Highway 22 eastward onto the bank of the Willamette River. The report evaluated the significance of the change in visual quality and determined it to be negligible for two of the locations and moderate for the other two. [164]

Illustrations of the visual impacts of the Preferred Alternative are provided in Figure 7, Figure 8, Figure 9 and Figure 10 in Section 3 of this report.

18. THE SALEM RIVER CROSSING PROJECT AND ITS IMPACT ON HOMES AND BUSINESSES

a. How would homes and businesses be impacted by the Preferred Alternative on the east side of the Willamette River?

The Preferred Alternative would displace approximately four residential units and 42 businesses on the east side of the Willamette River. With regard to residential impacts, it is not certain that this

number of units would need to be displaced until further engineering design and study is completed. A specific final count on business displacements will depend on final design, access issue resolution, and actual interviews with property owners. This is because multiple business entities often share space and potentially management. The likely displacements are documented the Right-of-way Technical Report Addendum, Appendix D.[165]

The Land Use Technical Report Addendum provides a qualitative assessment of the impacts of the Preferred Alternative to homes and businesses in the Central Business District (CBD) area. Excerpts are provided below:[166]

> *The preferred alternative would reduce congestion in the CBD for nearly all intersections relative to the No Build Alternative.*
>
> *Lower congestion levels in the Central Business District (including lower levels of freight traffic), even during peak hours, would make it easier for commuters and shoppers to access downtown, potentially supporting pedestrian-oriented retail businesses downtown.*
>
> *On the other hand, the new northerly bridge would also make it easier for the same drivers to avoid downtown and would reduce through-traffic, thereby decreasing visibility for downtown retailers. The increased accessibility from West Salem to shopping destinations such as Keizer Station could have a minor negative impact on the downtown retail core.*
>
> *Reduced congestion in the Central Business District would be supportive of multiple overlay districts, urban renewal plans and public and private investments that emphasize pedestrian-oriented mixed-use development (including housing) in the core area.*
>
> *The reduction in congestion in the CBD could make it easier and more comfortable for pedestrian and cyclists to cross the larger streets and travel within and through the core area.*

The Land Use Technical Report Addendum provides a qualitative assessment of the impacts of the Preferred Alternative to homes and businesses in the north Salem area and the Salem-Keizer Urban Renewal Area (URA). Excerpts are provided below:[167]

> *The preferred alternative would increase accessibility from West Salem and Polk County to the North Gateway URA, which would support the City's urban renewal plans. The new bridge would also create a more convenient connection between West Salem and Keizer's River Road URA, as well as Keizer Station. This could make those areas more attractive for commercial uses, consistent with adopted plans.*
>
> *The connection from the new bridge to Hickory and Pine Streets and the increased traffic could change the character of that corridor, encouraging more commercial development. The portion of Pine Street closest to the bridgehead is already zoned for commercial use, and has been transitioning from residential to commercial. It is likely that the pace of redevelopment there would increase relative to the No Build Alternative, and that low intensity commercial uses*

would transition to higher intensity commercial and mixed uses, consistent with plan and zone designations. There is also a chance, however, that the volume of traffic would create demand for commercial development along portions of Pine and Hickory Streets that are currently designated for residential uses.

b. How would homes and businesses be impacted by the Preferred Alternative on the west side of the Willamette River?

The Preferred Alternative would displace approximately 43 residential units (27 single family and 16 apartment units) and 19 businesses on the west side of the Willamette River. With regard to residential impacts, it is not certain that this number of units would need to be displaced without further engineering design and study. A specific final count on business displacements will depend on final design, access issue resolution, and actual interviews with property owners because multiple business entities often share space and potentially management. The likely displacements are documented the Right-of-way Technical Report Addendum, Appendix D.[168]

The Land Use Technical Report Addendum provides a qualitative assessment of the impacts of the Preferred Alternative to homes and businesses in the west Salem area. Excerpts are provided below:[169]

The improved connectivity and availability of a new bridge crossing between NE Salem and West Salem would make development of buildable residential lands in the northwestern part of West Salem marginally more attractive when compared to the No Build Alternative.

The construction of the preferred alternative and the associated changes in traffic flow could increase the desirability of several residentially-zoned properties for commercial use near what would become major intersections at Hope Avenue and Wallace Road. While the potential for redevelopment to commercial uses would increase, the construction of the preferred alternative would not preclude the continued use of these parcels for residential use or, in some cases, their redevelopment to higher density residential uses.

c. What is the estimated cost to acquire homes and the other buildings?

The estimated total right-of-way cost for the Preferred Alternative is $54.9 million; this estimate includes land acquisition, property improvements, relocation, personnel, and contingencies. This estimate is based on gross estimation, not actual appraisals.[170] At this point in the process, no determination has been made regarding cost sharing among agencies for right-of-way acquisition, except that the City of Salem has already approved funding for acquiring a portion of the required right-of-way for Marine Drive.

d. Does the estimated right-of-way cost for the Preferred Alternative include the cost of potential business impacts?

The total estimated right-of-way cost for the Preferred Alternative (see previous question) includes the cost for acquiring and relocating businesses, but it does not separate out the costs for specific business impacts versus other right-of-way costs.[171]

e. Does the Preferred Alternative disproportionately impact environmental justice communities?

The Salem River Crossing Project Environmental Justice Technical Report Addendum evaluated the potential direct, indirect, and cumulative impacts on minority and low income populations associated with the No Build and Preferred Alternatives. [172] Based on the results of the analysis, the report made the following conclusion.[173]

> *The preferred alternative would result in both adverse impacts and benefits for environmental justice communities as well as the general population. For some elements, implementation of proposed mitigation measures would eliminate or reduce adverse impacts. When taking into account the mitigation measures, enhancements, and potential offsetting benefits, the preferred alternative does not appear to result in a disproportionately high and adverse effect on minority or low-income populations.*

19. THE SALEM RIVER CROSSING PROJECT AND ITS IMPACT ON GREENHOUSE GAS EMISSIONS

a. Does the Environmental Impact Statement for Salem River Crossing Project estimate greenhouse gas emissions for the No Build and Preferred Alternative?

