# I-5 at Chemawa Road Interchange Area Management Plan

## Volume II: Appendices

**FINAL DRAFT**

June 2012

CHEMAWA INTERCHANGE AREA MANAGEMENT PLAN

Oregon Department of Transportation

*Final Draft*
*Volume II*
*Appendixes*

# Chemawa Road Interchange Area Management Plan

Prepared for

**Oregon Department of Transportation**

Prepared by:

CH2MHILL®

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A CD containing the files of the IAMP and these appendixes is attached to Volume I.

# Note to Appendixes

## RE: References to “Radiant” and “Tepper Lane”

A brief explanation is provided to avoid possible confusion between the terms, “Radiant Drive”, “Tepper Lane” and “East Tepper Drive.” Relatively early in the IAMP development process, when alternatives were being developed, a split diamond interchange was investigated. The southerly half of this interchange would have been at the current Chemawa Interchange location and the northern portion would have been between the Keizer Station Target store and the Volcano Stadium. The historical road name before the construction of Keizer Station was Radiant Drive and that name, along with Chemawa, was used to identify this split diamond interchange. Keizer Station constructed a new east-west road called Tepper Lane that separates the retail area from the baseball stadium and would connect to the north half of the split diamond interchange. The IAMP recommends a new roadway alignment from the northerly half of the interchange east and south to Chemawa Road, connecting at a point east of the current interchange location. Originally this new alignment was called Tepper Lane Extension. Because of citizen concern that the name Tepper Lane Extension might be misunderstood as re-opening the Tepper/Portland and Western Railroad grade crossing to the west, which was not the case, any further reference to the easterly extension was instead called East Tepper Drive. During further project development, the split diamond concept was rejected, but the local road overcrossing and extension to Chemawa Road was retained. The text in the IAMP document is consistent with this naming convention and its evolution, but the reader will still find references to “Radiant” and “Tepper Lane” in some of the graphics and some of the appendix materials. Leaving these references unchanged avoids the effort to revise the original documents, but also accurately reflects the evolution of developing this portion of the project recommendation.

APPENDIX A

# Policies and Plans Review, Comp Plan and Zoning Maps

# Chemawa Road Interchange Area Management Plan: Plan and Policy Review Memorandum

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DATE: October 1, 2010

This memorandum summarizes the applicable state, regional, and local plans and policies to the Chemawa Road Interchange Area Management Plan (IAMP) Project (referred to as the project or Chemawa IAMP). The objective of this memorandum is to understand and document: (1) the planned land uses in the study area; (2) the planned transportation network; and (3) any previous transportation or land use studies. This memorandum will be used to develop policies, strategies, and physical improvements in the Chemawa IAMP.

## IAMP Plan and Policy Review Study Area

Several study areas will be developed for various project elements of the Chemawa IAMP. The largest study area, also used for gathering traffic data, is the study area for this plan and policy review (Figure 1). A majority of this study area is located inside the Salem and Keizer urban growth boundaries (UGBs). Marion County has jurisdictional authority over the areas outside of the UGB.

The broadest study area where traffic volumes will be collected extends along River Road to the west. This section is from Wheatland to Chemawa Road. Chemawa Road, Verda Lane, Hyacinth Street, and Ward Drive generally describe the southern boundary from River Road to Cordon Road on the east. Along Cordon Road, the boundary extends from Ward Drive to one property north of Hazelgreen Road. The northern boundary then moves westerly along Lakeside Drive and Labish Ditch to the Union Pacific Railroad (UP RR). It extends northerly along UP RR to Brooklake Road, west along Brooklake Road to the Portland & Western Railroad (P&W RR). The boundary extends south along P&W RR to a point south of Perkins Road where it cuts across country to the point where this description started at the intersection of River Road and Wheatland Road.

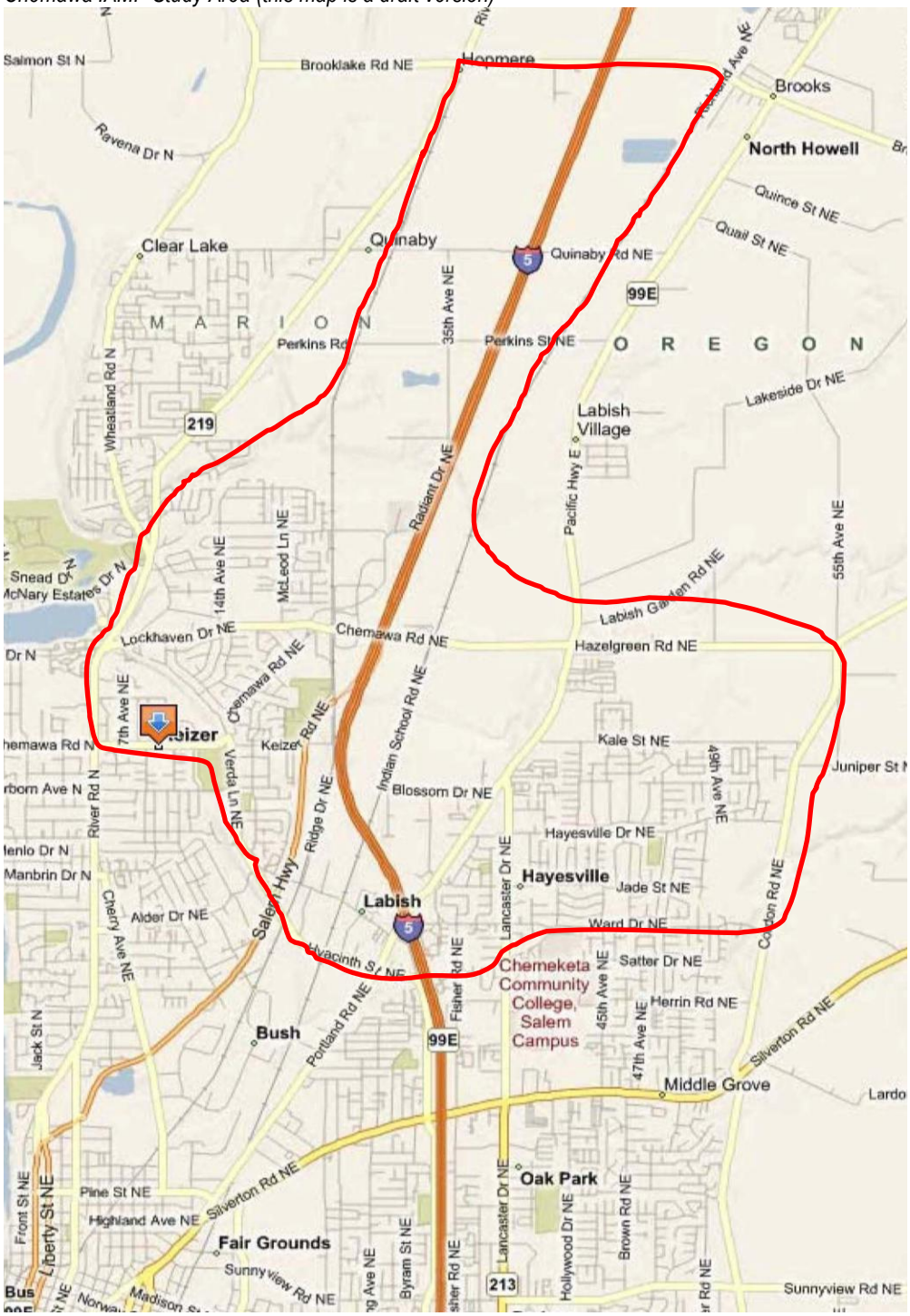
A smaller study area where environmental resources will be inventoried is bounded by Brooklake Road on the north; P&W RR and Salem Parkway on the west; Hyacinth Street on the south; and Portland Road, Labish Ditch and UP RR on the east.

An even smaller IAMP management area where solutions will be implemented will be established as these potential solutions are identified later in this study.

The Chemawa IAMP project will coordinate with local planning efforts and need to be adopted by Marion County and the Cities of Keizer and Salem. Keizer is in the process of updating their TSP and may be considering an expansion of their UGB. While final

decisions regarding this local planning work may come after the completion of the Chemawa IAMP, these two efforts should be coordinated. This may mean that interim actions and policies are developed and adopted to preserve and protect interchange capacity until final local land use decisions are made.

Figure 1
*Chemawa IAMP Study Area (this map is a draft version)*



# Documents Reviewed

The following state, regional, and local documents were reviewed. This memorandum summarizes the objectives of each document and provides a brief identification of relevance to the project.

## State Plans and Policies

- Oregon Administrative Rules 660-012 – Transportation Planning Rule
- Oregon Administrative Rules 734-051 – Access Management Standards
- Oregon Transportation Plan (2006)
- Oregon Highway Plan (1999)
- Freight Moves the Oregon Economy (1999)

## Regional/Local Plans and Policies

- Keizer Comprehensive Plan (1987, amended 1995 and 2003)
- Keizer Transportation Systems Plan (2000, amended May 2004)
- Keizer Development Code (1998, revised June 2007)
- Keizer Station Plan (2003)
- Salem Area Comprehensive Plan (1992, amended April 2004)
- Salem Transportation Systems Plan (2007)
- Salem Zoning Code (2006)
- Marion County Comprehensive Plan (1981, amended 1994, 1998, 2000, 2001, 2002, and 2005)
- Marion County Rural Transportation Systems Plan (1998, updated 2005)
- Marion County Zoning Ordinance (2004)
- SKATS 2031 Regional Transportation Plan (adopted May 2007)

# Federal Plans and Policies

Potentially applicable federal transportation planning policies are the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), 23 Code of Federal Regulations (CFR) 450, and 49 CFR 613. SAFETEA-LU changed transportation planning activities for states and metropolitan planning organizations (MPOs) originally instituted by the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). The regulations for these state and MPO planning activities are specified in 23 CFR 450 and 49 CFR 613. The study area is included within the Salem-Keizer Area Transportation Study (SKATS), the designated MPO for the Salem-Keizer area. SKATS demonstrates compliance with federal transportation planning regulations through the Regional Transportation Systems Plan (RTSP). The SKATS plan is discussed in a subsequent section of this memorandum. Because the federal policies are implemented through local plans, the federal plans themselves are not reviewed in this memorandum.

# State Plans and Policies

## Oregon Administrative Rules 660-012 – Transportation Planning Rule

The State of Oregon has established 19 statewide planning goals to guide local and regional land use planning. The Transportation Planning Rule (TPR) (Oregon Administrative Rule [OAR] 660-012) implements Oregon Statewide Planning Goal 12, which encourages construction of transportation facilities that are safe and efficient and designed to reduce automobile reliance. The objective of the TPR is to define planning process and products needed to ensure regional and local plan compliance with Goal 12.

The TPR requires the preparation of regional TSPs by MPOs or counties, and local TSPs by counties and cities. TSPs identify long-range (20-year) strategies for local transportation facilities and services for all modes, integrate transportation and land use, provide a basis for land use and transportation decision-making, and identify projects for the State Transportation Improvement Program (STIP). TSPs need to be consistent with the Oregon Transportation Plan (OTP) and its modal elements.

***Project Relevance:*** The four applicable TSPs to the study area, the MPO Regional Transportation System Plan (RTSP), the Marion County Rural Transportation Systems Plan, Salem Transportation Systems Plan, and Keizer Transportation Systems Plan, comply with the TPR. These four plans are reviewed in subsequent sections of this memorandum.

### 660-012-0060, Plan and Land Use Regulation Amendments

The purpose of this section of the Transportation Planning Rule is to address transportation impacts associated with proposed land use and zoning amendments. One aspect of this section is to encourage local governments to increase the number of pedestrian-friendly, mixed-use centers and neighborhoods by lowering the regulatory barriers to plan amendments which accomplish this type of development. If changes to a functional plan, comprehensive plan, or land use/zoning regulation would significantly affect an existing transportation facility, a local jurisdiction needs to provide for measures to assure that allowed land uses are consistent with the affected facility(s). One or a combination of the below measures would result in compliance:

- Adopt measures that show the allowed land uses are consistent with the planned function, capacity, and performance standards of the facility.
- Amend the TSP or comprehensive plan to support the proposed land uses or modify the planned function, increase capacity, or modify adopted performance standards.
- Alter land use designations, densities, or design requirements to reduce automobile travel and promote alternative modes of transportation. Provide other measures, including transportation system management measures, demand management, or minor transportation improvements.

Affected transportation facility and service providers and other affected local governments should work together to determine what is needed to support amendments. If an amendment has a significant effect on an existing facility inside an interstate interchange area (property within one-half mile of an existing interchange on an Interstate Highway), ODOT needs to provide a written statement that the proposed mitigation measures are reasonably likely to be funded within the designated planning horizon (if they are on a state facility) and, when implemented, will avoid a significant adverse impact on the Interstate

Highway system. Local governments may also rely on those improvements, or an adopted interchange area management plan. In circumstances where a facility is already performing below adopted standards, an amendment that would significantly affect an existing facility can be approved by a local jurisdiction without assuring that the allowed land uses are consistent with the adopted function, capacity, and performance standards if the improvements provided by the proposed development will mitigate impacts to no worse than the existing conditions or avoid further degradation of the facility performance through transportation improvements or measures.

***Project Relevance:*** An amendment may be needed to apply transportation system management measures, such as access management, if the measures are inconsistent with the local land uses or adopted plans. If physical improvements are recommended, ODOT will also need to explicitly identify if they are to be considered planned improvements that are reasonably likely to be constructed within the designated planning horizon.

## Oregon Administrative Rules 734-051 – Access Management Standards

The intent of ODOT's access management standards (OAR 734-051), commonly referred to as Division 51 or the Access Management Rule, is to balance the safety and mobility needs of travelers along state highways with the access needs of property and business owners. ODOT's rule is intended to manage access to state highways to maintain functional use, safety, and to preserve public investment consistent with the 1999 Oregon Highway Plan (OHP) and local comprehensive plans.

### 734-051-0125, Access Management Spacing Standards for Approaches in an Interchange Area

The highway design standards below apply to OR 99E (also called Portland Road; extends from Brooks to the north to Hyacinth to the south; south of Hyacinth within Salem City limits, it is not a state highway) and OR 99E Business (Salem Parkway).

Minimum Spacing Standards Applicable for Private and Public Approaches on Regional Highways (OAR 734-051-0115, Table 2)

| Posted Speed | Urban |
|---|---|
| >55 | 990 feet |
| 40 and 45 | 830 feet |

***Notes:*** *Measurement of the approach road spacing is from center to center on the same side of the roadway.*

*(1) These access management spacing standards are for unsignalized approaches only. Signal spacing standards supersede access management spacing standards for approaches.*

*(2) These access management spacing standards do not apply to approaches in existence prior to April 1, 2000 except as provided in OAR 734-051-0115(1)(c) and 734-051-0125(1)(c).*

*(3) For infill and redevelopment, see OAR 734-051-0135(4).*

*(4) For deviations to the designated access management spacing standards see OAR 734-051-0135.*

*(5) Posted (or Desirable) Speed: Posted speed can only be adjusted (up or down) after a speed study is conducted and that study determines the correct posted speed to be different than the current posted speed. In cases where actual speeds are suspected to be much higher than posted speeds, the Department reserves the right to adjust the access management spacing accordingly. A determination can be made to go to longer access management spacing standards as appropriate for a higher speed. A speed study will need to be conducted to determine the correct speed.*

Minimum Spacing Standards Applicable to Freeway Interchanges with Multi-Lane Crossroads (OAR 734-051-0125, Table 5)

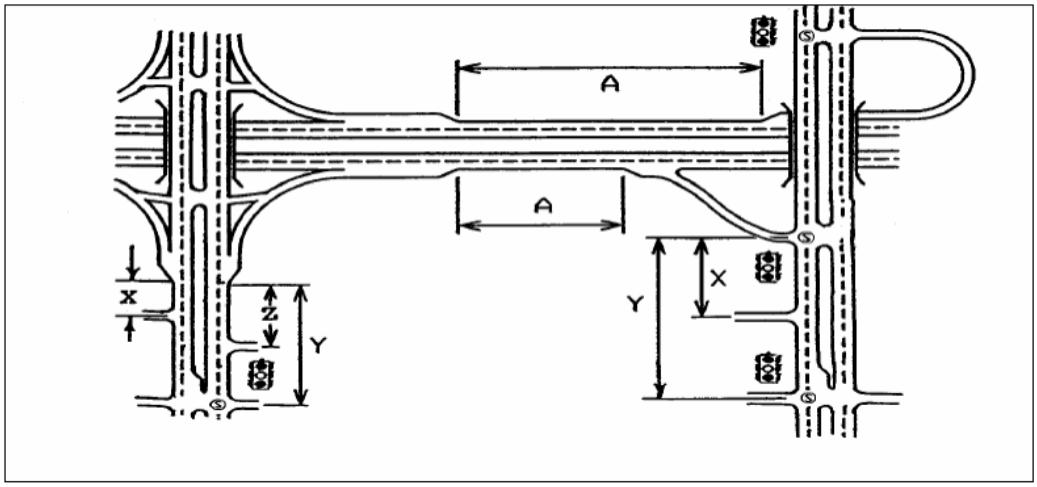
| Category of Mainline | Type of Area | Spacing Dimension | | | |
|---|---|---|---|---|---|
| | | A | X | Y | Z |

| | | | | | |
|---|---|---|---|---|---|
| Freeway | Fully Developed Urban* | 1 mile | 750 feet | 1320 feet | 1320 feet |
| | Urban | 1 mile | 1320 feet | 1320 feet | 1320 feet |

***Notes:*** *1) If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.*
*2) No four-legged intersections may be placed between ramp terminals and the first major intersection.*
*3) No application shall be accepted where an approach would be aligned opposite a freeway or expressway ramp terminal (OAR 734-051-0070(4)(a)).*
** Fully Developed Urban Interchange Management Area: Occurs when 85% or more of the parcels along the developable frontage area are developed at urban densities and many have driveways connecting to the crossroad. See definition in the 1999 Oregon Highway Plan.*

*A = Distance between the start and end of tapers of adjacent interchanges*
*X = Distance to the first approach on the right; right in/right out only*
*Y = Distance to first intersections where left turns are allowed*
*Z = Distance between the last right in/right out approach road and the start of the taper for the on ramp*

Measurement of Spacing Standards for above table




***Project Relevance:*** The applicable interchange area access management standards are identified above. Interchange improvements and interchange area access spacing projects should move in the direction of the access management spacing standards, with the goal of meeting or improving compliance with the access management spacing standards (derived from Tables 2 and 5 of the Division 51 Guidelines).

### 734-051-0135, Deviations from Access Management Spacing Standards

***Project Relevance:*** A deviation would be required for any access not meeting the applicable Division 51 spacing standard.

### 734-051-0155, Access Management Plans, Access Management Plans for Interchanges, and Interchange Area Management Plans

The Department encourages the development of Access Management Plans and Interchange Area Management Plans to maintain and improve highway performance and safety by improving system efficiency and management before adding capacity. ODOT prioritizes

high traffic volume or facilities that provide important statewide or regional connectivity for the development of management plans, especially if those facilities do not currently meet spacing standards. Existing development patterns, land ownership patterns, and land use policies may make it impractical or inadvisable to meet state spacing standards. An Access Management Plan preserves or enhances the safe and efficient operation of a state highway or interchange.

An Access Management Plan, as stated directly from Division 51, must comply with all of the following criteria, unless the Plan documents why a criterion is not applicable:

(a) Include sufficient area to address highway operation and safety issues and development of adjoining properties including local access and circulation.
(b) Describe the roadway network, right-of-way, access control, and land parcels in the analysis area.
(c) Be developed in coordination with local governments and property owners in the affected area.
(d) Be consistent with any applicable Interchange Area Management Plan, corridor plan, or other facility plan adopted by the Oregon Transportation Commission.
(e) Include polices, provisions and standards from local comprehensive plans, transportation system plans, and land use and subdivision codes that are relied upon for consistency and that are relied upon to implement the Access Management Plan.
(f) Contain short, medium, and long-range actions to improve operations and safety and preserve the functional integrity of the highway system.
(g) Consider whether improvements to local street networks are feasible.
(h) Promote safe and efficient operation of the state highway consistent with the highway classification and the highway segment designation.
(i) Consider the use of the adjoining property consistent with the comprehensive plan designation and zoning of the area.
(j) Provide a comprehensive, area-wide solution for local access and circulation that minimizes use of the state highway for local access and circulation.

An Interchange Area Management Plan is encouraged to plan for and manage grade-separated interchange areas to ensure safe and efficient operation between connecting roadways by providing safe and efficient operations between connecting roadways, protecting the function of the interchange through increased capacity at the interchange, and minimizing the need for major improvements. The rule also states that facilities on the Interstate system with high volume cross roads which service statewide or regional connectivity should have higher priority.

An Interchange Area Management Plan for new or significantly modified interchanges, as stated directly from Division 51, must comply with all of the following criteria, unless the Plan documents why a criterion is not applicable:

(a) Be developed no later than the time an interchange is designed or is being redesigned.
(b) Identify opportunities to improve operations and safety in conjunction with roadway projects and property development or redevelopment and adopt policies, provisions, and development standards to capture those opportunities.

(c) Include short, medium, and long-range actions to improve operations and safety within the designated study area.
(d) Consider current and future traffic volumes and flows, roadway geometry, traffic control devices, current and planned land uses and zoning, and the location of all current and planned approaches.
(e) Provide adequate assurance of the safe operation of the facility through the design traffic forecast period, typically 20 years.
(f) Consider existing and proposed uses of all the property within the designated study area consistent with its comprehensive plan designations and zoning.
(g) Be consistent with any applicable Access Management Plan, corridor plan or other facility plan adopted by the Oregon Transportation Commission.
(h) Include polices, provisions and standards from local comprehensive plans, transportation system plans, and land use and subdivision codes that are relied upon for consistency and that are relied upon to implement the Interchange Area Management Plan.

***Project Relevance:*** This IAMP will include an access management plan component to maintain and improve highway performance and safety. Access Management tools will be focused on strategies and actions for public roads rather than specific actions for private approaches. The project will be developed consistent with the OHP, which is reviewed later in this document. Local governments and the public will be involved in the development of the IAMP through membership on the Chemawa IAMP project management team, the Stakeholder working group and through participation in open houses and other work sessions. This plan and policy review is the first step in ensuring communication and consistency with the local agencies and their established plans. The IAMP will include improvement strategies intended to improve the functionality of the existing interchange, I-5 in the vicinity of the interchange, and the roadways that connect to the interchange. This IAMP aims at improving the safety and functionality of the Chemawa Road interchange, while also increasing the overall lifespan of the area's transportation facilities. IAMP recommendations are expected to improve the efficiency of the Interstate system and local and regional traffic on the connecting roadway system.

### 734-051-0285, Project Delivery

An Access Management Plan will be developed for highway and interchange modernization projects when the project includes work along the crossroad. All approaches that are remaining open (in an area that is not access controlled) are presumed to be in compliance with Division 51 rules. However, that status does not convey a grant of access.

***Project Relevance:*** This project is located on the Interstate system and, if recommended, modifications are expected to improve the highway performance and safety. Based on the recommendation of this Rule, Access Management strategies addressing specific private approaches and validating the public approach recommendations made in this IAMP will be developed during project delivery to maintain and improve highway performance and safety to the extent reasonable with the limitation, scope, and purpose of the project.

### 734-051-0295, Grants of Access

After 2000, an application for access may be approved only where an Application for State Highway Approach or a Construction Permit or Permit to Operate may be approved. In an Interchange Management Area, an application for a Grant of Access for a public or private approach will not be approved unless the access will benefit the state highway system or alternate access to the property is not reasonable. An intergovernmental agreement that details the responsibility for construction, maintenance, operation, and cost between the State and local jurisdiction is needed when allowing a public approach.

***Project Relevance:*** Future applications for a private and approach access within the interchange management areas will not be allowed, unless special circumstances are met.

## Oregon Transportation Plan

The Oregon Transportation Plan (OTP) is a long-range policy document developed by ODOT to address federal and state mandates for systematic statewide transportation system planning. The goal of the OTP is to promote a safe, efficient, and convenient transportation system over the next 40 years that improves livability and facilitates economic development for residents of the state. The goals and policies of the OTP cover a broad range of issues and those that directly applicable to the Chemawa IAMP project are summarized below.

### Goal 1: Characteristics of the System

Policy 1.1 (Development of an Integrated Multimodal System) states that a balanced, integrated transportation system with modal choices for the efficient movement of people for commerce and production of goods and services that is coordinated with regional and local plans should be planned and developed. Centers of economic activity, routes, and modes of passenger and freight facilities, intermodal facilities, industrial land, and inter- and intra-city transportation corridors will require regional and local transportation plans for existing and future conditions. While developing these plans, the most cost-effective modes and solutions should be used.

### Goal 2 - Management of the System

The second goal of the OTP, Management of the transportation System, outlines, through Policy 2.1, the need to improve capacity and operational efficiency for the long term benefit of people and goods movement. Specifically, the integrity of the statewide transportation corridors should be managed by limiting access to highways, limiting interchanges, creating safe rail crossings, and controlling incompatible land uses. Enhancing efficiency and reducing conflicts among transportation users is important, as is creating a network or arterials and highways that efficiently move goods and services, while enhancing local street movement.

Policy 2.2 states that management of transportation assets to extend their life and reduce maintenance costs; specifically through size and weight enforcement should be implemented.

### Goal 3 - Economic Vitality

Policy 3.1, seeks to promote an integrated, efficient, and reliable freight system to provide Oregon a competitive advantage by moving goods faster and more reliably to regional, national, and international markets. This can be done by reducing conflicts between rail and

highway crossings, through improved transportation networks, and enhanced intermodal facility connections. Barriers to efficient truck movements should be systematically addressed while balancing the needs of all modes. However, freight mobility projects should be given priority if the project is located on an identified freight route of statewide or regional significance, if they remove barriers for the safe, reliable, and efficient movements of goods and facilitate public and private investment to create or sustain jobs.

### Goal 4 - Sustainability

Policy 4.1 outlines the need for an environmentally responsible transportation system, while also encourages conservation and protection of natural resources. Cost effective investments that consider the life-cycle costs in transportation maintenance, equipment, materials, and design of infrastructure should be used when appropriate.

### Goal 5 - Safety and Security

Policy 5.1 seeks to improve safety and security on the transportation facilities. Specifically, through improvements for the safety and security of all modes and transportation facilities for system users including operators, passengers, pedestrians, recipients of goods and services, and property owners through the planning, design, construction, operation, and maintenance of the transportation system.

### Goal 6 - Funding the Transportation System

The last relevant goal for the Chemawa IAMP is funding the transportation system, through Policy 6.2 (Achievement of State and Local Goals). This goal can be obtained through the planning and management of the transportation finance structure, to contribute to the accomplishment of state and local environmental, land use, and economic goals and objectives. Additionally, making strategic investments to all transportation systems for capacity, safety, operational, and maintenance issues will aid in this goal. Funding should be given to programs and projects that use resources efficiently, based on the return on investment of both short- and long-term benefits.

***Project Relevance:*** I-5 within Oregon extends from the Washington border to the California border, and serves the state of Oregon at a regional and local level. Improving the mobility of I-5 by reducing congestion at the Chemawa Road interchange is expected to improve interstate, regional, and local freight and non-freight travel (I-5, OR 99E, and OR 99E Business, all within the study area, are designated freight routes which are regional designations). The project will improve system management by reducing conflicts between users, limiting access, ensuring that all transportation modes are operating efficiently without encroaching on the needs of other modes, and maintaining the balance of modes on applicable facilities. Modernization improvements to the interchange are expected to extend its life and improve mobility. The improvements identified in the IAMP are expected to increase the life of the facility, thus decreasing the life-cycle costs and improving the safety and security of all modes.

## Oregon Highway Plan

The 1999 Oregon Highway Plan (OHP) is a modal element of the OTP and defines policies and investment strategies for Oregon's state highway system over the next 20 years. The plan contains a 20-year vision element for the highway system; a policy element that contains goals, policies, and actions to be followed by state, regional, and local jurisdictions;

and a system element of needs, revenues, and performance measures. The following policies are relevant to the Chemawa IAMP.

### Policy 1A: State Highway Classification System

Policy 1A develops a state highway classification. system to guide ODOT priorities for system investment and management.

Action 1A.1 defines five categories of state highway facilities – interstate highways, statewide highways, regional highways, district highways, and local interest roads. Two of these (interstate and statewide highways) are part of the national highway system.

Interstate highways provide safe and efficient high-speed travel in urban and rural areas within the state and facilitate movement to and from other states. Statewide highways provide inter-urban and inter-regional mobility and connections to larger urban areas, ports, and major recreation areas not directly served by Interstate Highways. Statewide highways should provide safe and efficient, high-speed, continuous-flow operation along the corridor, with minimal interruptions to flow in constrained or urban areas.

***Project Relevance:*** Appendix D of the OHP classifies I-5 as an Interstate Highway and OR 99E and OR 99E Business as Regional Highways; I-5 and OR 99E are also classified as part of the National Highway System. All three of these facilities are designated Freight Routes and I-5 and OR 99E are designated Truck Routes.

### Policy 1B: Land Use and Transportation

Policy 1B directs the state to work with regional agencies and local jurisdictions to consider land use when planning transportation systems and projects.

Action 1B.1 discusses actively pursuing the objectives and designations in Policy 1B, as appropriate, through many methods including access management planning and permitting.

Action 1B.2 uses the rules, standards, policies, and guidance developed by ODOT to implement Policy 1B. These include, but are not limited to Oregon Administrative Rule Chapter 734, Division 51 on Access Management, the ODOT Highway Design Manual, ODOT Transportation System Plan Guidelines, and ODOT Development Review Guidelines, LCDC Goal 12 on Transportation and the Transportation Planning Rule.

Action 1B.7 discusses methods for implementing state access management standards and policies, including working with local governments to develop access management strategies, plans or access management components in comprehensive plans, facility plans, and/or transportation system plans involving the state and local system.

***Project Relevance:*** The project team includes representatives from the City of Salem, the City of Keizer, Marion County, ODOT, and tribal governments. Coordination between these jurisdictions will ensure consistently applied access management standards and policies in the vicinity of the interchange.

### Policy 1C: State Highway Freight System

Policy 1C states that the timeliness of freight movements should be considered when developing and implementing plans and projects on freight routes.

***Project Relevance:*** The entire length of I-5 within Oregon is a designated Freight Route. The segments of OR 99E and OR 99E Business within the study area are also designated as Freight Routes.

### Policy 1F: Highway Mobility Standards

Policy 1F states that it is the policy of the State of Oregon to use highway mobility standards to maintain acceptable and reliable levels of mobility on the state highway system, through measures such as managing access and traffic control systems.

Action 1F.1 requires that highways operate at a certain level of mobility, depending on their location and classification. Part of this action requires that freeway interchanges be managed to maintain safe and efficient operation of the freeway through the interchange area.

Action 1F.3 states that where it would be infeasible to meet the standards in this policy, consider adopting alternate highway mobility standards for:

- Metropolitan areas (size is not specified) or portions thereof to support an integrated land use and transportation plan for promoting compact development, reducing the use of automobiles and increasing the use of other modes of transportation, promoting efficient use of transportation infrastructure, and improving air quality
- Areas where severe environmental or land use constraints make infeasible the transportation improvements necessary to accommodate reasonable use of properties in accordance with acknowledged comprehensive plans or to accommodate comprehensive plan changes that carry out the Land Use and Transportation Policy (1B).
- The alternative standards shall be clear and objective and shall be related to V/C. The standards shall be adopted as part of a regional and/or local transportation system plan. The plan shall demonstrate that it would be infeasible to meet the highway mobility standards in this policy. These alternative standards can not be implemented until approved by the MPO and adopted by the Transportation Commission.

Action 1F.5 states that when preparing planning documents such as transportation system plans, it is important to consider volume to capacity (V/C) ratios. If the ratios cannot be raised to the performance standard in the immediate planning horizon because of severe environmental, land use, or financial constraints, the performance standard should improve performance as much as possible and avoid further degradation. Performance might be improved by:

- Reconfiguring highway and side-street accesses to minimize traffic conflicts at intersections;
- Altering traffic signals to improve traffic progression;
- Relocating driveways and improving local road connections to direct traffic away from overburdened intersections and intersections where side-street capacity is limited in order to optimize traffic progression on the state highway;
- Improving turning-radii at intersections that are heavily used by trucks to avoid lane blockages;
- Installing raised medians to reduce traffic conflicts;
- Improving accesses so that traffic can enter or exit the highway with minimal disruptions of flow; and

- Managing land uses to favor types of uses that generate less traffic or traffic peaks which do not coincide with traffic peaks on the highway. This could be done by making appropriate plan amendments or changes to zoning ordinances.

Local governments may also request that the Transportation Commission adopt alternate standards in accordance with Action 1F.3.

***Project Relevance:*** The Oregon Transportation Commission, Marion County, and the cities of Keizer and Salem will need to jointly adopt the IAMP or relevant portions thereof in order for it to be implementable and enforceable. Local jurisdictions will need to amend their transportation system plans (TSPs) to include the IAMP or relevant portions thereof. TSP amendments must be consistent with all applicable OHP policies. The relevant OHP mobility policy standards are described in greater detail in the Chemawa IAMP Methods and Assumptions Memo.

### Policy 1G: Major Improvements

Action 1G.1 directs agencies to make the fewest number of structural changes to a roadway system to address its identified needs and deficiencies, and to enhance the existing highway system before adding new facilities to it. Projects are prioritized as follows:

1. Preserving the functionality of the existing system through access management, local comprehensive plans, transportation demand management, improved traffic operations, and alternative modes of transportation.
2. Making minor improvements to improve the efficiency and capacity of the existing system
3. Adding capacity to the existing system with major roadway improvements
4. Building new transportation systems is the lowest priority

Action 1G.4 indicates that major improvements should be designed for limited access in order to protect through traffic movements. An access management intergovernmental agreement should be developed and the local jurisdiction should be required to adopt supporting actions in the local comprehensive plan.

***Project Relevance:*** The Chemawa IAMP project will analyze current and forecasted future traffic conditions in the study area to identify improvements to preserve the function and life of the Chemawa Road interchange. The underlying objective in identifying improvements is to recommend the minimum improvement needed to meet the project purpose and need. Project improvements will need to comply with the priorities listed above.

### Policy 2A: Partnerships

Policy 2A establishes the policy of cooperative partnerships within the State of Oregon to make more efficient and effective use of limited resources to develop, operate, and maintain the highway and road system.

Action 2A.1 supports the planning and development of highway and local road projects that enhance the seamless qualities of a transportation system which balances state, regional, and local needs.

Action 2A.2 continues and increases the number of partnerships with federal agencies, tribal governments, and regional and local jurisdictions to share planning, development,

operational and maintenance responsibilities, and address aspects of a seamless management system.

***Project Relevance:*** The Chemawa IAMP project will analyze possible improvements to the interchange that benefit all users at the state, regional, and local levels. The project structure will include all applicable local, regional, and state agencies in the area on the project management team. This team will meet regularly throughout the planning process to ensure coordination, collaboration, and partnership. Tribal representatives will be involved with the Stakeholder Advisory Committee (SAC), which serves as an advisory committee to the PMT regarding community concerns and issues, as well serving as a forum to help identify alternatives and solutions, in addition to building consensus across jurisdictional lines.

### Policy 2B: Off-System Improvements

Action 2B.1 establishes statewide criteria to identify and prioritize potential off-system improvements.

Action 2B.2 develops a model intergovernmental agreement that addresses access management and land use restrictions, notification requirements, design standards, and maintenance issues.

Action 2B.3 states that local transportation and land use planning should be used to identify and mitigate potential actions that will adversely impact the state highway system or undermine the benefits to the state system of off-system improvements.

Action 2B.4 states that when preparing corridor plans, transportation system plans and project plans, projects should work with local governments to identify and evaluate off-system improvements that would be cost-effective in improving performance of the state highway.

***Project Relevance:*** The project will be examining ways to develop, enhance, and maintain improvements on the local transportation system to improve the operation of the highway system. The IAMP will look at access management strategies and policies that will maintain the benefit of off-system improvements, if they are part of the project recommendations.

### Policy 2D: Public Involvement

Action 2D.1 states that effective public involvement programs should be conducted to create opportunities for citizens, businesses, regional and local governments, state agencies, and tribal governments to comment on proposed policies, plans, programs, and improvement projects.

Action 2D.2 seeks to increase public information and education about construction, operations, and maintenance activities.

Action 2D.3 coordinates with local governments and other agencies to ensure that public involvement programs target affected citizens, businesses, neighborhoods, and communities, as well as the general public.

Action 2D.4 states that agency public involvement programs should be evaluated on a regular basis to ensure the programs are effective in involving a broad range of the public in agency planning and decision-making processes.

***Project Relevance:*** This project includes a public involvement component that will ensure that citizens, businesses, regional and local governments, state agencies, and tribal governments are involved with the project early in the process. This ensures that these groups have the opportunity to give input on decisions regarding the proposed plan and improvements.

### Policy 2E: Intelligent Transportation Systems

Action 2E.2 encourages expanding traffic management capabilities in metropolitan areas through the use of ramp meters, variable message signs and closed circuit television to address recurrent congestion and enhance incident management.

Action 2E.3 promotes expanding incident management capabilities in metropolitan areas and along key freight and recreational routes around the state where traffic incidents cause severe non-recurrent congestion.

Action 2E.5 states that local and regional governments and law enforcement agencies should work together to deploy an effective advanced traffic management system in each metropolitan area.

Action 2E.6 encourages the creation of a statewide network for real time weather, road condition, traffic, traveler services, and public transportation information.

Action 2E.12 supports ITS planning, development, and implementation in corridor plans and local transportation system plans.

***Project Relevance:*** This project will consider a range of Intelligent Transportation System (ITS) services as a way to improve system efficiency and safety, in conjunction with other improvements. Some of these ITS measures might include traffic control, route guidance, pre-trip travel information, public transportation management, emergency vehicle management, commercial fleet management, and others.

### Policy 2F: Traffic Safety

Policy 2F identifies the need for projects in the state to improve safety for all users of the state highway system.

***Project Relevance:*** The Chemawa IAMP project will analyze existing and forecasted traffic conditions in the study area to identify safety concerns. The IAMP will address safety at the Chemawa Road interchange.

### Policy 2G: Rail and Highway Compatibility

Action 2G.2 states that highway projects should be designed to avoid or reduce rail crossings at grade.

Action 2G.3 states that railroads and local governments should coordinate to target resources to increase safety through automated devices and enforcement at specific crossings.

Action 2G.4 states that highway design, construction, resurfacing, and traffic signals affecting rail crossings be coordinated with the ODOT Rail Division and the railroads.

Action 2G.5 encourages that pedestrian and bicycle access issues and design concerns need to be addressed when designing grade-separated crossings.

***Project Relevance:*** Rail and highway compatibility will be an issue during this project.

### Policy 3A: Classification and Spacing Standards

Policy 3A addresses the location, spacing, and type of road/street intersections and approach roads on state highways. It includes spacing standards for each highway classification. Appendix C of the OHP provides tables of access management spacing standards.

***Project Relevance:*** The standards below will apply to the spacing along Chemawa Road and Lockhaven Drive.

Interchange Spacing (OHP, Table 12)

| Access Management Classification | Area | Interchange Spacing |
|---|---|---|
| Interstate* and Non-Interstate Freeways | Urban | 3 miles |
| | Rural | 6 miles |
| Statewide (NHS), Regional, and District Highways | Urban | 1.9 miles |
| | Rural | 3 miles |

***Notes:*** ** Interstate interchange spacing must be in conformance with federal policy.*

1) *The spacing standards in Table 12 are for planning and design of new interchanges on freeways or expressways. A design exception is required to change these standards. A proposed design exception should also consider the spacing requirements in the Interchange Access Management Area Tables 16-19.*
2) *Crossroad to crossroad centerline distance.*
3) *A design exception is required to change these planning spacing standards.*

Minimum Spacing Standards Applicable to Freeway Interchanges with Multi-Lane Crossroads (OHP, Table 17)

| Category of Mainline | Type of Area | Spacing Dimension | | | |
|---|---|---|---|---|---|
| | | A | X | Y | Z |
| Freeway | Fully Developed Urban* | 1 mile | 750 feet | 1320 feet | 1320 feet |
| | Urban | 1 mile | 1320 feet | 1320 feet | 1320 feet |
| | Rural | 2 mile | 1320 feet | 1320 feet | 1320 feet |

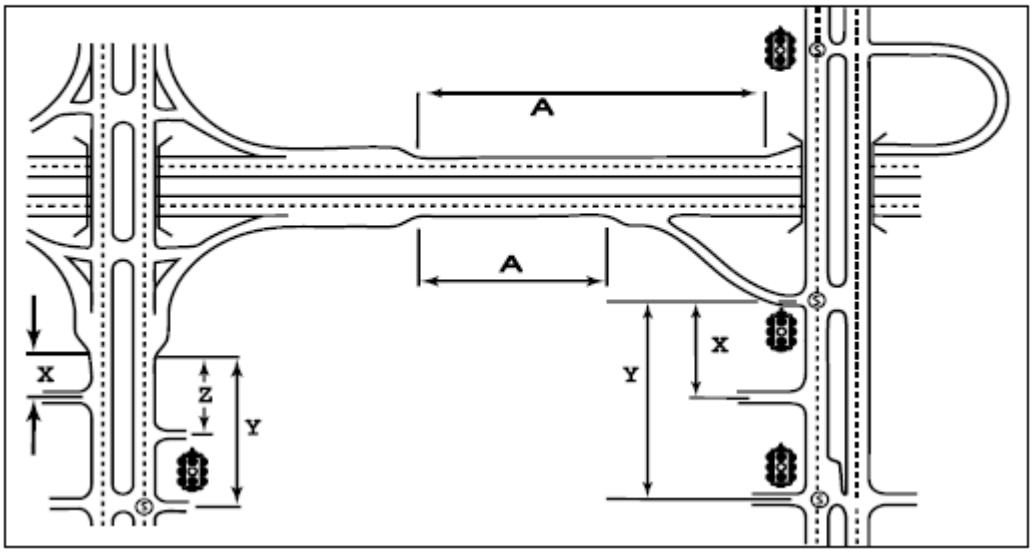
***Notes:***

1) *If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.*
2) *No four-legged intersections may be placed between ramp terminals and the first major intersection.*
3) *No application shall be accepted where an approach would be aligned opposite a freeway or expressway ramp terminal.*

** Fully Developed Urban Interchange Management Area: Occurs when 85% or more of the parcels along the developable frontage area are developed at urban densities and many have driveways connecting to the crossroad. See definition in the 1999 Oregon Highway Plan.*

*A = Distance between the start and end of tapers of adjacent interchanges*
*X = Distance to the first approach on the right; right in/right out only*
*Y = Distance to first intersections where left turns are allowed*
*Z = Distance between the last right in/right out approach road and the start of the taper for the on ramp*

Measurement of Spacing Standards for above table




The interchange ramp spacing standards along Chemawa Road (designated as a multiple-lane crossroad) within the study area is 1,320 feet (0.25 mile) to the nearest driveway or road approach measured from ramp intersections. The distance between the I-5 off ramps at Chemawa Road and the nearest street to the west (Stadium Drive NE, right in-right out only) is approximately 780 feet (0.14 miles). The distance between the I-5 off ramps at Chemawa Road and the nearest street to the east (Indian School Road NE) is approximately 400 feet (0.09 miles). These distances do not meet the minimum spacing standard of 1,320 feet (see Table 17 for more information).

### Policy 3B: Medians

This policy establishes the state's criteria for the placement of medians. Action 3B.2 calls for the construction of nontraversible medians to be considered as part of modernization projects for urban, multi-lane Statewide Highways when certain factors related to traffic volume, topography, and crash rate are present.

***Project Relevance:*** OR 99E and OR 99E Business are classified as urban, multi-lane statewide highway facilities within the study area. Forecasted traffic volumes, crash rates, and topographical conditions will be part of the data collection effort undertaken as part of this project. Nontraversible medians will be considered if the data indicates they are warranted.

### Policy 3C: Interchange Access Management Areas

Policy 3C calls for the planning and management of grade-separated interchange areas to ensure safe and efficient operation between connecting roadways. This is the Policy that is implemented by Section 0155 of Division 51.

Action 3C.3 establishes criteria for when deviations to the interchange access management spacing standards may be considered. The kinds of considerations likely to be included are:

- Location of existing parallel roadways (e.g., Highways 99W or 99E which parallel Interstate 5);
- Use of traffic controls;
- Potential queuing, increased delays and safety impacts; and
- Possible use of nontraversible medians for right-in/right-out movements.

Action 3C.6 suggests planning for and operating traffic controls within Interchange Access Management Areas with a priority of moving traffic off the main highway, Freeway, or Expressway, and away from the interchange area. Within an Interchange Access Management Area, priority shall be given to operating signals for the safe and efficient operation of the interchange.

***Project Relevance:*** The project focuses on I-5, which is designated as an interstate facility, and the Chemawa Road interchange. OR 99E and OR 99E Business are both within the study area and are classified as regional highways. The project will develop an IAMP for the Chemawa Road interchange to protect the function and safety of that facility.

### Policy 4A: Efficiency of Freight Movement

It is the policy of the State of Oregon to maintain and improve the efficiency of freight movement on the state highway system and access to intermodal connections. The intent of this policy is to balance the needs of long distance and through freight movements with local transportation needs on highway facilities in both urban areas and rural communities.

Action 4A.1 identifies obstacles to efficient truck movement on state highways, especially the Statewide Freight System.

***Project Relevance:*** I-5, OR 99E, and OR 99E Business are designated as freight routes within the study area. The IAMP will need to address the efficiency of freight movement through the Chemawa Road interchange.

## Freight Moves the Oregon Economy

This report identifies some of the concerns and needs regarding maintenance and enhancement of current and future freight mobility for Oregon's economy. This document reviews Oregon's transportation system's role in moving goods within Oregon, to other states, and internationally.

In part due to the North American Free Trade Agreement (NAFTA), Oregon's trade with Canada and Mexico is growing. Canada accounts for over 90 percent of Oregon's trade with its NAFTA partners. Trucks move the vast majority of Oregon's freight to and from Canada and Mexico, however, rail freight also plays a role. The *Oregon Transportation Plan*, *Oregon Rail Freight Plan*, and *Oregon Highway Plan* are the principle plans that provide the most direction regarding statewide freight transportation policies and actions. These documents are reviewed elsewhere in this document.

Within the study area, Union Pacific is classified as a Class I railroad. Portland & Western is classified as a Class III railroad, or short line railroad. In the greater Salem area, there is a general rail and truck reload facility, which involves the transfer of goods between modes.

Oregon's Intermodal Management System developed Performance Measures and identified performance measures for intermodal connectors and facilities. Connector roads and highways have performance measures for capacity, safety, and time delay (refer to Table III-1 for more detail). The rest of this section discusses the needs to maintain efficient and safe freight movement.

***Project Relevance:*** Rail lines for the Union Pacific and Portland & Western railroads are located within the study area and are part of the state freight system. OR 99E and I-5 are designated as truck routes and will need to meet OHP performance measures. ODOT has identified I-5 (milepost 260) and Chemawa Road in Keizer as having various condition deficiencies that adversely affect tractor-trailer travel. OR 99E is identified as heavily trafficked by freight with increasing congestion. These designations will be important to develop the IAMP.

# Regional/Local Plans and Policies

## Keizer Comprehensive Plan

The City of Keizer has adopted its own Comprehensive Plan as a guide to the conservation and development of the City through 2005. Marion County has also adopted the City of Keizer's plan as it applies to that portion of the Keizer Urban Area outside the City of Keizer.

The plan states that new development should be either infill in existing residential or commercial areas or new growth in designated areas, including the area along Radiant Drive just north of the Chemawa Road interchange, which has been designated for future commercial and industrial uses.

### Significant Natural and Cultural Features

Inventories undertaken for Keizer as part of the Salem Area Comprehensive Plan (refer to Chapter 3 for more detail) have identified the following potentially sensitive natural resources in the study area:

- Open Spaces - City parks, the Willamette and Claggett Creek corridors, McNary Golf Course, flood plains at the northwestern edge of the city, and school grounds.
- Vegetation - Willamette River, Labish Ditch, and Claggett Creek corridors.
- Labish Ditch is a man-made drainage ditch, mostly void of natural vegetation. An in-depth analysis of the issue of flooding in the areas around Labish Ditch and Claggett Creek is found in the Keizer Comprehensive plan.

### Land-use and Economic Development

The location of residential development is encouraged where full urban services, public facilities, and routes of public transportation are available. Compatibility among all types of residential uses, both new and existing, and between residential and non-residential uses should be ensured, but compatible mixed-use development should be provided. If the City voluntarily undertakes a street improvement project, which will increase traffic noise levels, it is the policy of the City of Keizer to protect existing residential uses from traffic noise levels that exceed those noise levels, which are typical of residential areas.

Keizer has three major opportunities for economic development, including the commercial and industrial development in the area adjacent to the Chemawa Road interchange on I-5, primarily to the north of Lockhaven Drive and secondarily to the south.

- Provide for limited mixing of office, commercial, and industrial land uses when such mixing does not reduce the suitability of the site for the primary land use designated in the plan.
- Concentrate major commercial and industrial development along major arterials.
- Allow neighborhood shopping and convenience stores in residential areas, providing such developments meet compatibility standards described in the implementing ordinances.

### Plan Diagram and Special Land Use Policies

Land use policies provide for an employment area service center (commercial) that allows retail, service, and office uses related to nearby industrial districts, and area commercial uses serving the traveling public such as restaurants, hotels, conference centers, and shopping facilities. This type of center should be from 20 to 50 acres in size, have direct access from I-5 and an arterial street, and provide facilities and services to adjacent industrial areas and to the traveling public, while not encouraging traffic through residential neighborhoods. It should be a unified district with coordinated circulation, parking and landscaping, not a collection of small unrelated commercial developments.

Keizer Station has an overlay district of "Activity Center" to encourage a mix of intensive land uses emphasizing transit and pedestrian activity, and to allow flexibility of development regulations. It may require the provision of, or participation in, the development of public facility improvements to implement the activity center design plan.

The primary use for this area should be regional service center, light industry, hotel/motel and supporting facilities, convention facilities, and retail shopping facilities. Improved access to the district and Lockhaven Drive will need to be coordinated with transportation improvements made to the industrial district to the north. This area will be designated as a Special Planning District. Keizer has listed public facility extensions to the Keizer Station as a medium priority in the Keizer Comprehensive Plan.

The transportation section of the Special Land Use Policies seeks to ensure that Lockhaven Drive from North River Road to the Chemawa Road interchange is carefully studied to determine the need for future widening, noise buffering, and for pedestrian crossing and safety improvements near the Whitaker Middle School. This plan also requires that existing and planned residential areas are protected from excessive noise levels resulting from an increase in traffic.

***Project Relevance:*** The majority of land in the study area is within the UGB. Newer development in the study area includes Keizer Station and the Keizer Volcano baseball stadium. Keizer Station is an employment area service center within the study area that attracts traffic from Keizer, Salem, and I-5. The City of Keizer has designated Keizer Station as a Special Planning District. Transportation impacts from this development will need to be considered in the IAMP.

A majority of the land use in the study area is residential. Therefore, increased noise levels from IAMP identified improvements will need to be considered. The IAMP will also need to consider impacts, including access to economic, commercial, and industrial development. Examining the impacts of increased traffic on Lockhaven Drive (the facility that transitions into Chemawa Road at the interchange with I-5) is also called out as important for the City of Keizer.

The study area includes Labish Ditch and Creek, parts of the Claggett Creek, and Claggett Creek Park. There are also six schools within the study area. The Chemawa Cemetery is also located within the study area. Claggett Creek runs through parts of the study area and water drainage may be an issue to consider with a high groundwater level. These features will need to be considered in the development of the IAMP.

## Keizer Transportation Systems Plan

The Keizer TSP is a long-range plan that provides the City of Keizer with the goals and polices to guide development of the transportation system over the next 20 years.[2] The City's TSP must be consistent with the Regional Transportation Systems Plan (RTSP).

Previous studies summarized in the TSP and relevant to the study area include:

- The *North River Road Alternative Modal Opportunity Study* was completed by SKATS in 1995 to encourage walking, bicycling, and transit use along the North River Road commercial corridor.
- The *River and Chemawa Design Study* (1995) was part of an economic development opportunity assessment for the northeast, southwest, and southeast corners of Chemawa Road and River Road. The purpose of the study was to encourage the development of a revitalized commercial area for this part of Keizer.
- The area surrounding the I-5/Chemawa Road interchange was identified by the cities of Keizer and Salem as needing a *Transportation Land Use and Facilities Plan* (1995). The main goal of this plan is to preserve the existing interchange level of service and design for future travel demand. Multi-modal transportation systems and mixed land uses, which could reduce the reliance of single-occupant vehicles, are the main policies to enact this goal. Through the next 20 years, the anticipated levels of service for the intersections and roads, remains below 0.87 V/C.
- The *Chemawa Activity Center Plan* (1997) identified multiple uses, including industrial, commercial, and residential. A standardized signalized intersection level on Lockhaven Drive and Chemawa Road (between River Road and the eastern I-5 ramp) was set to not fall below 0.87 V/C. This V/C ratio was formalized with the adoption of the Keizer Station Plan (2003). A high emphasis on alternative transportation modes such as bicycle (local and regional), pedestrian access, safety and efficiency, transit services and connection to the regional trail system will help ensure that this V/C ratio is maintained with future growth.

***Project Relevance:*** The Chemawa IAMP will consider the recommendations and findings of these previously completed plans. Upon local adoption, the IAMP will be included as an update to the Keizer TSP. The IAMP may include implementation measures that will amend the City of Keizer's transportation policy.

[2] The project completion dates listed in the Regional TSP should supercede any differences with the dates listed in this section (which are taken directly from the Keizer TSP).

### Population and Employment

Retail and service jobs are forecasted to increase the most in Keizer, followed by government and school employment. Employment growth is projected on North River Road and in the Chemawa Activity Center area (Keizer Station Plan).

***Project Relevance:*** Keizer Station is located within the study area. The IAMP will need to consider the expected increase in employment and associated traffic and land use impacts.

### Streets System

Each of the functional street classifications, along with their standards and policies for ensuring the efficient movement of people and goods, is described below.

- Major Arterials serve as the supporting framework for the city's road network, providing the highest level of mobility and primarily serving regional traffic. Typical traffic volumes are 15,000 to 50,000 Average Daily Trips (ADT), the highest level.
- Minor arterials complement major arterial systems, by accommodating travel moving between areas within the city (via major arterials to collector areas) and may provide access to significant community activity centers, such as schools or parks. Minor arterials function at 7,000 to 20,000 ADT.
- Collectors provide connections between neighborhood local streets and arterials, with a goal to collect traffic and distribute it inside the arterial grid. Collectors function at 1,600 to 10,000 ADT.

A goal of the TSP is to create a comprehensive street system to move people and goods into, out of, across, and through the Keizer urban area. To do this, existing and planned roads should be efficiently used whenever practical, by improving capacity within existing right-of-ways and employing access management strategies. The street system should be safe for all modes. A high priority is given to preserving existing roads, as well as for creating compatibility with multiple modes of transportation and minimizing vehicular travel time. This can be accomplished through the installation of bike, pedestrian, and public transit amenities and facilities, in addition to improved connectivity within the city and to major destinations or activity centers.

Regionally significant streets identified in the Regional Transportation Systems Plan (RTSP) that have been designated for future improvements are listed below. Since levels of service for these streets have been revised upwards, further work is an important next step, since some improvements might be unnecessary or deferrable.

- **Lockhaven Drive:** As a Major Arterial, Lockhaven Drive connects I-5 to North River Road. Traffic volumes near the I-5 interchange are expected to increase to approximately 32,000 vehicles per day by 2015 with a level of service (LOS) F between I-5 and Chemawa Road and LOS E from Chemawa Road to Kafir Drive at that time. As part of Keizer's *Chemawa Interchange Land Use and Transportation Study*, changes to reduce the number of conflicting traffic movements west of the Chemawa Road interchange were identified, including limiting access from Chemawa Road, realigning Radiant Drive, creating a new road south from this intersection to south of Chemawa Road, between I-5 and the Portland & Western Railroad tracks. Chemawa Road will have five lanes, with left turns at this intersection. The red flashing lights at the railroad crossing west of this intersection will be coordinated with the new signal. Intersection improvements are

recommended where Chemawa intersects with Lockhaven Drive and where McLeod Lane intersects with Lockhaven Drive.[3]

- **Verda Lane:** As a two-lane, Regional Minor Arterial street, Verda Lane connects the Salem Parkway with Chemawa Road. Traffic volumes are expected to increase to approximately 20,000 by 2020. Improvements are recommended at the Verda Lane and Parkway intersection, including dual left-turn lanes and one through-right lane for the southbound approach on Verda Lane. An additional northbound lane will be added.
- **North River Road:** This is the major commercial thoroughfare for city and regional traffic. Intensifying development along North River Road and population increases, will lead to a projected 36,000 vehicles per day by 2020. North River Road, just north of Broadway Street, is currently approaching capacity in the p.m. peak hour and will be capacity deficient here by 2015. The North River Road Alternative Modal Opportunity Study (1995) evaluated transportation and land use alternatives to encourage more walking, bicycling, and transit use on River Road. Access management is considered the most important improvement. This project is beyond the scope of the TSP tasking and additional information is needed before judgments can be made and decisions reached.

***Project Relevance:*** This project seeks to increase the efficiency of existing transportation facilities in the Chemawa Road interchange area by developing access management strategies, safety, and other facility improvements. Varying improvement options will be considered to weigh the costs and benefits of improving the existing infrastructure. Lockhaven Drive, portions of Verda Lane, and North River Road are projected to have levels of service C and D in a SKATS model (2015 traffic volumes for Keizer).

The improvements identified above to Lockhaven Drive, Verda Lane, and North River Road will not directly affect the Chemawa Road interchange. However, these improvements could decrease congestion, while improving mobility, efficiency, and safety to the greater transportation system. Improvements to Lockhaven Drive and River Road are listed in the Regional TSP as committed projects to be implemented in the next 10 years. The Chemawa IAMP will complete planning before these projects are completed. However, the improvements will be taken into account during this planning phase.

### Transportation System Management

Transportation system management (TSM) includes measures and techniques that attempt to maximize street system capacity and reduce demand.

***Project Relevance:*** The project will consider TSM measures to maximize efficiency of the existing transportation system. Specifically, access management strategies will be employed to increase safety and capacity.

### Bicycle/Pedestrian

The majority of the bicycle facilities in Keizer lack connectivity with other routes and have a substandard design (i.e., only one side of street having facilities). The goal for improving the system include developing a continuous and direct system of bicycle facilities that is integrated with the regional bicycle system and other modes of transportation. Collectors

[3] These improvements to Chemawa Road were completed as part of the Keizer Station development since the completion of the Keizer TSP. See Footnote 1 about Radiant Drive.

and arterials are designated bikeways, however, a majority of the routes need to have improved facilities, preferably added at the time of other improvement efforts (Table 7).

Completed Bike Projects (Keizer TSP, Table 7)

| Priority | Subject Facility & Location | | Existing Conditions | | Recommendations | | | |
|---|---|---|---|---|---|---|---|---|
| | Street | From – To | Bicycle Facility | Street Parking | Bike Facilities | Improvements | Street Parking | Right-of-way Acquisition |
| 1 | North River Road | Chemawa Road to N City Limits | None | No | Bike lanes | Curb widening – both sides | No | Yes |
| 1 | Chemawa Road | N River Road to Verda Lane | North, bike facility | No | Bike lanes | Curb widening – both sides | No | No |
| 1 | Chemawa Road | Verda Lane to Lockhaven Drive | Bike lanes | No | Bike lanes | Shoulder widening – both sides | No | No |
| 1 | Verda Lane | Chemawa Road to Salem Parkway (OR 99E Business) | None | No | Shoulder bikeways | Shoulder widening – both sides | No | Yes |

Sidewalks are required along arterials, collectors, and most local streets in urban areas, however, Keizer's arterial and collector streets are missing almost 22 miles of sidewalk from one or both sides of the streets. The City's main goal is to create a continuous safe, convenient, and accessible pedestrian network to schools, parks, activity centers, and transit facilities. Below is a prioritized list of sidewalk needs and priorities, which will typically occur in conjunction with other street improvements.

Pedestrian Facilities (Keizer TSP, Table 9)

| Facility | | Side of Street (N/S, E/W) | Length (feet) | Total (feet) | Schools affected |
|---|---|---|---|---|---|
| Street | From – To | | | | |
| Chemawa Road | N River Road to McNary School | N/S | 910/1,727 | 2,637 | McNary High |
| Chemawa Road | N River Road to Rickman Road | N/S | 1,388/1,310 | 2,698 | |
| Verda Lane | Chemawa Road to the Parkway (OR 99E Bus.) | E/W | 4,336/4,590 | 8,926 | |
| Chemawa Road | Verda Lane to Lockhaven Drive | E/W | 3,851/3,900 | 4,450 | |
| McLeod Lane | Chemawa Road to Lockhaven Drive | E/W | 564/630 | 1,194 | |
| Lockhaven Drive | I-5 to McLeod Lane | N/S | 2,130/1900 | 4,030 | |

### Public Transportation Systems

To enhance mobility and reduce reliance on the single-occupant automobile improvements to the public transportation system will provide options for all Keizer area residents, including the transportation disadvantaged. The City is planning for a centrally placed transit station in the area of Keizer Station Boulevard and Lockhaven to which several routes serving Keizer would connect to the Downtown Salem Station. By encouraging passenger stops and amenities at regular intervals, particularly at activity centers such as schools, parks, and shopping centers, the city hopes to increase rider levels.

***Project Relevance:*** Recommended improvements that result from the Chemawa IAMP planning process will include bicycle facilities. There are several roadways within the study area designated as bikeways (Lockhaven Drive, North River Road, Chemawa Road, McLeod Lane, and Verda Lane). Pedestrian facilities will also be included to increase the connectivity of the overall pedestrian system and increase safety for pedestrians. New developments in the area and major attractors, including Keizer Station and the baseball stadium, are likely to increase the need for transit service and stations in the area. Interchange improvements will need to be consistent with the City's plans for a transit station.

### Air/Water/Rail/Pipeline

Coordination and cooperative efforts between public and private sectors can increase the efficiency of both the rail and non-rail transportation systems, since the rail infrastructure in the study area is privately owned and operated. Commuter rail is being developed in Washington County and there is the possibility of extending the service to Keizer, since the rail line runs through the study area. Freight rail services are offered on both the Portland & Western line, which is only for freight, and the Union Pacific line, which is used by Amtrak for passenger/freight travel. The regional plan outlines the main goal for providing a rail system that provides an adequate level of passenger and freight service.

***Project Relevance:*** While no future improvements have been designated for the two rail lines located within the study area, it will be important to revisit this issue if service levels increase or commuter rail is extended to the City.

## Keizer Development Code

The City of Keizer Development Code serves to implement the goals and policies of the City of Keizer's Comprehensive Plan, provide methods for administering and enforcing the provisions of this document, and promote the health, safety, and general welfare of the community. Zones within the study area include (see Figure 2):

- Residential Single Family
- Medium Density Residential
- Medium Residential Limited Use
- Limited Density Residential
- Public
- Commercial Mixed Use
- Commercial General
- Commercial Office
- Industrial Business Park
- Industrial General
- Chemawa Activity Center

### Residential Zones

The purpose of the RS (Single Family Residential) zone is to allow development of single family homes on individual lots provided with urban services at low urban densities. Other

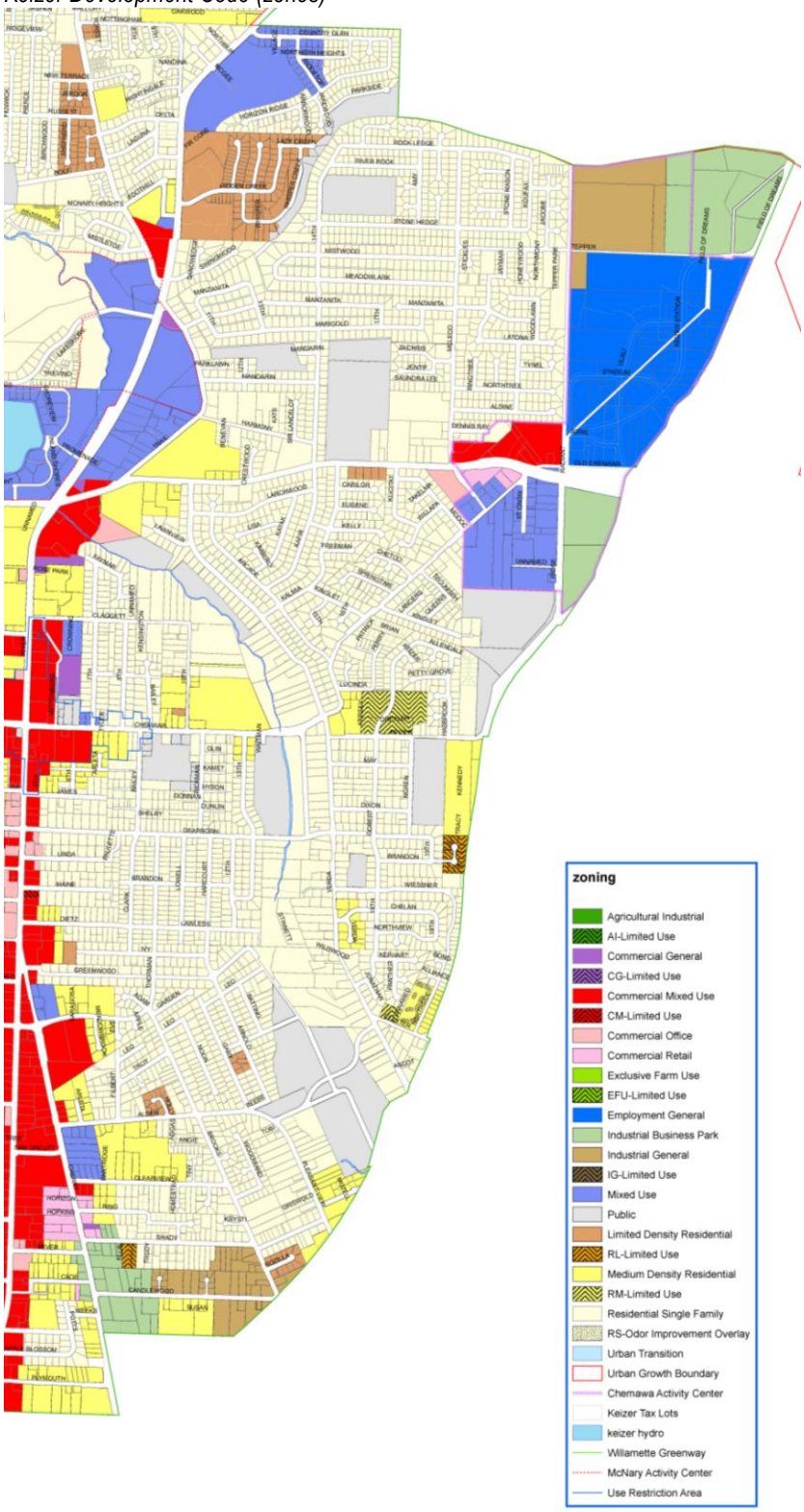
uses compatible with residential development are also appropriate. These areas are designated as Low Density Residential in the Comprehensive Plan.

The RL (Limited Density Residential) zone is intended to provide for detached and attached dwellings on a lot or multiple dwellings on a lot at an intermediate density. Other uses compatible with residential development are also appropriate. RL zones are located in areas designated Medium Density Residential, and, Medium and High Density Residential in the Comprehensive Plan and provided with urban services. RL zones will generally abut a collector or arterial street to prevent this from traveling through lower density residential neighborhoods.

The RM (Medium Density Residential) zone is primarily intended for multiple family development on a parcel, or attached dwellings on separate lots, at medium residential densities. Other uses compatible with residential development are also appropriate. RM zones are located in areas designated Medium and High Density Residential in the Comprehensive Plan. They are suited to locations near commercial areas and along collector and arterial streets where limited access is necessary so that traffic is not required to travel on local streets through lower density residential areas.

***Project Relevance:*** The RS zone is located along Chemawa Road, which turns into Lockhaven Road. The majority of the study area is zoned as single family residential. The RL zone is located near the study area's northern boundary, near Labish Ditch. The RM zone is predominately located on Lockhaven Drive in the western section of the study area.

Figure 2
*Keizer Development Code (zones)*



### Commercial Zones

The purpose of the CO (Commercial Office) zone is to provide areas suitable for professional and general commercial offices, membership organizations, similar low intensity, non-retail commercial activities and medium and high density residential accommodations. The Commercial Office zone is appropriate in those areas designated Commercial in the Comprehensive Plan where the location calls for limited traffic generation, and no increase in traffic except during normal business hours; or, commercial uses with low-intensity activity.

The Commercial Mixed Use (CM) zone is specifically designed to promote development that combines commercial and residential uses. This zone will support transit use, provide new housing opportunities while allowing a full range of commercial retail, service, and office uses. Development is intended to be pedestrian-oriented with buildings close to and oriented to the sidewalk. Parking may be shared between residential and commercial uses. Clusters of residential and commercial uses around landscaping features or parking areas can occur and are encouraged. The Commercial Mixed Use zone is suitable for the Commercial Plan designation.

Circulation standards apply for projects that are applicable and are developed within the River and Chemawa Specific Area boundaries (within both the CM and CO zones). As stated in the Specific Plan:

- Internal Driveway Connections - Where possible, internal parking lot driveways shall be designed to connect from parcel to parcel to allow travel through the site without the need to access a public street.
- Pedestrian Ways - Where indicated on the Development Plan and Circulation Plan in the Specific Plan Specific Plan, 10 foot wide pedestrian pathways shall be provided across development parcels. The pathways shall be improved with distinctive paving material that differentiates the pathway from any adjoining parking area. Where crossing parking area, the pathways shall be raised and shall include a minimum two feet landscape planter between the pathway and the adjoining parking lot.

The purpose of the CG (Commercial General) zone is to provide areas suitable for warehousing, wholesale commercial sales, and services with related outdoor storage or retail sales. The Commercial General zone is appropriate in those areas designated Commercial in the Comprehensive Plan where the location has access to an arterial street or highway for transport of bulk materials and where the noises, lights, odors, and traffic hazards associated with permitted uses will not conflict with local streets and uses.

***Project Relevance:*** The CO zone is located along Chemawa Road and near the intersection of Lockhaven and River Road. The CM zone is located along Chemawa Road, west of the I-5 interchange, and along River Road. There are a few parcels located along River Road that are zoned CG. The Chemawa Specific Area Boundary incorporates the much of the land to the north and south of Chemawa Road around the I-5 interchange.

### Industrial Business Park (IBP) Zone

The IBP zone is intended to provide for high quality light industrial and office parks with related commercial uses. It sets high design standards focusing on visual aesthetics, while providing a framework for the marketplace to work within creating vibrant, economically

viable commerce centers. The IBP zone may be utilized in conjunction with overlay zones, such as the AC (Activity Center) overlay zone used within the Keizer Station Plan (KSP), which may include use and development standards which are more restrictive.

***Project Relevance:*** Half of Area A (Sports Center) and all of Area D in the Keizer Station Plan is zoned IBP.

### Public (P) Zone

The purpose of the P (Public) zone is to provide areas appropriate for specific public and semi-public uses and to ensure their compatibility with adjacent uses. It is intended that this zone be applied to individual parcels shown to be an appropriate location for a certain public or semi-public use. The Public zone is applicable to those properties designated Civic, Schools, and Park in the Comprehensive Plan.

***Project Relevance:*** This zone is found throughout the study area, but generally located near single family residential or mixed use zones.

### General Employment (EG) Zone

The General Employment (EG) zone is located within the Keizer Station Plan (KSP) Area A – Village Center, and it corresponds directly with the Special Planning District (SPD) designation as described in the KSP and the Keizer Comprehensive Plan (Figure 3). Consistent with the KSP, the EG zone promotes a complementary mix of economic uses, development intensity, and development standards along with a wide range of employment opportunities. The EG zone regulations protect the health, safety, and welfare of the public, address area character, and address environmental concerns, while enhancing economic opportunities in Keizer. The intent is to promote attractive industrial/commercial areas, which will support the economic viability of the City. In addition, the regulations provide certainty to property owners, developers, and neighbors about the limits of what is allowed. To implement the KSP, the EG zone requires that a minimum of 25% of all the EG zone land area be devoted to listed Industrial Uses and allows a maximum of 75% of the EG zone land area to be developed with Commercial Uses. The EG zone is unique because the location of the particular areas devoted to Industrial and Commercial Uses shall be determined as part of the required Site Master Plan review.

***Project Relevance:*** This zone is found only in the Keizer Station Plan area, which is located along I-5 and Chemawa Road.

### Overlay Zones

The purpose of the Limited Use Overlay (LUO) zone is to reduce the list of permitted uses in a zone to those that are suitable for a particular location. Zones permit a number of uses without notification or opportunity for a hearing. These uses are included in the zone because they are considered basically equivalent in terms of the type and intensity of activity. However, on a particular property certain permitted uses may conflict with adjacent land uses. Rather than deny appropriate permitted uses because the proposed zone would permit an objectionable use, the Limited Use Overlay can be used to identify the appropriate uses and require a conditional use permit for other uses normally permitted in the zone. It is the intent that the maximum number of acceptable uses be permitted so that the use of the property is not unnecessarily limited.

The ACO (Activity Center Overlay) zone is adopted to implement the policies of the Comprehensive Plan for Activity Centers which include provisions for a mixture of intensive land uses emphasizing employment opportunities, transit and pedestrian facilities, and circulation. The provisions of this Section apply to Activity Centers as identified in the Comprehensive Plan on the Comprehensive Plan Map.

All development within an Activity Center is subject to City review and shall include the following factors:

- All new developments and expansions of existing developments shall comply with the adopted activity center design plan for each Activity Center.
- Developments in an activity center shall be required to submit a master plan for approval as part of the application process. The elements of such master plan shall include, but are not limited to, the following:
  1. A master plan map showing the location of land uses, open spaces, and pedestrian and vehicular circulation and a written explanation showing how these features achieve the purpose of the activity center design plan.
  2. For any project for which the projected average daily traffic will exceed 250 vehicle trips per day, according to Institute of Transportation Engineers (ITE) Traffic Generation Manual, a traffic impact analysis will be required as well as a plan for mitigating negative impacts.

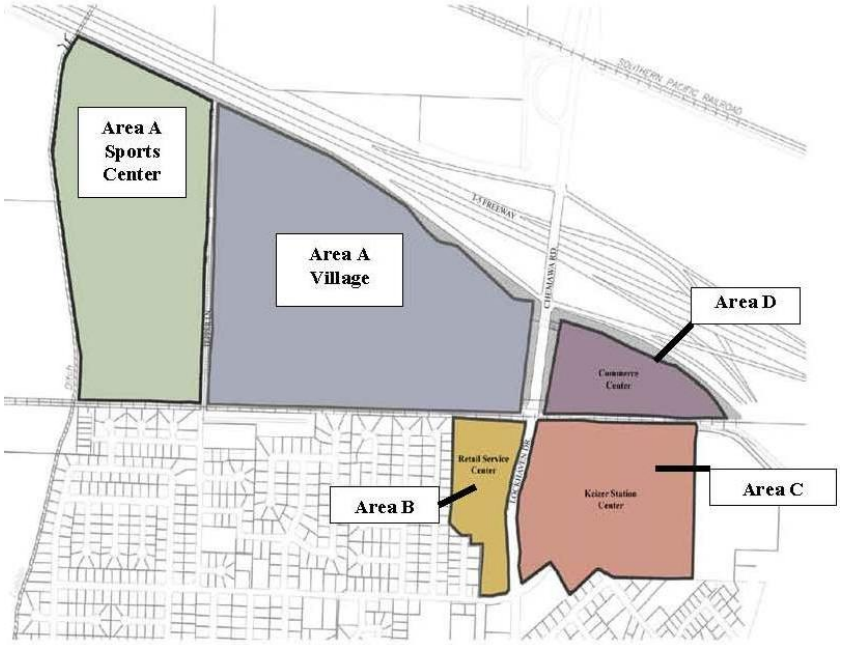
***Project Relevance:*** The LUO zone is found at two locations within the study area near I-5 within residential areas. The ACO applies to Keizer Station. The uses allowed in an Activity Center shall be regulated by the underlying zoning district. The Keizer Station Plan is a master plan that was developed since the area is designated as an activity center. The underlying zone for half of Area A (Sports Center) and all of Area D in the Keizer Station Plan is Industrial Business Park (IBP).

## Keizer Station Plan

The Keizer Station Plan was adopted by Keizer City Council in February 2003, amended in July 2007. The activity center is divided into four areas which correspond to specific sections from the north to the south of Chemawa Road and Lockhaven Drive. The five areas are:

- Area A – Village Center
- Area A – Sports Center
- Area B – Retail Service Center
- Area C – Keizer Station Center
- Area D – Commerce Center

Figure 3
*Keizer Station Plan map*




*Note: North is to the left of the map*

The Plan features a new zoning district called General Employment (EG) that develops standards to promote an employment center with the opportunity for a mix of industrial and commercial uses. Beginning with the adoption of the Chemawa Activity Center Plan (1997) a transportation LOS standard for future traffic operations at the signalized intersections on Lockhaven Drive and Chemawa Road between River Road and the eastern I-5 ramp was developed (0.87 V/C).

An underpass was installed to provide safe access to and from the developing areas of the Keizer Station Plan. Off-ramp and other facility improvements would be constructed as regional improvements to the I-5 Interchange under ODOT's direction, if needed in the future. All new public streets shall be constructed to the requirements of the City of Keizer Department of Public Works Design and Construction Standards.

### Area A – Village Center and Sports Center

The Village Center (95 acres) portion of Area A will provide the opportunity to establish an economic activity center that will focus on offering a variety of industrial and commercial activities. Development will also be controlled by a set of design standards aimed at establishing an environment that promotes a coordinated approach to developing the entire 95 acres. The intent is to establish design standards in addition to the standards identified in Keizer Development Code Section 2.315 that will guide future development in a manner that will achieve the development objectives for Area A – Village Center. Area A – Sports Center (66 acres) is the location of the Keizer Stadium as well as the potential location for a variety of industrial, entertainment, recreation, and sports-related facilities. A portion of this area is devoted to an existing power substation and a baseball stadium. Area A – Sports

Center will be accessed via the extension of Radiant Drive[3] through Area A - Village. In order to achieve the objective of making Area A – Village Center a gateway to Keizer, a gateway feature visible from I-5 shall be provided.

The extension of Radiant Drive through Area A – Village is a key element, not only to the transportation system, but to the visual quality of the center. Access from Radiant Drive to adjoining property shall be controlled to provide efficient through traffic. Signalized access connections will be located at least 600 feet apart, except where approved by the City Traffic Engineer. Additional access connections on Radiant Drive should be limited and designed to maximize the flow of traffic. All internal signalized intersections on Radiant Drive will operate at a V/C standard of 0.87 or better.

### Area B – Retail Service Center

Area B – Retail Service Center (12.5 acres) is envisioned to offer community supporting retail services such as a food store, personal services, and specialty retail. In addition, the plan proposes the completion of Dennis Ray Avenue to complete the residential neighborhood nearby.

Traffic operations on Lockhaven Drive are an important design issue as Area B develops. Careful consideration of the location of access points to Lockhaven Drive and McLeod to the site will need to occur. Based on initial traffic assessments for the Keizer Station Plan, the following traffic-related elements shall be a part of future development of Area B:

- Access will be via a single access point forming the northern leg of the Lockhaven Drive and Chemawa Road intersection. Additional or alternative access will only be allowed when it is demonstrated to the approval of the City Traffic Engineer that it can be designed so as to have minimal impacts on the safe and efficient flow of traffic on Lockhaven Drive.
- Access may be provided via a single access point located as far north as possible. No automobile access shall be allowed to Dennis Ray Avenue. At the City Traffic Engineer's discretion, this driveway may be limited to right-in/right-out depending on anticipated traffic flows. The circulation system shall include provisions to provide pedestrian and bicycle connections to the overall Keizer Station Activity Center area from Area B and to Dennis Ray Avenue.

### Area C – Keizer Station Center

Area C (36 acres) is intended to allow for a mix of uses, both residential and commercial as well as opportunities for connection to public transit. Traffic operations on Lockhaven Drive are an important design issue as the Keizer Station Center area develops. Careful consideration of the location of access points to Lockhaven Drive, McLeod, and Chemawa Road will need to occur. Based on initial traffic assessments for the overall Keizer Station Plan, the following traffic-related elements shall be a part of future development of Area C:

- Access to Lockhaven Drive will be allowed when it is demonstrated to the approval of the City Traffic Engineer that it can be designed so as to have minimal impacts on the safe and efficient flow of traffic on Lockhaven Drive.

[3] Since the Keizer Station Plan was published, Radiant Drive was replaced with a new street network. Keizer Station Boulevard extends through Areas A – Village Center and Sports Center (the highest classification in the station).

- Access to McLeod and Chemawa Road shall be coordinated with properties on both sides of these roads to minimize the number of access points and to align primary access points opposite each other. At the City Traffic Engineer's discretion, driveways may be limited to right-in/right-out depending on anticipated traffic flows.
- The circulation system shall include provisions to provide pedestrian and bicycle connections to the overall Keizer Station Plan area.

### Area D – Commerce Center

Area D (15 acres) is proposed to have a mix of industrial uses. The extension of transportation facilities through Area D is a key element, not only to the transportation system but also to the visual quality of the center. Accordingly, the following design features shall apply to Radiant Drive:

- Access from a potential transportation facility to adjoining property shall be controlled. The intent of Radiant Drive is to provide efficient through traffic.

***Project Relevance:*** While Area A is still being developed, future development is expected since this area has been designated by the City for growth. A key element for the Chemawa IAMP is the gateway feature that would be visible from I-5. Traffic operations at Chemawa Road interchange and development phasing are listed as key issues for Area A and are relevant to the IAMP. Access to and traffic operations on Lockhaven Drive are of importance, as are the expected traffic impacts from proposed community retail services to the Chemawa Road interchange. The location and operation of a possible commuter retail transit station, will also need to be evaluated if it is developed in the future.

## Salem Area Comprehensive Plan

The Salem Area Comprehensive Plan is a long-range plan for guiding development in the Salem urban area (adopted in 1992, last amended January 2005). The jurisdictions of City of Salem, Marion, and Polk Counties have adopted this plan. The Comprehensive Plan provides a general framework for urban elements and issues including natural resources, growth management, and jurisdictional authority. The area around the Chemawa Road interchange is designated as:

- Single Family Residential
- Multifamily Residential 1 and 2
- Residential Agriculture
- Public/Private Education
- Public services
- Public Amusement
- General Commercial
- Retail Commercial
- Industrial Park
- General Industrial
- Industrial Business Campus
- Industrial Commercial
- Employment Center

The Study Area Boundary, extending further in all directions from the IAMP Plan Area, includes large areas of single family and other forms of residential uses, in addition to industrial and commercial uses. Other land use designations, around Portland Road (OR 99E), include Industrial Business Campus, Multi-Family Residential, Public/Private Education, and Residential Agriculture. North of Chemawa Road the area is outside of the UGB and city limits, so no land designation is specified.

***Project Relevance:*** The land use patterns indicated on the Comprehensive Plan map imply the types of land uses that exist on lands that are committed to development and the type of

development and growth that can be expected on vacant or underdeveloped land. Existing and future land uses imply trips on the transportation system. These trips need to be anticipated and included in assumptions for transportation analysis to ensure a balance between land use and the transportation system, as required by Statewide Planning Goal 12.

### Residential

Of the three City of Salem residential designations, two are within the study area; Single Family and Multi-Family. Single and Multi-Family Residential designation applies to areas in Salem currently developed with housing or public facilities. Schools, parks, and churches can also be located in these areas since these are support facilities for residential use. A comprehensive plan and zone change would be required for commercial and other types of more intensive development.

The intent of this designation is to hold the properties needed to accommodate future urban development during the next 20 years. The strategies for achieving this goal include:

- Retaining and conserving existing housing stock, while preserving the essential characteristics of residential environments, including natural features.
- Maintain and provide an overall land use pattern in the urban area that is consistent with the service capabilities in the area. As well as keeping a supply of land throughout the urban area for residential and other urban uses as needed, specifically to support services to the residents of an area, such as neighborhood shopping facilities, schools, parks, and churches.

Multi-Family Residential is intended to encompass all types of housing, with the predominant land use being multifamily dwelling units, but other service-related uses, such as parks, schools, and churches, also are compatible with the designation. The intent of the residential designations is:

- To retain and conserve the existing sound housing stock;
- To encourage locating residential development where full urban services, public facilities, and routes of public transportation are available;

The City must issue an Urban Growth Area Permit or expand the Urban Service Area before an area outside the city limits can receive services.

### Commercial

The Commercial land use designation includes five "types": Regional Shopping Facilities, Community and Neighborhood Shopping and Service Facilities, Convenience Stores, Commercial Offices, and Specialized Shopping Areas (including automobile center and freeway interchange service area). Policies relevant to the IAMP include the following:

4. Community shopping and service facilities shall be located adjacent to major arterials and shall provide adequate parking and service areas. Land use regulations shall include provisions for siting and development which discourage major customer traffic from outside the immediate neighborhoods from filtering through residential streets.
5. Unless the existing development pattern along arterials and collectors commits an area to strip development, new commercial development shall be clustered and located to provide convenience goods and services for neighborhood residents or a wide variety of goods and services for a market area of several neighborhoods.
6. Commercial office uses shall have convenient access to collector and arterial streets.
7. Mixed use developments shall be provided for in land use regulations.

### Employment Center

This designation provides for the formulation and implementation of economic development strategies through a comprehensive, systematic, and on-going development process involving the collaboration between public and private entities. The intent of this designation is to:

- enhance the long-term quality of life in Salem and the region
- provide long- and short-term employment and business opportunities that contribute positively to the local and regional economy
- develop implementation strategies so that property can be equitably financed, marketed, and permitted
- involve the community in the planning process
- provide positive additions to the community
- promote integration, transition, and compatibility with neighboring uses
- provide open spaces that are in balance with the industrial and commercial uses of the property, protect and enhance key natural features
- preserve historical and cultural features
- provide local infrastructure and public services along with development

### Industrial/Commercial

The intent of the Industrial/Commercial designation is to provide areas for a mixture of heavy commercial and light manufacturing and warehousing activities.

The definition of the Industrial designation states that this land use requires consideration of potentially heavier demands on public facilities, significant impacts on the environment, and vehicular traffic. Industrial policies include maintaining a 20-year industrial land inventory and the conditions under which redesignation of land to or from industrial will be allowed. Also included in IV.I.12 is the policy that division of parcels 40 acres and larger in size will be subject to a special review process.

### Parks, Open Space, and Outdoor Recreation

There are eight types of parks and open spaces designated by the City of Salem: neighborhood, community, and large urban parks; school/park; special use facilities; connector trail; and historic and natural resource areas. Natural open spaces within the study area include Claggett Creek and Agricultural land within the floodplain.

### Floodplains Boundary

The flood boundary includes parts of the study area, primarily to the north of Chemawa Road. This designation was prepared under the sponsorship of the Federal Emergency Management Agency (FEMA).

***Project Relevance:*** The trips made based on single and multi-family land uses will be predictable, but will need to be included in assumptions for the transportation analysis to ensure a balance between land use and the transportation system, as required by Statewide Planning Goal 12. Travel behavior may change if increased transit, bike, and pedestrian facilities or commuter rail is installed in the area. The trips in Commercial and Employment Center zones are less predictable than those of residential land use, since the type of development will dictate the level and hours of traffic. More detail about this zone is found in the Salem zoning code, in the following section. The trips in Industrial/Commercial and Industrial zones are different from both commercial and residential, often dealing with

freight movement. More detail about this zone is found in the Salem zoning code, in the following section. The trips in Parks, Open Spaces, and Outdoor Recreation zones are less predictable than the above zones, often determinate upon the weather, time of year, and holidays. There is an emphasis for the City to increase alternate modes of transportation, including bicycling, walking, and public transportation. More detail about this zone is found in the Salem zoning code, in the following section. The Floodplain overlay zone helps designate the appropriate level and type of development that should occur in these areas, based on possible future flooding. Most of this area is currently designated as Public/Private Education, Employment Center, and outside of the UGB (so not zoned).

### Other Relevant Comprehensive Plan Policies

Other Comprehensive Plan policies relevant to the development of land in the Chemawa IAMP include those governing general development, urban growth, growth management, scenic and natural resources, economic development, and transportation. Policies that are most relevant to the Study Area are described below.

Coordination policies (IV.A) recommend plan and code coordination between the city, Marion County, and Polk County, as well as any special districts or planning agencies that will support the Comprehensive Plan. Policies under Growth Management policies (IV.D.) state that the City of Salem is responsible for the formulation of a growth management program and outline the elements of this program. Policy 2 states that the City has general policies for orderly extension of facilities and services within the UGB. Policies 16 and 17 outline a plan for development of capital improvement programs for public facilities within the Salem Urban area and creating financial programs to complete the programs. The industrial development goal (IV.I.) outlines policies for the possible redesignation of large industrial parcels, including between Kale Street and Hazelgreen Road.

Section IV.J. (Transportation) includes policies that seek to achieve a balanced system of transportation facilities in the region, addressing non-motorized modes of transportation, connectivity, and balance with the planned land uses. Transportation policies related to this project include:

9. Improvements to the transportation system, in addition to those in or abutting a development may be required as a condition of approval of subdivisions and other intensification of land use.
10. To mitigate traffic impacts placed on area wide transportation facilities by new development, Transportation System Development Charges, as defined by Oregon Revised Statutes and local government ordinances, may be collected.
12. The transportation system and related demand management strategies should be pursued first to accommodate travel demand and relieve congestion in a travel corridor, along with improvements to the alternative transportation methods.
14. Local governments within the Salem Urban Area shall make a high priority to plan, design, construct, and operate a safe transportation system for all modes.
17. Supportive of the mobility needs of businesses and industries, the transportation system shall consist of the infrastructure necessary for the safe and efficient movement of goods, services, and people throughout the Salem Urban Area. The Salem Transportation System Plan shall include consideration of the area's rail, aviation, inland marine, pipeline, and truck movement network. The Plan shall include ways to facilitate the intermodal transfer of freight in the area.

18. The Salem Transportation System Plan shall identify methods that employers can use to better facilitate the commute of their employees, encourage employees to use alternative travel modes other than the Single-Occupant Vehicle, and decrease their needs for off-street parking.
19. Transportation facilities shall be designed and constructed to: minimize noise; energy consumption; neighborhood disruption; economic losses to the private or public economy, and social, environmental, and institutional disruptions; and to encourage the use of public transit, bikeways, and walkways.

Natural resources (IV.N.) within the area also have policies that apply to the project. These include preserving, protecting, and maintaining waterways as drainage courses (policy 5). Regulating development in the floodplain to preserve and maintain the capability of the floodplain to convey flood water discharges (policy 6).

***Project Relevance:*** This project will coordinate with all local agencies to ensure that relevant documents and previous planning efforts are incorporated. The need for a regional, cohesive transportation system is important for the Salem-Keizer area and the above policies address some of the most important issues for the area.

## Salem Transportation Systems Plan

The Salem Transportation System Plan, adopted in 1998 and amended in 2007, provides a framework of goals, objectives, and policies with the intent to achieve and maintain acceptable mobility standards and meet anticipated travel demands.[4] Several of the plan's guiding principles apply to the Chemawa IAMP project, and numerous committed and recommended projects are within the study area.

The SKATS regional goal is to hold vehicle miles traveled (VMT) per capita constant over the next 10 years (while population grows 19 percent), and the goal for the following 10 years is a 5 percent reduction in VMT per capita while population and employment are expected to grow at over 12 percent.

***Project Relevance:*** Retail and service jobs are forecasted to increase by the greatest amount within the Salem-Keizer UGB, followed by government and school employment. While alternative modes of transportation will be encouraged by the City and will likely be a component of interchange improvemnts resulting from this project, single occupant vehicles will also be a consideration. Impacts of increasing growth and related traffic in the study area will need to be considered, as well as possible additions to facility imrpovemnts to accomodate alternative modes of travel. One of the project objectives is to provide for future travel patterns in a manner that increases functionality and reduces the congestion levels of the interchange.

### Street System

The main goal is to provide a comprehensive system of streets and highways that serves the mobility and multimodal travel needs of the Salem Urban Area.

- **Policy 2.1 Multimodal Street Design –** Streets should be designed to safely accommodate pedestrian, bicycle, and motor vehicle travel.

[4] The project completion dates (priority levels) listed in the Regional TSP should supercede any differences with the dates listed in this section (which are taken directly from the Salem TSP).