The Salem River Crossing Environmental Impact Statement (EIS) does not determine greenhouse gas (GHG) emissions for the 2040 No Build or 2040 Preferred Alternative scenarios. It does, however, estimate tailpipe emissions for Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Volatile Organic Compounds (VOC), Particle Matter with diameters 10 micrometers and smaller (PM10), and Particle Matter with diameters 2.5 micrometers and smaller (PM2.5). [174]

b. What is the difference in the estimated tail pipe emissions in 2040 for the Preferred Alternative compared to the No Build Alternative?

In the Air Quality Technical Report Addendum:[175]

> *The Preferred Alternative would result in decreased emissions in 2040 compared to existing conditions. Advances in engine technology have led to reduced emissions in newer vehicles. This, combined with older vehicles going out of service, will dramatically decrease emissions by 2040 for all pollutants, regardless of the alternative.*
>
> *The No Build Alternative would result in higher criteria pollutant emissions in 2040 because it is associated with the greatest amount of delay and the lowest average speed compared to the Preferred Alternative.*

Per to the Air Quality Technical Report, the amount of tail-pipe emissions (CO, NOx, VOC, PM10, and PM2.5) for the Preferred Alternative is lower for all five emissions compared to the No Build Alternative. This is illustrated in Table 4.2-1 of the report, which is reproduced as Table 16.

Table 16: 2040 Annual Project Emissions – Existing vs. No Build vs. Preferred Alternative

TABLE 4.2-1
2040 Annual Project Emissions (tons per year)
Air Quality Technical Report Addendum, Salem River Crossing Project FEIS

Alternative	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
Existing Conditions (2012)	520	103	27.1	6.27	3.25
No Build Alternative	15.6	11.6	3.32	12.9	6.34
Preferred Alternative	12.2	7.75	2.10	8.24	3.98

Note:
Based on SKATS MPO model traffic data provided by CH2M (2016) and MOVES 2014a model (EPA, 2015) emission factors. All emissions are for 2040 except for the existing conditions, which are for 2012.

c. What do we know about traffic congestion and Greenhouse Gas emissions?

Regarding carbon dioxide (CO2) emissions, staff conducted a simple analysis that reviewed vehicle travel times for 23 origin-destination (O-D) pairs and the aggregate average speeds coupled with an emissions curve developed by researchers at University of California at Riverside. Based on this analysis, the Preferred Alternative is expected to produce less CO2 than the No Build Alternative because of the lower average vehicle speeds estimated under the No Build Alternative.

Although qualitative in nature, the analysis and conclusions are provided specifically because of the interest expressed by Council in comparing GHG emissions between the two alternatives. The average speeds between O-D pairs as provided in the Air Quality Technical Report were compared to research conducted by the University of California at Riverside (UCR) that measured how CO2 emissions vary by speed. [176] In its findings, UCR researchers produced a U-shaped graph showing the relationship between average speeds and CO2 emissions. The graph from their report is reproduced as Figure 27.[177]

FIGURE 5

Emission-speed plot of individual trips or trip segments

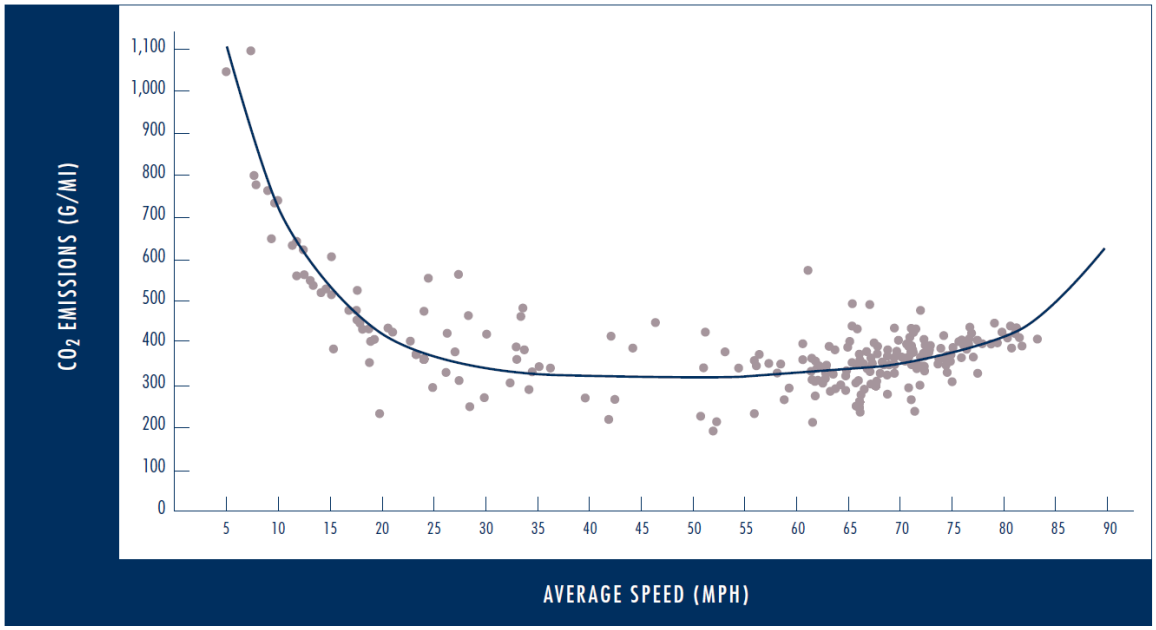

Figure 27: CO2 Emission vs. Average Speed

From this graph:

- CO2 emissions are generally lowest when speeds are between 25 mph to 65 mph;
- CO2 emissions increase at speeds above 70 mph and below 25 mph; and
- The highest amount of CO2 emissions occur at speeds 15 mph or lower.

Table 4.2-4 of the Air Quality Technical Report (reproduced as Table 17) shows the average speeds for the 23 O-D pairs.[178]

Table 17: Annual Vehicle Miles Traveled Comparison by Alternative (2040)

TABLE 4.2-4
Annual VMT Comparison by Alternative (2040)
Air Quality Technical Report Addendum, Salem River Crossing Project FEIS

Alternative	Forecasted Annual VMT for 2040 (millions)	Forecasted Average Speed (mph)	Forecasted Average Travel Time Along Each OD pairs (minutes)
Existing Conditions (2012)	42.38	25.0	13.9
No Build Alternative	53.26	13.1	27.7
Preferred Alternative	56.44	21.9	14.3
Preferred Alternative Change from No Build	6.0%	67.1%	-48.4%

Note: All VMTs are for 2040 except for the existing conditions, which is for 2012. The increase in VMT for the preferred alternative compared to the No Build alternative is offset by the increase in forecasted average speed and decrease in forecasted average travel time.

Source: CH2M, 2016.

Based on Table 4.2-4 and using the CO2 Emissions v. Average Speed research by UCR:

- For the 2040 No Build, the congestion on the roads will result in an average speed of 13.1 mph. According to the UCR graph, this produces a high level of CO2 (between 600-700 grams CO2/mile).
- For the 2040 Preferred Alternative, the average speed of the O-D pairs is 21.9 mph. At this speed, vehicles produce a lower amount of CO2 (between 400-500 grams of CO2/mile).

d. What analysis was provided in the Environmental Impact Statement regarding fuel use and energy consumption for the No Build and Preferred Alternative?

The draft Energy Technical Report states "the Preferred Alternative would result in a 16.1 percent increase in operational energy consumption in 2040 compared to the No Build Alternative."[179] While researching the issue of comparable fuel usage, staff identified the need for further analysis of this preliminary result.

To estimate operational energy consumption (based on the summation of automobile and truck fuel usage), the Energy Technical Report estimated annual Vehicle Miles Traveled (VMT), energy consumption, and gallons of fuel along 10 roadways in the study area. However, in calculating the estimated 16 percent increase in fuel usage, the analysis used a limited area of potential impact. The area chosen included 10 roadways (west and east of the river) but excluded most roads in downtown Salem and other roads that are expected to experience reductions in VMT under the Preferred Alternative. Further analysis is needed to determine how an expanded area of potential impact would impact the conclusions. Until the analysis is more fully vetted and the results confirmed (or otherwise), the 16 percent increase should be considered preliminary.

e. Because the traffic models do not fully account for induced travel, is it possible that emissions under the Preferred Alternative will be higher than estimated in the Environmental Impact Statement?

As noted in the answer to Question 14b, the SKATS model partly accounts for latent demand. That is why total bridge crossings in the AM Peak and PM Peak are 15% more for the Preferred Alternative than the No Build.

Whether this 15% factor results in an underestimation or overestimation of traffic owing to latent demand is not known. To determine the degree to which emissions are underestimated (or otherwise) would require using a different transportation model, which requires a significant amount of data and information that is currently not available.

f. What statements can be made regarding the impact of the No Build and Preferred Alternative on Green House Gas Emissions in 2040?

The Salem River Crossing Environmental Impact Statement (EIS) does not project greenhouse gas (GHG) emissions for the 2040 No Build or 2040 Preferred Alternative scenarios. The following statements are based on the information presented in this section.

Based on the results presented in the Air Quality Technical Addendum regarding emissions:

The 2040 *No Build Alternative has higher tailpipe emissions* for CO, NOx, VOC, PM10, and PM2.5 than the Preferred Alternative.

Based on the results presented in the Energy Technical Addendum:

The 2040 *Preferred Alternative will have higher operational energy consumption* than the No Build Alternative

Based on the simple analysis described earlier in this section in which average speeds were paired with CO2 emissions:

The 2040 *No Build Alternative will produce a higher level of CO2* than the Preferred Alternative.

The Oregon Department of Transportation published a report in 2018, "Oregon Greenhouse Gas Modeling and Analysis Tools," that describes the methods available for GHG analysis at the strategic, tactical, and operational levels. The report states that tools used for traffic operational analysis of individual projects are not well suited for GHG analysis.[180]

20. THE SALEM RIVER CROSSING PROJECT AND RESILIENCY IN THE EVENT OF A CASCADIA-SCALE EARTHQUAKE

a. How does the design for the new bridge address risks associated with earthquakes and liquefaction?

A preliminary review of the geological resources is contained in the Salem River Crossing Project Geological Resources Technical Report Addendum.[181] This work expands on work done for the Draft Environmental Impact Statement (DEIS), which is documented in Chapter 3.18, Geology and Soils, starting on page 3-494.[182] The Geological Technical Report Addendum documents the measures to mitigate the Preferred Alternative direct impacts related to soil erosion and disturbance; settlement; stability; lateral loading; earthquake hazards (such as liquefaction and seismic shaking); channel migration and scour; and construction across existing gravel pits (See Section 4.6, starting on page 4-11). The report states the following specific to seismic hazards/earthquakes:

> *Mitigation measures for a seismic event would include conducting stability analyses using standard computer software to evaluate the effects of earthquake shaking when designing safe slope angles and embankments. Mitigation measures for liquefaction and seismic shaking would include proper earthquake-resistant engineering of structures such as drilled shafts founded on competent materials, ground improvements to increase foundation strength, and dewatering using wick drains or other means to reduce pore pressure and increase soil strength to avoid liquefaction.* [183]

b. Does the cost estimate account for the work needed to address the geological conditions, including the potential for liquefaction?

The cost estimate is based on unit costs selected to best represent the current understanding of the project design and the key components. To account for site-specific conditions (environmental, archaeological, geological, geotechnical, etc.), a 40 percent contingency factor is included in the cost estimate.

c. Between the location of the current Marion and Center Street bridges and the proposed location for the third bridge, which site is more vulnerable to the Cascadia subduction earthquake?

The Salem Area Geology Liquefaction Hazard Map (Figure 2.4-2 in the Geological Resources Technical Report Addendum) shows different zones based on estimated thickness of liquefiable material – with Category 1 being least susceptible and Category 5 having the most estimated thickness of liquefiable material.

- The Preferred Alternative east side bridge landing is primarily Category 3; the western bridge approach is primarily Category 4, transitioning to Category 2 with some Category 3.