- **Policy 2.2 Multimodal Intersection Design** - Arterial and collector street intersections designs should promote safe and accessible crossings for pedestrians and bicyclists, through the use of accessible crossings that are not a barrier to pedestrian mobility. Transit stops should be located near these intersections.
- **Policy 2.3 Arterial and Collector Street Intersections -** Left-turn pockets shall be incorporated into the design of all intersections of arterial streets with other arterial and collector streets, as well as collector streets with arterials and other collectors.
- **Policy 2.4 City of Salem Street Design Standards -** Design Standards will reflect the street classification and consider the character and livability of surrounding neighborhoods and businesses, by managing vehicle speeds and other measures.
- **Policy 2.5 Capacity Efficient Design and Level of Service (LOS) Standards -** Safely and efficiently providing motor vehicle capacity respective to the functional classification of the street.
- **Policy 2.8 Physical Improvements to Existing City Streets -** Adjustments to the design standards may be necessary to avoid existing topographical constraints, historic properties, schools, cemeteries, existing on-street parking, and significant cultural features.
- **Policy 2.9 Access Management -** To maintain utility and mobility of all users, access location, and spacing to arterial and collector streets shall be controlled (see Transportation System Management Element).
- **Policy 3.3 Street Safety Improvement Projects –** Funding and constructing street projects that address vehicular, bicycle, and pedestrian safety issues should be a higher priority for the City than those projects that just respond to vehicular capacity deficiencies. Capacity improvements that resolve identified safety problems through design are exceptions to this policy.
- **Policy 4.3 Project Design Life -** Maximize the longevity of investments, by designing street improvement projects to meet existing travel demand and, whenever possible, accommodate the anticipated travel demand of the next 20 years for that facility.
- **Policy 4.7 Additional Intersection Improvements and Right-of-way -** Intersections and access points for high traffic generators (shopping centers, schools, major recreational sites) may require additional intersection right-of-way and improvements.

The Street Classification System provides the "blueprint" of how the City wants its street system to develop and function over the next 20 years and beyond.

- Freeway - High capacity, speed highway that serves regional, statewide, and interstate travel with ADT of 50,000 or more. Bicycles are allowed on shoulder per Oregon State Statute (ORS), but sidewalks are not. On-street parking is not permitted. Access is fully controlled through grade separated interchanges.
- Parkway - High capacity, speed highway that serves regional and intra-city travel with ADT between 30,000 and 60,000. Ultimately, traffic design would be a divided highway with minimum of 2-4 travel lanes with a raised center median. Bicycles lanes or separate paths are allowed, as are sidewalks. On-street parking is not permitted. Access is limited, but available through at-grade intersections or grade-separated interchanges with selected arterial and collector streets. The minimum right of way is 120 feet (2-4 travel lanes) or 144 feet (6 lanes).
- Major Arterial - High capacity street that primarily serves regional and intra-city travel with ADT between 15,000 and 50,000. These are the main radial and peripheral routes

through the city. Ultimately, traffic design would depend on the expected traffic volumes, with a minimum of 4 travel lanes with left-turn pockets, raised medians, or center turn lanes where appropriate. Bicycles lanes and sidewalks are along the facility. On-street parking is not permitted (except in existing business or residential districts where off-street parking alternatives are not available). Access is limited, to the minimum street and driveway spacing outlined in the Salem Revised Code. The minimum right of way is 96 feet (4 travel lanes).

- Collector- Primarily distributes traffic between neighborhoods, activity centers, and the arterial street system, secondarily it provides access to properties. Collectors have an ADT between 1,600 and 10,000. Traffic design dictates a minimum of 2 travel lanes with left-turn pockets where appropriate. Bicycles lanes, sidewalks, and on-street parking are permitted (where possible). There are minimum street and driveway spacing as outlined in the Salem Revised Code. The minimum right of way is 60 feet.

Local access and circulation recommendations made in the City's TSP include those in Northeast Salem, which encompasses a large portion of the Salem Urban Area, which will face continued growth. Challenges for Northeast Salem include how to increase mobility and connectivity within the commercial and residential areas east of I-5. Issues that need to be addressed include better access management in commercial areas and better local street connectivity in and between residential neighborhoods. The TSP anticipates that additional investments will be needed to improve system capacity.

**Committed Projects (Funds are available)**

- Salem Parkway at Hyacinth Street and Cherry Avenue NE – upgrade both intersections to improve safety
- Ward Drive at Ward Court and Lancaster Drive NE – improve to minor arterial standards, add signal and turn lanes at Fisher Road

**High Priority (next 10 years)**

- Blossom Drive NE (Lilac Lane NE to Portland Road NE)– improve County section to urban standards
- Cordon Road NE at Hayesville Drive NE– install northbound left-turn lane on Cordon Road
- Hazelgreen Road NE at Cordon Road NE/55th Avenue NE - turn lanes on all four legs and install signal
- Ward Drive NE at Lancaster Drive NE – add eastbound right-turn lane on Ward Drive and upgrade signal

**Low Priority (next 25 years)**

- Chemawa Road NE (Interstate 5 to Portland Road) – Improve to urban parkway standards
- Hazelgreen Road NE (Portland Road NE to Cordon Road NE) – improve to interim two travel lanes with center turn lane, also improve Portland Road intersection approach
- Hyacinth Street NE (Portland Road NE to Salem Parkway NE) – widen and improve Hyacinth Street
- Kale Street NE (Portland Road NE to Cordon Road NE) – improve to full urban standards, possibly add a signal
- Hayesville Drive NE (Portland Road NE to Lancaster Drive NE) – improve to urban standards

- Hayesville Drive NE (Lancaster Drive NE to Cordon Road NE) – improve to urban standards
- Indian School Road NE (Chemawa Road NE to Blossom Drive NE) – improve to urban standards
- New Collector (Kale Street NE to Hazelgreen Road NE) – construct as a result of land development

***Project Relevance:*** I-5 is a Freeway, OR 99E Business (Salem Parkway) and Chemawa Road are designated Parkways, OR 99E (Portland Road) is a Major Arterial, and Indian School Road is a Collector. The above standards apply to these facilities. The majority of the roads in the study area are owned by the City of Salem; however, OR 99E, OR 99E Business, and I-5 are state owned. There are also streets outside of the UGB, but within the study area that are owned by Marion County. Chemawa Road and I-5 in the vicinity of the Chemawa Road interchange are expected to exceed or be close to exceeding the capacity of the facilities by 2030 during PM peak hours.

Chemawa Road, Hazelgreen Road, Kale Street, and Hayesville Drive are designated as low priority projects, to be completed in the next 25 years. The intersections of Hazelgreen/Cordon and Hayesville/Cordon are listed as high priority intersection projects, to be completed in 10 years. Improvements have already been completed on parts of Lancaster Drive and the intersection of Verda Lane and the Salem Parkway (OR 99E Business). Most short and medium range projects will be incorporated into the transportation modeling, as outlined by SKATS. The projects above will likely have an impact on the Chemawa Road interchange even if they are not included in the modeling.

### Transportation System Management

Transportation System Management (TSM) measures provide for better traffic movement and increased safety by managing the existing street system. Another goal for using TSM measures is to increase street system safety and capacity through the adoption and implementation of access management standards.

- **Policy 3.1 Development and Adoption of Access Management Standards**
  - Properties should use a primary access from the lowest street classification.
  - Individual driveways will not be considered for each parcel.
  - Access to the arterial street system is limited to one point, provided adequate street frontage is available.
  - Signalized access for private streets and driveways onto the main street system is not allowed within 1,320 feet of any existing or planned future signal. Access spacing is determined on the street classification.
- **Policy 3.2 Incorporate Access Management into Arterial Street Design -** Access management plans will be incorporated into all arterial street design projects.
- **Policy 3.3 Access Management Projects -** develop for congested arterials to help improve safety and traffic flow.

***Project Relevance:*** Effective access management can improve safety, increase capacity, reduce congestion, and increase the functional life of the facility. Consistent with the City's access management goals and policies, the Chemawa IAMP will analyze a variety of access management tools to control speed and limit access points on the transportation system

near the interchange in order to preserve the function and capacity of this facility. An access management plan will be an element of the Chemawa IAMP.

### Local Street Connectivity Element

The City of Salem has designated a local street circulation pattern to provide access to property and connections to Collector and Arterial streets, neighborhood activity centers, and emergency access as a high priority for the city. Local streets should also provide bicycle facilities to increase ridership and safety. Arterial and collector streets should have bicycle lanes installed or have the road re-striped to include these bicycle lanes.

The City also indicates a desire to increase pedestrian facilities and walking trips, through a complete sidewalk and transit system. To accomplish this, the City will dedicate funding based on the need to complete the sidewalk system, especially when providing or improving access to schools, parks, shopping, and transit services.

Included in the Salem TSP are the following areas designated for bicycle improvement:

- Hayesville Drive NE (from Portland Road to Cordon Road NE) – Medium priority
- Ward Drive NE (Lancaster Drive to Janice Avenue NE) – Low priority
- Blossom Drive NE (Indian School Road to Portland Road NE) – Low priority
- 45th Avenue NE (Silverton Road to Ward Avenue NE) – Low priority
- Indian School Road NE (Chemawa Road to Blossom Drive NE) – Low priority
- Janice Avenue NE (Ward Drive to Hayesville Drive NE) – Low priority
- Happy Drive NE (Hayesville Drive to Kale Street NE) – Low priority

The following Collector Streets were listed as lacking sidewalks (2001):

- Hayesville Drive NE (Nandale Drive NE to Lisa Street NE; and Harlan Drive NE to Janice Avenue NE; and Stephens Middle School to Cordon Road NE)
- Herrin Road NE (45th Avenue to Cordon Road NE)
- Blossom Drive NE (Indian School to Portland Road NE) – To be constructed within the 1998-2003 CIP period
- Auburn Road NE (Lancaster Drive to Cordon Road NE)
- Evergreen Avenue NE (Englewood Avenue to Sunnyview Road NE)

***Project Relevance:*** The recommended interchange improvements that result from the Chemawa IAMP project should be consistent with the City's planning for bicycle and pedestrian facilities. The projects above will improve connectivity for bicyclists and pedestrians, improving the ability for residents to travel by alternative modes.

### Freight Movement

The City's TSP encourages accessibility to a range of viable and competitive transport modes that fulfill the needs of Salem area shippers, to ensure a multimodal transport system for the efficient, safe, and competitive movement of goods and services to, from, and within the Salem Urban Area.

- **Policy 2.3 Adequate Street Design Standards for Trucks** - The City shall develop adequate design standards that meet the weight and dimensional needs of trucks, particularly for those streets that serve industrial and commercial areas.

The following streets have been identified as needing improvements (based on the status and condition of the roadway and/or the amount of congestion that causes delays to freight movement).

**High Priority Freight-related Street Improvements**
- Traffic Signal Interconnects and Coordination (Citywide)
- Cordon Road NE (State Street to Center Street NE)

**Medium Priority Freight-movement Street Improvements**
- Cordon Road SE at Pennsylvania Avenue SE
- Blossom Drive NE/Indian School Road NE

***Project Relevance:*** The Chemawa Road interchange is important for freight movement. Improvements to the larger transportation system, specifically to those streets listed above, will improve mobility within the study area.

## Salem Zoning Code

### Zoning Districts and Land Use Regulations

Title 10 of the City of Salem's Revised Codes defines the basic land use districts. The predominant City zoning designations in the IAMP Plan Area includes public service and public/private education. Two overlay zones, floodplain and Chemawa/I-5 Northeast Quadrant Gateway (13), are in the interchange area. The study area is comprised of several different zoning districts including:

- Single Family Residential
- Multifamily Residential 1 and 2
- Residential Agriculture
- Public/Private Education
- Public services
- Public Amusement
- General Commercial
- Retail Commercial
- Industrial Park
- General Industrial
- Industrial Business Campus
- Industrial Commercial
- Employment Center

### Employment Center (EC) and Public Service (PS) Zones

The area directly to the northeast of the Chemawa/I-5 Interchange is designated as an Employment Center (EC) and Public Service (PS) with the Chemawa/I-5 Northeast Quadrant Gateway Overlay Zone (see below for more information on the overlay districts).

Permitted uses in the EC zone include:
- Agriculture (such as raising, producing, keeping plants)
- Farming
- Manufacturing and production (This includes the manufacture, process, fabricate, package, or assemble goods, which are not generally sold or displayed on site. Slaughter houses, meat packing, feet lots, lumber, pulp, and paper mills, and concrete batching are not allowed)
- Industrial services (such as repair or service of industrial, business, or consumer machinery, equipment, products, or by-products)
- Warehouse and freight movement
- Wholesale sales
- Office use

- Parks and open space
- Public utilities

Permitted uses in the PS zone include:
- Transportation, communications, electric, gas, and sanitary services
- Retail trade
- Services, such as health, educational, and social services as well as museums, art galleries, botanical, and zoological gardens
- Public administration
- Manufacturing

### Public/Private Education (PE) Zone
A large section of Public/Private Education (PE) is also in the interchange area, south and partially north of Chemawa Road. This land is owned by the Bureau of Indian Affairs and occupied by the Chemawa Indian School. The general development standards in the PE zone code permit health, educational, and social services, as well as fire protection.

### Residential Agriculture (RA) Zone
Residential Agriculture (RA) zones are found in the larger study area, east of I-5 within the Salem City limits. The RA zone is limited to single-family, duplex, and agricultural-related uses and is considered a "holding zone" until urban services are available. Single family dwellings are allowed. Special Uses, subject to restrictions and development requirements include sports and recreation clubs, golf courses, veterinarian specialty services, and bed and breakfast establishments. Conditional uses include livestock-related uses, beauty and barbershops, and fraternal organizations.

### Other Residential Zones
Other zones in the study area are predominately single-family residential (RS) and multi-family residential 1 (RM1) and 2 (RM2). Permitted uses in these three zones include the following (if applicable to some zones, notes are made):
- One single family dwelling (or townhouse for RM1 and RM2), other than a manufactured home, per lot
- One duplex on a corner lot (for RS)
- Apartment houses, court apartments, condominiums, duplexes, and room and board facilities serving five or fewer persons (for RM1 and RM2)
- An apartment house or lodging with 25 dwelling units, or more, may have a newsstand, barber shop, beauty parlor, food shop, and dining rooms within the building (for RM2)
- Manufactured homes in manufactured dwelling parks
- Agricultural uses, including crops, timber, and nurseries
- Playgrounds and parks
- Public buildings and structures, such as libraries and fire stations
- Public utility structures and buildings such as pump stations and reservoirs, telephone substations, and electric substations
- Residential home
- Child day care homes and babysitting, as well as Adult day care homes
- Funeral service, except crematories
- Membership sports and recreation clubs having golf courses
- Elementary and secondary schools

- Religious organizations

Conditional uses include:
- Crude petroleum and natural gas extraction
- Electric services
- Gas production and distribution
- Water supply
- Beauty and Barber shops
- Homeless shelters and room and board facilities serving six to ten persons
- Civic, social, and fraternal organizations
- Community or neighborhood club buildings, including swimming pools and similar recreation facilities, when operated by a nonprofit community club.

The minimum residential density in the RM1 district is eight, with a maximum of 14 dwellings per acre. Manufactured dwelling parks have a minimum density of six dwellings per acre. The minimum residential density in the RM2 zone is 12, with a maximum of 28 dwellings per gross acre. Manufactured dwelling parks should have a minimum density of six dwellings per acre.

### Industrial Zones

In the study area, along OR 99E and Chemawa Road, is Industrial Commercial (IC). General Industrial (IG) and Industrial Business Campus (IBC) can be found further south, nearby I-5 and the Hayesville/OR 99E interchange. These industrial zones allow a variety of agricultural, forestry manufacturing, and assembly/fabrication-related uses. The zones allow certain types of wholesale and retail trade, as well as finance, insurance and real estate services. The IBC does have locational standards that require direct access onto an arterial or collector street. While the IC zone includes similar agricultural, forestry, and manufacturing-related uses, it allows more retail uses than the other two zones. Industrial Park (IP) zoning occurs further southwest from the Chemawa Road interchange, between the Portland & Western Railroad and OR 99E Business (Salem Parkway).

### Commercial Zones

Retail Commercial (CR) uses in the Study Area can be found along OR 99E and Hayesville Drive, near the Lancaster Drive intersection. Allowed uses are predominantly retail, with some finance, insurance, real estate, and services listed. Some small areas of General Commercial (CG) are found in the Study Area off OR 99E, near the Kale Street interchange. Agricultural and forestry-related uses are permitted in CG, as are wholesale trade establishments. Uses allowed under "retail trade" in the CG include automotive service stations, retail bakeries, furniture, home furnishings, and equipment stores, and fruit and vegetable stores. Special Uses include entertainment establishments, wildlife rehabilitation facilities, and used merchandise stores. Conditional Uses include crude petroleum and natural gas extraction, racing (including track operations) and solid waste transfer stations.

***Project Relevance:*** The City's land use (zoning) districts regulate the allowable land uses and development standards within the City of Salem. This information can be used to calculate the intensity and type of development allowed within particular zoning districts, which in turn informs the number, types, and modes of trips and the transportation facilities necessary to support them. Conversely, knowing the allowed land uses, one can anticipate the impact a proposed transportation facility can have on existing and future development.

### Overlay Districts

Much of the Study Area is covered with a Floodplain Overlay Zone. These areas are subject to Chapter 140, Flood Plain Overlay Zones. A floodplain development permit must be obtained prior to any development or change in use in these areas. Allowed uses vary depending on whether or not areas are in the floodway or floodway fringe or floodplain.

The purpose of the Chemawa/I-5 Northeast Quadrant Gateway overlay zone is to complement the existing land uses while creating a gateway into the city of Salem. The transportation goals most relevant to this IAMP project:

a) Pedestrian and transit connections. The overlay district shall have an internal pedestrian network connecting the primary buildings, automobile parking area, and open spaces. The pedestrian network shall provide direct connection to transit on Chemawa Road NE and to the Indian School Road NE.

c) The internal transportation network of the quadrant shall encourage and accommodate freight movement by truck and rail.

***Project Relevance:*** The City's land use overlay zones regulate the allowable land uses and development standards within the City of Salem for special areas. Some land use will not be allowed in the floodplain overlay zone, which means that this area will likely remain at a low density. The Chemawa/I-5 Northeast Quadrant Gateway overlay zone has different purposes and specifically for this project the transportation goals will require more connections between certain uses within the zone.

## Marion County Comprehensive Plan

The Marion County Comprehensive Plan was developed to guide to the development and conservation of Marion County's land resources, both urban and rural areas. This is a generalized, long-range policy guide and land use map that provides the basis for decisions on the physical, social, and economic development of the county. The County completed a multi-year urban growth management project in 2002 in an effort to address the County's basic planning goals and coordinate planning activities with its cities regarding urban growth and expansion issues.

### Urbanization

The Urbanization Goal of Marion County is to provide for an orderly and efficient transition from rural to urban land use. Numerous sub-goals specify that it is the County's intent to direct urban uses to areas within urban growth boundaries and away from agricultural uses, provide for an orderly transition from rural to urban uses, and develop stable and attractive residential areas containing a wide variety of housing types and densities. Sub-goals specific to land uses in the County are found under "Urban Land Use Goals" and include:

f. Development of a commercial land use pattern which assures a convenient and adequate supply of goods and services to the resident, transient and trade area population.
g. Development of commercial areas and employment centers that favor being located in relation to the urban transportation system.
h. Development of industrial land use within urbanized areas unless an industry specifically is best suited to a rural site.
i. Provision of sufficient areas for future industrial land use.

The County's Comprehensive Plan also contains a section on Urban Area Planning. This section addresses how the County and the Cities within the County can achieve orderly, efficient development of urban areas. Each community should develop management programs in conformance with Statewide Planning Goal 14, Urbanization, and each program should consist of an UGB, urban development policies or ordinances to achieve the desired purpose, and joint city-county agreements to coordinate land use planning activities.

### Growth Management Framework – Transportation

The transportation goals that are part of the Growth Management Framework address the role of transportation in providing efficient movement of people and freight throughout the county. The County will review city Transportation System Plans (TSPs) and/or transportation elements of city comprehensive plans with these goals in mind. The goals include:

a. Encourage use of alternative modes of transportation including mass transit, bicycling, walking, and carpooling.

b. Address transportation needs appropriate to both urban and rural areas throughout the county.

4. Allow for a complementary mix of land uses and transportation systems.

- Mixed land uses encourage walking and biking trips, and keep auto trips short and on city streets. County agreements with the cities should provide for zoning that allows the co-location of employment and residential uses (mixed use development) in appropriate areas for communities that will exceed 5,000 persons in the preliminary 2050 Framework forecast, and encouraged in all communities.
- Transportation trips can be shortened and traffic reduced by an effective matching of retail uses to city size. Coordination efforts will strive to ensure that retail land uses over 60,000 sq. ft. or 300 employees per building are located in the urban growth boundaries of cities that are in excess of 10,000 people.

6. Improve key freight routes.

- Cities over 10,000 in population and the County should jointly plan for freight movement by both rail and truck in their transportation planning activities.

### Rural and Urban Transportation Planning

The findings, recommendations, and policies contained in this Transportation element come directly from the Marion County Rural Transportation System Plan (RTSP). While every effort has been made to ensure this element matches the RTSP, in the event of any differences, the RTSP would govern.

A set of goals and objectives was created to provide a starting point for the planning process and to identify concepts that would be used in determining a future transportation system. Details regarding the RTSP are listed in the following section.

***Project Relevance:*** Some of the study area north of Chemawa Road and east of I-5 is outside of the UGB. Improvements to the interchange may spur development of the area as a whole, which might include development outside the UGB, even though future development is encouraged within the UGB. Providing multi-modal transportation systems that are complete and efficient is one of the main concerns of Marion County.

## Marion County Rural Transportation System Plan

For rural areas outside of an UGB, the Marion County Rural Transportation System Plan (RTSP) serves as the framework for transportation planning. The RTSP is the County's 20-year plan to provide mobility, address safety needs, accommodate planned growth, facilitate economic development, and maintain a high standard of livability for county residents.[5]

### Facility Inventory and Conditions

The County maintains approximately 1,130 miles of roads, including 140 miles within UGBs. The Marion County RTSP also identifies I-5 and OR 22 as emergency detour routes. The County has almost 122 miles of railroad tracks. There are two major railroad mainlines (Union Pacific and Portland & Western) within the County. The County considers Level-of-Service (LOS) D or better to be acceptable for roadway segments in rural areas, which is the level at which concerns regarding adequate capacity typically arise.

***Project Relevance:*** I-5 is classified as a principal arterial, while OR 99E and OR 99E Business are classified as arterials in the Marion County RTSP. Most of the study area is within the Keizer or Salem UGBs, however, some sections north of Chemawa Road on the east side of I-5 are outside of the UGB. For the state highway classification, I-5 is designated an interstate facility, OR 99E is a regional facility, and OR 99E Business is district facility.

### Recommended 20-Year Rural Improvements

The recommended rural improvements address various modes of transportation and include specific projects and anticipated needs within the next 20 years to maintain the safety and efficiency of the transportation system at an acceptable level. A summary of the recommended improvements in the Marion County RTSP is provided below.

- Roadway improvements comprise the majority of transportation facility needs and consist of safety projects, non-safety and capacity projects, bridge rehabilitation and replacement projects, railroad bridge restrictions and grade crossing deficiencies, and roadway drainage deficiencies. The County will continue to keep maintenance and preservation of the existing roadway system as its top priority in terms of resource allocation.
- Freight transport along rail lines is expected to continue. The County will continue to support efforts for developing cost-effective passenger and freight rail service.
- The State Highway system is a critical part of the overall transportation system and many key corridors in the County are made up of State highways, including I-5 and OR 22. State Highway needs include safety, modernization, roadway maintenance, and bridge preservation improvements, as well as corridor and refinement studies. The Marion County RTSP identifies these needs, along with connectivity of County roadways to State routes, future widening of State Highways for capacity, regional planning studies, and addressing other restrictions to county roads due to limiting highway structures.

[5] The project completion dates (priority levels) listed in the Regional TSP should supercede any differences with the dates listed in this section (which are taken directly from the Marion County TSP).

***Project Relevance:*** I-5 is listed as a strategic Intra/Inter-County Corridor with two existing or committed park-and-ride/pool locations near the intersection of I-5 and OR 99E. This IAMP seeks to improve the existing infrastructure to increase safety and reduce congestion.

### Roadway System Needs and Recommended Improvements

The Marion County RTSP lists the existing roadway needs; those that are relevant to the Chemawa IAMP project are listed in the table below.

Safety Projects (Table 8-5)

| Facility | Location | Safety Issues | Need |
|---|---|---|---|
| Cordon Road | Hayesville Drive | Rear-end and left-turning accidents | Left turn lane on Cordon |
| Brooklake Road | Wheatland Road | Accidents; vehicles driving off end of road | ITS Safety – speeding (nonstopping) vehicle warning |
| Cordon Road | Ward Drive | Anticipated rear-end and left-turning accidents | Left turn lane on Cordon |
| Cordon Road | Kale Street | Rear-end and left-turning accidents | Left turn lane on Cordon |

Intersection traffic control needs identified in the Marion County RTSP include signals, turn lanes, reconfiguration of approaches, and changes to through traffic movement. These needs are related to operational problems than safety problems, even though most of these cases also involve some aspect of safety.

Intersection Traffic Control and Modernization Needs (Table 8-6)

| Facility | Location | Problem | Need |
|---|---|---|---|
| Cordon Road | MacLeay Road | Congestion | Traffic Signal at intersection |

Corridor studies examine corridors where there could be significant demand for future travel, and often a considerable demand for freight mobility. There are currently aspects of the roadway that may reduce the ability of the corridor to serve this potential significant demand. The studies will examine the demands on the facility, the cost and benefit of improving the corridor, and will recommend whether or not to improve the roadway.

Recommended Corridor Studies (Table 8-15)

| Facility | Endpoint | Endpoint | Connecting | Issues |
|---|---|---|---|---|
| Cordon Road | I-5 | Hazelgreen Road | North-South Route along east side of Salem | Capacity issues imminent; future signal locations; many locations needing turn lanes; access management |
| Brooklake Road | River Road NE | OR 99E | I-5 Interchange, Keizer, Brooks, farmland, and surrounding area | Capacity issues imminent; future signal locations; many locations needing turn lanes; access management |

Future roadway needs in the Marion County RTSP are based on evaluating the possible impacts of the projected 2025 traffic volumes on the transportation system, where capacity deficiencies may develop by 2025 if no improvements are made during that time. Concepts such as expanded transit service, land use planning, and other strategies could help to

reduce some of these potential deficiencies. As documented in the Marion County RTSP, detailed planning will not occur until these anticipated future needs become identified as actual needs.

The Marion County RTSP outlines intersection traffic control and configuration issues. Projected traffic volumes were also used to identify locations with potential intersection capacity deficiencies and possible traffic control needs. Traffic control needs include signals, turn lanes, and changes to through traffic movement.

Future Intersection Traffic Control and Modernization Needs (Table 8-17)

| Facility | Location | Projected Problem | Probable Need |
|---|---|---|---|
| Brooklake Road | River Road | Developing congestion; Traffic control and location of railroad crossing | Signal, move RR gates, left turn lanes, drainage; possible realignment of intersection |
| Cordon Road | Hazelgreen Road/55th Avenue | Developing congestion; approach angles | Traffic signal and left turn lanes at intersection |
| Brooklake Road | Huff Avenue | Future Congestion | Left turn lane on Brooklake Road; possible signal |

State highway and regional transportation needs are also outlined in the RTSP. The 2005 update includes projects on, or that impact, I-5 (which is one of two Principal Arterials that are the most important roadways in Marion County and issues on these roads affect the whole system). However, the Marion County RTSP is not intended to include detailed plans for I-5, but state highway needs will be identified to include safety and modernization improvements, corridor studies, and refinement studies.

Highway modernization needs are addressed through capacity, reconfiguration, and other related improvements that improve the efficiency of highway facilities. Modernization improvements are not implemented for the primary reason of safety. Generally isolated to specific locations, changes will improve the operation of the transportation system in the vicinity. None of the modernization needs identified in the Marion County RTSP involve additional lanes on highways, other than turn lanes at key intersections.

State Highway Modernization Needs (Table 8-20)

| Facility | Location | Problem | Need |
|---|---|---|---|
| I-5 Ramps | Brooklake Road | Congestion; delay; queues backing up to freeway mainline | Install traffic signals and turn lanes at ramp intersections; may need to adjust location of ramps |

Traffic volume growth in portions of the State and Interstate highway system in Marion County is resulting in capacity problems. While improvements at specific locations can alleviate these capacity issues to some extent, County projections indicate that it will become necessary to add lanes to the following sections of State Highway in order to maintain adequate traffic flow in the next 20 years.

State and Interstate Highway Widening Needs for Capacity (Table 8-22)

| Facility | From | To | Need |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Interstate 5 | Salem | Clackamas County | Additional capacity may become necessary within 20 years. |
| OR 99E | Salem | Woodburn | Add a center turn lane and/or an additional travel lane in each direction |

The Marion County RTSP states that corridor studies are needed to maintain the accessibility, safety, and mobility along two state highway routes within the study area. The studies will identify specific improvements to be added to the transportation plan.

Corridor Studies on State Highways (Table 8-23)

| Corridor | Description |
|---|---|
| Connections to and from Interstate 5 | I-5 serves as the primary transportation corridor though the County. It provides access between several cities in the county as well as access to places outside the county. Many interchanges within or adjacent to the County have developed capacity issues at the interchange and also in areas leading to the interchange. Additionally, in northern Marion county the wide spacing and long distances between interchanges necessitates considerable out-of-direction travel in order to use the Interstate. This study is needed to look at the possible interchange revisions. |
| Oregon 99E from Salem to Clackamas County | Oregon 99E serves as the major transportation route to Salem. This highway also serves as a major farm-to-market route for the significant agricultural businesses and farms in the area. Traffic volumes have increased on this road to the point where delay and poor level of service are common occurrences, and capacity problems are worsening. The high volume of traffic can detrimentally effect the quality of life of the many smaller Marion County communities and cities that the road bisects. This study may be combined with study of OR 99E in Clackamas County. |

***Project Relevance:*** The existing County roadway safety improvements (Table 8-5) are within the greater study area, or just outside of the study area boundary. All improvements will affect the future conditions of the transportation system and the IAMP study area. The Cordon Road project is listed as the second highest priority for the County (Table 8-6). The first two corridor studies on local roads are recommended (Table 8-15) are Cordon and Brooklake Roads; Cordon Road forms the eastern boundary of the study area and Brooklake Road is directly outside the study area. The possibility exists to improve these roadways to better facilitate movement of people and goods, which will have a direct impact to the Chemawa IAMP area. However, while these studies should be considered, they should not be relied upon since they may not be built. Improvements to the Brooklake Road/I-5 ramp connections could influence traffic operations in the Chemawa IAMP study area.

The IAMP will consider projects in the Marion County RTSP that may widen I-5 and OR 99E in the northern portion of Salem and within the study area (Table 8-22). These improvements could improve the functionality of these facilities and at the Chemawa Road interchange. The corridor studies called for in the Marion County RTSP have not yet been developed. While there are no policy recommendations or implementation measures for the identified corridors, the IAMP planning process will take into consideration the identified issues that underlie the stated need for corridor planning, as they relate to the Chemawa Road interchange and the surrounding transportation system.

### Transportation System Management (TSM) Policies

The RTSP highlights the significant role access management has in facilitating free flow of traffic on Cordon Road. To ensure its capacity and safety, the Board of Commissioners has

approved requirements to limit and control further access to Cordon Road. The Marion County RTSP documents that land use controls also are used to ensure that new development enabled by zoning changes does not adversely affect transportation facilities.

***Project Relevance:*** Chemawa Road, I-5, OR 99E, and OR 99E Business are all classified as principal arterials within the study area and would be subject to the County's spacing standards. The spacing requirements for access along arterials is 500-feet from any intersection with a state highway, arterial or major collector (the Chemawa/I-5 Interchange) and 400 feet from any other intersection. OHP standards apply at the Chemawa Road interchange.

### Transportation System Planning Policies

County transportation system planning policies that have relevance to the Chemawa IAMP include:

8. The County recognizes the role of State Highways and County Arterials as the backbone of the transportation network. These roads are critical for everyday transportation and serve as critical lifelines in emergency situations. The County will support efforts to enhance and maintain the function of these roads through land use policies, access management strategies, and roadway improvements.
11. The County recognizes the importance of facilitating freight movement. Effort will be made to facilitate freight movement on freight routes.
12. Effort will be made to reduce conflicts between mobility of freight and livability of communities along these routes.

***Project Relevance:*** The IAMP should be consistent with County transportation policy where improvements affect County land use or facilities.

### Air, Rail, Water, Energy and Pipeline Transportation Policies

These modes are an important part of the existing and future transportation network in terms of moving freight, passengers, services, and information in the County.

5. The County will encourage the establishment of cost-effective passenger and commuter rail service in the Willamette Valley.
6. The County generally supports development of new or expanded freight rail service that would improve the efficiency of freight movement, as long as its impacts can be appropriately addressed.

***Project Relevance:*** Since there are two railroad lines in the study area, future passenger or commuter rail could affect land use and future development of this area. Increased freight rail service could also affect travel patterns in the study area.

### Development and Access Policies

Development and access policies provide guidelines for linking transportation and land use in an attempt to provide suitable transportation facilities while protecting and preserving the agricultural and rural nature of the County. The following County policies are relevant to the IAMP planning process:

1. Additional interchanges on I-5 (from northern County line to Chemawa Road interchange) will be discouraged, unless a comprehensive study and County support demonstrate that a new interchange is appropriate for regional access.

7. The County will consider roadway functional classification, capacity, and current conditions, in addition to safety issues, as primary criteria for land use designation and land use development changes.
8. The County shall review land use actions, development proposals, and large transportation projects in the region for impacts to the transportation system and facilities, affected communities, and urban areas. Significant impacts that cannot be mitigated to the County's satisfaction, will require modification until the impacts are acceptable, or the project will be denied.
10. a.) The number of access points on arterial roadways shall be kept to a minimum to reduce the interruption to traffic flow and to promote safety.
11. a.) Direct access to arterials from adjacent parcels should not be allowed if alternative access is available or can be made available.
13. a) To minimize and eliminate hazards along County roadways, review and approval of proposed driveways and accesses are required.
    b) Accesses shall be located at the safest site possible and shall meet the stopping sight distance requirements specified in Marion County's design standards. Actions required to obtain these stopping sight distances shall be required as a condition of approval of the access permit.
    c) Accesses should be consolidated, whenever feasible, to minimize the number of access points.

***Project Relevance:*** With its emphasis on improving an existing interchange, the goals of the Chemawa IAMP planning project is consistent with the County's policy to discourage additional interchanges on I-5. The County policies reflect the importance of limiting access to a major arterial, including Chemawa Road, I-5, OR 99E, and OR 99E Business. To this end, the County will consider altering land use development changes if there are significant reasons for doing so.

## Financing Plan

The cost to fund the rural 20-year recommended improvements is estimated to be $104 million. However, this represents only part of the total cost for all of the identified transportation needs. The cost to address the remaining rural needs is estimated to be $25 million, and the total urban needs are anticipated to exceed $100 million. The total cost to address all of the identified needs would be at least $229 million, or $11 million per year over 20 years, far beyond our available funding of about $1 million per year.

A fiscally constrained plan of improvements for the next 20-years, in 2004 dollars, was approved under this updated Marion County RTSP. Improvements relevant to the Chemawa IAMP are listed below.

20-Year Financially Constrained Plan (Table 11-1)

| Corridor | Location | Description | Estimate |
|---|---|---|---|
| Zero to five year time frame | | | |
| Safety | Cordon Road/Hayesville Drive | Construct left turn lane on Cordon Rd | $300,000 |
| Safety | Brooklake Rd / Wheatland Rd | ITS Safety – Speeding (non-stopping) Vehicle Warning | $100,000 |

| | | | |
|---|---|---|---|
| Transportation planning activities in zero to five year time frame | | | |
| Corridor Study | Cordon Road from City of Salem to Hazelgreen Road | Corridor Study to develop detailed plan (signal locations, turn lanes, future capacity, access management, etc.) for Cordon Road | In House, Cooperating with Salem |
| Five to Ten year time frame | | | |
| Capacity/ Modernization | River Road NE/ Brooklake Road | Construct traffic signal and left turn lanes at intersection; some relocation of roads may be necessary | $900,000 |
| Capacity/ Modernization | Cordon Road/Hazelgreen Road/55th Avenue | Construct traffic signal and left turn lanes at intersection | $900,000 |
| Transportation planning activities in five to ten year time frame | | | |
| Corridor Study | Brooklake Road from River Road NE to Oregon 99E | Corridor Study to develop detailed plan (signal locations, turn lanes, future capacity, access management, etc.) for Brooklake Road | In House |

### *Unfunded 20-Year Improvements*

Due to the projected revenue shortfall, funding for the projects that are recommended, but not in the above list, has not been determined. The County will continue to look for additional sources of funding to facilitate the completion of these improvements.

Unfunded 20-Year Recommended Improvements (Table 11-2)

| Corridor | Location | Description | Estimate |
|---|---|---|---|
| Unfunded 20-Year Recommended Improvements | | | |
| Capacity/Safety | Cordon Road from Caplinger Road (Salem UGB) to State Street | Widen to two lanes each direction; includes intersection improvements | $3,400,000 |
| Safety | Cordon Road/Ward Drive | Construct left turn lane on Cordon Road | $400,000 |
| Safety | Cordon Road/Kale Street | Construct left turn lane on Cordon Road | $300,000 |
| Capacity/ Modernization | Brooklake Road/Huff Avenue | Construct left turn lane on Brooklake Road and possibly a traffic signal at intersection | $750,000 |
| Capacity/ Modernization | Brooklake Road from River Road NE through I-5 Interchange | Widen to two lanes each direction plus center turn lane | $3,000,000 |

***Project Relevance:*** Funding will be an ever increasing concern for the development and improvement of the transportation system in Marion County. Improvements that are listed in the financially constrained plan will likely be funded. Therefore, these projects will be considered in the Chemawa IAMP. Improvements made on the connecting facilities could improve congestion in the interchange area.

## Long Term Transportation Issues

Marion County's long-range view of transportation and land use issues aims to influence regional development and transportation functionality through the 21st Century. The long-

term issues are only concepts at this time and still require extensive study before the County is ready to pursue implementing any of these ideas.

Within the 20-year horizon of the RTSP, the County will focus on facilitating intra- and inter-County mobility by maintaining the function of key transportation corridors that serve travel and freight movement. This will addresses many of the needs of commuters, farm-to-market issues, as well as the needs of businesses.

The development of passenger rail service, either light rail, commuter rail, and/or high-speed rail, is a viable alternative for Marion County in the future.

Good access to I-5 will become more important to Marion County's quality of life in the future. A project to reconstruct the Woodburn Interchange (exit 271) is currently being developed. Long-term improvements to the quality of the I-5 corridor through Marion County will likely involve improvements to the Brooks (exit 263) and Aurora/Donald (exit 278) interchanges.

***Project Relevance:*** Since I-5 is a principal arterial, interstate facility, and freight route, it is important to ensure the continued efficient use of the facility by improving safety and mobility. Improvements to the interstate system in the County north of the Chemawa Road interchange could impact the function of the Chemawa Road interchange and influence design alternatives for IAMP improvements. The cause and effect of the relationship of land use planning to the transportation system will be increasingly important as Marion County continues to grow. Examining the changing dynamics of land use in the area, as well as travel behaviors, will help develop a set of alternatives for the IAMP project that, optimally, will meet the current and future travel patterns for the area. Achieving this goal will require a holistic approach to the planning process.

If high-speed or commuter rail is added to Marion County, a station could be located in the study area, which would affect traffic in the study area. Because Marion County identifies TSM strategies as a recommended approach to address future development and maintain the transportation system, the IAMP will need to consider TSM strategies.

## Marion County Zoning Ordinance

The zone classifications implement the Marion County Comprehensive Plan designations. Since the County zoning ordinance implements several city comprehensive plans and not all plan designations are identical for all cities, those in the Salem/Keizer Comprehensive Plan are used below. The following Marion County urban and rural zoning designations are located within the study area:

- Urban Transition (UT) zone
- Commercial General (CG) zone
- Exclusive Farm Use (EFU) zone

### Urban Transition (UT) Zone

The predominant zoning to the east of the interchange area is Urban Transition, which is essentially an urban "holding zone" intended to protect undeveloped or underdeveloped properties that do not have available urban facilities for future development. Development regulations are found in Chapter 13 of the Marion County Urban Zoning Ordinance. In the area of the Chemawa Road interchange, the UT zoning north of Chemawa Road is

designated for future single-family residential development at 5-acre minimum lot size (UT-5) and that to the south of Chemawa Road is designated for 20-acre industrial development (UT-20-IND). Conditional uses include commercial activities in conjunction with farm or forest use, public golf courses, schools, civic organizations, kennels, public parks, and playgrounds.

The Zoning Ordinance states that the UT zone anticipates future city annexation and extension of public facilities and services. The County regulations governing the division of land are intended to facilitate an orderly transition to efficient urban development (see Section 13.31, Division of Land).

### General Commercial (CG) Zone

Uses allowed in the CG zone (urban zoning designation) include hotels, restaurants, and building materials, hardware, retail nurseries and garden supply stores. Automobile dealers, RV parks, and gas stations are allowed, but subject to special standards. Other automotive-related uses are conditional.

### Exclusive Farm Use (EFU) Zone

This is the only rural zoning designation in the study area. The EFU zone's primary function is for commercial, large scale agriculture on tracts of predominately high-value farm soils. Small tracts of non-high value soils are also included in this zone to serve as buffers between commercial farming activities and non-farm uses. Subdivisions and planned developments are not consistent with this zone and are prohibited. Uses allowed include buildings in conjunction with farm use, propagation and harvesting of forest product, and farm uses. Single-family dwelling, manufactured homes not in conjunction with farm use, bed and breakfast inns, commercial activities in conjunction with farm uses, and utility use (including transmission towers) are allowed on conditional circumstances.

### Other Zones

The following Marion County urban zoning designations are located within the IAMP study area, to the east of I-5 and south of Chemawa Road:

- Single Family Residential (RS)
- Multiple Family Residential (RM)
- Public (P)
- Urban Transition (UT)
- Urban Development (UD)
- Commercial Retail (CR)
- Commercial Office (CO)
- Commercial General (CG)

Moving west from Cordon Road, the area is dominated by residential uses (predominantly RS, with areas of RM along Lancaster Drive). The density requirement for the RM zone is one dwelling unit per 1,500 square feet of lot area; 2,000 square feet of lot area for each mobile home in a mobile home park. Urban Development (UD) zones are also scattered throughout the study area. The intent of this zone is to provide for urban development consistent with the land use designation, where sanitary services are, or can be, made available.

Public zoned lots are located within areas of Single Family Residential. The purpose of this zone is to provide areas appropriate for specific public and semi-public uses and to ensure that they are compatibility with nearby uses. It is not intended that a property zoned Public for one type of use be allowed to change to another use without demonstrating through the conditional use process that the proposed use satisfies the conditional use criteria. Permitted uses include:

- Farm and Forest use
- Utilities, except public power generation
- Child day care home for 12 children or less and child care centers (see Section 26.22)
- Elementary and secondary schools (see Section 26.62)
- Religious organizations (see Section 26.60)
- Senior citizens center, counseling center, and neighborhood center

Conditional uses that require a permit:

- Cemeteries, crematoriums and mausoleums
- Parks, playgrounds, parkways, public or private open space. Also commercial sports, public golf courses, and amusement parks, as well as Amusement and recreation services not elsewhere classified
- Health, Educational, and Social services
- Museums, art galleries, botanical, and zoological gardens
- Membership organizations, physical fitness facilities, and Membership Sports and Recreation Clubs
- Engineering, Architectural, and Surveying Services
- Justice, public order and safety, including correctional facilities.
- Solid waste disposal site subject to Chapter 32.
- Surface mining subject to Chapter 32.
- Hazardous waste disposal facility as defined by State Department of Environmental Quality laws and subject to local land use compatibility criteria in DEQ rules.

The County zone most prevalent in the Study Area along OR 99E is Commercial Retail (CR), as well as Commercial General and Commercial Office. Allowed uses in the CR zone include hotels, restaurants, and building materials, hardware, retail nurseries and garden supply stores. Automobile dealers, RV parks, and gas stations are allowed, but subject to special standards. Other automotive-related uses are conditional. Commercial office uses are predominantly restricted to service-oriented businesses, schools, and administrative and executive offices.

***Project Relevance:*** The County's land use zones regulate the allowable land uses and development standards within Marion County. This information can be used to calculate the intensity and type of development allowed within particular zoning districts, which in turn informs the number, types, and modes of trips and the transportation facilities necessary to support them. Conversely, knowing the allowed land uses, one can anticipate the impact a proposed transportation facility can have on existing and future development.

## SKATS 2031 Regional Transportation Plan

The Regional Transportation Systems Plan (RTSP), adopted in June 1996 and updated as recently as 2003, provides a regional, multimodal framework for local transportation plans. [6] A major emphasis of the Plan is reducing the region's reliance on the single-occupant automobile and developing alternative methods of mobility in the region.

### Transportation System Efficiency Management

Congestion Management Process Corridors, which are congested corridors that are monitored and analyzed in order to develop strategies to alleviate congestion and enhance system performance, in the study area are on Cordon and Chemawa Roads. In conjunction with activities described in the Congestion Management Process portion of the Plan, the RTSP calls for the eventual interconnection of the traffic signals associated with specific corridors of the Regional Highway System. The Chemawa/Hazelgreen corridor (at Portland Road) is listed as a longer term regional corridor for signal interconnection improvements. Additionally, a future regional major transit stop at Keizer Station Boulevard and Lockhaven has been identified.

### Roads and Highways

One of the major goals for the Salem-Keizer urban area is to provide an adequate system of regional highway facilities to serve the vehicular movements of people and goods into, out of, across, and through the area. To do this, SKATS recommends identifying, designating, and adopting the regionally significant highway system facilities, as part of the RTSP. Another goal is to ensure adequate levels of service on the Regional Road System for the "regional" movement of people and goods. To do this, any regional highway facilities that have a Level of Service in the peak hours of V/C > 1.0 are considered deficient and facilities with V/C 0.88 - 0.99 are approaching this capacity deficiency. (State operated facilities are held to ODOT's mobility standards, as defined in the OTP.) The RTSP will try to improve those facilities that are capacity deficient. Improvements that significantly modify capacity must be consistent with the Congestion Management System (CMS) provisions of the RTSP. Maximizing the safety of the Regional Highway System wherever practicable is another goal and safety issues are a priority when comparing alternative projects.

Another goal of the RTSP is to preserve the existing facilities that comprise the regional highway system and the preservation of facilities should be given priority over building new facilities. Existing facilities and rights-of-way should be utilized through Transportation System Efficiency Management techniques, in addition to access management strategies. Integration of the regional road system with other transportation modes is also an important goal of the RTSP. Improvements to the system should integrate other modes of multi- and inter-modal connectivity and efficiency whenever practicable. Additionally facilities and nearby land uses should be functionally compatible now and in the future. This is especially important at major regional destinations and activity centers (such as Keizer Station). Other considerations that the RTSP suggests are minimizing adverse effects on environmentally sensitive areas such as wetlands and endangered species habitat(s), in addition to minimizing adverse effects on water quality.

### Regional Road System Deficiencies and Recommended Improvements

[6] The project completion dates listed in the Regional TSP should supercede any differences with the dates listed in local TSPs.

Near- and long-term needs of the Salem-Keizer area, to provide the residents and businesses with an adequate level of mobility, are described in the following projects. The financially constrained portion of the RTSP includes funded and unfunded projects. Funded projects are those that address the most pressing roadway needs facing the area over the next 24 years. Unfunded projects represent important and needed improvements that will address the mobility needs of the area, but can be deferred until new funding sources can be identified. Before any of the unfunded projects could be built, the Plan would need to be amended. The improvements in the RTSP, both funded and unfunded, do not solve all the roadway problems. Several areas where outstanding issues have been identified are discussed in more detail below.

### Outstanding Issues

Increasing bicycle and pedestrian safety and connectivity is a priority of the RTSP, as it is for the TSPs for the City of Salem and Keizer. Increasing transit lines and ridership is also outlined.

In the 2002 RTSP Update, the Chemawa/I-5 interchange was designated as an outstanding issue. At that time, work was ongoing on a Traffic Impact Study (TIS) for the proposed Chemawa/Keizer Station development. Improvements to the interchange were identified to ensure that the operational characteristics of the interchange and Chemawa Road were not degraded in the future. IAMPs are required to identify the severity of the expected problems and to evaluate and recommend preferred solutions.

***Project Relevance:*** The Chemawa Road interchange is listed as a transportation system need and outstanding issue that requires further study. Chemawa Road (from River to Portland Road) and Cordon Road (Kuebler Boulevard to Chemawa Road) are Congestion Management Process Corridors. The Chemawa Road interchange was designated as an outstanding issue in the 2002 RTSP Update in need of improvements to improve mobility. Since that time, Keizer Station has begun to develop and infrastructure improvements have been completed. A list of relevant projects to the Chemawa IAMP are listed in the table below.

2007 Financially Constrained Project List (Table 15-1)

| Jurisdiction | Description | Cost ($1,000s) |
|---|---|---|
| Committed Projects (0-10 years) | | |
| City of Keizer | Chemawa Road NE Bridge: River Road to Verda Lane NE (Claggett Creek Bridge replacement, urban standards, bike lanes, curbs) | $2,000 |
| | Lockhaven Drive NE and River Road N, add additional lane eastbound Lockhaven West of River Road at Intersection between Lockhaven and Chemawa Road | |
| | Chemawa Interchange with I-5 (Improve intersections w/ additional turn lanes) | |
| Committed Projects (10-20 years) | | |
| City of Keizer | Chemawa Road, Lockhaven Drive, Ridge Drive, Radiant Drive (Reconfigure streets and intersections and provide access control) | $2,265 |
| | Chemawa Queue Jump – HPTC – Transit (Queue jump on Chemawa West Bound at River Road N as recommended by the HPTC project) | $450 |

| Included Projects (10-20 years) | | |
|---|---|---|
| Marion County | Cordon Road NE and Hayesville Drive NE (Add northbound left turn lane) | $450 |
| | Cordon Road NE and Ward Drive NE (Add northbound left turn lane) | $450 |
| | Hazelgreen Road at Cordon Road NE/55th Avenue (Realign, add turn lanes and signal) | $1,000 |
| Unfunded Projects (10-20 years) | | |
| City of Salem | Chemawa Road: I-5 to Portland, widen to 4 lanes plus center turn lane, bike lanes, curbs, gutters and sidewalks | $2,511 |

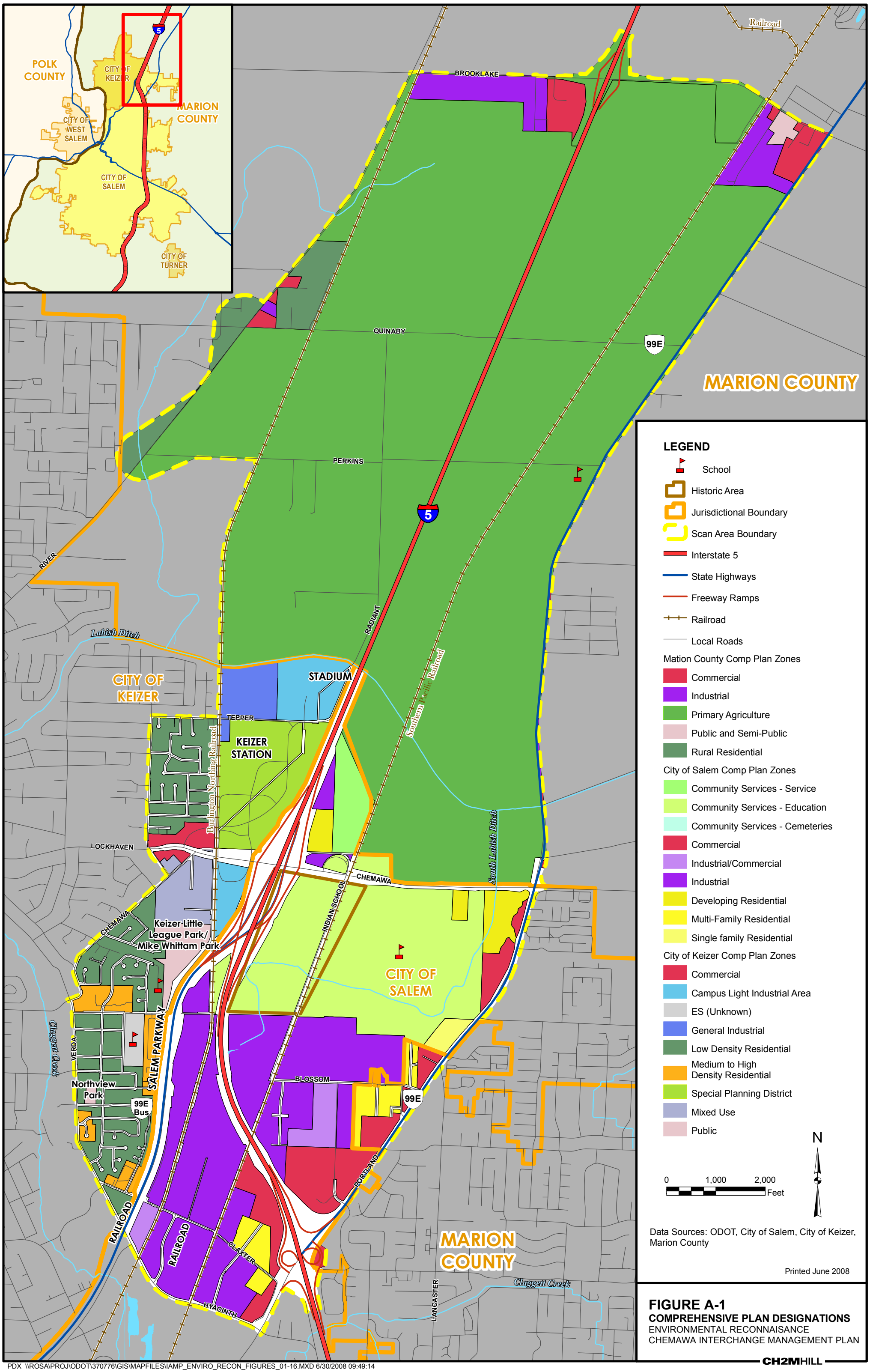



**FIGURE A-1**
**COMPREHENSIVE PLAN DESIGNATIONS**
ENVIRONMENTAL RECONNAISANCE
CHEMAWA INTERCHANGE MANAGEMENT PLAN

CH2MHILL

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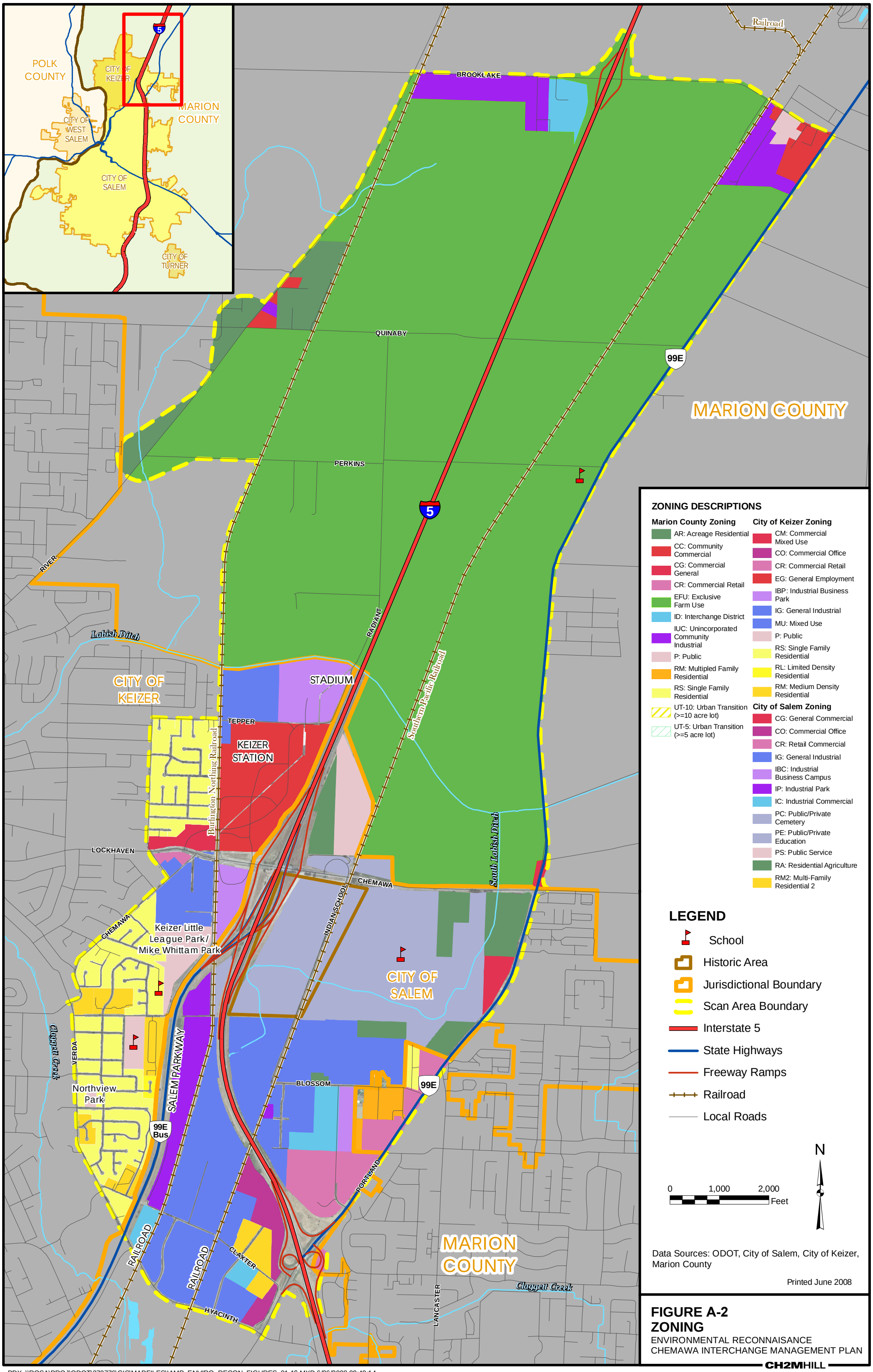


**FIGURE A-2**
**ZONING**
ENVIRONMENTAL RECONNAISANCE
CHEMAWA INTERCHANGE MANAGEMENT PLAN

CH2MHILL

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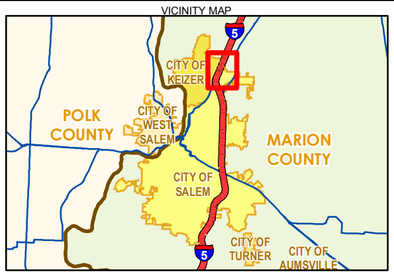
VICINITY MAP




LEGEND
- One Mile Outline
- Half Mile Outline
- Jurisdictional Boundary

Notes:
1. Airphoto scanned in 2006.

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0 250 500
Feet

**FIGURE 1**
**Taxlots Surrounding Chemawa Interchange**
Chemawa Interchange Enviromental Reconnaisance

APPENDIX B

# Existing and Future No-Build Traffic Operations

DRAFT TECHNICAL MEMORANDUM 7.2 CH2MHILL

# Chemawa Road IAMP: Technical Memorandum 7.2
## 2031 Future Baseline Transportation Analysis - DRAFT


| | |
|---|---|
| PREPARED FOR: | Terry Cole/ODOT<br>Dorothy Upton/ODOT |
| PREPARED BY: | Tony Woody/CH2M HILL<br>Andra Henriques/CH2M HILL |
| CC: | Rick Kuehn/CH2M HILL |
| DATE: | November 23, 2009 |


## 1. Introduction

This memorandum provides an overview of the Future Baseline (Year 2031) transportation conditions for the Chemawa Road/I-5 interchange. The 2031 Future Baseline analysis includes adopted land use plans from the local jurisdictions as well as all financially constrained projects expected to be built by the year 2031. The 2031 Future Baseline analysis provides an overview of expected future traffic conditions with minimal improvements made to the transportation infrastructure.

## 2. Future Study Area and Analysis Year

### 2.1 Project Study Area

The project study area for the 2031 Future Baseline traffic analysis is based on the existing traffic analysis study area outlined in section 2 of *Chemawa IAMP Technical Memorandum 5.1: Existing Transportation Conditions*. The analysis study area includes 24 study intersections and 14 freeway segments along Interstate-5 near the Chemawa interchange.

### 2.2 Analysis Year and Time Period

The year 2031 was chosen as the horizon analysis year for the Future Baseline traffic analysis. This year was chosen to stay consistent with the adopted Salem-Keizer Area Transportation Study (SKATS) travel demand model. The PM peak hour was chosen as the Future Baseline analysis time period to stay consistent with the existing conditions traffic analysis.

## 3. Future Baseline Forecasting

### 3.1 Forecasting Methodology

The 2031 Future Baseline forecast volumes were developed using the SKATS EMME2 travel demand model. The 2031 Future Baseline analysis is based off of and includes the land use represented in the SKATS 2031 Action (Build) network.

Land use assumptions for the 2031 Baseline scenario are based off the adopted comprehensive plans from the City of Keizer, the City of Salem, and Marion County. Forecasts related to population and employment estimates were overseen by a working group comprised of representatives from the local jurisdictions. The population and employment forecasts were developed for the year 2030 and then extrapolated to the year 2031 by SKATS staff.

**Figures A.1** and **A.2** in **Appendix A** show future household and employment data for the 2031 Future Baseline analysis.

## 3.2 Future Planned Projects

The SKATS 2031 Action (Build) network includes all financially constrained projects expected to occur through 2031. The projects included in the analysis are based off of several transportation system plans (TSP), including the City of Salem TSP, City of Keizer TSP, Marion County TSP, and the SKATS Regional TSP.

Table 1 shows a listing of all projects within the project study area that are included in the 2031 Future Baseline traffic analysis.

**TABLE 1**
2031 Baseline Traffic Analysis Projects

| Jurisdiction | Location | Improvement |
|---|---|---|
| Marion County | Hazelgreen Rd./Cordon Rd. NE-55th Ave | Realign, add left turn lanes to east and south approaches, add right turn to west approach and signalize. |
| Marion County | River Rd./Brooklake Rd | Signalize and realign intersection. Add double left turn lanes to east approach, left turn lane to north approach, and right turn lane to south approach. |
| City of Keizer | Verda Lane/Lockhaven Drive | Extend Verda Lane north to River Rd |
| ODOT | Chemawa Interchange northbound ramp terminals | Add double left turn lanes to south approach, right turn lane to east approach, and double left turn lanes to the west approach. |
| ODOT | Chemawa Interchange southbound ramp terminals | Add double left turn lanes to east approach and double right turn lane to west approach. |
| ODOT | Hyacinth/OR 99E-Portland Ave | Widen to east approach to accommodate 2 travel lanes with center turn lane where needed. |
| ODOT | Chemawa-Hazelgreen/OR 99E-Portland | Upgrade signal and interconnect to other signals along Chemawa-Hazelgreen. |

# 4. Future Baseline Traffic Analysis

This section describes the methodology employed and results for the 2031 Future Baseline traffic operational analysis.

## 4.1 Methodology

### 4.1.1 Volume Post-Processing

ODOT requires that the 2031 Baseline traffic volumes from the travel demand model be post-processed following guidelines outlined in the National Cooperative Highway Research Program (NCHRP) 255 document to ensure reasonableness. The overall analysis and post-processing was developed in accordance with the ODOT Analysis Procedures Manual (APM).

The post-processing of turning movements for the intersections followed the steps below:

1. Obtain the 2005 and 2031 SKATS model outputs by links.
2. Use the volume difference method to determine the volume growth between the years 2008 and 2031 for each link. Two volume growth methods were used at this stage; the percentage growth and the difference growth methods. Based on the volume results of the two methods, it was determined that the difference method provided the most reasonable prediction of future growth.
3. Using 2008 balanced volumes and predicted volume growth; project the traffic to create year 2031 link volumes.
4. Use a turn balancing spreadsheet application that replicates the Furness processing algorithm on the 2008 volumes and the 2031 link volumes to create 2031 intersection turn volumes.

The post-processing of freeway mainline and ramps volumes will follow the steps below:

1. Obtain the 2005 and 2031 SKATS model outputs by links.
2. Use the volume difference method to determine the volume growth between the years 2008 and 2031 for each link.
3. Using 2008 balanced volumes and predicted volume growth; project the traffic to create year 2031 link volumes.

### 4.1.2 Performance and Mobility Standards

For the 2031 Future Baseline conditions, the City of Keizer and the City of Salem have a level-of-service (LOS) threshold of 'E' for intersections within their jurisdictions. Marion County mobility standards vary based on intersection type. The ODOT mobility standard v/c ratio threshold for the freeway segments at the Chemawa interchange is 0.80. The mobility standards for intersections within ODOT's jurisdiction vary based on roadway classification. Tables 2 and 3 show the mobility standards for the intersection and freeway operational analysis.

### 4.1.4 Traffic Analysis Software Tools

A Synchro 7 computer traffic operations model was constructed for the 2031 Future Baseline analysis. The future model utilizes existing peak hour factors and truck percentages and future geometrics and post-processed turning movement volumes.

SimTraffic, a traffic microsimulation software program, was used to collect queuing information for all signalized intersections. Queue results are reported as a 95th percentile expected queue length, which means that 95 percent of the time during the peak hour analyzed, the queue length should be less than or equal to the value reported. Two methods were used to calculate the 95th percentile queue lengths:

- The Two-Minute Rule is used for stop-controlled and uncontrolled approaches of isolated, unsignalized intersections.
- An average of at least five runs of SimTraffic was used for signalized intersections.

Highway Capacity Software (HCS+) was utilized for the freeway analysis.

## 4.2 Future Intersection Operations

The average vehicle delay, 95$^{th}$ percentile queue length, LOS, and volume to capacity ratio were collected from the existing Synchro and SimTraffic simulation models for the 24 study area intersections. The post processed 2031 balanced volumes for each intersection were utilized in the analysis.

### 4.2.1 Operational Analysis Results

Results from the operational analysis results showed that 18 of the 25 study intersections are not meeting jurisdictional mobility standards for the 2031 Future Baseline scenario. The following study intersections fail to meet the mobility standards for the jurisdictions that they are located within.

- Lockhaven Drive/River Road (City of Keizer)
- Lockhaven Drive/Trail Avenue (City of Keizer)
- Lockhaven Drive at 14th Avenue-Kafir Dr. (City of Keizer)
- Chemawa Road at Stadium Drive-Ulali Drive (City of Keizer)
- Chemawa Road/I-5 NB Ramps (ODOT)
- Chemawa Road/I-5 SB Ramps (ODOT)
- Chemawa Road/OR 99E (ODOT)
- OR 99E/Kale Street (ODOT)
- OR 99E/Lancaster Road (ODOT)
- OR 99E/Blossom Drive (ODOT)
- Chemawa Road/Verda Lane (City of Keizer)
- OR 99E Business-Salem Parkway/Verda Lane (ODOT)
- OR 99E/Hyacinth Street (ODOT)
- OR 99E at Astoria Street-Ward Street (ODOT)
- Brooklake Road/OR 99E (ODOT)
- Brooklake Road/I-5 NB Ramps (ODOT)
- Brooklake Road/I-5 SB Ramps (ODOT)
- Perkins Road at 35th Avenue NE (Marion County)

**Table 2** shows the results of the 2031 Future Baseline intersection operational analysis. **Figure B.1** of **Appendix B** shows the volumes, channelization, and analysis results for all of the study area intersections. **Appendix C** shows the Synchro HCM reports for each study intersection.

### 4.2.2 Queuing Analysis Results

The analysis shows that several intersections within the Chemawa IAMP study area are experiencing queue lengths that extend to the previous intersection. Key roadway segments impacted by queuing include:

- Westbound Lockhaven Drive between McLeod Lane and River Road
- Westbound Chemawa Road between Indian School Road and I-5 SB ramps
- Westbound Chemawa Road between OR 99E and Indian School Road
- Northbound and southbound ramps at I-5/Chemawa Road Interchange
- Westbound Brooklake Road between the I-5 NB and SB ramps
- Northbound and southbound ramps at I-5/Brooklake Road Interchange
- Westbound Hyacinth Street between OR 99E and Salem Parkway

In addition to the key roadways segments listed above, the intersections of Lockhaven Drive/River Road, Lockhaven Drive/14th Avenue-Kafir Drive, Lockhaven Drive/McLeod Lane, Lockhaven Drive/Chemawa Road, Chemawa Road/Stadium Dr.-Ulali Dr., Hazelgreen Road/Cordon Road, OR 99E/Kale Street, OR 99E/Lancaster Drive, Chemawa Road/Verda Lane, OR 99E Business (Salem Parkway)/Verda Lane-Hyacinth Street, OR 99E/Hyacinth Street, OR 99E/Brooklake Road, OR 99E/Astoria-Ward Street, OR 99E/Chemawa Road, and OR 99E/Brooklake Road also experience queue lengths that exceed queue storage.

Table B.1 in Appendix B shows a detailed description of the 95th percentile queue lengths.

**TABLE 2**
Chemawa IAMP Traffic Analysis Results: Intersections

| ID | Intersection | Control Type (Existing/ Future) | Jurisdiction | Existing Conditions (2008) | | | | | | Future Baseline (2031) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service[4] | V/C Ratio | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service[4] | V/C Ratio | |
| 1 | Lockhaven Drive at River Road | Signal | City of Keizer | LOS E | | 77.3 | E | 0.99 | | LOS E | | 124.2 | F | 1.27 | |
| 2 | Lockhaven Drive at Trail Avenue | TWSC | City of Keizer | LOS E | | 68.7 | F (SB) | 0.47 | LOS | LOS E | | 995.3 | F (SB) | 0.67 | 2.69 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Dr. | Signal | City of Keizer | LOS E | | 32.9 | C | 0.94 | | LOS E | | 135.9 | F | 1.37 | |
| 4 | Lockhaven Drive at McLeod Lane | Signal | City of Keizer | LOS E | | 12.4 | B | 0.63 | | LOS E | | 24.2 | C | 0.89 | |
| 5 | Lockhaven Dr. at Chemawa Rd.-Keizer Station | Signal | City of Keizer | LOS E | | 26.7 | C | 0.62 | | LOS E | | 36.7 | D | 0.96 | |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | Signal | ODOT | 0.90 (5) | | 12.7 | B | 0.62 | | 0.90 | | 65.7 | E | 1.06 | |
| 7 | Chemawa Road at Southbound I-5 ramp | Signal | ODOT | 0.80 (1) | | 12.4 | B | 0.75 | | 0.80 | | 49.9 | D | 1.14 | |
| 8 | Chemawa Road at Northbound I-5 ramp | Signal | ODOT | 0.80 | | 46.2 | D | 0.88 | | 0.80 | | 92.5 | F | 1.15 | |
| 9 | Chemawa Road at Indian School Road | TWSC | ODOT | 0.90 | 0.90 | 14.0 | B | 0.34 | 0.18 | 0.90 | 0.90 | 26.8 | D | 0.42 | 0.60 |
| 10 | Chemawa Road at OR 99E | Signal | ODOT | 0.80 | | 52.7 | D | 0.83 | | 0.80 | | 66.0 | E | 1.06 | |
| 11 | Hazelgreen Road at Cordon Road | AWSC/Signal | Marion County | LOS E | 0.85 | 45.5 | E | 1.03 | | LOS E | 0.85 | 9.3 | A | 0.66 | |
| 12 | Cordon Road at Kale Street | TWSC | Marion County | LOS D | 0.90 | 12.6 | B | 0.22 | 0.18 | LOS D | 0.90 | 23.5 | C | 0.42 | 0.44 |
| 13 | OR 99E at Kale Street | Signal | ODOT | 0.80 (2) | | 11.7 | B | 0.50 | | 0.80 | | 31.2 | C | 0.98 | |
| 14 | OR 99E at Lancaster Drive | TWSC | ODOT | 0.80 | 0.90 | 143.8 | F (WB) | 0.55 | 2.66 | 0.80 | 0.90 | 1000.0 | F (WB) | 1.88 | 1.86 |
| 15 | OR 99E at Blossom Drive | TWSC | ODOT | 0.80 | 0.90 | 24.4 | C | 0.23 | 0.45 | 0.80 | 0.90 | 1000.0 | F (EB) | 0.39 | 4.13 |
| 16 | Chemawa Road at Verda Lane | AWSC | City of Keizer | LOS E | | 92.2 | F | 1.22 | | LOS E | | 330.6 | F | 1.89 | |
| 17 | OR 99E Business at Verda Lane-Hyacinth St. | Signal | ODOT | 0.85 | | 67.0 | E | 0.97 | | 0.85 | | 174.3 | F | 1.46 | |
| 18 | OR 99E at Hyacinth Street | Signal | ODOT | 0.80 | | 108.8 | F | 1.06 | | 0.80 | | 135.7 | F | 1.29 | |
| 19 | OR 99E at Astoria Street-Ward Street | Signal | ODOT | 0.80 | | 38.3 | D | 0.66 | | 0.80 | | 55.6 | E | 1.03 | |
| 20 | Brooklake Road at OR 99E | Signal | ODOT | 0.70 | | 65.4 | E | 0.85 | | 0.70 | | 199.3 | F | 1.46 | |
| 21 | Brooklake Road at I-5 NB Ramps | TWSC | ODOT | 0.75 | 0.70 | 1000.0 | F (NB) | 0.33 | 3.19 | 0.75 | 0.70 | 1000.0 | F (NB) | 0.79 | 5.00 |
| 22 | Brooklake Road at I-5 SB Ramps | TWSC | ODOT | 0.75 | 0.70 | 1000.0 | F (SB) | 0.70 | 4.38 | 0.75 | 0.70 | 1000.0 | F (SB) | 0.83 | 5.00 |
| 23 | Brooklake Road at River Road | AWSC/Signal | Marion County | LOS E | 0.85 | 29.3 | D | 0.90 | | LOS E | 0.85 | 21.2 | C | 0.59 | |
| 24 | Perkins Road at 35th Avenue NE | TWSC | Marion County | LOS E | 0.90 | 10.4 | B | 0.11 | 0.03 | LOS E | 0.90 | 38.7 | E | 0.07 | 0.70 |
| 33 | Verda Lane at Lockhaven | Signal | City of Keizer | Does not Exist | | | | | | LOS D | | 19.2 | B | 0.81 | |

**Notes:**
[1] LOS = Level of Service
[2] Indicates OHP Mobility Standard V/C ratio for uncontrolled roadway approach
[3] Indicates OHP Mobility Standard V/C ratio for stop controlled roadway approach
[4] Failing movement is shown in parentheses for TWSC intersections
- Signal: Signalized Intersection
- AWSC: All-Way Stop controlled
- TWSC: Two-Way Stop controlled
- Black highlighting indicates intersection does not meet mobility standards

## 4.3 Future Freeway Operations

All I-5 freeway basic, merging, and diverging segments within the vicinity of the Chemawa Road interchange were analyzed for the 2031 Future Baseline scenario. Results from the freeway analysis show that 10 of the 14 Chemawa Study area freeway segments fail to meet ODOT mobility standards.

**Table 3** shows the results of the 2031 Future Baseline freeway operational analysis. **Figure B.2** of **Appendix B** shows the graphical results of the freeway analysis. **Appendix C** provides the HCM Output sheets for the freeway analysis.

**TABLE 3**
Chemawa IAMP Traffic Analysis Results: Freeways

| ID # | Location | Segment Type | Facility^ | Existing Conditions (2008) | | Future Baseline (2031) | |
|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio |
| N1 | NB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.59 | 0.80 | 0.80 |
| N2 | NB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.20 | 0.80 | 0.40 |
| | | | Mainline | 0.80 | 0.53 | 0.80 | 0.68 |
| N3 | NB I-5 Mainline South of On-Ramp from OR 99E Business | Basic | Mainline | 0.80 | 0.54 | 0.80 | 0.70 |
| N4 | NB On-Ramp from OR 99E Business/Salem Parkway | Merge | Ramp | 0.80 | 0.60 | 0.80 | 0.84 |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.84 |
| N5 | NB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.83 |
| N6 | NB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.61 | 0.80 | 0.80 |
| | | | Mainline | 0.80 | 0.64 | 0.80 | 0.85 |
| N7 | NB I-5 Mainline North of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.64 | 0.80 | 0.85 |
| S1 | SB I-5 Mainline North of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.72 | 0.80 | 0.99 |
| S2 | SB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.30 | 0.80 | 0.34 |
| | | | Mainline | 0.80 | 0.63 | 0.80 | 0.89 |
| S3 | SB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.63 | 0.80 | 0.89 |
| S4 | SB Off-Ramp to OR 99E Business | Diverge | Ramp | 0.80 | 0.54 | 0.80 | 0.77 |
| | | | Mainline | 0.80 | 0.47 | 0.80 | 0.66 |
| S5 | SB I-5 Mainline South of Off-Ramp to OR 99E Business | Basic | Mainline | 0.80 | 0.48 | 0.80 | 0.68 |
| S6 | SB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.65 | 0.80 | 0.96 |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.89 |
| S7 | SB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.88 |

**Notes:**
Black highlighting indicates spacing does not meet standards.
^ Mainline and Ramp v/c ratios reported at merge and diverge segments per ODOT traffic analysis guidelines

# 5 Summary of Results

The following 18 intersections located in the Chemawa study area fail to meet jurisdictional mobility standards in the 2031 Future Baseline scenario:

- Lockhaven Drive/River Road (City of Keizer)
- Lockhaven Drive/Trail Avenue (City of Keizer)
- Lockhaven Drive at 14th Avenue-Kafir Dr. (City of Keizer)
- Chemawa Road at Stadium Drive-Ulali Drive (City of Keizer)
- Chemawa Road/I-5 NB Ramps (ODOT)
- Chemawa Road/I-5 SB Ramps (ODOT)
- Chemawa Road/OR 99E (ODOT)
- OR 99E/ Kale Street (ODOT)
- OR 99E/Lancaster Road (ODOT)
- OR 99E/Blossom Drive (ODOT)
- Chemawa Road/Verda Lane (City of Keizer)
- OR 99E Business-Salem Parkway/Verda Lane (ODOT)
- OR 99E/Hyacinth Street (ODOT)
- OR 99E at Astoria Street-Ward Street (ODOT)
- Brooklake Road/OR 99E (ODOT)
- Brooklake Road/I-5 NB Ramps (ODOT)
- Brooklake Road/I-5 SB Ramps (ODOT)
- Perkins Road at 35th Avenue NE (Marion County)

The freeway analysis results show that 10 of the 14 freeway segments analyzed fail to operate at an acceptable mobility standard.

The following key roadway segments currently have 95$^{th}$ percentile queue lengths that extend back to the previous intersection.

- Westbound Lockhaven Drive between McLeod Lane and River Road
- Westbound Chemawa Road between Indian School Road and I-5 SB ramps
- Northbound and southbound ramps at I-5/Chemawa Road Interchange
- Westbound Brooklake Road between the I-5 NB and SB ramps
- Northbound and southbound ramps at I-5/Brooklake Road Interchange
- Westbound Hyacinth Street between OR 99E and Salem Parkway

In addition to the above queue problems, several intersections experience queue lengths that exceed the queue storage capacity.

APPENDIX C

# Possible Future Land Use and UGB Expansion

**APPENDIX C**

# Possible Future Land Use and UGB Expansion

As of this writing, the City of Keizer is exploring the need to expand its portion of the Salem-Keizer Urban Growth Boundary. If this occurs, it is likely to expand to the north due to the constraints posed by the City of Salem and Willamette River which make expansion to the south, east, or west impossible or impractical. The recommendations in this document are solely based on the growth associated with the existing adopted comprehensive plans and not any speculative expanded land use scenarios.

However, based on the development and analysis of a hypothetical land use scenario, which is attached here, it should be noted that the improvements recommended to serve the existing adopted land use plans would also have great value in serving additional growth in this area.

Extending the UGB further north of Keizer and adding approximately 8,000 new residents. Population and employment projections are shown on the attached figure.

Salem Parkway serves the industrial areas of north Salem, but the Chemawa/Lockhaven corridor is not expected to see significant industrial usage.

The Volcanoes facility generates event traffic in fairly large numbers, but these events generally do not coincide with routine peak traffic periods, therefore, the resulting increased capacity need is insignificant.

This interchange also serves a large agricultural area that extends from Salem to Silverton along the Hazelgreen Road corridor, which is the extension to the east of Chemawa Road.

This interchange serves as the gateway to Keizer and Salem. The Keizer gateway has become more evident as Keizer Station has developed. The Salem gateway will be more fully realized in the future as evidenced by the zoning overlay for the undeveloped property at the interchange.

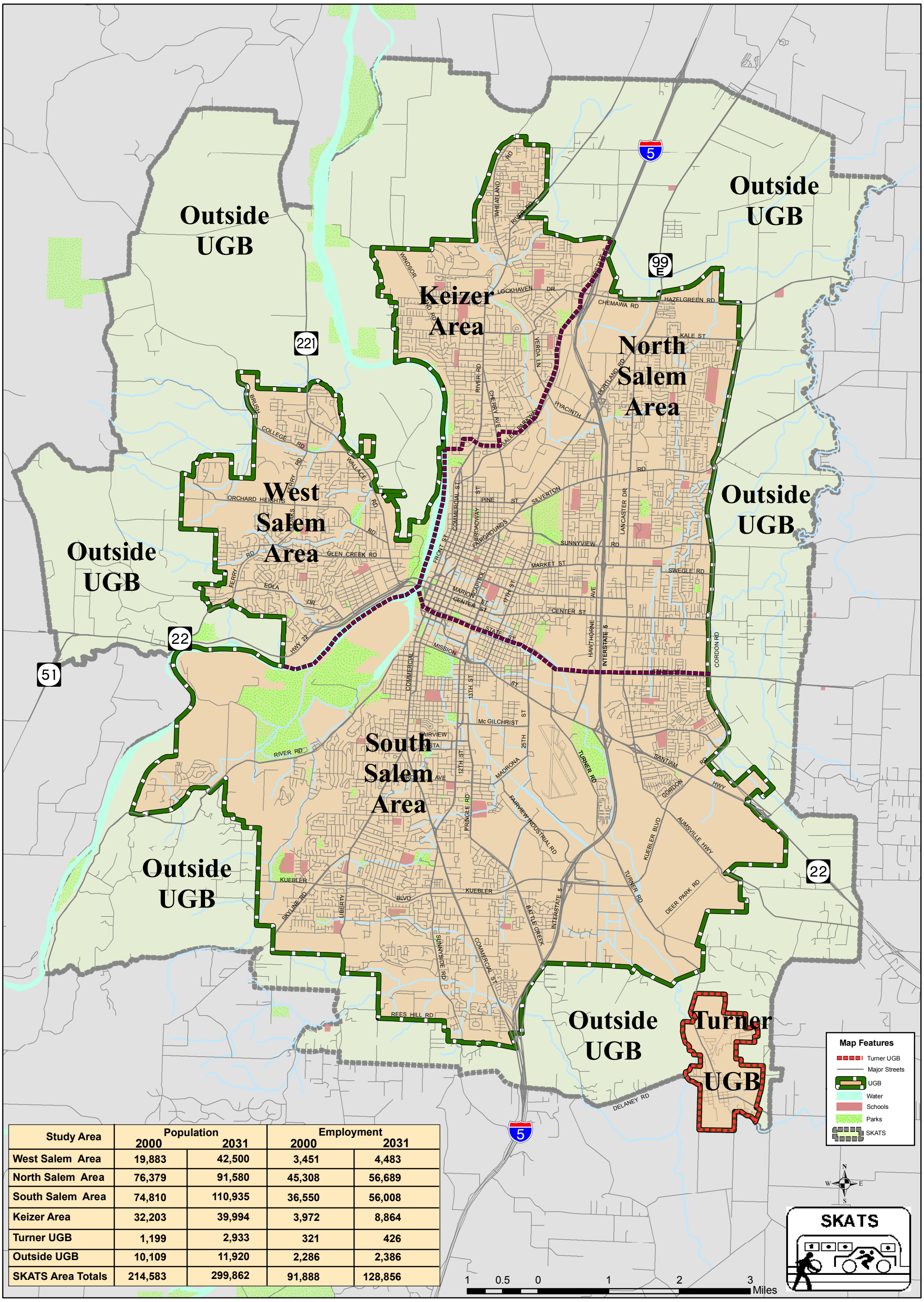
Land use assumptions for the 2031 Future Baseline scenario are based on the adopted comprehensive plans from the City of Keizer, the City of Salem, and Marion County. Comprehensive Plan designations (see Appendix A). Forecasts related to population and employment estimates were overseen by a working group comprised of representatives from the local jurisdictions. The population and employment forecasts were developed for the year 2030 and then extrapolated to the year 2031 by SKATS staff, as shown in Map 3-1 (attached).

According to the 2031 Regional Transportation Systems Plan (RTSP), within the Salem-Keizer Urban Growth Boundary (UGB) the population is forecast to increase by 81,743 or 40 percent from a 2000 population of 203,275 to a 2031 population of 285,009. Employment is forecast to increase by 36,763 or 41 percent from 2000 jobs of 89,281 to 2031 jobs of 126,044.

The Marion County Growth Management Framework 2050 has a population forecast and land need estimate for Salem-Keizer of 342, 387 people and 2,563 acres for urbanizable lands (within the UGB, providing a 20-year land supply).

Map 3-1

# Population (2000), Employment (2000) and Forecast for 2031




| Study Area | Population 2000 | Population 2031 | Employment 2000 | Employment 2031 |
|---|---|---|---|---|
| West Salem Area | 19,883 | 42,500 | 3,451 | 4,483 |
| North Salem Area | 76,379 | 91,580 | 45,308 | 56,689 |
| South Salem Area | 74,810 | 110,935 | 36,550 | 56,008 |
| Keizer Area | 32,203 | 39,994 | 3,972 | 8,864 |
| Turner UGB | 1,199 | 2,933 | 321 | 426 |
| Outside UGB | 10,109 | 11,920 | 2,286 | 2,386 |
| SKATS Area Totals | 214,583 | 299,862 | 91,888 | 128,856 |

To limit lower density development patterns, the 2031 RTSP encourages local jurisdictions to incorporate several land use provisions within their comprehensive plans during the plan review cycle:

- Allow proposals for more compact development
- Encourage a proximate mixture of land uses
- Increase allowable densities along transit corridors
- Encourage transit- and pedestrian-sensitive designs for new business and office park developments
- Encourage pedestrian-friendly and bicycle-friendly design considerations for new developments

According to the 2031 RTSP, "The arrangement, density, and diversity of land uses contained in the comprehensive plans of local jurisdictions in the region are the most significant shapers of travel demand."

The Cities and Counties of the RTSP have agreed through Plan policies that (a) no new service districts will be created in the UGB to provide sewer, water or fire protection facilities and services, and (b) that as a prerequisite of urban development, areas must be annexed to the Cities before urban facilities and services will be provided.

# Chemawa Road Interchange Area Management Plan

## Future Alternatives Analysis – UGB Expansion Land Use

**April 1, 2009**

**Project Management Team**

**Salem, OR**

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# Presentation Outline

- Schedule & Overview
- UGB Expansion – Assumptions
- Summary of Analysis Results
- UGB Expansion - Analysis Results (Baseline + 5 Alternatives)

# Introduction & IAMP Process

**Existing Conditions**
-Data Collection
-Policy Review
-Traffic Analysis
-Affected Environment

**2031 Future "Baseline"**
-Future Traffic Analysis

**Alternatives Analysis**
[Adopted Land Use]
-Alternative Screening
-Traffic Analysis

Today's Topic

SUPPLEMENT TO IAMP

**Alternatives Analysis**
[UGB Expansion]
-Alternative Screening
-Traffic Analysis

**Draft & Final IAMP**
-Recommendations
-Adoption of IAMP

Current Work

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# UGB Expansion: Land Use/ Network Assumptions

- Puropose of UGB Expansion Traffic Analysis
  - Further understanding of implications of increased growth North of Keizer
  - Supplement to IAMP – Contained in Appendix
  - IAMP will be based off of current Adopted Land Use plan
- Alternatives Analyzed
  - 2031 Baseline
  - 2031 Alternative 1: Chemawa/Lockhaven Corridor Widening
  - 2031 Alternative 6: Chemawa/Tepper Half Diamond Interchange
  - 2031 Alternative 12: Brooks Interchange SPUI
  - 2031 Alternative 13: Quinaby Interchange
  - 2031 Alternative 14: Verda/Hyacinth Corridor Improvements

# UGB Expansion: Land Use Assumptions

- Assumptions developed by small sub-group in November, 2008
  - City of Keizer
  - SKATS
  - City of Salem
  - Marion County
- Land Use Assumptions
  - UGB Would Expand North to Quinaby Road
  - ~920 Acres in Size (680 Residential, 120 Retail, 120 Non-Retail)
  - Based on Marion County Populaton Forecasts - ~8000 people (mid-level)
  - ~3100 new households
  - Disaggregeted 2 network zones into 6 network zones

# UGB Expansion: Network Assumptions

- Planned Improvements from SKATS TSP
- 35th Street Extension from Quinaby to Brooklake
- Improvements to Quinaby, 35th, Perkins
- New East-West arterial South of Perkins
- Minor North-South Arterial Near Railroad Tracks
- Signal at 35th/Perkins

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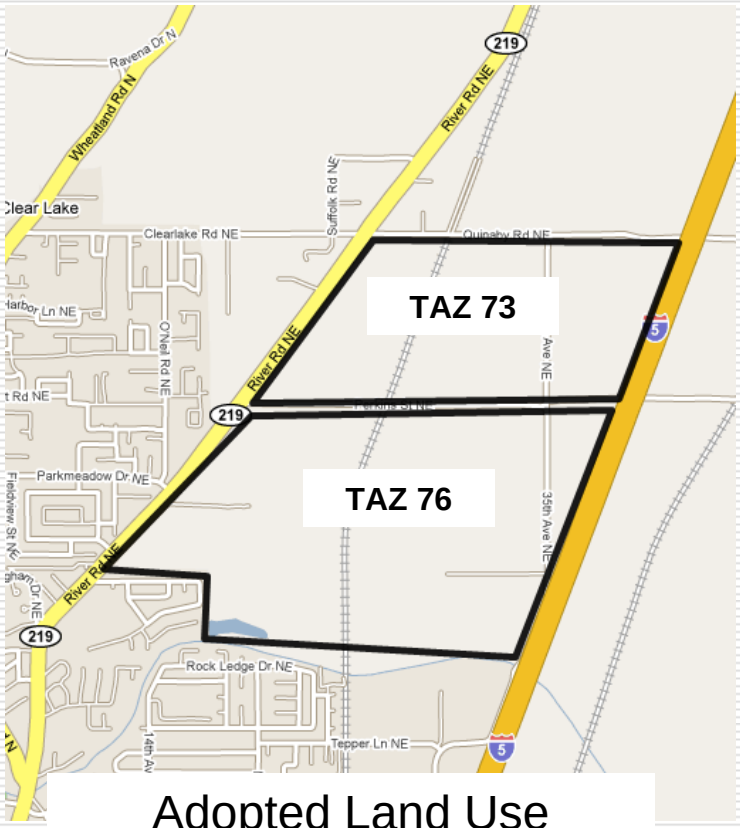
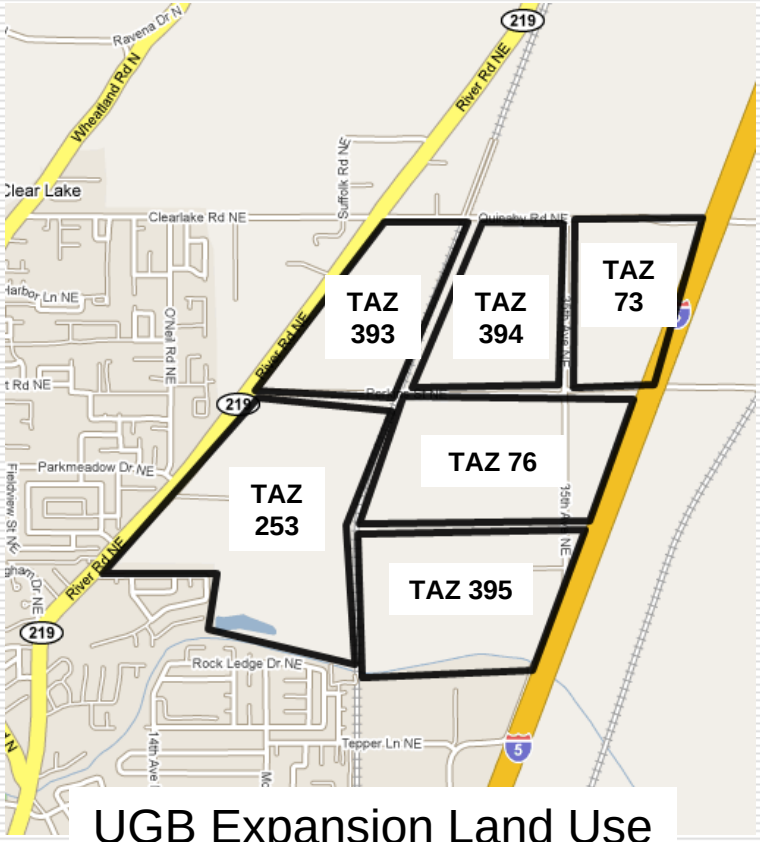
# UGB Expansion: Land Use Assumptions




Adopted Land Use




UGB Expansion Land Use

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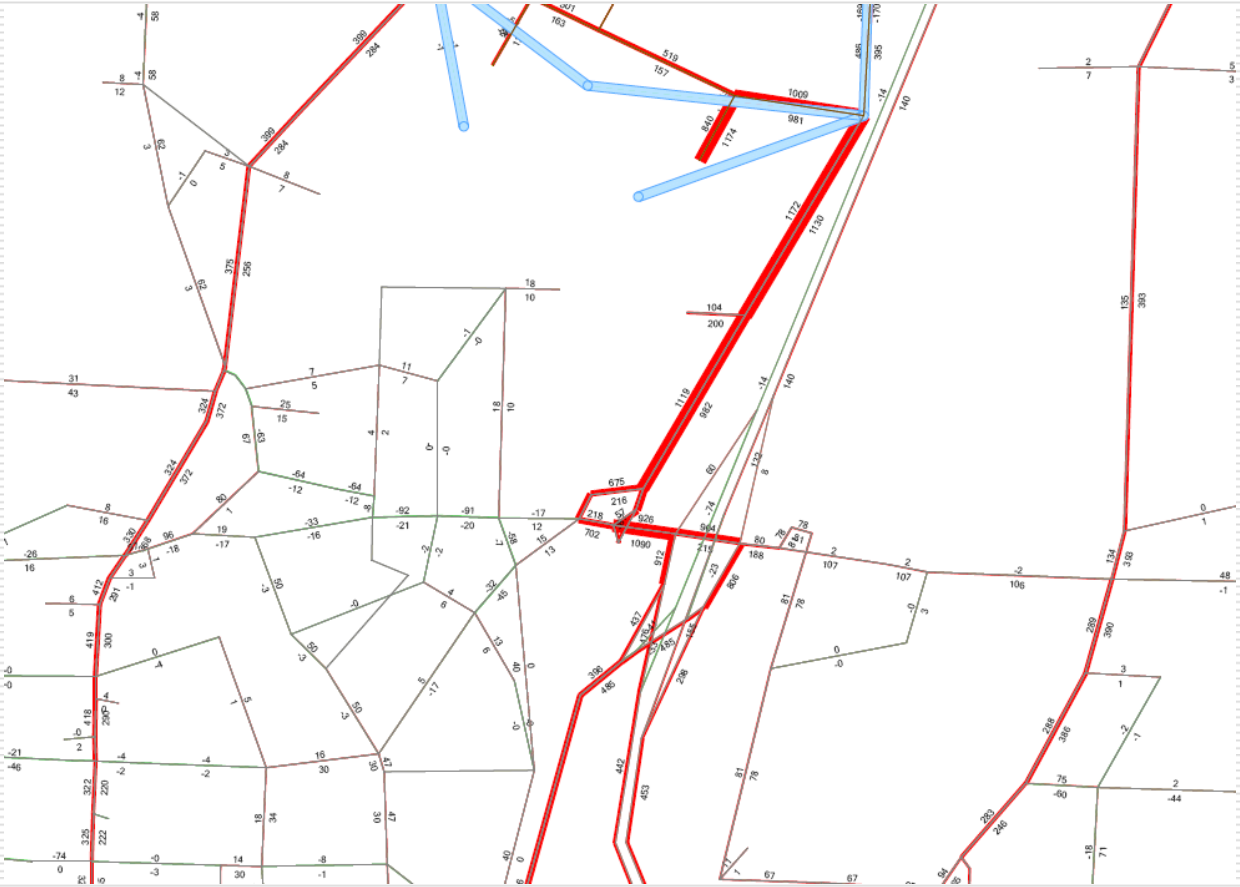
# Analysis Results

- Adopted Land Use Scenarios
  - Most direct improvements at Chemawa Interchange occur with Alts 1, 6.
  - Least improvments (Alts. 12, 13, 14)
- UGB Expansion Land Use Scenarios
  - Substantially more growth for all scenarios
  - Most direct improvements at Chemawa Interchange occur with Alts. 1, 6, & 13, 14.
  - Least improvement is with Alternative 12.