- The current bridge locations, east side, are primarily Category 5, transitioning to Categories 4 and 3. On the west side, the bridge landings are primarily on Category 3.[184]

d. Has a traffic analysis study been done to show the region would be better served in the event of an earthquake by a proposed third bridge rather than the already funded upgrades to the Center Street Bridge and any upgrades (or even replacement) of the Marion Street bridge?

The traffic analysis completed for the Final Environmental Impact Statement assumes future operation of both the new bridge and the existing bridges. No traffic analysis has been completed specific to conditions that might result from an earthquake.

21. THE SALEM RIVER CROSSING PROJECT AND EMERGENCY RESPONSE

Note: The answers below are based on information provided by the City of Salem Fire Chief on January 8, 2019.[185]

a. What are City and national standards for adequate emergency response times for an ambulance to get to a call in west Salem, or for an ambulance to get to Salem Hospital or other emergency medical services?

There are three standards that apply to this question:

1. The national standard from the National Fire Protection Association (NFPA 1710) stipulates that an emergency vehicle will arrive at the emergency scene (priority one) within five minutes 90.0% of the time from dispatch to arrival. The Salem Fire Department was able to arrive within five minutes 65.9% in 2018.[186]

2. The City Council-adopted response standard for a priority one emergency is five minutes and 30 seconds 85% of the time from receipt of call to arrival on scene. The Salem Fire Department was able to arrive within five minutes 30 seconds 70.9% of the time in 2018.

3. The Marion County and Polk County ambulance service areas have a response time criteria for ambulances as follows: Urban area ambulance arrival within eight minutes 90% of the time, suburban area ambulance arrival within 15 minutes 90% of the time. Salem Fire Department and Falck Ambulance met and exceeded both counties' response time criteria. Urban area responses within eight minutes or less 93.4% of the time in Marion County and 96.83% of the time in Polk County. Suburban area responses in less than 15 minutes 98% of the time.

There is no adopted standard for an ambulance to travel to the hospital.

b. Has the fire or police department ever been unreasonably delayed in any response to an emergency because of an obstruction on the current bridges? If so, how many times in how many years?

Salem Fire Department has experienced a few delays for weather events such as snow storms. However, these delays have not been characterized as unreasonable as Salem Fire Department has been able to get across the bridge in all cases.

In the last 15 years there have been two occasions where one or both of the bridges had delays: one owing to a weather-related event and one a suicide attempt.

c. How many times in the past 20 years has one of the two current bridges been closed because a "jumper" was on the bridge?

There was one event where the Marion Street Bridge was closed for a suicide attempt for several hours. During this closure there was a single lane open for traffic flow on the Marion Street Bridge. While the lanes were closed, the Salem Fire Department positioned additional apparatus in west Salem to reduce response times. There have been other suicide attempts that closed one lane, but traffic was kept flowing in the other lanes.

d. Would other actions, such as updating the City's emergency response plan, providing signal pre-emption for emergency vehicles, pre-positioning ambulances in west Salem during peak hours, improving the Union Street Railroad Bridge for emergency vehicle access, or expanding emergency care facilities in west Salem enable the City to meet its emergency response time standards?

Salem Emergency Response Plan, or SEMP, was updated in June 2018.

The Salem Fire Department currently uses emergency vehicle signal preemption (called Opticom) for emergency response. This is a traffic control system that provides a green light—and therefore intersection right-of-way—to emergency vehicles.

Ambulances are prepositioned at designated posting locations to best serve the entire community, one of these priority locations is in west Salem. The Salem Fire Department employs a computer system for posting recommendations based on computer modeling of historical call volumes. Ambulances are moved in the system to be best positioned to respond to the community's needs.

The Union Street Railroad Bridge is engineered to allow emergency response vehicles including ambulances, fire trucks, and grassfire fighting vehicles to access west Salem in the event of total closure of the other bridges.

There are currently emergency medical care facilities located on the west side of the bridge, including West Valley Hospital in Dallas.

e. Could most of the actions listed in the question above be implemented much sooner and at much lower cost than for the Preferred Alternative?

All of these actions have already been implemented with the exception of adding more emergency medical facilities.

[Note: Comparing the cost for additional medical facilities to the cost for the Preferred Alternative (or a phase of the Preferred Alternative) is beyond the scope of this report.]

f. If the current bridges are both rendered unusable and assuming that the new bridge would still be usable, in an emergency where someone in west Salem needed to get to the Salem Hospital, what is the anticipated travel time from Wallace Road and Edgewater north to the new bridge, across the 3/4 mile bridge itself (assuming it is still standing), and then south to the hospital?

Depending on the exact path of the route from Wallace Road to the bridge site and where it lands on the East side, a travel time would be approximately 12 minutes, depending on traffic flow and levels of traffic congestion.

g. How does that travel time compare with the travel time to the Dallas hospital?

Travel time to the hospital in Dallas would be about 20 minutes, again depending on traffic volume and other congestion this could be longer.

22. SUMMARY: POTENTIAL COSTS OF THE PREFERRED ALTERNATIVE AND THE NO BUILD ALTERNATIVE

a. In summary, what are the potential cost items for the Preferred Alternative and the No Build Alternative?

Table 18 provides a summary of the potential cost items that have been identified in this report for the Preferred Alternative and the No Build Alternative. The items listed includes not only capital costs, but also social and environmental costs. In many instances, the table uses comparative adjectives (e.g., “higher” and “longer”) to summarize costs. For all cost items listed, cross-references are provided so the underlying details and, in some cases, quantitative values can be located within this report.

Table 18: Potentials Costs of the Preferred Alternative and the No Build Alternative

Costs of the Preferred Alternative	Costs of the No Build Alternative
Compared to the No Build Alternative, in 2040 the costs of the Preferred Alternative include: 1. **Increased** congestion during PM peak north of downtown on arterials and approaches leading to the eastern bridge landing (Question 13b) 2. **Impacts** to views of Wallace Marine Park and from Union Street Railroad Bridge (Question 3e) 3. **Impacts** to Wallace Marine Park (Section 17) 4. **Impacts** to green space and businesses along south side of Edgewater (Questions 3g, 3j) 5. **Higher** Vehicle Miles Traveled during the AM and PM peaks (Question 13c, 13f) 6. **Higher** operational energy consumption (Question 19d) 7. **Closing** the Rosemont Avenue Exit from Highway 22 (Question 3k) 8. **Changing** Front Street in the vicinity of Pine/Hickory (Question 3h) 9. **Construction costs** (Question 3f, 9c, 9d, 3n): [a, b] • ≈$300 million for bridge, approaches, multiuse paths, connections • ≈$100 million for flyover ramps Marine Drive to Hwy 22 • Unknown cost for Hwy 22/Eola/Rosemont reconfiguration	*Compared to the Preferred Alternative, in 2040 the costs of the No Build Alternative include:* 1. **Increased** congestion at east and west bridgeheads of existing bridges, connecting arterials, and downtown (Question 13a) 2. **Increased** congestion downtown during the PM peak (Question 13b) 3. **Increased** congestion on Wallace Road during the PM peak (Question 13b) 4. **Higher** total bridge trips over the Marion and Center Street bridges (Question 15d) 5. **Higher** number of downtown intersections not meeting mobility standards (Question 13b) 6. **Higher** Vehicle Hours Delay (Question 13f) 7. **Higher** Vehicle Hours Traveled (Question 13f) 8. **Higher** average travel times (Question 16a) 9. **Longer** peak congestion periods (Question 13a) 10. **Longer** queue lengths on westbound Marion Street at High Street during both AM and PM Peaks (Question 13e) 11. **Longer** queue lengths during AM Peak on Wallace Road, Edgewater Road, and Commercial Street (Question 13e)[c] 12. **Longer** queue lengths during PM Peak on Commercial Street, Marion Street, and Liberty Street (Question 13e)[c] 13. **Higher** emissions of criteria pollutants (Question 19b) 14. **Higher** emissions of CO2 based on average speeds (Question 19c) 15. **Lower** average speeds (Question 19c) 16. **No** Final Environmental Impact Statement is issued (Question 4g, 4h) 17. **Sunk costs** of approximately $9-10 million total (Question 1i)

[a] Capital construction costs for new Marine Drive NW are not included here because that project is in the Salem *Transportation System Plan* and it may be built, in total or in segments, even under No Build Alternative.
[b] Costs include acquisition costs, estimated at ≈$54.9 million total for all components including Marine Drive.
[c] Queue lengths are for the year 2035.

REFERENCES

Note: Many of the references cited in this report appear online as "Final Technical Report Addendum." These technical reports, most of which have been available since 2016, must remain identified as "draft" until published as part of the Final Environmental Impact Statement, should that process be completed.

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[47] ch2m, 2016. "Salem River Crossing Project – Visual Resources Technical Report Addendum." Draft. August 2016. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-visual-finaltechreport-addendum.pdf. Viewpoint 13, Page B-4. (Accessed January 6, 2019)

[48] ch2m, 2019. "Salem River Crossing Project: Description of Preferred Alternative." January 2019. Prepared for City of Salem by ch2m. Excerpted from Final EIS Technical Report Addenda. Figure 6.

[49] ch2m, 2019. "Salem River Crossing Project: Description of Preferred Alternative." January 2019. Prepared for City of Salem by ch2m. Excerpted from Final EIS Technical Report Addenda. Figure 10.

[50] City of Salem, 2018. *Staff Report*. City Council of November 26, 2018. File Number 18-531. "Motion from Councilor Jim Lewis concerning the Salem River Crossing." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3761415&GUID=F13F0FB8-09C3-4582-92B1-A932F68A591D. (Accessed December 21, 2018). Quote is from "Subject" of the Staff Report.

[51] See "Final Action Agenda – Minutes – Final" from City Council of November 26, 2018, available at: https://salem.legistar.com/View.ashx?M=M&ID=576602&GUID=4F4CAFAA-D73F-47A6-BEF0-F2593AA19F4F. (Accessed December 21, 2018)

[52] ODOT, 2018. "Salem River Crossing – Remaining Tasks to Complete the Environmental Impact Statement." Memorandum from Dan Fricke, ODOT Senior Transportation Planner, to SKATS Policy Committee. October 30, 2018. Provided as an attachment in letter dated November 13, 2018, from SKATS to Salem City Council. See Appendix B of this report.

[53] Land Use Board of Appeals, August 9, 2017. Final Opinion and Order. LUBA No. 2016-126. Available at: https://www.oregon.gov/LUBA/docs/Opinions/2017/08-17/16126.pdf. (Accessed December 21, 2018)

[54] Hewitt, Becky and M. Dorman, 2016. Findings Report: Salem River Crossing Preferred Alternative. Angelo Planning Group. October 4, 2016. 269 pp. A discussion of the *de minimis* determination can be found in Section 6.2.8 Goal 8 (Recreational Needs) that begins on Page 248 of the Findings Report. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-exhibit-1-findings-report.pdf. (Accessed December 21, 2018)

[55] For a summary of the Land Use Board of Appeals' decision and the actions needed by the City to address the remand, see Attachment 2 to the City of Salem, 2018. *Staff Report*. City Council of November 26, 2018. File Number 18-531. "Motion from Councilor Jim Lewis concerning the Salem River Crossing." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3761415&GUID=F13F0FB8-09C3-4582-92B1-A932F68A591D. (Accessed December 21, 2018).

[56] FHWA, 2017. Letter to Sonny Chickering, ODOT Region 2 Manager. Response to ODOT letter requesting an extension to provisions set forth in 23 CFR 630.11(c)(2), commonly referred to as the PE 10-year rule, until September 30, 2019. FHWA letter is dated August 3, 2017.

[57] Salem River Crossing, 2012. "Draft Section 4(f) Evaluation for the Salem River Crossing Project." Prepared in tandem with the Draft Environmental Impact Statement. ODOT Region 2, Marion and Polk Counties, Oregon. Key No. 13622. Federal I.D. No. S000(287)PL & S000(288)PL. April 2012. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/02/Salem_DEIS_Draft_4f_Eval.pdf. (Accessed January 11, 2019)

[58] A discussion of the *de minimis* determination can be found in Section 6.2.8 Goal 8 (Recreational Needs) that begins on Page 248 of the Findings Report (Hewitt and Dorman, 2016).