# 2031 Baseline Growth
# [UGB Expansion] – [Adopted Land Use]



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# UGB Expansion Alternative 1:

# Chemawa/Lockhaven Corridor Widening

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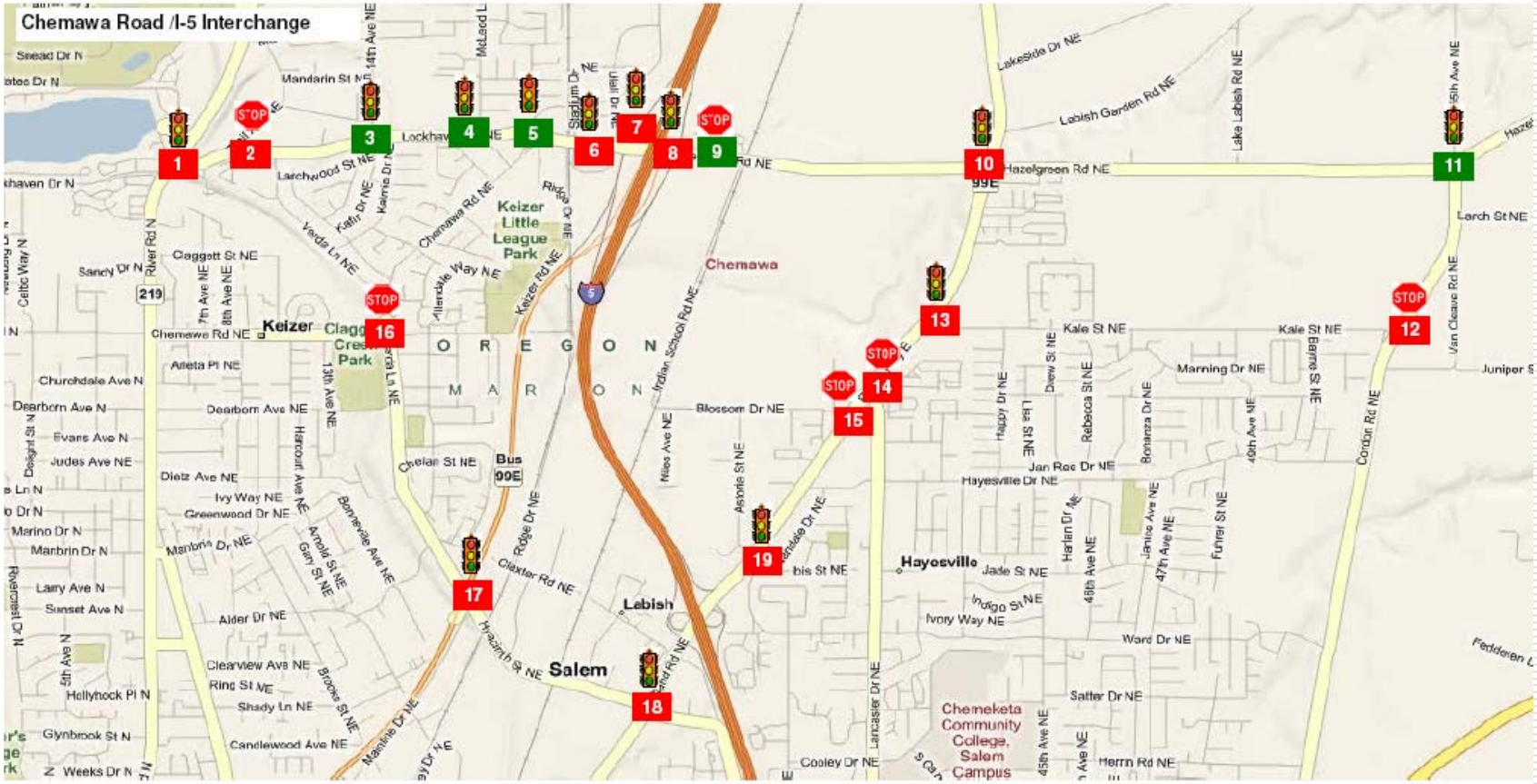
# Traffic Operational Analysis: Intersections – Alt. 1



# Traffic Operational Analysis: Intersections – Alt. 1

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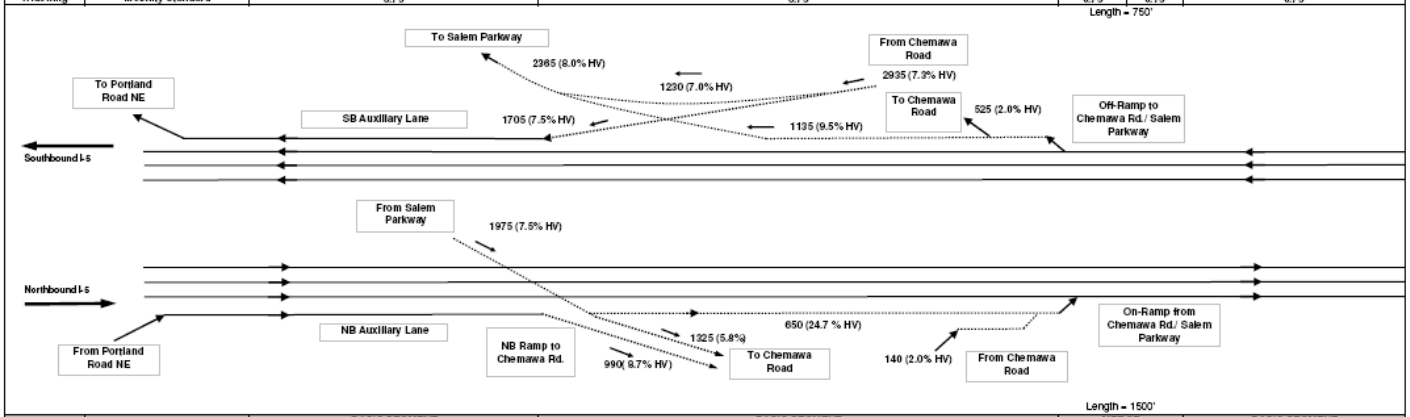
# Traffic Operational Analysis: Freeways – Alt. 1

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 6395 | 4690 | 1660 | | 6305 |
| | Flow Rate^ | 1780 | 1745 | 1950 | 7005 | 2335 |
| | V/C | 0.76 | 0.74 | 0.92 | 0.99 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 5775 | 4785 | 790 | | 5575 |
| | Flow Rate^ | 1575 | 1730 | 4205 | 6180 | 2065 |
| | V/C | 0.67 | 0.74 | 0.91 | 0.88 | 0.88 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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FIGURE B.2 Chemawa Road IAMP Traffic Analysis

2031 UGB Expansion Alternative 1: Chemawa/Lockhaven Corridor Widening
Freeway Volumes and V/C Ratio

**Assumptions**

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

**Legend/Notes:**

^ Flow Rate represents unit in COCT Analysis Procedure Manual
FFS: Free flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

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# Traffic Operational Analysis: Alternative 1 Comparison to Baseline (UGB Expansion)

| # | Description | Jurisdiction | 2031 Alternative 1 UGB Expansion Land Use | | | |
|---|---|---|---|---|---|---|
| | | | Standard | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | n/a | -104.2 | n/a | -0.26 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | n/a | -373.3 | n/a | -2.75 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | n/a | -139.4 | n/a | -0.59 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | n/a | -25.6 | n/a | -0.31 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | n/a | -37.3 | n/a | -0.10 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | n/a | -111.6 | n/a | -0.36 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | n/a | -74.4 | n/a | -0.05 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | n/a | -60.8 | n/a | -0.19 |
| 9 | Chemawa Road at Indian School Road | ODOT | n/a | -7.1 | n/a | -0.01 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | n/a | -0.1 | n/a | -0.06 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | n/a | 6.6 | n/a | -0.15 |
| 12 | Cordon Road at Kale Street | Marion County | n/a | 1.4 | n/a | 0.02 |
| 13 | Portland Road at Kale Street | ODOT | n/a | -16.2 | n/a | 0.02 |
| 14 | Portland Road at Lancaster Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 16 | Chemawa Road at Verda Lane | Keizer | n/a | -8.3 | n/a | 0.01 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | n/a | -23.6 | n/a | -0.04 |
| 18 | Portland Road at Hyacinth Street | ODOT | n/a | 0.4 | n/a | 0.01 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | n/a | 4.0 | n/a | 0.02 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | n/a | -12.5 | n/a | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | n/a | -1.6 | n/a | 0.04 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | n/a | 1.2 | n/a | -0.03 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 27 | Radiant/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 28 | Radiant/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 29 | Radiant/Chemawa | Keizer | n/a | 0.0 | n/a | 0.00 |
| 30 | Brooks SPUI | ODOT | n/a | 0.0 | n/a | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 32 | Quinaby/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |

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# UGB Expansion Alternative 6:

# Chemawa/Tepper

# Half Diamond Interchange

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# Traffic Operational Analysis: Intersections – Alt. 6

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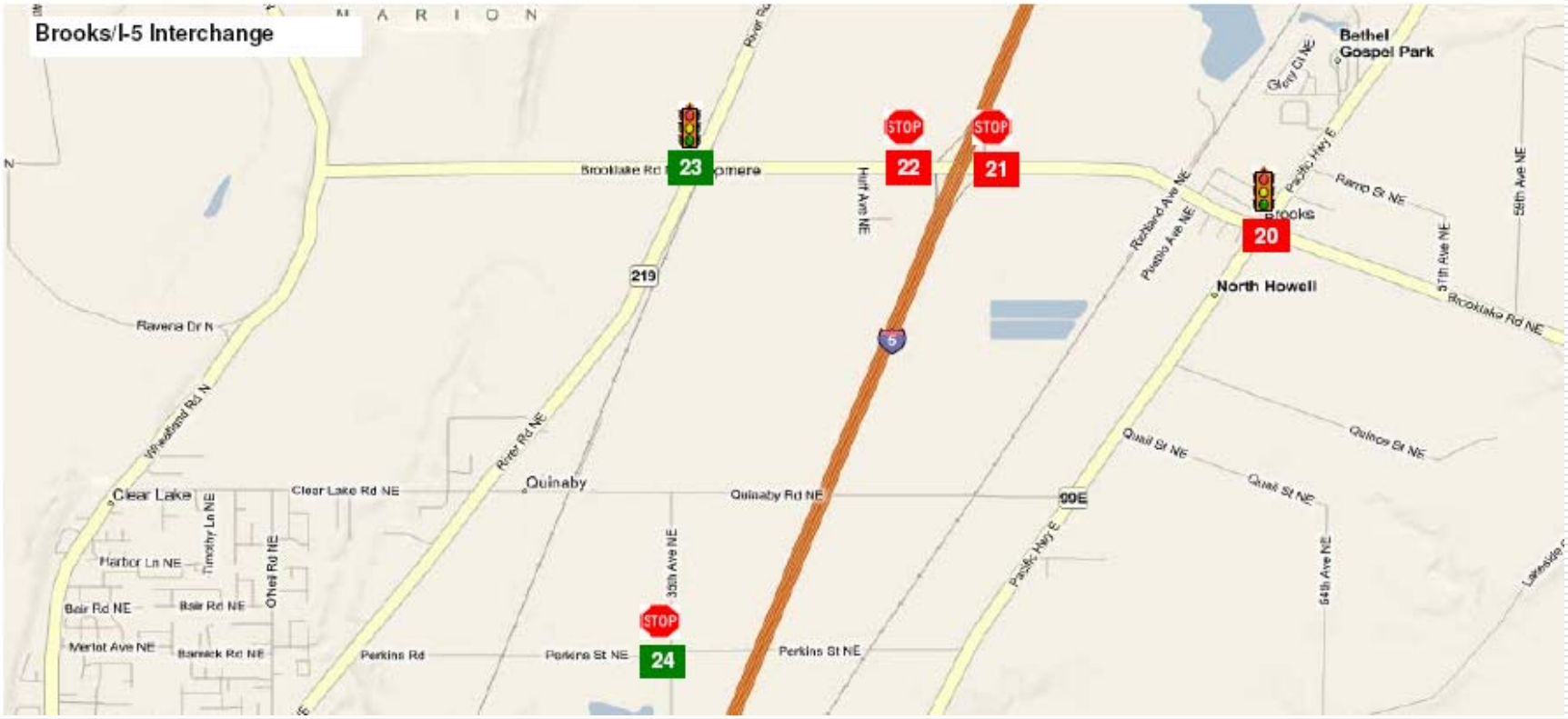
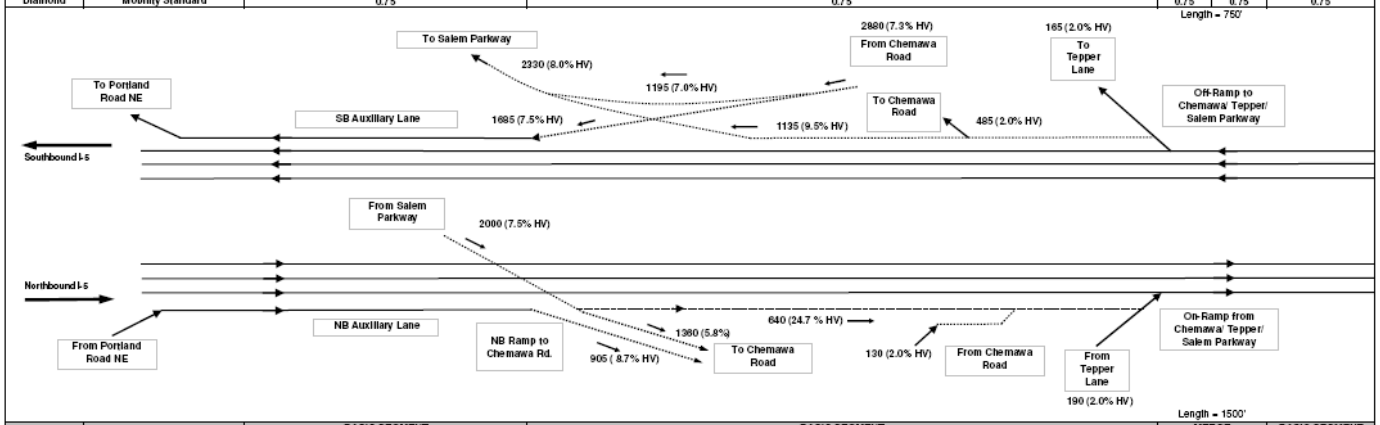
# Traffic Operational Analysis: Intersections – Alt. 6



# Traffic Operational Analysis: Freeways – Alt. 6

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Spit Diamond | Volume | 6275 | 4590 | 1785 | | 6375 |
| | Flow Rate^ | 1745 | 1710 | 2055 | 6940 | 2360 |
| | V/C | 0.74 | 0.73 | 0.98 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Spit Diamond | Volume | 5530 | 4625 | 960 | | 5585 |
| | Flow Rate^ | 1510 | 1675 | 4300 | 6210 | 2050 |
| | V/C | 0.64 | 0.71 | 0.93 | 0.88 | 0.87 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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FIGURE B.2 Chemawa Road IAMP Traffic Analysis

2031 UGB Expansion Alternative 6: Chemawa/Tepper Half Diamond Interchange
Freeway Volumes and V/C Ratio

**Assumptions**

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FFS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

**Legend/Notes:**

^ Flow Rate represents unit in COOT Analysis Procedure Manual
FFS: Free flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

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# Traffic Operational Analysis: Alternative 6 Comparison to Baseline (UGB Expansion)

| # | Description | Jurisdiction | 2031 Alternative 6 UGB Expansion Land Use | | | |
|---|---|---|---|---|---|---|
| | | | Standard | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | n/a | -56.7 | n/a | -0.16 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | n/a | -15.0 | n/a | 0.00 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | n/a | -18.5 | n/a | -0.07 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | n/a | -18.9 | n/a | -0.20 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | n/a | -20.4 | n/a | -0.14 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | n/a | -55.2 | n/a | -0.06 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | n/a | -38.0 | n/a | -0.12 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | n/a | -83.1 | n/a | -0.26 |
| 9 | Chemawa Road at Indian School Road | ODOT | n/a | 89.9 | n/a | 0.35 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | n/a | 18.3 | n/a | 0.05 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | n/a | 28.7 | n/a | 0.06 |
| 12 | Cordon Road at Kale Street | Marion County | n/a | 38.2 | n/a | 0.24 |
| 13 | Portland Road at Kale Street | ODOT | n/a | -0.5 | n/a | -0.01 |
| 14 | Portland Road at Lancaster Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 16 | Chemawa Road at Verda Lane | Keizer | n/a | -7.1 | n/a | 0.04 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | n/a | -32.1 | n/a | -0.07 |
| 18 | Portland Road at Hyacinth Street | ODOT | n/a | 0.1 | n/a | 0.02 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | n/a | 8.5 | n/a | 0.03 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | n/a | -0.1 | n/a | -0.02 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | n/a | 12.6 | n/a | -0.02 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | n/a | -5.1 | n/a | -0.17 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 27 | Radiant/SB Ramps | ODOT | n/a | 9.5 | n/a | 0.58 |
| 28 | Radiant/NB Ramps | ODOT | n/a | 7.9 | n/a | 0.67 |
| 29 | Radiant/Chemawa | Keizer | n/a | 51.0 | n/a | 0.94 |
| 30 | Brooks SPUI | ODOT | n/a | 0.0 | n/a | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 32 | Quinaby/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |

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# UGB Expansion Alternative 12:

# Brooks Interchange

# Single-Point Urban Interchange (SPUI)

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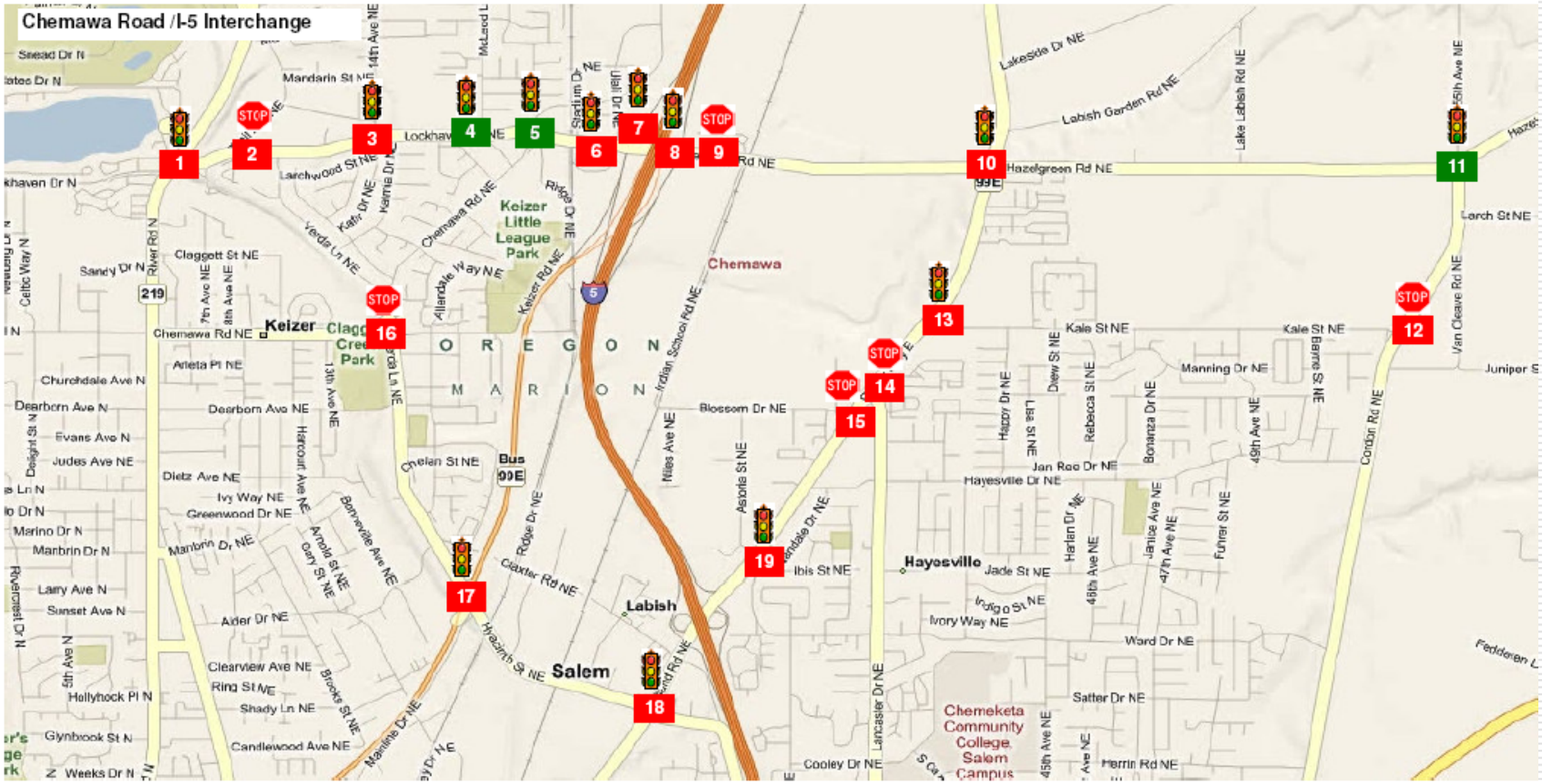
# Traffic Operational Analysis: Intersections – Alt. 12

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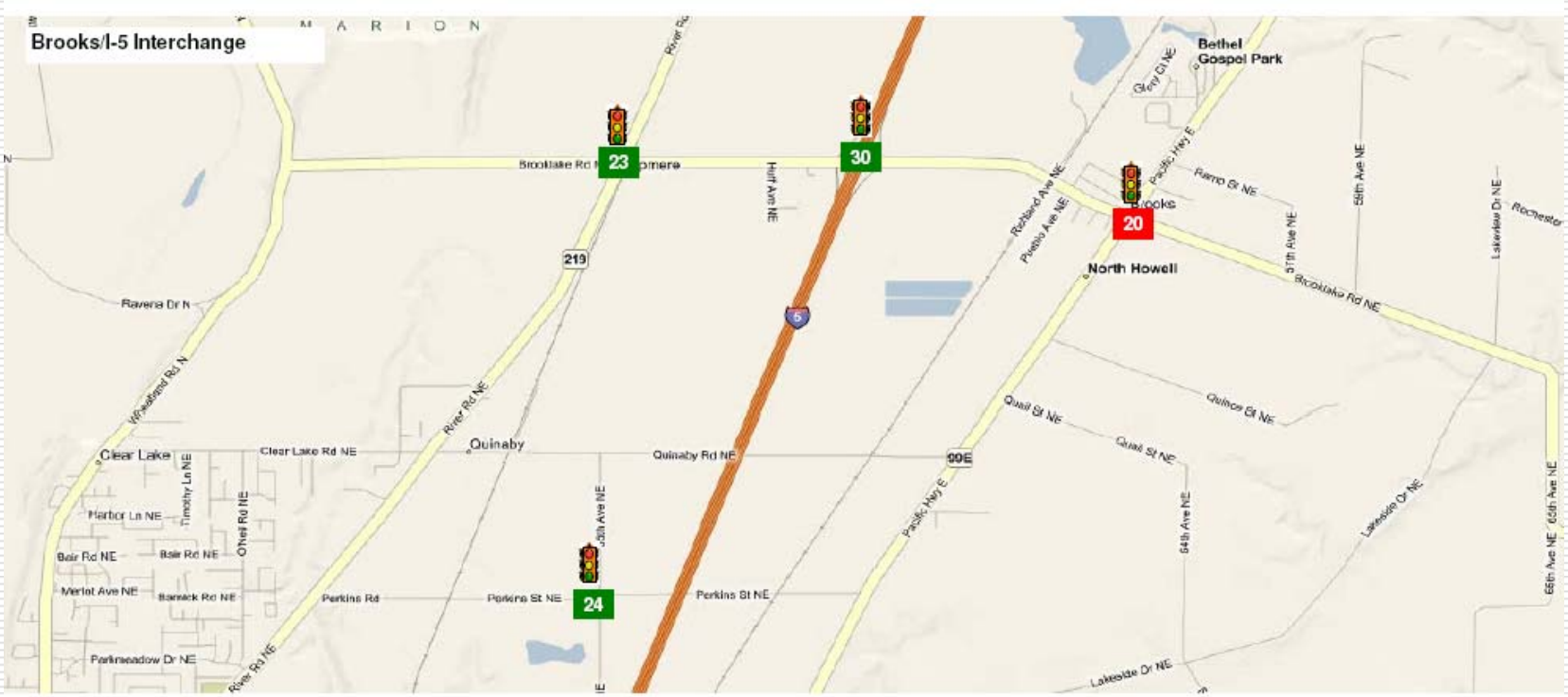
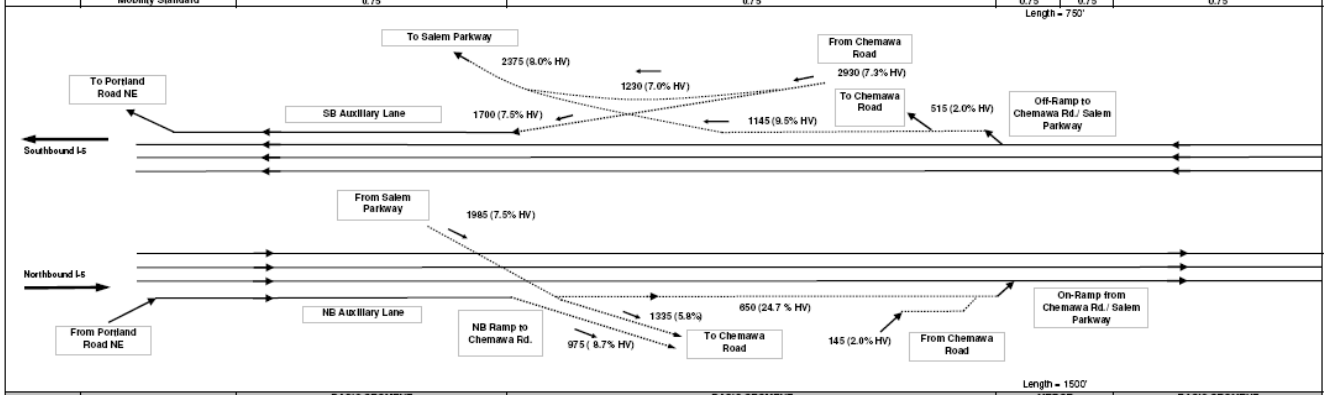
# Traffic Operational Analysis: Intersections – Alt. 12



# Traffic Operational Analysis: Freeways – Alt. 12

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 6360 | 4660 | 1660 | | 6920 |
| | Flow Rate^ | 1770 | 1735 | 1910 | 6880 | 2340 |
| | V/C | 0.75 | 0.74 | 0.91 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 5790 | 4815 | 795 | | 5610 |
| | Flow Rate^ | 1580 | 1740 | 4230 | 6220 | 2080 |
| | V/C | 0.67 | 0.74 | 0.92 | 0.88 | 0.89 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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FIGURE B.2 Chemawa Road IAMP Traffic Analysis

2031 UGB Expansion Alternative 12: Brooks Interchange SPUI

Freeway Volumes and V/C Ratio

**Assumptions**

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 55 mph, Ramp FFS: 45 mph
5. Lanewidth: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. Bystam Peak Hour is 4:30-5:30 PM

Meets Mobility Standard

Fails Mobility Standard

**Legend/Notes:**

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/ Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps

Mainline Freeway

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# Traffic Operational Analysis: Comparison to Baseline (UGB Expansion)

| | # | Description | Jurisdiction | 2031 Alternative 12 UGB Expansion Land Use Standard | Delay | LOS | V/C |
|---|---|---|---|---|---|---|---|
| 9 | 1 | Lockhaven Drive at River Road | Keizer | n/a | -56.7 | n/a | -0.16 |
| 0 | 2 | Trail Avenue at Lockhaven Drive | Keizer | n/a | 0.0 | n/a | 0.00 |
| 1 | 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | n/a | -24.7 | n/a | -0.10 |
| 2 | 4 | Lockhaven Drive at McLeod Lane | Keizer | n/a | -20.2 | n/a | -0.18 |
| 3 | 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | n/a | 14.7 | n/a | 0.00 |
| 4 | 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | n/a | 13.3 | n/a | 0.09 |
| 5 | 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | n/a | 4.9 | n/a | -0.03 |
| 6 | 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | n/a | -10.1 | n/a | -0.06 |
| 7 | 9 | Chemawa Road at Indian School Road | ODOT | n/a | 8.3 | n/a | 0.05 |
| 8 | 10 | Chemawa Road at Pacific Highway 99E | ODOT | n/a | 1.0 | n/a | -0.01 |
| 9 | 11 | Hazelgreen Road at Cordon Road | Marion County | n/a | -3.8 | n/a | -0.13 |
| 0 | 12 | Cordon Road at Kale Street | Marion County | n/a | 3.8 | n/a | 0.04 |
| 1 | 13 | Portland Road at Kale Street | ODOT | n/a | -14.1 | n/a | -0.01 |
| 2 | 14 | Portland Road at Lancaster Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 3 | 15 | Portland Road at Blossom Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 4 | 16 | Chemawa Road at Verda Lane | Keizer | n/a | 16.0 | n/a | 0.03 |
| 5 | 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | n/a | -10.9 | n/a | 0.00 |
| 6 | 18 | Portland Road at Hyacinth Street | ODOT | n/a | 3.1 | n/a | 0.02 |
| 7 | 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | n/a | 9.6 | n/a | 0.06 |
| 8 | 20 | Brooklake Road at Pacific Highway 99E | ODOT | n/a | -5.5 | n/a | -0.04 |
| 9 | 21 | Brooklake Road at I-5 NB Ramps | ODOT | n/a | n/a | n/a | n/a |
| 0 | 22 | Brooklake Road at I-5 SB Ramps | ODOT | n/a | n/a | n/a | n/a |
| 1 | 23 | Brooklake Road at River Road | Marion County | n/a | 11.6 | n/a | 0.00 |
| 2 | 24 | Perkins Road at 35th Avenue NE | Marion County | n/a | -1.9 | n/a | -0.04 |
| 3 | 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 4 | 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 5 | 27 | Radiant/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 6 | 28 | Radiant/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 7 | 29 | Radiant/Chemawa | Keizer | n/a | 0.0 | n/a | 0.00 |
| 8 | 30 | Brooks SPUI | ODOT | n/a | 48.3 | n/a | 0.72 |
| 9 | 31 | Quinaby/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 0 | 32 | Quinaby/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |

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# UGB Expansion Alternative 13:

# Quinaby Diamond Interchange

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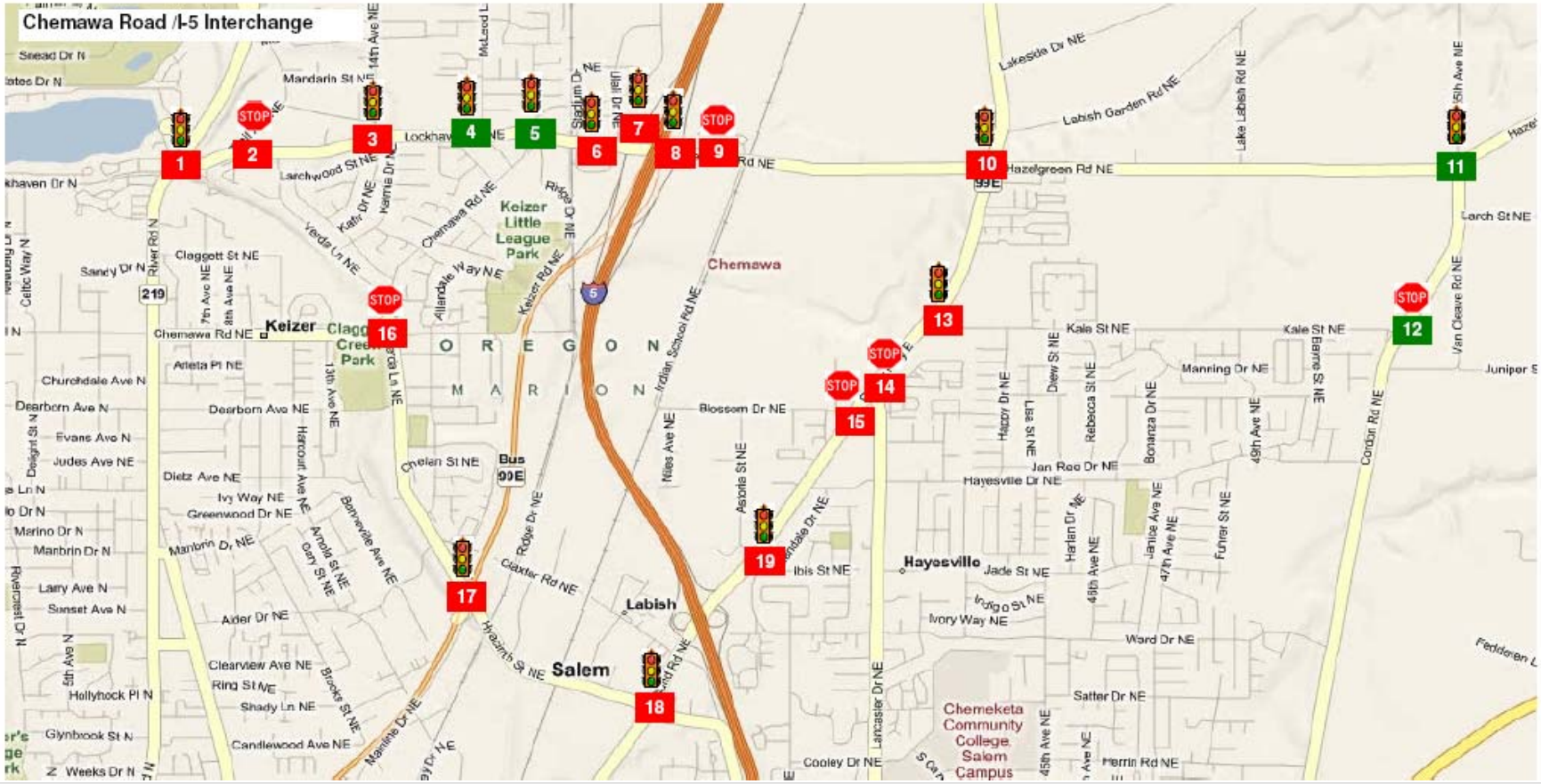
# Traffic Operational Analysis: Intersections – Alt. 13

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# Traffic Operational Analysis: Intersections – Alt. 13

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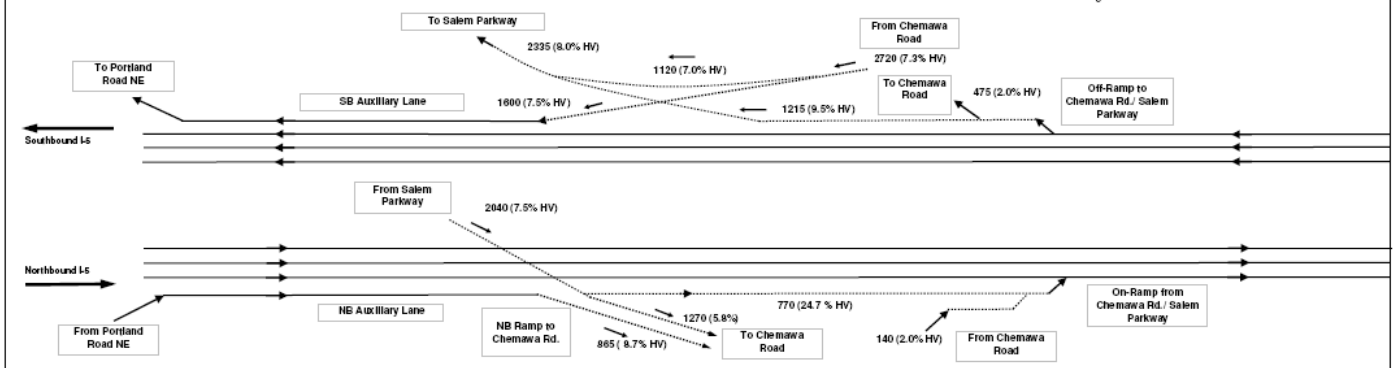
# Traffic Operational Analysis: Freeways – Alt. 13

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 6320 | 4720 | 1690 | | 6410 |
| | Flow Rate^ | 1755 | 1760 | 1945 | 6980 | 2375 |
| | V/C | 0.75 | 0.75 | 0.93 | 0.99 | 1.01 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.9% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 5895 | 5020 | 910 | | 5930 |
| | Flow Rate^ | 1605 | 1815 | 4515 | 6585 | 2200 |
| | V/C | 0.68 | 0.77 | 0.96 | 0.93 | 0.94 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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FIGURE B.2A Chemawa Road IAMP Traffic Analysis

2031 UGB Expansion Alternative 13: Quinaby Road Interchange

Freeway Volumes and V/C Ratio: Chemawa/I-5 Interchange

**Assumptions**

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard

Fails Mobility Standard

**Legend/Notes:**

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps

Mainline Freeway

N

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# Traffic Operational Analysis: Alternative 13 Comparison to Baseline (UGB Expansion)

| # | Description | Jurisdiction | 2031 Alternative 13 UGB Expansion Land Use | | | |
|---|---|---|---|---|---|---|
| | | | Standard | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | n/a | -84.4 | n/a | -0.23 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | n/a | -25.2 | n/a | -2.05 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | n/a | -68.8 | n/a | -0.25 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | n/a | -26.1 | n/a | -0.23 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | n/a | -7.0 | n/a | -0.05 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | n/a | -47.8 | n/a | -0.04 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | n/a | -53.5 | n/a | -0.16 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | n/a | -60.8 | n/a | -0.19 |
| 9 | Chemawa Road at Indian School Road | ODOT | n/a | 41.7 | n/a | 0.16 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | n/a | -16.4 | n/a | -0.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | n/a | -3.6 | n/a | -0.11 |
| 12 | Cordon Road at Kale Street | Marion County | n/a | -7.9 | n/a | -0.04 |
| 13 | Portland Road at Kale Street | ODOT | n/a | -11.8 | n/a | -0.07 |
| 14 | Portland Road at Lancaster Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 16 | Chemawa Road at Verda Lane | Keizer | n/a | -25.1 | n/a | 0.02 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | n/a | -32.4 | n/a | -0.07 |
| 18 | Portland Road at Hyacinth Street | ODOT | n/a | 5.4 | n/a | 0.03 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | n/a | -29.7 | n/a | -0.14 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | n/a | -70.8 | n/a | -0.24 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | n/a | 12.0 | n/a | -0.05 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | n/a | -6.2 | n/a | -0.20 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 27 | Radiant/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 28 | Radiant/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 29 | Radiant/Chemawa | Keizer | n/a | 0.0 | n/a | 0.00 |
| 30 | Brooks SPUI | ODOT | n/a | 0.0 | n/a | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | n/a | 30.0 | n/a | 0.84 |
| 32 | Quinaby/SB Ramps | ODOT | n/a | 22.6 | n/a | 0.79 |

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# UGB Expansion Alternative 14:

# Hyacinth/Verda Improvements

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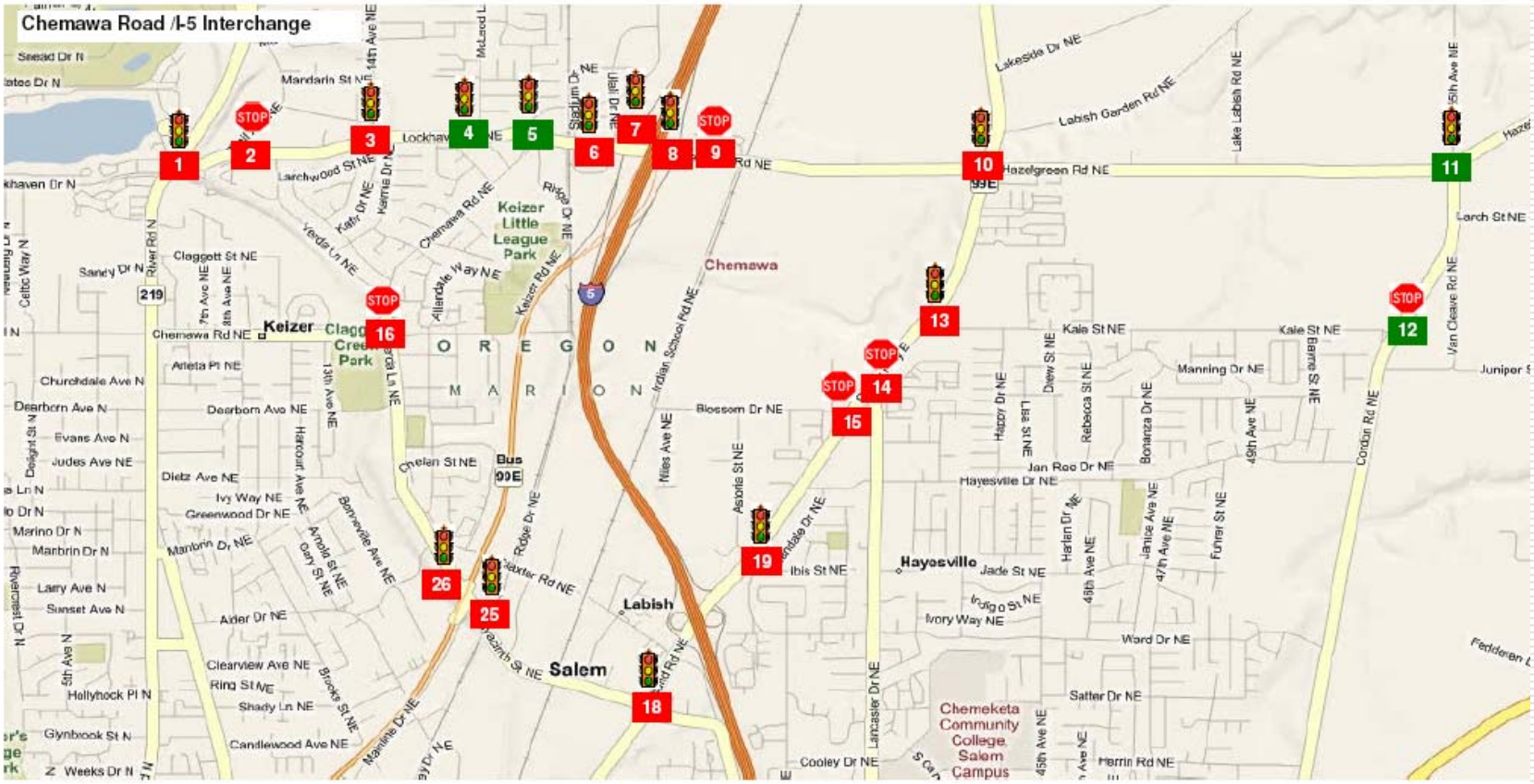
# Traffic Operational Analysis: Intersections – Alt. 14

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# Traffic Operational Analysis: Intersections – Alt. 14

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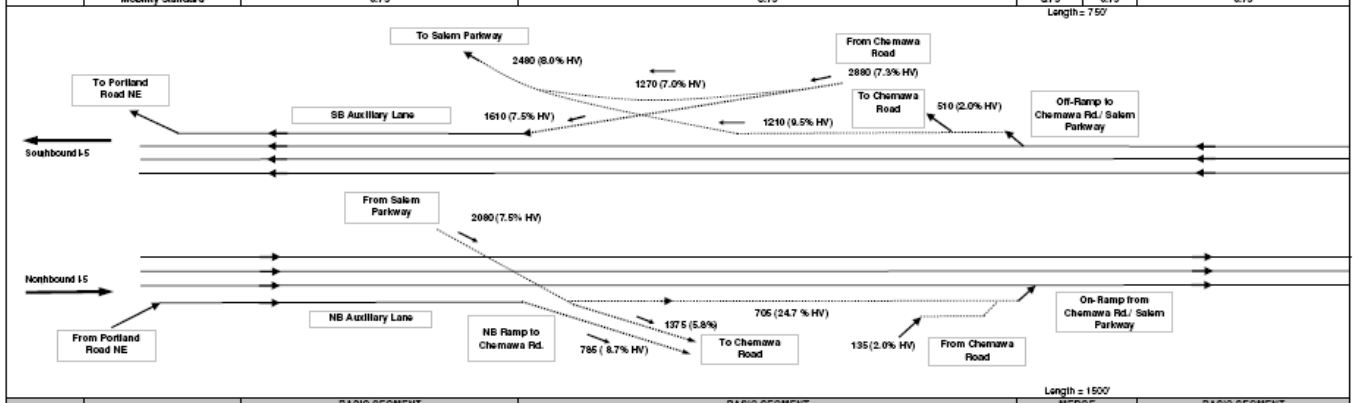
# Traffic Operational Analysis: Freeways – Alt. 14

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S6: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/Verda | Volume | 6190 | 4580 | 1720 | | 6300 |
| | Flow Rate* | 1720 | 1705 | 1980 | 6860 | 2335 |
| | V/C | 0.73 | 0.73 | 0.94 | 0.97 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N5: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.9% | 20.7% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/Verda | Volume | 5485 | 4700 | 840 | | 5540 |
| | Flow Rate* | 1495 | 1700 | 4210 | 6150 | 2035 |
| | V/C | 0.64 | 0.72 | 0.92 | 0.87 | 0.87 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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FIGURE B.2 Chemawa Road IAMP Traffic Analysis

2031 UGB Expansion Alternative 14: Verda/Hyacinth Corridor Improvements
Freeway Volumes and V/C Ratio

**Assumptions**

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.99
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph; Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

**Legend/Notes:**

* Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

# Traffic Operational Analysis: Alternative 14 Comparison to Baseline (UGB Expansion)

| # | Description | Jurisdiction | 2031 Alternative 14 UGB Expansion Land Use | | | |
|---|---|---|---|---|---|---|
| | | | Standard | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | n/a | -66.0 | n/a | -0.15 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | n/a | 0.0 | n/a | 0.00 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | n/a | -41.3 | n/a | -0.23 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | n/a | -19.6 | n/a | -0.20 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | n/a | -31.0 | n/a | -0.14 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | n/a | -18.0 | n/a | 0.02 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | n/a | -19.7 | n/a | -0.13 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | n/a | -46.6 | n/a | -0.18 |
| 9 | Chemawa Road at Indian School Road | ODOT | n/a | 22.1 | n/a | 0.08 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | n/a | -11.8 | n/a | -0.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | n/a | -3.8 | n/a | -0.12 |
| 12 | Cordon Road at Kale Street | Marion County | n/a | -10.1 | n/a | -0.08 |
| 13 | Portland Road at Kale Street | ODOT | n/a | -28.0 | n/a | -0.09 |
| 14 | Portland Road at Lancaster Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | n/a | 0.0 | n/a | 0.00 |
| 16 | Chemawa Road at Verda Lane | Keizer | n/a | 284.1 | n/a | 1.39 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | n/a | n/a | n/a | n/a |
| 18 | Portland Road at Hyacinth Street | ODOT | n/a | 22.5 | n/a | 0.14 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | n/a | -11.1 | n/a | -0.05 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | n/a | -5.9 | n/a | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | n/a | 13.4 | n/a | 0.07 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | n/a | -2.7 | n/a | -0.08 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | 32.1 | n/a | 0.92 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | 42.6 | n/a | 1.00 |
| 27 | Radiant/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 28 | Radiant/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 29 | Radiant/Chemawa | Keizer | n/a | 0.0 | n/a | 0.00 |
| 30 | Brooks SPUI | ODOT | n/a | 0.0 | n/a | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |
| 32 | Quinaby/SB Ramps | ODOT | n/a | 0.0 | n/a | 0.00 |

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# Alternatives Comparison

# Difference Table Comparison – Adopted Land Use

| # | Description | Jurisdiction | 2031 - Adopted Land Use Alt.1 | | 2031 - Adopted Land Use Alt.6 | | 2031 - Adopted Land Use Alt.12 | | 2031 - Adopted Land Use Alt.13 | | 2031 - Adopted Land Use Alt.14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | -12.2 | 0.02 | 13.7 | 0.05 | 24.1 | 0.08 | -0.3 | 0.00 | 10.4 | 0.05 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | -188.4 | -0.33 | 204.5 | 0.42 | 354.3 | 1.17 | 20.8 | 0.02 | 346.2 | 0.73 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | -114.1 | -0.45 | 24.0 | 0.12 | 33.2 | 0.10 | -8.9 | 0.03 | 20.6 | 0.10 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | -11.8 | -0.16 | 5.7 | 0.08 | 6.1 | 0.09 | -1.2 | 0.02 | -1.2 | 0.02 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | -16.0 | -0.15 | -8.1 | -0.10 | -8.9 | -0.10 | -9.2 | -0.13 | -10.1 | -0.13 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | -44.5 | -0.20 | 1.0 | -0.02 | 29.8 | 0.06 | 29.1 | 0.05 | 27.4 | 0.05 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | -15.4 | -0.04 | 7.3 | -0.04 | 27.1 | 0.06 | 9.8 | -0.01 | 9.7 | -0.01 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | -13.7 | -0.05 | 6.6 | 0.01 | 37.2 | 0.09 | 16.4 | 0.04 | 5.8 | 0.02 |
| 9 | Chemawa Road at Indian School Road | ODOT | -9.8 | -0.18 | -11.7 | -0.21 | 21.9 | 0.15 | 5.7 | 0.03 | 1.9 | -0.02 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 2.8 | 0.03 | 0.2 | -0.01 | 4.6 | 0.05 | 4.0 | 0.05 | -3.0 | 0.02 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 2.0 | -0.05 | 31.7 | 0.16 | 0.2 | -0.02 | 0.2 | -0.02 | 31.1 | -0.03 |
| 12 | Cordon Road at Kale Street | Marion County | -1.3 | -0.02 | 0.4 | -0.01 | -0.5 | -0.01 | -0.6 | -0.01 | -0.9 | -0.02 |
| 13 | Portland Road at Kale Street | ODOT | -6.5 | -0.04 | -5.8 | -0.03 | -9.2 | -0.03 | -6.2 | -0.05 | -11.2 | -0.11 |
| 14 | Portland Road at Lancaster Drive | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | 0.0 | -0.49 | -467.7 | -2.11 | -606.9 | -2.42 | -690.4 | -2.60 | -590.7 | -2.39 |
| 16 | Chemawa Road at Verda Lane | Keizer | -49.9 | -0.14 | -42.5 | -0.18 | -32.9 | -0.13 | -54.0 | -0.18 | 104.7 | 0.48 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | -7.1 | 0.04 | -12.5 | 0.02 | -9.9 | 0.03 | -12.9 | 0.01 | Intersection Removed | |
| 18 | Portland Road at Hyacinth Street | ODOT | 17.4 | 0.08 | 19.0 | 0.09 | 21.3 | 0.09 | 23.7 | 0.10 | 41.1 | 0.17 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | -6.3 | 0.00 | 0.4 | 0.01 | 2.1 | 0.01 | -18.7 | -0.10 | -10.8 | -0.04 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | -14.6 | -0.05 | -21.0 | -0.07 | -13.2 | -0.04 | -118.7 | -0.38 | -15.6 | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | Intersection Removed | | 0.0 | 0.00 | 0.0 | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | Intersection Removed | | 0.0 | 0.00 | 0.0 | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | -13.8 | 0.10 | -12.8 | 0.03 | -0.5 | 0.07 | -13.7 | 0.03 | 2.9 | 0.17 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | -11.6 | -0.14 | -20.0 | -0.29 | -6.0 | -0.07 | -14.6 | -0.29 | -11.0 | -0.13 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 25.5 | 0.81 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 30.7 | 0.86 |
| 27 | Tepper Lane/SB Ramps | ODOT | n/a | n/a | 27.7 | 0.40 | n/a | n/a | n/a | n/a | n/a | n/a |
| 28 | Tepper Lane/NB Ramps | ODOT | n/a | n/a | 4.8 | 0.31 | n/a | n/a | n/a | n/a | n/a | n/a |
| 29 | Tepper Lane/Chemawa | Keizer | n/a | n/a | 16.1 | 0.79 | n/a | n/a | n/a | n/a | n/a | n/a |
| 30 | Brooks SPUI | ODOT | n/a | n/a | n/a | n/a | 35.6 | 0.62 | n/a | n/a | n/a | n/a |
| 31 | Quinaby/NB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | 29.0 | 0.46 | n/a | n/a |
| 32 | Quinaby/SB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | 25.0 | 0.46 | n/a | n/a |
| | **Chemawa Interchange Vicinity - Delay Savings over Baseline** | | -111.2 | | 0.8 | | 113.2 | | 50.6 | | 33.5 | |

**Notes:**

* Yellow highlighting represents intersections that were added or removed as part of the alternative
* Blue highligting represents intersections in close proximity to the Chemawa Road interchange

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# Difference Table Comparison – UGB Expansion

| # | Description | Jurisdiction | 2031 Alternative 1 UGB Expansion Land | | 2031 Alternative 6 UGB Expansion Land | | 2031 Alternative 12 UGB Expansion Land | | 2031 Alternative 13 UGB Expansion Land | | 2031 Alternative 14 UGB Expansion Land | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | -104.2 | -0.26 | -56.7 | -0.16 | -56.7 | -0.16 | -84.4 | -0.23 | -66.0 | -0.15 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | -358.3 | -2.75 | 0.0 | 0.00 | 0.0 | 0.00 | -25.2 | -2.05 | 0.0 | 0.00 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | -139.4 | -0.59 | -18.5 | -0.07 | -24.7 | -0.10 | -68.8 | -0.25 | -41.3 | -0.23 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | -25.6 | -0.31 | -18.9 | -0.20 | -20.2 | -0.18 | -26.1 | -0.23 | -19.6 | -0.20 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | -37.3 | -0.10 | -20.4 | -0.14 | 14.7 | 0.00 | -7.0 | -0.05 | -31.0 | -0.14 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | -111.6 | -0.36 | -55.2 | -0.06 | 13.3 | 0.09 | -47.8 | -0.04 | -18.0 | 0.02 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | -74.4 | -0.05 | -38.0 | -0.12 | 4.9 | -0.03 | -53.5 | -0.16 | -19.7 | -0.13 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | -60.8 | -0.19 | -83.1 | -0.26 | -10.1 | -0.06 | -60.8 | -0.19 | -46.6 | -0.18 |
| 9 | Chemawa Road at Indian School Road | ODOT | -7.1 | -0.01 | 89.9 | 0.35 | 8.3 | 0.05 | 41.7 | 0.16 | 22.1 | 0.08 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | -0.1 | -0.06 | 18.3 | 0.05 | 1.0 | -0.01 | -16.4 | -0.07 | -11.8 | -0.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 6.6 | -0.15 | 28.7 | 0.06 | -3.8 | -0.13 | -3.6 | -0.11 | -3.8 | -0.12 |
| 12 | Cordon Road at Kale Street | Marion County | 1.4 | 0.02 | 38.2 | 0.24 | 3.8 | 0.04 | -7.9 | -0.04 | -10.1 | -0.08 |
| 13 | Portland Road at Kale Street | ODOT | -16.2 | 0.02 | -0.5 | -0.01 | -14.1 | -0.01 | -11.8 | -0.07 | -28.0 | -0.09 |
| 14 | Portland Road at Lancaster Drive | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 15 | Portland Road at Blossom Drive | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 16 | Chemawa Road at Verda Lane | Keizer | -8.3 | 0.01 | -7.1 | 0.04 | 16.0 | 0.03 | -25.1 | 0.02 | 284.1 | 1.39 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | -23.6 | -0.04 | -32.1 | -0.07 | -10.9 | 0.00 | -32.4 | -0.07 | Intersection Removed | |
| 18 | Portland Road at Hyacinth Street | ODOT | 0.4 | 0.01 | 0.1 | 0.02 | 3.1 | 0.02 | 5.4 | 0.03 | 22.5 | 0.14 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | 4.0 | 0.02 | 8.5 | 0.03 | 9.6 | 0.06 | -29.7 | -0.14 | -11.1 | -0.05 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | -12.5 | -0.05 | -0.1 | -0.02 | -5.5 | -0.04 | -70.8 | -0.24 | -5.9 | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | Intersection Removed | | 0.0 | 0.00 | 0.0 | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | Intersection Removed | | 0.0 | 0.00 | 0.0 | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | -1.6 | 0.04 | 12.6 | -0.02 | 11.6 | 0.00 | 12.0 | -0.05 | 13.4 | 0.07 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | 1.2 | -0.03 | -5.1 | -0.17 | -1.9 | -0.04 | -6.2 | -0.20 | -2.7 | -0.08 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 32.1 | 0.92 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 42.6 | 1.00 |
| 27 | Tepper Lane/SB Ramps | ODOT | n/a | n/a | 9.5 | 0.58 | n/a | n/a | n/a | n/a | n/a | n/a |
| 28 | Tepper Lane/NB Ramps | ODOT | n/a | n/a | 7.9 | 0.67 | n/a | n/a | n/a | n/a | n/a | n/a |
| 29 | Tepper Lane/Chemawa | Keizer | n/a | n/a | 51.0 | 0.94 | n/a | n/a | n/a | n/a | n/a | n/a |
| 30 | Brooks SPUI | ODOT | n/a | n/a | n/a | n/a | 48.3 | 0.72 | n/a | n/a | n/a | n/a |
| 31 | Quinaby/NB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | 30.0 | 0.84 | n/a | n/a |
| 32 | Quinaby/SB Ramps | ODOT | n/a | n/a | n/a | n/a | n/a | n/a | 22.6 | 0.79 | n/a | n/a |
| | Chemawa Interchange Vicinity - Delay Savings over Baseline | | -316.8 | | -125.7 | | 10.9 | | -153.5 | | -112.8 | |

**Notes:**

* Yellow highlighting represents intersections that were added or removed as part of the alternative
* Blue highligting represents intersections in close proximity to the Chemawa Road interchange

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# Difference Table Comparison - Freeways

| ID # | Location | Segment Type | Facility^ | Future Alt. 1 UGB Expansion Land Use (2031) | | Future Alt. 6 UGB Expansion Land Use (2031) | | Future Alt. 12 UGB Expansion Land Use (2031) | | Future Alt. 13 UGB Expansion Land Use (2031) | | Future Alt. 14 UGB Expansion Land Use (2031) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio |
| N4 | NB On-Ramp from OR 99E Business/Salem Parkway | Merge | Ramp | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | | | | | | | | | | |
| N5 | NB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| N6 | NB On-Ramp from Chemawa Road | Merge | Ramp | 0.75 | 0.10 | 0.75 | 0.12 | 0.75 | 0.11 | 0.75 | 0.17 | 0.75 | 0.11 |
| | | | Mainline | 0.75 | 0.01 | 0.75 | 0.01 | 0.75 | 0.01 | 0.75 | 0.06 | 0.75 | 0.00 |
| N7 | NB I-5 Mainline North of On-Ramp from Chemawa Road | Basic | Mainline | 0.75 | 0.01 | 0.75 | 0.00 | 0.75 | 0.02 | 0.75 | 0.07 | 0.75 | 0.00 |
| S1 | SB I-5 Mainline North of Off-Ramp to Chemawa Road | Basic | Mainline | 0.75 | 0.01 | 0.75 | 0.02 | 0.75 | 0.02 | 0.75 | 0.03 | 0.75 | 0.01 |
| S2 | SB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.75 | 0.53 | 0.75 | 0.58 | 0.75 | 0.51 | 0.75 | 0.53 | 0.75 | 0.54 |
| | | | Mainline | 0.75 | 0.01 | 0.75 | 0.00 | 0.75 | 0.00 | 0.75 | 0.01 | 0.75 | -0.01 |
| S3 | SB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| S4 | SB Off-Ramp to OR 99E Business | Diverge | Ramp | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | | | | | | | | | | |
| S5 | SB I-5 Mainline South of Off-Ramp to OR 99E Business | Basic | Mainline | 0.75 | 0.06 | 0.75 | 0.05 | 0.75 | 0.06 | 0.75 | 0.07 | 0.75 | 0.05 |
| S6 | SB On-Ramp from Chemawa Road | Merge | Ramp | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | | | | | | | | | | |
| S7 | SB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.75 | -0.20 | 0.75 | -0.22 | 0.75 | -0.21 | 0.75 | -0.21 | 0.75 | -0.23 |

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## Conclusion and Summary

- Alternative 1 (Chemawa/Lockhaven Widening) shows the most benefits under UGB Expansion Land Use
- Alternatives 6 (Chemawa/Tepper Half Diamond), 13 (Quinaby Diamond), and 14 (Verda/Hyacinth Improvements) also show benefits under UGB Expansion
- Alternatives 12 (Brooks SPUI) and 14 (Verda/Hyacinth Improvements) show the least improvements under the UGB Expansion scenario.

APPENDIX D

# Evaluation Framework Notes for Alternatives 1–15

APPENDIX D

# Evaluation Framework Notes for Alternatives 1–15

# Chemawa Interchange IAMP Evaluation Framework Notes

## Goal 1: Mobility

### Objective 1.1: Design for the projected 2031 traffic volumes

**Evaluation Criteria 1.1.1: Freeways: Mobility of freeway segments with 2031 projected traffic compared to standard of 0.80 V/C**.

*Note: All alternatives improve v/c on I-5 because they include the auxiliary lane capacity improvements.*

Alts 9-13: (3) Improvements on the north end are expected to draw traffic away from the Chemawa congested sections, so they got 3s.

Alt 14: (3) Improvements on the south end are expected to draw traffic away from the Chemawa congested sections, so it got a 3.

Alternative 15 – Keizer road: (2) Does not add any improvements to get traffic off of I-5.

All other alternatives: (2) because they do not add any improvements to get traffic off of I-5.

**Evaluation Criteria 1.1.2: Interchange: Mobility of ramps and ramp terminal intersections with 2031 projected traffic compared to standard of 0.80 V/C**

Alt 1 – Chemawa Widening: (3) Receives a 3 because this alternative is making large scale capacity improvements.

Alt 2 – Chemawa Parclo A: (1) Doesn't address NB-WB traffic movement

Alt 3 – Chemawa Parclo B: (2) Does address NB-WB traffic movement, but does not add capacity to Chemawa

Alt 4 – Chemawa Flyover Ramp: (2) Does address NB-WB traffic movement, but does not add capacity to Chemawa

Alt 5 – Split Diamond Perkins: (2) Adds more traffic signals, but spreads them out. Could also increase NB traffic

Alt 6 – Split Diamond Radiant: (2) Adds more traffic signals, but spreads them out. Could increase NB traffic

Alt 7 – Chemawa Roundabouts: (1) Doesn't add capacity, just redesigns the capacity. Won't bring v/c less than 1.

Alt 8 – Modified Roundabout: (1) Doesn't add capacity, just redesigns the capacity. Won't bring v/c less than 1.

Alts 9 – 12: Brooks Improvements: (3) All Brooks Alternatives receive a 3 because they are expected to pull significant traffic away from Chemawa.

Alt 13 – Quinaby/Perkins: (3) Is expected to pull traffic away from Chemawa and provide an alternative route to the north

Alt 14 – Verda/Hyacinth: (3) Expected to pull traffic away from Chemawa ramps. This will be a larger effect than just extending Keizer Road.

Alt 15 – Keizer road: (2) Might pull a minor amount of traffic from the Chemawa ramps.

**Evaluation Criteria 1.1.3: Chemawa Road/Lockhaven Drive: Mobility of lineal segments and intersections with 2031 projected traffic compared to standard of LOS E**

Alt 1 – Chemawa Widening: (3) LOS D or better
Alt 2 – Chemawa Parclo A: (1) Doesn't remove traffic from the Chemawa/Lockhaven corridor
Alt 3 – Chemawa Parclo B: (1) Doesn't remove traffic from the Chemawa/Lockhaven corridor
Alt 4 – Chemawa Flyover Ramp: (1) Doesn't remove traffic from the Chemawa/Lockhaven corridor
Alt 5 – Split Diamond Perkins: (2) Doesn't get a 3 because it is uncertain how much traffic will be diverted from Chemawa.
Alt 6 – Split Diamond Radiant: (2) Doesn't get a 3 because it is uncertain how much traffic will be diverted from Chemawa.
Alt 7 – Chemawa Roundabouts: (1) Doesn't pull traffic off Chemawa
Alt 8 – Modified Roundabout: (1) Doesn't pull traffic off Chemawa
Alts 9 – 12 The Brooks Alternatives: (3) All the Brooks alternatives are expected to pull traffic off the Chemawa corridor.
Alt 13 – Quinaby/Perkins: (3) Expected to pull traffic off the Chemawa corridor.
Alt 14 – Verda/Hyacinth: (3) Expected to pull traffic off the Chemawa corridor.
Alt 15 – Keizer road: (2) Expected to pull only a minor amount of traffic off Chemawa corridor.

**Evaluation Criteria 1.1.4: Local circulation system: Mobility of lineal segments and intersections with 2031 projected traffic compared to standard of LOS E in Keizer and Salem and in Marion County compared to standard of LOS E or D or a V/C ratio of 0.85 or 0.90, depending on the configuration of the intersection**

*Note: In most cases, the secondary project elements that are not integral to the primary project element are not considered in the evaluation. For this criteria, all elements are considered.*

Alt 1 – Chemawa Widening: (3) Accommodates the projected congestion problem and might pull some traffic off the local circulation system.
Alts 2–14: (3) The primary elements don't do anything to improve the local circulation system, but the secondary improvement elements do add capacity to the local system.
Alt 15 – Keizer road: (1) Does not have a local improvement package included with the alternative, so it does not address local mobility.

## Objective 1.2: Consider impacts of future growth and land use changes

**Evaluation Criteria 1.2.1: Degree of consistency of transportation solutions relative to future land use patterns and density**

Alt 1 – Chemawa Widening: (3) Adds capacity – offers future flexibility
Alts 2–8 - Chemawa Alternatives: (2s) Consistent with plans, but offer less future flexibility
Alts 9–12 - Brooks Alternatives: (3s) Address inefficiencies. Consistent with plans and offers future flexibility.
Alt 13 – Quinaby/Perkins: (1) Building a new interchange is inconsistent with

existing plans.

Alt 14 – Verda/Hyacinth: (2) Consistent with plans, but does not offer future land use flexibility since the area is largely developed.

Alt 15 – Keizer road: (1) Creates a connection in an existing neighborhood; not consistent with plans.

## Objective 1.3: Minimize congestion and optimize traffic flow in the interchange area

### Evaluation Criteria 1.3.1: Number of deviations from mobility and safety standards under 2031 traffic and land use conditions

Alt 1 – Chemawa Widening: (3) No deviations

Alts 2–4: (1) The v/c ratio will not improve.

Alt 5 – Split Diamond Perkins: (1) Major deviations

Alt 6 – Split Diamond Radiant: (2) Deviations are minor

Alt 7 – Chemawa Roundabouts: (1) The v/c ratio will not improve.

Alt 8 – Modified Roundabout: (1) There is no other interchange like this in Oregon. The v/c ratio will not improve.

Alts 9–12: The Brooks Alternatives: (3) No deviations

Alts 13–14: (3) No deviations

Alt 15 – Keizer road: (1) Major deviations

## Objective 1.4: Provide transportation improvements that are well connected and effectively serve all travel modes, including but not limited to, bicycles, pedestrians, motor vehicles, freight, transit, commuter rail and freight rail.

### Evaluation Criteria 1.4.1 - Degree to which system hierarchy is maintained

*Note: Brooklake Road should be upgraded and perhaps reclassified with the Brooks Alternatives.*

Alts 1-4, 7–15: (2) All alternatives (except 5 & 6) received a score of 2 because they maintain the freeway hierarchy and the connection to arterials.

Alts 5–6 Split Diamonds: (1) Something major would have to be done to keep these alternatives from connecting to local streets.

### Evaluation Criteria 1.4.2: Number of impediments to freight travel

*Note: For this criterion, the evaluation team decided to look at a combination of the Chemwawa interchange and the Brooks interchange*

Alt 1 – Chemawa Widening: (1) There would still be traffic signals at Chemawa and stop signs at Brooks.

Alts 2–8 - Chemawa Alternatives: (1) None of these alternatives would remove the stop signs at Brooks.

Alt 9 – Brooks Diamond Improvement: (2) Would replace stop signs with traffic signals.

Alt 10 – Brooks Parclo A: (3) The heaviest turning movement would be on a free-flowing loop ramp.

Alt 11 – Brooks Flyover: (2) The heaviest turning movement would be on a

free-flowing flyover ramp, but the touch-down point would make the route to area destinations more circuitous.

Alt 12 – Brooks SPUI: (2) Would replace stop signs with traffic signals.

Alt 13 – Quinaby/Perkins: (1) Could retain stop sign control and would not be a direct route for freight traffic.

Alt 14 – Verda/Hyacinth: (3) Hyacinth improvements would generate a net benefit for freight by removing potential impediments to free flow (grade separate at railroads and Salem Parkway), but would not remove the stop signs at Brooks.

Alt 15 – Keizer road: (1) Route would be more circuitous for I-5 freight traffic.

### Evaluation Criteria 1.4.3: Number of gaps in bicycle and pedestrian system

*Note: The evaluation team had to use assumptions until the final designs are completed. The evaluation was based on whether or not bike and pedestrian crossings could occur, not on the difficulty of the crossing.)*

Alts 2–4, 10-11 –Chemawa & Brooks Flyovers & Loops: (2) It would be hard to maintain bike/ped connectivity where the ramps join the street.

Alt 7 & 8 – Chemawa Roundabouts: (3) Roundabouts may pose crossing difficulty for bike/ped, but won't create actual crossing gaps.

Alts 1, 5–6, 9, 12-15: (3) All other alternatives received a 3 because no major gaps could be anticipated until the design phase is complete.

### Evaluation Criteria 1.4.4: Compatibility with transit service

Alt 1 – Chemawa Widening: (3) Allows more room for bus pulloffs.

All other alternatives received a 2 because they could not be seen to impede or improve transit service. The Flyover options could be mitigated via design.

## Objective 1.5: Provide reasonable access to the interchange area businesses

### Evaluation Criteria 1.5.1: Change in distance from I-5 ramps to major access points

Alts 1–3, 7-8, 9-10, 12, 14-15: (2) Same distance.

Alt 4 – Chemawa Flyover Ramp: (1) Distance would be longer.

Alt 5 – Split Diamond Perkins: (1) Distance would be longer.

Alt 6 – Split Diamond Radiant: (2) Access would be shorter in one direction, but it would be longer in the other direction. The result would be no net gain.

Alt 11 – Brooks Flyover: (1) Distance would be increased due to touch down point.

Alt 13 – Quinaby/Perkins: (2) Scores a 2, however, it could have shorter distances for future businesses on Quinaby.

### Evaluation Criteria 1.5.2: Volume of traffic diverted to residential streets

*Notes: Diversion can come from design (split diamond where one end connects to residential streets), insufficient capacity on Chemawa Road, or a change in business access that forces traffic into residential areas. For the purposes this evaluation, interchange area businesses were defined as those in Keizer Station and the properties in the northeast quadrant.*

Alt 1 – Chemawa Widening: (3) This alternative would add capacity to Chemawa, likely attract traffic from residential streets, and would not divert business traffic to residential streets.

Alts 5 & 6 Chemawa Split Diamonds: (1) Split diamonds will divert business traffic because one end of the diamond may go through a residential neighborhood.
Alt 15 – Keizer road: (1) Diverts traffic through a residential neighborhood.
All other alternatives: (2) No impact either way.

### Objective 1.6: Avoid the situation of Chemawa Interchange being the sole focus of access to 1-5 for the study area

#### Evaluation Criteria 1.6.1: Number of alternative elements that accommodate traffic away from Chemawa Interchange

*Note: To score high, the alternative must improve other interchanges and be able to meet 2031 mobility standards at Chemawa Interchange.*

Alt 1 – Chemawa Widening: (1) No other routes are improved and the alternative does not diversify I-5 access.
Alts 2-8 - Chemawa Alternatives: (1) 2031 mobility standards will not be met with only these alternatives.
Alt 9–14: (3) All improvements are expected to allow Chemawa Interchange to operate acceptably by making improvements at other locations.
Alt 15 – Keizer Road: (1) It is not expected that this will draw enough traffic from Chemawa Road to allow it to operate acceptably in 2031.

## Goal 2: Safety

### Objective 2.1: Provide for operational safety for all modes

#### Evaluation Criteria 2.1.1: Degree of compliance with interchange spacing standards along I-5 and Salem Parkway and access spacing standards along Chemawa Road and Lockhaven Drive

*Note: An Access Management Plan is needed to fully address this evaluation criterion. For this round of screening, professional assumptions were made regarding access.*

Alts 5 & 6 - Split Diamonds: (1) The north end of the split diamond alternatives are too close to the Brooks Interchange and would violate safety and spacing standards.
Alt 13 – Quinaby/Perkins: (1) This new interchange would violate spacing requirements.
All other alternatives receive 2s, assuming that the existing local access points at Chemawa and Brooks Interchanges, which are closer than standard now, would remain unchanged.

#### Evaluation Criteria 2.1.2: Number of deviations from mobility and safety standards under 2031 traffic and land use conditions

*Note: Same as Goal 1, Objective 3, Evaluation Criteria 1.*

#### Evaluation Criteria 2.1.3: Degree to which signal spacing is optimized

*Note: This could be evaluated more fully with more refined design.*

Alt 14 – Verda/Hyacinth: (2) Hyacinth most likely would have two signals at a Salem Parkway Interchange, rather than the one signal at the existing grade

intersection.

Alts 1-6, 9-13, 15: (3) Until more refined design is done, it is assumed that all signal progression can be provided at posted speeds for all directions.

Alts 7 & 8 – Chemawa Roundabouts: Less coordination is because two of the signals are removed.

#### Evaluation Criteria 2.1.4: Number of gaps in bicycle and pedestrian system

*Note: Same as Evaluation Criteria 1.3.1.*

#### Evaluation Criteria 2.1.5: Protection of pedestrian and bicycle crossings

Alts 2-4, 10-11: (1) Flyovers and loops require crossings at locations where the vehicle interface is difficult to manage (unsignalized and potentially unsafe)

Alts 7 & 8 – Chemawa Roundabouts: (2) Roundabouts are safe and un-signalized, but more uncommon than most intersections.

All other alternatives: (3) All crossings are signalized or stop controlled and safe.

### Objective 2.2: Provide for emergency response

#### Evaluation Criteria 2.2.1: Change in response time for emergency vehicles

*Note: This is assuming fire stations on Chemawa Road near River Road, on Wheatland Road near Clearlake Road, at Brooks, at Labish Center, at Chemeketa Community College, on Cordon Road near Silverton Road, and on Fairgrounds Road at Summer Street.*

Alt 1 – Chemawa Widening: (3) The wider road is assumed to help emergency vehicles through less congestion and more space for emergency vehicle passing.

Alts 2-4 – Chemawa Loops & Flyover: (2s) No change.

Alts 5-6 - Chemawa Split Diamonds: (1) More than 10% longer than current Conditions because of the configuration.

Alts 7-8 – Chemawa Roundabouts: (2) Roundabouts slow traffic, but the flow is uninterrupted.

Alts 9-13 – Brooks Alternatives: (3) All Brooks improvement options are assumed to improve emergency vehicle access.

Alt 14 – Verda/Hyacinth: (3) Grade separations improve emergency response.

Alt 15 – Keizer road: (2) No change.

## Goal 3: Economic Development

### Objective 3.1: Serve planned land uses (commercial, industrial, and agricultural)

#### Evaluation Criteria 3.1.1: Number of businesses displaced or negatively impacted

*Note: It is assumed that "Chemawa Widening" would mean one additional lane in each direction from east of Indian School Road to River Road.*

Alt 1 – Chemawa Widening: (3) Mostly of the area is residential, no businesses would be displaced.

Alt 2 – Chemawa Parclo A: (1) Would take land from Keizer Station where businesses are established, likely to more than two.

Alt 3 – Chemawa Parclo B: (2) May property in the northeast quadrant, but that area is not yet master-planned.
Alt 4 – Chemawa Flyover Ramp: (1) Would likely have significant impact along south side of Keizer Station.
Alts 5-6 – Chemawa Split Diamonds: (1) Could take businesses for the connecting roadways and could leave businesses with much more congested accesses.
Alt 7 – Chemawa Roundabouts: (3) Would not require additional right-of-way.
Alt 8 – Modified Roundabout: (1) Will probably require right-of-way in the northwest and northeast quadrants.
Alts 9 & 12 – Brooks Diamond Improvement and SPUI: (3) Tight diamond and single point urban designs could probably stay within the existing footprint.
Alt 10 – Brooks Loop: (3) Would only take farmland on the east side (farm conversion is considered under a separate evaluation criterion) and could probably stay within the existing footprint on the west side.
Alt 11 – Brooks Flyover: (1) Would likely impact several businesses, either physical impacts or indirect access in the length required for touch down.
Alt 13 – Quinaby/Perkins: (3) There are no businesses in this area.
Alt 14 – Verda/Hyacinth: (1) Businesses located near the railroad grade separations would have more indirect access.
Alt 15 – Keizer Road: (3) No businesses would be impacted.

#### Evaluation Criteria 3.1.2: Change in distance from 1-5 ramps to major access points

*Note: Same as Evaluation Criteria 1.5.1.*

#### Evaluation Criteria 3.1.3: Mobility of access routes compared to standards stated in Goal 1

*Note: Same as Evaluation Criteria 1.1.3.*

### Objective 3.2: Accommodate Freight Movement

#### Evaluation Criteria 3.2.1: Number of impediments to freight travel

*Note: Same as Evaluation Criteria 1.4.2.*

#### Evaluation Criteria 3.2.2: Appropriateness of freight routing

Alts 5-6 – Split Diamonds (1): Freight traffic may be routed through residential neighborhoods.
Alt 13 – Quinaby/Perkins: (3) If this alternative materializes the evaluation team assumes Quinaby will be an arterial & freight would not be routed through it.
Alt 15 – Keizer road: (1) Freight would be routed through neighborhoods
All other alternatives received a score of 3 because they will not route freight through residential neighborhoods
All other alternatives received a score of 3

### Objective 3.3: Serve Regional Recreational Attractions

#### Evaluation Criteria 3.3.1: Number of alternative elements that accommodate major destinations

*Note: The evaluation team compared against the current condition. If they were to compare to a future no build, the ratings would change.*

Alt 1 – Chemawa Widening (2) All attractions will be served in the same manner as the current condition with comparable congestion

Alts 2–5, 7 & 8: (1) Access to any of the major attractions (provided by Chemawa and Salem parkway) will be more difficult in 2031 than the current condition – because traffic conditions will be worse than they are today

Alt 6 – Split Diamond Radiant: ( 2) Could isolate Volcanos – Note : The evaluation team was not sure how much weight this has

Alts 9– 13 Brooks Alternatives: (2) All attractions will be served in the same manner as the current condition with comparable congestion

Alt 14 – Verda/Hyacinth: (2) All attractions will be served in the same manner as the current condition with comparable congestion

Alt 15 – Keizer road: (1) Access to any of the major attractions (provided by Chemawa and Salem parkway) will be more difficult in 2031 than the current condition

# Goal 4: Livability

## Objective 4.1: Consider growth and land use changes over time

### Evaluation Criteria 4.1.1: Degree of consistency of transportation solutions relative to future land use patterns and density

*Note: Same as Evaluation Criteria 1.2.2*

## Objective 4.2: Support local and regional goals for mode choices

### Evaluation Criteria 4.2.1: Degree to which system hierarchy is maintained

*Note: Same as Evaluation Criteria 1.4.1*

### Evaluation Criteria 4.2.2 Number of gaps in bicycle and pedestrian system

*Note: Same as Evaluation Criteria 2.1.4*

### Evaluation Criteria 4.2.3: Compatibility with transit service

*Note: Same as Evaluation Criteria 1.4.4*

## Objective 4.3: Support existing and planned residential and associated development

### Evaluation Criteria 4.3.1: Degree of acceptability of local land use decision by local governments

Alt 1 – Chemawa Widening: (2) No ROW effects – won't modify access, though controversy is expected.

Alt 2 – Chemawa Parclo A: (1) Loop ramp will impact Keizer station

Alt 3 – Chemawa Parclo B: (2) Loop ramp will impact Keizer station & thrust onramp onto annexed land. Impacts to Coleson properties

Alt 4 – Chemawa Flyover Ramp: (1) Will need ROW – not expected to be supported

Alt 5 – Split Diamond Perkins: (1) Changes to land use to north at Perkins – some public controversy expected

Alt 6 – Split Diamond Radiant: (2) Probably not supported by the public, but has a higher probability of being supported by the PMT andSAC

Alt 7 – Chemawa Roundabouts: (2) Support expected from SAC and PMT

Alt 8 – Modified Roundabout: (1) Less support than Alt 7 expected

Alts 9 & 12 – Brooks Diamond Improvement & SPUI: (3) Will be less controversial because the alternatives stay within their current footprint

Alt 10 – Brooks Parclo A: (2) Will need some ROW in exclusive farmland

Alt 11 – Brooks Flyover: (1) Will need some ROW in exclusive farmland and no support is expected from SAC

Alt 13 – Quinaby/Perkins: (2) Would need a goal exception for purchasing ROW outside of the UGB

Alt 14 – Verda/Hyacinth: (2) Some public controversy, more traffic on Hyacinth – a local road

Alt 15 – Keizer road: (1) May not be accepted by SAC & PMT, some public controversy expected

**Evaluation Criteria 4.3.2: Degree to which alternatives fit development plans**

*Note: The scoring is based only on the Keizer Station Development Plan. It is unknown if there are other development plans in the study area.*

Alt 1 – Chemawa Widening: (3) Not sure if widening to south would impact Keizer station

Alt 2 – Chemawa Parclo A: (1) Requires going to the NW quadrant – Keizer Station

Alt 3 – Chemawa Parclo B: (3) There is a question about whether there is a master plan on the impacted property, though it would not be adopted

Alt 4 – Chemawa Flyover Ramp: (1) Impacts quite a bit of Keizer station

Alts 5-6 – Split Diamonds: (1) At the very least, these alternatives would need to rework the main road that runs through the station.

Alt 7 – Chemawa Roundabouts: (3) No impacts to Keizer station – Can be done within the existing ROW

Alt 8 – Modified Roundabout: (1) Higher likelihood of not being in compliance with the development plan

Alts 9–15: (3) Assuming there are no development plans near the Brooks area, Quinaby, and Keizer Road.

**Evaluation Criteria 4.3.3: Degree to which alternatives fit comprehensive plan**

*Note: All alternatives would require updates to TSP and therefore, to the Comp Plan. This does not mean they are out of compliance. The language of the scoring parameter should be changed.*

Alt 1 – Chemawa Widening: (3) No reason it would not be compatible

Alts 2–4 Chemawa Lops & Flyover: (3) In compliance

Alt 5 – Split Diamond Perkins: (1) Building new ramps & interchange outside UGB

Alt 6 – Split Diamond Radiant: (1) Would probably require Tepper to be reclassified

Alts 7 -8– Chemawa Roundabouts: (3) Note – Look closer at the TSP to see if there is anything about prohibiting Roundabouts on certain road classifications

Alt 9 & 12: (3) Improvements may be non-compliant with Marion County's Comp Plan. However, the developments may be merited based on the developments around Brooks alone.

Alts 10-11– Brooks Loop & Flyover: Require taking farmland, which would require a change to Marion County's Comp Plan

Alt 13 – Quinaby/Perkins: (1)

Alts 14-15: (1) May require changing road classifications, which would be out of compliance with the Comp Plan

## Objective 4.4: Protect neighborhoods

### Evaluation Criteria 4.4.1: Appropriateness of freight routing

*Note: Same as Evaluation Criteria 3.2.2*

### Evaluation Criteria 4.4.2: Number of residences displaced or negatively impacted

*Note: The evaluation team chose to score this item based only on the direct impacts of alternatives. They did not consider impacts to 35th.*

Alt 1 – Chemawa Widening: (1) Would affect residential houses by taking portions of front lawns and placing them on more high traffic routes.

Alts 2-4 – Chemawa Loops & Flyovers: (3) No residences are expected to be impacted with the possible exception of more traffic on Lockhaven

Alt 5 – Split Diamond Perkins: (1) Several homes along 35th and Perkins may be impacted.

Alt 6 – Split Diamond Radiant: (1) Tepper & McCloud will be more congested.

Alts 7-8 – Chemawa Roundabouts: (3) No residences would be impacted.

Alts 9-12 – Brooks Alternatives: (3) impacts to 35th were not considered

Alt 13 – Quinaby/Perkins: (1) Some residences may be impacted

Alts 14–15: (1) Some residences may be impacted

### Evaluation Criteria 4.4.3 Visual impacts (walls, hardscape vs landscaping, lighting, etc.)

Alt 1 – Chemawa Widening: (1) Yards removed on homes

Alts 2-4 – Chemawa Loops and Flyovers: (2) Concentrated in current location

Alt 5 – Split Diamond Perkins: (1) Walls & lighting will create negative visual impacts in residential areas

Alt 6 – Split Diamond Radiant: (1) Will create negative visual impacts in residential areas if Tepper is part of the project

Alts 7 & 8– Chemawa Roundabouts: (2) They are not located in neighborhoods

Alts 9-12 – Brooks Alternatives: (2) Not in neighborhoods

Alt 13 – Quinaby/Perkins: (1) Walls and lighting will be added in rural residential neighborhoods

Alts 14-15: (1) Visual conditions would be worse than current conditions

### Evaluation Criteria 4.4.4: Desirability of residential access changes

Alt 1 – Chemawa Widening: (3) Would make it better for homes in the general area, but worse for Chemawa homes (ie less congested, but with more difficult access). Overall the outcome would be better, though a few homes may be more impacted.

Alts 2–4 - Chemawa Loops & Flyover: (2) Would not directly affect homes on Chemawa, but wouldn't fix a lot either

Alts 5–6 - Split Diamonds: (2) Access would be different, but equal. The net effect would be unchanged (ie some residences would be better, others would be worse.)

Alts 7–9 - Chemawa Roundabouts: (2) Isolated

Alts 9–12 - Brooks Alternatives: (2) Note: Where capacity is being added, it could be argued that residential capacity is also being added

Alt 13 – Quinaby/Perkins: (3) Access would be improved for anyone along the

corridor in rural neighborhoods

Alt 14 – Verda/Hyacinth: (3) As a new gateway to Keizer, this alternative would improve access.

Alt 15 – Keizer road: (3) Improves access

**Evaluation Criteria 4.4.5: Change in noise impacts on residential areas**

Alt 1 – Chemawa Widening: (1) Noise would increase

Alts 2-4 - Chemawa Loops & Flyover: (2) For these alternatives, there would be more traffic on Lockwood, however the evaluation team choose to not score based on secondary noise levels.

Alts 5–6 - Split Diamonds: (1) New traffic would be introduced to residential areas.

Alts 7–8 - Chemawa Roundabouts: (2) No change for residential areas

Alts 9–12 - Brooks Alternatives: (2) No change for residential areas

Alt 13 – Quinaby/Perkins: (1) Traffic would be created in areas where it doesn't currently exist.

Alts 14 -15: (1) Traffic would increase along Verda

### Objective 4.5: Provide for appropriate land use policy that seeks to maintain interchange functionality over time

**Evaluation Criteria 4.5.1: Degree of acceptability of recommended land use management actions by local governments**

*Note: Same as Evaluation Criteria 4.3.1*

## Goal 5: Environmental

### Objective 5.1: Protect high quality adjacent farm land

**Evaluation Criteria 5.1.1: Number of farm land acres required for right-of-way**

Alts 1–4: (3) Won't need much farmland

Alt 5 – Split Diamond Perkins: (1) Could need more than 10 acres of farm land

Alt 6 – Split Diamond Radiant: (2) New onramp may extend into farmland, though it would probably not take more than 10 acres.

Alts 7-8 – Chemawa Roundabouts: (3) No farm land would be required

Alts 9–12 - Brooks Alternatives: (2) Could do tight diamonds, but some farmland may be taken anyhow.

Alt 13 – Quinaby/Perkins: (1) Takes farm land

Alts 14–15 - Verda/Hyacinth: (3) Not in farm land

**Evaluation Criteria 5.1.2: Degree of acceptability of recommended land use management actions by agricultural community**

*Note: The evaluation team noted that in many cases, it is better to assume controversy than not. Input from the Farm Bureau stakeholder is needed to further clarify scores.*

Alts 1–4: (3) No impacts to the agricultural community are expected

Alt 5 – Split Diamond Perkins: (1) Better to assume controversy than not.