[59] For an example of an FHWA-issued Record of Decision, see "Interstate 5 Columbia River Crossing Project, Record of Decision." FHWA-WA-EIS-08-01-F. December 11, 2011. Available at: https://www.wsdot.wa.gov/accountability/ssb5806/docs/6_Project_Development/Environmental_Process_And_Permitting/ROD_PDFs/CRC_ROD_Narrative_with_Signatures.pdf. (Accessed December 21, 2018)

[60] OAR 731-015-0075(3) states "The Department shall rely on affected cities and counties to make all necessary land use decisions necessary to achieve compliance with the statewide planning goals and compatibility with local comprehensive plans after completion of the Draft Environmental Impact Statement or Environmental Assessment and before completion of the Final Environmental Impact Statement or Revised Environmental Assessment. These shall include adoption of general and specific plan provisions necessary to address applicable statewide planning goals."

[61] ODOT, 2018. "Salem River Crossing – Remaining Tasks to Complete the Environmental Impact Statement." Memorandum from Dan Fricke, ODOT Senior Transportation Planner, to SKATS Policy Committee. October 30, 2018. Provided as an attachment in letter dated November 13, 2018, from SKATS to Salem City Council.

[62] See 23 CFR 630.12(c)(2). "In the event that right-of-way acquisition for, or actual construction of, the road for which this preliminary engineering is undertaken is not started by the close of the tenth fiscal year following the fiscal year in which the project is authorized, the STD [State Transportation Department] will repay to the FHWA the sum or sums of Federal funds paid to the transportation department under the terms of the agreement. The State may request a time extension for any preliminary engineering project beyond the 10-year limit with no repayment of Federal funds, and the FHWA may approve this request if it is considered reasonable.

[63] Morrow, Mike, 2019. (Personal Communication to Robert Chandler, January 8, 2019). Salem River Crossing: Request for FHWA Assistance/Research.

[64] ODOT, 2018. "Salem River Crossing – Remaining Tasks to Complete the Environmental Impact Statement." Memorandum from Dan Fricke, ODOT Senior Transportation Planner, to SKATS Policy Committee. October 30, 2018. Provided as an attachment in letter dated November 13, 2018, from SKATS to Salem City Council.

[65] City of Salem, 2018. "Marine Drive NW Initiation." In Adopted FY 2019 Budget. Page 30, Line Item 13. Available at: https://www.cityofsalem.net/citydocuments/adopted-budget-book-1-fy-2018-19.pdf (Accessed January 9, 2019)

[66] See "Environmental Review Tool Kit: Legislation, Regulations, and Guidance." Available at: https://www.environment.fhwa.dot.gov/legislation/nepa/overview_project_dev.aspx. (Accessed January 7, 2019)

[67] See "Environmental Review Tool Kit: NEPA and Project Development." Available at: https://www.environment.fhwa.dot.gov/nepa/classes_of_action.aspx. (Accessed January 7, 2019)

[68] See "Develop in the Willamette Greenway." Available at: https://www.cityofsalem.net/Pages/develop-in-the-willamette-greenway.aspx. (Accessed January 11, 2019)

[69] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019)

[70] City of Salem, 2017. Staff Report. City Council of April 24, 2017. File Number 17-145. "Intergovernmental Agreement with the Oregon Department of Land Conservation and Development relating to the Salem River Crossing Project." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3022992&GUID=6946D358-D03C-4E44-AB89-B6C7B370C482. (Accessed January 5, 2019)

[71] The minutes of the April 24, 2017 Council meeting are available at: https://salem.legistar.com/View.ashx?M=M&ID=511416&GUID=21098432-200B-4E87-B70E-8AE79F5DE7F2. (Accessed January 7, 2019)

[72] Salem River Crossing Project, 2012. *Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Salem River Crossing Project.* Executive Summary. April 2012. Federal Highway Administration, Oregon Department of Transportation, and City of Salem. Key No. 13622, Federal ID No. S000(287)PL and S000(288)PL. See DEIS, Section 2.2.6.7, page 2-20. Available at: http://www.salemrivercrossing.org/draft-eis. (Accessed December 24, 2018)

[73] Salem River Crossing Project, 2012. *Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Salem River Crossing Project.* Executive Summary. April 2012. Federal Highway Administration, Oregon Department of Transportation, and City of Salem. Key No. 13622, Federal ID No. S000(287)PL and S000(288)PL. See Section 2.2.6.12, p. 2-25. Available at: http://www.salemrivercrossing.org/draft-eis. (Accessed December 24, 2018)

[74] Salem River Crossing, 2006. "Study Area Refinement" Memorandum from Steve Perone/PTV America, Sumi Malik/CH2M HILL, and Dave Simmons/CH2M HILL to Salem River Crossing Task Force, Oversight Team, and Project Management Team. October 20, 2006. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/02/StudyAreaRefinementMemo_102006.pdf. (Accessed January 7, 2019)

[75] SKATS, 2002. *Willamette River Crossing Capacity Study: General Corridor Evaluation*. Executive Summary including Purpose and Need and Next Steps. Salem-Keizer Area Transportation Study. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/02/WRCCS-ExecutiveSummary-06.02.pdf. (Accessed January 7, 2019)

[76] Salem River Crossing Project, 2012. *Draft Environmental Impact Statement and Draft Section 4(f) Evaluation: Salem River Crossing Project.* Executive Summary. April 2012. Federal Highway Administration, Oregon Department of Transportation, and City of Salem. Key No. 13622, Federal ID No. S000(287)PL and S000(288)PL. This process is documented in the DEIS Sections 2.2.4, 2.2.5, and 2.2.6, starting on page 2-7. Available at: http://www.salemrivercrossing.org/draft-eis. (Accessed December 24, 2018)

[77] Hewitt, Becky and M. Dorman, 2016. *Findings Report: Salem River Crossing Preferred Alternative*. Angelo Planning Group. October 4, 2016. 269 pp. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-exhibit-1-findings-report.pdf. (Accessed December 21, 2018) Page 166.