Alt 6 – Split Diamond Radiant: (1) Good soil quality in the area could incite controversy

Alts 7-8 – Chemawa Roundabouts: (3) No controversy expected

Alts 9–13: (1) Could be controversial
Alts 14 & 15: (3) Not in farm land – no controversy expected.

## Objective 5.2: Avoid impacting cultural sites and resources where practicable

### Evaluation Criteria 5.2.1: Number of historical sites impacted

Alt 2 – Chemawa Parclo A: (1) The loopramp in the south east quadrant may impact historical property

All other alternatives received 3s and were determined to have no impact to historical sites.

### Evaluation Criteria 5.2.2: Number of archaeological sites impacted

*Note: Rick will check to ensure that the cemetery property does not extend to the highway*

All alternatives were assumed not to impact archeological sites, pending Rick's inquiry.

## Objective 5.3: Avoid or minimize impacts to habitat systems, including streams and water bodies, riparian zones, and wetlands

### Evaluation Criteria 5.3.1: Number of acres and quality of habitat impacted

Alt 1 – Chemawa Widening: (3)
Alt 2 – Chemawa Parclo A: (2)
Alt 3 – Chemawa Parclo B: (3)
Alt 4 – Chemawa Flyover Ramp: (2)
Alt 5 – Split Diamond Perkins: (1)
Alt 6 – Split Diamond Radiant: (1)
Alt 7 – Chemawa Roundabouts: (3)
Alt 8 – Modified Roundabout: (3)
Alt 9 – Brooks Diamond Improvement: (2)
Alt 10 – Brooks Parclo A: (1)
Alt 11 – Brooks Flyover: (1)
Alt 12 – Brooks SPUI: (2)
Alt 13 – Quinaby/Perkins: (3)
Alt 14 – Verda/Hyacinth: (3)
Alt 15 – Keizer road: (2)

### Evaluation Criteria 5.3.2: Surface waterways impacted

Alt 1 – Chemawa Widening: (3)
Alt 2 – Chemawa Parclo A: (2)
Alt 3 – Chemawa Parclo B: (3)
Alt 4 – Chemawa Flyover Ramp: (2)
Alts 5 & 6 – Split Diamonds: (1)
Alts 7–14: (3)
Alt 15 – Keizer road: (2)

### Evaluation Criteria 5.3.3: Floodways impacted

All alternatives will have no impact to floodways.

## Objective 5.4: Provide strong environmental stewardship for the built environment (noise, air quality, socioeconomics, etc)

### Evaluation Criteria 5.4.1: Number of residences displaced or negatively impacted

*Note: Same as Evaluation Criteria 4.4.2*

**Evaluation Criteria 5.4.2: Change in noise impacts on residential areas**

*Note: Same as Evaluation Criteria 4.4.5*

**Evaluation Criteria 5.4.3: Change in air quality condition**

*Note: Further modeling information is needed before these scores can be determined.*

**Evaluation Criteria 5.4.4: Effect on greenhouse gases**

*Note: Further modeling information is needed before these scores can be determined.*

**Evaluation Criteria 5.4.5: Degree to which minority or Title 6 populations are impacted**

Alt 1 – Chemawa Widening: (2)
Alt 14 – Verda/Hyacinth: (2)
Alt 15 – Keizer road: (1)
All other alternatives were received a score of 3 and were determined to have no impact on minority of Title 6 populations.

# Goal 6: Cost

## Objective 6.1: Provide fundable solutions

**Evaluation Criteria 6.1.1: Cost of the project ($)**

*Note: The 1-5 auxiliary lane could be $50 million by itself, so was not included in the overall scoring of alternatives*

Alt 1 – Chemawa Widening: (2)
Alt 2 – Chemawa Parclo A: (2)
Alt 3 – Chemawa Parclo B: (2)
Alt 4 – Chemawa Flyover Ramp: (1)
Alts 5–6 Split Diamonds: (1) Would cost over $50 million
Alt 7 – Chemawa Roundabouts: (3) Would be the cheapest option
Alt 8 – Modified Roundabout:
Alts 9–12 - Brooks Alternatives: (2) Would probably cost around $40 million, though they could go higher
Alt 13 – Quinaby/Perkins: (1) Couldn't build it and not hook it up to stuff, so it would be costly
Alt 14 – Verda/Hyacinth: (1) Would cost over $50 million
Alt 15 – Keizer road: (2) Would cost between $10 – $50 million

**Evaluation Criteria 6.1.2: Ability to be constructed in phases**

*Note: The 1-5 auxiliary lanes have not been included in the scoring in order to see the distinctions between each alternative.*

Alt 1 – Chemawa Widening: (3) Could be completed in phases
Alt 2 – Chemawa Parclo A: (2) Could be phased, but complete construction would be desirable
Alts 3-4: (1) Could not be phased – you either have to build the ramp or not.
Alts 5-6 – Split Diamonds: (2) Could be phased, but complete construction would be desirable
Alt 7 – Chemawa Roundabouts: (2) Could build 2 roundabouts in phases
Alt 8 – Modified Roundabout: (1) Either need to build it or not
Alt 9 – Brooks Diamond Improvement: (2) Could be phased
Alts 10–12: (1) Either needs to be built or not
Alts 13 – Quinaby/Perkins: (2) Could be staged
Alt 14 – Verda/Hyacinth: (3) There would be a benefit by doing it in pieces

Alt 15 – Keizer road: (1) The bridges must be built, otherwise the alternative would not go anywhere

## Objective 6.2: Provide a timely and cost-effective project solution that performs as designed throughout its expected design life

### Evaluation Criteria 6.2.1: Cost/Benefit ratio

*Note: Further information is needed before these scores can be determined*

## Objective 6.3: Demonstrate equitable distribution of responsibility for identified transportation improvements

### Evaluation Criteria 6.3.1: The transportation solution is properly balanced between both sides of I-5

*Note: This criterion is pre-emptive. We cannot know how the financial responsibility will be distributed within each alternative at this phase. All alternatives are assumed to be equitable, unless inequalities are revealed.*

APPENDIX E

# Alternatives 1, 6, 12, 13, and 14 Drawings

APPENDIX E

# Alternatives 1, 6, 12, 13, and 14 Drawings

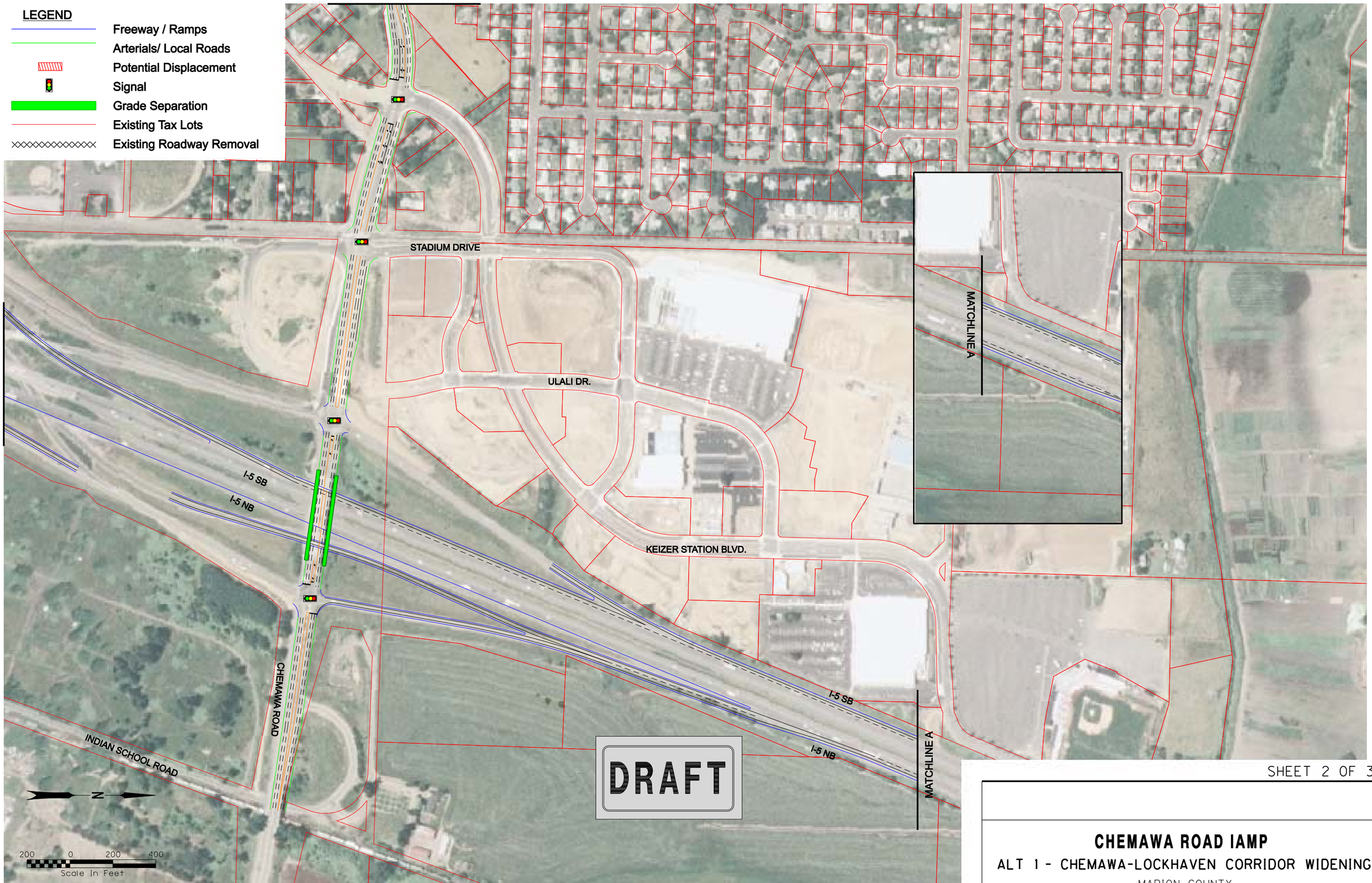
SHEET 1 OF 3

**CHEMAWA ROAD IAMP**

ALT 1 -CHEMAWA-LOCKHAVEN CORRIDOR WIDENING

MARION COUNTY

02/13/09




SHEET 2 OF 3

# CHEMAWA ROAD IAMP

## ALT 1 - CHEMAWA-LOCKHAVEN CORRIDOR WIDENING

MARION COUNTY

02/13/09

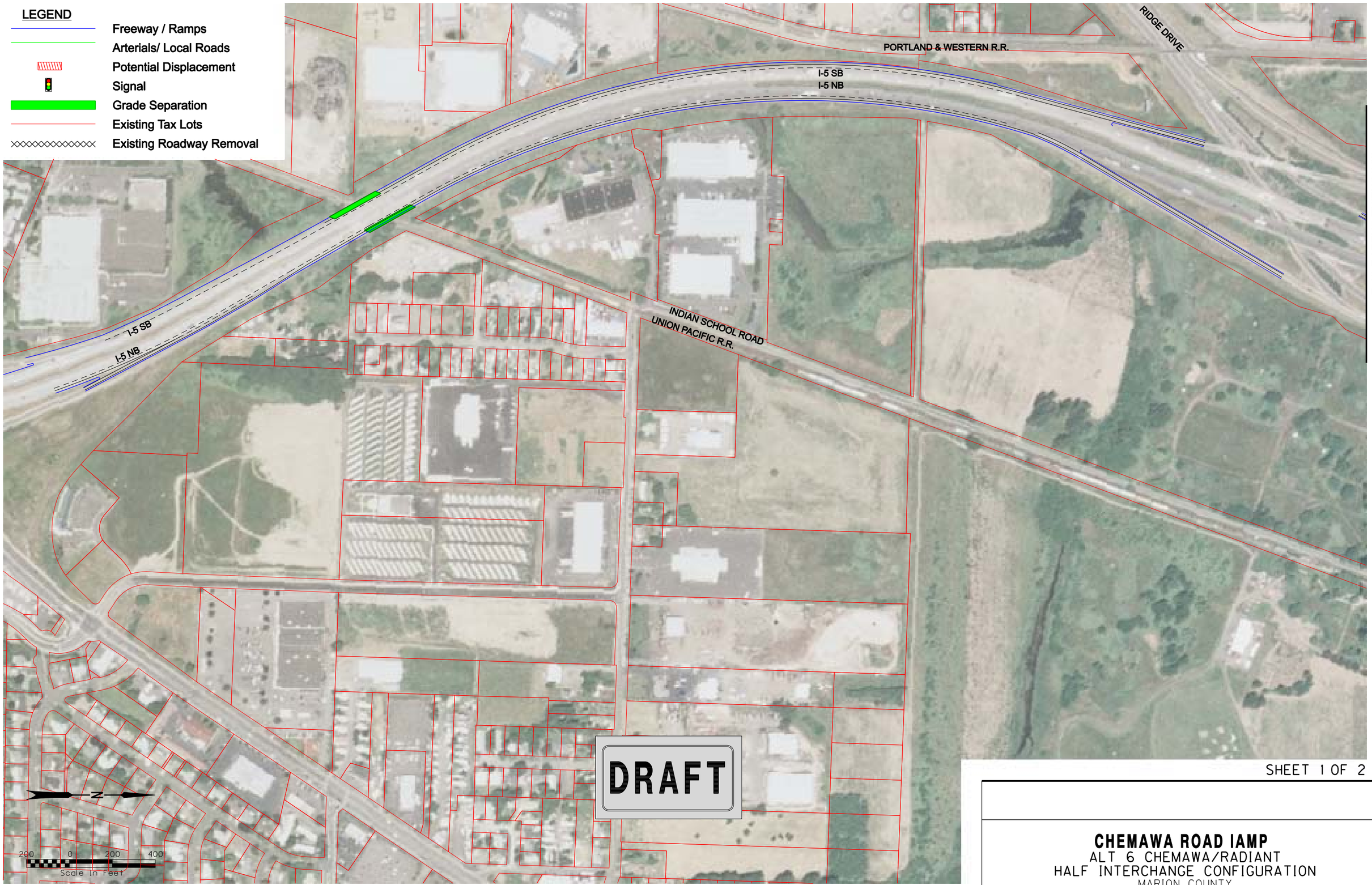
SHEET 3 OF 3

**CHEMAWA ROAD IAMP**

ALT 1 -CHEMAWA-LOCKHAVEN CORRIDOR WIDENING

MARION COUNTY

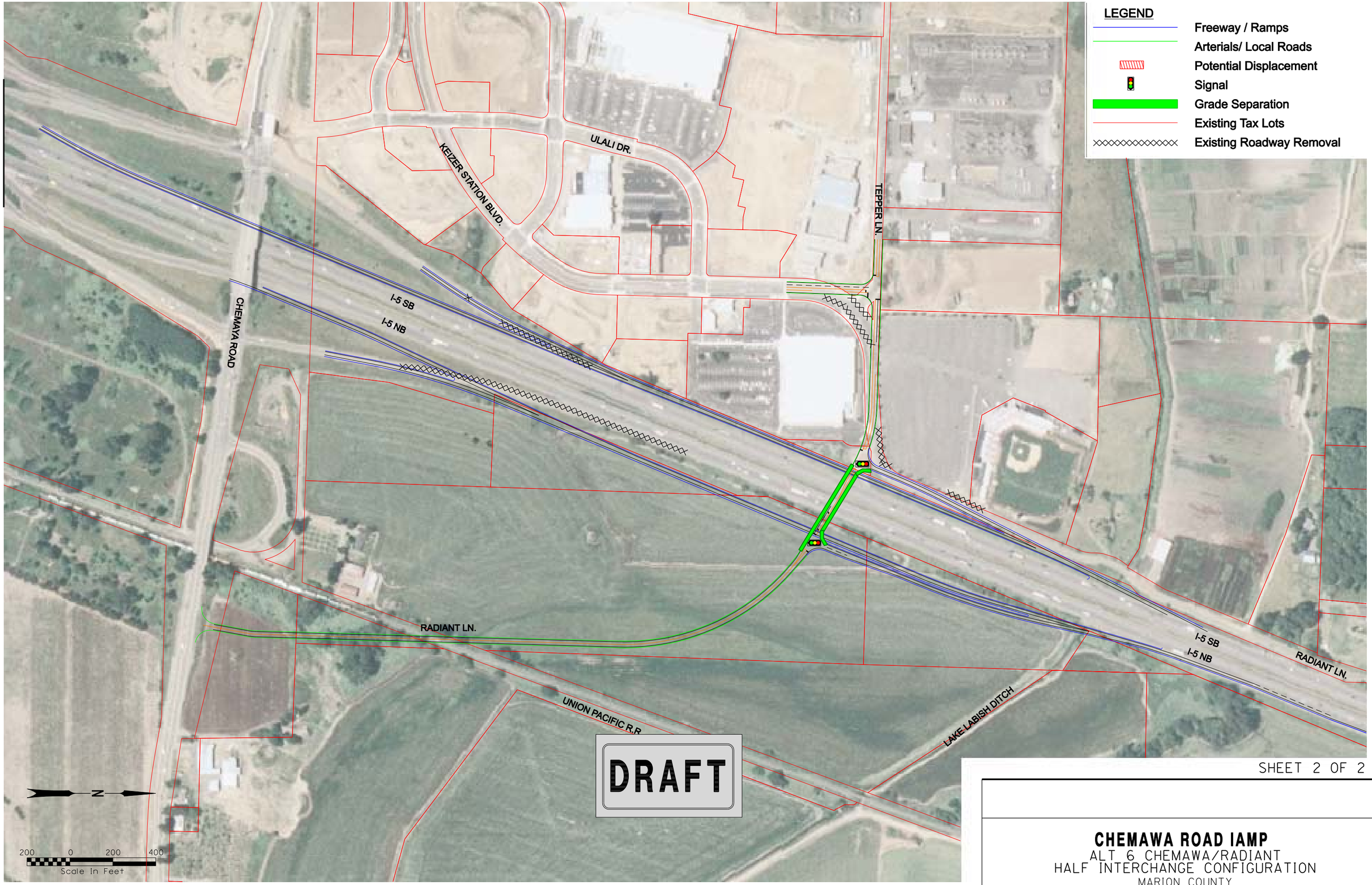
02/13/09




SHEET 1 OF 2

**CHEMAWA ROAD IAMP**
ALT 6 CHEMAWA/RADIANT
HALF INTERCHANGE CONFIGURATION
MARION COUNTY

02/13/09




SHEET 2 OF 2

**CHEMAWA ROAD IAMP**

ALT 6 CHEMAWA/RADIANT
HALF INTERCHANGE CONFIGURATION
MARION COUNTY

02/13/09

**CHEMAWA ROAD IAMP**

ALT 12: BROOKS INTERCHANGE SPUI

MARION COUNTY

02/13/09

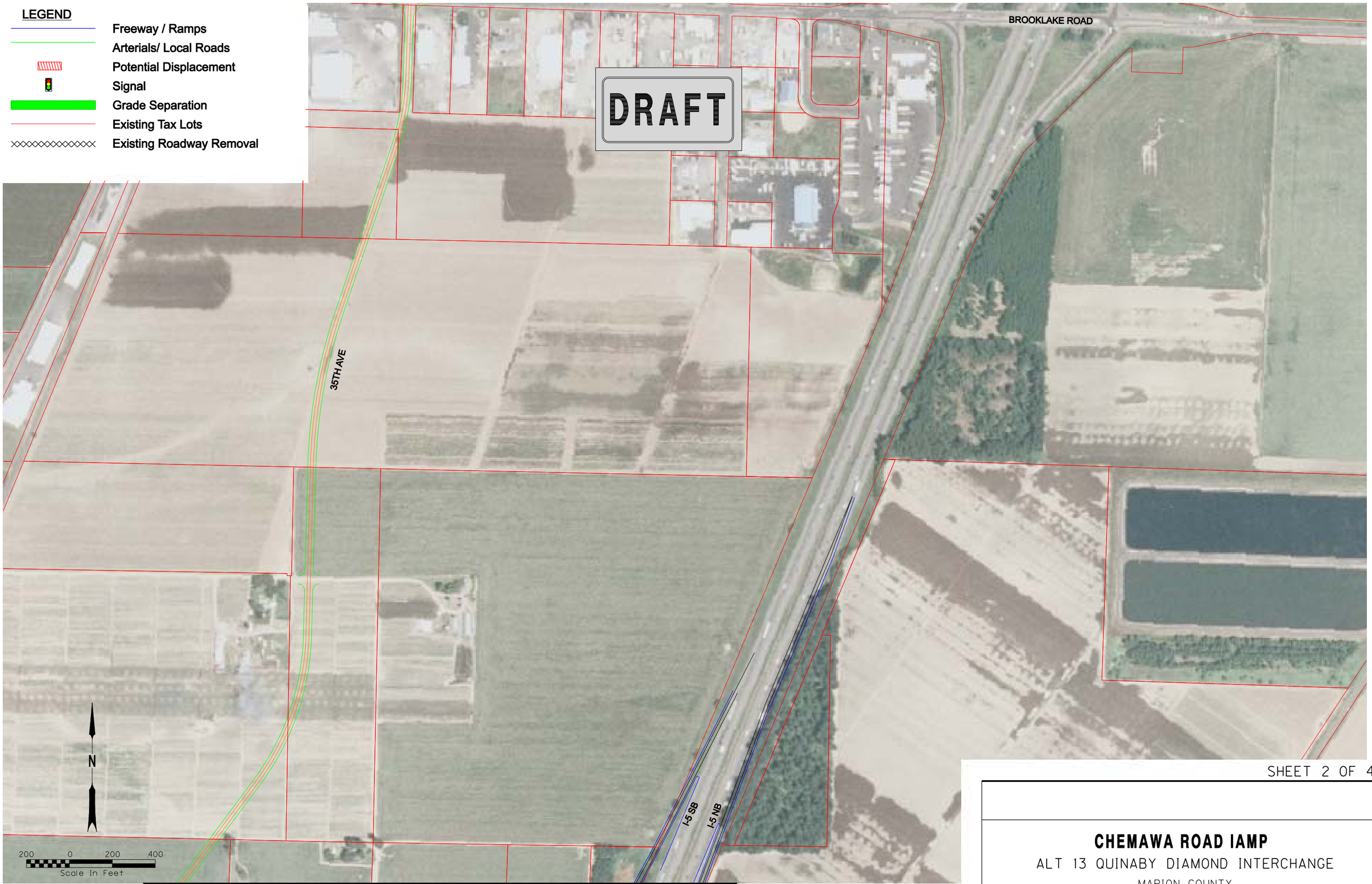
SHEET 1 OF 4

**CHEMAWA ROAD IAMP**

ALT 13 -QUINABY DIAMOND INTERCHANGE

MARION COUNTY

02/13/09



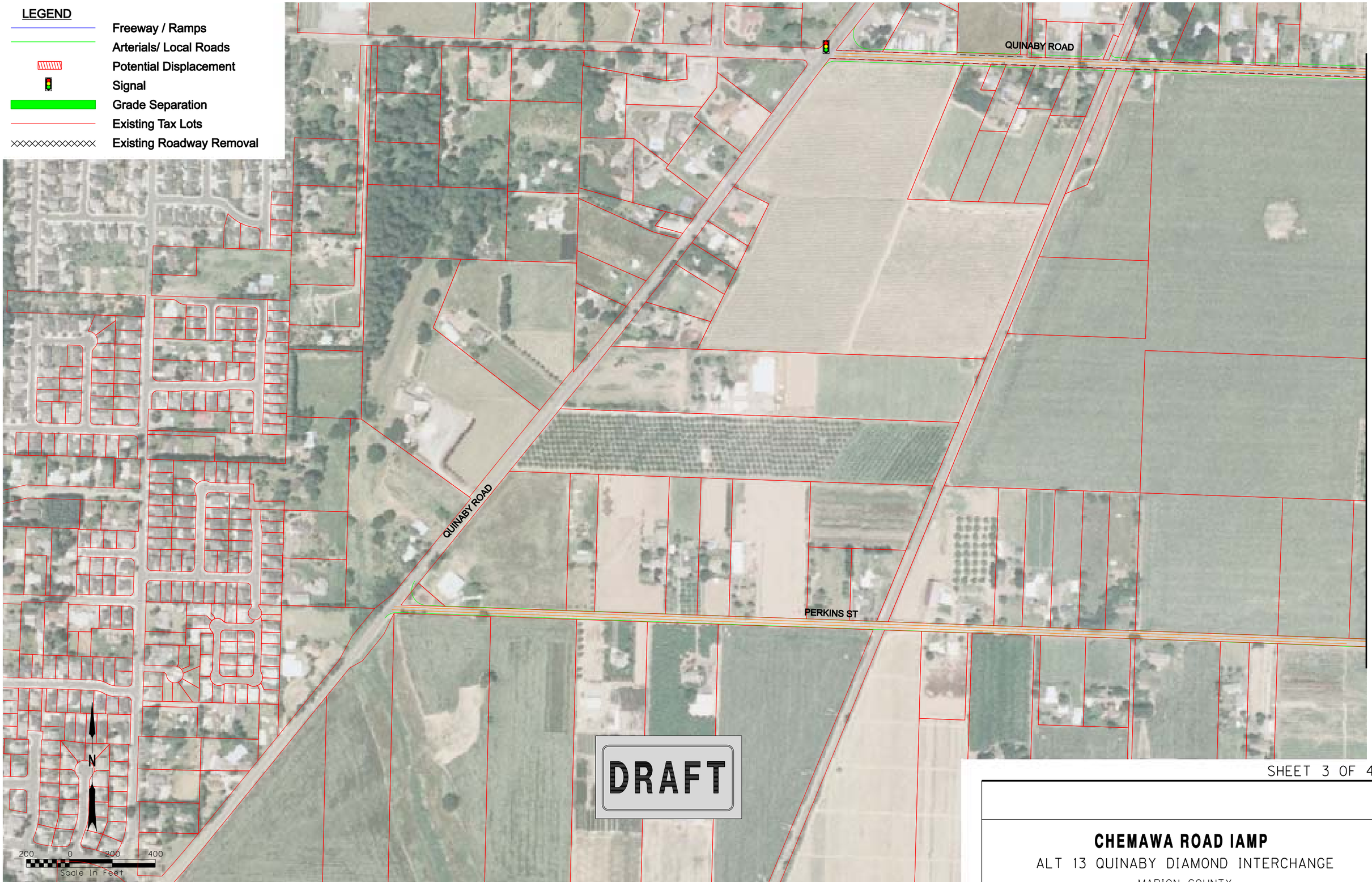

SHEET 2 OF 4

**CHEMAWA ROAD IAMP**

ALT 13 QUINABY DIAMOND INTERCHANGE

MARION COUNTY

02/13/09




SHEET 3 OF 4

**CHEMAWA ROAD IAMP**

ALT 13 QUINABY DIAMOND INTERCHANGE

MARION COUNTY

02/13/09

SHEET 4 OF 4

**CHEMAWA ROAD IAMP**

ALT 13 QUINABY DIAMOND INTERCHANGE

MARION COUNTY

02/13/09

# CHEMAWA ROAD IAMP

ALT 14 VERDA/HYACINTH CORRIDOR IMPROVEMENTS

MARION COUNTY

02/13/09

APPENDIX F

# Future Baseline and Build Analysis for Alternatives 1, 6, 12, 13, and 14

# Chemawa Road Interchange Area Management Plan

## Future Alternatives Analysis

**February 18, 2009**

**Oregon Department of Transportation**

**Salem, OR**

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# Discussion Topics

- Schedule & Overview
- Review of Existing and Future Baseline
- Alternative Analysis Procedures and Assumptions
- Alternatives Analysis Results (5 Alternatives)

# Introduction & IAMP Process

**Existing Conditions**
-Data Collection
-Policy Review
-Traffic Analysis
-Affected Environment

**2031 Future "Baseline"**
-Future Traffic Analysis

Today's Topic

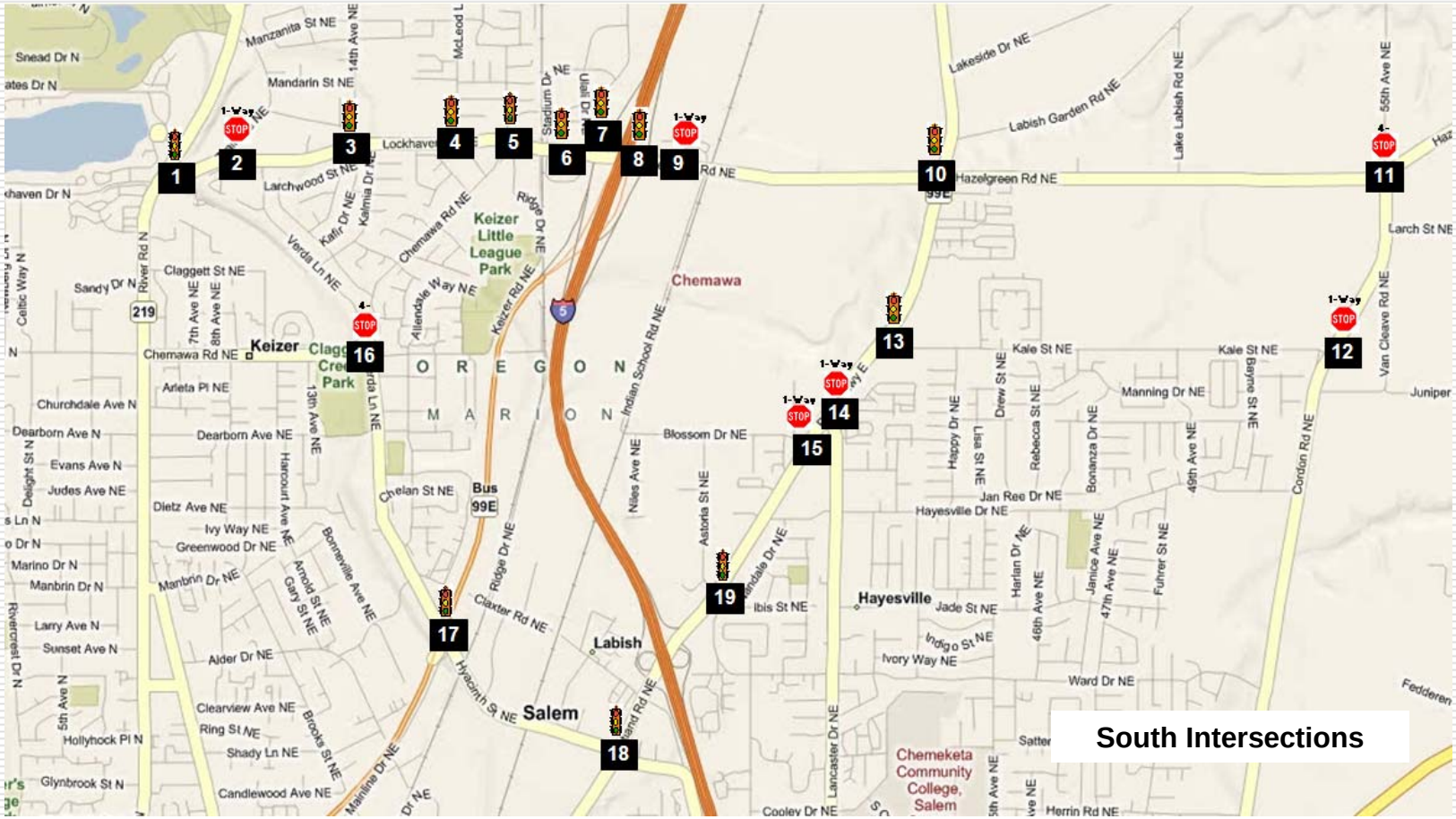
**Alternatives Analysis**
[Adopted Land Use]
-Alternative Screening
-Traffic Analysis

**Alternatives Analysis**
[UGB Expansion]
-Alternative Screening
-Traffic Analysis

**Draft & Final IAMP**
-Recommendations
-Adoption of IAMP

Current Work

# Chemawa IAMP Study Area: Intersections




South Intersections

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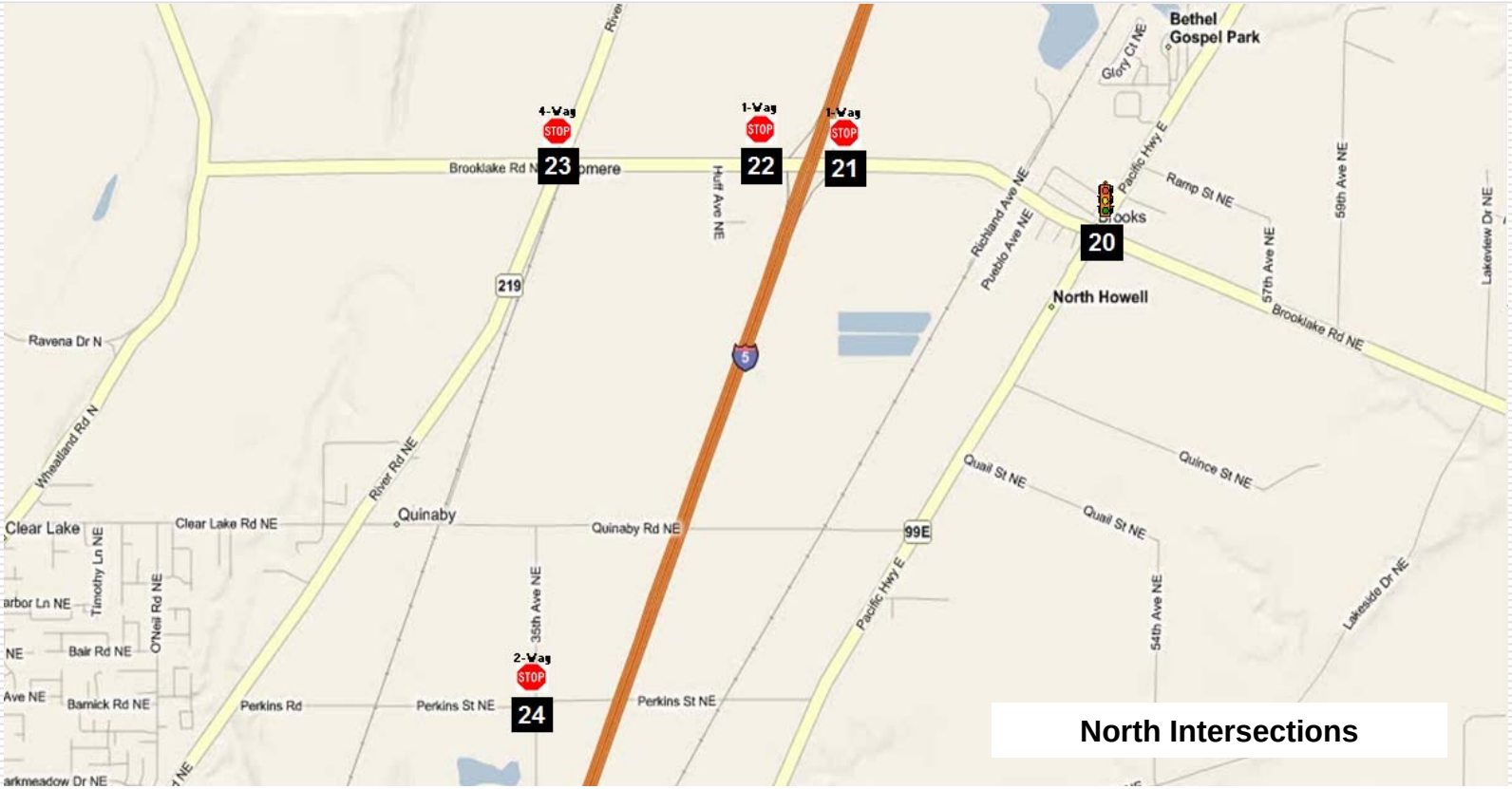
# Chemawa IAMP Study Area: Intersections

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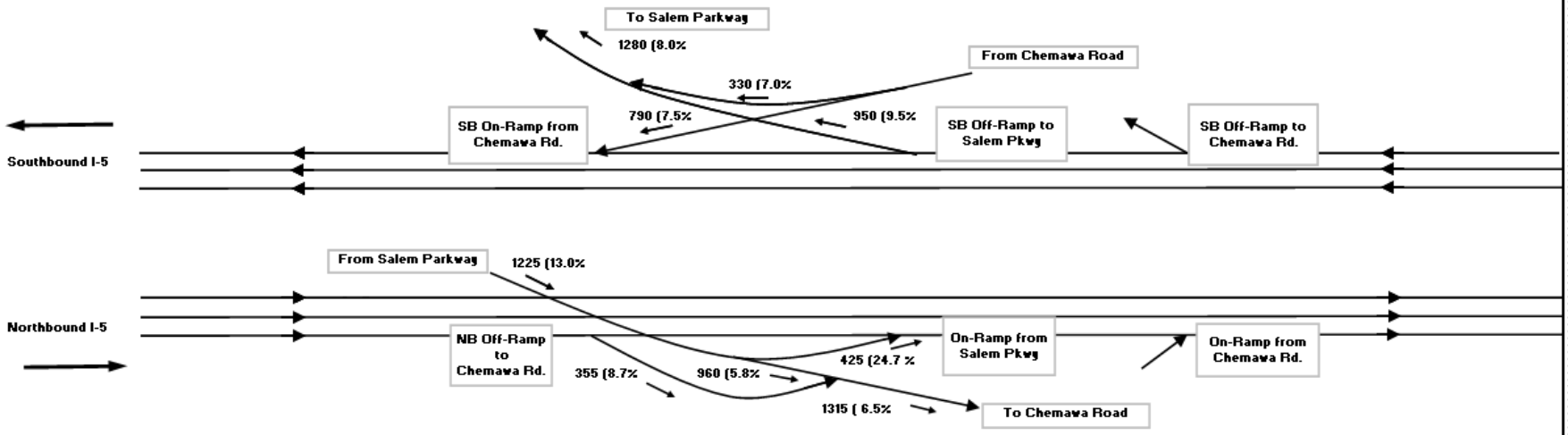
# Summary of Existing and Future Baseline

- Existing Conditions (2008)
  - 13 of 24 intersection meeting standards
  - 14 of 14 freeway segments meeting standards
- Future Baseline (2031)
  - 7 of 24 intersection meeting standards
  - 3 of 14 freeway segments meeting standards

# Traffic Operational Analysis: Freeways

| Scenario | Output Summary | BASIC SEGMENT | MERGE | BASIC SEGMENT | DIVERGE | BASIC SEGMENT | DIVERGE | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|
| | | S7: I-5 Mainline | S6: Chemawa On | S5: SB I-5 Mainline | S4: Salem Pkwy Off | S3: SB I-5 Mainline | S2: Chemawa Off | S1: SB I-5 Mainline |
| | | | Length = 875' | | Length = 280' | | Length = 275' | |
| Existing | | 0.60 | 0.65/0.61 | 0.48 | 0.54/0.47 | 0.63 | 0.30/0.63 | 0.72 |
| Future Baseline | | 0.88 | 0.96/0.89 | 0.68 | 0.77/0.66 | 0.89 | 0.33/0.89 | 0.99 |




| Scenario | Output Summary | BASIC SEGMENT | DIVERGE | BASIC SEGMENT | MERGE | BASIC SEGMENT | MERGE | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N2: Chemawa Off | N3: NB I-5 Mainline | N4: Salem Pkwy On | N5: NB I-5 Mainline | N6: Chemawa On | N7: NB I-5 Mainline |
| | | | Length = 175' | | Length = 420' | | Length = 750' | |
| Future Baseline | | 0.80 | 0.40/0.68 | 0.70 | 0.84/0.84 | 0.83 | 0.79/0.85 | 0.84 |
| Existing | | 0.60 | 0.20/0.53 | 0.54 | 0.60/0.61 | 0.60 | 0.61/0.64 | 0.64 |

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# Future Alternatives Analysis: Assumptions

- Alternatives Analyzed
  - Alternative 1: Chemawa/Lockhaven Corridor Widening
  - Alternative 6: Chemawa/Radiant Half Diamond Interchange
  - Altenrative 12: Brooks Interchange SPUI
  - Alternative 13: Quinaby Interchange
  - Alternative 14: Verda/Hyacinth Corridor Improvements
- SKATS Model
  - Alternatives built from 2031 Action Scenario
  - Land Used from Adopted Comprehensive Plans
- Volumes
  - Post-Processed Based on NCHRP 255
- Planned Improvements Included in Future Analysis

# Adopted Alternative 1:

# Chemawa/Lockhaven Corridor Widening

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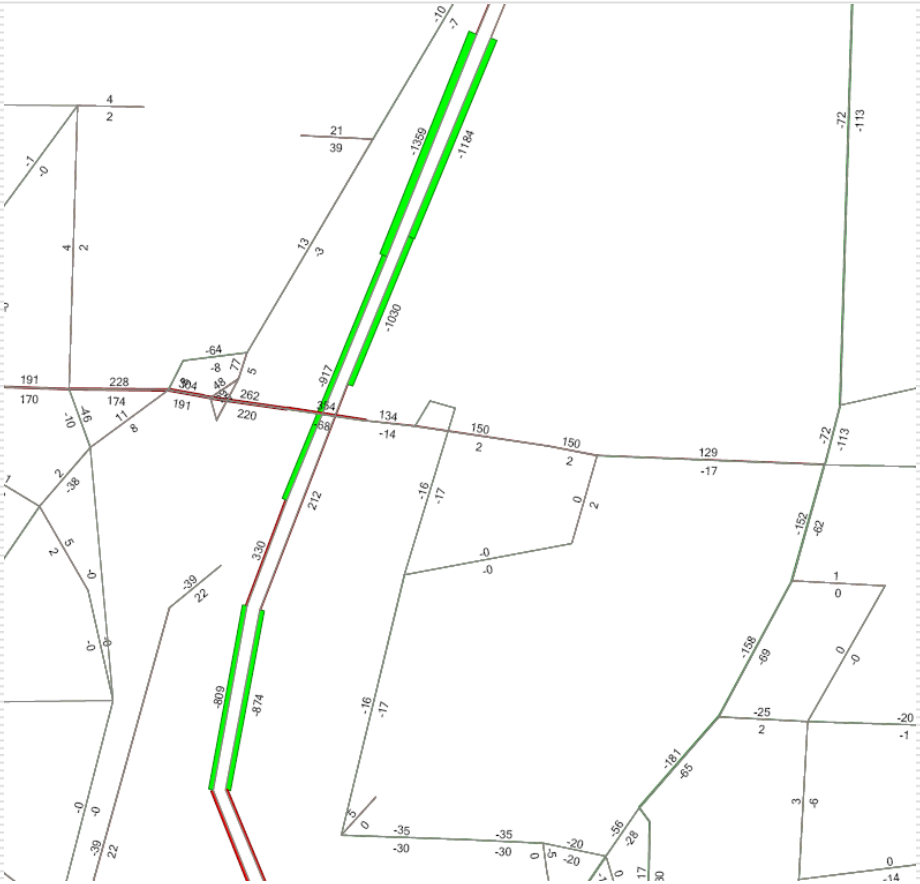
# SKATS Raw Model - Travel Pattern Shifts – Alt. 1



- CD Roads at Chemawa divert traffic from OR 99E
- Adding Capacity at Chemawa draws more traffic to the Chemawa/Lockhaven Corridor

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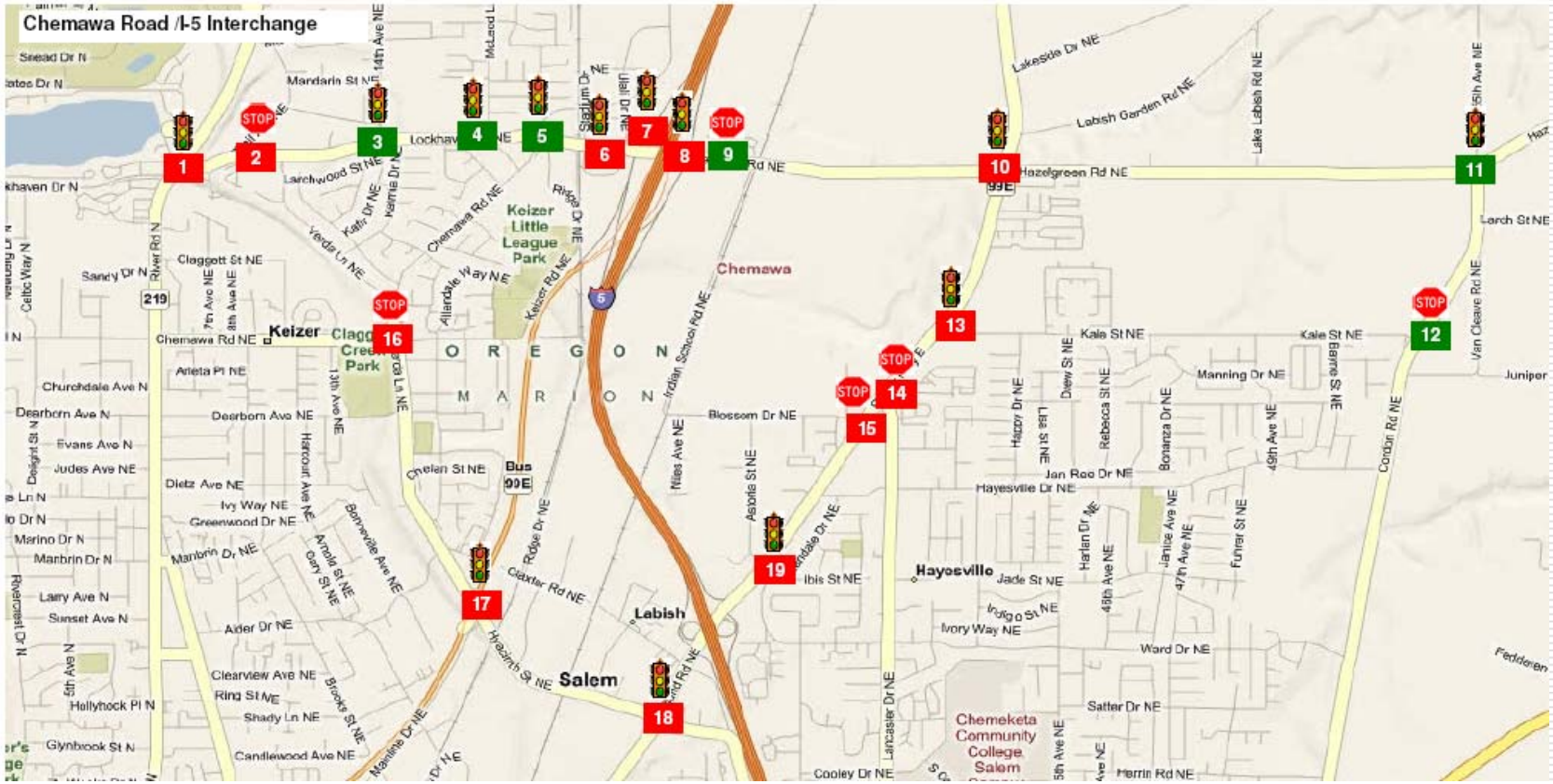
# Traffic Operational Analysis: Intersections – Alt. 1

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# Traffic Operational Analysis: Intersections – Alt. 1

8 of 24 intersections ‘Acceptable’

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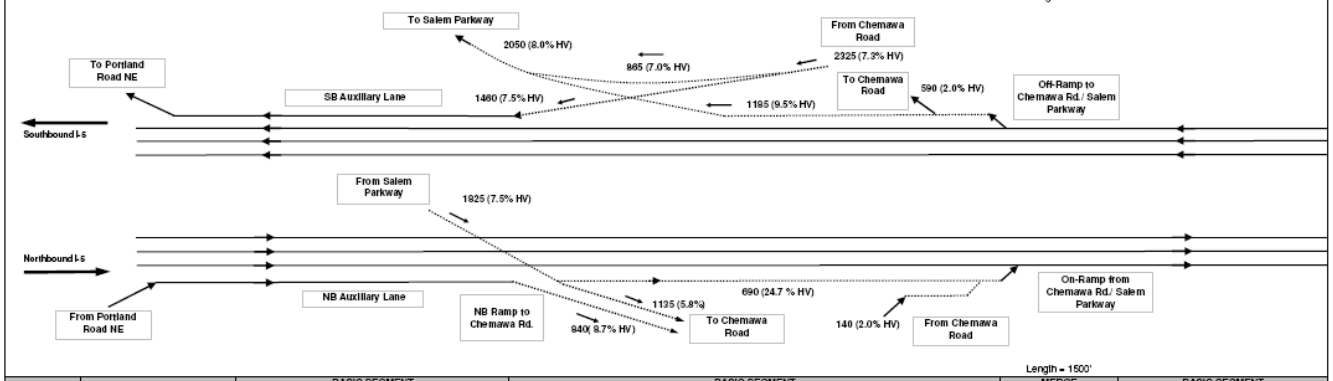
# Traffic Operational Analysis: Freeways – Alt. 1

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 6010 | 4550 | 1775 | | 6325 |
| | Flow Rate^ | 1669 | 1693 | 2035 | 5030 | 2345 |
| | V/C | 0.71 | 0.72 | 0.97 | 0.71 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 5490 | 4590 | 830 | | 5420 |
| | Flow Rate^ | 1479 | 1659 | 4125 | 6015 | 2007 |
| | V/C | 0.63 | 0.71 | 0.90 | 0.85 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

4 of 8 Freeway Segments at Chemawa 'Acceptable'

C-D System Eliminates Many Failing Segments

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# Adopted Alternative 6:

# Chemawa/Radiant Half Dimaond

# Interchange

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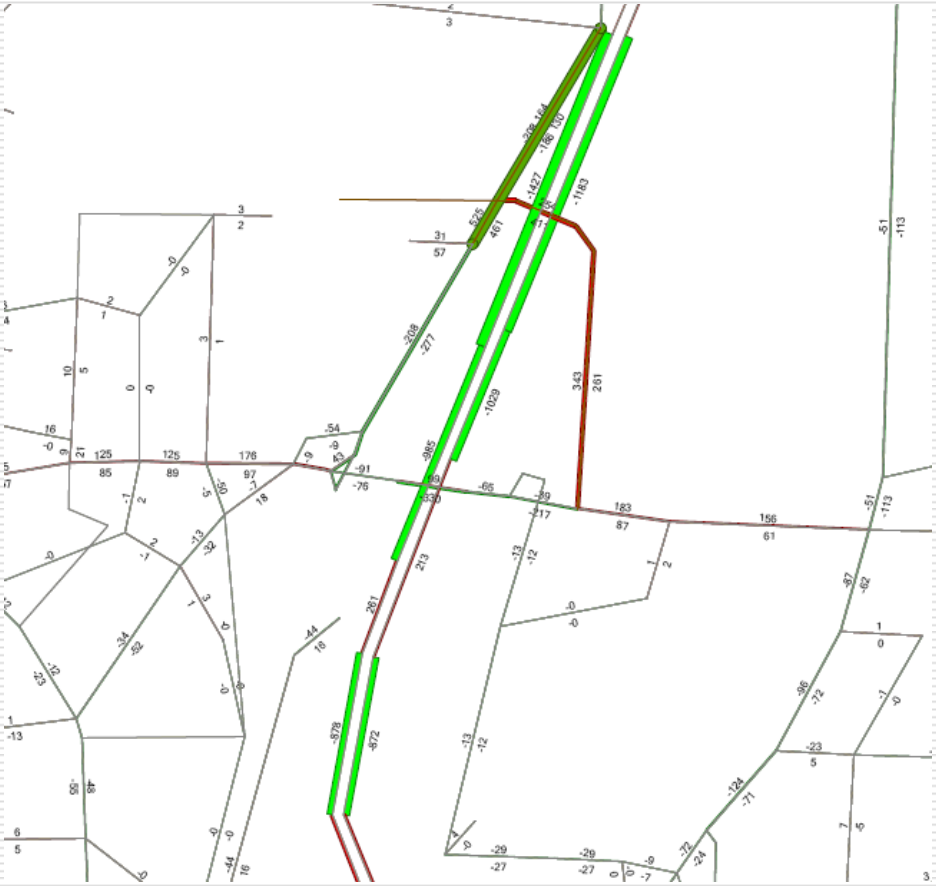
# SKATS Raw Model - Travel Pattern Shifts – Alt. 6



- CD Roads at Chemawa divert traffic from OR 99E
- Overpass at Radiant diverts traffic from Chemawa
- Less Traffic on Keizer Station Blvd. as Result
- 2 new intersections added
- Small increase on Chemawa due to better connections at freeway

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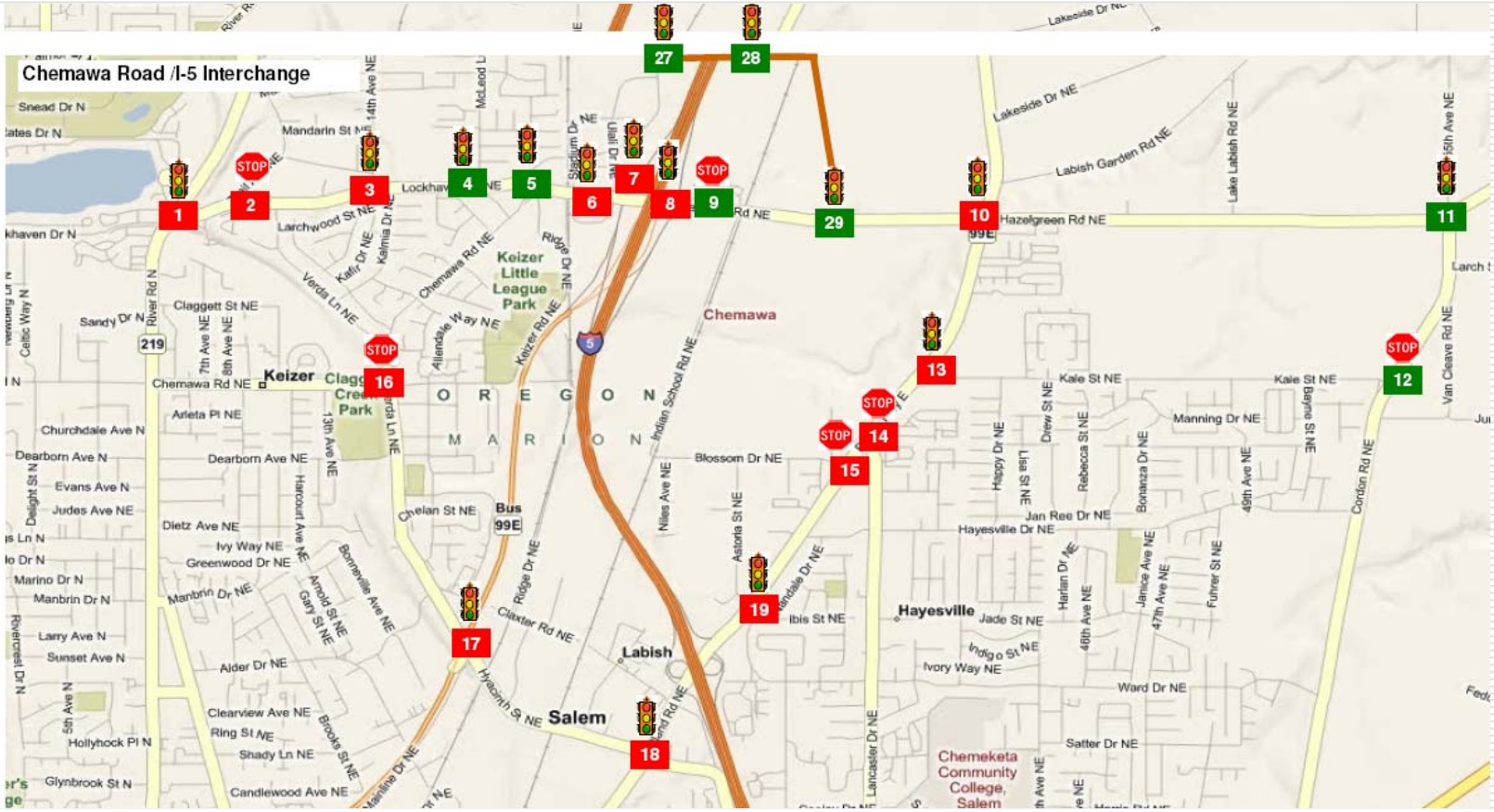
# Traffic Operational Analysis: Intersections – Alt. 6

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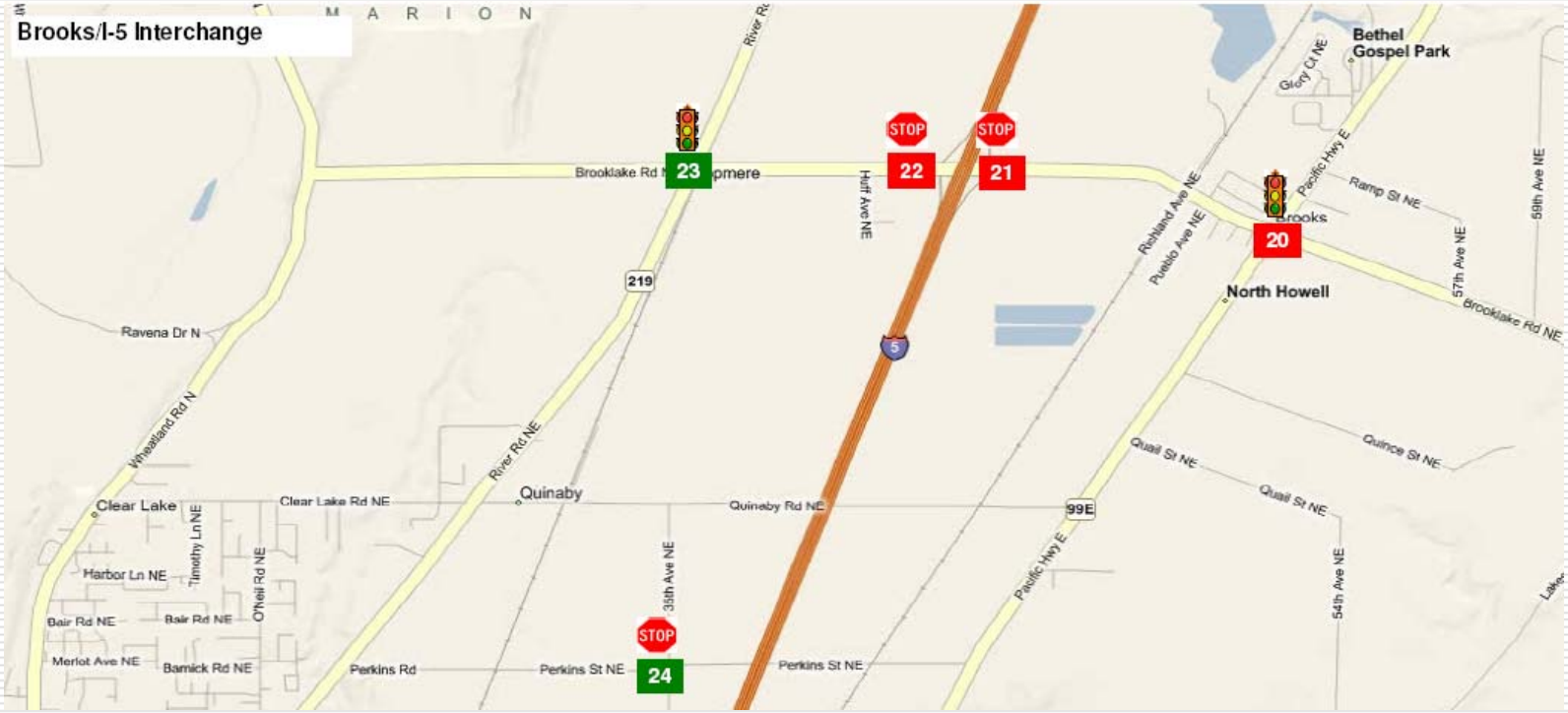
# Traffic Operational Analysis: Intersections – Alt. 6




10 of 27 intersections ‘Acceptable’

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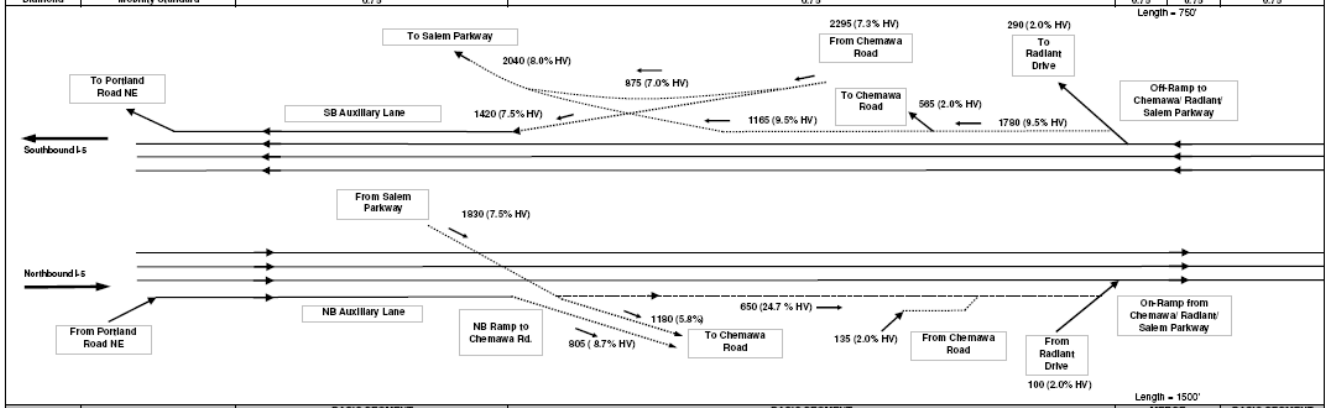
# Traffic Operational Analysis: Freeways – Alt. 6

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Split Diamond | Volume | 5750 | 4330 | 2020 | | 6350 |
| | Flow Rate^ | 1600 | 1615 | 2325 | 6915 | 2351 |
| | V/C | 0.68 | 0.69 | 1.11 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Split Diamond | Volume | 5400 | 4595 | 885 | | 5480 |
| | Flow Rate^ | 1475 | 1665 | 4190 | 6095 | 2010 |
| | V/C | 0.63 | 0.71 | 0.91 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

4 of 8 Freeway Segments at Chemawa 'Acceptable'

C-D System Eliminates Many Failing Segments

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# Adopted Alternative 12:

# Brooks Interchange SPUI

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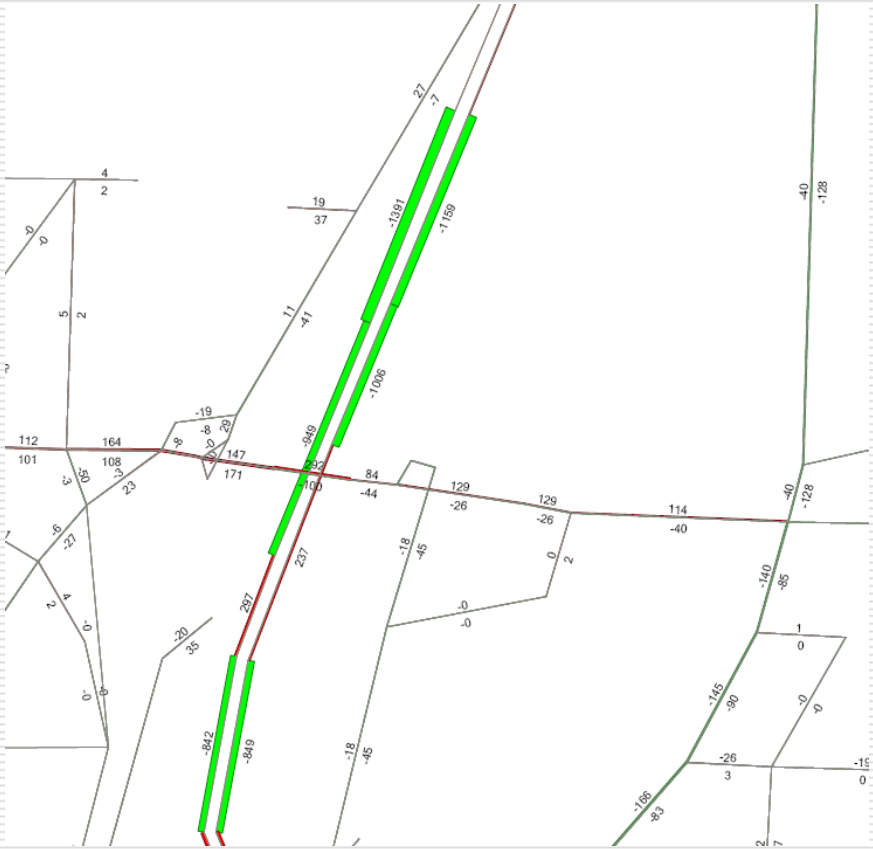
# SKATS Raw Model - Travel Pattern Shifts – Alt. 12



- CD Roads at Chemawa divert traffic from OR 99E
- 2 Ramp Terminals at Brooks replaced with SPUI
- Traffic Diverted from OR 99E and redirected to Brooks SPUI
- Small increase on Chemawa due to better connections at freeway

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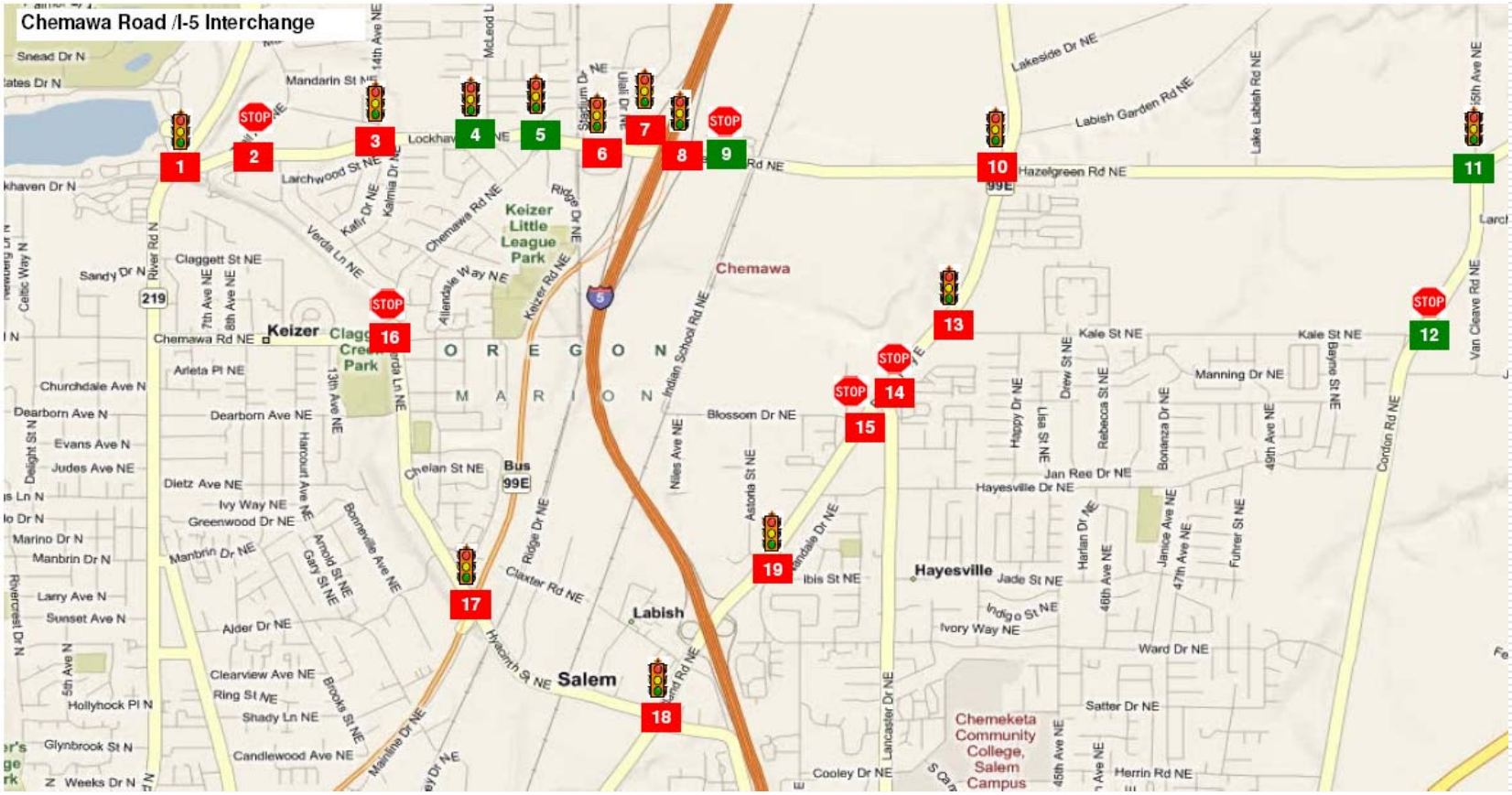
# Traffic Operational Analysis: Intersections – Alt. 12

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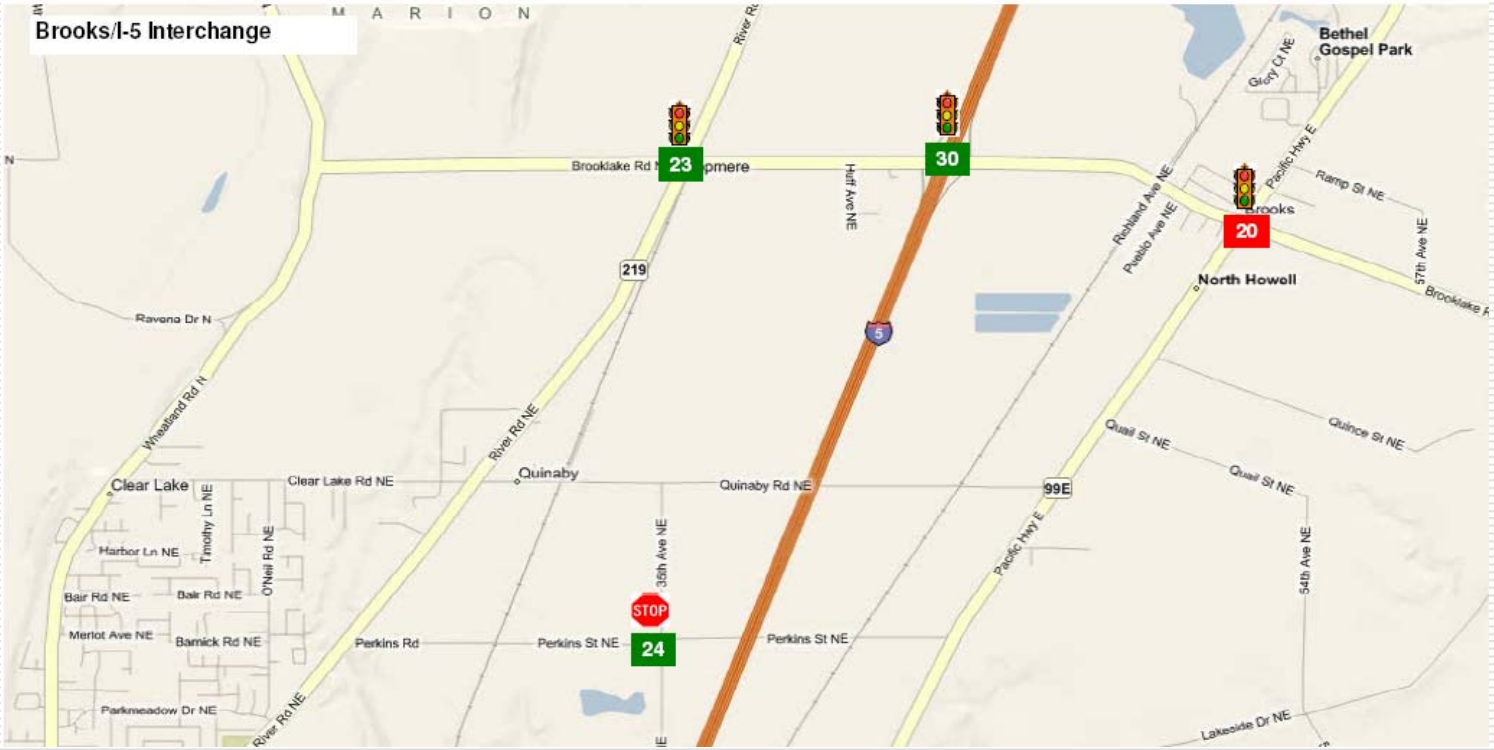
# Traffic Operational Analysis: Intersections – Alt. 12




8 of 23 intersections ‘Acceptable’

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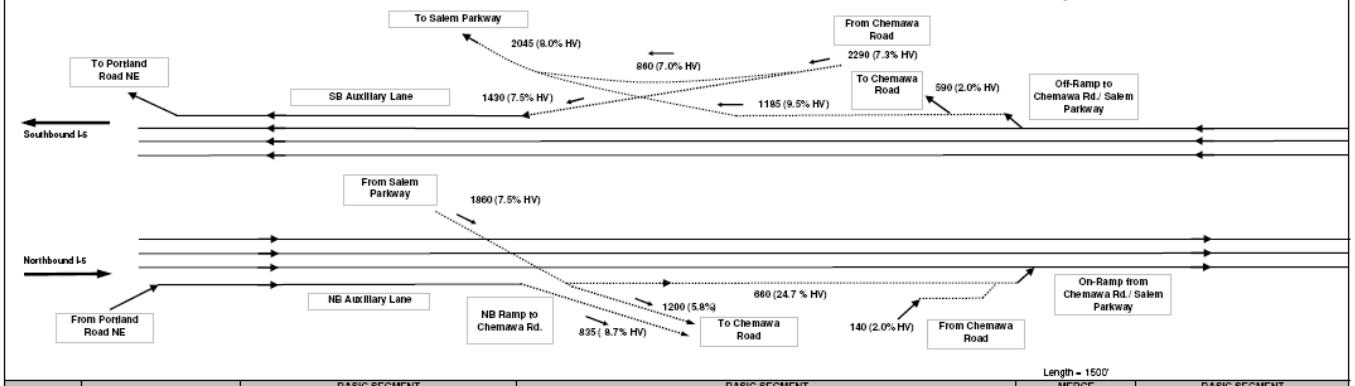
# Traffic Operational Analysis: Freeways – Alt. 12

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 5930 | 4500 | 1775 | | 6275 |
| | Flow Rate^ | 1650 | 1675 | 2045 | 4790 | 2925 |
| | V/C | 0.70 | 0.71 | 0.97 | 0.68 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 5490 | 4655 | 800 | | 5455 |
| | Flow Rate^ | 1495 | 1685 | 4130 | 6050 | 2020 |
| | V/C | 0.64 | 0.72 | 0.90 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

4 of 8 Freeway Segments at Chemawa 'Acceptable'

C-D System Eliminates Many Failing Segments

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# Adopted Alternative 13:

# Quinaby Diamond Interchange

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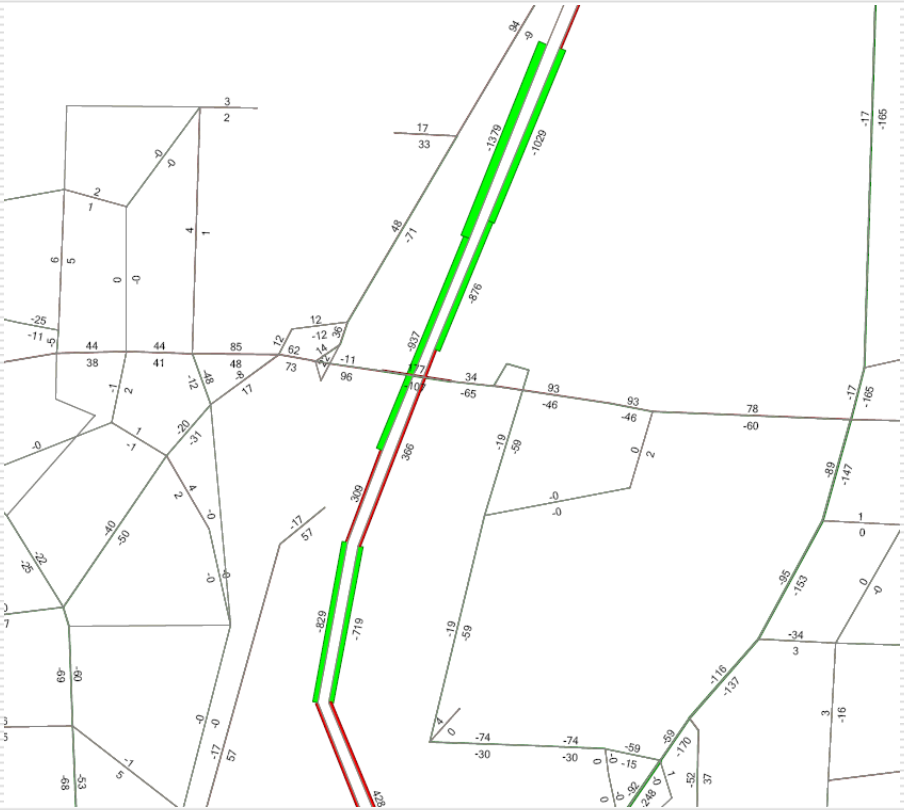
# SKATS Raw Model - Travel Pattern Shifts – Alt. 13



- CD Roads at Chemawa divert traffic from OR 99E
- Small increase on Chemawa due to better connections at freeway

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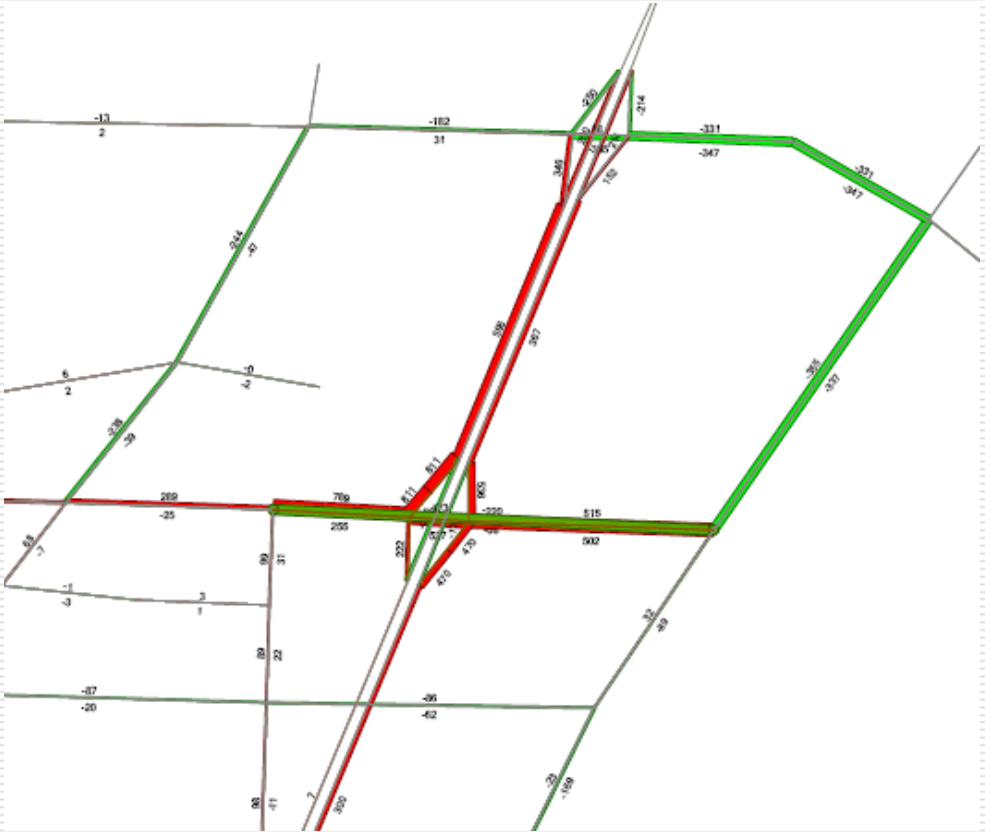
# SKATS Raw Model - Travel Pattern Shifts – Alt. 13



- New Interchange at Quinaby diverts traffic from OR 99E and River Road North of Quinaby
- Higher Traffic on Quinaby Road

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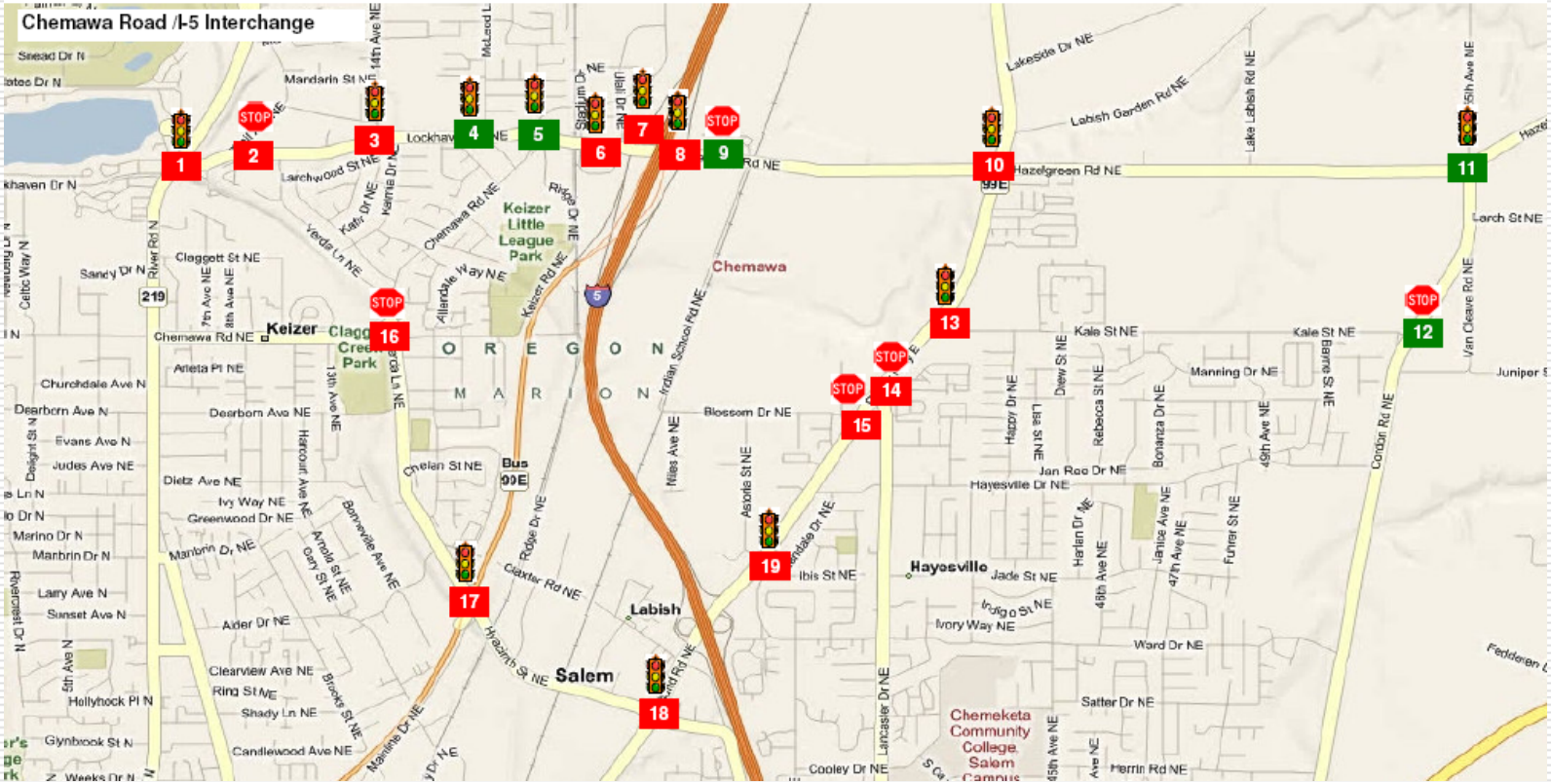
# Traffic Operational Analysis: Intersections – Alt. 13

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# Traffic Operational Analysis: Intersections – Alt. 13

9 of 26 intersections ‘Acceptable’

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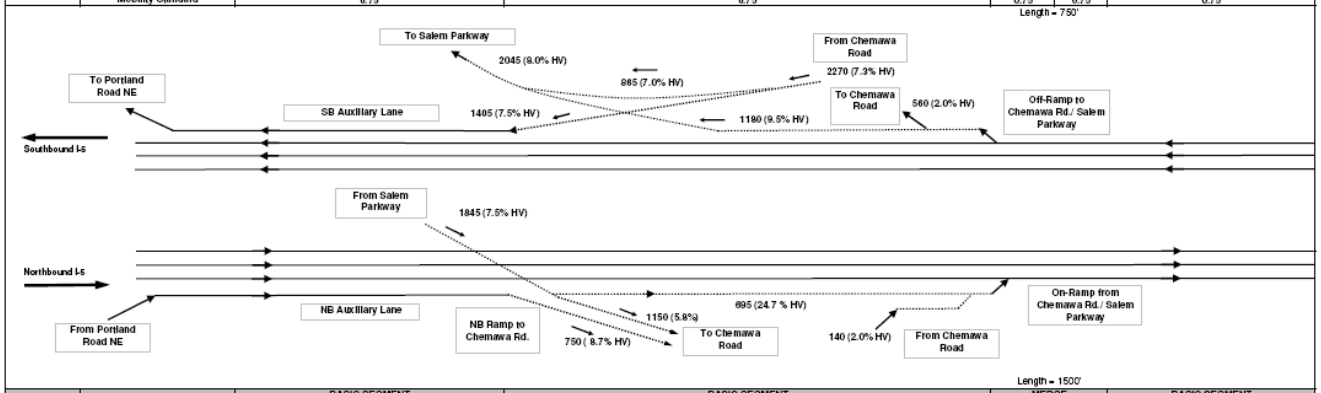
# Traffic Operational Analysis: Freeways – Alt. 13

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Culnaby Interchange | Volume | 5165 | 3760 | 1740 | | 5500 |
| | Flow Rate^ | 1435 | 1400 | 2005 | 4070 | 2040 |
| | V/C | 0.61 | 0.60 | 0.95 | 0.58 | 0.87 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Culnaby Interchange | Volume | 5515 | 4765 | 835 | | 5600 |
| | Flow Rate^ | 1505 | 1725 | 4250 | 6220 | 2075 |
| | V/C | 0.64 | 0.73 | 0.92 | 0.88 | 0.88 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

4 of 8 Freeway Segments at Chemawa 'Acceptable'

C-D System Eliminates Many Failing Segments

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# Adopted Alternative 14:

# Hyacinth/Verda Improvements

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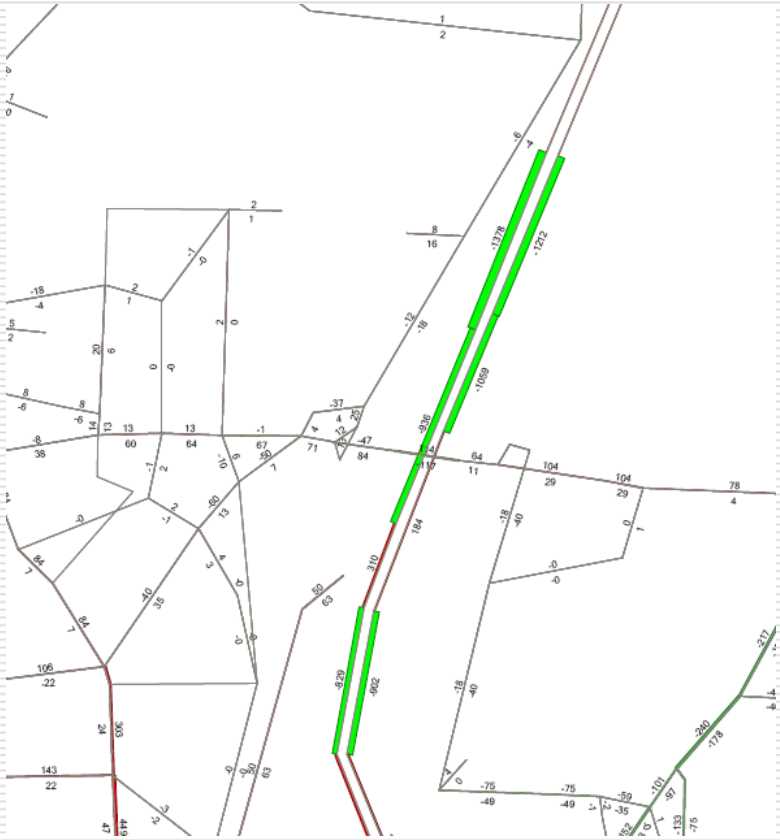
# SKATS Raw Model - Travel Pattern Shifts – Alt. 14



- CD Roads at Chemawa divert traffic from OR 99E
- Small increase on Chemawa due to better connections at freeway
- New grade separation at Hyacinth/Salem Pkwy diverts traffic from South to Hyacinth

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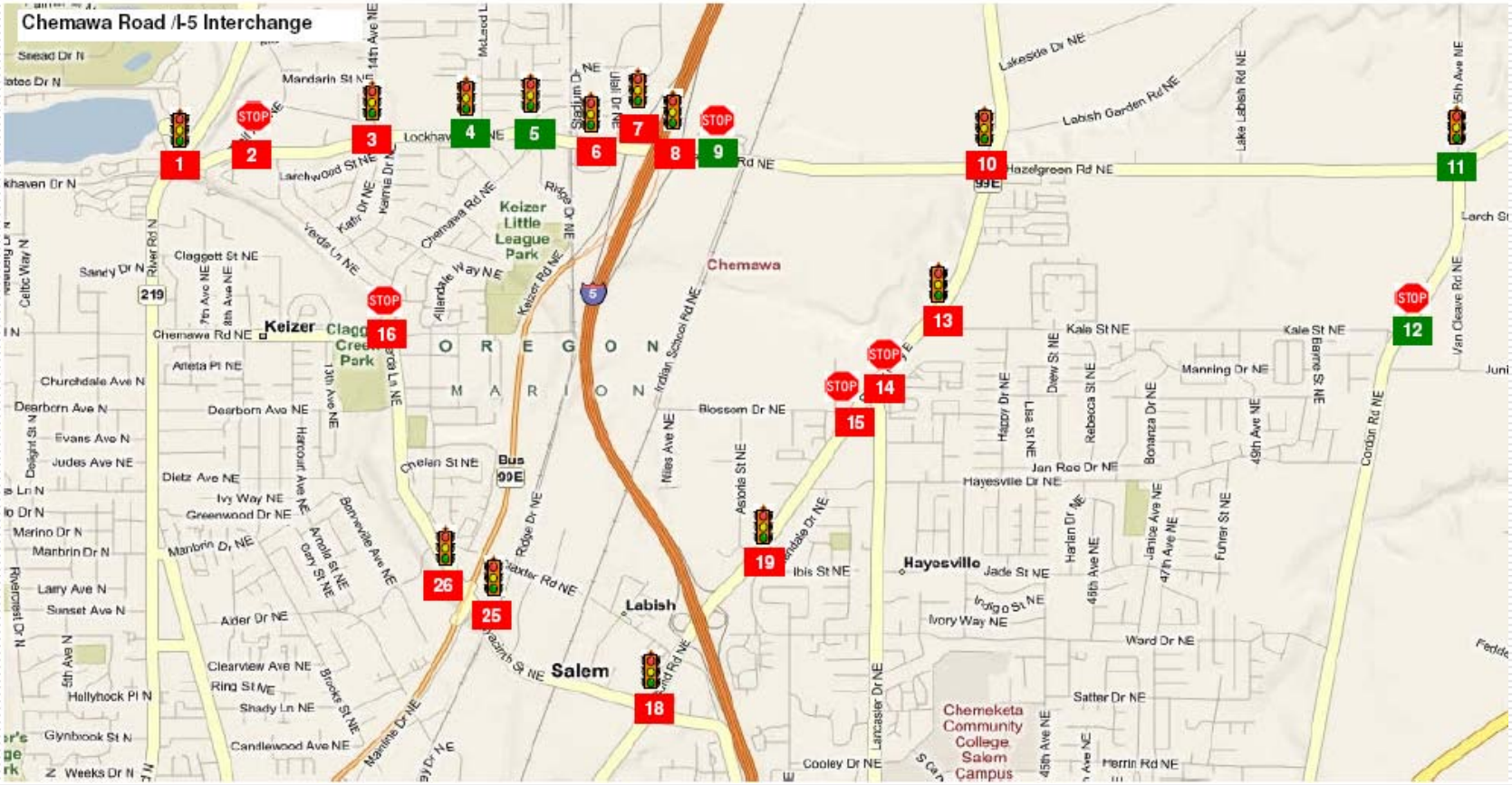
# Traffic Operational Analysis: Intersections – Alt. 14

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# Traffic Operational Analysis: Intersections – Alt. 14

7 of 25 intersections ‘Acceptable’

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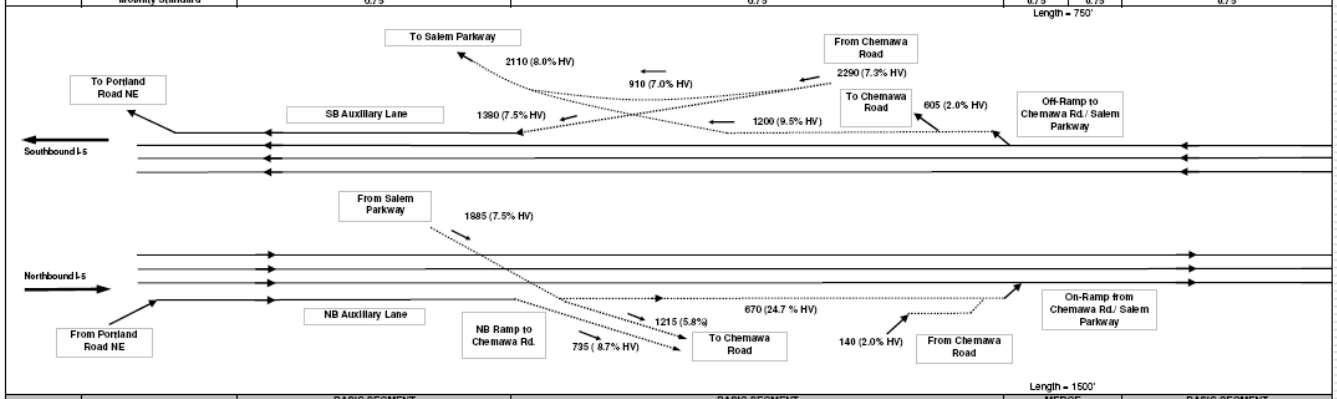
# Traffic Operational Analysis: Freeways – Alt. 14

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/ Verda | Volume | 5940 | 4560 | 1805 | | 6365 |
| | Flow Rate^ | 1650 | 1696 | 2076 | 4855 | 2357 |
| | V/C | 0.70 | 0.72 | 0.99 | 0.69 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N5: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.9% | 20.7% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/ Verda | Volume | 5370 | 4635 | 810 | | 5445 |
| | Flow Rate^ | 1463 | 1675 | 4130 | 6040 | 1987 |
| | V/C | 0.62 | 0.71 | 0.90 | 0.86 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

4 of 8 Freeway Segments at Chemawa 'Acceptable'

C-D System Eliminates Many Failing Segments

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# Alternatives Comparison

# Mobility Standards Comparison

| Scenario | Intersections | | | Freeways | | |
|---|---|---|---|---|---|---|
| | Total | Pass | % | Total | Pass | % |
| Existing | 24 | 13 | 54% | 14 | 14 | 100% |
| 2031 Baseline | 24 | 7 | 29% | 14 | 3 | 21% |
| 2031 Alternative 1 | 24 | 8 | 33% | 8 | 4 | 50% |
| 2031 Alternative 6 | 27 | 10 | 37% | 8 | 4 | 50% |
| 2031 Alternative 12 | 23 | 8 | 35% | 8 | 4 | 50% |
| 2031 Alternative 13 | 26 | 9 | 35% | 8 | 4 | 50% |
| 2031 Alternative 14 | 25 | 7 | 28% | 8 | 4 | 50% |

# Difference Table Comparison

| # | Description | [Alt1]- [Base] | | [Alt6]- [Base] | | [Alt12]- [Base] | | [Alt13]- [Base] | | [Alt14]- [Base] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C |
| 1 | Lockhaven Drive at River Road | -12.2 | 0.02 | 13.7 | 0.05 | 19.7 | 0.07 | -9.2 | -0.01 | 10.4 | 0.05 |
| 2 | Trail Avenue at Lockhaven Drive | -188.4 | -0.33 | 204.5 | -0.33 | 354.3 | -1.36 | 44.2 | -1.58 | 346.2 | -1.40 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | -116.2 | -0.40 | 24.1 | 0.12 | 18.9 | 0.13 | -7.0 | 0.04 | 21.8 | 0.06 |
| 4 | Lockhaven Drive at McLeod Lane | -8.5 | -0.14 | 5.6 | 0.08 | 2.5 | 0.06 | 1.4 | -0.02 | -1.7 | 0.03 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blv | -21.1 | -0.21 | -8.1 | -0.10 | -3.4 | -0.11 | -42.1 | -0.16 | -8.9 | -0.15 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | -35.3 | -0.19 | 0.8 | -0.02 | 6.2 | 0.05 | 14.0 | 0.05 | 27.4 | 0.05 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | -10.4 | -0.06 | 7.5 | -0.04 | 15.5 | 0.04 | 1.4 | -0.04 | 10.1 | -0.01 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | 4.4 | -0.02 | 10.8 | 0.01 | 22.3 | 0.07 | 1.7 | 0.00 | 8.4 | 0.02 |
| 9 | Chemawa Road at Indian School Road | -9.5 | -0.33 | -12.4 | -0.30 | 21.4 | -0.13 | 1.3 | -0.14 | 1.9 | -0.14 |
| 10 | Chemawa Road at Pacific Highway 99E | 2.5 | 0.04 | 4.7 | 0.04 | 7.2 | 0.04 | 8.9 | 0.02 | -2.7 | 0.02 |
| 11 | Hazelgreen Road at Cordon Road | 2.4 | -0.05 | 33.6 | 0.18 | 0.0 | -0.02 | 0.4 | 0.01 | -0.3 | -0.05 |
| 12 | Cordon Road at Kale Street | -1.3 | -0.03 | 0.4 | -0.01 | -0.5 | -0.02 | -0.3 | -0.02 | -0.9 | -0.02 |
| 13 | Portland Road at Kale Street | -6.4 | -0.04 | -5.1 | -0.03 | -6.6 | -0.07 | -7.4 | -0.08 | -10.9 | -0.11 |
| 14 | Portland Road at Lancaster Drive | 0.0 | -0.26 | 0.0 | -0.16 | 0.0 | -0.22 | 0.0 | -0.30 | 0.0 | -0.28 |
| 15 | Portland Road at Blossom Drive | 0.0 | 0.02 | -467.7 | -3.73 | -606.9 | -3.73 | -627.4 | -3.77 | -590.7 | -3.74 |
| 16 | Chemawa Road at Verda Lane | -49.9 | -0.14 | -42.5 | -0.18 | -32.9 | -0.13 | -52.7 | -0.19 | 104.7 | 0.48 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | -12.0 | 0.01 | -18.7 | -0.01 | -16.4 | -0.01 | -18.1 | -0.02 | n/a | n/a |
| 18 | Portland Road at Hyacinth Street | 17.6 | 0.08 | 21.4 | 0.09 | 15.8 | 0.06 | 15.4 | 0.06 | 41.3 | 0.17 |
| 19 | Portland Road- Pacific Highway 99E at Astoria St. | -5.0 | 0.01 | -1.1 | 0.01 | 3.3 | 0.02 | -18.6 | -0.12 | -10.5 | -0.03 |
| 20 | Brooklake Road at Pacific Highway 99E | -14.6 | -0.05 | -21.0 | -0.07 | -13.2 | -0.04 | -123.9 | -0.37 | -15.6 | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | 0.0 | -4.28 | 0.0 | -4.32 | n/a | n/a | 0.0 | -4.51 | 0.0 | -4.28 |
| 22 | Brooklake Road at I-5 SB Ramps | 0.0 | -4.11 | 0.0 | -4.17 | n/a | n/a | 0.0 | -4.25 | 0.0 | -4.10 |
| 23 | Brooklake Road at River Road | -14.9 | 0.11 | 4.4 | 0.00 | -2.9 | 0.08 | -15.2 | 0.00 | -7.4 | 0.23 |
| 24 | Perkins Road at 35th Avenue NE | -11.6 | -0.63 | -20.0 | -0.57 | -6.0 | -0.57 | -11.2 | -0.61 | -11.0 | -0.13 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 23.0 | 0.83 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 28.0 | 0.88 |
| 27 | Radiant/SB Ramps | 0.0 | 0.00 | 25.5 | 0.46 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 28 | Radiant/NB Ramps | 0.0 | 0.00 | 4.5 | 0.31 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 29 | Radiant/Chemawa | 0.0 | 0.00 | 16.5 | 0.83 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 30 | Brooks SPUI | 0.0 | 0.00 | 0.0 | 0.00 | 61.4 | 0.72 | 0.0 | 0.00 | 0.0 | 0.00 |
| 31 | Quinaby/NB Ramps | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 27.0 | 0.65 | 0.0 | 0.00 |
| 32 | Quinaby/SB Ramps | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 24.9 | 0.60 | 0.0 | 0.00 |

CH2MHILL

## Conclusion and Summary

- Alternative 1 (Chemawa/Lockhaven Widening) shows the most benefits under Adopted Land Use
- Alternative 14 (Verda/Hyacinth Improvements) shows the least benefits under Adopted Land Use
- Collector-Distributor System improves Freeway operations over Baseline Conditions
- Freeway Improvements to the north of Chemawa are Still necessary to alleviate all failing segments

**Chemawa IAMP Intersection Operations - DRAFT**

| | | | Existing Conditions | | | | 2031 Baseline | | | | 2031 - Adopted Alt.1 | | | | 2031 - Adopted Alt.6 | | | | 2031 - Adopted Alt.12 | | | | 2031 - Adopted Alt.13 | | | | 2031 Adopted Alt. 14 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Description | Jurisdiction | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C | Standard | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | LOS E | 77.3 | E | 0.99 | LOS E | 155.4 | F | 1.31 | LOS D | 143.2 | F | 1.33 | LOS D | 169.1 | F | 1.36 | LOS D | 175.1 | F | 1.38 | LOS D | 146.2 | F | 1.3 | LOS D | 165.8 | F | 1.36 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | LOS E | 68.7 | F | 0.61 | LOS E | 645.7 | F | 2.15 | LOS D | 457.3 | F | 1.82 | LOS D | 850.2 | F | 2.57 | LOS D | 1000.0 | F | 3.33 | LOS D | 689.9 | F | 2.22 | LOS D | 991.9 | F | 2.88 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | LOS E | 32.9 | C | 0.94 | LOS E | 139.0 | F | 1.32 | LOS D | 22.8 | C | 0.92 | LOS D | 163.1 | F | 1.44 | LOS D | 157.9 | F | 1.45 | LOS D | 132.0 | F | 1.36 | LOS D | 160.8 | F | 1.38 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | LOS E | 12.4 | B | 0.63 | LOS E | 25.3 | C | 0.86 | LOS D | 16.8 | B | 0.72 | LOS D | 30.9 | C | 0.94 | LOS D | 27.8 | C | 0.92 | LOS D | 26.7 | C | 0.84 | LOS D | 23.6 | C | 0.89 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | LOS E | 26.7 | C | 0.62 | LOS E | 42.5 | D | 0.97 | LOS D | 21.4 | C | 0.76 | LOS D | 34.4 | C | 0.87 | LOS D | 39.1 | D | 0.86 | LOS D | 0.35 | A | 0.81 | LOS D | 33.6 | C | 0.82 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | 0.90 | 12.7 | B | 0.62 | 0.90 | 85.7 | F | 1.19 | 0.85 | 50.4 | D | 1.00 | 0.85 | 86.5 | F | 1.17 | 0.85 | 91.9 | F | 1.24 | 0.85 | 99.7 | F | 1.24 | 0.85 | 113.1 | F | 1.24 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | 0.80 | 34.3 | C | 0.75 | 0.80 | 52.2 | D | 1.13 | 0.75 | 41.8 | D | 1.07 | 0.75 | 59.7 | E | 1.09 | 0.75 | 67.7 | E | 1.17 | 0.75 | 53.6 | D | 1.09 | 0.75 | 62.3 | E | 1.12 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | 0.80 | 46.2 | D | 0.88 | 0.80 | 103.8 | F | 1.16 | 0.75 | 108.2 | F | 1.14 | 0.75 | 114.6 | F | 1.17 | 0.75 | 126.1 | F | 1.23 | 0.75 | 105.5 | F | 1.16 | 0.75 | 112.2 | F | 1.18 |
| 9 | Chemawa Road at Indian School Road | ODOT | 0.90 | 14.0 | B | 0.34 | 0.90 | 26.9 | D | 0.60 | 0.85 | 17.4 | C | 0.42 | 0.85 | 14.5 | B | 0.38 | 0.85 | 48.3 | E | 0.75 | 0.85 | 28.2 | D | 0.55 | 0.85 | 28.8 | D | 0.58 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 0.80 | 52.7 | D | 0.83 | 0.80 | 65.9 | E | 1.05 | 0.75 | 68.4 | E | 1.09 | 0.75 | 70.6 | E | 1.09 | 0.75 | 73.1 | E | 1.09 | 0.75 | 74.8 | E | 1.07 | 0.75 | 63.2 | E | 1.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | LOS E | 45.5 | E | 1.03 | LOS E | 9.3 | A | 0.66 | LOS D | 11.7 | B | 0.61 | LOS D | 42.9 | D | 0.84 | LOS D | 9.3 | A | 0.64 | LOS D | 9.7 | A | 0.67 | LOS D | 9 | A | 0.61 |
| 12 | Cordon Road at Kale Street | Marion County | LOS E | 12.6 | B | 0.22 | LOS E | 23.5 | C | 0.44 | LOS D | 22.2 | C | 0.42 | LOS D | 23.9 | C | 0.43 | LOS D | 23 | C | 0.43 | LOS D | 23.2 | C | 0.43 | LOS D | 22.6 | C | 0.42 |
| 13 | Portland Road at Kale Street | ODOT | 0.80 | 11.7 | B | 0.50 | 0.80 | 31.0 | C | 0.98 | 0.75 | 24.6 | C | 0.94 | 0.75 | 25.9 | C | 0.95 | 0.75 | 24.4 | C | 0.91 | 0.75 | 23.6 | C | 0.90 | 0.75 | 20.1 | C | 0.87 |
| 14 | Portland Road at Lancaster Drive | ODOT | 0.80 | 143.8 | F | 2.66 | 0.80 | 1000.0 | F | 1.88 | 0.75 | 1000.0 | F | 1.73 | 0.75 | 1000.0 | F | 1.72 | 0.75 | 1000.0 | F | 1.68 | 0.75 | 1000.0 | F | 1.70 | 0.75 | 1000.0 | F | 1.60 |
| 15 | Portland Road at Blossom Drive | ODOT | 0.80 | 24.4 | C | 0.45 | 0.80 | 1000.0 | F | 4.13 | 0.75 | 1000.0 | F | 3.64 | 0.75 | 532.3 | F | 2.02 | 0.75 | 393.1 | F | 1.71 | 0.75 | 372.6 | F | 1.67 | 0.75 | 409.3 | F | 1.74 |
| 16 | Chemawa Road at Verda Lane | Keizer | LOS E | 92.2 | F | 1.22 | LOS E | 330.6 | F | 1.89 | LOS D | 280.7 | F | 1.75 | LOS D | 288.1 | F | 1.71 | LOS D | 297.7 | F | 1.76 | LOS D | 277.9 | F | 1.70 | LOS D | 435.3 | F | 2.37 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | 0.85 | 67.0 | E | 0.97 | 0.85 | 174.3 | F | 1.46 | 0.80 | 162.3 | F | 1.47 | 0.80 | 155.6 | F | 1.45 | 0.80 | 157.9 | F | 1.45 | 0.80 | 156.2 | F | 1.44 | 0.80 | na | n/a | na |
| 18 | Portland Road at Hyacinth Street | ODOT | 0.80 | 108.8 | F | 1.06 | 0.80 | 135.8 | F | 1.29 | 0.75 | 153.4 | F | 1.37 | 0.75 | 157.2 | F | 1.38 | 0.75 | 151.6 | F | 1.35 | 0.75 | 151.2 | F | 1.35 | 0.75 | 177.1 | F | 1.46 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | 0.80 | 38.3 | D | 0.66 | 0.80 | 55.5 | E | 1.03 | 0.75 | 50.5 | D | 1.04 | 0.75 | 54.4 | D | 1.04 | 0.75 | 58.8 | E | 1.05 | 0.75 | 36.9 | D | 0.91 | 0.75 | 45.0 | D | 1.00 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | 0.70 | 65.4 | E | 0.85 | 0.70 | 199.3 | F | 1.46 | 0.60 | 184.7 | F | 1.41 | 0.60 | 178.3 | F | 1.39 | 0.60 | 186.1 | F | 1.42 | 0.60 | 75.4 | E | 1.09 | 0.60 | 183.7 | F | 1.41 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 0.75 | 1000.0 | F | 3.19 | 0.75 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 | 0.70 | na | n/a | na | 0.70 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 0.75 | 1000.0 | F | 4.38 | 0.75 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 | 0.70 | na | n/a | na | 0.70 | 1000.0 | F | 5.00 | 0.70 | 1000.0 | F | 5.00 |
| 23 | Brooklake Road at River Road | Marion County | LOS E | 29.3 | D | 0.90 | LOS E | 33.1 | C | 0.56 | LOS D | 18.2 | B | 0.67 | LOS D | 37.5 | D | 0.56 | LOS D | 30.2 | C | 0.64 | LOS D | 17.9 | B | 0.56 | LOS D | 25.7 | C | 0.79 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | LOS E | 10.4 | B | 0.11 | LOS E | 38.7 | E | 0.70 | LOS D | 27.1 | D | 0.56 | LOS D | 18.7 | C | 0.41 | LOS D | 32.7 | D | 0.63 | LOS D | 27.5 | D | 0.48 | LOS D | 27.7 | D | 0.57 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 23.0 | C | 0.83 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 28.0 | D | 0.88 |
| 27 | Radiant/SB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 25.5 | D | 0.46 | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | |
| 28 | Radiant/NB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 4.5 | A | 0.31 | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | |
| 29 | Radiant/Chemawa | Keizer | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | LOS D | 16.5 | C | 0.83 | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | |
| 30 | Brooks SPUI | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 61.4 | E | 0.72 | Does Not Exist | | | | Does Not Exist | | | |
| 31 | Quinaby/NB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 27.0 | C | 0.65 | Does Not Exist | | | |
| 32 | Quinaby/SB Ramps | ODOT | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | Does Not Exist | | | | 0.75 | 24.9 | C | 0.6 | Does Not Exist | | | |

## Chemawa IAMP Freeway Operations - DRAFT

| ID # | Location | Segment Type | Facility^ | Existing Conditions (2008) | | Future Baseline (2031) | | Future Adopted Alt. 1 (2031) | | Future Adopted Alt. 6 (2031) | | Future Adopted Alt. 12 (2031) | | Future Adopted Alt. 13 (2031) | | Future Adopted Alt. 14 (2031) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio |
| N1 | NB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.59 | 0.80 | 0.80 | 0.75 | 0.63 | 0.75 | 0.63 | 0.75 | 0.64 | 0.75 | 0.64 | 0.75 | 0.62 |
| N2 | NB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.20 | 0.80 | 0.40 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.53 | 0.80 | 0.68 | | | | | | | | | | |
| N3 | NB I-5 Mainline South of On-Ramp from OR 99E Business | Basic | Mainline | 0.80 | 0.54 | 0.80 | 0.70 | 0.75 | 0.71 | 0.75 | 0.71 | 0.75 | 0.72 | 0.75 | 0.73 | 0.75 | 0.71 |
| N4 | NB On-Ramp from OR 99E Business/Salem Parkway | Merge | Ramp | 0.80 | 0.60 | 0.80 | 0.84 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.84 | | | | | | | | | | |
| N5 | NB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.83 | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| N6 | NB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.61 | 0.80 | 0.79 | 0.75 | 0.90 | 0.75 | 0.91 | 0.75 | 0.90 | 0.75 | 0.92 | 0.75 | 0.90 |
| | | | Mainline | 0.80 | 0.64 | 0.80 | 0.85 | 0.75 | 0.85 | 0.75 | 0.86 | 0.75 | 0.86 | 0.75 | 0.88 | 0.75 | 0.86 |
| N7 | NB I-5 Mainline North of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.64 | 0.80 | 0.84 | 0.75 | 0.85 | 0.75 | 0.86 | 0.75 | 0.86 | 0.75 | 0.88 | 0.75 | 0.85 |
| S1 | SB I-5 Mainline North of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.72 | 0.80 | 0.99 | 0.75 | 1.00 | 0.75 | 1.00 | 0.75 | 0.99 | 0.75 | 0.87 | 0.75 | 1.00 |
| S2 | SB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.30 | 0.80 | 0.33 | 0.75 | 0.97 | 0.75 | 0.98 | 0.75 | 0.68 | 0.75 | 0.58 | 0.75 | 0.71 |
| | | | Mainline | 0.80 | 0.63 | 0.80 | 0.89 | 0.75 | 0.71 | 0.75 | 1.11 | 0.75 | 0.97 | 0.75 | 0.95 | 0.75 | 0.97 |
| S3 | SB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.63 | 0.80 | 0.89 | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| S4 | SB Off-Ramp to OR 99E Business | Diverge | Ramp | 0.80 | 0.54 | 0.80 | 0.77 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.47 | 0.80 | 0.66 | | | | | | | | | | |
| S5 | SB I-5 Mainline South of Off-Ramp to OR 99E Business | Basic | Mainline | 0.80 | 0.48 | 0.80 | 0.68 | 0.75 | 0.72 | 0.75 | 0.69 | 0.75 | 0.71 | 0.75 | 0.60 | 0.75 | 0.72 |
| S6 | SB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.65 | 0.80 | 0.96 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.89 | | | | | | | | | | |
| S7 | SB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.88 | 0.75 | 0.71 | 0.75 | 0.68 | 0.75 | 0.70 | 0.75 | 0.61 | 0.75 | 0.70 |

## Chemawa IAMP Intersection Operations - DRAFT

| # | Description | Jurisdiction | [Alt1] - [Base] | | [Alt6] - [Base] | | [Alt12] - [Base] | | [Alt13] - [Base] | | [Alt14] - [Base] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay (s) | V/C | Delay (s) | V/C | Delay (s) | V/C | Delay (s) | V/C | Delay (s) | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | -12.2 | 0.02 | 13.7 | 0.05 | 19.7 | 0.07 | -9.2 | -0.01 | 10.4 | 0.05 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | -188.4 | -0.33 | 204.5 | 0.42 | 354.3 | 1.18 | 44.2 | 0.07 | 346.2 | 0.73 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | -116.2 | -0.40 | 24.1 | 0.12 | 18.9 | 0.13 | -7.0 | 0.04 | 21.8 | 0.06 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | -8.5 | -0.14 | 5.6 | 0.08 | 2.5 | 0.06 | 1.4 | -0.02 | -1.7 | 0.03 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | -21.1 | -0.21 | -8.1 | -0.10 | -3.4 | -0.11 | -42.1 | -0.16 | -8.9 | -0.15 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | -35.3 | -0.19 | 0.8 | -0.02 | 6.2 | 0.05 | 14.0 | 0.05 | 27.4 | 0.05 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | -10.4 | -0.06 | 7.5 | -0.04 | 15.5 | 0.04 | 1.4 | -0.04 | 10.1 | -0.01 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | 4.4 | -0.02 | 10.8 | 0.01 | 22.3 | 0.07 | 1.7 | 0.00 | 8.4 | 0.02 |
| 9 | Chemawa Road at Indian School Road | ODOT | -9.5 | -0.18 | -12.4 | -0.22 | 21.4 | 0.15 | 1.3 | -0.05 | 1.9 | -0.02 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 2.5 | 0.04 | 4.7 | 0.04 | 7.2 | 0.04 | 8.9 | 0.02 | -2.7 | 0.02 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 2.4 | -0.05 | 33.6 | 0.18 | 0.0 | -0.02 | 0.4 | 0.01 | -0.3 | -0.05 |
| 12 | Cordon Road at Kale Street | Marion County | -1.3 | -0.02 | 0.4 | -0.01 | -0.5 | -0.01 | -0.3 | -0.01 | -0.9 | -0.02 |
| 13 | Portland Road at Kale Street | ODOT | -6.4 | -0.04 | -5.1 | -0.03 | -6.6 | -0.07 | -7.4 | -0.08 | -10.9 | -0.11 |
| 14 | Portland Road at Lancaster Drive | ODOT | 0.0 | -0.15 | 0.0 | -0.16 | 0.0 | -0.20 | 0.0 | -0.18 | 0.0 | -0.28 |
| 15 | Portland Road at Blossom Drive | ODOT | 0.0 | -0.49 | -467.7 | -2.11 | -606.9 | -2.42 | -627.4 | -2.46 | -590.7 | -2.39 |
| 16 | Chemawa Road at Verda Lane | Keizer | -49.9 | -0.14 | -42.5 | -0.18 | -32.9 | -0.13 | -52.7 | -0.19 | 104.7 | 0.48 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | -12.0 | 0.01 | -18.7 | -0.01 | -16.4 | -0.01 | -18.1 | -0.02 | n/a | n/a |
| 18 | Portland Road at Hyacinth Street | ODOT | 17.6 | 0.08 | 21.4 | 0.09 | 15.8 | 0.06 | 15.4 | 0.06 | 41.3 | 0.17 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | -5.0 | 0.01 | -1.1 | 0.01 | 3.3 | 0.02 | -18.6 | -0.12 | -10.5 | -0.03 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | -14.6 | -0.05 | -21.0 | -0.07 | -13.2 | -0.04 | -123.9 | -0.37 | -15.6 | -0.05 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | n/a | n/a | 0.0 | 0.00 | 0.0 | 0.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | n/a | n/a | 0.0 | 0.00 | 0.0 | 0.00 |
| 23 | Brooklake Road at River Road | Marion County | -14.9 | 0.11 | 4.4 | 0.00 | -2.9 | 0.08 | -15.2 | 0.00 | -7.4 | 0.23 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | -11.6 | -0.14 | -20.0 | -0.29 | -6.0 | -0.07 | -11.2 | -0.22 | -11.0 | -0.13 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 23.0 | 0.83 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 28.0 | 0.88 |
| 27 | Radiant/SB Ramps | ODOT | 0.0 | 0.00 | 25.5 | 0.46 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 28 | Radiant/NB Ramps | ODOT | 0.0 | 0.00 | 4.5 | 0.31 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 29 | Radiant/Chemawa | Keizer | 0.0 | 0.00 | 16.5 | 0.83 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 30 | Brooks SPUI | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 27.0 | 0.65 | 0.0 | 0.00 |
| 32 | Quinaby/SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 24.9 | 0.60 | 0.0 | 0.00 |

**Chemawa IAMP Intersection Operations - DRAFT**

| | | | 2031 Baseline | | | 2031 - Adopted Alt.1 | | | 2031 - Adopted Alt.6 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Description | Jurisdiction | Delay | LOS | V/C | Delay | LOS | V/C | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | 155.4 | F | 1.31 | 143.2 | F | 1.33 | 169.1 | F | 1.36 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | 645.7 | F | 2.15 | 457.3 | F | 1.82 | 850.2 | F | 2.57 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | 139.0 | F | 1.32 | 22.8 | C | 0.92 | 163.1 | F | 1.44 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | 25.3 | C | 0.86 | 16.8 | B | 0.72 | 30.9 | C | 0.94 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | 42.5 | D | 0.97 | 21.4 | C | 0.76 | 34.4 | C | 0.87 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | 85.7 | F | 1.19 | 50.4 | D | 1.00 | 86.5 | F | 1.17 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | 52.2 | D | 1.13 | 41.8 | D | 1.07 | 59.7 | E | 1.09 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | 103.8 | F | 1.16 | 108.2 | F | 1.14 | 114.6 | F | 1.17 |
| 9 | Chemawa Road at Indian School Road | ODOT | 26.9 | D | 0.60 | 17.4 | C | 0.42 | 14.5 | B | 0.38 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 65.9 | E | 1.05 | 68.4 | E | 1.09 | 70.6 | E | 1.09 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 9.3 | A | 0.66 | 11.7 | B | 0.61 | 42.9 | D | 0.84 |
| 12 | Cordon Road at Kale Street | Marion County | 23.5 | C | 0.44 | 22.2 | C | 0.42 | 23.9 | C | 0.43 |
| 13 | Portland Road at Kale Street | ODOT | 31.0 | C | 0.98 | 24.6 | C | 0.94 | 25.9 | C | 0.95 |
| 14 | Portland Road at Lancaster Drive | ODOT | 1000.0 | F | 1.88 | 1000.0 | F | 1.73 | 1000.0 | F | 1.72 |
| 15 | Portland Road at Blossom Drive | ODOT | 1000.0 | F | 4.13 | 1000.0 | F | 3.64 | 532.3 | F | 2.02 |
| 16 | Chemawa Road at Verda Lane | Keizer | 330.6 | F | 1.89 | 280.7 | F | 1.75 | 288.1 | F | 1.71 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | 174.3 | F | 1.46 | 162.3 | F | 1.47 | 155.6 | F | 1.45 |
| 18 | Portland Road at Hyacinth Street | ODOT | 135.8 | F | 1.29 | 153.4 | F | 1.37 | 157.2 | F | 1.38 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | 55.5 | E | 1.03 | 50.5 | D | 1.04 | 54.4 | D | 1.04 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | 199.3 | F | 1.46 | 184.7 | F | 1.41 | 178.3 | F | 1.39 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 |
| 23 | Brooklake Road at River Road | Marion County | 33.1 | C | 0.56 | 18.2 | B | 0.67 | 37.5 | D | 0.56 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | 38.7 | E | 0.70 | 27.1 | D | 0.56 | 18.7 | C | 0.41 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 27 | Radiant/SB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | 25.5 | D | 0.46 |
| 28 | Radiant/NB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | 4.5 | A | 0.31 |
| 29 | Radiant/Chemawa | Keizer | Does Not Exist | | | Does Not Exist | | | 16.5 | C | 0.83 |
| 30 | Brooks SPUI | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 31 | Quinaby/NB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 32 | Quinaby/SB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |

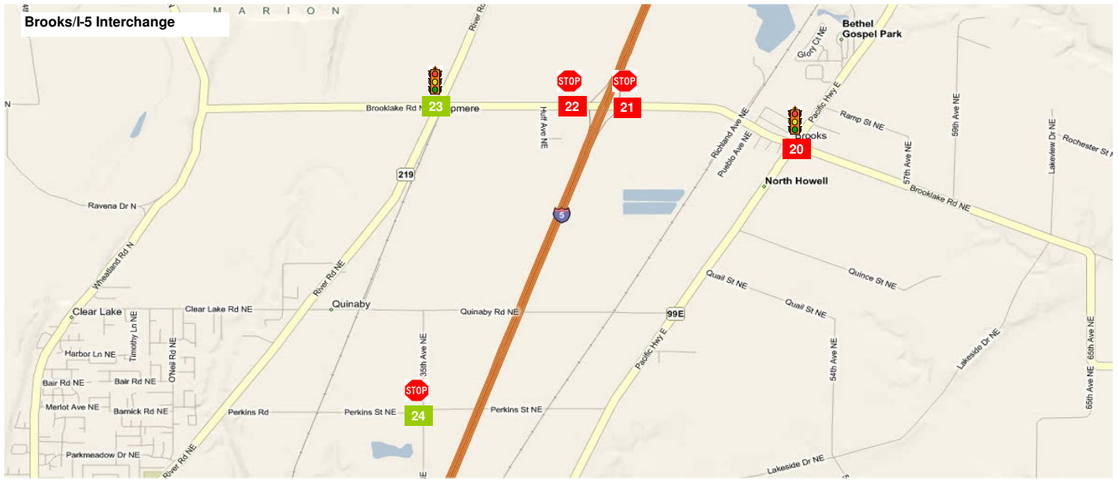
## Chemawa IAMP Intersection Operations - DRAFT

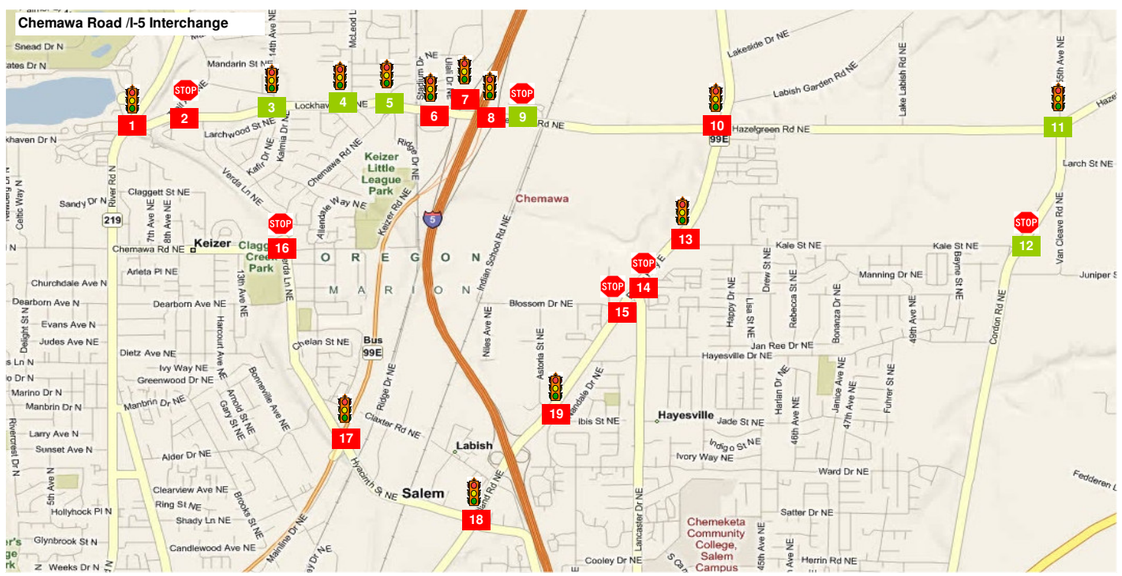
| # | Description | Jurisdiction | 2031 - Adopted Alt.12 | | | 2031 - Adopted Alt.13 | | | 2031 Adopted Alt. 14 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | V/C | Delay | LOS | V/C | Delay | LOS | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | 175.1 | F | 1.38 | 146.2 | F | 1.3 | 165.8 | F | 1.36 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | 1000.0 | F | 3.33 | 689.9 | F | 2.22 | 991.9 | F | 2.88 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | 157.9 | F | 1.45 | 132.0 | F | 1.36 | 160.8 | F | 1.38 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | 27.8 | C | 0.92 | 26.7 | C | 0.84 | 23.6 | C | 0.89 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | 39.1 | D | 0.86 | 0.35 | A | 0.81 | 33.6 | C | 0.82 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | 91.9 | F | 1.24 | 99.7 | F | 1.24 | 113.1 | F | 1.24 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | 67.7 | E | 1.17 | 53.6 | D | 1.09 | 62.3 | E | 1.12 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | 126.1 | F | 1.23 | 105.5 | F | 1.16 | 112.2 | F | 1.18 |
| 9 | Chemawa Road at Indian School Road | ODOT | 48.3 | E | 0.75 | 28.2 | D | 0.55 | 28.8 | D | 0.58 |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 73.1 | E | 1.09 | 74.8 | E | 1.07 | 63.2 | E | 1.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 9.3 | A | 0.64 | 9.7 | A | 0.67 | 9 | A | 0.61 |
| 12 | Cordon Road at Kale Street | Marion County | 23 | C | 0.43 | 23.2 | C | 0.43 | 22.6 | C | 0.42 |
| 13 | Portland Road at Kale Street | ODOT | 24.4 | C | 0.91 | 23.6 | C | 0.90 | 20.1 | C | 0.87 |
| 14 | Portland Road at Lancaster Drive | ODOT | 1000.0 | F | 1.68 | 1000.0 | F | 1.70 | 1000.0 | F | 1.60 |
| 15 | Portland Road at Blossom Drive | ODOT | 393.1 | F | 1.71 | 372.6 | F | 1.67 | 409.3 | F | 1.74 |
| 16 | Chemawa Road at Verda Lane | Keizer | 297.7 | F | 1.76 | 277.9 | F | 1.70 | 435.3 | F | 2.37 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | 157.9 | F | 1.45 | 156.2 | F | 1.44 | na | n/a | na |
| 18 | Portland Road at Hyacinth Street | ODOT | 151.6 | F | 1.35 | 151.2 | F | 1.35 | 177.1 | F | 1.46 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | 58.8 | E | 1.05 | 36.9 | D | 0.91 | 45.0 | D | 1.00 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | 186.1 | F | 1.42 | 75.4 | E | 1.09 | 183.7 | F | 1.41 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | na | n/a | na | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | na | n/a | na | 1000.0 | F | 5.00 | 1000.0 | F | 5.00 |
| 23 | Brooklake Road at River Road | Marion County | 30.2 | C | 0.64 | 17.9 | B | 0.56 | 25.7 | C | 0.79 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | 32.7 | D | 0.63 | 27.5 | D | 0.48 | 27.7 | D | 0.57 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | 23.0 | C | 0.83 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | 28.0 | D | 0.88 |
| 27 | Radiant/SB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 28 | Radiant/NB Ramps | ODOT | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 29 | Radiant/Chemawa | Keizer | Does Not Exist | | | Does Not Exist | | | Does Not Exist | | |
| 30 | Brooks SPUI | ODOT | 61.4 | E | 0.72 | Does Not Exist | | | Does Not Exist | | |
| 31 | Quinaby/NB Ramps | ODOT | Does Not Exist | | | 27.0 | C | 0.65 | Does Not Exist | | |
| 32 | Quinaby/SB Ramps | ODOT | Does Not Exist | | | 24.9 | C | 0.6 | Does Not Exist | | |

APPENDIX G

# Future Build Analysis for Alternatives 1, 6, 12-18, and 21-23: Intersection and Freeway Volumes, Channelization, Delay, LOS, V/C Ratio

FIGURE A.1a: Chemawa Road IAMP Traffic Analysis: Alternative 1: Intersections
FIGURE A.1b: Chemawa Road IAMP Traffic Analysis: Alternative 1: Freeway
FIGURE A.2a: Chemawa Road IAMP Traffic Analysis: Alternative 6: Intersections
FIGURE A.2b: Chemawa Road IAMP Traffic Analysis: Alternative 6: Freeway
FIGURE A.3a: Chemawa Road IAMP Traffic Analysis: Alternative 12: Intersections
FIGURE A.3b: Chemawa Road IAMP Traffic Analysis: Alternative 12: Freeway
FIGURE A.4a: Chemawa Road IAMP Traffic Analysis: Alternative 13: Intersections
FIGURE A.4b: Chemawa Road IAMP Traffic Analysis: Alternative 13: Freeway
FIGURE A.5a: Chemawa Road IAMP Traffic Analysis: Alternative 14: Intersections
FIGURE A.5b: Chemawa Road IAMP Traffic Analysis: Alternative 14: Freeway
FIGURE A.6a: Chemawa Road IAMP Traffic Analysis: Alternative 15: Intersections
FIGURE A.6b: Chemawa Road IAMP Traffic Analysis: Alternative 15: Freeway
FIGURE A.7a: Chemawa Road IAMP Traffic Analysis: Alternative 16: Intersections
FIGURE A.7b: Chemawa Road IAMP Traffic Analysis: Alternative 16: Freeway
FIGURE A.8a: Chemawa Road IAMP Traffic Analysis: Alternative 17: Intersections
FIGURE A.8b: Chemawa Road IAMP Traffic Analysis: Alternative 17: Freeway
FIGURE A.9a: Chemawa Road IAMP Traffic Analysis: Alternative 18: Intersections
FIGURE A.9b: Chemawa Road IAMP Traffic Analysis: Alternative 18: Freeway
FIGURE A.10a: Chemawa Road IAMP Traffic Analysis: Alternative 21: Intersections
FIGURE A.10b: Chemawa Road IAMP Traffic Analysis: Alternative 21: Freeway
FIGURE A.11a: Chemawa Road IAMP Traffic Analysis: Alternative 22: Intersections
FIGURE A.11b: Chemawa Road IAMP Traffic Analysis: Alternative 22: Freeway
FIGURE A.12a: Chemawa Road IAMP Traffic Analysis: Alternative 23: Intersections
FIGURE A.12b: Chemawa Road IAMP Traffic Analysis: Alternative 23: Freeway




| 1 | Lockhaven Dr. & River Rd. | | | 2 | Lockhaven Dr. & Trail Ave. | | | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.33 | Jurisdiction: Keizer | | V/C Ratio: | 0.53(1.82)^ | Jurisdiction: Keizer | | V/C Ratio: | 0.87 | Jurisdiction: Keizer | |
| Delay (s): | 143.2 | Standard: LOS D | | Delay (s): | 457.3 | Standard: LOS D | | Delay (s): | 24.9 | Standard: LOS D | |
| LOS : | F | PHF 0.87 | | LOS : | F | PHF 0.97 | | LOS : | C | PHF 0.91 | |
| | 3.8% | | | | 0.0% | | | | 1.6% | | |
| | 180 825 400 | 385 | | | 140 0 35 | 25 | | | 75 25 175 | 330 | |
| | | 390 | 3.0% | | | 1210 | 1.3% | | | 1125 | 1.5% |
| | | 575 | | | | 0 | | | | 60 | |
| 5.0% | 130 | | | 1.8% | 105 | | | 2.4% | 65 | | |
| | 275 | | | | 1040 | | | | 990 | | |
| | 135 | | | | 0 | | | | 20 | | |
| | | 115 1225 470 | | | | | | | 35 25 25 | | |
| | | 1.3% | | | | | | | 7.0% | | |

| 4 | Lockhaven Dr. & McLeod Ln. | | | 5 | Lockhaven & Chemawa/Keizer St. | | | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.70 | Jurisdiction: Keizer | | V/C Ratio: | 0.82 | Jurisdiction: Keizer | | V/C Ratio: | 0.99 | Jurisdiction: ODOT | |
| Delay (s): | 13.5 | Standard: LOS D | | Delay (s): | 26.5 | Standard: LOS D | | Delay (s): | 41.2 | Standard: 0.85 | |
| LOS : | B | PHF 0.97 | | LOS : | C | PHF 0.97 | | LOS : | D | PHF 0.98 | |
| | 1.2% | | | | 0.4% | | | | 0.8% | | |
| | 130 50 220 | 395 | | | 100 60 220 | 30 | | | 165 0 0 | 625 | |
| | | 1345 | 0.7% | | | 1645 | 0.8% | | | 2225 | 0.9% |
| | | 20 | | | | 715 | | | | 230 | |
| 1.3% | 100 | | | 1.1% | 190 | | | 0.7% | 10 | | |
| | 1070 | | | | 1115 | | | | 1695 | | |
| | 20 | | | | 20 | | | | 35 | | |
| | | 40 65 35 | | | | 15 95 405 | | | | 0 0 1135 | |
| | | 0.0% | | | | 0.3% | | | | 0.7% | |

| 7 | Chemawa Rd. & I-5 SB Ramps | | | 8 | Chemawa Rd. & I-5 NB Ramps | | | 9 | Chemawa Rd. & Indian School Rd. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.09 | Jurisdiction: ODOT | | V/C Ratio: | 1.11 | Jurisdiction: ODOT | | V/C Ratio: | 0.27(0.42)^ | Jurisdiction: ODOT | |
| Delay (s): | 36.8 | Standard: 0.75 | | Delay (s): | 90.1 | Standard: 0.75 | | Delay (s): | 17.2 | Standard: 0.85(0.85)^ | |
| LOS : | D | PHF 0.97 | | LOS : | F | PHF 0.94 | | LOS : | C | PHF 0.97 | |
| | 3.2% | | | | | | | | 1.5% | | |
| | 480 5 105 | 0 | | | | 30 | | | 175 0 10 | 10 | |
| | | 2600 | 1.3% | | | 1255 | 0.7% | | | 1110 | 1.3% |
| | | 405 | | | | 0 | | | | 0 | |
| 0.7% | 0 | | | 1.7% | 110 | | | 2.1% | 60 | | |
| | 915 | | | | 910 | | | | 1070 | | |
| | 1915 | | | | 0 | | | | 0 | | |
| | | | | | | 1750 5 220 | | | | | |
| | | | | | | 1.9% | | | | | |

| 10 | Chemawa Rd. & OR 99E | | | 11 | Hazelgreen Rd. & Cordon Rd. | | | 12 | Cordon Rd. & Kale St. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.08 | Jurisdiction: ODOT | | V/C Ratio: | 0.61 | Jurisdiction: Marion County | | V/C Ratio: | 0.41(0.42)^ | Jurisdiction: Marion County | |
| Delay (s): | 68.7 | Standard: 0.75 | | Delay (s): | 11.3 | Standard: LOS E | | Delay (s): | 22.2 | Standard: LOS D | |
| LOS : | E | PHF 0.97 | | LOS : | B | PHF 0.95 | | LOS : | C | PHF 0.94 | |
| | 1.0% | | | | 1.3% | | | | 1.2% | | |
| | 215 1070 130 | 100 | | | 25 130 15 | 15 | | | 35 580 0 | | |
| | | 430 | 2.7% | | | 370 | 3.2% | | | | |
| | | 105 | | | | 110 | | | | | |
| 1.6% | 170 | | | 2.5% | 40 | | | 0.0% | 15 | | |
| | 490 | | | | 385 | | | | 0 | | |
| | 430 | | | | 375 | | | | 95 | | |
| | | 485 860 180 | | | | 240 120 75 | | | | 90 420 0 | |
| | | 0.8% | | | | 1.4% | | | | 1.6% | |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

Volume Diagram

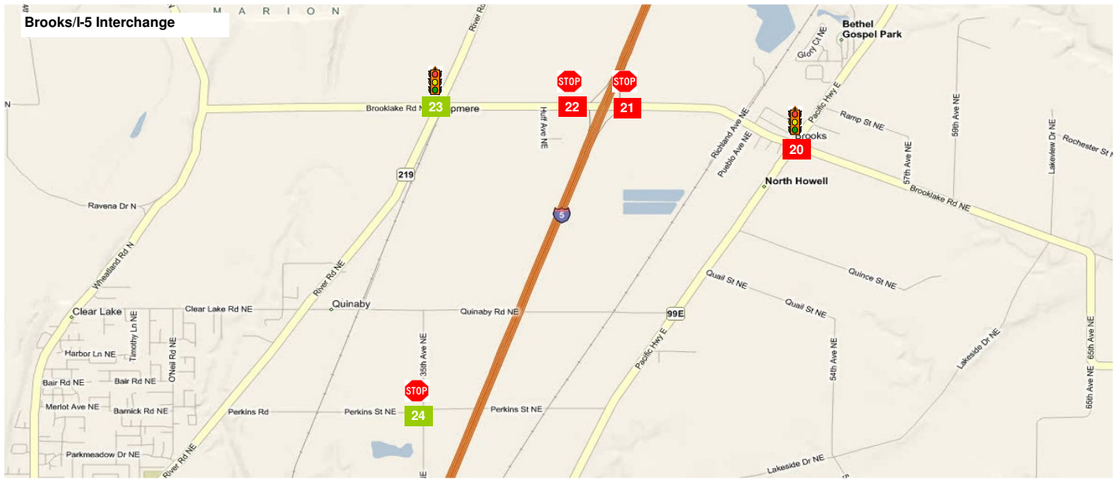
SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

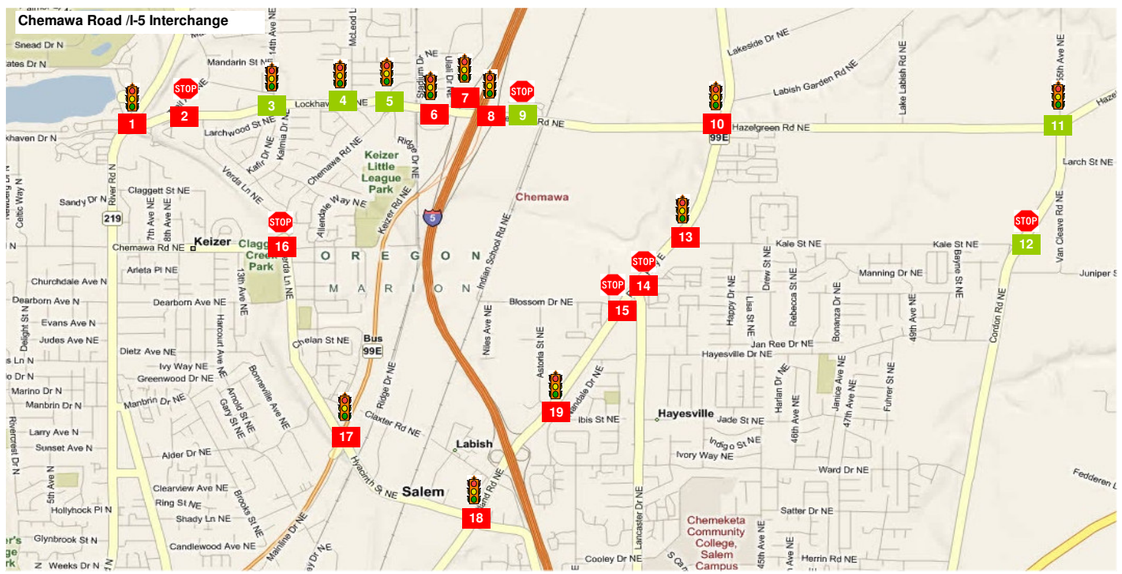
555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

CH2MHILL

# FIGURE A.1a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 1: Chemawa/Lockhaven Corridor Widening
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio




| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.94 | Jurisdiction: ODOT | V/C Ratio: | 1.62(1.73)^ | Jurisdiction: ODOT | V/C Ratio: | 0.38(3.64)^ | Jurisdiction: ODOT |
| Delay (s): | 24.5 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |
| 0.5% | 0 1330 275 | 170 0 185 0.6% | 2.2% | 10 690 815 | 615 10 50 1.2% | 1.3% | 75 675 0 | |
| | | 0 1355 405 1.0% | 0.0% | 0 0 10 | 20 1145 155 2.2% | 2.2% | 145 0 190 | 125 1175 0 1.7% |

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.75 | Jurisdiction: Keizer | V/C Ratio: | 1.50 | Jurisdiction: ODOT | V/C Ratio: | 1.37 | Jurisdiction: ODOT |
| Delay (s): | 280.7 | Standard: LOS D | Delay (s): | 167.2 | Standard: 0.85 | Delay (s): | 153.2 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |
| 1.0% | 50 80 10 | 10 425 260 0.5% | 3.5% | 120 1850 80 | 325 610 100 1.6% | 4.4% | 595 860 230 | 120 360 100 1.5% |
| 1.1% | 50 380 220 | 260 120 155 0.6% | 1.5% | 45 335 195 | 280 1455 335 3.1% | 1.5% | 655 290 390 | 270 1470 110 1.7% |

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.03 | Jurisdiction: ODOT | V/C Ratio: | 1.41 | Jurisdiction: ODOT | V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 49.2 | Standard: 0.75 | Delay (s): | 184.7 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |
| 1.8% | 20 1100 165 | 240 50 385 1.4% | 2.5% | 260 730 10 | 10 55 30 1.7% | | | 170 510 0 4.0% |
| 5.9% | 35 40 65 | 90 1650 740 2.2% | 6.1% | 200 80 555 | 365 440 35 3.6% | 9.3% | 440 505 0 | 145 0 330 8.8% |

| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.89(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.66 | Jurisdiction: Marion County | V/C Ratio: | 0.07(0.56)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 19.3 | Standard: LOS E | Delay (s): | 27.1 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | B | PHF 0.96 | LOS : | D | PHF 0.89 |
| 10.9% | 1080 15 355 | 0 235 420 6.8% | 6.0% | 15 185 215 | 140 160 780 4.8% | 0.0% | 20 105 30 | 10 75 70 2.1% |
| 11.2% | 0 590 305 | | 6.0% | 15 70 25 | 30 120 215 2.3% | 0.0% | 5 40 45 | 85 75 50 0.0% |

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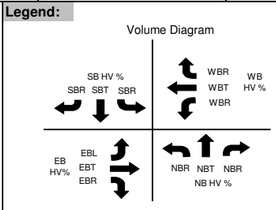
# FIGURE A.1a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 1: Chemawa/Lockhaven Corridor Widening
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

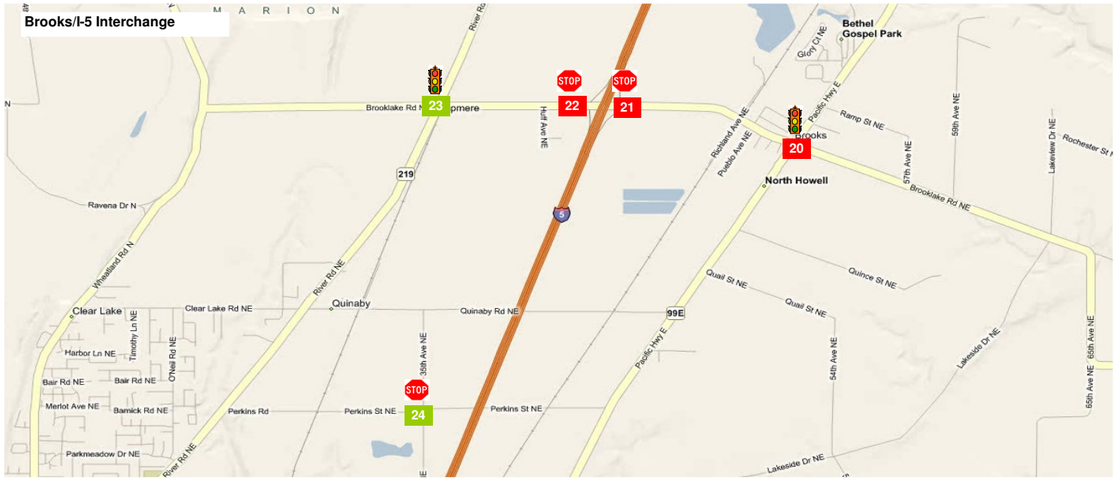
**Notes:**

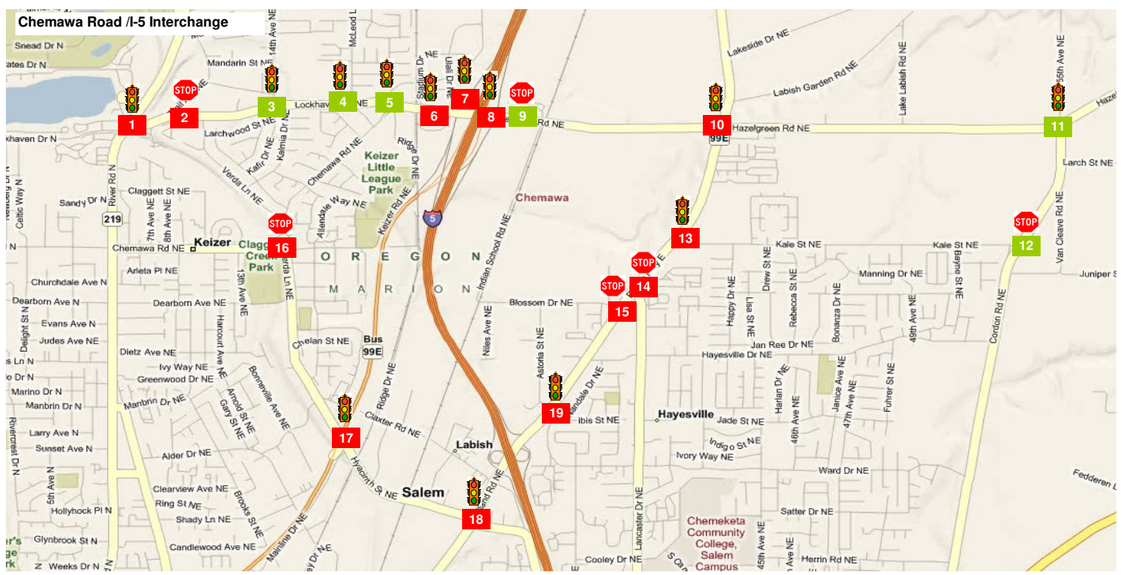
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane /SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | | PHF |
| **Does Not Exist in Alternative** | | | **Does Not Exist in Alternative** | | | **Does Not Exist in Alternative** | | |

| 28 | Tepper Lane /NB Ramps | | 29 | Chemawa Road/ Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | V/C Ratio: | | Jurisdiction: | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | | PHF |
| **Does Not Exist in Alternative** | | | **Does Not Exist in Alternative** | | | **Does Not Exist in Alternative** | | |

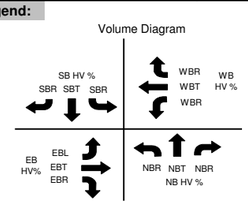
| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | | | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | | | |
| Delay (s): | | Standard: | Delay (s): | | Standard: | | | |
| LOS : | | PHF | LOS : | | PHF | | | |
| **Does Not Exist in Alternative** | | | **Does Not Exist in Alternative** | | | | | |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

Volume Diagram




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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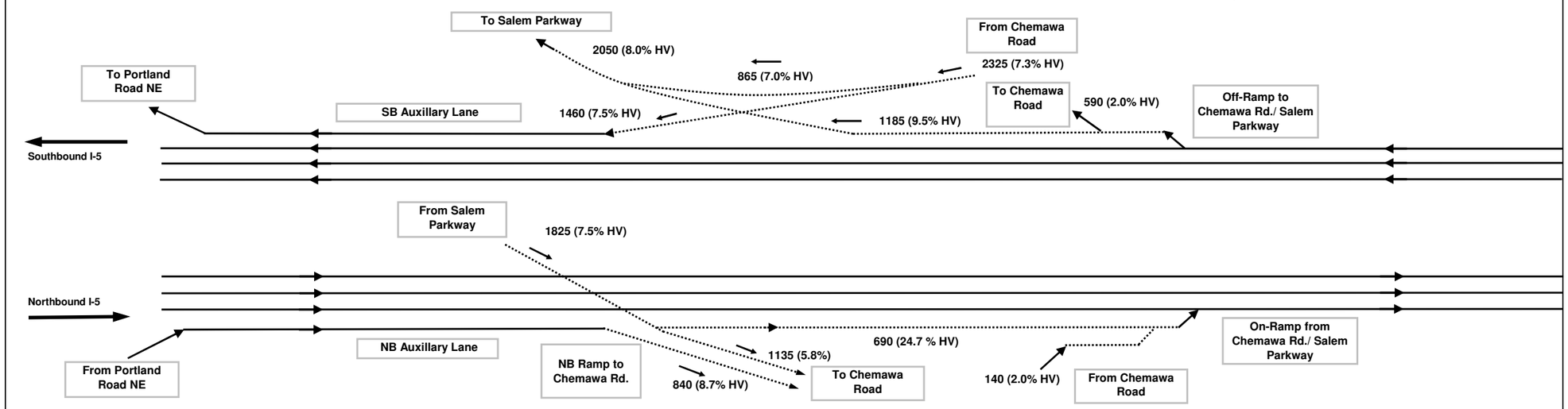
# FIGURE A.1a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 1: Chemawa/Lockhaven Corridor Widening
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 6010 | 4550 | 1775 | | 6325 |
| | Flow Rate^ | 1670 | 1695 | 2035 | 7060 | 2345 |
| | V/C | 0.71 | 0.72 | 0.97 | 1.00 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 1: Chemawa-Lockhaven Widening | Volume | 5430 | 4590 | 830 | | 5420 |
| | Flow Rate^ | 1479 | 1659 | 4125 | 6015 | 2010 |
| | V/C | 0.63 | 0.71 | 0.90 | 0.85 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.1b Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 1: Chemawa/Lockhaven Corridor Widening
## Freeway Volumes and V/C Ratio

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

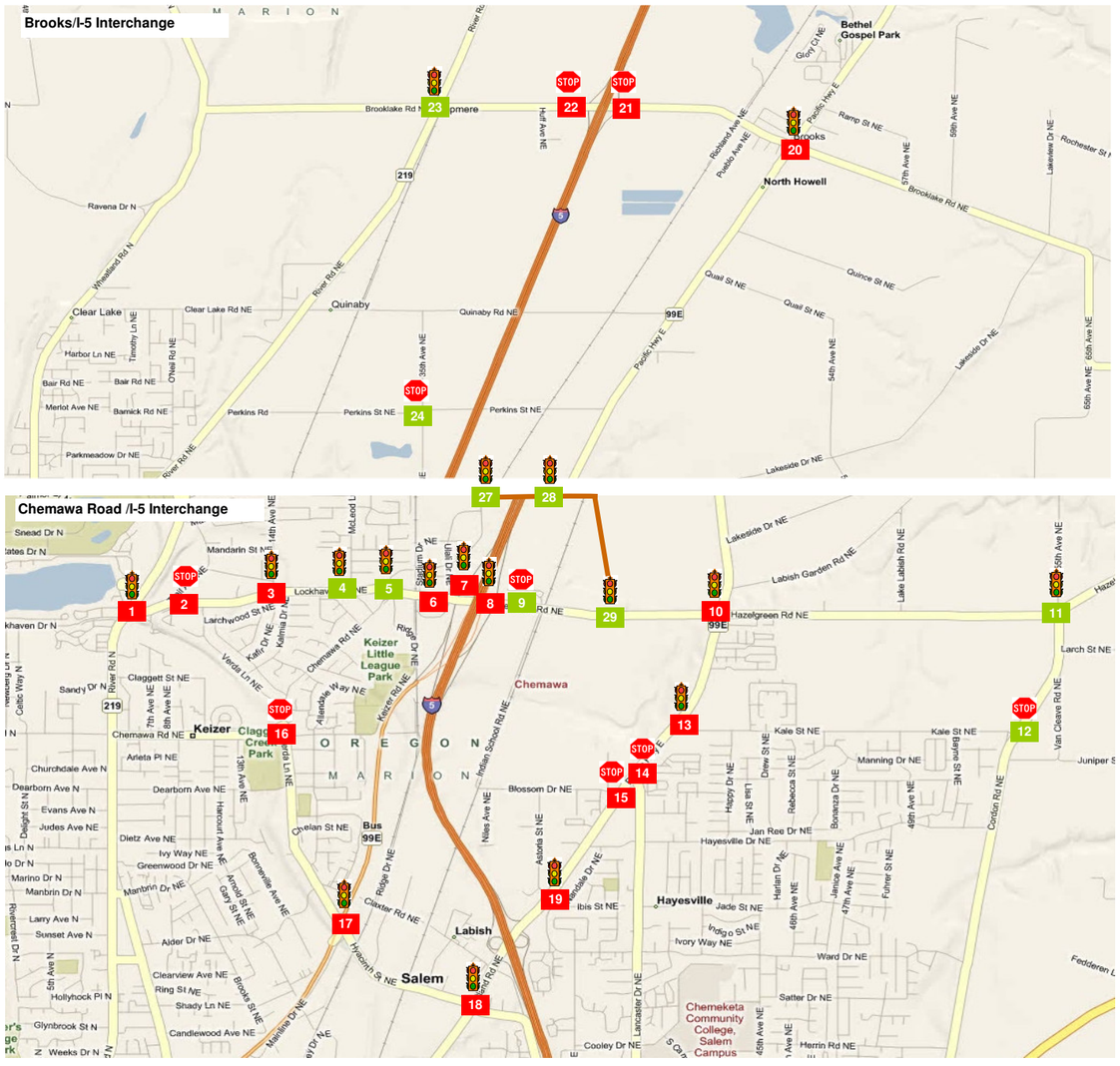
Meets Mobility Standard
Fails Mobility Standard

### Legend/Notes:

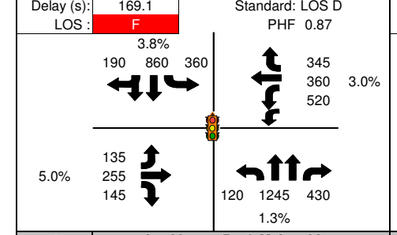
^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

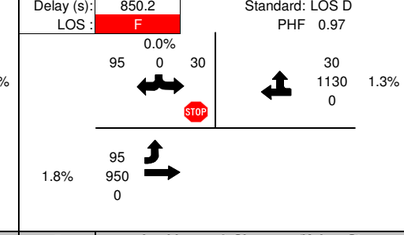
Collector-Distributor Road; Ramps
Mainline Freeway

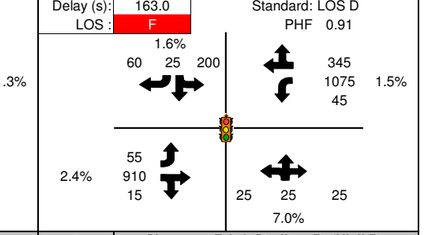
N



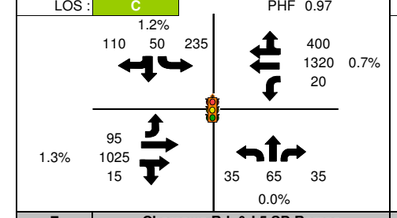

| 1 | Lockhaven Dr. & River Rd. | 2 | Lockhaven Dr. & Trail Ave. | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.36 | V/C Ratio: | 0.76(2.57)^ | V/C Ratio: | **1.44** |
| Delay (s): | 169.1 | Delay (s): | 850.2 | Delay (s): | 163.0 |
| LOS : | F | LOS : | F | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | Keizer |
| Standard: | LOS D | Standard: | LOS D | Standard: | LOS D |
| PHF | 0.87 | PHF | 0.97 | PHF | 0.91 |

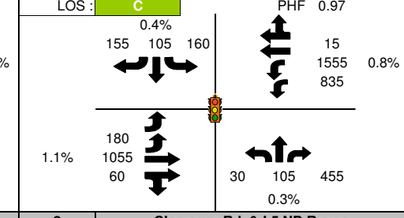


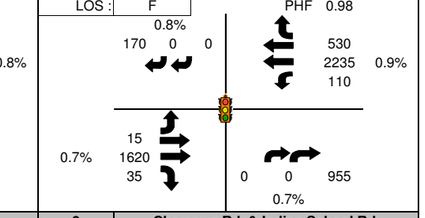



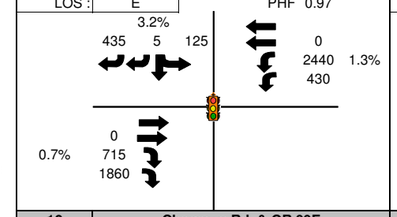

| 4 | Lockhaven Dr. & McLeod Ln. | 5 | Lockhaven & Chemawa/Keizer St. | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 0.94 | V/C Ratio: | 0.87 | V/C Ratio: | **1.17** |
| Delay (s): | 31.0 | Delay (s): | 34.4 | Delay (s): | 86.7 |
| LOS : | C | LOS : | C | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | ODOT |
| Standard: | LOS D | Standard: | LOS D | Standard: | 0.85 |
| PHF | 0.97 | PHF | 0.97 | PHF | 0.98 |

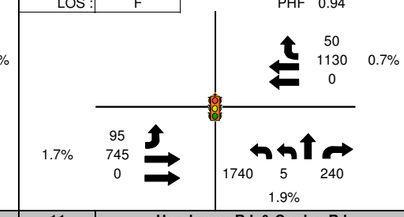


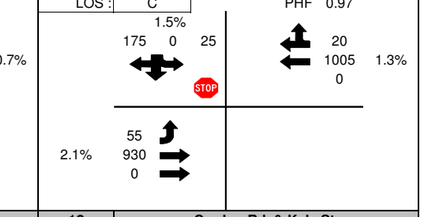



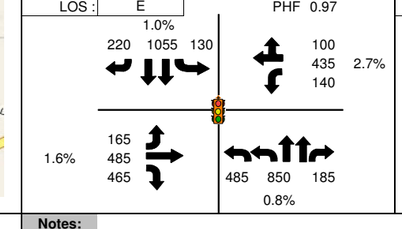

| 7 | Chemawa Rd. & I-5 SB Ramps | 8 | Chemawa Rd. & I-5 NB Ramps | 9 | Chemawa Rd. & Indian School Rd. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.09 | V/C Ratio: | 1.17 | V/C Ratio: | 0.30(0.39)^ |
| Delay (s): | 59.5 | Delay (s): | 110.4 | Delay (s): | 15.2 |
| LOS : | E | LOS : | F | LOS : | C |
| Jurisdiction: | ODOT | Jurisdiction: | ODOT | Jurisdiction: | ODOT |
| Standard: | 0.75 | Standard: | 0.75 | Standard: | 0.85(0.85)^ |
| PHF | 0.97 | PHF | 0.94 | PHF | 0.97 |

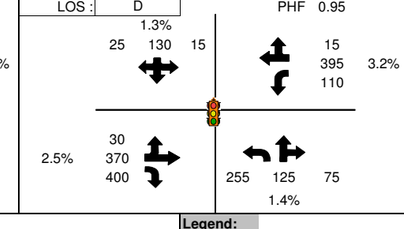


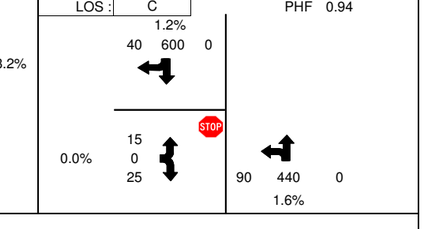




| 10 | Chemawa Rd. & OR 99E | 11 | Hazelgreen Rd. & Cordon Rd. | 12 | Cordon Rd. & Kale St. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.04 | V/C Ratio: | 0.82 | V/C Ratio: | 0.43(0.22)^ |
| Delay (s): | 66.1 | Delay (s): | 41.0 | Delay (s): | 23.9 |
| LOS : | E | LOS : | D | LOS : | C |
| Jurisdiction: | ODOT | Jurisdiction: | Marion County | Jurisdiction: | Marion County |
| Standard: | 0.75 | Standard: | LOS E | Standard: | LOS D |
| PHF | 0.97 | PHF | 0.95 | PHF | 0.94 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
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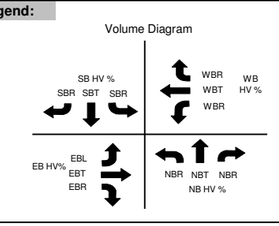
**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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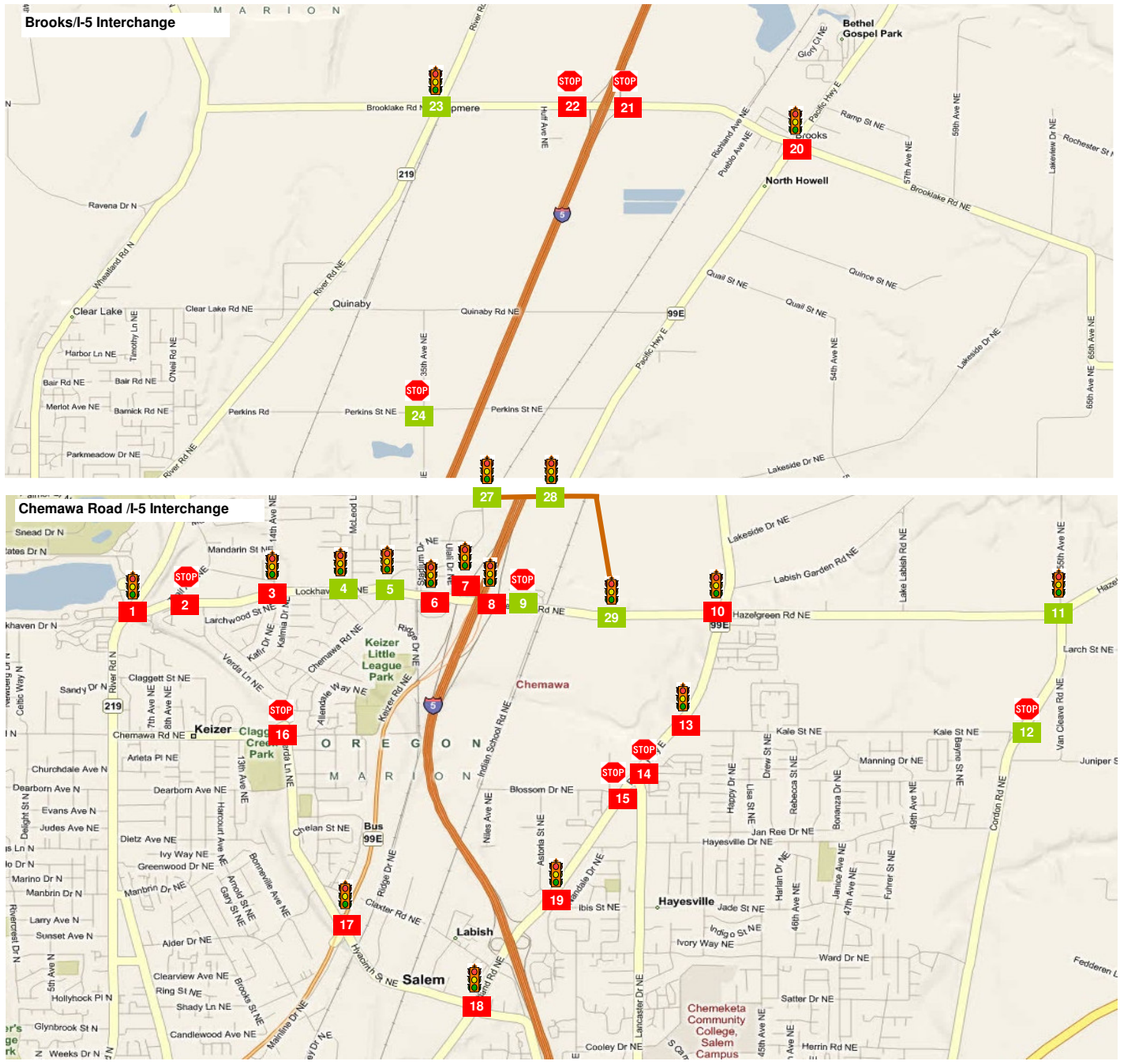
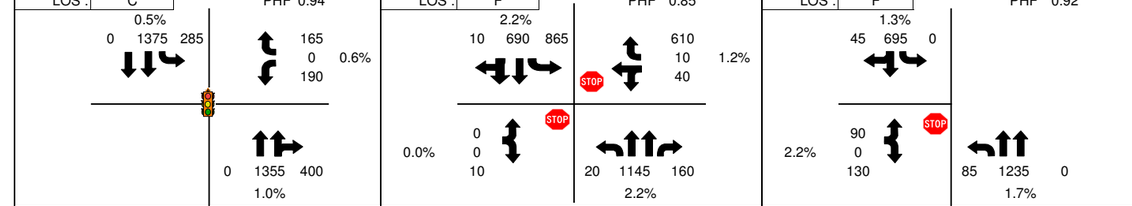
# FIGURE A.2a Chemawa Road IAMP Traffic Analysis

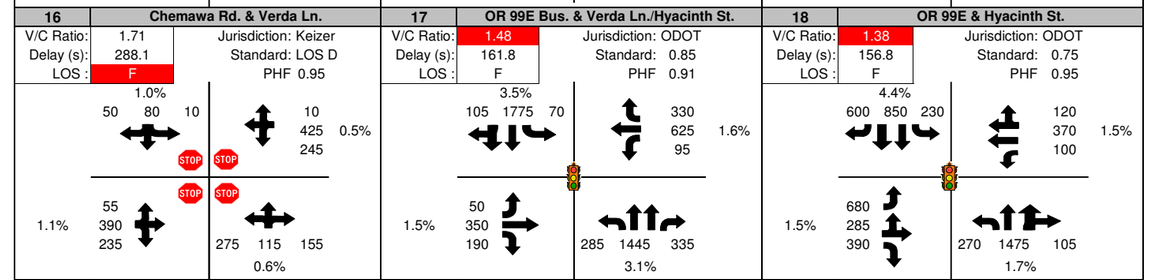
## 2031 Adopted Land Use Alternative 6: Chemawa/Tepper Half Diamond Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio



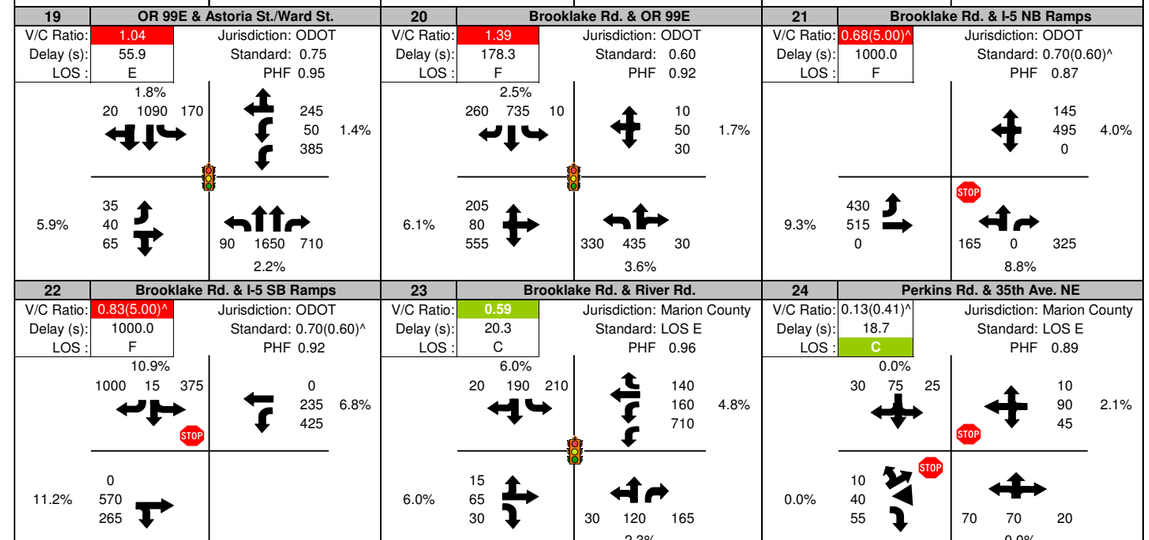

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.95 | Jurisdiction: ODOT | V/C Ratio: | 1.72(1.72)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(2.02)^ | Jurisdiction: ODOT |
| Delay (s): | 25.2 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 532.3 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |



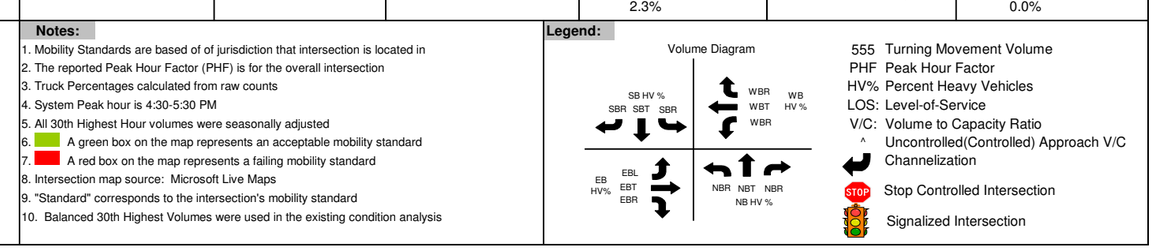

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.71 | Jurisdiction: Keizer | V/C Ratio: | 1.48 | Jurisdiction: ODOT | V/C Ratio: | 1.38 | Jurisdiction: ODOT |
| Delay (s): | 288.1 | Standard: LOS D | Delay (s): | 161.8 | Standard: 0.85 | Delay (s): | 156.8 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |




| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | V/C Ratio: | 1.39 | Jurisdiction: ODOT | V/C Ratio: | 0.68(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 55.9 | Standard: 0.75 | Delay (s): | 178.3 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.83(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.13(0.41)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 20.3 | Standard: LOS E | Delay (s): | 18.7 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
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6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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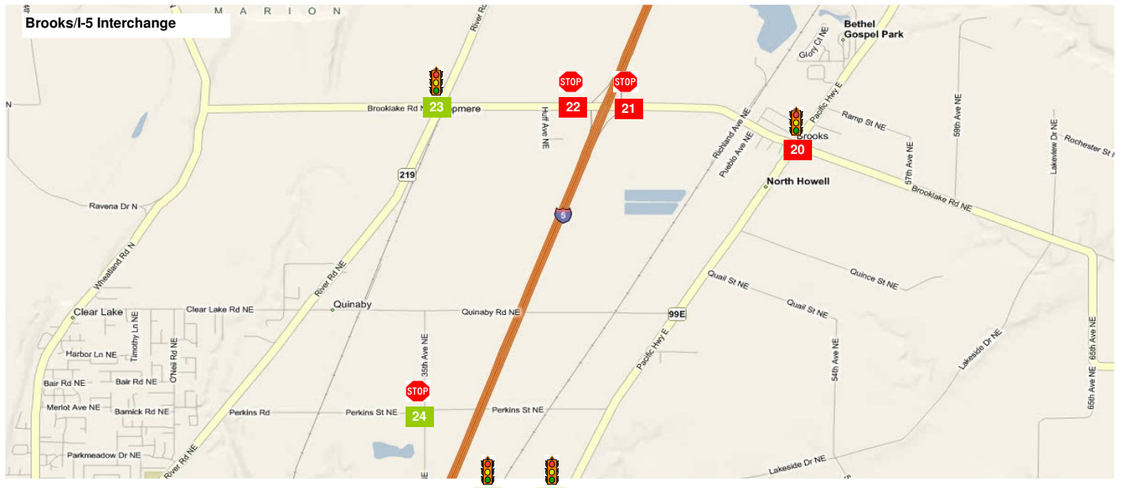
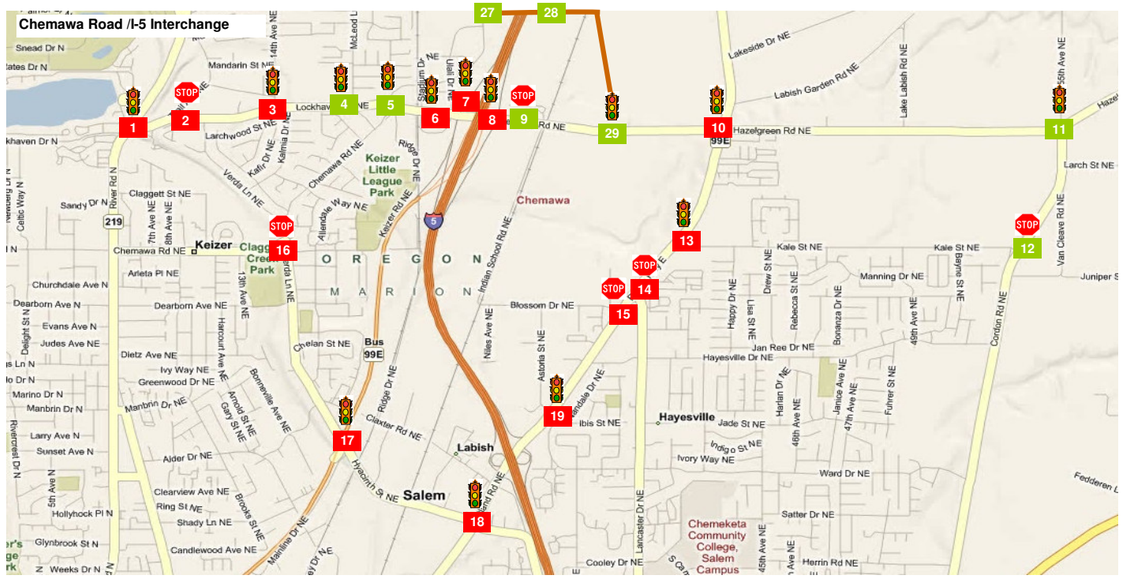
# FIGURE A.2a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 6: Chemawa/Tepper Half Diamond Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane/SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.40 | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 27.7 | Standard: 0.75 |
| LOS : | | PHF | LOS : | | PHF | LOS : | D | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 170 0 20; 0 345 0; 2.0%; 0 470 0; 2.0% | | |

| 28 | Tepper Lane/NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.31 | Jurisdiction: ODOT | V/C Ratio: | 0.79 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | 4.8 | Standard: 0.75 | Delay (s): | 16.1 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | A | PHF 0.92 | LOS : | C | PHF 0.92 | LOS : | | PHF |
| 25 345 0; 2.0%; 75 415 0; 2.0% | | | 2.0%; 105 0 310; 210 920 0; 2.0%; 160 795 0; 2.0% | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | | | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | | | |
| Delay (s): | | Standard: | Delay (s): | | Standard: | | | |
| LOS : | | PHF | LOS : | | PHF | | | |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | | | |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

Volume Diagram

SB HV %; SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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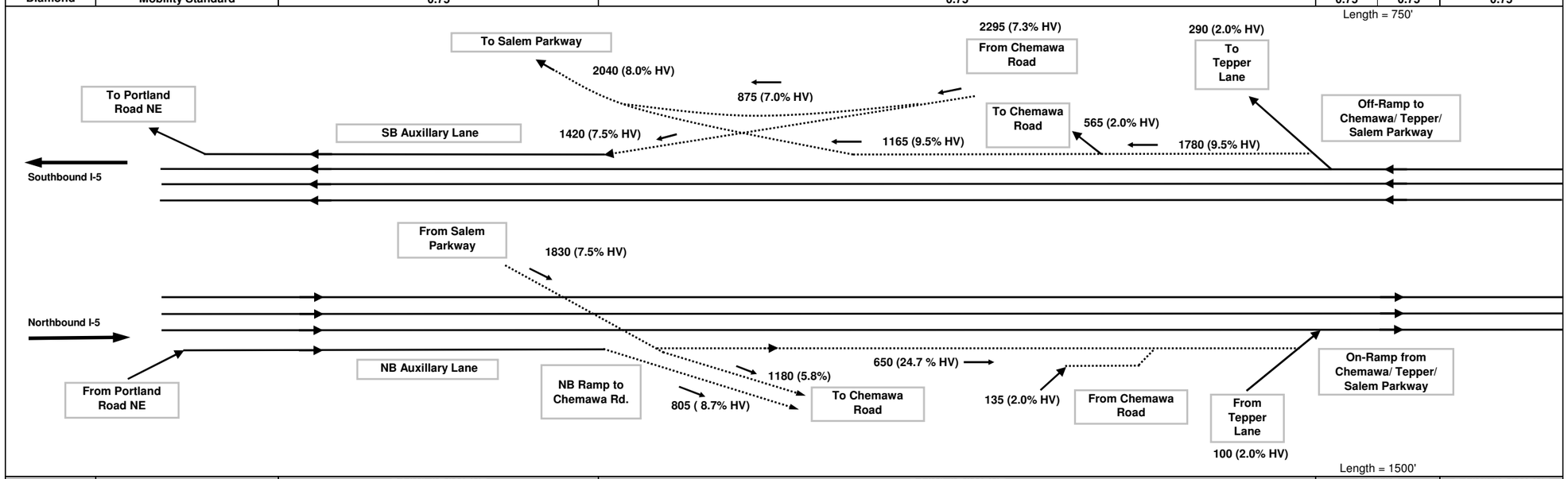
# FIGURE A.2a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 6: Chemawa/Tepper Half Diamond Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Splt Diamond | Volume | 5750 | 4330 | 2020 | | 6350 |
| | Flow Rate^ | 1600 | 1615 | 2325 | 6915 | 2355 |
| | V/C | 0.68 | 0.69 | 1.11 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 6: Chemawa/ Radiant Splt Diamond | Volume | 5400 | 4595 | 885 | | 5480 |
| | Flow Rate^ | 1475 | 1665 | 4190 | 6085 | 2010 |
| | V/C | 0.63 | 0.71 | 0.91 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.2b Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 6: Chemawa/Tepper Half Diamond Interchange
## Freeway Volumes and V/C Ratio

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

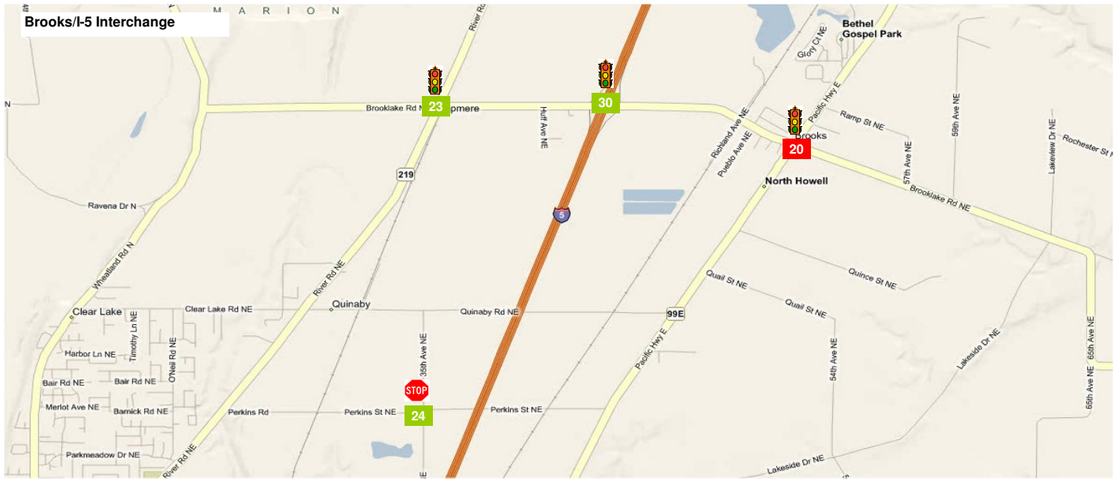
Meets Mobility Standard
Fails Mobility Standard

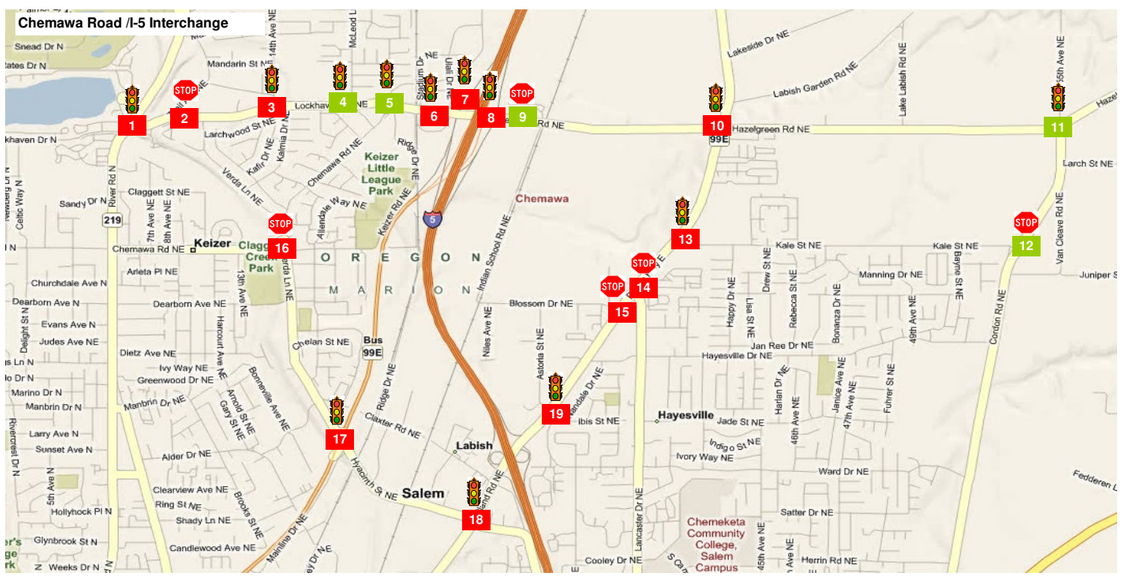
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N




| 1 | Lockhaven Dr. & River Rd. | 2 | Lockhaven Dr. & Trail Ave. | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.39 | V/C Ratio: | 0.79(3.32)^ | V/C Ratio: | 1.42 |
| Delay (s): | 179.5 | Delay (s): | 1000.0 | Delay (s): | 172.2 |
| LOS : | F | LOS : | F | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | Keizer |
| Standard: | LOS D | Standard: | LOS D | Standard: | LOS D |
| PHF | 0.87 | PHF | 0.97 | PHF | 0.91 |
| 3.8% | 185 865 370 | 0.0% | 100 0 35 | 1.6% | 65 25 200 |
| | 345 365 565 3.0% | | 30 1175 0 1.3% | | 340 1110 55 1.5% |
| 5.0% | 130 255 150 | 1.8% | 100 960 0 | 2.4% | 55 920 20 |
| | 120 1245 435 1.3% | | | | 30 25 25 7.0% |

| 4 | Lockhaven Dr. & McLeod Ln. | 5 | Lockhaven & Chemawa/Keizer St. | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 0.95 | V/C Ratio: | 0.87 | V/C Ratio: | 1.26 |
| Delay (s): | 31.4 | Delay (s): | 33.6 | Delay (s): | 115.5 |
| LOS : | C | LOS : | C | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | ODOT |
| Standard: | LOS D | Standard: | LOS D | Standard: | 0.85 |
| PHF | 0.97 | PHF | 0.97 | PHF | 0.98 |
| 1.2% | 115 50 225 | 0.4% | 160 115 155 | 0.8% | 135 0 0 |
| | 400 1360 20 0.7% | | 15 1585 825 0.8% | | 610 2290 210 0.9% |
| 1.3% | 95 1035 15 | 1.1% | 175 1060 60 | 0.7% | 10 1620 35 |
| | 30 65 35 0.0% | | 35 105 450 0.3% | | 0 0 1135 0.7% |

| 7 | Chemawa Rd. & I-5 SB Ramps | 8 | Chemawa Rd. & I-5 NB Ramps | 9 | Chemawa Rd. & Indian School Rd. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.19 | V/C Ratio: | 1.25 | V/C Ratio: | 0.47(0.75)^ |
| Delay (s): | 79.3 | Delay (s): | 141.0 | Delay (s): | 48.8 |
| LOS : | E | LOS : | F | LOS : | E |
| Jurisdiction: | ODOT | Jurisdiction: | ODOT | Jurisdiction: | ODOT |
| Standard: | 0.75 | Standard: | 0.75 | Standard: | 0.85(0.85)^ |
| PHF | 0.97 | PHF | 0.94 | PHF | 0.97 |
| 3.2% | 470 5 115 | | | 1.5% | 165 0 20 |
| | 0 2640 420 1.3% | | 30 1265 0 0.7% | | 15 1130 0 1.3% |
| 0.7% | 0 885 1870 | 1.7% | 110 890 0 | 2.1% | 55 1070 0 |
| | | | 1795 5 235 1.9% | | |

| 10 | Chemawa Rd. & OR 99E | 11 | Hazelgreen Rd. & Cordon Rd. | 12 | Cordon Rd. & Kale St. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.10 | V/C Ratio: | 0.64 | V/C Ratio: | 0.42(0.43)^ |
| Delay (s): | 70.5 | Delay (s): | 9.5 | Delay (s): | 23.0 |
| LOS : | E | LOS : | A | LOS : | C |
| Jurisdiction: | ODOT | Jurisdiction: | Marion County | Jurisdiction: | Marion County |
| Standard: | 0.75 | Standard: | LOS E | Standard: | LOS D |
| PHF | 0.97 | PHF | 0.95 | PHF | 0.94 |
| 1.0% | 240 1060 135 | 1.3% | 35 130 15 | 1.2% | 30 600 0 |
| | 100 440 135 2.7% | | 15 395 115 3.2% | | |
| 1.6% | 170 495 435 | 2.5% | 30 395 385 | 0.0% | 15 0 95 |
| | 475 850 180 0.8% | | 245 120 75 1.4% | | 90 425 0 1.6% |