[78] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019).

[79] Examples of components used in the cost estimate for the Salem River Crossing include: (1) curb, gutter, and drainage with sidewalks of various widths measured in miles; (2) earthwork, measured in cubic yards; new roadways, existing roadway overlays, and reconstructed roadways all measured in lane-miles; (3) multi-use paths, measured in lane-miles; (4) pre-cast segmental (span-by-span) bridges, measured in square feet; (5) steel tub girder bridges, measured in square feet; (6) cast-in-place segmental (balanced cantilever)bridges, measured in square feet; and traffic signal interconnections, measured in linear feet. (Note: This is not an all-inclusive listing.)

[80] Pavela, Daniel, 2016. "Salem 3rd Willamette Bridge Cost Estimating Services: Final Report." Prepared for City of Salem Public Works Department by T. Y. Lin International. Prepared by Daniel Pavela, PE. Reviewed by Scott Nettleton, PE. October 2016. 54 pp. See Appendix D of this report.

[81] Pavela, Daniel, 2016. "Salem 3rd Willamette Bridge Cost Estimating Services: Final Report." Prepared for City of Salem Public Works Department by T. Y. Lin International. Prepared by Daniel Pavela, PE. Reviewed by Scott Nettleton, PE. October 2016. 54 pp. See Appendix D of this report.

[82] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019).

[83] The underlying map is from a presentation made at the December 14, 2014, Funding Workshop. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/12/SRC_PFunding_Presentation_122914.pdf. (Accessed January 17, 2019)

[84] Angelo Planning Group, 2016. "Salem River Crossing Project: Right-of-Way Final Technical Report Addendum." Draft. Prepared for Oregon Department of Transportation by Universal Field Services, Inc. August 2016. Quote is in Section 4.2, page 4-4. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-row-finaltechreport-addendum.pdf. (Accessed January 11, 2019) Page 4-4

[85] This program is described on the US DOT web page at: https://www.transportation.gov/BUILDgrants

[86] Salem River Crossing, 2014. "Funding the Salem River Crossing Project: An overview of potential funding sources." December 2014. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/12/SRC-FundingBooklet-Reduced-122914.pdf. (accessed January 5, 2019).

[87] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019).

[88] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019). Quoted text in sentence above is from Page 3 of this memorandum.

[89] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019). Quoted text in sentence above is from Page 3 of this memorandum.

[90] See "Oversight Team meeting summary." December 11, 2014. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2015/04/SRC-121114-OT-Summary-final.pdf. (Accessed January 5, 2019)

[91] ECONorthwest, 2014. "Salem River Crossing – Revenue Projections." Report prepared by Nick Popenuk, ECONorthwest for Salem River Crossing Project Management. November 12, 2014. 15 pp

[92] Salem River Crossing, 2015. "Project Funding Strategy Memorandum." March 6, 2015. Link provided under Thursday, December 11, 2014, Oversight Team Meeting. Available at: http://www.salemrivercrossing.org/oversight-team. (Accessed January 4, 2019).

[93] See https://www.fhwa.dot.gov/majorprojects/financial_plans/guidance14.cfm#s100million. (Accessed January 15, 2019)

[94] See https://www.fhwa.dot.gov/majorprojects/financial_plans/guidance14.cfm#s100million. (Accessed January 15, 2019)

[95] Salem River Crossing, 2014. "Funding the Salem River Crossing Project: An overview of potential funding sources." December 2014. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/12/SRC-FundingBooklet-Reduced-122914.pdf. (accessed January 5, 2019). Page 15.

[96] Loffman, Matt, 2018. "The Bipartisan Movement to Bring Back Earmarks in Congress." March 2, 2018. Available at: https://www.pbs.org/newshour/politics/the-bipartisan-movement-to-bring-back-earmarks-in-congress. (Accessed January 9, 2019)

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[98] City of Salem, 2018. "Marine Drive NW Initiation." In Adopted FY 2019 Budget. Page 30, Line Item 13. Available at: https://www.cityofsalem.net/citydocuments/adopted-budget-book-1-fy-2018-19.pdf (Accessed January 9, 2019)

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[100] See Portland State University, College of Urban and Public Affairs, Population Research Center. "Oregon Population Forecast Program (OPFP)." Available at: https://www.pdx.edu/prc/opfp. (Accessed January 9, 2019)

[101] See Portland State University, College of Urban and Public Affairs, Population Research Center. "Oregon Population Forecast Program Cycle 1 (2014-2017)." Available at: https://www.pdx.edu/prc/cycle-1-2014-17. (Accessed January 9, 2019)

[102] City of Salem, 2017. *Staff Report*. City Council of November 13, 2017. File Number 17-545. "Creation of a Council Task Force to evaluate options for reducing traffic congestion and improving vehicular mobility around the Marion and Center Street bridges." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3204009&GUID=1F345D62-17B5-45D8-9F23-F4074AE4EE9A (Accessed December 20, 2018). Quote is from "Issue" of the Staff Report.

[103] City of Salem, 2017. *Staff Report*. City Council of November 13, 2017. File Number 17-545. "Creation of a Council Task Force to evaluate options for reducing traffic congestion and improving vehicular mobility around the Marion and Center Street bridges." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3204009&GUID=1F345D62-17B5-45D8-9F23-F4074AE4EE9A. (Accessed December 20, 2018). See "Project Study Area" figure on Page 2.

[104] City of Salem, 2018. *Staff Report*. City Council Work Session of November 5, 2018. File Number 18-446. "City Council Congestion Relief Task Force." Available at: https://salem.legistar.com/MeetingDetail.aspx?ID=642342&GUID=EFA01E13-BF48-4604-8883-BE3367271A66&Options=info&Search. (Accessed December 20, 2018).