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# FIGURE A.3a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 12: Brooks Interchange SPUI
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

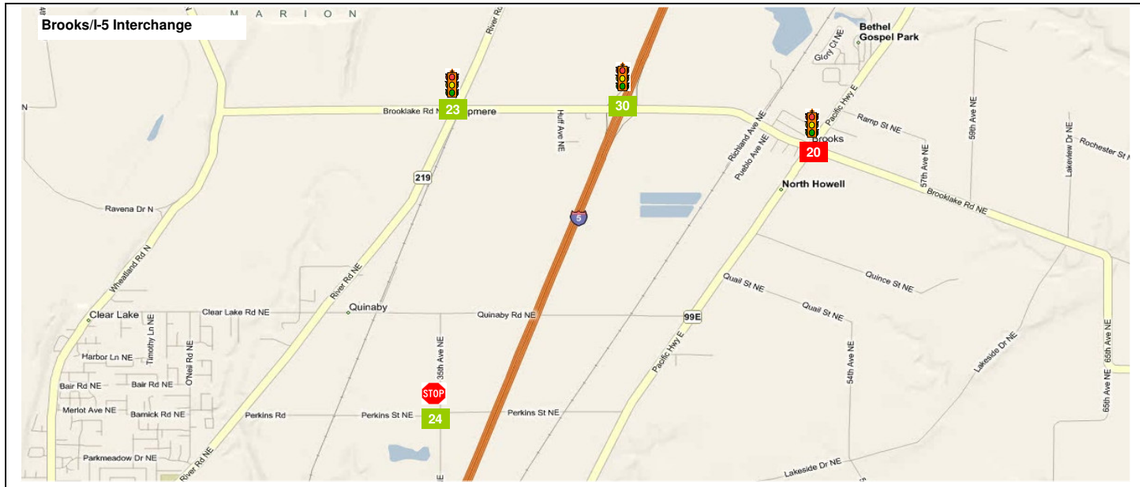
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

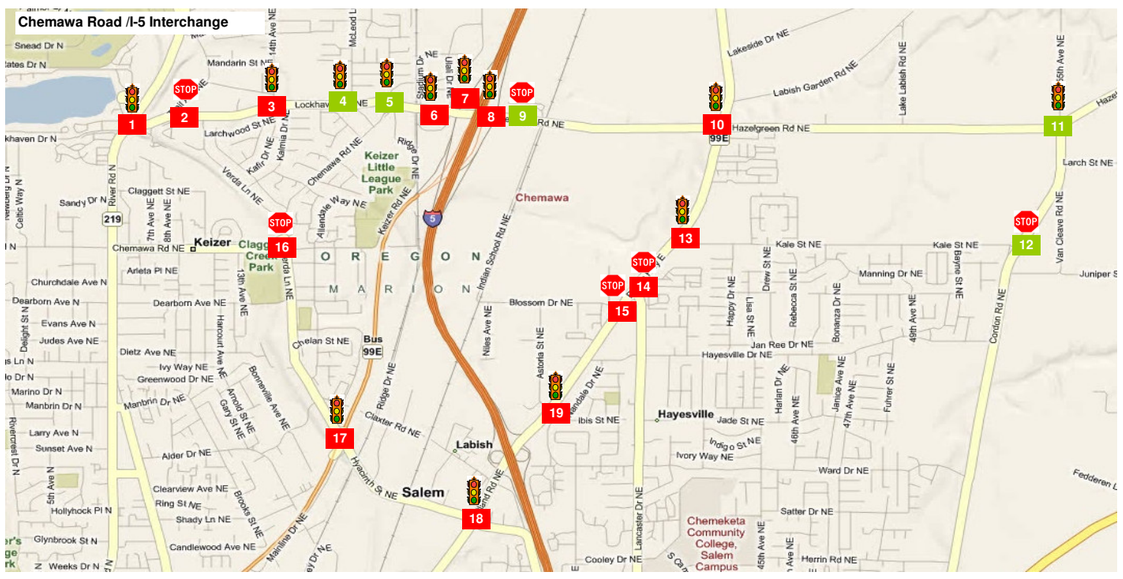
**Legend:**

Volume Diagram

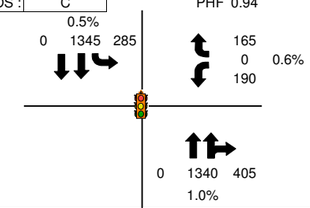
SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

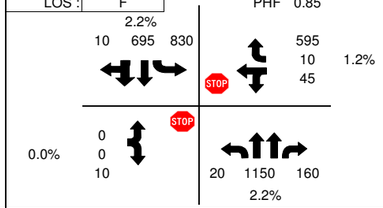


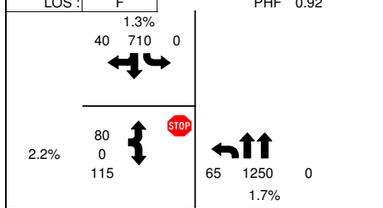

| 13 | OR 99E & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.95 | Jurisdiction: ODOT | |
| Delay (s): | 21.8 | Standard: 0.75 | |
| LOS : | C | PHF 0.94 | |



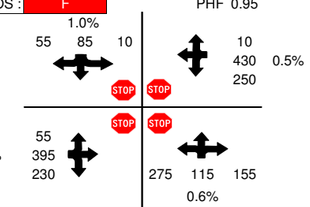

| 14 | OR 99E & Lancaster Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.66(1.68)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.85 | |



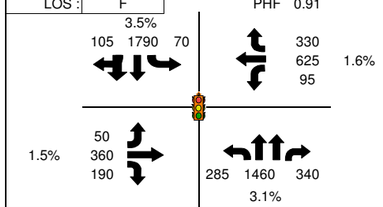

| 15 | OR 99E & Blossom Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.40(1.71)^ | Jurisdiction: ODOT | |
| Delay (s): | 393.1 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.92 | |



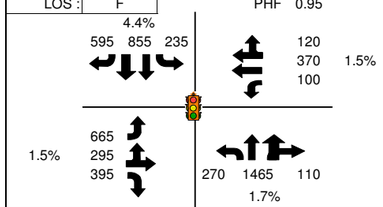

| 16 | Chemawa Rd. & Verda Ln. | | |
|---|---|---|---|
| V/C Ratio: | 1.76 | Jurisdiction: Keizer | |
| Delay (s): | 297.7 | Standard: LOS D | |
| LOS : | F | PHF 0.95 | |



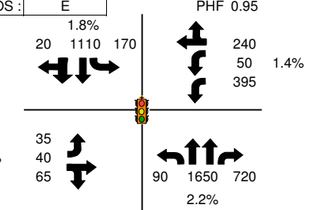

| 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.49 | Jurisdiction: ODOT | |
| Delay (s): | 164.4 | Standard: 0.85 | |
| LOS : | F | PHF 0.91 | |



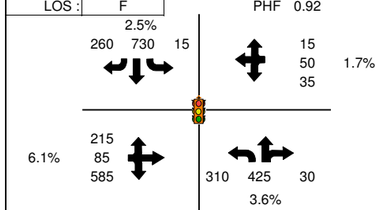

| 18 | OR 99E & Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.38 | Jurisdiction: ODOT | |
| Delay (s): | 157.1 | Standard: 0.75 | |
| LOS : | F | PHF 0.95 | |



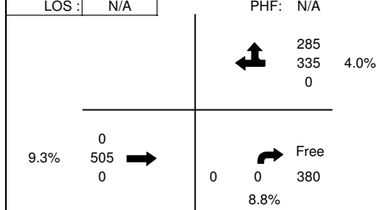

| 19 | OR 99E & Astoria St./Ward St. | | |
|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | |
| Delay (s): | 57.6 | Standard: 0.75 | |
| LOS : | E | PHF 0.95 | |



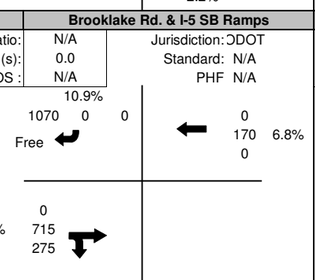

| 20 | Brooklake Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.42 | Jurisdiction: ODOT | |
| Delay (s): | 186.1 | Standard: 0.60 | |
| LOS : | F | PHF 0.92 | |



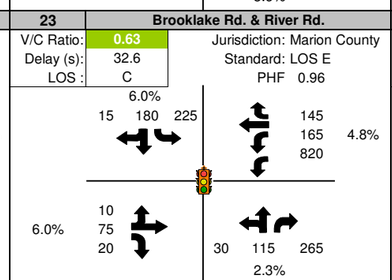

| 21 | Brooklake Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | N/A | Jurisdiction: ODOT | |
| Delay (s): | 0.0 | Standard: N/A | |
| LOS : | N/A | PHF: N/A | |



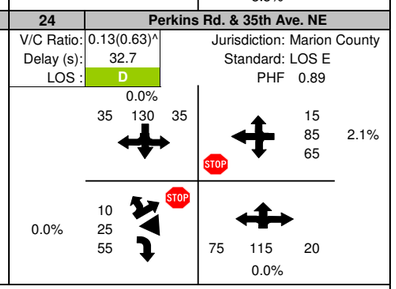

| 22 | Brooklake Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | N/A | Jurisdiction: ODOT | |
| Delay (s): | 0.0 | Standard: N/A | |
| LOS : | N/A | PHF N/A | |




| 23 | Brooklake Rd. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.63 | Jurisdiction: Marion County | |
| Delay (s): | 32.6 | Standard: LOS E | |
| LOS : | C | PHF 0.96 | |




| 24 | Perkins Rd. & 35th Ave. NE | | |
|---|---|---|---|
| V/C Ratio: | 0.13(0.63)^ | Jurisdiction: Marion County | |
| Delay (s): | 32.7 | Standard: LOS E | |
| LOS : | D | PHF 0.89 | |

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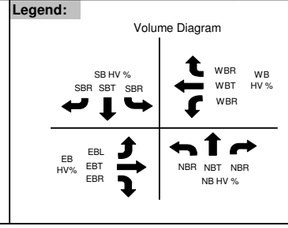
# FIGURE A.3a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 12: Brooks Interchange SPUI
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

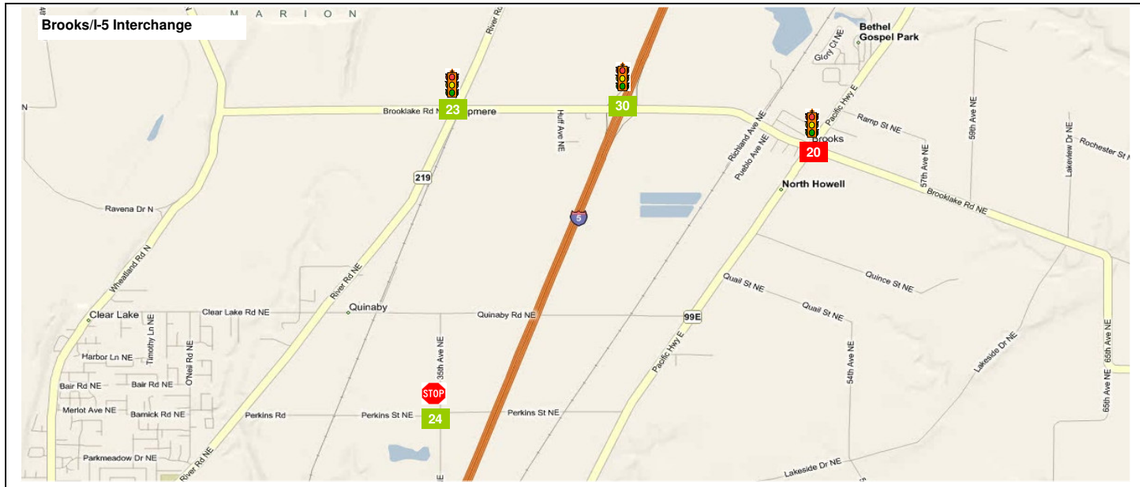
**Notes:**

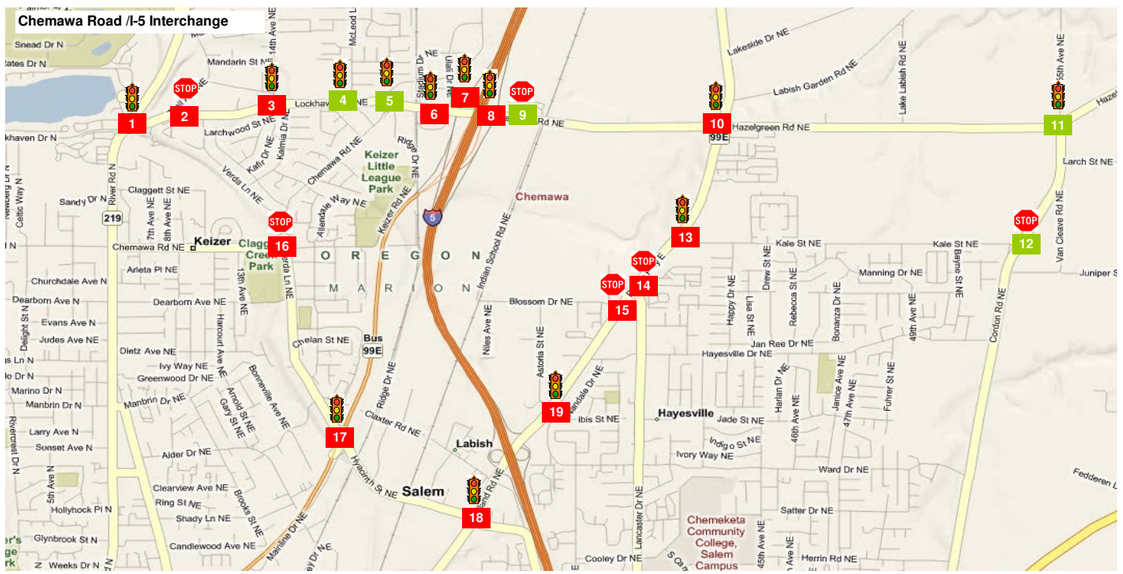
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | 26 | Hyacinth/SB Salem Pkwy Ramps | 27 | Tepper Lane/SB Ramps |
|---|---|---|---|---|---|
| V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT |
| Delay (s): | Standard: | Delay (s): | Standard: | Delay (s): | Standard: |
| LOS : | PHF | LOS : | PHF | LOS : | PHF |
| Does Not Exist in Alternative | | Does Not Exist in Alternative | | Does Not Exist in Alternative | |

| 28 | Tepper Lane/NB Ramps | 29 | Chemawa Road/Tepper Lane | 30 | Brooklake/I-5 Ramps (SPUI) |
|---|---|---|---|---|---|
| V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: Keizer | V/C Ratio: 0.62 | Jurisdiction: ODOT |
| Delay (s): | | Delay (s): | Standard: LOS D | Delay (s): 35.6 | Standard: 0.80 |
| LOS : | | LOS : | PHF 0.00 | LOS : D | PHF: 0.92 |
| Does Not Exist in Alternative | | Does Not Exist in Alternative | | 2.0%; 0 0 390; 0 45 290 2.0%; 600 115 0 2.0%; 125 0 0; 2.0% | |

| 31 | Quinaby Road/NB Ramps | 32 | Quinaby Road/SB Ramps |
|---|---|---|---|
| V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT |
| Delay (s): | Standard: | Delay (s): | Standard: |
| LOS : | PHF | LOS : | PHF |
| Does Not Exist in Alternative | | Does Not Exist in Alternative | |

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# FIGURE A.3a Chemawa Road IAMP Traffic Analysis

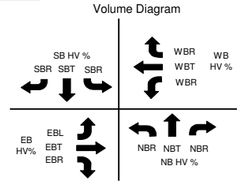
## 2031 Adopted Land Use Alternative 12: Brooks Interchange SPUI
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

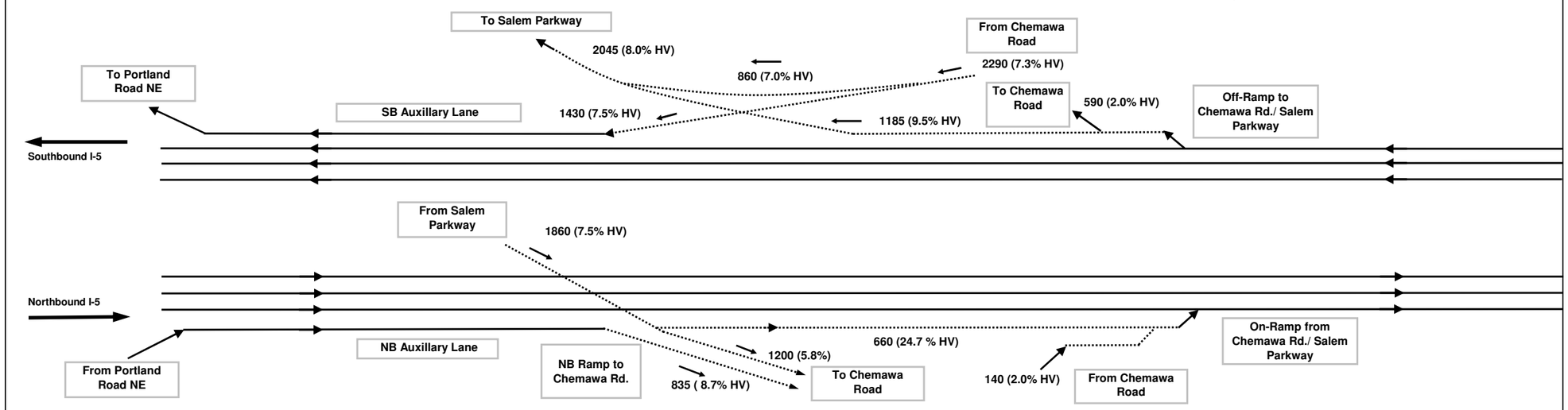
Volume Diagram




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 5930 | 4500 | 1775 | | 6275 |
| | Flow Rate^ | 1650 | 1675 | 2045 | 6835 | 2325 |
| | V/C | 0.70 | 0.71 | 0.97 | 0.97 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 12: Brooks SPUI | Volume | 5490 | 4655 | 800 | | 5455 |
| | Flow Rate^ | 1495 | 1685 | 4130 | 6050 | 2020 |
| | V/C | 0.64 | 0.72 | 0.90 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.3b Chemawa Road IAMP Traffic Analysis

**2031 Adopted Land Use Alternative 12: Brooks Interchange SPUI**
**Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

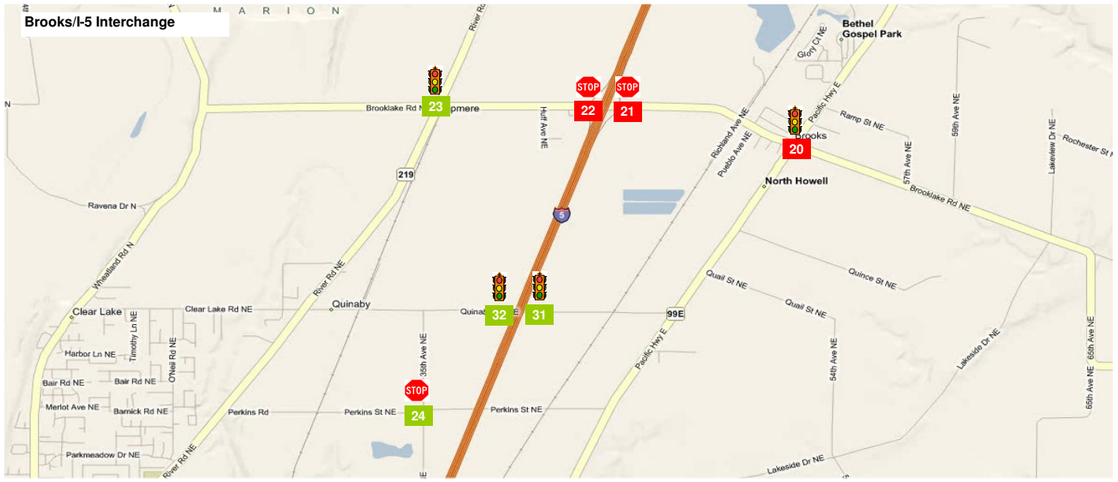
Meets Mobility Standard
Fails Mobility Standard

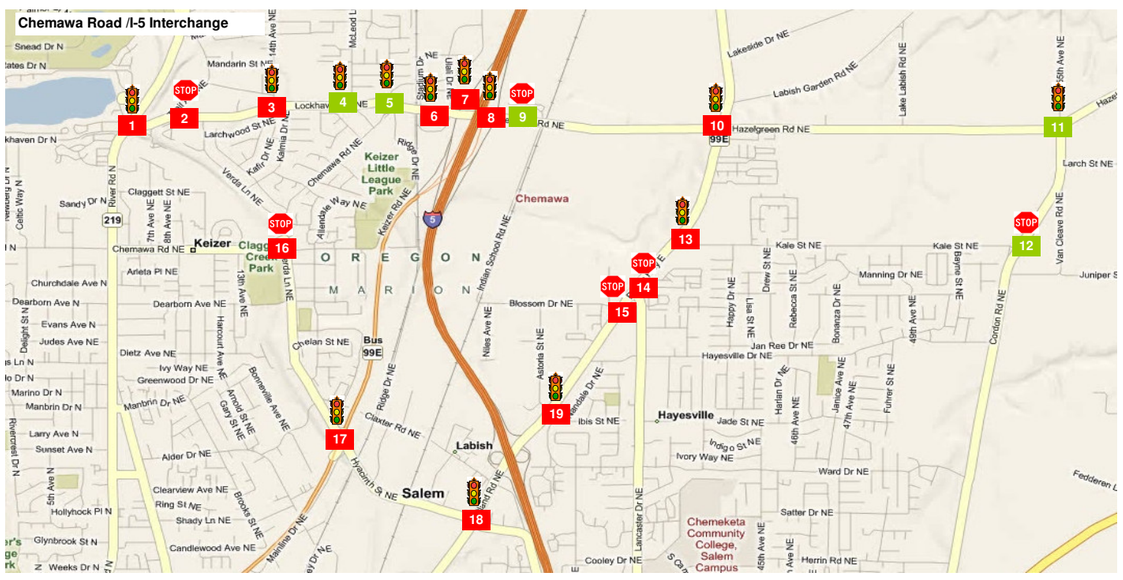
## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

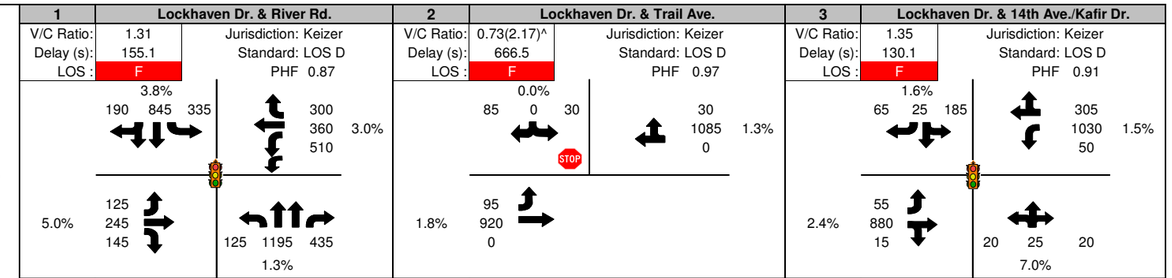
Collector-Distributor Road; Ramps
Mainline Freeway

N

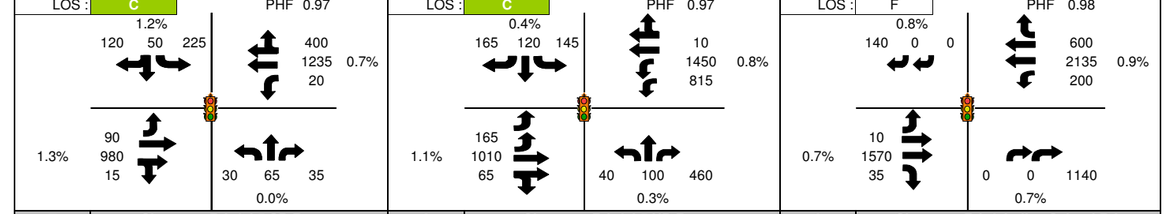


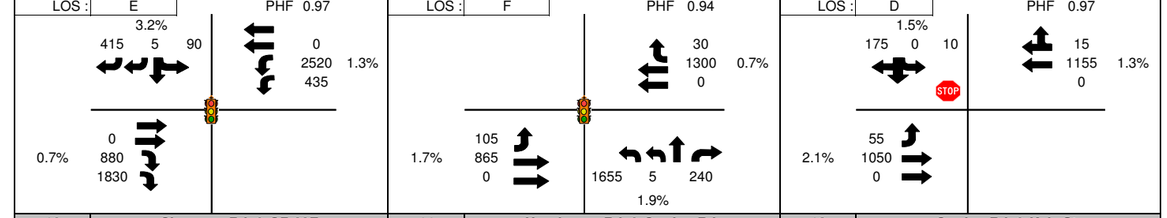

| 1 | Lockhaven Dr. & River Rd. | 2 | Lockhaven Dr. & Trail Ave. | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.31 | V/C Ratio: | 0.73(2.17)^ | V/C Ratio: | 1.35 |
| Delay (s): | 155.1 | Delay (s): | 666.5 | Delay (s): | 130.1 |
| LOS : | F | LOS : | F | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | Keizer |
| Standard: | LOS D | Standard: | LOS D | Standard: | LOS D |
| PHF | 0.87 | PHF | 0.97 | PHF | 0.91 |



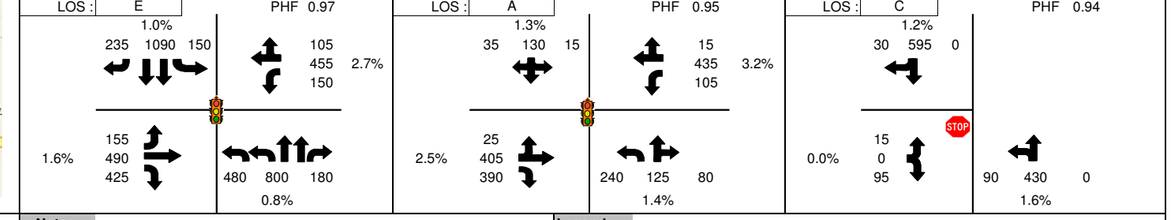

| 4 | Lockhaven Dr. & McLeod Ln. | 5 | Lockhaven & Chemawa/Keizer St. | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | 0.88 | V/C Ratio: | 0.84 | V/C Ratio: | 1.24 |
| Delay (s): | 24.1 | Delay (s): | 33.3 | Delay (s): | 114.8 |
| LOS : | C | LOS : | C | LOS : | F |
| Jurisdiction: | Keizer | Jurisdiction: | Keizer | Jurisdiction: | ODOT |
| Standard: | LOS D | Standard: | LOS D | Standard: | 0.85 |
| PHF | 0.97 | PHF | 0.97 | PHF | 0.98 |




| 7 | Chemawa Rd. & I-5 SB Ramps | 8 | Chemawa Rd. & I-5 NB Ramps | 9 | Chemawa Rd. & Indian School Rd. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.12 | V/C Ratio: | 1.20 | V/C Ratio: | 0.48(0.63)^ |
| Delay (s): | 62.0 | Delay (s): | 120.2 | Delay (s): | 32.6 |
| LOS : | E | LOS : | F | LOS : | D |
| Jurisdiction: | ODOT | | | Jurisdiction: | ODOT |
| Standard: | 0.75 | | | Standard: | 0.85(0.85)^ |
| PHF | 0.97 | PHF | 0.94 | PHF | 0.97 |




| 10 | Chemawa Rd. & OR 99E | 11 | Hazelgreen Rd. & Cordon Rd. | 12 | Cordon Rd. & Kale St. |
|---|---|---|---|---|---|
| V/C Ratio: | 1.10 | V/C Ratio: | 0.64 | V/C Ratio: | 0.42(0.43)^ |
| Delay (s): | 69.9 | Delay (s): | 9.5 | Delay (s): | 22.9 |
| LOS : | E | LOS : | A | LOS : | C |
| Jurisdiction: | ODOT | Jurisdiction: | Marion County | Jurisdiction: | Marion County |
| Standard: | 0.75 | Standard: | LOS E | Standard: | LOS D |
| PHF | 0.97 | PHF | 0.95 | PHF | 0.94 |




**Notes:**

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2. The reported Peak Hour Factor (PHF) is for the overall intersection
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6. A green box on the map represents an acceptable mobility standard
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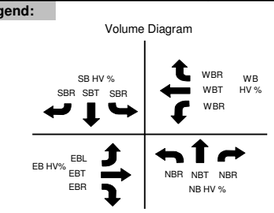
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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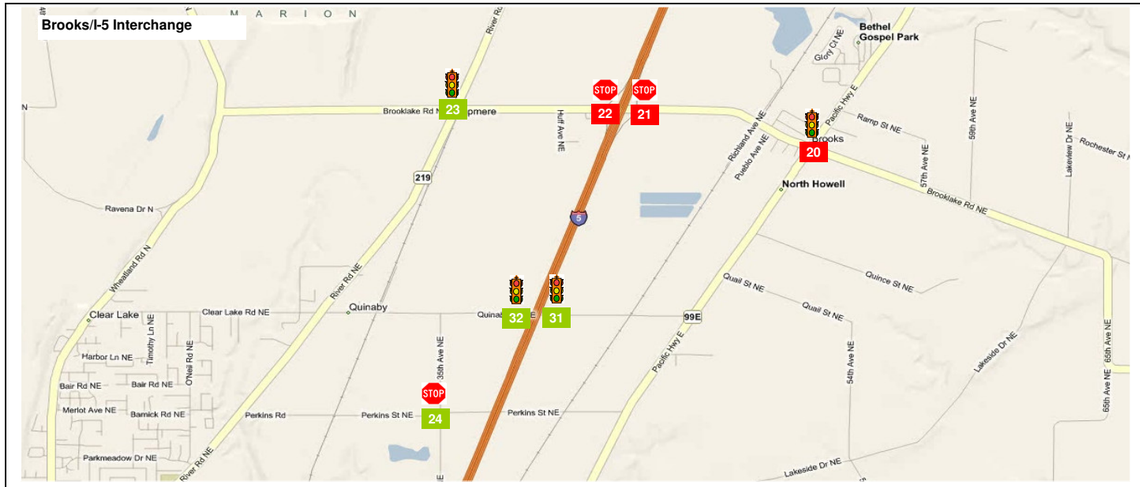
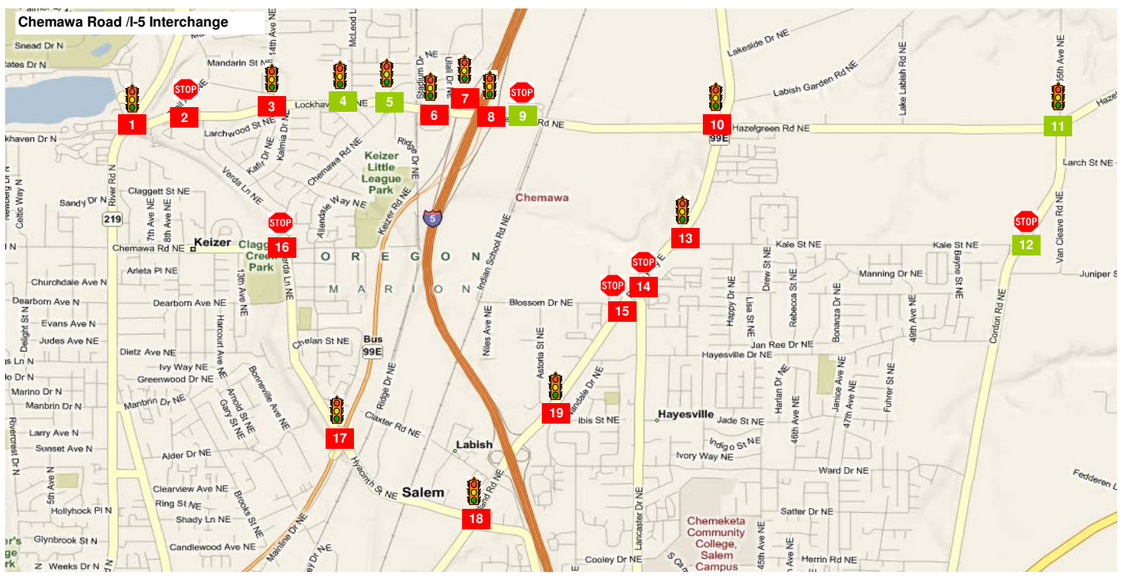
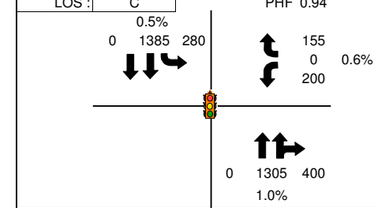
# FIGURE A.4a Chemawa Road IAMP Traffic Analysis

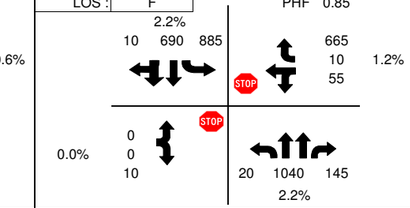
## 2031 Adopted Land Use Alternative 13: Quinaby Road Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

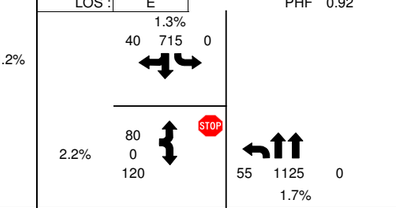


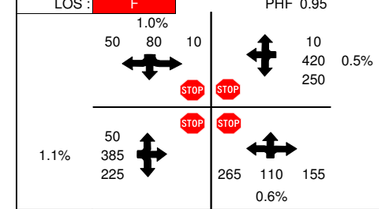

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.93 | Jurisdiction: ODOT | V/C Ratio: | 1.59(1.71)^ | Jurisdiction: ODOT | V/C Ratio: | 0.36(1.53)^ | Jurisdiction: ODOT |
| Delay (s): | 24.8 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 35.9 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | E | PHF 0.92 |

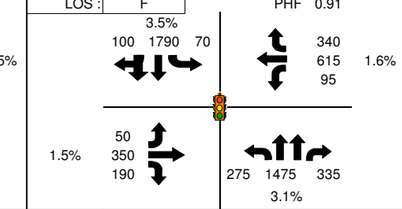


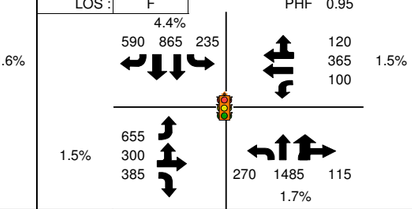



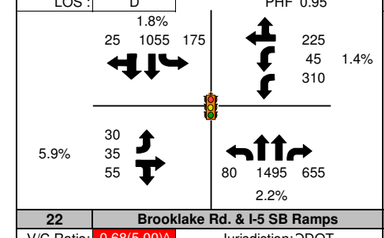

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.71 | Jurisdiction: Keizer | V/C Ratio: | 1.47 | Jurisdiction: ODOT | V/C Ratio: | 1.39 | Jurisdiction: ODOT |
| Delay (s): | 276.6 | Standard: LOS D | Delay (s): | 161.4 | Standard: 0.85 | Delay (s): | 159.5 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

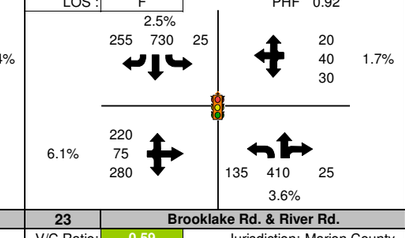


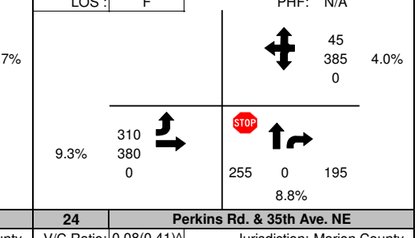



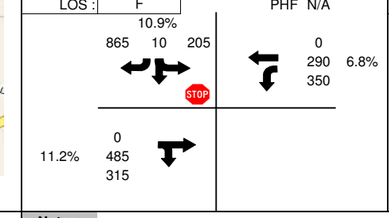

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.93 | Jurisdiction: ODOT | V/C Ratio: | 1.08 | Jurisdiction: ODOT | V/C Ratio: | 0.39(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 36.8 | Standard: 0.75 | Delay (s): | 80.6 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: N/A |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF: N/A |

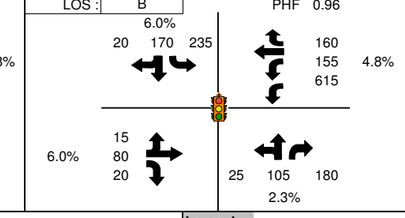


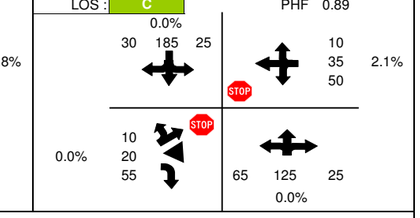




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.68(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.08(0.41)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: N/A | Delay (s): | 19.4 | Standard: LOS E | Delay (s): | 24.1 | Standard: LOS E |
| LOS : | F | PHF N/A | LOS : | B | PHF 0.96 | LOS : | C | PHF 0.89 |

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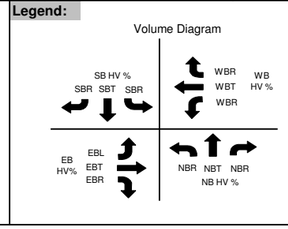
# FIGURE A.4a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 13: Quinaby Road Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

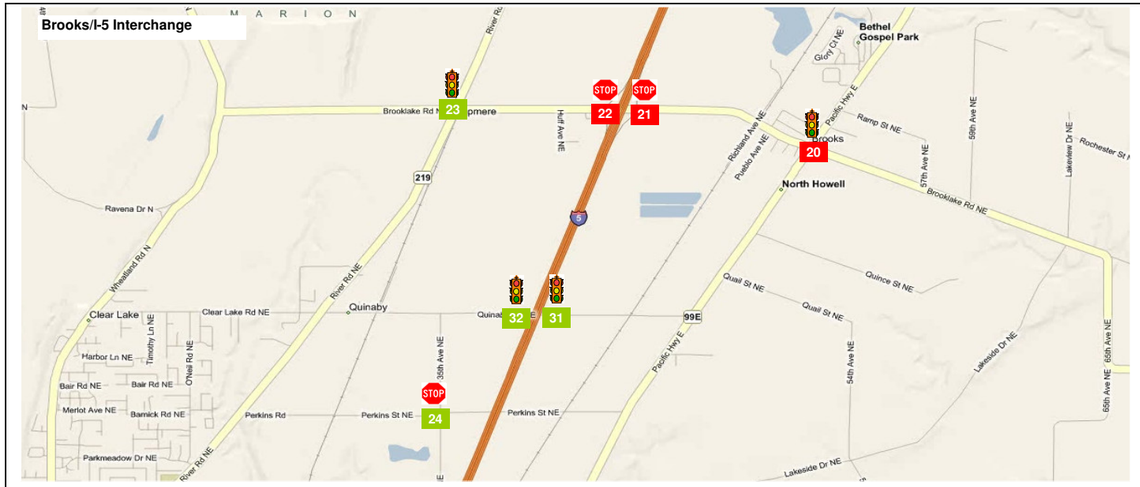
**Notes:**

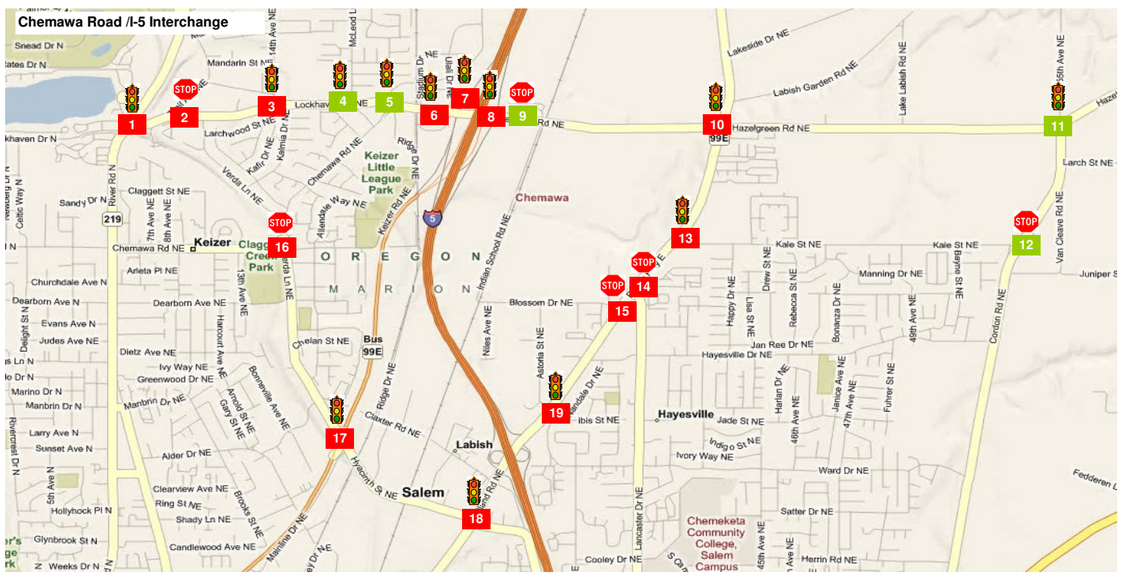
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

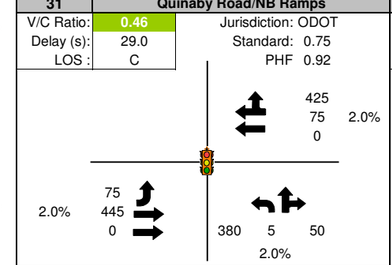


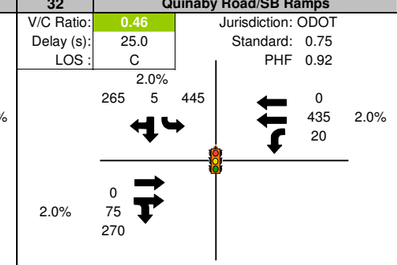




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane/SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | | PHF |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | Does Not Exist in Alternative | | |

| 28 | Tepper Lane/NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | | Delay (s): | | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | | | LOS : | | PHF 0.00 | LOS : | | PHF |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | | |
|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.46 | Jurisdiction: ODOT | V/C Ratio: | 0.46 | Jurisdiction: ODOT | | |
| Delay (s): | 29.0 | Standard: 0.75 | Delay (s): | 25.0 | Standard: 0.75 | | |
| LOS : | C | PHF 0.92 | LOS : | C | PHF 0.92 | | |

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# FIGURE A.4a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 13: Quinaby Road Interchange
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

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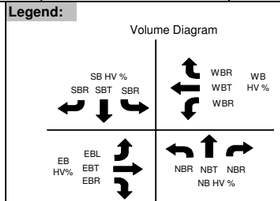
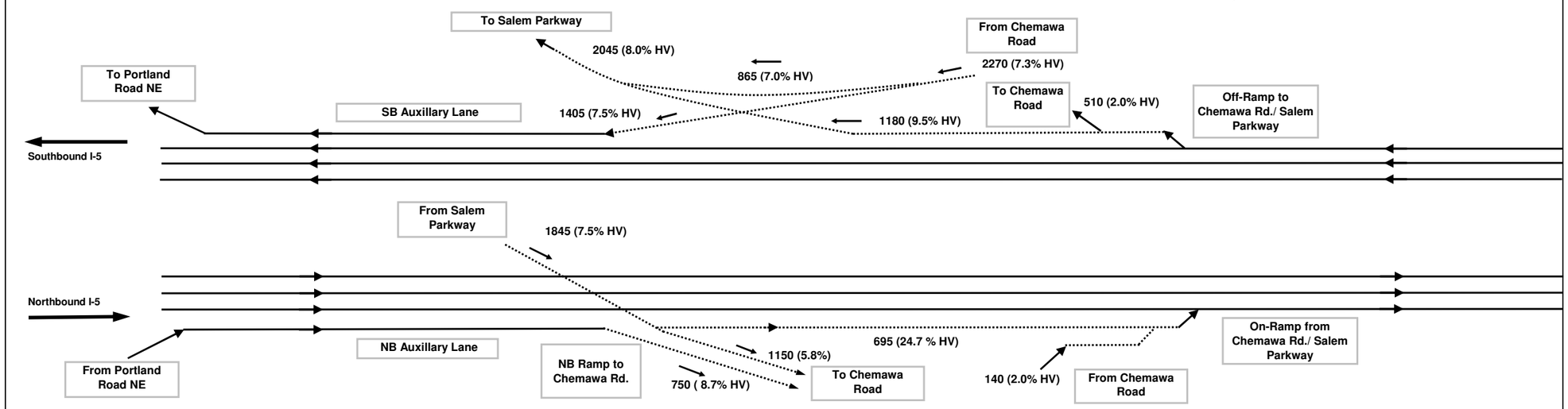



555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 5165 | 3760 | 1690 | | 5450 |
| | Flow Rate^ | 1435 | 1400 | 1945 | 5933 | 2020 |
| | V/C | 0.61 | 0.60 | 0.93 | 0.84 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 5515 | 4765 | 835 | | 5600 |
| | Flow Rate^ | 1505 | 1725 | 4250 | 6220 | 2075 |
| | V/C | 0.64 | 0.73 | 0.92 | 0.88 | 0.88 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.4b Chemawa Road IAMP Traffic Analysis

**2031 Adopted Land Use Alternative 13: Quinaby Road Interchange**
**Freeway Volumes and V/C Ratio: Chemawa/I-5 Interchange**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

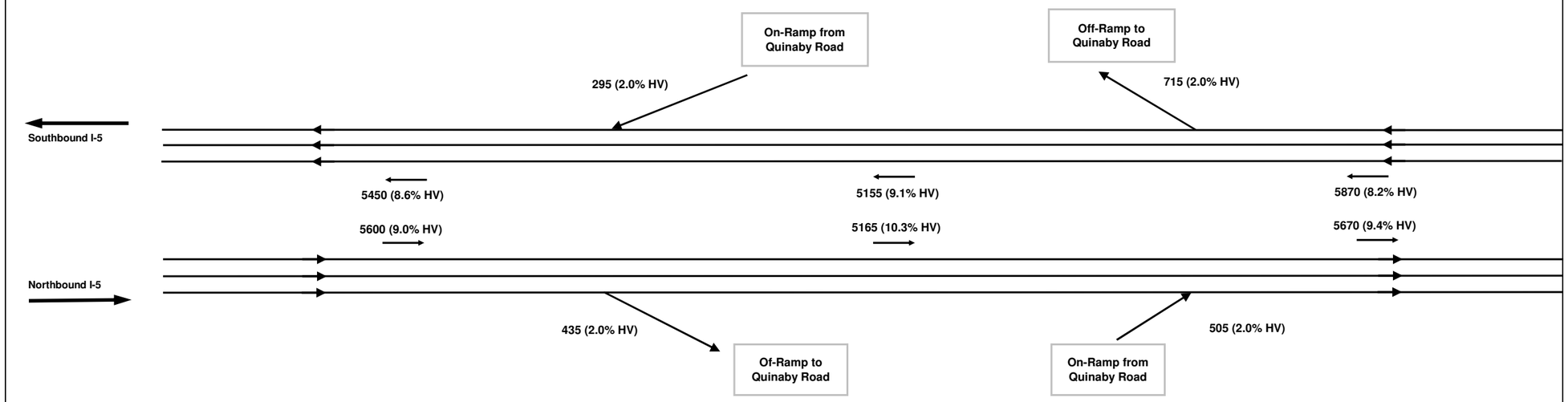
## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

| Scenario | Output Summary | BASIC SEGMENT | MERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|
| | | S105: SB I-5 Mainline | S104: Quinaby On-Ramp | | S103: SB I-5 Mainline | S102: Quinaby Off-Ramp | | S101: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 4600 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.6% | 2.0% | | 9.1% | 2.0% | | 8.2% |
| | PHF | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 5450 | 295 | | 5155 | 715 | | 5870 |
| | Flow Rate^ | 2020 | 3785 | 6100 | 1920 | 805 | 6390 | 2175 |
| | V/C | 0.86 | 0.82 | 0.87 | 0.82 | 0.38 | 0.91 | 0.93 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| | | | Length = 750' | | | Length = 750' | | |




| Scenario | Output Summary | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|
| | | N101: NB I-5 Mainline | N102: Quinaby Off-Ramp | | N103: NB I-5 Mainline | N104: Quinaby On-Ramp | | N105: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2100 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 9.0% | 2.0% | | 10.3% | 2.0% | | 9.4% |
| | PHF | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 13: Quinaby Interchange | Volume | 5600 | 435 | | 5165 | 505 | | 5670 |
| | Flow Rate^ | 2075 | 490 | 6100 | 1935 | 4045 | 6370 | 2110 |
| | V/C | 0.88 | 0.23 | 0.87 | 0.82 | 0.88 | 0.90 | 0.90 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| | | | Length = 750' | | | Length = 750' | | |

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## FIGURE A.4b Chemawa Road IAMP Traffic Analysis

**2031 Adopted Land Use Alternative 13: Quinaby Road Interchange**
**Freeway Volumes and V/C Ratio: Quinaby Road/I-5 Interchange**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

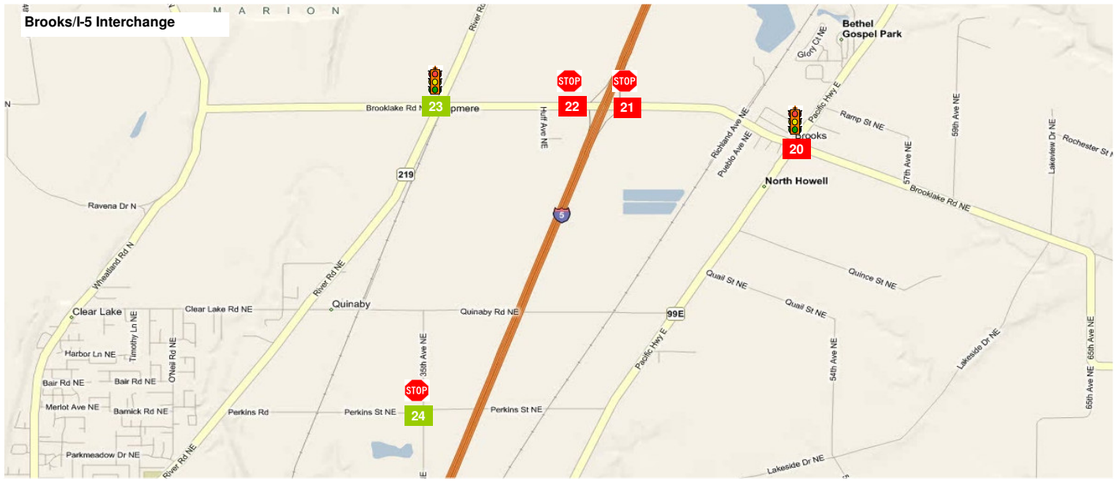
Meets Mobility Standard
Fails Mobility Standard

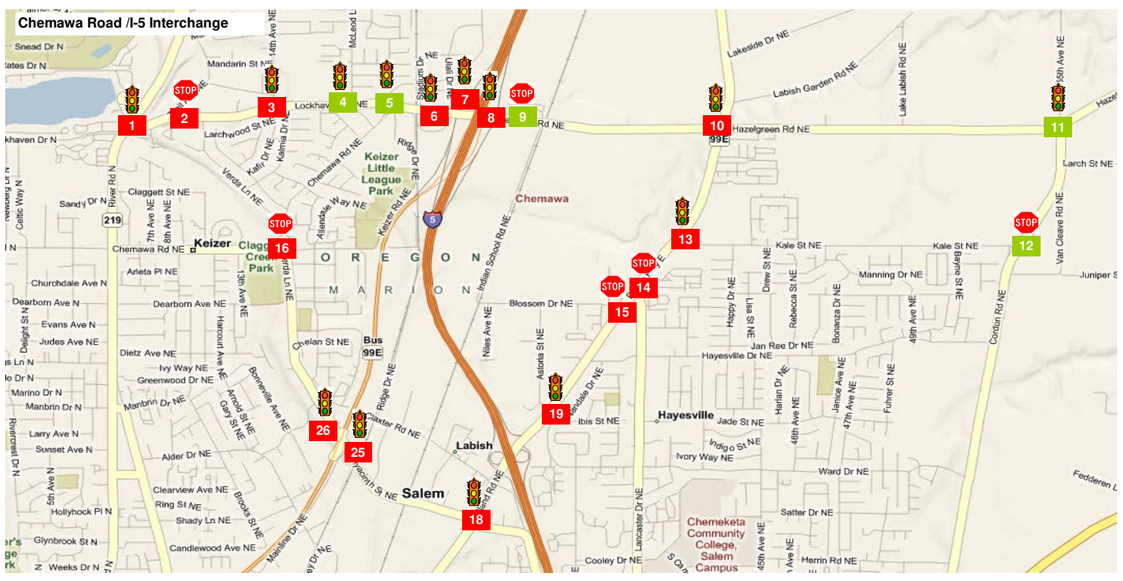
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

..... Collector-Distributor Road; Ramps
——— Mainline Freeway

N




| 1 | Lockhaven Dr. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 1.36 | Jurisdiction: Keizer | |
| Delay (s): | 165.8 | Standard: LOS D | |
| LOS : | F | PHF | 0.87 |

3.8%
180 850 370
355
355 3.0%
505
5.0%
135
250
130
110 1245 425
1.3%

| 2 | Lockhaven Dr. & Trail Ave. | | |
|---|---|---|---|
| V/C Ratio: | 0.75(2.88)^ | Jurisdiction: Keizer | |
| Delay (s): | 991.9 | Standard: LOS D | |
| LOS : | F | PHF | 0.97 |

0.0%
95 0 35
35
1120 1.3%
0
1.8%
100
945
0

| 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.42 | Jurisdiction: Keizer | |
| Delay (s): | 159.6 | Standard: LOS D | |
| LOS : | F | PHF | 0.91 |

1.6%
65 25 200
340
1065 1.5%
50
2.4%
55
910
15
25 25 20
7.0%

| 4 | Lockhaven Dr. & McLeod Ln. | | |
|---|---|---|---|
| V/C Ratio: | 0.88 | Jurisdiction: Keizer | |
| Delay (s): | 24.1 | Standard: LOS D | |
| LOS : | C | PHF | 0.97 |

1.2%
140 50 220
380
1280 0.7%
15
1.3%
110
1010
10
35 70 35
0.0%

| 5 | Lockhaven & Chemawa/Keizer St. | | |
|---|---|---|---|
| V/C Ratio: | 0.84 | Jurisdiction: Keizer | |
| Delay (s): | 32.4 | Standard: LOS D | |
| LOS : | C | PHF | 0.97 |

0.4%
170 110 135
10
1460 0.8%
785
1.1%
165
1040
60
45 100 440
0.3%

| 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.24 | Jurisdiction: ODOT | |
| Delay (s): | 113.1 | Standard: | 0.85 |
| LOS : | F | PHF | 0.98 |

0.8%
155 0 0
615
2100 0.9%
215
0.7%
10
1565
40
0 0 1120
0.7%

| 7 | Chemawa Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.12 | Jurisdiction: ODOT | |
| Delay (s): | 61.9 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |

3.2%
480 5 120
0
2450 1.3%
450
0.7%
0
850
1835

| 8 | Chemawa Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.18 | Jurisdiction: ODOT | |
| Delay (s): | 109.6 | Standard: | 0.75 |
| LOS : | F | PHF | 0.94 |

35
1235 0.7%
0
1.7%
100
870
0
1665 5 280
1.9%

| 9 | Chemawa Rd. & Indian School Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.46(0.58)^ | Jurisdiction: ODOT | |
| Delay (s): | 28.8 | Standard: | 0.85(0.85)^ |
| LOS : | D | PHF | 0.97 |

1.5%
165 0 10
15
1105 1.3%
0
2.1%
55
1095
0

| 10 | Chemawa Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.07 | Jurisdiction: ODOT | |
| Delay (s): | 62.9 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |

1.0%
245 1025 135
100
435 2.7%
115
1.6%
190
510
415
445 815 175
0.8%

| 11 | Hazelgreen Rd. & Cordon Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.63 | Jurisdiction: Marion County | |
| Delay (s): | 40.4 | Standard: LOS E | |
| LOS : | D | PHF | 0.95 |

1.3%
25 125 15
15
395 3.2%
115
2.5%
25
405
390
230 110 70
1.4%

| 12 | Cordon Rd. & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.42(0.42)^ | Jurisdiction: Marion County | |
| Delay (s): | 22.6 | Standard: LOS D | |
| LOS : | C | PHF | 0.94 |

1.2%
30 600 0
0.0%
15
0
95
90 395 0
1.6%

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

Volume Diagram

SB HV %
SBR SBT SBR
WBR WB
WBT HV %
WBR
EB HV%
EBL
EBT
EBR
NBR NBT NBR
NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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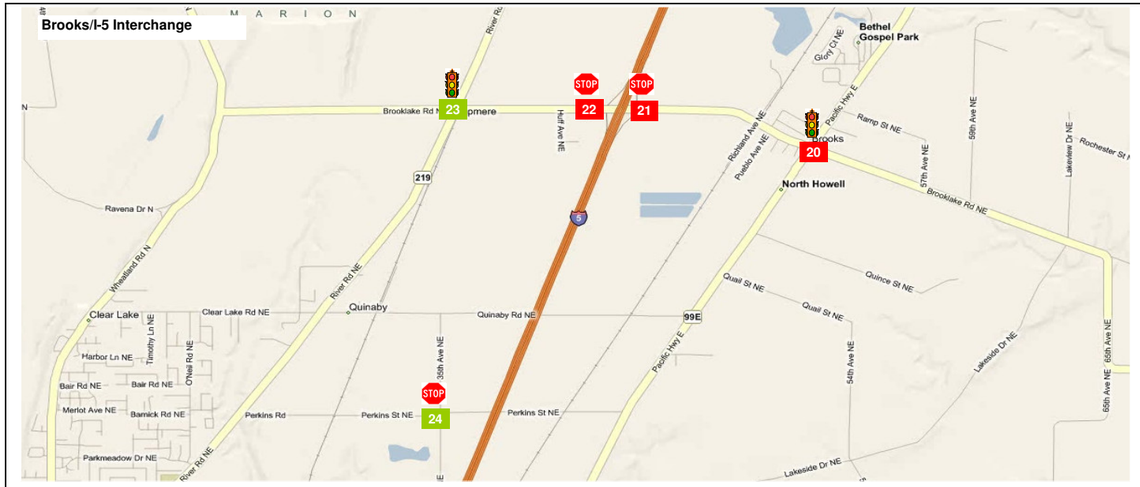
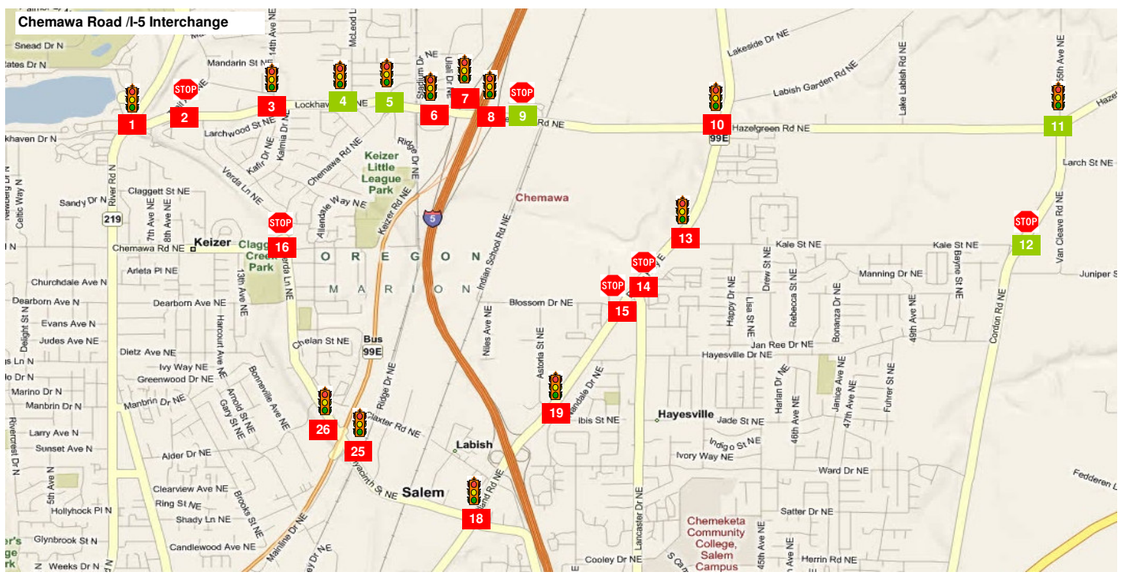
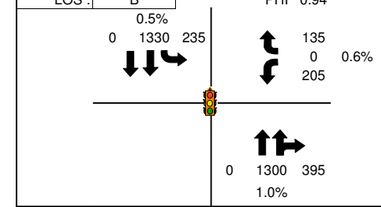
# FIGURE A.5a Chemawa Road IAMP Traffic Analysis

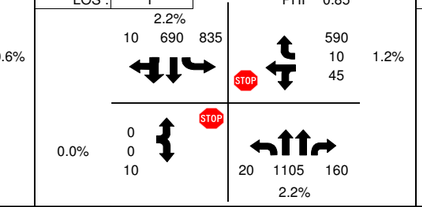
## 2031 Adopted Land Use Alternative 14: Verda/Hyacinth Corridor Improvements
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

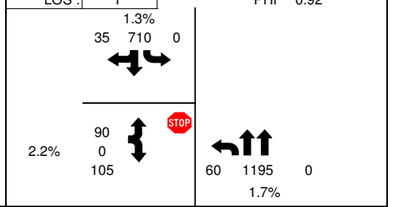


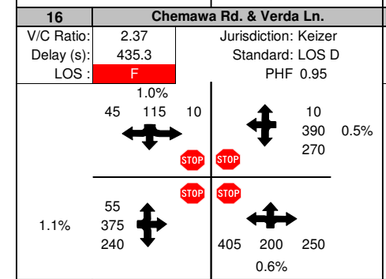

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.87 | Jurisdiction: ODOT | V/C Ratio: | 1.60(1.60)^ | Jurisdiction: ODOT | V/C Ratio: | 0.39(1.74)^ | Jurisdiction: ODOT |
| Delay (s): | 19.8 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 409.3 | Standard: 0.75(0.85)^ |
| LOS : | B | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |

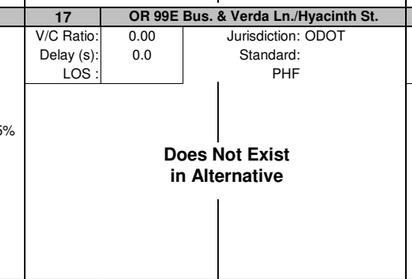


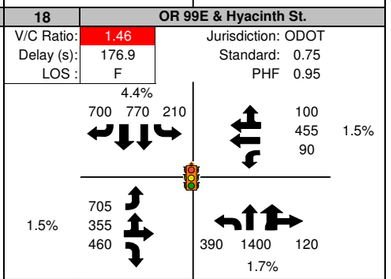



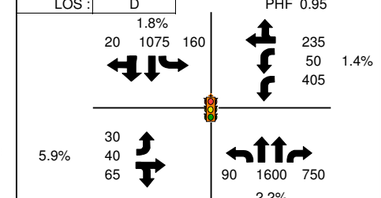

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 2.37 | Jurisdiction: Keizer | V/C Ratio: | 0.00 | Jurisdiction: ODOT | V/C Ratio: | 1.46 | Jurisdiction: ODOT |
| Delay (s): | 435.3 | Standard: LOS D | Delay (s): | 0.0 | Standard: | Delay (s): | 176.9 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | | PHF | LOS : | F | PHF 0.95 |

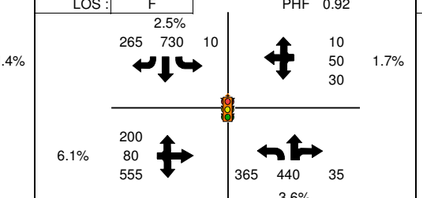


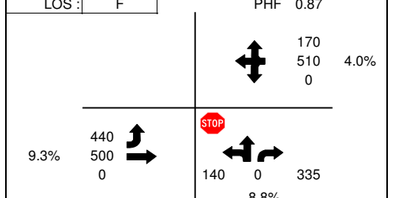



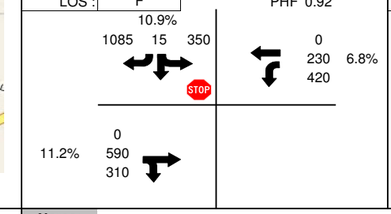

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.99 | Jurisdiction: ODOT | V/C Ratio: | 1.41 | Jurisdiction: ODOT | V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 44.7 | Standard: 0.75 | Delay (s): | 183.7 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

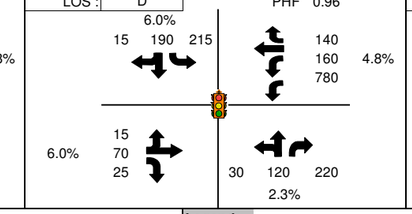


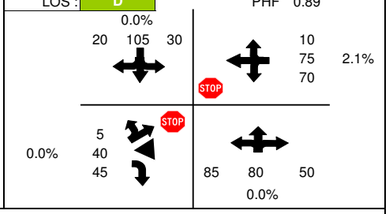




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.90(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.73 | Jurisdiction: Marion County | V/C Ratio: | 0.57(0.07)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 36.0 | Standard: LOS E | Delay (s): | 27.7 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | D | PHF 0.96 | LOS : | D | PHF 0.89 |

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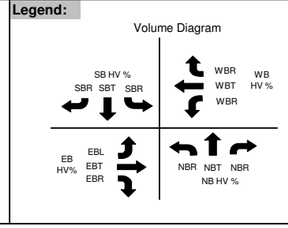
# FIGURE A.5a Chemawa Road IAMP Traffic Analysis

## 2031 Adopted Land Use Alternative 14: Verda/Hyacinth Corridor Improvements
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

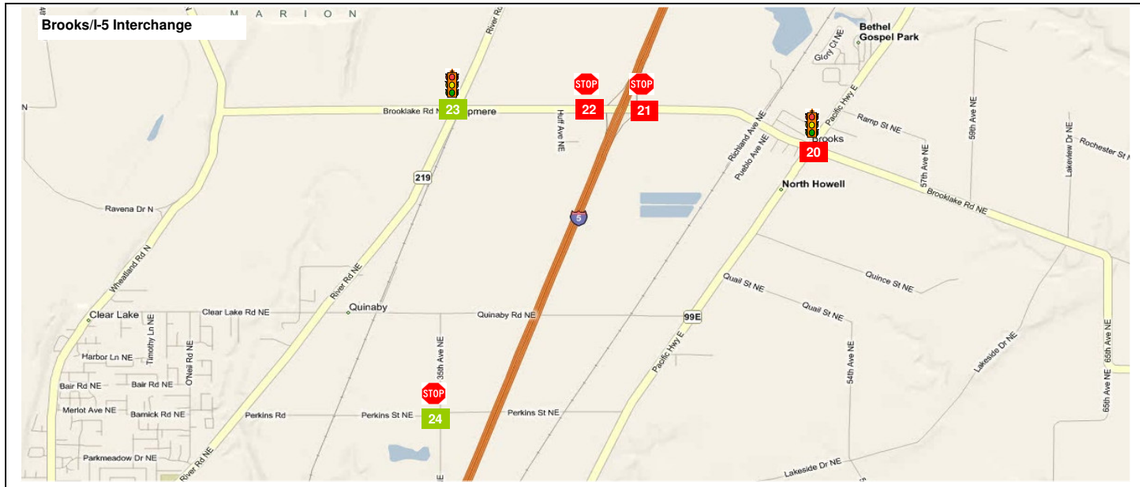
**Notes:**

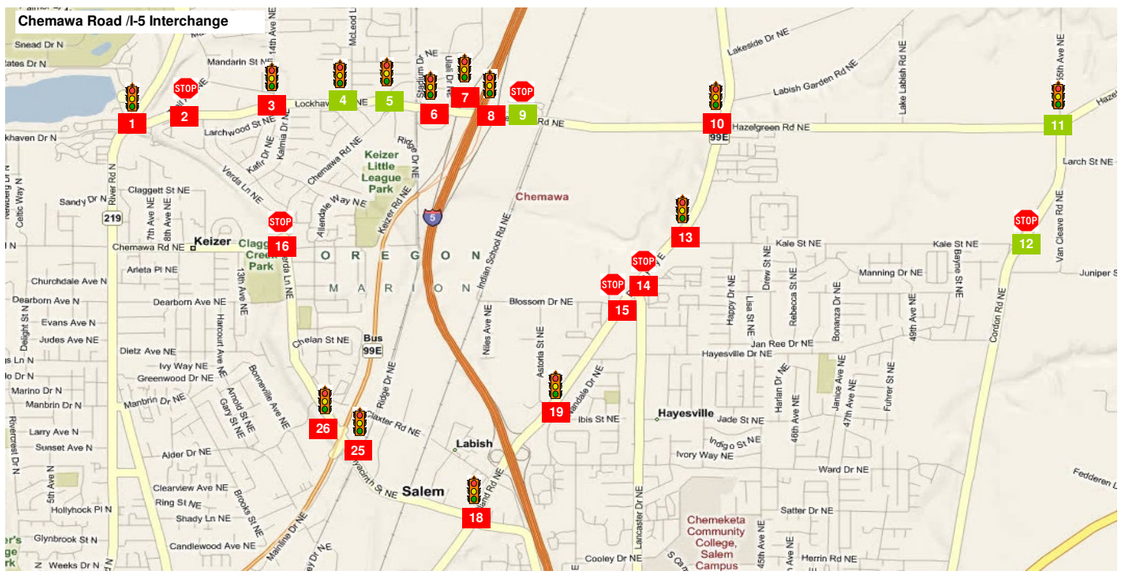
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

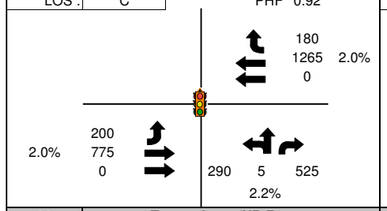


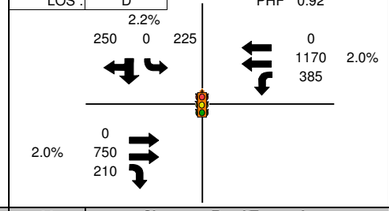

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane /SB Ramps |
|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.81 | Jurisdiction: ODOT | V/C Ratio: | 0.86 | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT |
| Delay (s): | 25.5 | Standard: 0.75 | Delay (s): | 30.7 | Standard: 0.75 | Delay (s): | Standard: |
| LOS : | C | PHF 0.92 | LOS : | D | PHF 0.92 | LOS : | PHF |




Does Not Exist in Alternative

| 28 | Tepper Lane /NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) |
|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | V/C Ratio: | | Jurisdiction: | V/C Ratio: | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | PHF |

Does Not Exist in Alternative

Does Not Exist in Alternative

Does Not Exist in Alternative

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | | |
|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | | |
| Delay (s): | | Standard: | Delay (s): | | Standard: | | |
| LOS : | | PHF | LOS : | | PHF | | |

Does Not Exist in Alternative

Does Not Exist in Alternative

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# FIGURE A.5a Chemawa Road IAMP Traffic Analysis

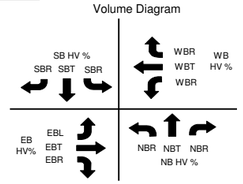
## 2031 Adopted Land Use Alternative 14: Verda/Hyacinth Corridor Improvements
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

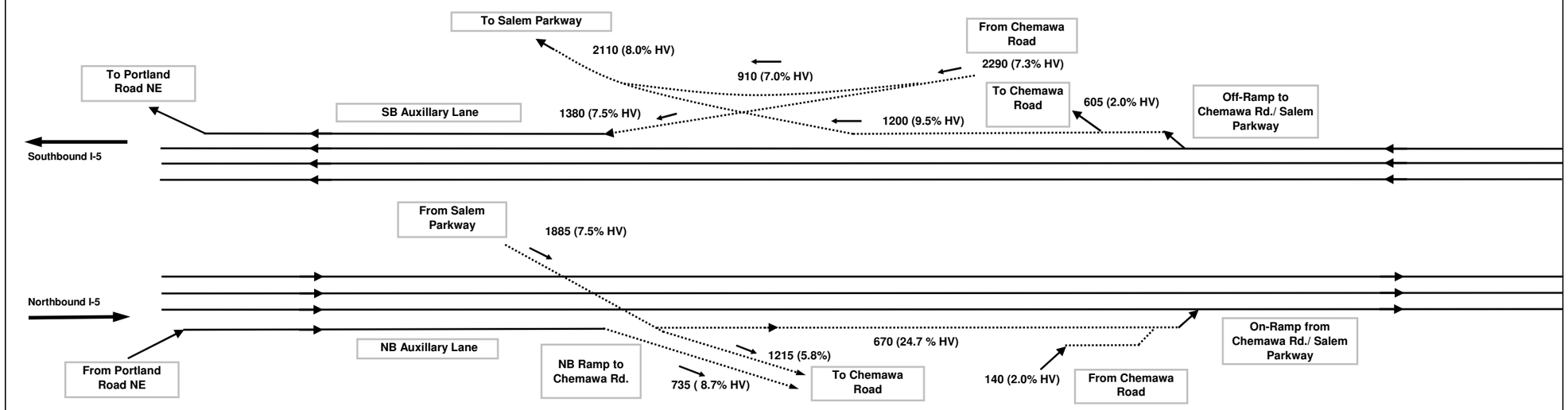
Volume Diagram




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/ Verda | Volume | 5940 | 4560 | 1805 | | 6365 |
| | Flow Rate^ | 1650 | 1700 | 2080 | 6930 | 2360 |
| | V/C | 0.70 | 0.72 | 0.99 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.9% | 20.7% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 14: Improved Hyacinth/ Verda | Volume | 5370 | 4635 | 810 | | 5445 |
| | Flow Rate^ | 1465 | 1675 | 4130 | 6040 | 1987 |
| | V/C | 0.62 | 0.71 | 0.90 | 0.86 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.5b Chemawa Road IAMP Traffic Analysis

**2031 Adopted Land Use Alternative 14: Verda/Hyacinth Corridor Improvements**
**Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

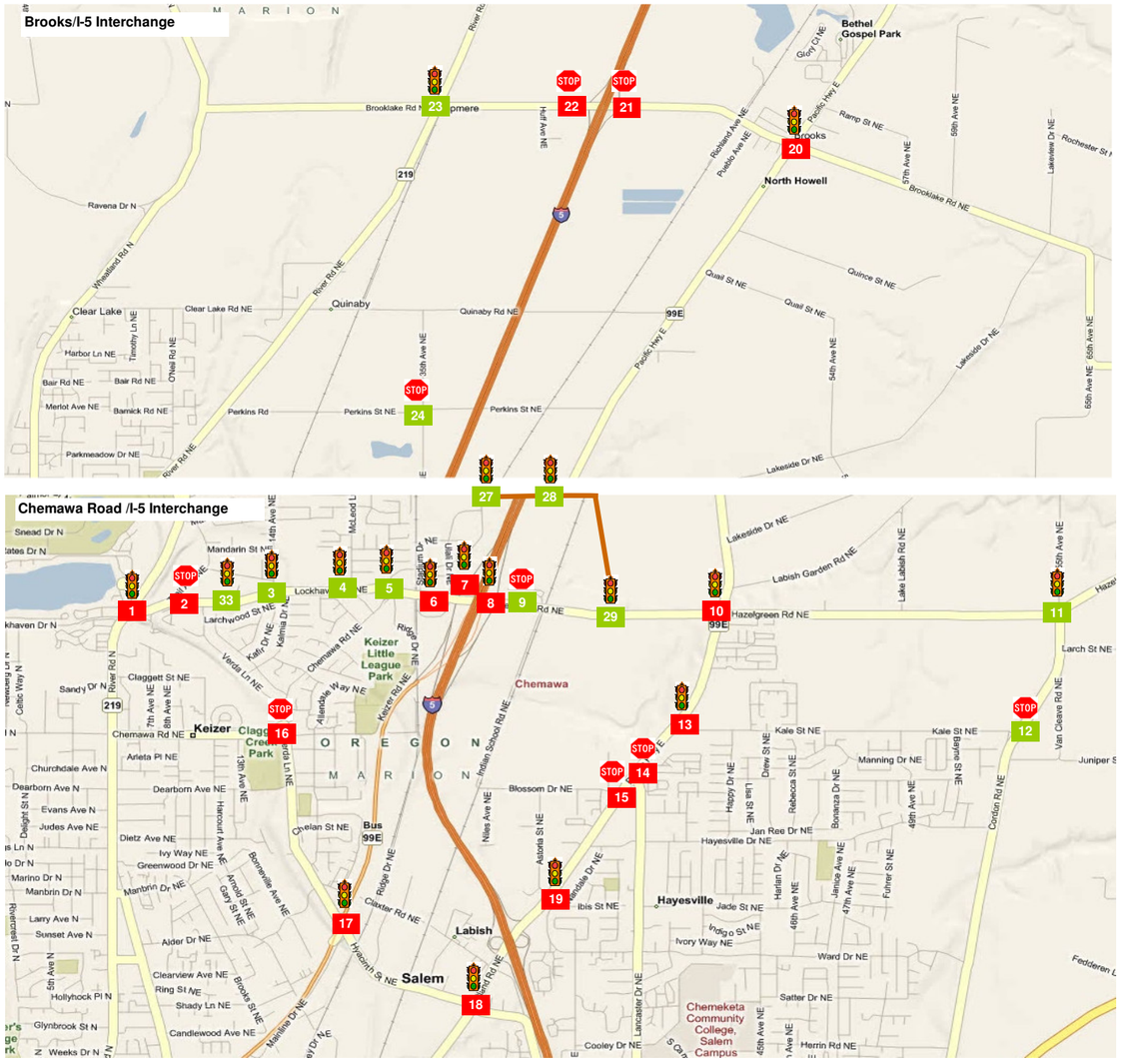
Meets Mobility Standard
Fails Mobility Standard

## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N




| 1 | Lockhaven Dr. & River Rd. | 2 | Lockhaven Dr. & Trail Ave. | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. |
|---|---|---|---|---|---|
| V/C Ratio: 1.12 | Jurisdiction: Keizer | V/C Ratio: 0.27(0.89)^ | Jurisdiction: Keizer | V/C Ratio: 0.75 | Jurisdiction: Keizer |
| Delay (s): 112.1 | Standard: LOS D | Delay (s): 68.6 | Standard: LOS D | Delay (s): 13.4 | Standard: LOS D |
| LOS : F | PHF 0.87 | LOS : F | PHF 0.97 | LOS : B | PHF 0.91 |
| 3.8%; 165 785 230; 105 245 190; 5.0%; 205 360 530 3.0%; 180 1135 485; 1.3% | | 0.0%; 160 0 25; 95 865 0; 1.8%; 15 935 0 1.3% | | 1.6%; 30 10 45; 70 1165 35; 2.4%; 185 1350 55 1.5%; 40 20 15; 7.0% | |

| 4 | Lockhaven Dr. & McLeod Ln. | 5 | Lockhaven & Chemawa/Keizer St. | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. |
|---|---|---|---|---|---|
| V/C Ratio: 0.71 | Jurisdiction: Keizer | V/C Ratio: 0.83 | Jurisdiction: Keizer | V/C Ratio: 1.00 | Jurisdiction: ODOT |
| Delay (s): 17.1 | Standard: LOS D | Delay (s): 31.6 | Standard: LOS D | Delay (s): 53.0 | Standard: 0.85 |
| LOS : B | PHF 0.97 | LOS : C | PHF 0.97 | LOS : D | PHF 0.98 |
| 1.2%; 130 50 220; 100 1110 15; 1.3%; 395 1420 25 0.7%; 40 65 40; 0.0% | | 0.4%; 155 90 200; 195 1130 45; 1.1%; 20 1640 870 0.8%; 45 100 420; 0.3% | | 0.8%; 265 0 0; 15 1700 35; 0.7%; 505 2265 110 0.9%; 0 0 915; 0.7% | |

| 7 | Chemawa Rd. & I-5 SB Ramps | 8 | Chemawa Rd. & I-5 NB Ramps | 9 | Chemawa Rd. & Indian School Rd. |
|---|---|---|---|---|---|
| V/C Ratio: 1.05 | Jurisdiction: ODOT | V/C Ratio: 1.06 | Jurisdiction: ODOT | V/C Ratio: 0.25(0.45)^ | Jurisdiction: ODOT |
| Delay (s): 35.4 | Standard: 0.75 | Delay (s): 75.5 | Standard: 0.75 | Delay (s): 17.5 | Standard: 0.85(0.85)^ |
| LOS : D | PHF 0.97 | LOS : E | PHF 0.94 | LOS : C | PHF 0.97 |
| 3.2%; 405 5 90; 0 700 1915; 0.7%; 0 2475 395 1.3% | | 1.7%; 100 690 0; 30 1155 0 0.7%; 1715 5 225; 1.9% | | 1.5%; 190 0 15; 55 860 0; 2.1%; 20 995 0 1.3% | |

| 10 | Chemawa Rd. & OR 99E | 11 | Hazelgreen Rd. & Cordon Rd. | 12 | Cordon Rd. & Kale St. |
|---|---|---|---|---|---|
| V/C Ratio: 1.05 | Jurisdiction: ODOT | V/C Ratio: 0.85 | Jurisdiction: Marion County | V/C Ratio: 0.41(0.42)^ | Jurisdiction: Marion County |
| Delay (s): 67.9 | Standard: 0.75 | Delay (s): 44.5 | Standard: LOS E | Delay (s): 22.4 | Standard: LOS D |
| LOS : E | PHF 0.97 | LOS : D | PHF 0.95 | LOS : C | PHF 0.94 |
| 1.0%; 225 1050 125; 170 495 465; 1.6%; 95 440 140 2.7%; 505 830 180; 0.8% | | 1.3%; 30 130 15; 40 385 375; 2.5%; 15 400 110 3.2%; 245 125 75; 1.4% | | 1.2%; 30 585 0; 15 0 95; 0.0%; 90 430 0; 1.6% | |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

Volume Diagram

SB HV %; SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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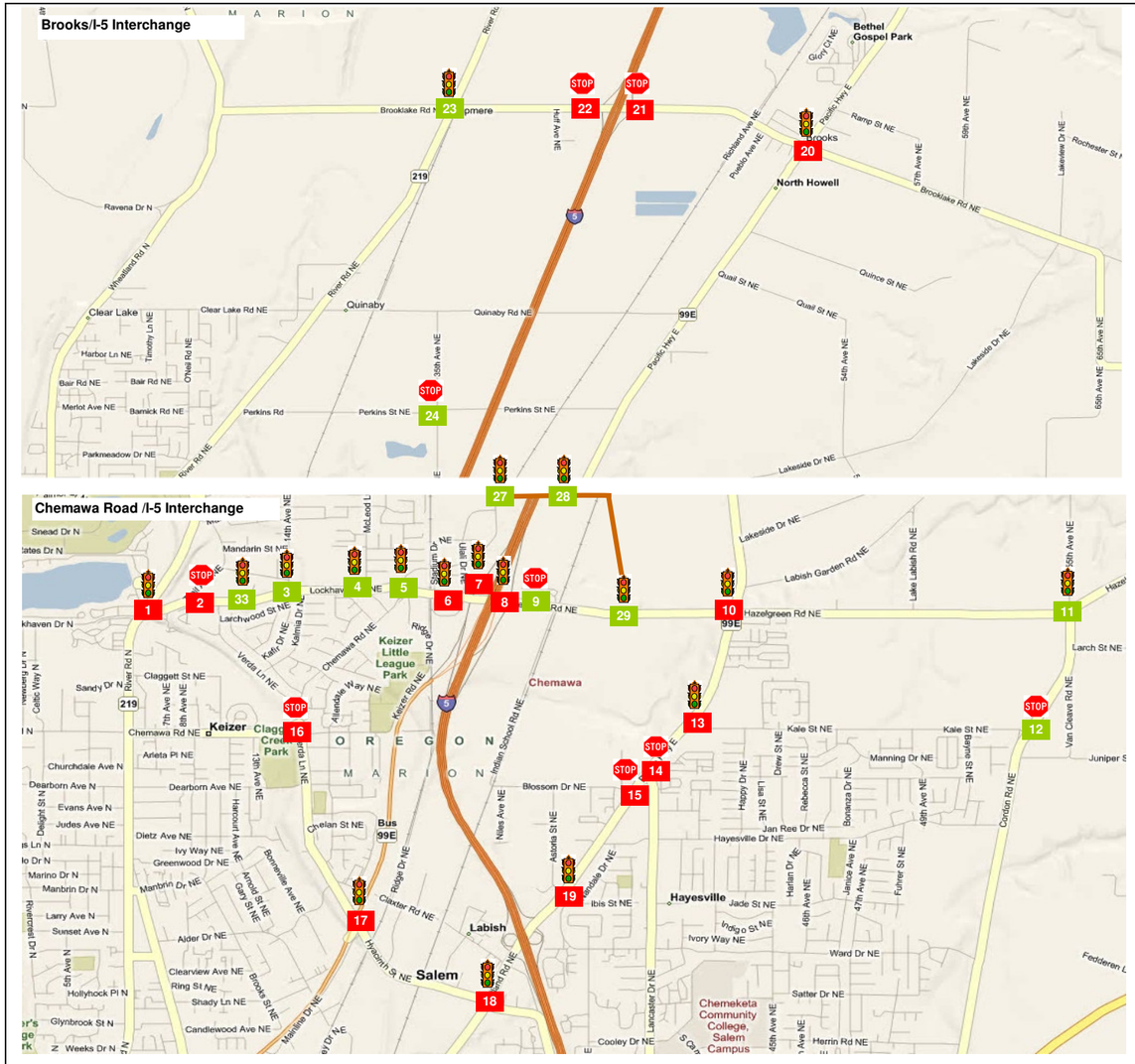
# FIGURE A.6a Chemawa Road IAMP Traffic Analysis

**2031 Alternative 15: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Half Diamond**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**




| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.94 | Jurisdiction: ODOT | V/C Ratio: | 1.70(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(2.00)^ | Jurisdiction: ODOT |
| Delay (s): | 24.7 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 521.2 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |
| 0.5% | 0 1370 285 | 165 0 185 0.6% | 2.2% | 10 680 865 | 615 10 40 1.2% | 1.3% | 50 680 0 | |
| | | 0 1350 400 1.0% | 0.0% | 0 0 10 | 20 1135 160 2.2% | 2.2% | 90 0 125 | 90 1225 0 1.7% |

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.29 | Jurisdiction: Keizer | V/C Ratio: | 1.45 | Jurisdiction: ODOT | V/C Ratio: | 1.37 | Jurisdiction: ODOT |
| Delay (s): | 271.3 | Standard: LOS D | Delay (s): | 159.4 | Standard: 0.85 | Delay (s): | 153.2 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |
| 1.0% | 50 85 10 | 10 410 260 0.5% | 3.5% | 95 1760 65 | 320 605 100 1.6% | 4.4% | 595 870 235 | 120 355 100 1.5% |
| 1.1% | 55 375 210 | 245 125 155 0.6% | 1.5% | 45 330 195 | 280 1445 335 3.1% | 1.5% | 655 290 385 | 265 1480 110 1.7% |

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.05 | Jurisdiction: ODOT | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 0.67(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 60.7 | Standard: 0.75 | Delay (s): | 179.5 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |
| 1.8% | 20 1085 165 | 240 50 380 1.4% | 2.5% | 260 735 10 | 10 50 30 1.7% | | | 140 500 0 4.0% |
| 5.9% | 35 35 65 | 90 1650 700 2.2% | 6.1% | 205 80 560 | 330 435 30 3.6% | 9.3% | 425 520 0 | 160 0 325 8.8% |

| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.83(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.12(0.33)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 20.7 | Standard: LOS E | Delay (s): | 15.8 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |
| 10.9% | 1000 15 375 | 0 235 425 6.8% | 6.0% | 20 195 210 | 140 155 710 4.8% | 0.0% | 25 70 25 | 10 80 40 2.1% |
| 11.2% | 0 570 265 | | 6.0% | 15 65 30 | 30 120 165 2.3% | 0.0% | 10 40 35 | 50 65 20 0.0% |

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# FIGURE A.6a Chemawa Road IAMP Traffic Analysis

**2031 Alternative 15: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

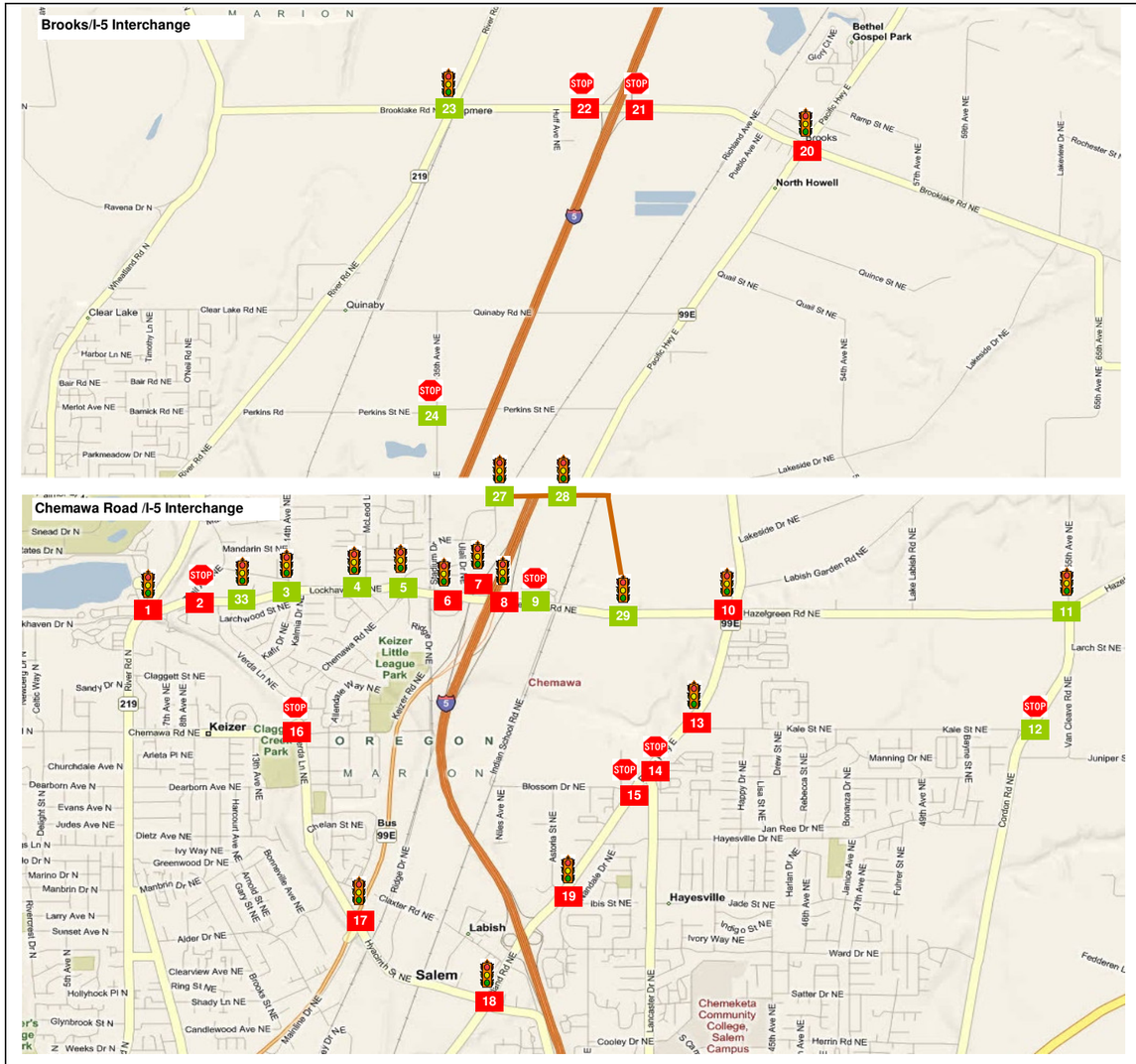
**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

Volume Diagram

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection



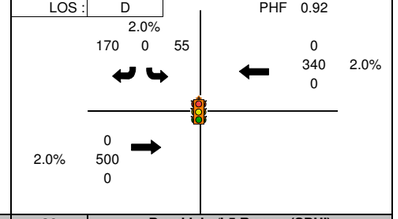

| 25 | Hyacinth/NB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

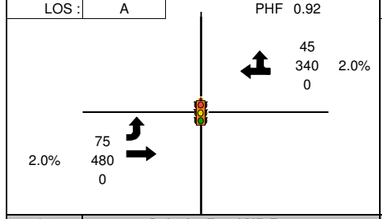
| 26 | Hyacinth/SB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

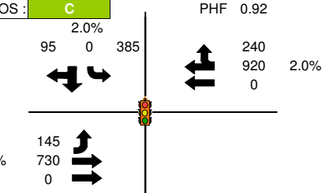
| 27 | Tepper Lane/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.45 | Jurisdiction: ODOT | |
| Delay (s): | 27.7 | Standard: | 0.75 |
| LOS : | D | PHF | 0.92 |




| 28 | Tepper Lane/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.32 | Jurisdiction: ODOT | |
| Delay (s): | 2.1 | Standard: | 0.75 |
| LOS : | A | PHF | 0.92 |




| 29 | Chemawa Road/Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Keizer | |
| Delay (s): | 15.4 | Standard: | LOS D |
| LOS : | C | PHF | 0.92 |




| 30 | Brooklake/I-5 Ramps (SPUI) | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

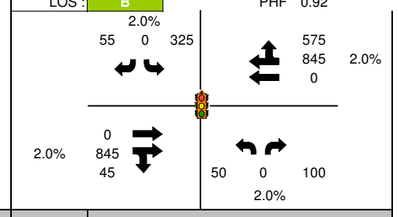
| 31 | Quinaby Road/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 32 | Quinaby Road/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 33 | Verda Lane/Lockhaven Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.71 | Jurisdiction: Keizer | |
| Delay (s): | 17.9 | Standard: | LOS D |
| LOS : | B | PHF | 0.92 |

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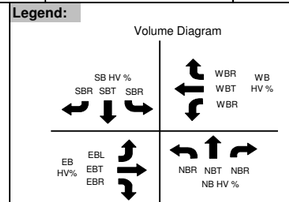
# FIGURE A.6a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 15: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

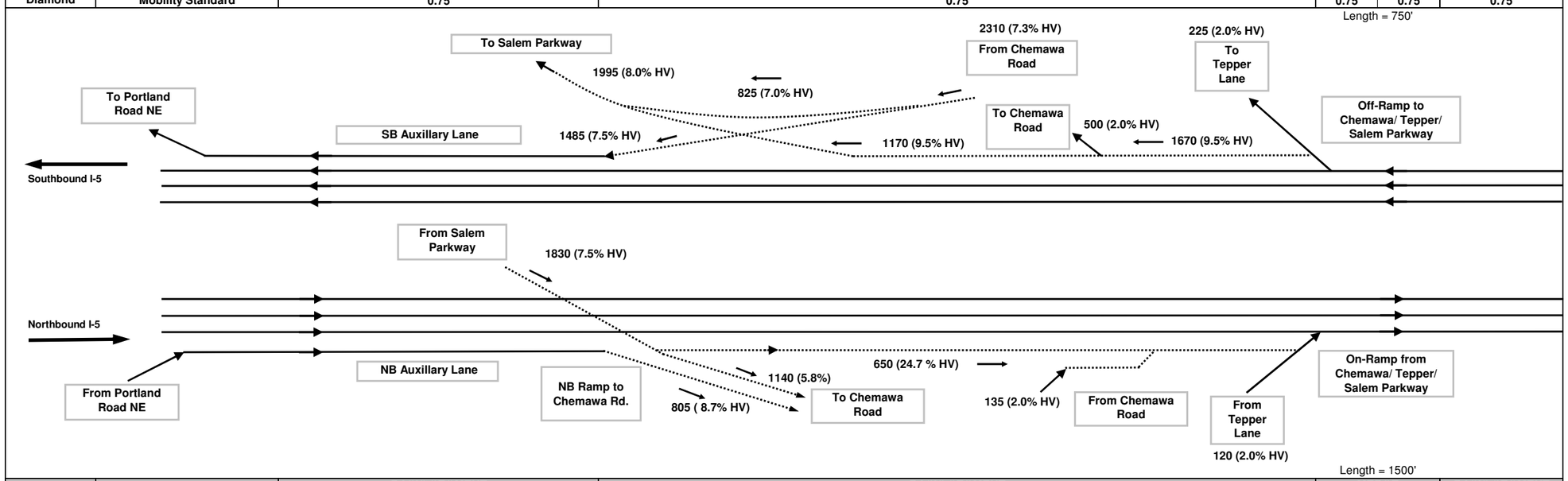
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
STOP Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 15: Chemawa/ Tepper Half Diamond | Volume | 5935 | 4450 | 1895 | | 6345 |
| | Flow Rate^ | 1650 | 1660 | 2180 | 6910 | 2350 |
| | V/C | 0.70 | 0.71 | 1.04 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 15: Chemawa/ Tepper Half Diamond | Volume | 5370 | 4565 | 905 | | 5470 |
| | Flow Rate^ | 1465 | 1650 | 4190 | 6075 | 2010 |
| | V/C | 0.62 | 0.70 | 0.91 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.6b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 15: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Half Diamond Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

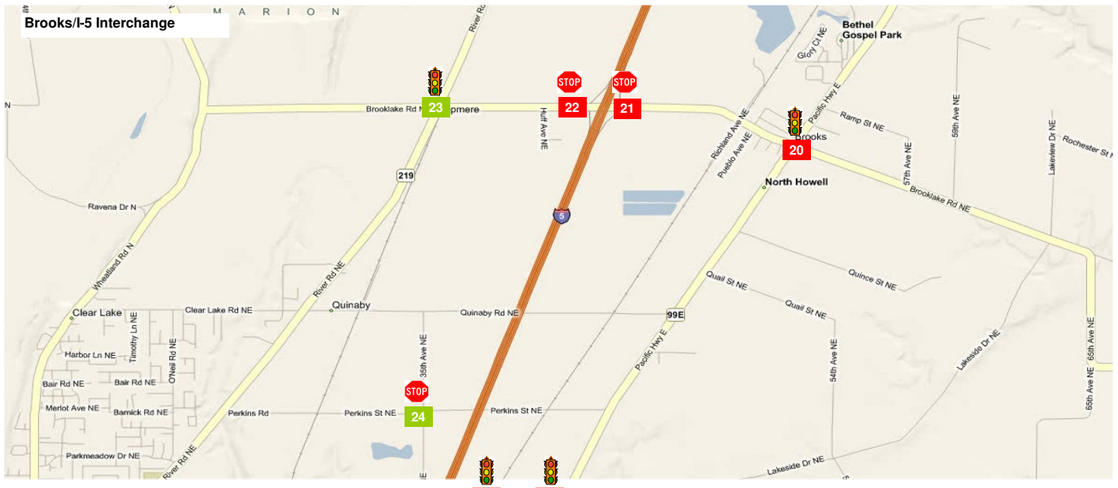
Meets Mobility Standard
Fails Mobility Standard

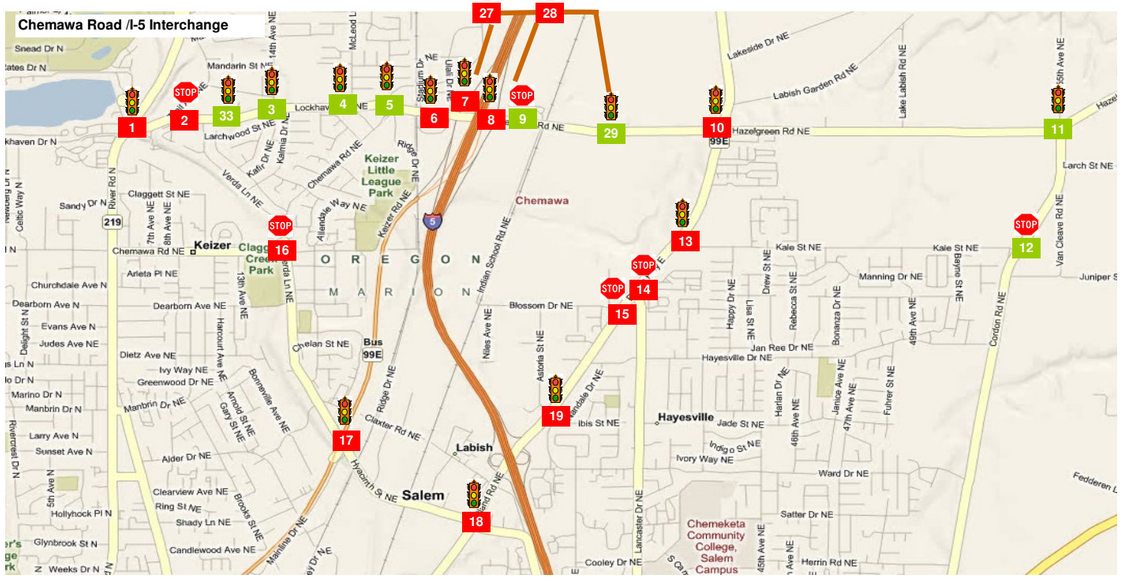
## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

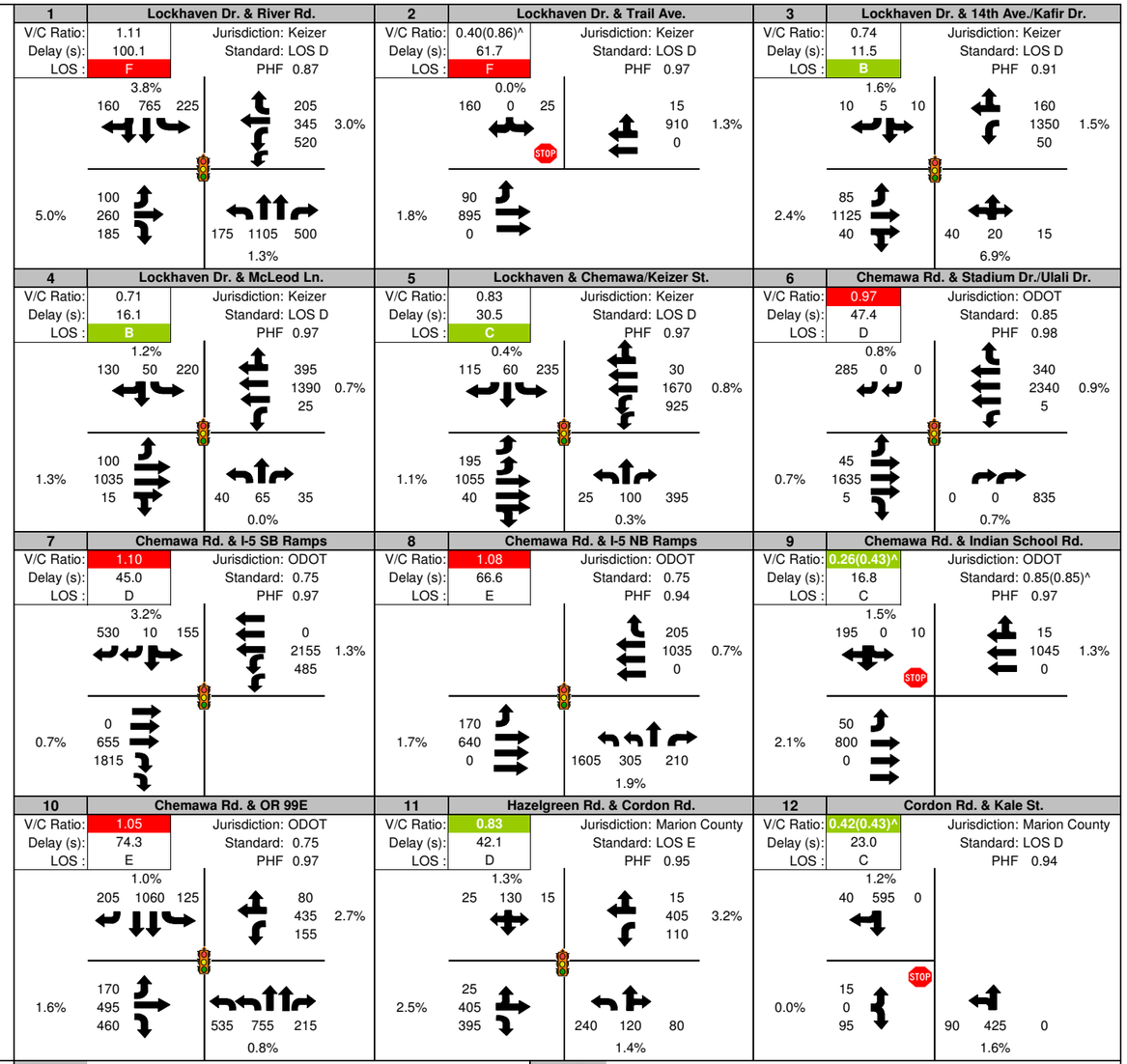



**CH2MHILL**

# FIGURE A.7a Chemawa Road IAMP Traffic Analysis

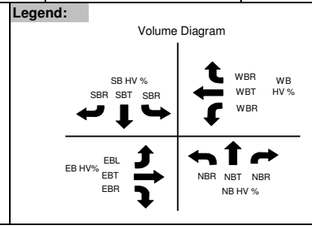
## 2031 Alternative 16: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Split Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio



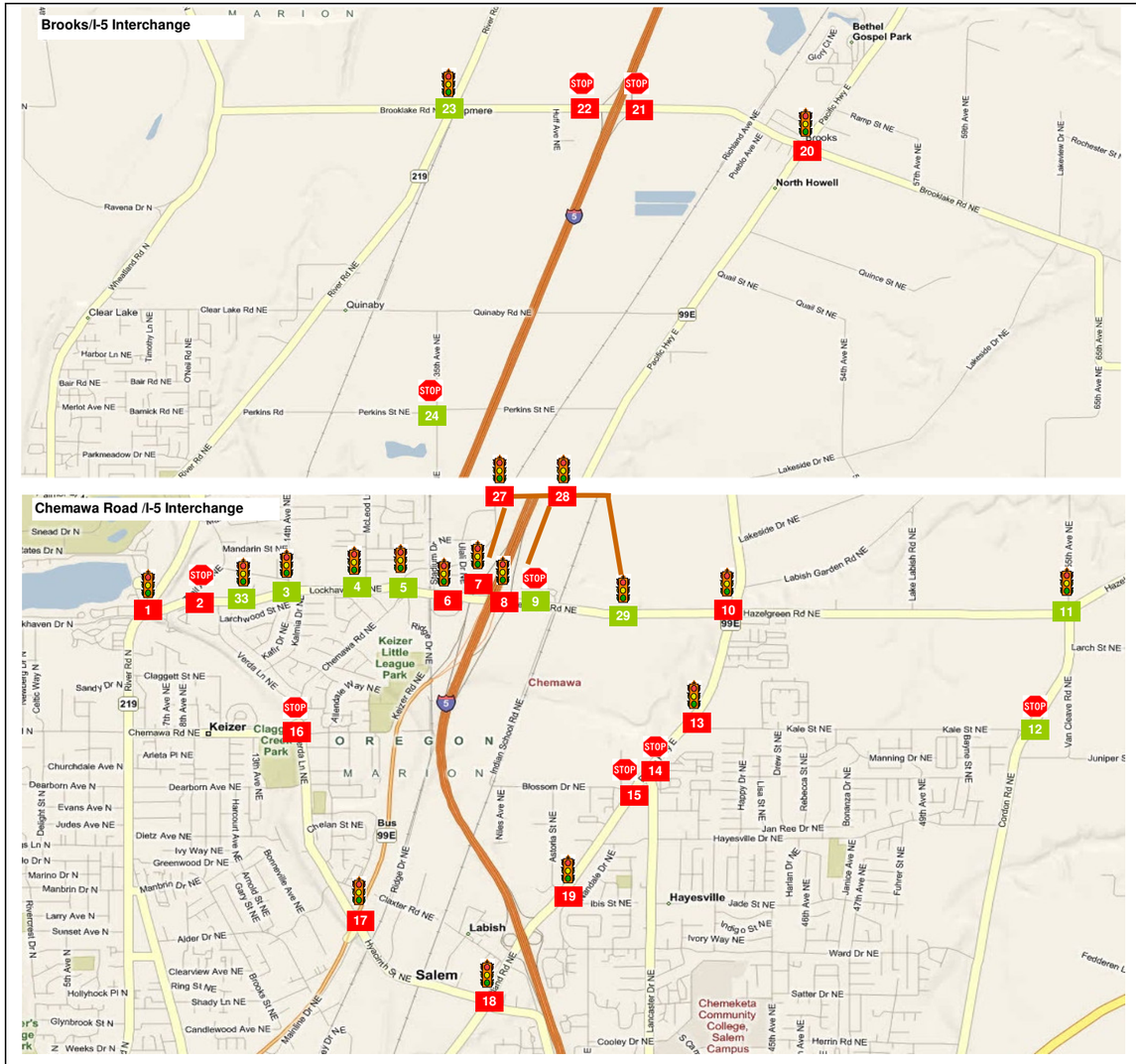

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

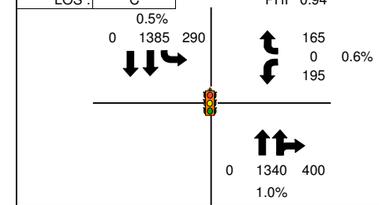
**Legend:**

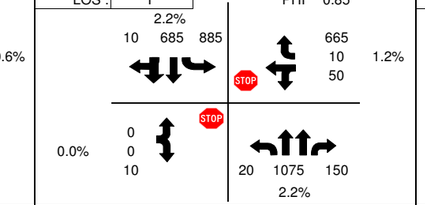


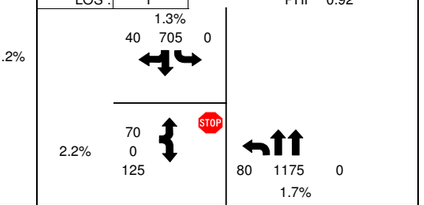

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection



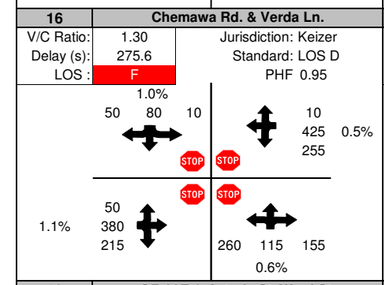

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.95 | Jurisdiction: ODOT | V/C Ratio: | 1.76(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.38(1.56)^ | Jurisdiction: ODOT |
| Delay (s): | 22.2 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 323.1 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |

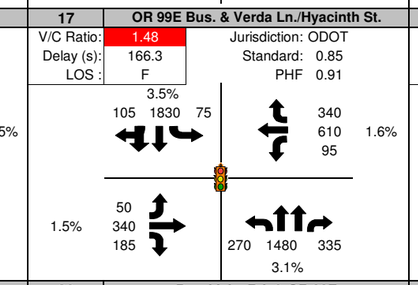


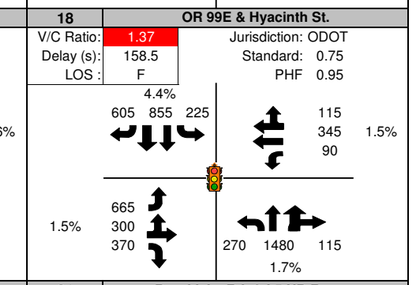



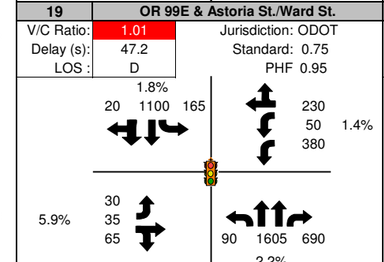

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.30 | Jurisdiction: Keizer | V/C Ratio: | 1.48 | Jurisdiction: ODOT | V/C Ratio: | 1.37 | Jurisdiction: ODOT |
| Delay (s): | 275.6 | Standard: LOS D | Delay (s): | 166.3 | Standard: 0.85 | Delay (s): | 158.5 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

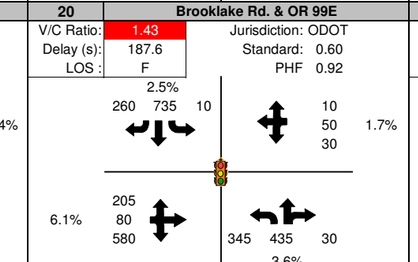


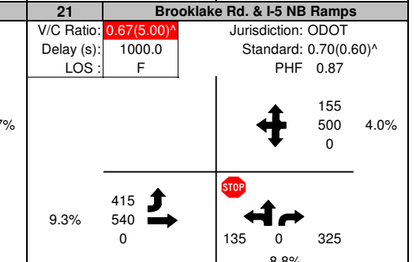



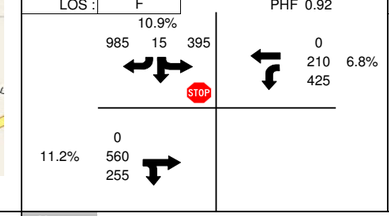

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.01 | Jurisdiction: ODOT | V/C Ratio: | 1.43 | Jurisdiction: ODOT | V/C Ratio: | 0.67(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 47.2 | Standard: 0.75 | Delay (s): | 187.6 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

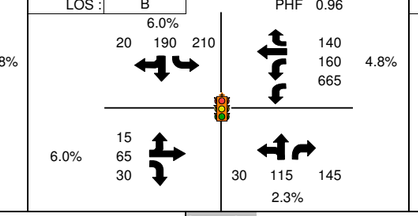


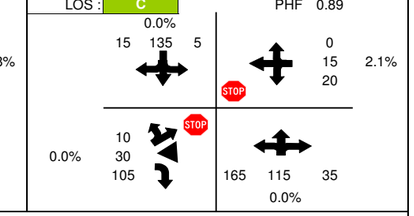




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.81(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.57 | Jurisdiction: Marion County | V/C Ratio: | 0.13(0.20)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 19.8 | Standard: LOS E | Delay (s): | 24.2 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | B | PHF 0.96 | LOS : | C | PHF 0.89 |

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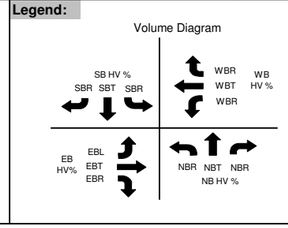
# FIGURE A.7a Chemawa Road IAMP Traffic Analysis

**2031 Alternative 16: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Split Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

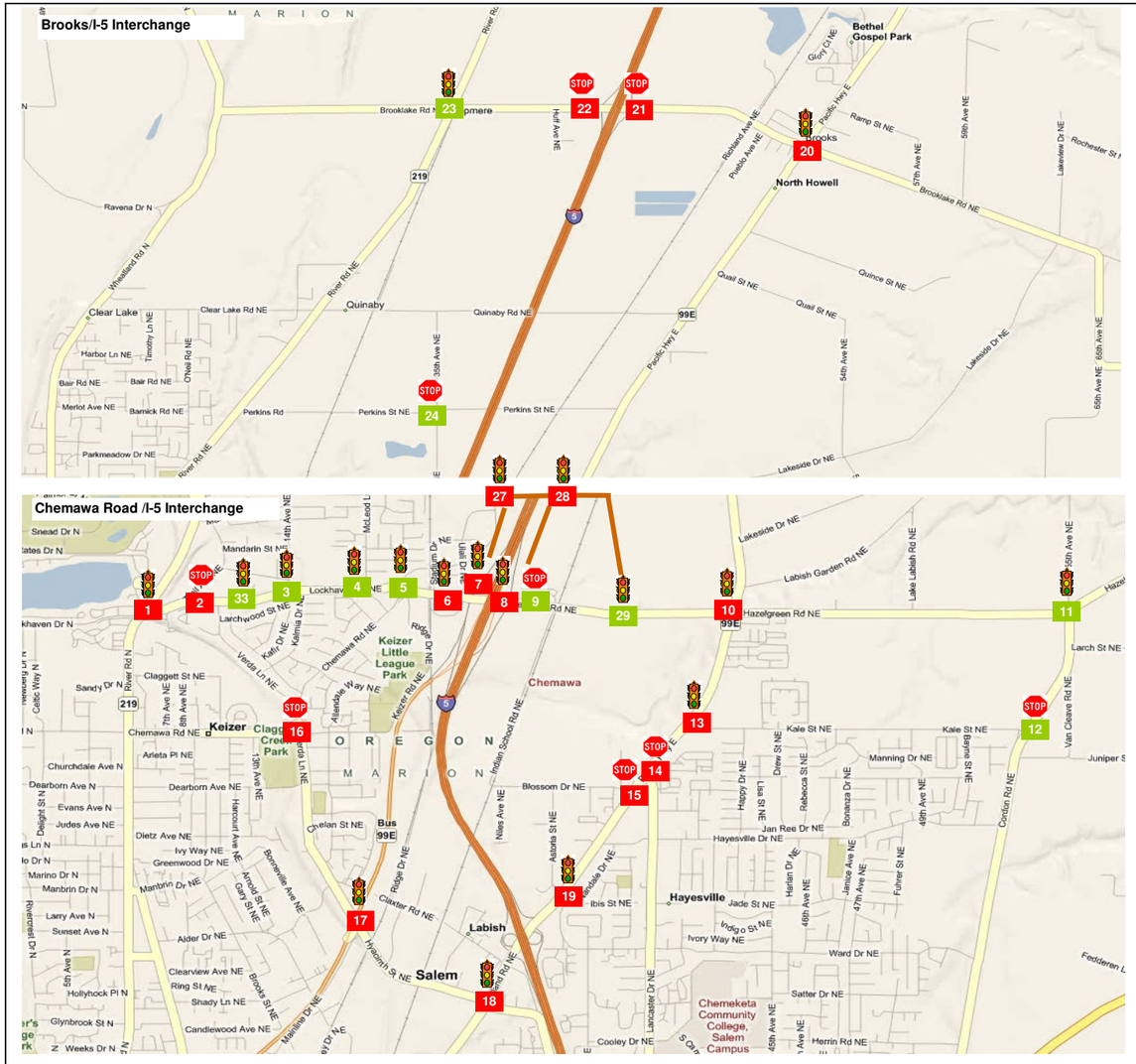
**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane/SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.77 | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 25.4 | Standard: 0.75 |
| LOS : | | PHF | LOS : | | PHF | LOS : | D | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 45 695 40; 0 785 2.0% 0; 0 2.0% 520 0 | | |

| 28 | Tepper Lane/NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.78 | Jurisdiction: ODOT | V/C Ratio: | 0.67 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | 33.5 | Standard: 0.75 | Delay (s): | 16.4 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | D | PHF 0.92 | LOS : | C | PHF 0.92 | LOS : | | PHF |
| 25; 285 2.0%; 0 | | | 2.0%; 125 0 380; 230; 935 2.0%; 0 | | | Does Not Exist in Alternative | | |
| 75; 2.0% 485; 0 | | | 80; 2.0% 730; 0 | | | | | |
| 500 160 20; 2.0% | | | | | | | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | 33 | Verda Lane/Lockhaven Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.67 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 16.4 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | B | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 50 0 275; 555; 845 2.0%; 0 | | |
| | | | | | | 0; 2.0% 875; 45; 30 0 100; 2.0% | | |

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# FIGURE A.7a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 16: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Split Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

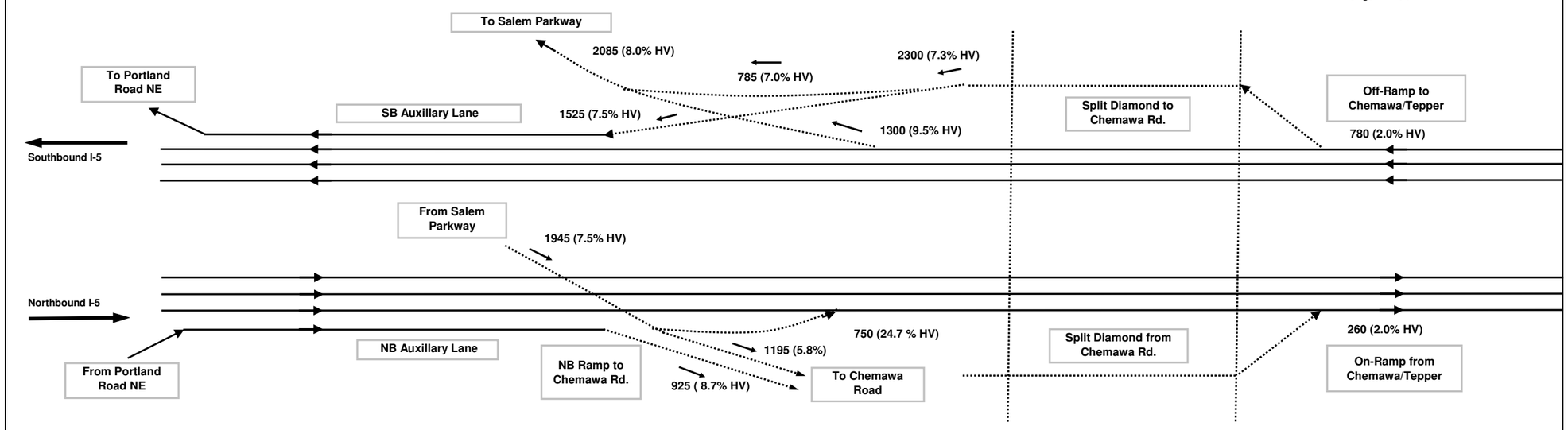
Volume Diagram

SB HV %; SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S4: Salem Pkwy Off | | S3: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 1.0% | 1.0% | 1.0% | 1.0% | 6.4% | | 8.6% |
| | PHF | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | | 0.96 |
| 2031 Alt. 16: Chemawa/ Tepper Split Diamond | Volume | 5775 | 4250 | 1300 | | 5550 | 780 | | 6330 |
| | Flow Rate^ | 1605 | 1455 | 1335 | 5695 | 1900 | 900 | 6890 | 2345 |
| | V/C | 0.68 | 0.62 | 0.64 | 0.81 | 0.99 | 0.43 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N4: Salem Pkwy On | | N5: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 24.7% | | 9.3% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 16: Chemawa/ Tepper Split Diamond | Volume | 5360 | 4435 | 750 | | 5185 | 260 | | 5445 |
| | Flow Rate^ | 1460 | 1605 | 3790 | 5765 | 1930 | 3910 | 6110 | 2000 |
| | V/C | 0.62 | 0.68 | 0.82 | 0.82 | 0.99 | 0.85 | 0.87 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE A.7b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 16: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Chemawa/Tepper Split Diamond**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

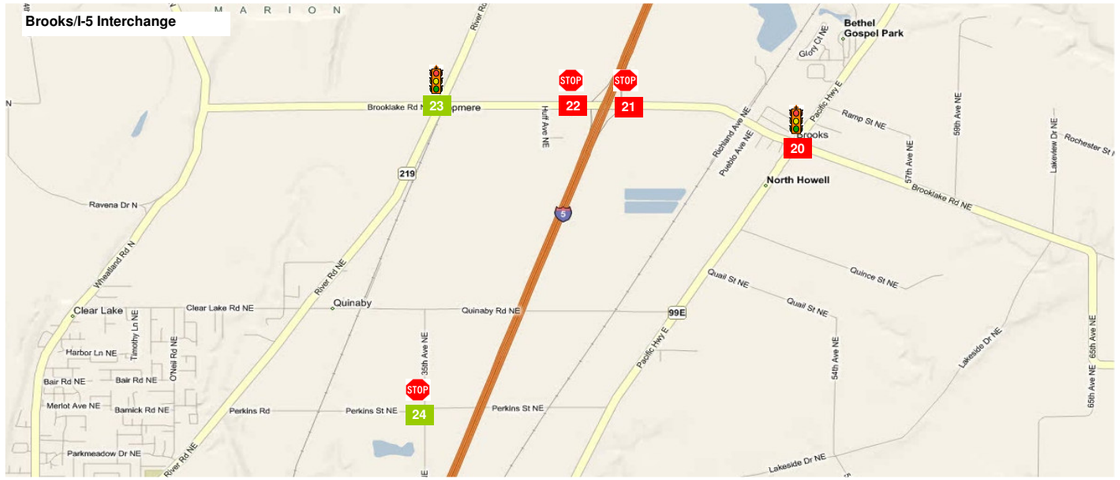
Meets Mobility Standard
Fails Mobility Standard

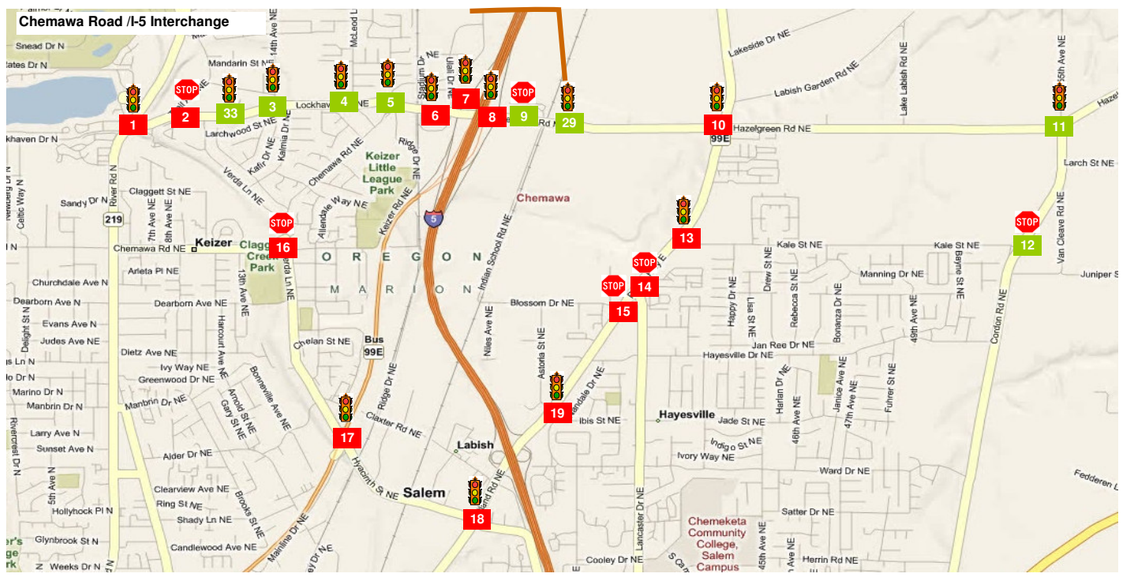
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

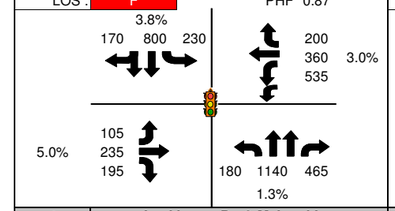
Collector-Distributor Road; Ramps
Mainline Freeway

N

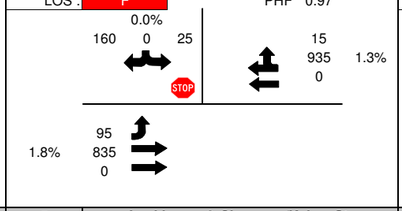


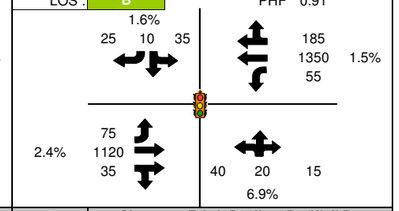

| 1 | Lockhaven Dr. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 1.12 | Jurisdiction: Keizer | |
| Delay (s): | 115.8 | Standard: LOS D | |
| LOS : | F | PHF | 0.87 |



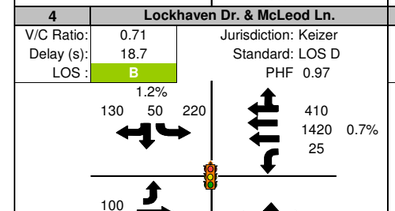

| 2 | Lockhaven Dr. & Trail Ave. | | |
|---|---|---|---|
| V/C Ratio: | 0.41(0.88)^ | Jurisdiction: Keizer | |
| Delay (s): | 66.1 | Standard: LOS D | |
| LOS : | F | PHF | 0.97 |



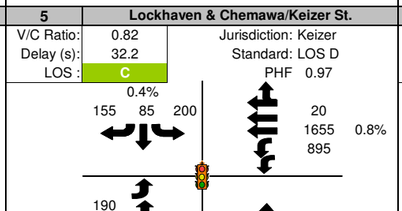

| 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.74 | Jurisdiction: Keizer | |
| Delay (s): | 11.9 | Standard: LOS D | |
| LOS : | B | PHF | 0.91 |



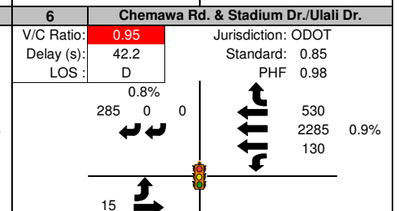

| 4 | Lockhaven Dr. & McLeod Ln. | | |
|---|---|---|---|
| V/C Ratio: | 0.71 | Jurisdiction: Keizer | |
| Delay (s): | 18.7 | Standard: LOS D | |
| LOS : | B | PHF | 0.97 |



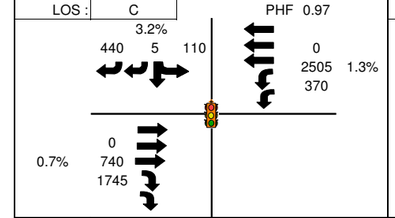

| 5 | Lockhaven & Chemawa/Keizer St. | | |
|---|---|---|---|
| V/C Ratio: | 0.82 | Jurisdiction: Keizer | |
| Delay (s): | 32.2 | Standard: LOS D | |
| LOS : | C | PHF | 0.97 |



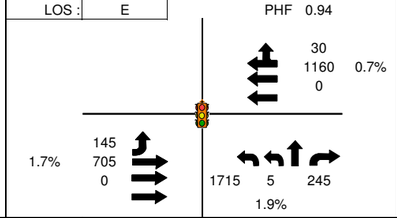

| 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.95 | Jurisdiction: ODOT | |
| Delay (s): | 42.2 | Standard: | 0.85 |
| LOS : | D | PHF | 0.98 |



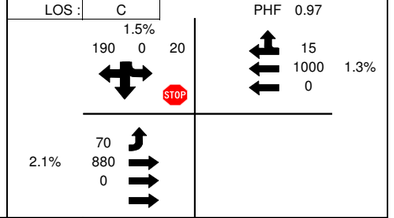

| 7 | Chemawa Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | |
| Delay (s): | 25.6 | Standard: | 0.75 |
| LOS : | C | PHF | 0.97 |



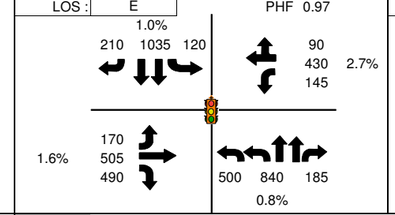

| 8 | Chemawa Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.09 | Jurisdiction: ODOT | |
| Delay (s): | 79.5 | Standard: | 0.75 |
| LOS : | E | PHF | 0.94 |



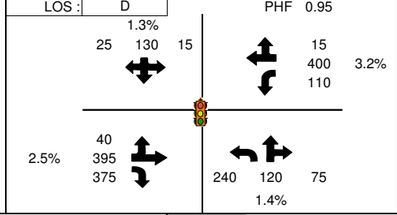

| 9 | Chemawa Rd. & Indian School Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.25(0.50)^ | Jurisdiction: ODOT | |
| Delay (s): | 19.9 | Standard: | 0.85(0.85)^ |
| LOS : | C | PHF | 0.97 |



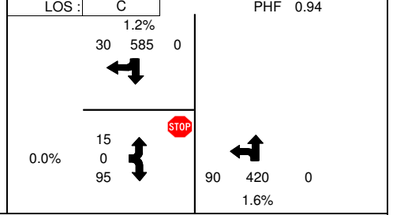

| 10 | Chemawa Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | |
| Delay (s): | 65.7 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |




| 11 | Hazelgreen Rd. & Cordon Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Marion County | |
| Delay (s): | 45.2 | Standard: LOS E | |
| LOS : | D | PHF | 0.95 |



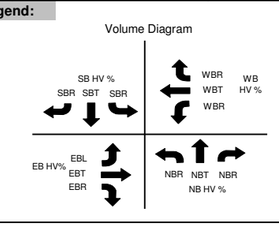

| 12 | Cordon Rd. & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.41(0.42)^ | Jurisdiction: Marion County | |
| Delay (s): | 22.3 | Standard: LOS D | |
| LOS : | C | PHF | 0.94 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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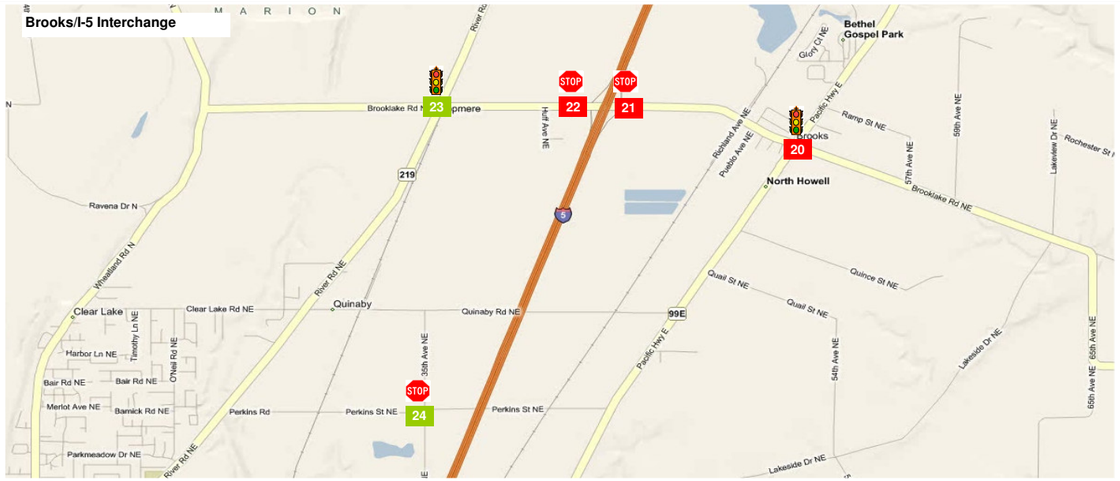
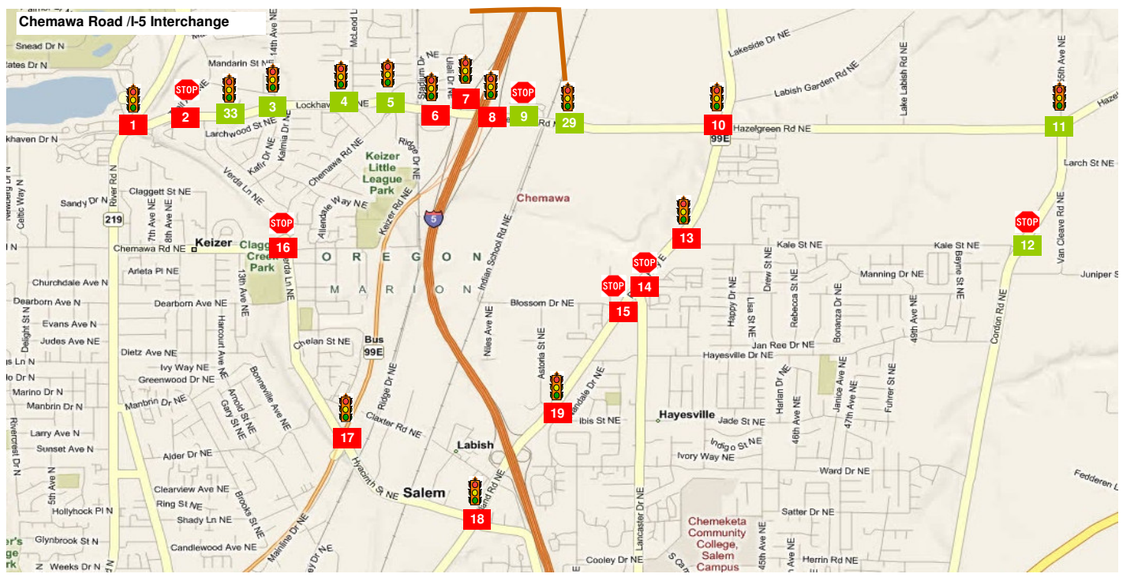
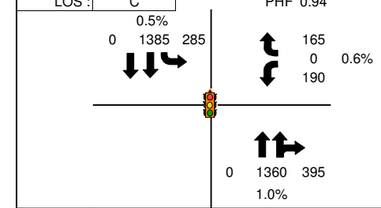
# FIGURE A.8a Chemawa Road IAMP Traffic Analysis

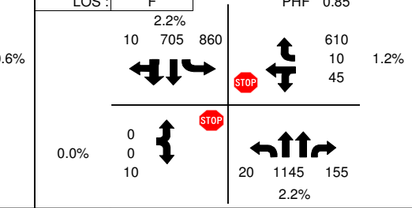
## 2031 Alternative 17: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

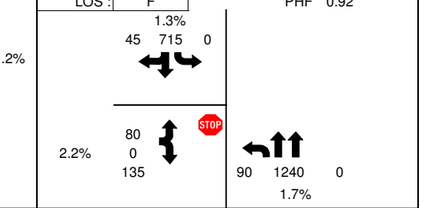


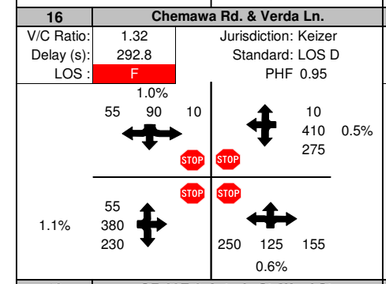

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.95 | Jurisdiction: ODOT | V/C Ratio: | 1.72(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(1.96)^ | Jurisdiction: ODOT |
| Delay (s): | 24.8 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 503.1 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |

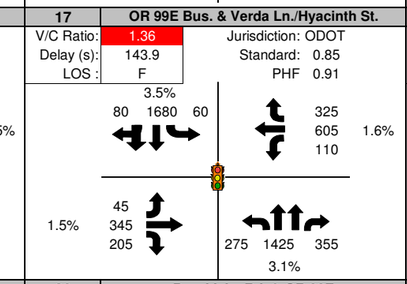


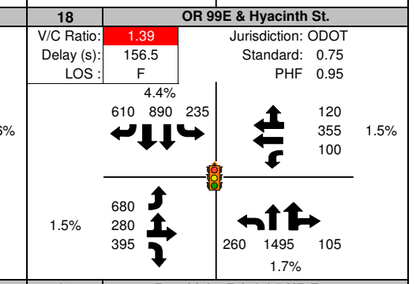



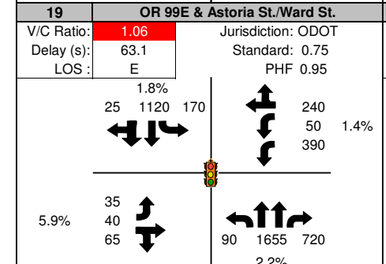

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.32 | Jurisdiction: Keizer | V/C Ratio: | 1.36 | Jurisdiction: ODOT | V/C Ratio: | 1.39 | Jurisdiction: ODOT |
| Delay (s): | 292.8 | Standard: LOS D | Delay (s): | 143.9 | Standard: 0.85 | Delay (s): | 156.5 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

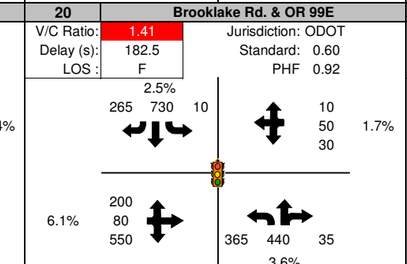


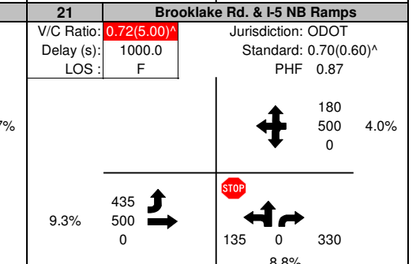



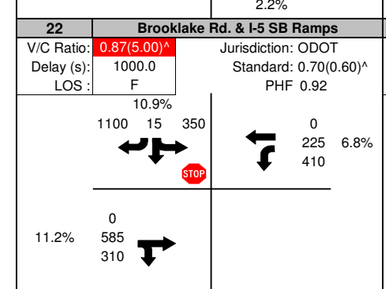

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.06 | Jurisdiction: ODOT | V/C Ratio: | 1.41 | Jurisdiction: ODOT | V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 63.1 | Standard: 0.75 | Delay (s): | 182.5 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

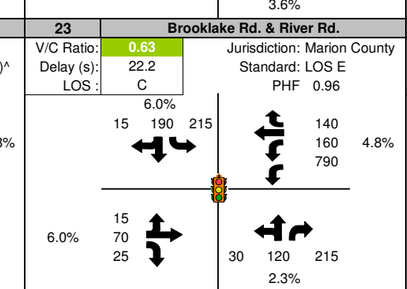


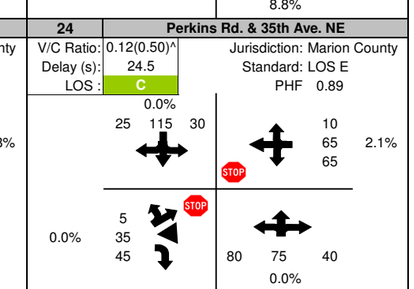




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.87(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.63 | Jurisdiction: Marion County | V/C Ratio: | 0.12(0.50)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 22.2 | Standard: LOS E | Delay (s): | 24.5 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |

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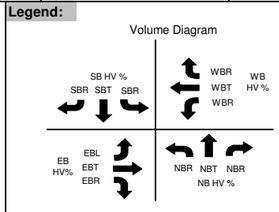
# FIGURE A.8a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 17: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

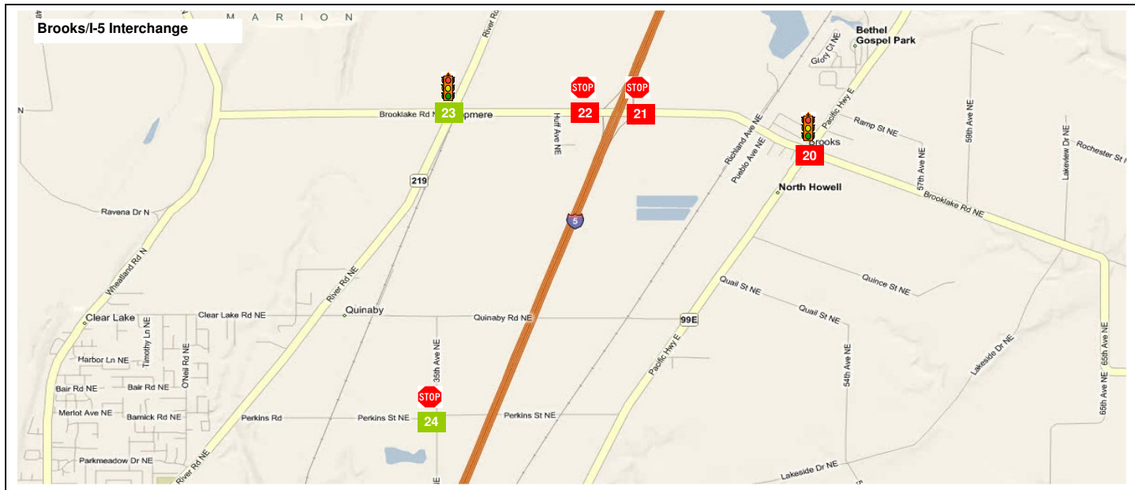
**Notes:**

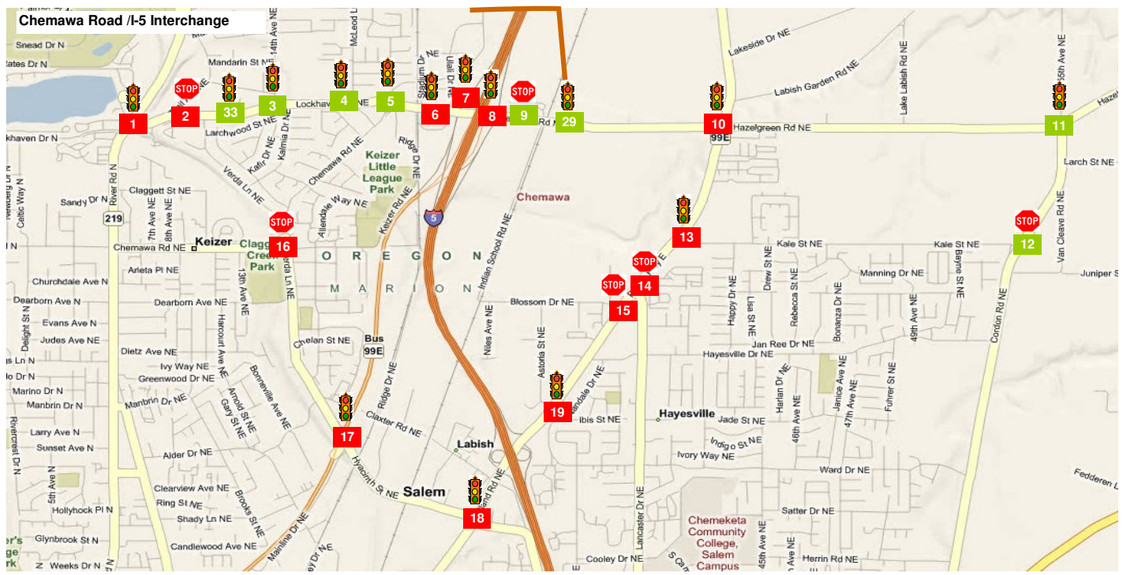
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane /SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | | PHF |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | Does Not Exist in Alternative | | |

| 28 | Tepper Lane /NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | V/C Ratio: | 0.85 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | 19.2 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | B | PHF 0.92 | LOS : | | PHF |
| Does Not Exist in Alternative | | | 2.0%; 95 0 405; 210 920 0 2.0%; 145 755 0 2.0% | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | 33 | Verda Lane/Lockhaven Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.71 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 16.8 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | B | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 55 0 325; 575 840 0 2.0%; 0 805 55 2.0%; 55 0 100 2.0% | | |

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# FIGURE A.8a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 17: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

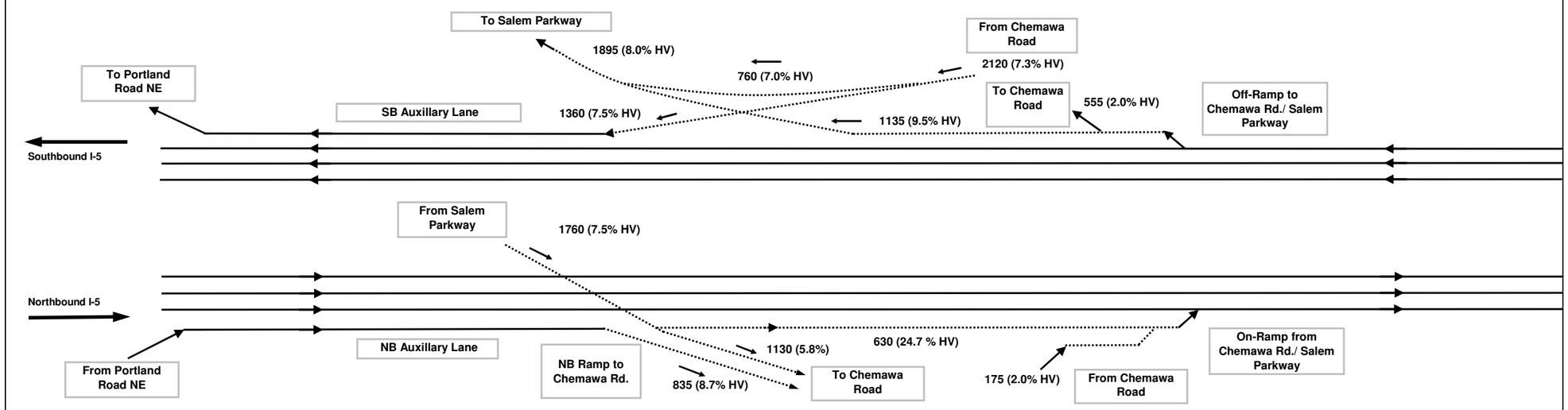
Volume Diagram

SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 17: Widening w/Tepper Overcrossing | Volume | 5975 | 4615 | 1690 | | 6305 |
| | Flow Rate^ | 1660 | 1720 | 1945 | 6865 | 2335 |
| | V/C | 0.71 | 0.73 | 0.93 | 0.97 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 17: Widening w/Tepper Overcrossing | Volume | 5430 | 4595 | 805 | | 5400 |
| | Flow Rate^ | 1450 | 1660 | 4095 | 5990 | 2000 |
| | V/C | 0.62 | 0.71 | 0.89 | 0.85 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.8b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 17: Chemawa/Lockhaven Widening: River Road to Tepper Extension & Tepper Overcrossing**
**Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

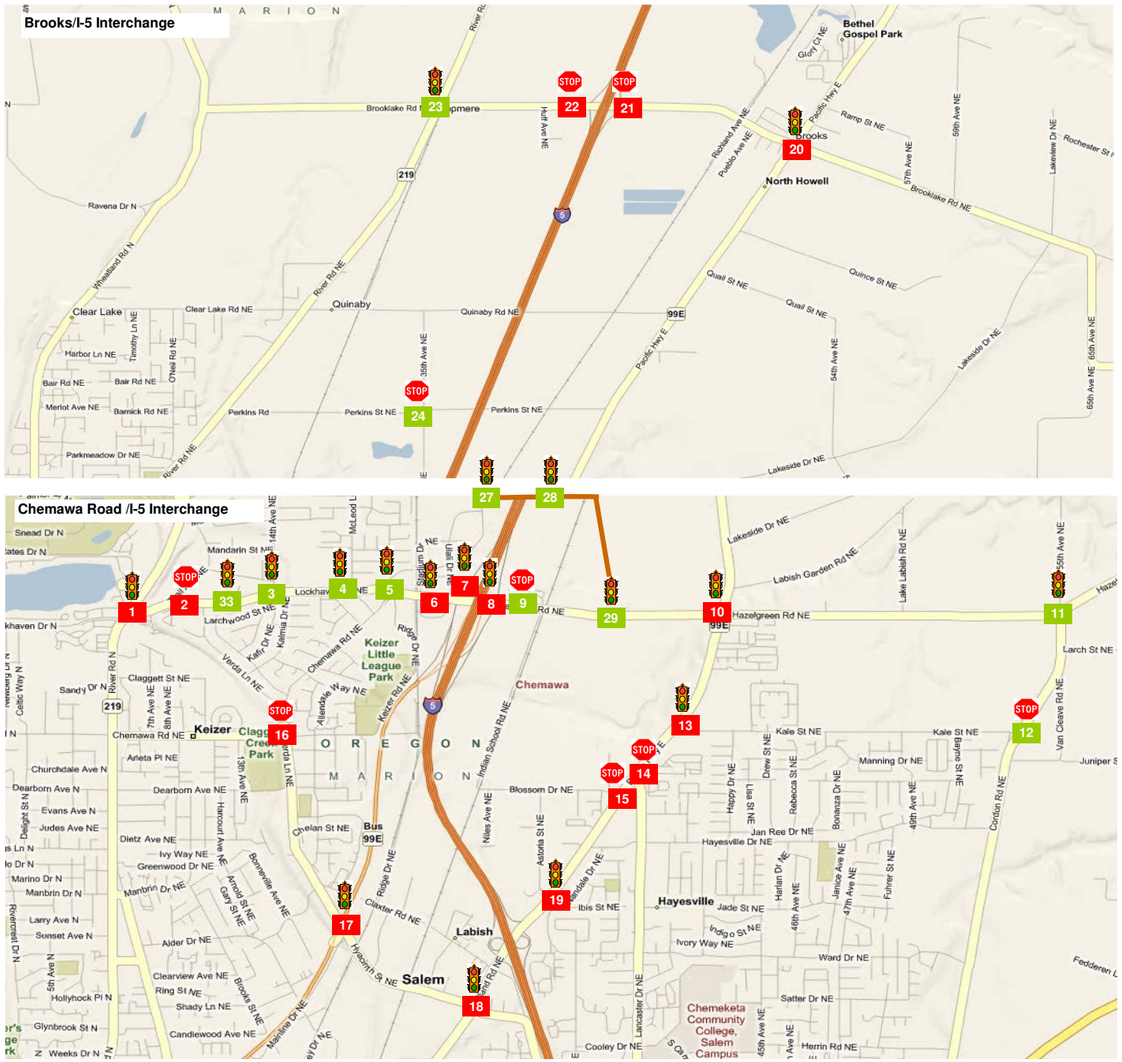
Meets Mobility Standard
Fails Mobility Standard

## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N




| 1 | Lockhaven Dr. & River Rd. | 2 | Lockhaven Dr. & Trail Ave. | 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. |
|---|---|---|---|---|---|
| V/C Ratio: 1.13 | Jurisdiction: Keizer | V/C Ratio: 0.58(2.54)^ | Jurisdiction: Keizer | V/C Ratio: 1.09 | Jurisdiction: Keizer |
| Delay (s): 142.3 | Standard: LOS D | Delay (s): 796.2 | Standard: LOS D | Delay (s): 50.7 | Standard: LOS D |
| LOS : F | PHF 0.87 | LOS : F | PHF 0.97 | LOS : D | PHF 0.91 |
| 3.8%: 170 810 225 | 195 340 480 3.0% | 0.0%: 150 0 25 | 15 865 0 1.3% | 1.6%: 40 15 80 | 235 1215 55 1.5% |
| 5.0%: 105 240 185 | 175 1145 475 1.3% | 1.8%: 90 850 0 | | 2.4%: 70 1095 25 | 30 25 20 7.0% |

| 4 | Lockhaven Dr. & McLeod Ln. | 5 | Lockhaven & Chemawa/Keizer St. | 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. |
|---|---|---|---|---|---|
| V/C Ratio: 0.96 | Jurisdiction: Keizer | V/C Ratio: 0.82 | Jurisdiction: Keizer | V/C Ratio: 0.99 | Jurisdiction: ODOT |
| Delay (s): 34.6 | Standard: LOS D | Delay (s): 30.9 | Standard: LOS D | Delay (s): 53.4 | Standard: 0.85 |
| LOS : C | PHF 0.97 | LOS : C | PHF 0.97 | LOS : D | PHF 0.98 |
| 1.2%: 105 50 220 | 400 1370 25 0.7% | 0.4%: 155 90 195 | 20 1595 885 0.8% | 0.8%: 260 0 0 | 505 2240 115 0.9% |
| 1.3%: 100 1080 15 | 30 65 35 0.0% | 1.1%: 185 1105 45 | 45 100 430 0.3% | 0.7%: 15 1680 35 | 0 0 915 0.7% |

| 7 | Chemawa Rd. & I-5 SB Ramps | 8 | Chemawa Rd. & I-5 NB Ramps | 9 | Chemawa Rd. & Indian School Rd. |
|---|---|---|---|---|---|
| V/C Ratio: 1.05 | Jurisdiction: ODOT | V/C Ratio: 1.06 | Jurisdiction: ODOT | V/C Ratio: 0.25(0.45)^ | Jurisdiction: ODOT |
| Delay (s): 34.3 | Standard: 0.75 | Delay (s): 76.0 | Standard: 0.75 | Delay (s): 17.5 | Standard: 0.85(0.85)^ |
| LOS : C | PHF 0.97 | LOS : E | PHF 0.94 | LOS : C | PHF 0.97 |
| 3.2%: 400 5 90 | 0 2460 400 1.3% | | 35 1145 0 0.7% | 1.5%: 190 0 15 | 25 990 0 1.3% |
| 0.7%: 0 695 1900 | | 1.7%: 100 685 0 | 1715 5 235 1.9% | 2.1%: 55 865 0 | |

| 10 | Chemawa Rd. & OR 99E | 11 | Hazelgreen Rd. & Cordon Rd. | 12 | Cordon Rd. & Kale St. |
|---|---|---|---|---|---|
| V/C Ratio: 1.09 | Jurisdiction: ODOT | V/C Ratio: 0.86 | Jurisdiction: Marion County | V/C Ratio: 0.41(0.42)^ | Jurisdiction: Marion County |
| Delay (s): 67.9 | Standard: 0.75 | Delay (s): 46.0 | Standard: LOS E | Delay (s): 22.4 | Standard: LOS D |
| LOS : E | PHF 0.97 | LOS : D | PHF 0.95 | LOS : C | PHF 0.94 |
| 1.0%: 225 1050 130 | 95 440 140 2.7% | 1.3%: 30 130 15 | 15 400 110 3.2% | 1.2%: 30 585 0 | |
| 1.6%: 175 495 460 | 500 830 180 0.8% | 2.5%: 45 385 375 | 245 125 75 1.4% | 0.0%: 15 0 95 | 90 430 0 1.6% |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

Volume Diagram

SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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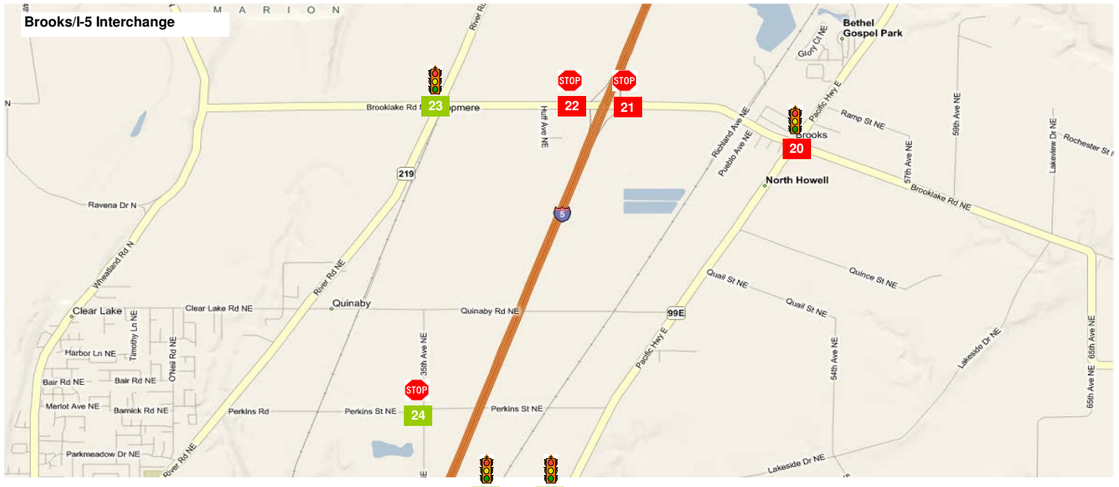
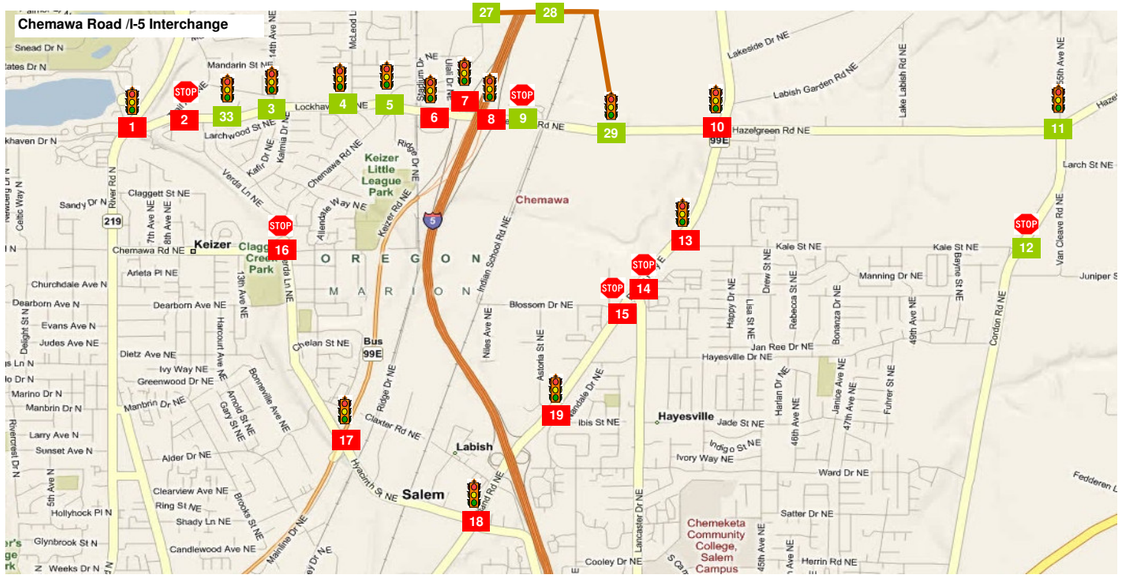
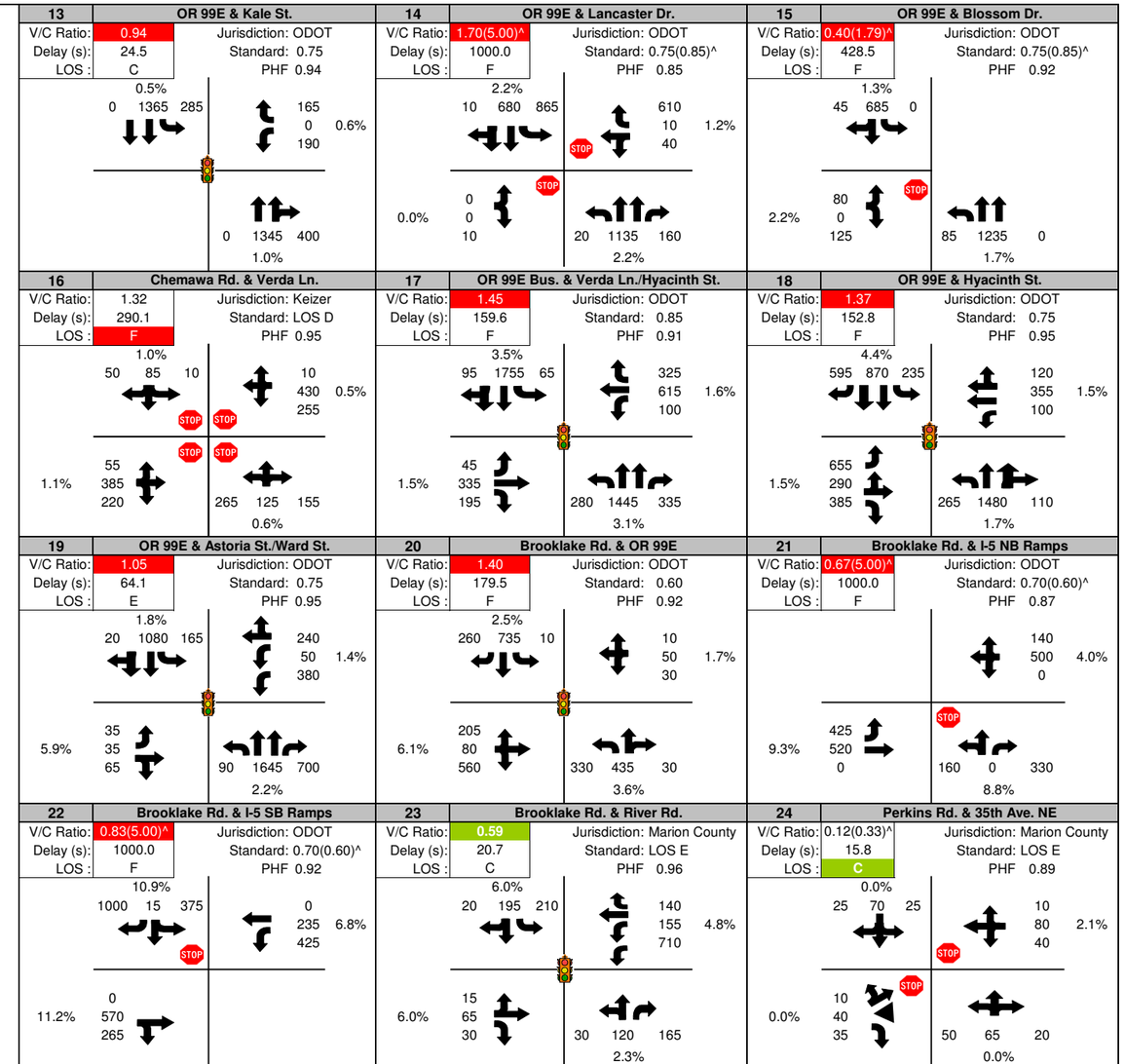
# FIGURE A.9a Chemawa Road IAMP Traffic Analysis

**2031 Alternative 18: Chemawa/Lockhaven Widening: McLeod Ln. to Tepper Extension & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**




| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.94 | Jurisdiction: ODOT | V/C Ratio: | 1.70(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(1.79)^ | Jurisdiction: ODOT |
| Delay (s): | 24.5 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 428.5 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |




| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.32 | Jurisdiction: Keizer | V/C Ratio: | 1.45 | Jurisdiction: ODOT | V/C Ratio: | 1.37 | Jurisdiction: ODOT |
| Delay (s): | 290.1 | Standard: LOS D | Delay (s): | 159.6 | Standard: 0.85 | Delay (s): | 152.8 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.05 | Jurisdiction: ODOT | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 0.67(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 64.1 | Standard: 0.75 | Delay (s): | 179.5 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.83(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.12(0.33)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 20.7 | Standard: LOS E | Delay (s): | 15.8 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |

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# FIGURE A.9a Chemawa Road IAMP Traffic Analysis

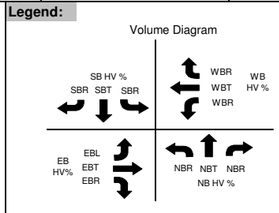
## 2031 Alternative 18: Chemawa/Lockhaven Widening: McLeod Ln. to Tepper Extension & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

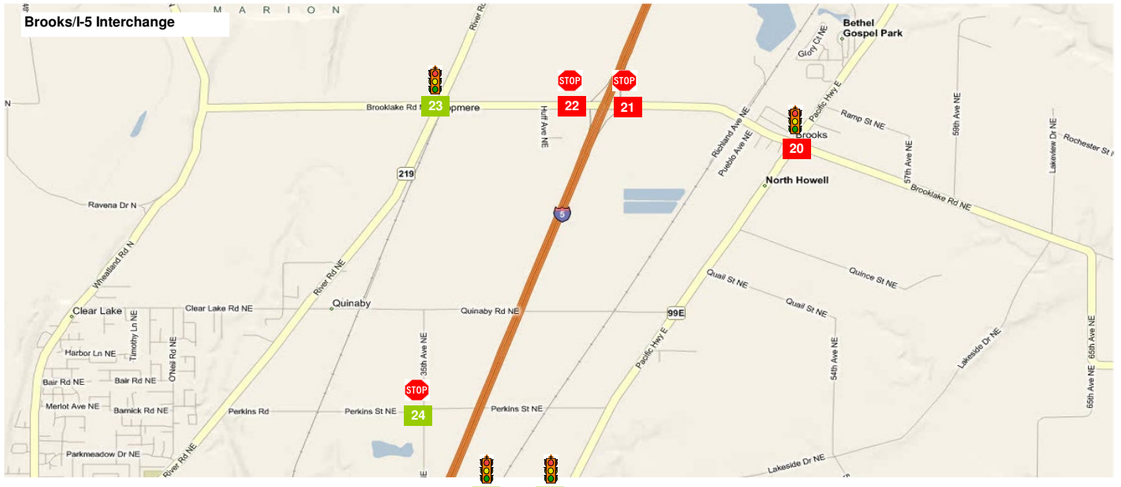
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

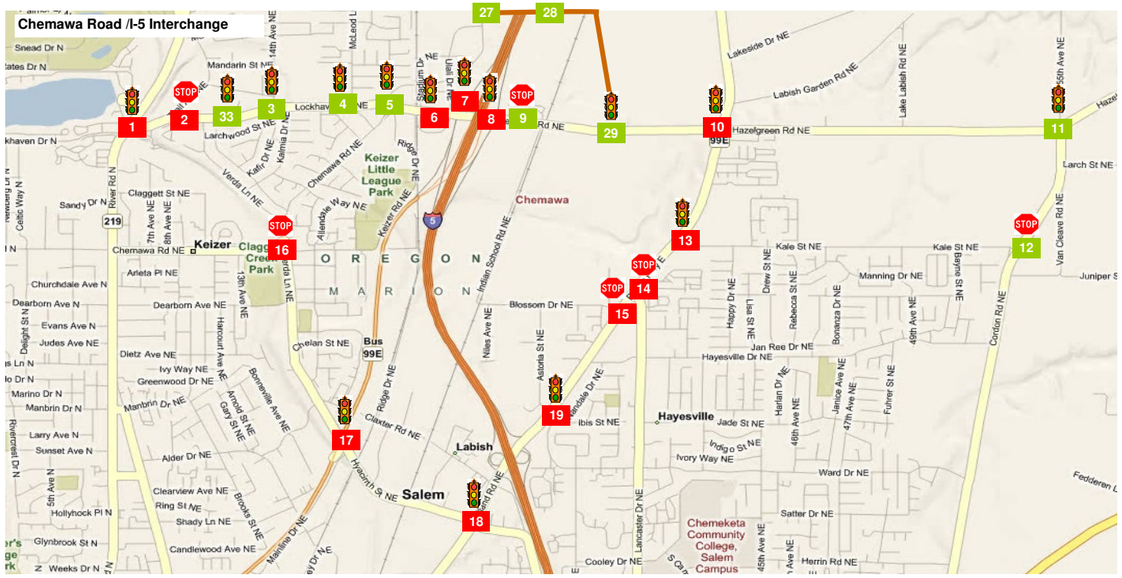
**Legend:**

Volume Diagram




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
STOP Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane/SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.45 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 27.7 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | C | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 170 0 55; 0 345 0; 2.0%; 0 500 0; 2.0% | | |

| 28 | Tepper Lane/NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.32 | Jurisdiction: Keizer | V/C Ratio: | 0.84 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | 2.0 | Standard: LOS D | Delay (s): | 15.2 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | A | PHF 0.92 | LOS : | B | PHF 0.92 | LOS : | | PHF |
| 25 345 0; 2.0%; 75 480 0; 2.0% | | | 2.0%; 95 0 385; 225 920 0; 2.0%; 145 735 0; 2.0% | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | 33 | Verda Lane/Lockhaven Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 1.09 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 46.0 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | D | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 40 0 300; 485 800 0; 2.0%; 0 835 40; 2.0%; 40 0 55; 2.0% | | |

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# FIGURE A.9a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 18: Chemawa/Lockhaven Widening: McLeod Ln. to Tepper Extension & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

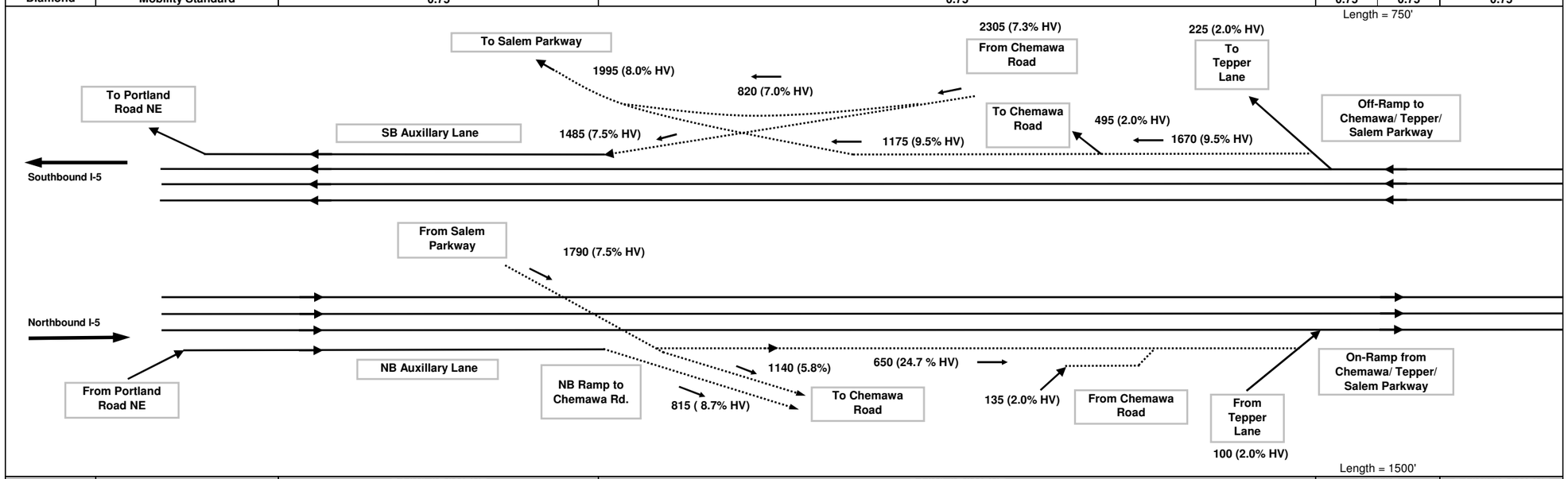
**Legend:**

Volume Diagram

SB HV % SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 18: Chemawa/ Tepper Half Diamond | Volume | 5935 | 4450 | 1895 | | 6345 |
| | Flow Rate^ | 1650 | 1650 | 2225 | 7050 | 2350 |
| | V/C | 0.70 | 0.70 | 1.06 | 1.00 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 18: Chemawa/ Tepper Half Diamond | Volume | 5405 | 4590 | 885 | | 5475 |
| | Flow Rate^ | 1475 | 1660 | 4185 | 6075 | 2010 |
| | V/C | 0.63 | 0.71 | 0.91 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE A9.b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 18: Chemawa/Lockhaven Widening: McLeod Ln. to Tepper Extension & Chemawa/Tepper Half Diamond Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

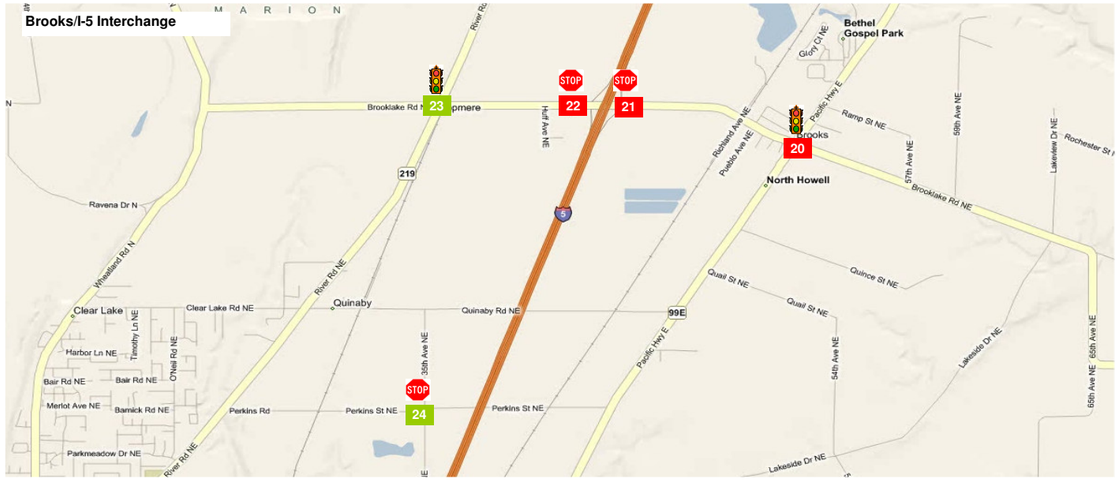
Meets Mobility Standard
Fails Mobility Standard

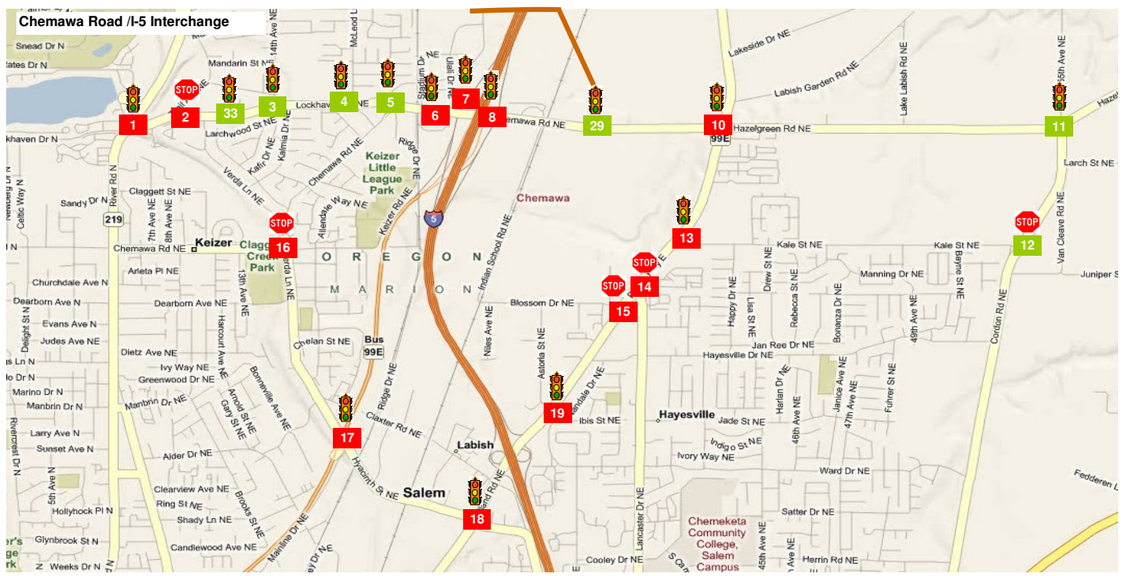
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

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# FIGURE A.10a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 21: Chemawa/Lockhaven Widening: River Road to OR 99E & Tepper Overcrossing
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

### 1 — Lockhaven Dr. & River Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.11 | Jurisdiction: Keizer | |
| Delay (s): | 115.2 | Standard: LOS D | |
| LOS : | F | PHF | 0.87 |

3.8%
170 795 230
205
355 3.0%
535
5.0%
105
235
190
180 1140 465
1.3%

### 2 — Lockhaven Dr. & Trail Ave.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.41(0.87)^ | Jurisdiction: Keizer | |
| Delay (s): | 63.9 | Standard: LOS D | |
| LOS : | F | PHF | 0.97 |

0.0%
160 0 25
15
935 1.3%
0
1.8%
90
840
0

### 3 — Lockhaven Dr. & 14th Ave./Kafir Dr.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.75 | Jurisdiction: Keizer | |
| Delay (s): | 11.8 | Standard: LOS D | |
| LOS : | B | PHF | 0.91 |

1.6%
25 10 35
180
1360 1.5%
55
2.4%
75
1120
35
40 20 15
7.0%

### 4 — Lockhaven Dr. & McLeod Ln.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.74 | Jurisdiction: Keizer | |
| Delay (s): | 15.4 | Standard: LOS D | |
| LOS : | B | PHF | 0.97 |

1.2%
105 50 220
395
1460 0.7%
25
1.3%
100
1055
15
30 65 35
0.0%

### 5 — Lockhaven & Chemawa/Keizer St.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.81 | Jurisdiction: Keizer | |
| Delay (s): | 31.3 | Standard: LOS D | |
| LOS : | C | PHF | 0.97 |

0.4%
155 85 205
30
1680 0.8%
885
1.1%
190
1080
40
45 100 410
0.3%

### 6 — Chemawa Rd. & Stadium Dr./Ulali Dr.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.96 | Jurisdiction: ODOT | |
| Delay (s): | 41.9 | Standard: | 0.85 |
| LOS : | D | PHF | 0.98 |

0.8%
290 0 0
520
2305 0.9%
135
0.7%
15
1640
40
0 0 840
0.7%

### 7 — Chemawa Rd. & I-5 SB Ramps

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.97 | Jurisdiction: ODOT | |
| Delay (s): | 27.7 | Standard: | 0.75 |
| LOS : | C | PHF | 0.97 |

3.2%
440 5 110
0
2520 1.3%
380
0.7%
0
750
1730

### 8 — Chemawa Rd. & I-5 NB Ramps

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.06 | Jurisdiction: ODOT | |
| Delay (s): | 72.7 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |

35
1190 1.3%
0
2.1%
100
760
0
1710 5 250
0.0%

### 9 — Chemawa Rd. & Indian School Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

### 10 — Chemawa Rd. & OR 99E

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.14 | Jurisdiction: ODOT | |
| Delay (s): | 71.8 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |

1.0%
230 1020 115
90
450 2.7%
135
1.6%
190
545
535
540 835 175
0.8%

### 11 — Hazelgreen Rd. & Cordon Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.86 | Jurisdiction: Marion County | |
| Delay (s): | 39.1 | Standard: LOS E | |
| LOS : | D | PHF | 0.95 |

1.3%
35 135 15
15
400 3.2%
110
2.5%
40
410
385
240 125 75
1.4%

### 12 — Cordon Rd. & Kale St.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.43(0.42)^ | Jurisdiction: Marion County | |
| Delay (s): | 23.0 | Standard: LOS D | |
| LOS : | C | PHF | 0.94 |

1.2%
30 570 0
0.0%
15
0
95
90 415 0
1.6%

**Notes:**

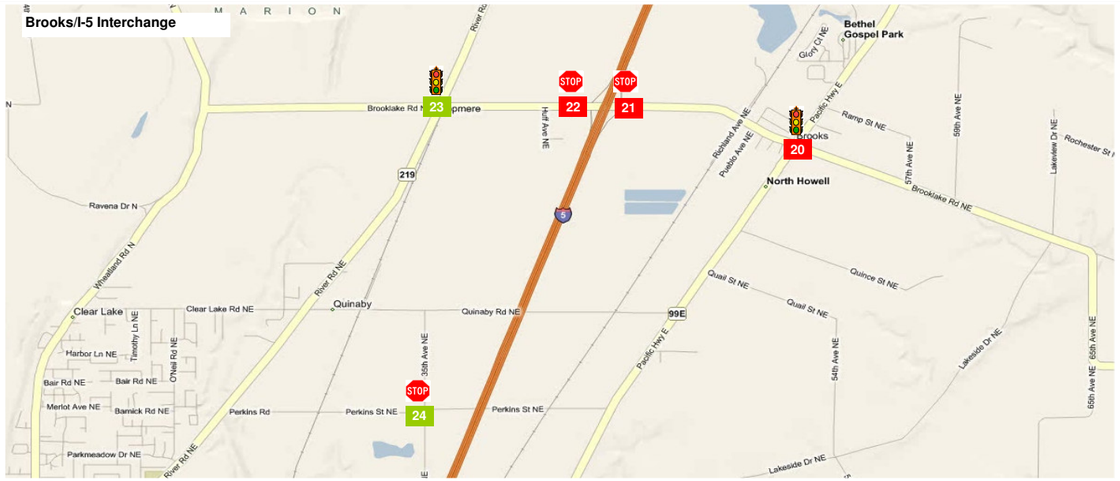
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