[105] City of Salem, 2017. *Staff Report*. City Council of November 13, 2017. File Number 17-545. "Creation of a Council Task Force to evaluate options for reducing traffic congestion and improving vehicular mobility around the Marion and Center Street bridges." Available at: https://salem.legistar.com/LegislationDetail.aspx?ID=3204009&GUID=1F345D62-17B5-45D8-9F23-F4074AE4EE9A. (Accessed December 20, 2018). Quote is from Section 2.f.i.2 of the work scope contained in the Staff Report.

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[107] DKS Associates, 2018. *Salem Congestion Relief Task Force: Final Report*. Prepared for the City of Salem by DKS Associates, Cogito Partners, and Angelo Planning Group. October 19, 2018. Available at: https://www.cityofsalem.net/citydocuments/traffic-congestion-task-force-recommendations-final-report.pdf. (Accessed December 20, 2018). All quotes are from page 5.

[108] DKS Associates, 2018. *Salem Congestion Relief Task Force: Final Report*. Prepared for the City of Salem by DKS Associates, Cogito Partners, and Angelo Planning Group. October 19, 2018. Available at: https://www.cityofsalem.net/citydocuments/traffic-congestion-task-force-recommendations-final-report.pdf. (Accessed December 20, 2018).

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[110] DKS Associates, 2018. *Salem Congestion Relief Task Force: Final Report*. Prepared for the City of Salem by DKS Associates, Cogito Partners, and Angelo Planning Group. October 19, 2018. Available at: https://www.cityofsalem.net/citydocuments/traffic-congestion-task-force-recommendations-final-report.pdf. (Accessed December 20, 2018). Quote is from page 7.

[111] More information regarding the Congestion Relief Task Force's Solution Packages can be found in DKS Associates (2018). See "Project Ideas" (pages 4 - 6) for written descriptions the packages. The material in Appendix H (Task Force Meeting #4) provides graphics and additional information regarding the Solution Packages.

[112] SKATS, 1998. *Willamette River Bridgehead Engineering Study*. Executive Summary. 14 pp. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/02/Bridgehead_Exec_summary.pdf. (Accessed January 9, 2019)

[113] SKATS, 1998. *Willamette River Bridgehead Engineering Study*. Executive Summary. 14 pp. Available at: http://www.salemrivercrossing.org/wp-content/uploads/2014/02/Bridgehead_Exec_summary.pdf. (Accessed January 9, 2019)

[114] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Section 4.5.1 and 4.5.2. First quote is on page 4-32; second quote begins on page 4-32. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[115] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Figures 4.2-1, 4.2-2, 4.2.5, and 4.2-6. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[116] Household survey data are used to determine trips per household, which are further divided into trip types (work trips, shopping trips, school trips, other trips, etc.)

[117] Martinenko, K, 2019. (Personal Communication to Mike Jaffe, January 2, 2019). SKATS 2040 VISUM models

[118] Martinenko, K, 2019. (Personal Communication to Mike Jaffe, January 10, 2019). SKATS 2040 VISUM models

[119] Rodier, Caroline and Julia Michaels, 2018. "Travel Effects and Associated Greenhouse Gas Emissions of Automated Vehicles." National Center for Sustainable Transportation. September 2018. Available at: https://escholarship.org/uc/item/27p0k44g. (Accessed January 9, 2019)

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[121] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Tables 2.3-3, 4.2-5. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[122] Marinenko, K, 2019. (Personal Communication to Mike Jaffe, December 10, 2018). SKATS 2040 VISUM models

[123] DKS Associates, 2018. *Salem Congestion Relief Task Force: Final Report*. Prepared for the City of Salem by DKS Associates, Cogito Partners, and Angelo Planning Group. October 19, 2018. Queuing for 2035 is derived from Appendix E of the report which contains handouts from the April 20, 2018 meeting. Available at: https://www.cityofsalem.net/citydocuments/traffic-congestion-task-force-recommendations-final-report.pdf. (Accessed December 20, 2018)

[124] City of Salem, 2018. *Staff Report*. City Council Work Session of November 5, 2018. File Number 18-446. "City Council Congestion Relief Task Force." Queuing for current conditions is derived from Attachment 1 of the Staff Report. Available at: https://salem.legistar.com/MeetingDetail.aspx?ID=642342&GUID=EFA01E13-BF48-4604-8883-BE3367271A66&Options=info&Search. (Accessed January 15, 2019)

[125] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. See, for example, Table 4.4-1 on Page 4-28 for VMT, VHT, and VHD for the No Build. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[126] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. See, for example, Table 4.4-1 on Page 4-28 for VMT, VHT, and VHD for the No Build. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[127] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Table 4.4-1 on Page 4-28. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[128] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. This table combines the findings presented in Table 4.4-1 on Page 4-28 and Table 4.4-2 on Page 4-30. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[129] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Quotations are from Page 4-30. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[130] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Page 2-2. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[131] ODOT, 2015. "1999 Oregon Highway Plan: Including Amendments November 1999 through May 2015." Available at: https://www.oregon.gov/ODOT/Planning/Documents/OHP.pdf. (Accessed January 13, 2019)

[132] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Page 2-2. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[133] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[134] ch2m, 2016. "Salem River Crossing Project – Traffic and Transportation Technical Report Addendum." Draft. October 2016. Table 4.2-4. Available at: https://www.cityofsalem.net/citydocuments/salem-river-crossing-ca16-04-src-traffic-transportation-final-tech-report-addendum.pdf. (Accessed January 9, 2019)

[135] Marinenko, K, 2016. (Personal Communication October 27, 2016). Email. Preferred Alternative vs. No Build Differences (PM peak volumes).

[136] For an overview, see "Understanding the Concept of Latent Demand," a presentation by Prof. Patricia L. Mokhtarian, Department of Civil and Environmental Engineering, UC Davis. Undated. Available at: https://tinyurl.com/PLM-UC-Davis. (Accessed January 9, 2019)

[137] Cervero, Robert, 2003. "Are Induce-Travel Studies Inducing Bad Investments?" Access Magazine 22, Spring 2003. Page 22-27. Available at: http://americandreamcoalition-org.adcblog.org/highways/induced.pdf. (Accessed January 9, 2019)

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