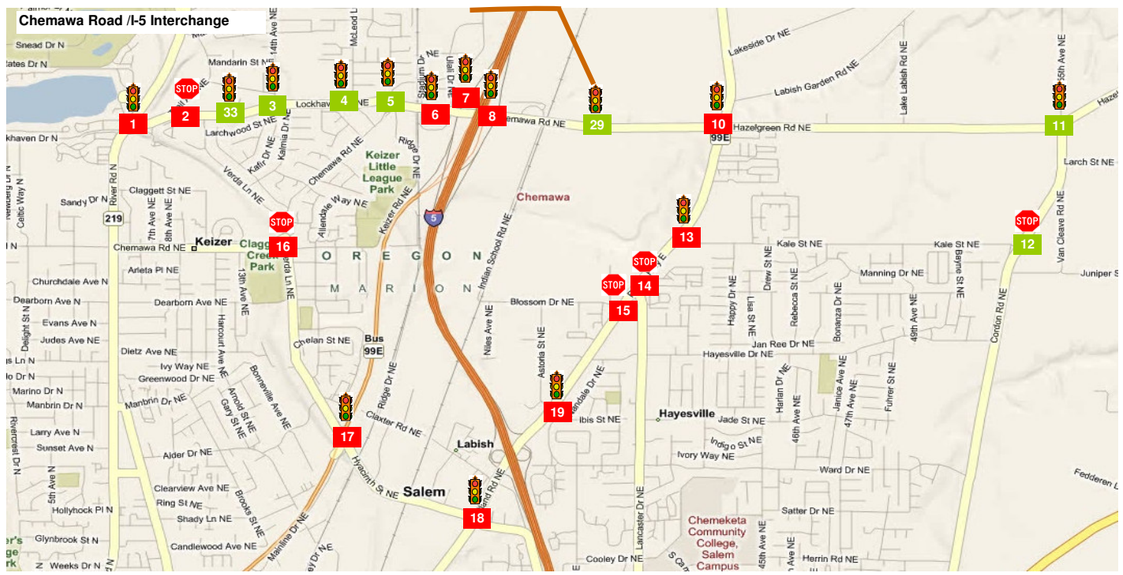
**Legend:**

Volume Diagram

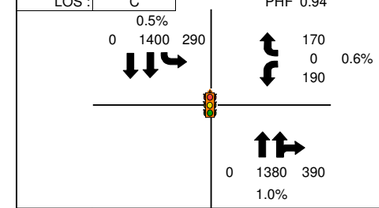
SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

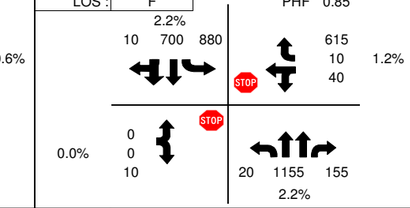
555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

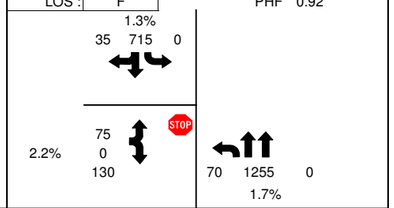


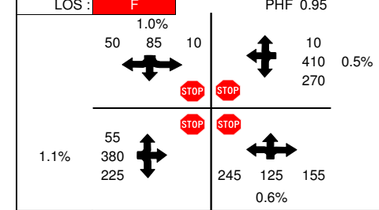

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.96 | Jurisdiction: ODOT | V/C Ratio: | 1.77(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.41(1.70)^ | Jurisdiction: ODOT |
| Delay (s): | 27.1 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 386.8 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |

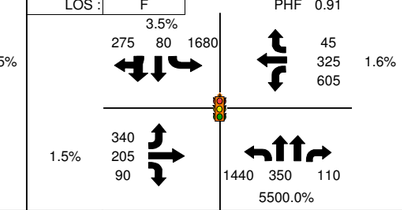


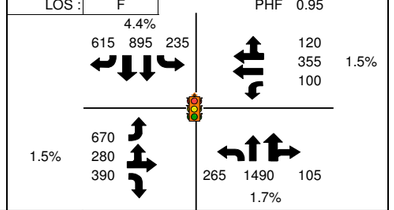



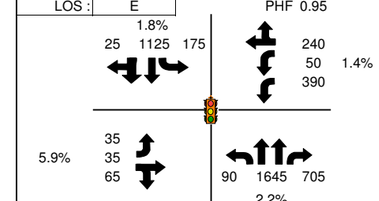

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.31 | Jurisdiction: Keizer | V/C Ratio: | 1.38 | Jurisdiction: ODOT | V/C Ratio: | 1.38 | Jurisdiction: ODOT |
| Delay (s): | 282.1 | Standard: LOS D | Delay (s): | 145.7 | Standard: 0.85 | Delay (s): | 153.8 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

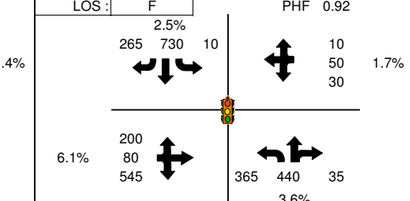


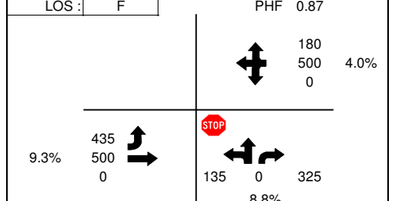



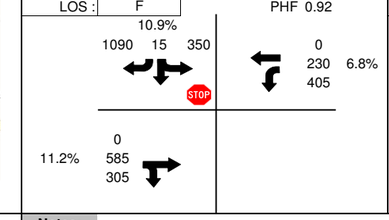

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | V/C Ratio: | 1.41 | Jurisdiction: ODOT | V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 60.0 | Standard: 0.75 | Delay (s): | 180.0 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

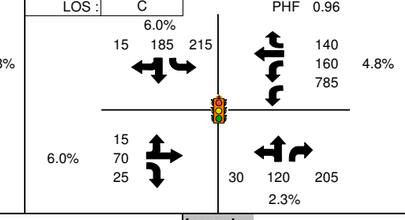


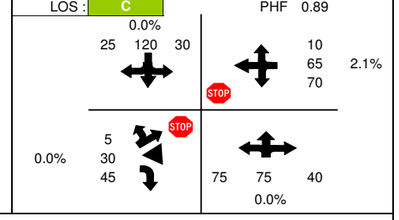




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.86(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.60 | Jurisdiction: Marion County | V/C Ratio: | 0.11(0.52)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 33.1 | Standard: LOS E | Delay (s): | 24.8 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |

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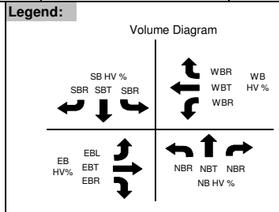
# FIGURE A.10a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 21: Chemawa/Lockhaven Widening: River Road to OR 99E & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

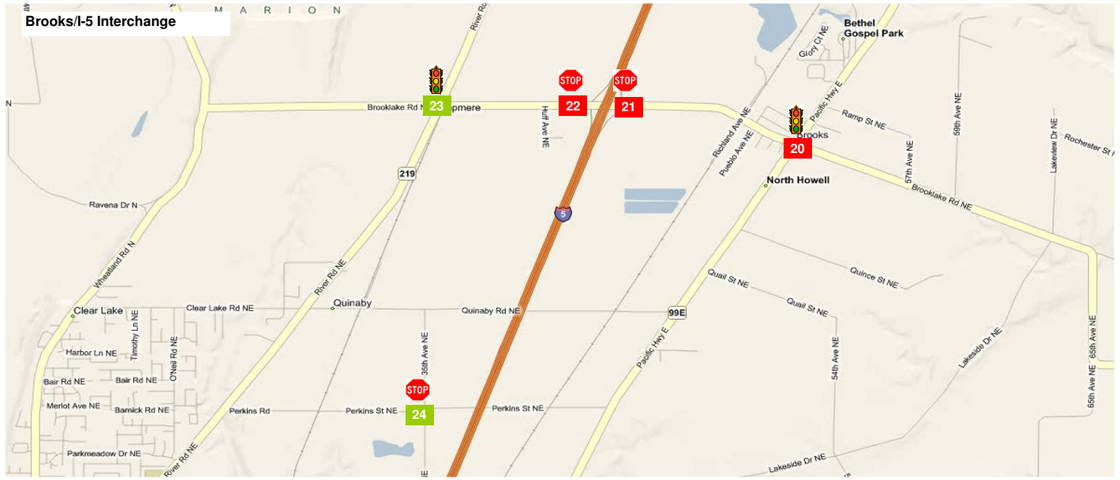
**Notes:**

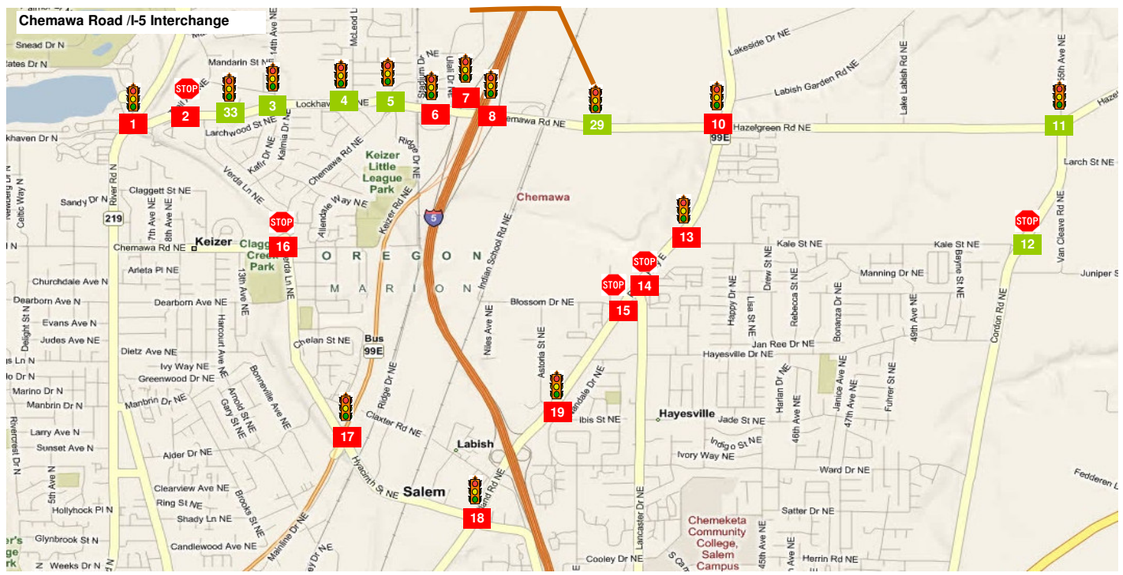
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane /SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | | PHF | LOS : | | PHF |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | Does Not Exist in Alternative | | |

| 28 | Tepper Lane /NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brookline/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | V/C Ratio: | 0.87 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | 51.9 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | | PHF | LOS : | D | PHF 0.92 | LOS : | | PHF |
| Does Not Exist in Alternative | | | 2.0%; 95 25 400; 210 940 70; 2.0%; 145 795 70; 2.0%; 190 75 75; 2.0% | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | 33 | Verda Lane/Lockhaven Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.71 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 15.8 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | B | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 55 0 325; 585 840 0; 2.0%; 0 805 60; 2.0%; 55 0 100; 2.0% | | |

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# FIGURE A.10a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 21: Chemawa/Lockhaven Widening: River Road to OR 99E & Tepper Overcrossing
## Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

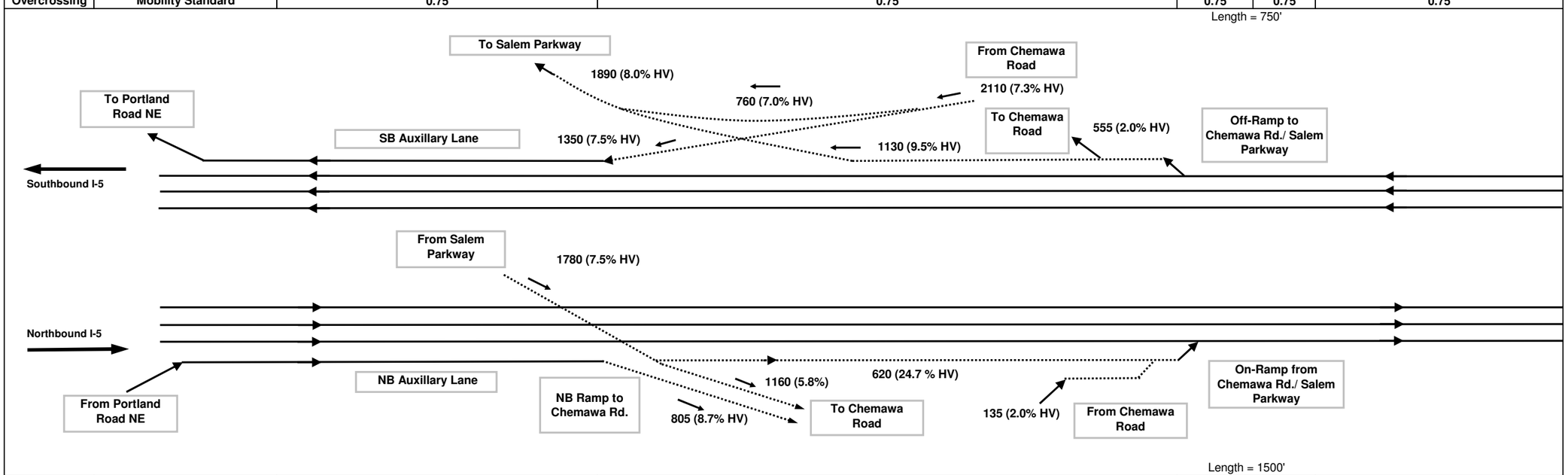
**Legend:**

Volume Diagram

SB HV % SBR SBT SBR; WBR WBT WBR WB HV %; EB HV% EBL EBT EBR; NBR NBT NBR NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 21: Widening w/Tepper Overcrossing | Volume | 5965 | 4615 | 1685 | | 6300 |
| | Flow Rate^ | 1655 | 1720 | 1940 | 6860 | 2335 |
| | V/C | 0.70 | 0.73 | 0.92 | 0.97 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 21: Widening w/Tepper Overcrossing | Volume | 5450 | 4645 | 755 | | 5400 |
| | Flow Rate^ | 1485 | 1680 | 4065 | 5985 | 2000 |
| | V/C | 0.63 | 0.71 | 0.88 | 0.85 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE A.10b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 21: Chemawa/Lockhaven Widening: River Road to OR 99E & Tepper Overcrossing**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

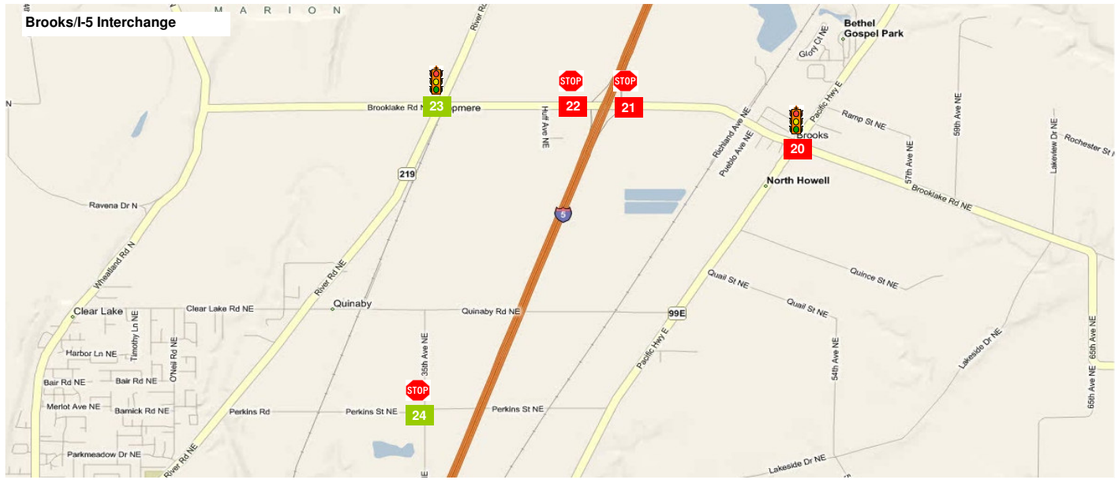
Meets Mobility Standard
Fails Mobility Standard

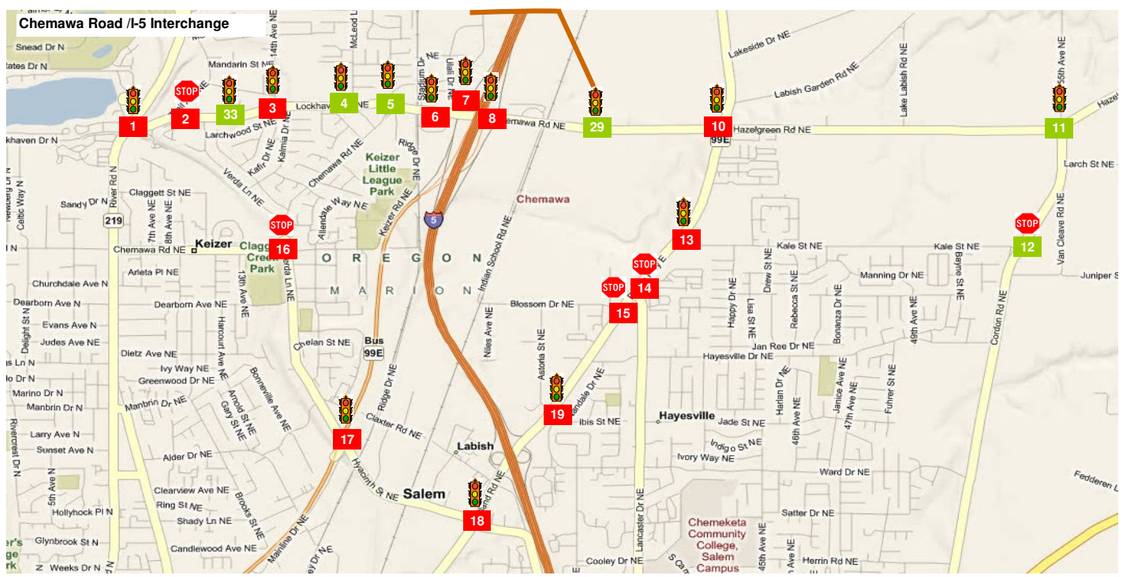
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

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# FIGURE A.11a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 22: Chemawa/Lockhaven Widening: McLeod Ln. to OR 99E & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

### 1 — Lockhaven Dr. & River Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.13 | Jurisdiction: Keizer | |
| Delay (s): | 143.9 | Standard: LOS D | |
| LOS : | F | PHF | 0.87 |

3.8%
170 810 225
200
335 3.0%
505
5.0%
110
235
190
175 1150 455
1.3%

### 2 — Lockhaven Dr. & Trail Ave.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.59(2.79)^ | Jurisdiction: Keizer | |
| Delay (s): | 911.1 | Standard: LOS D | |
| LOS : | F | PHF | 0.97 |

0.0%
155 0 25
15
885 1.3%
0
1.8%
95
820
0

### 3 — Lockhaven Dr. & 14th Ave./Kafir Dr.

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.10 | Jurisdiction: Keizer | |
| Delay (s): | 56.5 | Standard: LOS D | |
| LOS : | E | PHF | 0.91 |

1.6%
35 15 80
245
1220 1.5%
55
2.4%
75
1060
25
30 25 20
6.9%

### 4 — Lockhaven Dr. & McLeod Ln.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.73 | Jurisdiction: Keizer | |
| Delay (s): | 16.0 | Standard: LOS D | |
| LOS : | B | PHF | 0.97 |

1.2%
110 50 220
400
1380 0.7%
25
1.3%
95
1050
15
30 65 35
0.0%

### 5 — Lockhaven & Chemawa/Keizer St.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Keizer | |
| Delay (s): | 33.3 | Standard: LOS D | |
| LOS : | C | PHF | 0.97 |

0.4%
120 85 205
20
1665 0.8%
905
1.1%
185
1080
40
20 105 425
0.3%

### 6 — Chemawa Rd. & Stadium Dr./Ulali Dr.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.96 | Jurisdiction: ODOT | |
| Delay (s): | 42.5 | Standard: | 0.85 |
| LOS : | D | PHF | 0.98 |

0.8%
295 0 0
525
2295 0.9%
130
0.7%
15
1650
45
0 0 845
0.7%

### 7 — Chemawa Rd. & I-5 SB Ramps

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.97 | Jurisdiction: ODOT | |
| Delay (s): | 27.6 | Standard: | 0.75 |
| LOS : | C | PHF | 0.97 |

3.2%
445 5 105
0
2505 1.3%
380
0.7%
0
760
1735

### 8 — Chemawa Rd. & I-5 NB Ramps

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.06 | Jurisdiction: ODOT | |
| Delay (s): | 66.7 | Standard: | 0.75 |
| LOS : | E | PHF | 0.94 |

35
1190 0.7%
0
1.7%
105
760
0
1695 5 250
1.9%

### 9 — Chemawa Rd. & Indian School Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

### 10 — Chemawa Rd. & OR 99E

| | | | |
|---|---|---|---|
| V/C Ratio: | 1.11 | Jurisdiction: ODOT | |
| Delay (s): | 76.1 | Standard: | 0.75 |
| LOS : | E | PHF | 0.97 |

1.0%
230 1020 115
90
445 2.7%
135
1.6%
190
545
535
545 815 175
0.8%

### 11 — Hazelgreen Rd. & Cordon Rd.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Marion County | |
| Delay (s): | 39.1 | Standard: LOS E | |
| LOS : | D | PHF | 0.95 |

1.3%
30 135 15
15
400 3.2%
110
2.5%
40
410
385
240 125 75
1.4%

### 12 — Cordon Rd. & Kale St.

| | | | |
|---|---|---|---|
| V/C Ratio: | 0.42(0.43)^ | Jurisdiction: Marion County | |
| Delay (s): | 23.0 | Standard: LOS D | |
| LOS : | C | PHF | 0.94 |

1.2%
30 600 0
0.0%
15
0
95
90 425 0
1.6%

**Notes:**

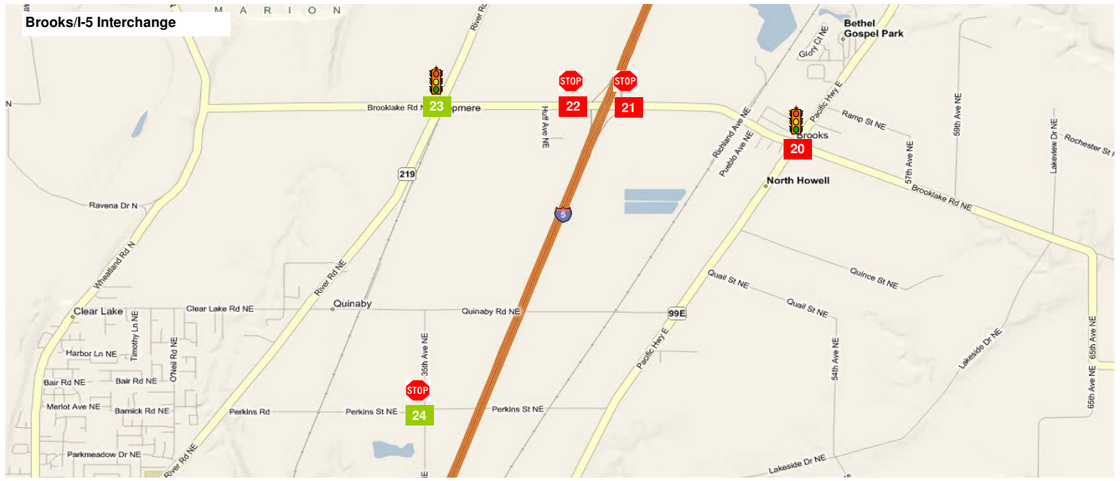
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

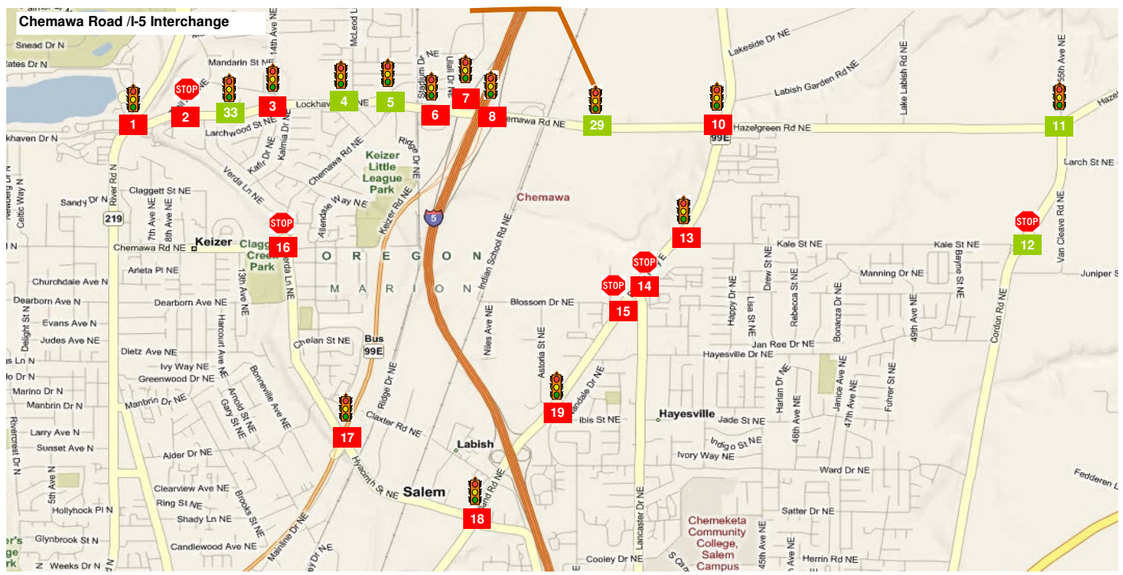
**Legend:**

Volume Diagram

SB HV %
SBR SBT SBR
WBR WB
WBT HV %
WBR
EB HV%
EBL
EBT
EBR
NBR NBT NBR
NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 13 | OR 99E & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | |
| Delay (s): | 22.8 | Standard: 0.75 | |
| LOS : | C | PHF 0.94 | |

0.5%
0 1400 290
165
0 0.6%
190
0 1370 395
1.0%

| 14 | OR 99E & Lancaster Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.74(1.76)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.85 | |

2.2%
10 700 880
615
10 1.2%
40
0
0.0% 0
10
20 1150 155
2.2%

| 15 | OR 99E & Blossom Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.40(1.70)^ | Jurisdiction: ODOT | |
| Delay (s): | 384.1 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.92 | |

1.3%
35 715 0
75
2.2% 0
130
70 1250 0
1.7%

| 16 | Chemawa Rd. & Verda Ln. | | |
|---|---|---|---|
| V/C Ratio: | 1.35 | Jurisdiction: Keizer | |
| Delay (s): | 310.3 | Standard: LOS D | |
| LOS : | F | PHF 0.95 | |

1.0%
55 95 10
10
430 0.5%
275
55
1.1% 385
235
260 125 155
0.6%

| 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.37 | Jurisdiction: ODOT | |
| Delay (s): | 149.4 | Standard: 0.85 | |
| LOS : | F | PHF 0.91 | |

3.5%
80 1680 60
330
620 1.6%
110
45
1.5% 345
205
275 1440 355
3.1%

| 18 | OR 99E & Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.38 | Jurisdiction: ODOT | |
| Delay (s): | 156.2 | Standard: 0.75 | |
| LOS : | F | PHF 0.95 | |

4.4%
620 890 235
120
360 1.5%
100
675
1.5% 280
400
265 1480 105
1.7%

| 19 | OR 99E & Astoria St./Ward St. | | |
|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | |
| Delay (s): | 54.2 | Standard: 0.75 | |
| LOS : | D | PHF 0.95 | |

1.8%
25 1120 175
240
50 1.4%
385
35
5.9% 35
65
90 1640 700
2.2%

| 20 | Brooklake Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.41 | Jurisdiction: ODOT | |
| Delay (s): | 180.0 | Standard: 0.60 | |
| LOS : | F | PHF 0.92 | |

2.5%
265 730 10
10
50 1.7%
30
200
6.1% 80
545
365 440 35
3.6%

| 21 | Brooklake Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | |
| LOS : | F | PHF 0.87 | |

180
500 4.0%
0
440
9.3% 500
0
140 0 325
8.8%

| 22 | Brooklake Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.86(5.00)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | |
| LOS : | F | PHF 0.92 | |

10.9%
1090 15 350
0
230 6.8%
410
0
11.2% 590
300

| 23 | Brooklake Rd. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.63 | Jurisdiction: Marion County | |
| Delay (s): | 33.3 | Standard: LOS E | |
| LOS : | C | PHF 0.96 | |

6.0%
15 185 220
140
160 4.8%
785
15
6.0% 70
25
30 120 205
2.3%

| 24 | Perkins Rd. & 35th Ave. NE | | |
|---|---|---|---|
| V/C Ratio: | 0.12(0.54)^ | Jurisdiction: Marion County | |
| Delay (s): | 26.1 | Standard: LOS E | |
| LOS : | D | PHF 0.89 | |

0.0%
25 115 30
10
70 2.1%
70
5
0.0% 35
45
80 75 40
0.0%

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# FIGURE A.11a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 22: Chemawa/Lockhaven Widening: McLeod Ln. to OR 99E & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

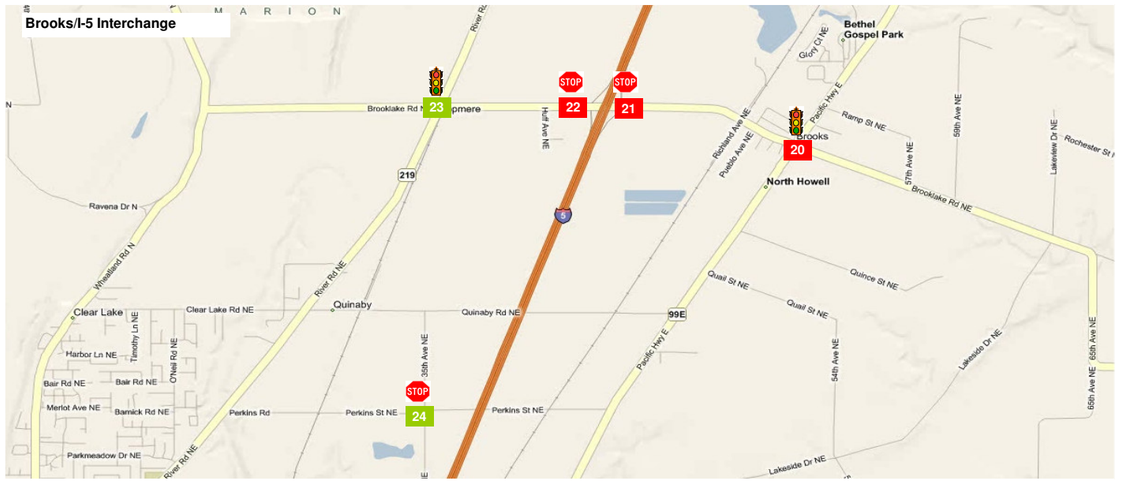
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

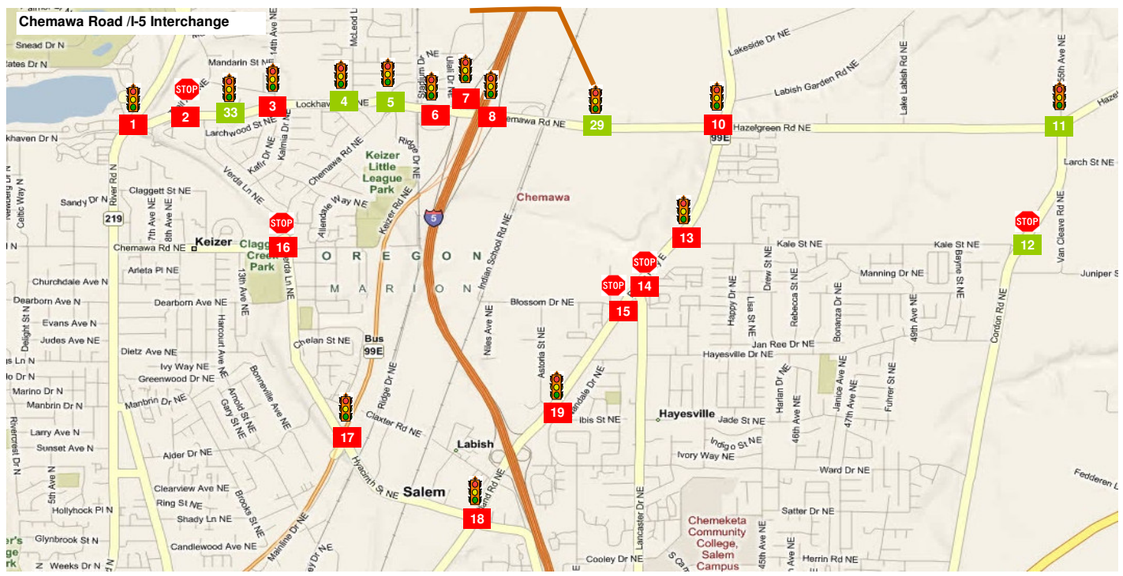
**Legend:**

Volume Diagram

SB HV %
SBR SBT SBR
WBR WB
WBT HV %
WBR
EB HV%
EBL
EBT
EBR
NBR NBT NBR
NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 26 | Hyacinth/SB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

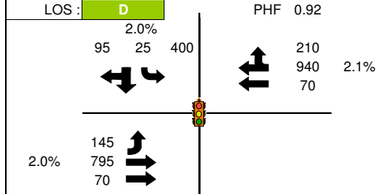
| 27 | Tepper Lane/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 28 | Tepper Lane/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 29 | Chemawa Road/Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.87 | Jurisdiction: Keizer | |
| Delay (s): | 42.4 | Standard: LOS D | |
| LOS : | D | PHF | 0.92 |




| 30 | Brooklake/I-5 Ramps (SPUI) | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

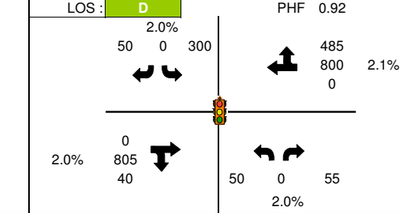
| 31 | Quinaby Road/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 32 | Quinaby Road/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 33 | Verda Lane/Lockhaven Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.09 | Jurisdiction: Keizer | |
| Delay (s): | 45.4 | Standard: LOS D | |
| LOS : | D | PHF | 0.92 |

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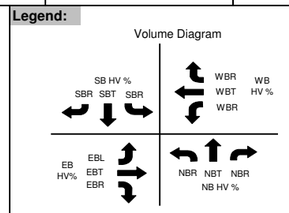
# FIGURE A.11a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 22: Chemawa/Lockhaven Widening: McLeod Ln. to OR 99E & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

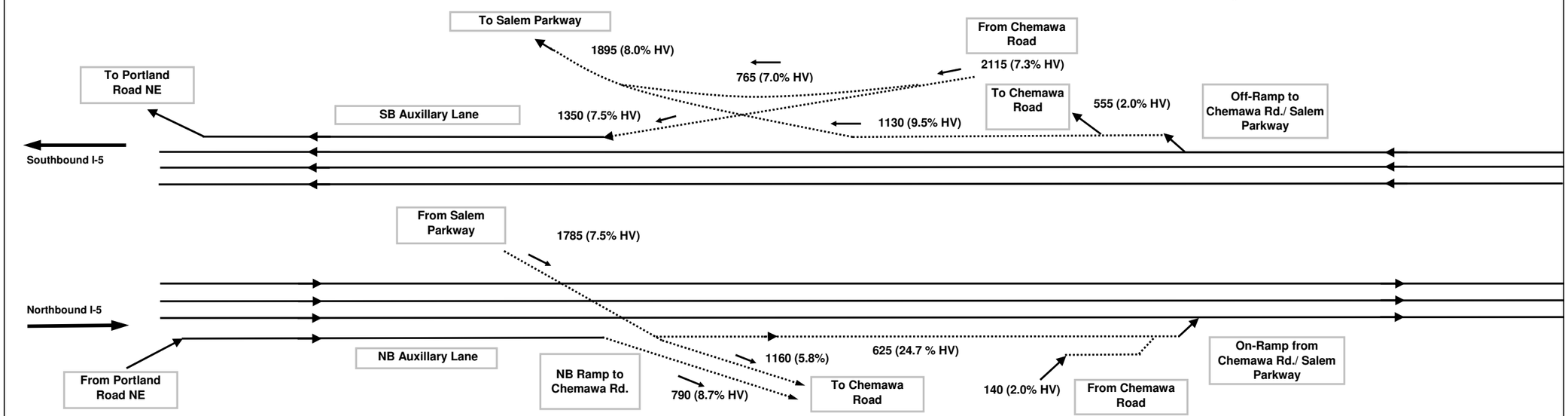
**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.2% | 6.9% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 22: Widening w/Tepper Overcrossing | Volume | 5965 | 4615 | 1685 | | 6300 |
| | Flow Rate^ | 1660 | 1720 | 1940 | 6860 | 2335 |
| | V/C | 0.71 | 0.73 | 0.92 | 0.97 | 0.99 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'




Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Salem Pkwy On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 3.8% | 20.8% | | 9.0% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 22: Widening w/Tepper Overcrossing | Volume | 5430 | 4640 | 765 | | 5405 |
| | Flow Rate^ | 1480 | 1680 | 4075 | 5990 | 2005 |
| | V/C | 0.63 | 0.71 | 0.89 | 0.85 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.11b Chemawa Road IAMP Traffic Analysis

**2031 Alternative 22: Chemawa/Lockhaven Widening: McLeod Ln. to OR 99E & Tepper Overcrossing**
**Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

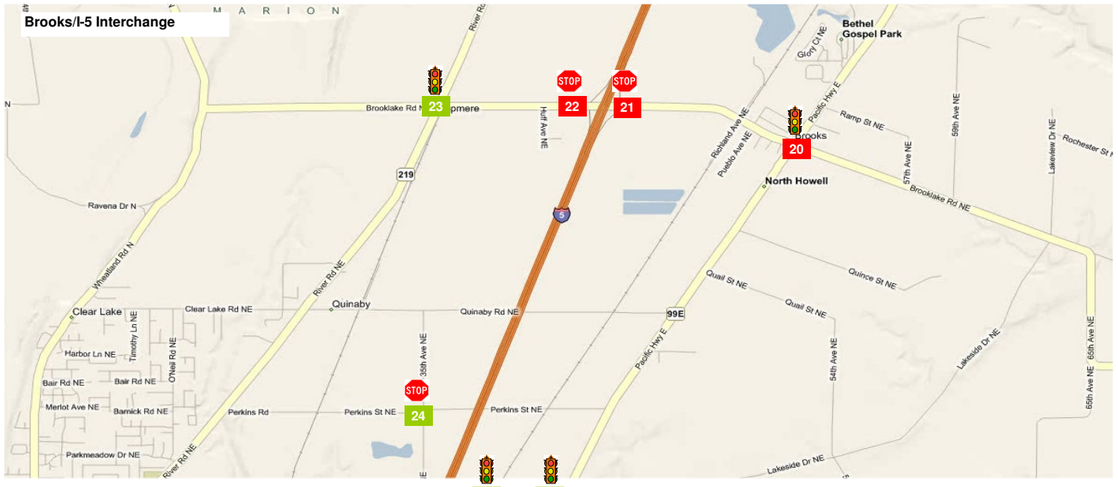
Meets Mobility Standard
Fails Mobility Standard

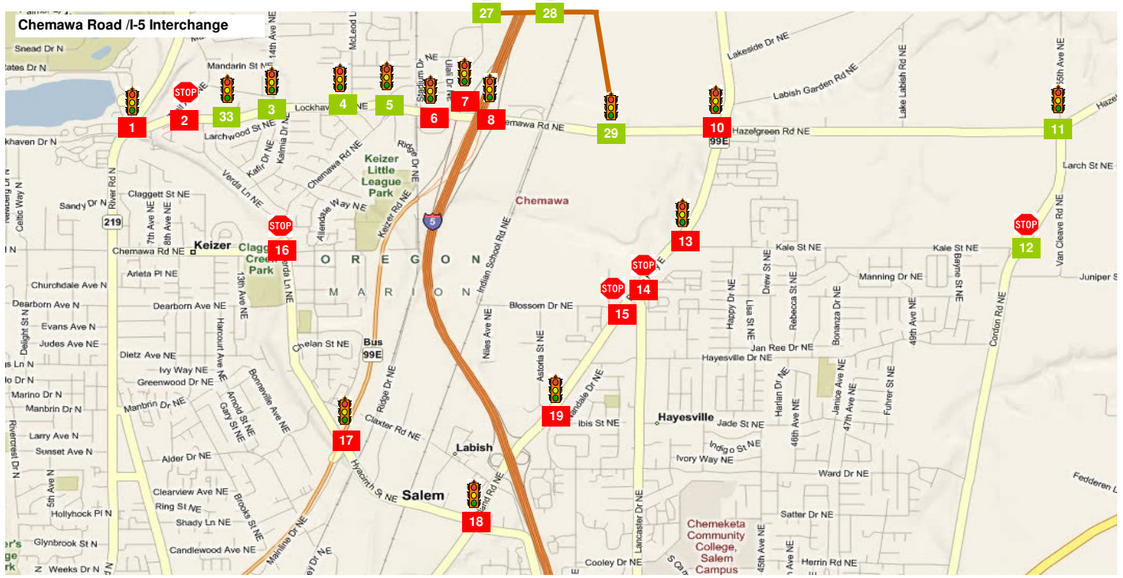
## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

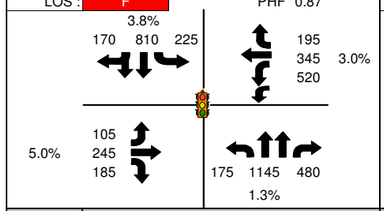
Collector-Distributor Road; Ramps
Mainline Freeway

N

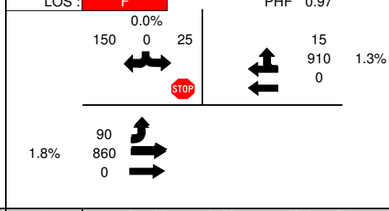


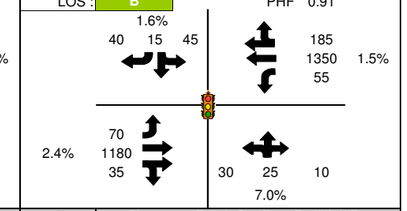

| 1 | Lockhaven Dr. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 1.11 | Jurisdiction: Keizer | |
| Delay (s): | 109.9 | Standard: LOS D | |
| LOS : | F | PHF 0.87 | |



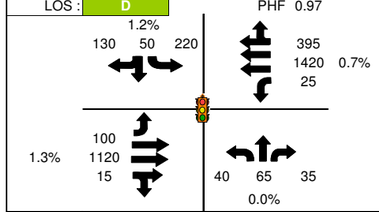

| 2 | Lockhaven Dr. & Trail Ave. | | |
|---|---|---|---|
| V/C Ratio: | 0.41(0.82)^ | Jurisdiction: Keizer | |
| Delay (s): | 56.2 | Standard: LOS D | |
| LOS : | F | PHF 0.97 | |



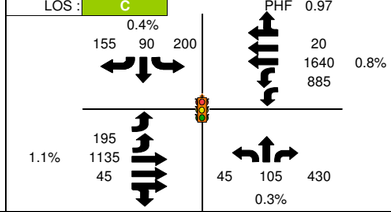

| 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.75 | Jurisdiction: Keizer | |
| Delay (s): | 11.9 | Standard: LOS D | |
| LOS : | B | PHF 0.91 | |



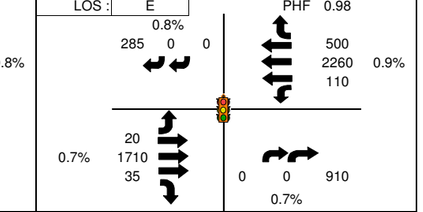

| 4 | Lockhaven Dr. & McLeod Ln. | | |
|---|---|---|---|
| V/C Ratio: | 0.97 | Jurisdiction: Keizer | |
| Delay (s): | 35.3 | Standard: LOS D | |
| LOS : | D | PHF 0.97 | |



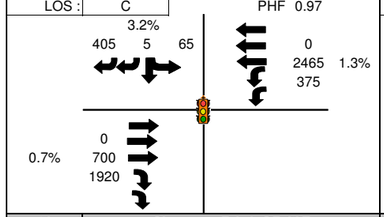

| 5 | Lockhaven & Chemawa/Keizer St. | | |
|---|---|---|---|
| V/C Ratio: | 0.81 | Jurisdiction: Keizer | |
| Delay (s): | 31.7 | Standard: LOS D | |
| LOS : | C | PHF 0.97 | |



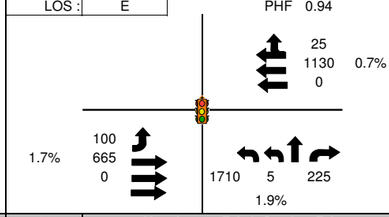

| 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | |
| Delay (s): | 56.0 | Standard: 0.85 | |
| LOS : | E | PHF 0.98 | |




| 7 | Chemawa Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.05 | Jurisdiction: ODOT | |
| Delay (s): | 34.5 | Standard: 0.75 | |
| LOS : | C | PHF 0.97 | |



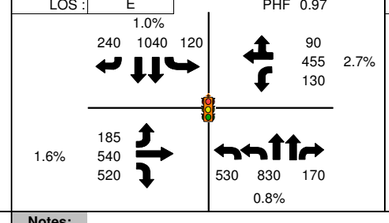

| 8 | Chemawa Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.05 | Jurisdiction: ODOT | |
| Delay (s): | 66.8 | Standard: 0.75 | |
| LOS : | E | PHF 0.94 | |



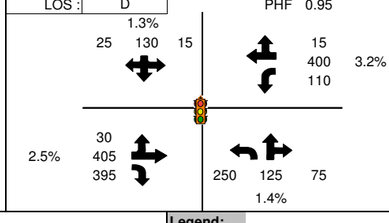

| 9 | Chemawa Rd. & Indian School Rd. | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

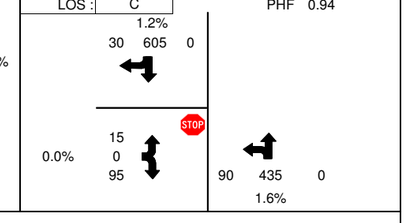
| 10 | Chemawa Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.12 | Jurisdiction: ODOT | |
| Delay (s): | 75.1 | Standard: 0.75 | |
| LOS : | E | PHF 0.97 | |




| 11 | Hazelgreen Rd. & Cordon Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Marion County | |
| Delay (s): | 45.2 | Standard: LOS E | |
| LOS : | D | PHF 0.95 | |




| 12 | Cordon Rd. & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.41(0.44)^ | Jurisdiction: Marion County | |
| Delay (s): | 23.4 | Standard: LOS D | |
| LOS : | C | PHF 0.94 | |

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# FIGURE A.12a Chemawa Road IAMP Traffic Analysis

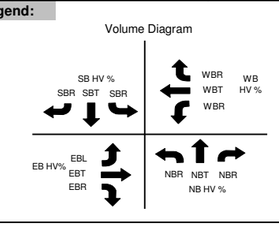
## 2031 Alternative 23: Chemawa/Lockhaven Widening: River Road to OR 99E & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

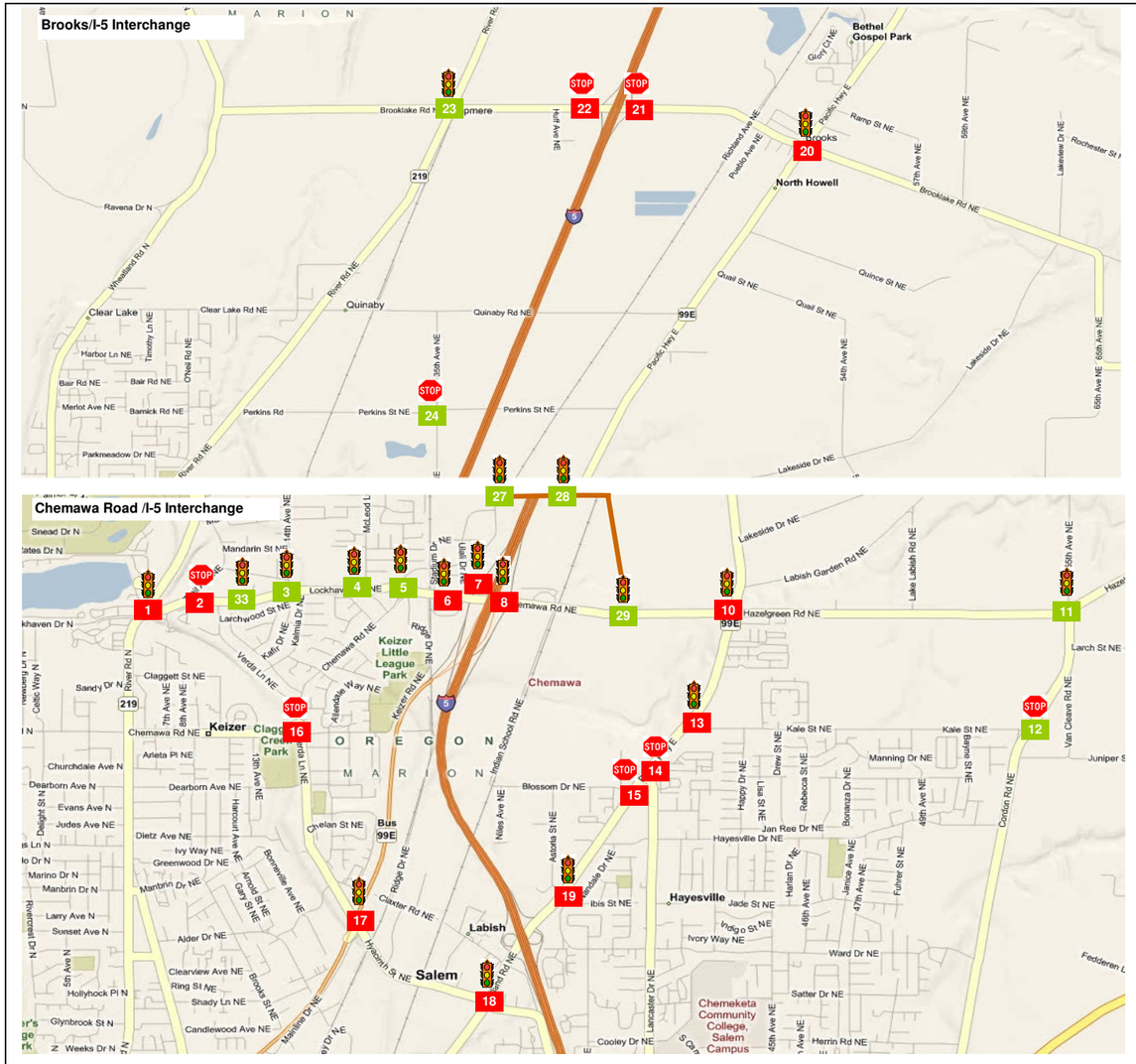
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

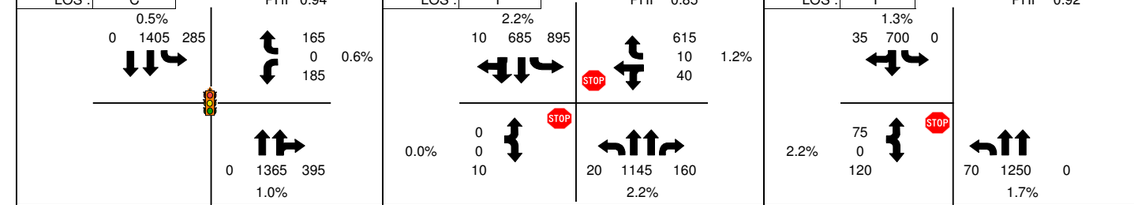
Volume Diagram



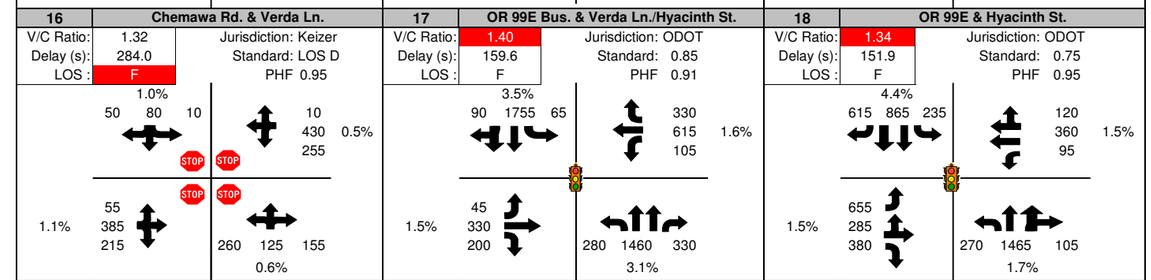

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection



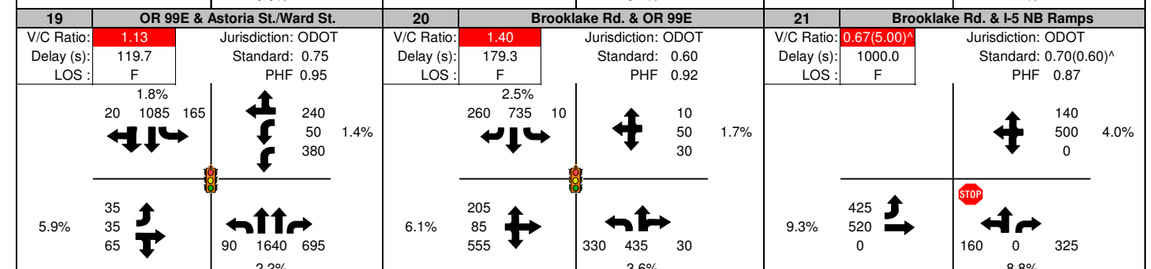

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.96 | Jurisdiction: ODOT | V/C Ratio: | 1.73(1.78)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(1.63)^ | Jurisdiction: ODOT |
| Delay (s): | 28.2 | Standard: 0.75 | Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | Delay (s): | 356.7 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |



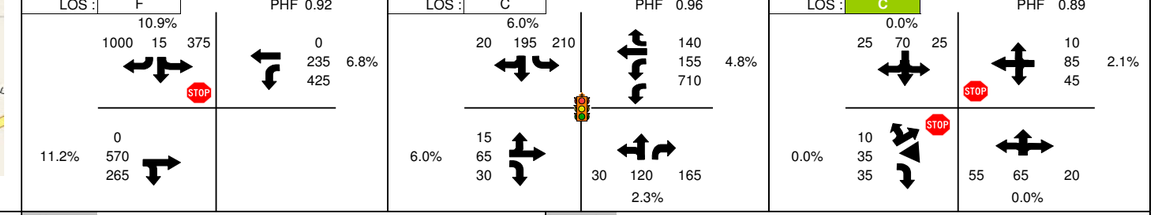

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.32 | Jurisdiction: Keizer | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 1.34 | Jurisdiction: ODOT |
| Delay (s): | 284.0 | Standard: LOS D | Delay (s): | 159.6 | Standard: 0.85 | Delay (s): | 151.9 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |




| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.13 | Jurisdiction: ODOT | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 0.67(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 119.7 | Standard: 0.75 | Delay (s): | 179.3 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.65(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.11(0.36)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 32.6 | Standard: LOS E | Delay (s): | 16.5 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |

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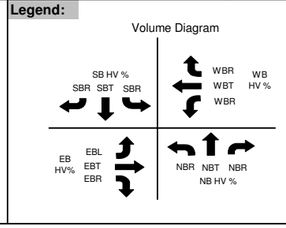
# FIGURE A.12a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 23: Chemawa/Lockhaven Widening: River Road to OR 99E & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

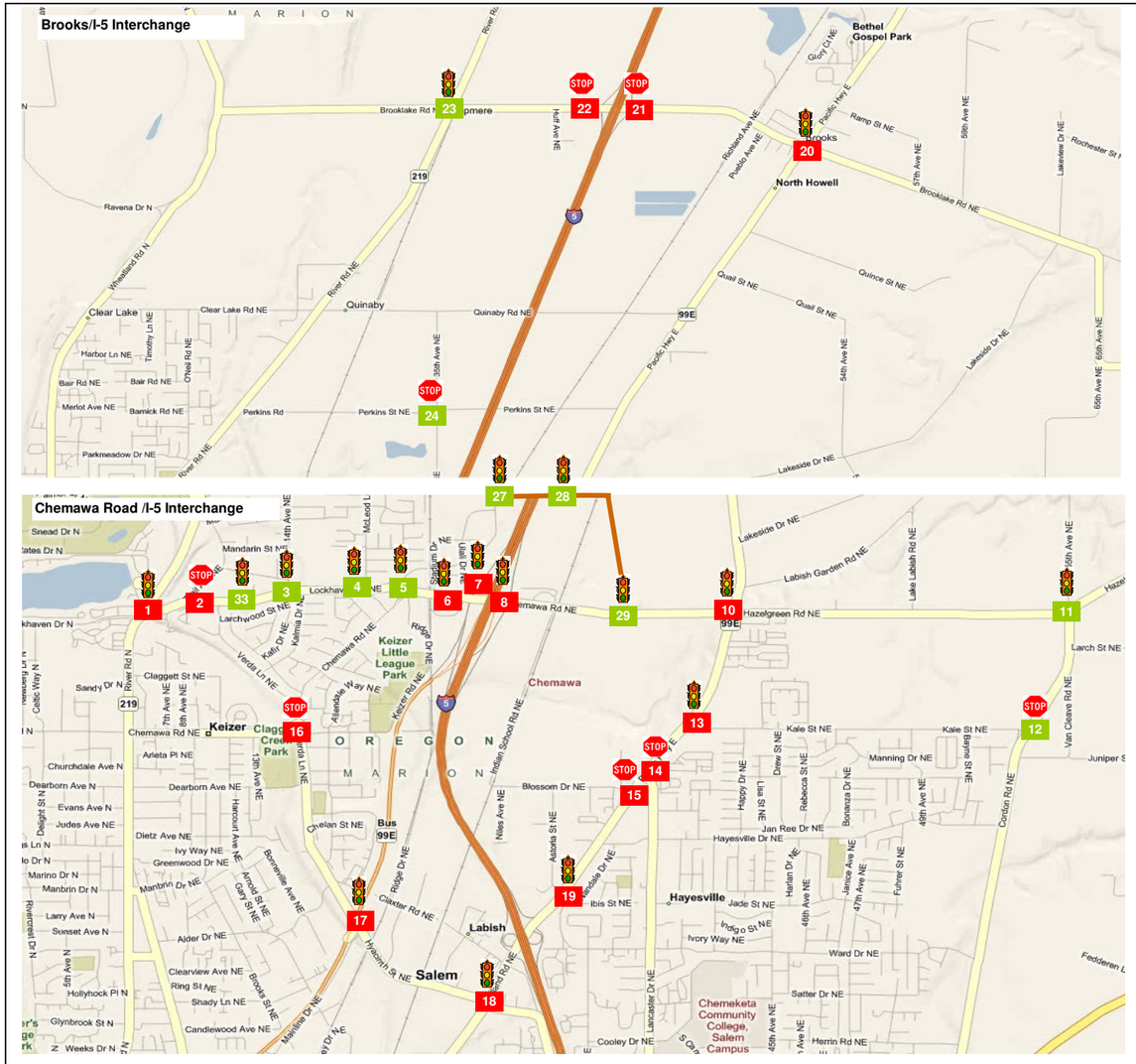
**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 25 | Hyacinth/NB Salem Pkwy Ramps | | 26 | Hyacinth/SB Salem Pkwy Ramps | | 27 | Tepper Lane/SB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.53 | Jurisdiction: ODOT |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 26.3 | Standard: 0.75 |
| LOS : | | PHF | LOS : | | PHF | LOS : | D | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 170 0 80; 0 495 0; 2.0%; 0 570 0; 2.0% | | |

| 28 | Tepper Lane/NB Ramps | | 29 | Chemawa Road/Tepper Lane | | 30 | Brooklake/I-5 Ramps (SPUI) | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.43 | Jurisdiction: ODOT | V/C Ratio: | 0.85 | Jurisdiction: Keizer | V/C Ratio: | | Jurisdiction: ODOT |
| Delay (s): | 2.7 | Standard: 0.75 | Delay (s): | 33.6 | Standard: LOS D | Delay (s): | | Standard: |
| LOS : | A | PHF 0.92 | LOS : | D | PHF 0.92 | LOS : | | PHF |
| 65 495 0; 2.0%; 75 575 0; 2.0% | | | 2.0%; 95 55 425; 340 870 15; 2.0%; 145 745 0; 2.0%; 190 75 75; 2.0% | | | Does Not Exist in Alternative | | |

| 31 | Quinaby Road/NB Ramps | | 32 | Quinaby Road/SB Ramps | | 33 | Verda Lane/Lockhaven Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | | Jurisdiction: ODOT | V/C Ratio: | 0.73 | Jurisdiction: Keizer |
| Delay (s): | | Standard: | Delay (s): | | Standard: | Delay (s): | 16.6 | Standard: LOS D |
| LOS : | | PHF | LOS : | | PHF | LOS : | B | PHF 0.92 |
| Does Not Exist in Alternative | | | Does Not Exist in Alternative | | | 2.0%; 40 0 340; 575 845 0; 2.0%; 0 845 40; 2.0%; 40 0 100; 2.0% | | |

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# FIGURE A.12a Chemawa Road IAMP Traffic Analysis

## 2031 Alternative 23: Chemawa/Lockhaven Widening: River Road to OR 99E & Chemawa/Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

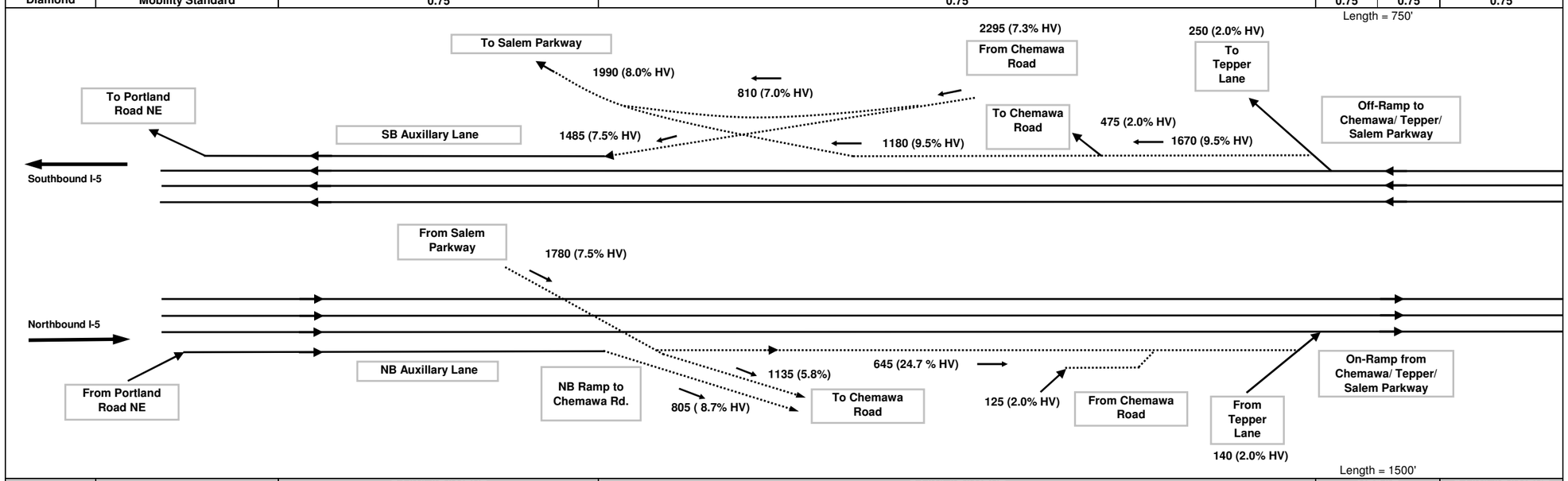
**Legend:**

Volume Diagram

SB HV %; SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S2: Chemawa/ Radiant/ Salem Pkwy Off | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 9.6% | 6.4% | | 8.6% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 23: Chemawa/ Tepper Half Diamond | Volume | 5930 | 4445 | 1905 | | 6350 |
| | Flow Rate^ | 1650 | 1655 | 2190 | 6910 | 2350 |
| | V/C | 0.70 | 0.70 | 1.04 | 0.98 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N6: Chemawa/ Radiant/ Salem Pkwy On | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 |
| 2031 Alt. 23: Chemawa/ Tepper Half Diamond | Volume | 5370 | 4565 | 910 | | 5475 |
| | Flow Rate^ | 1465 | 1650 | 4195 | 6080 | 2010 |
| | V/C | 0.62 | 0.70 | 0.91 | 0.86 | 0.86 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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# FIGURE A.12b Chemawa Road IAMP Traffic Analysis

**2031 Adopted Land Use Alternative 23: Full Chemawa/Lockhaven Widening & Chemawa/Tepper Half Diamond**
**Freeway Volumes and V/C Ratio**

## Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

## Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

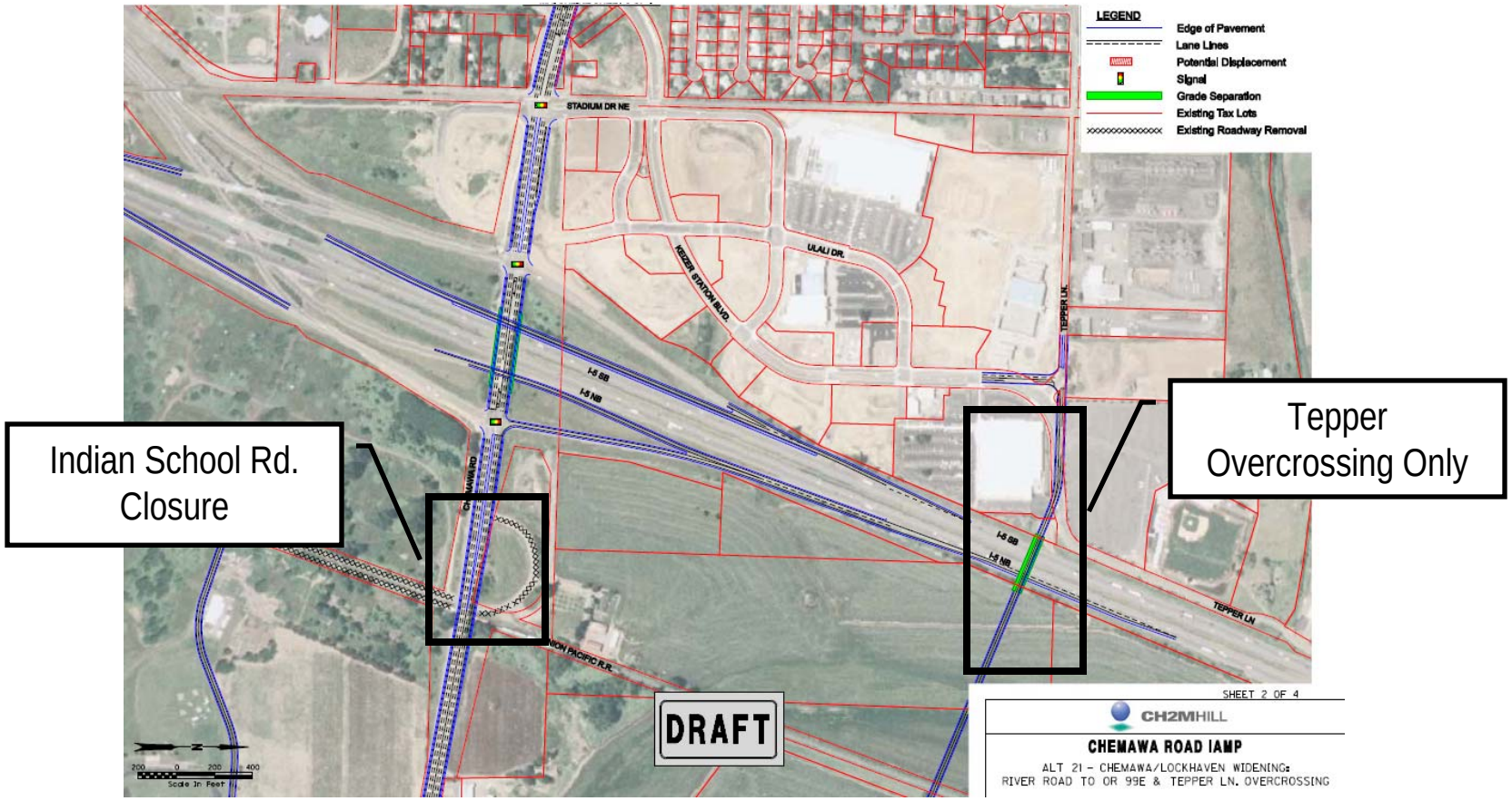
Collector-Distributor Road; Ramps
Mainline Freeway

N

APPENDIX H

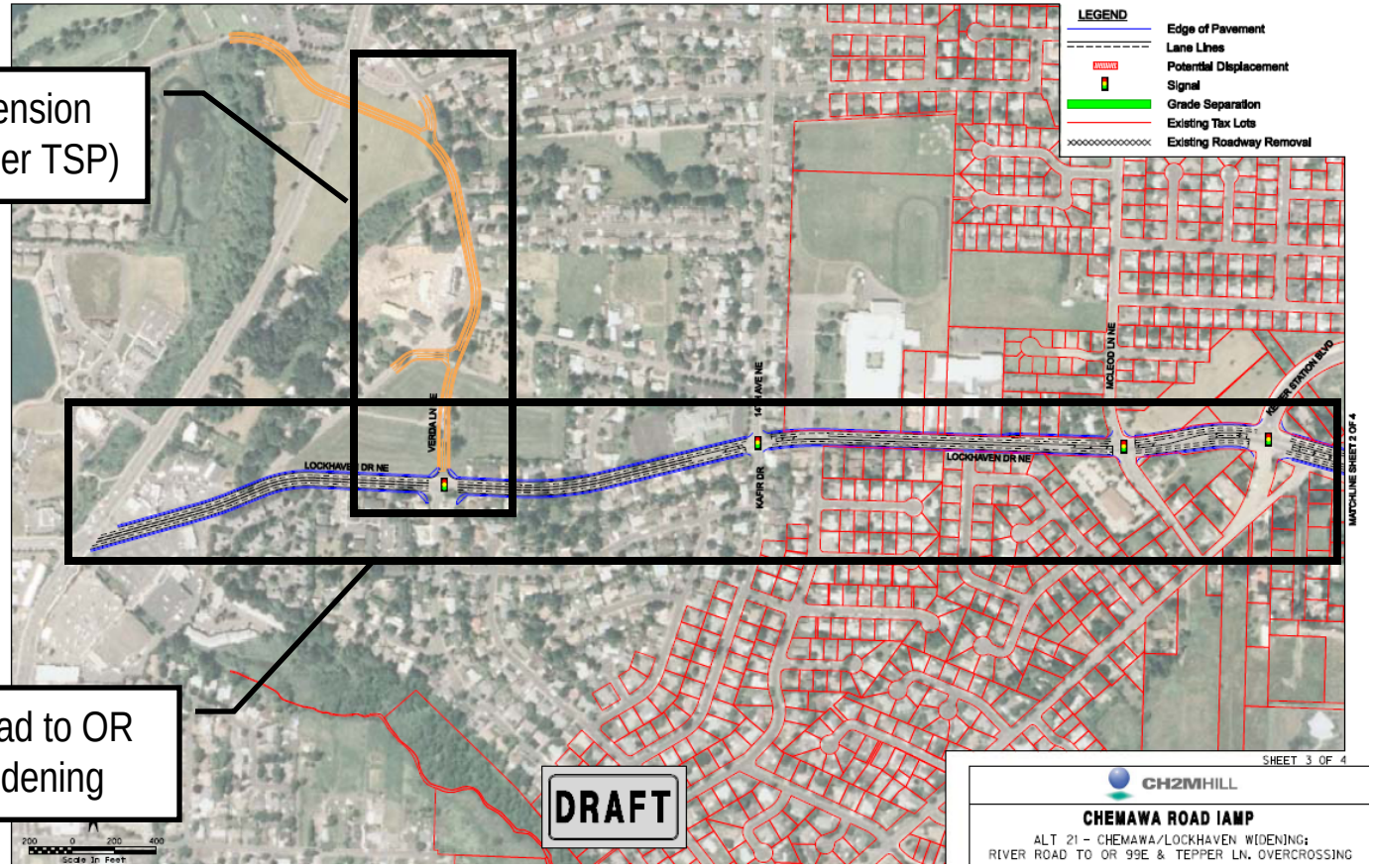
# Design Refinements and Operational Results for Alternatives 1, 6, 21-23: Intersection and Freeway Mobility and Queuing

# Design Refinements: Alternative 21 - Central



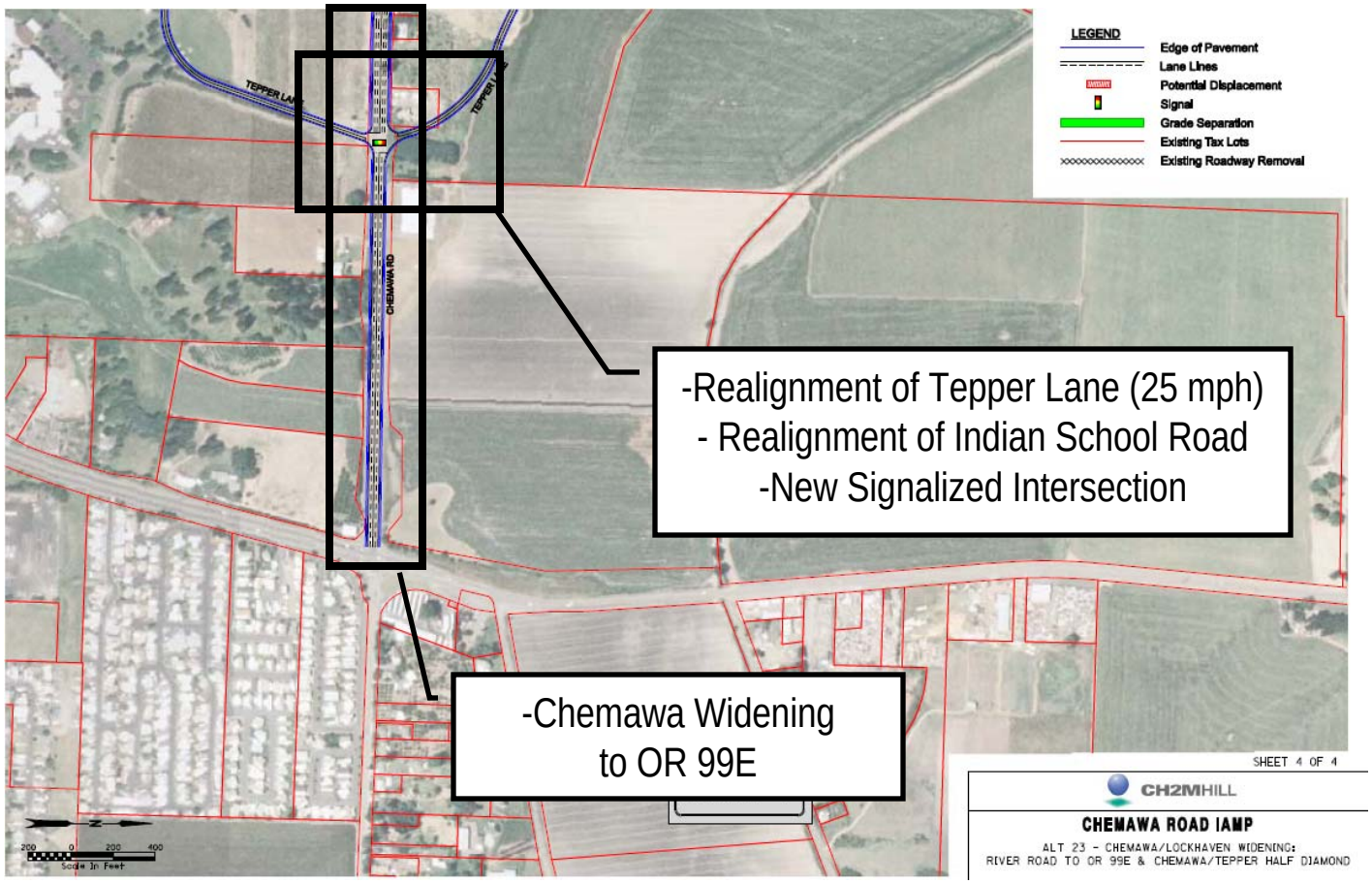
# Design Refinements: Alternative 21 - West

Verda Extension
(Part of Keizer TSP)

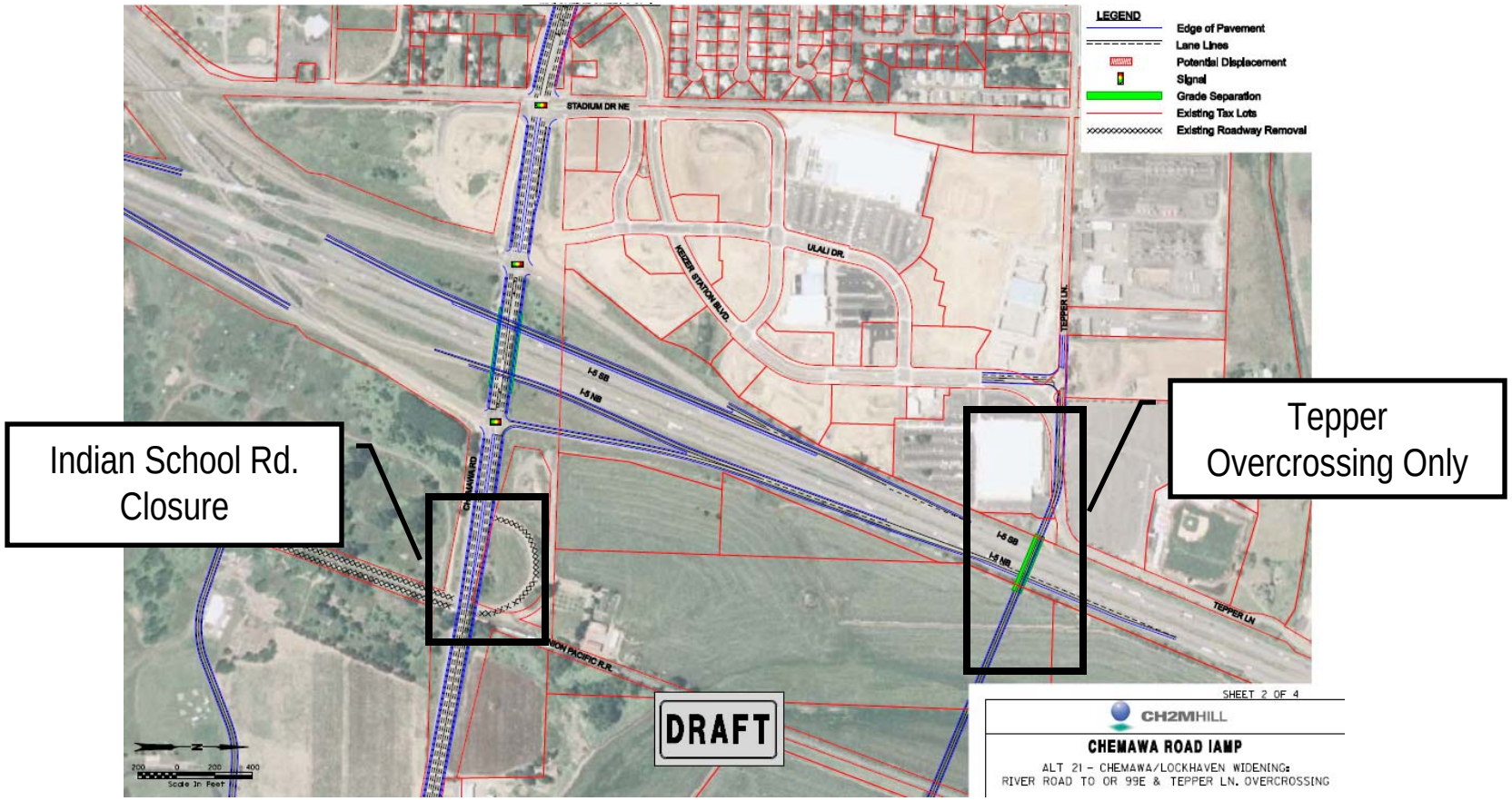



River Road to OR
99E Widening

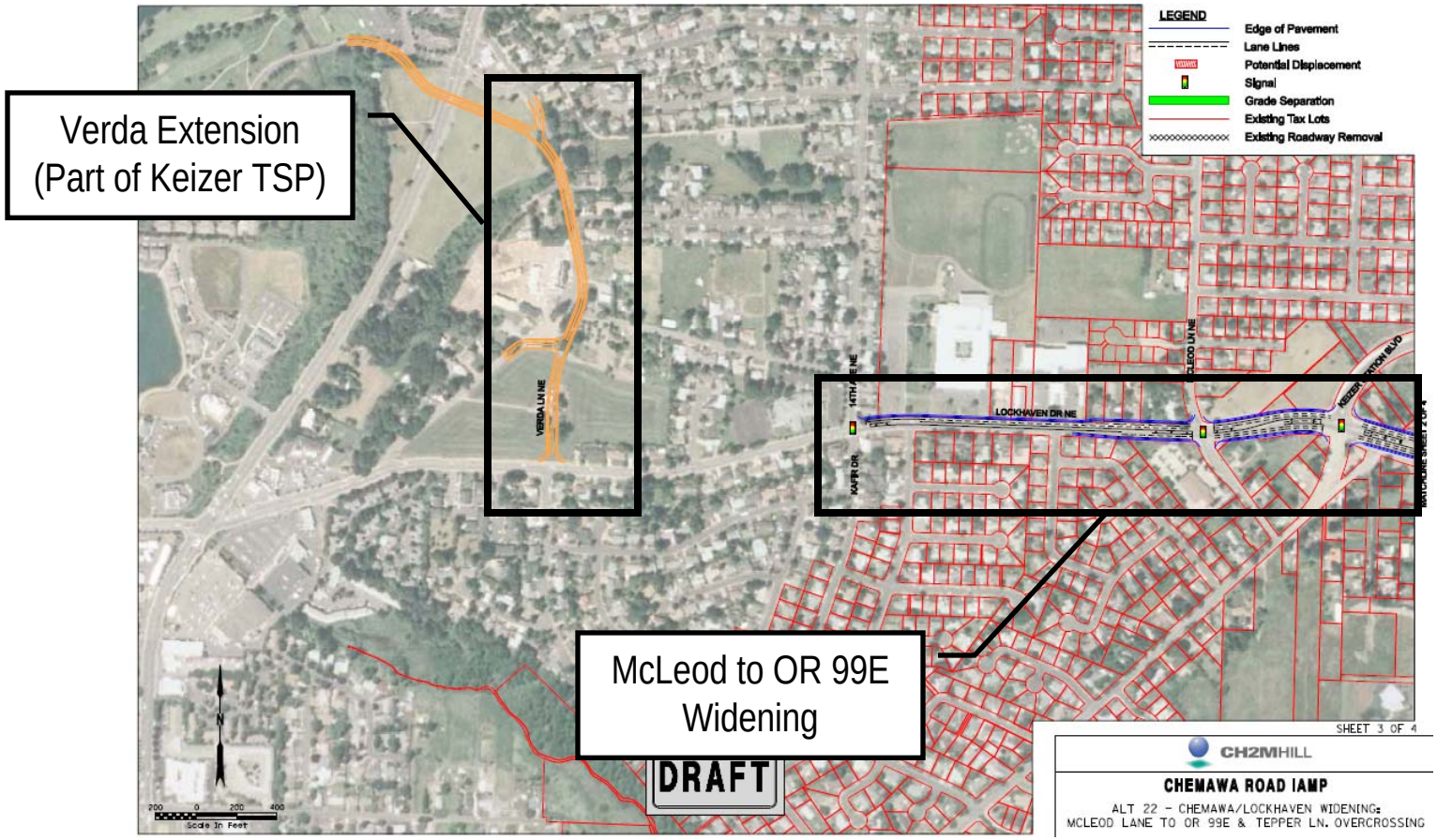
# Design Refinements: Alternative 21 - East



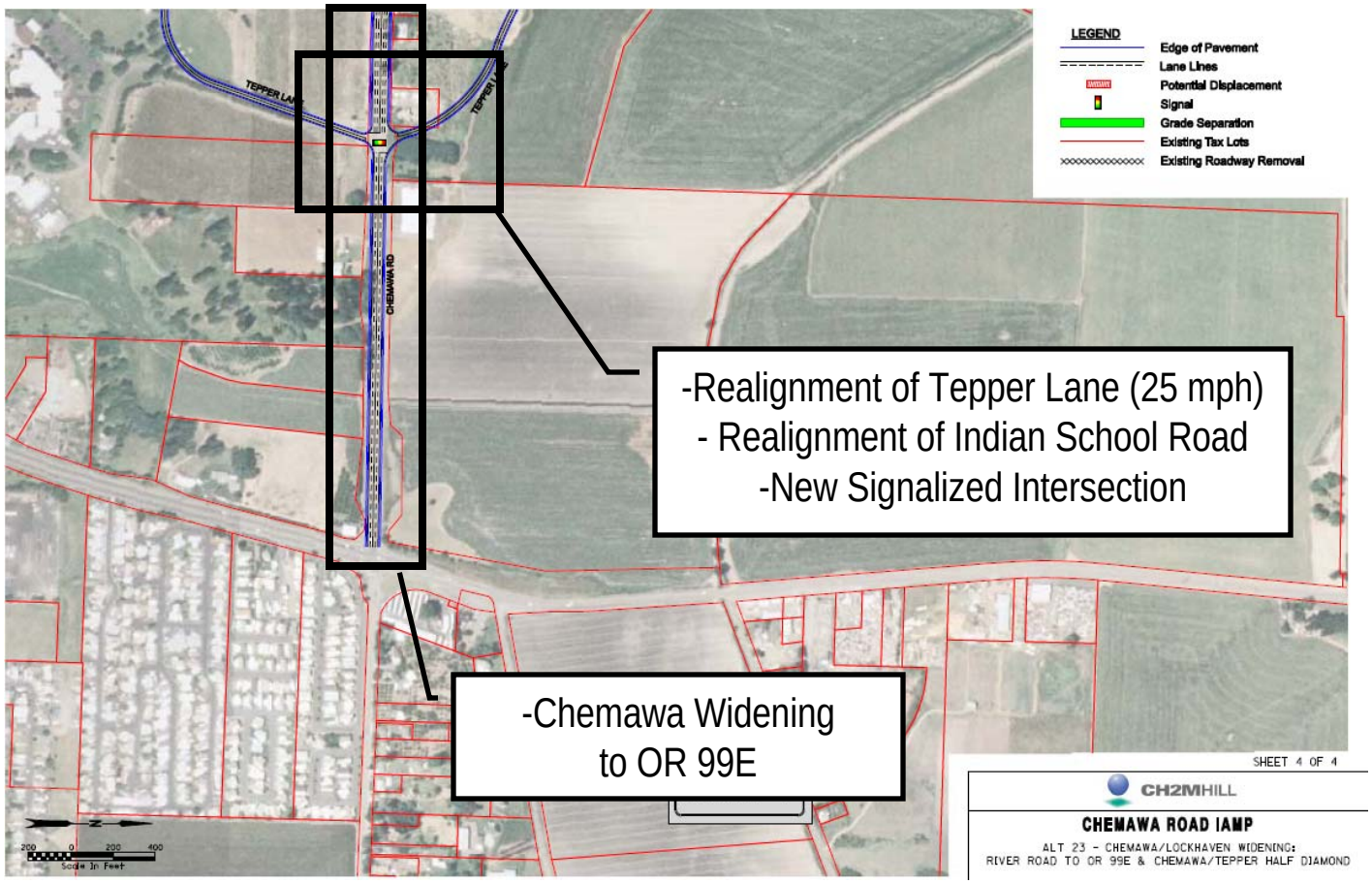
# Design Refinements: Alternative 22 - Central



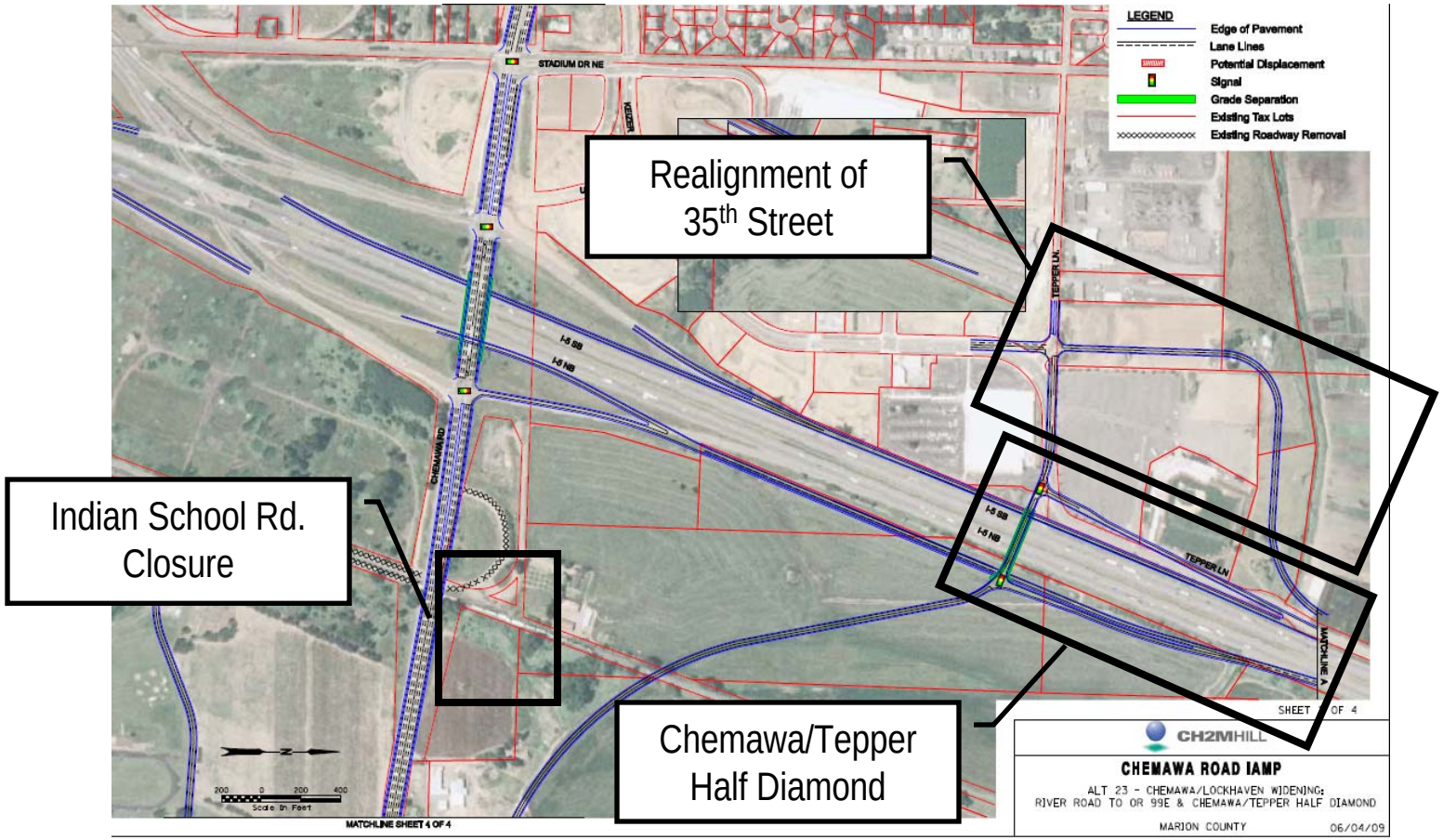
# Design Refinements: Alternative 22 - West



# Design Refinements: Alternative 22 - East

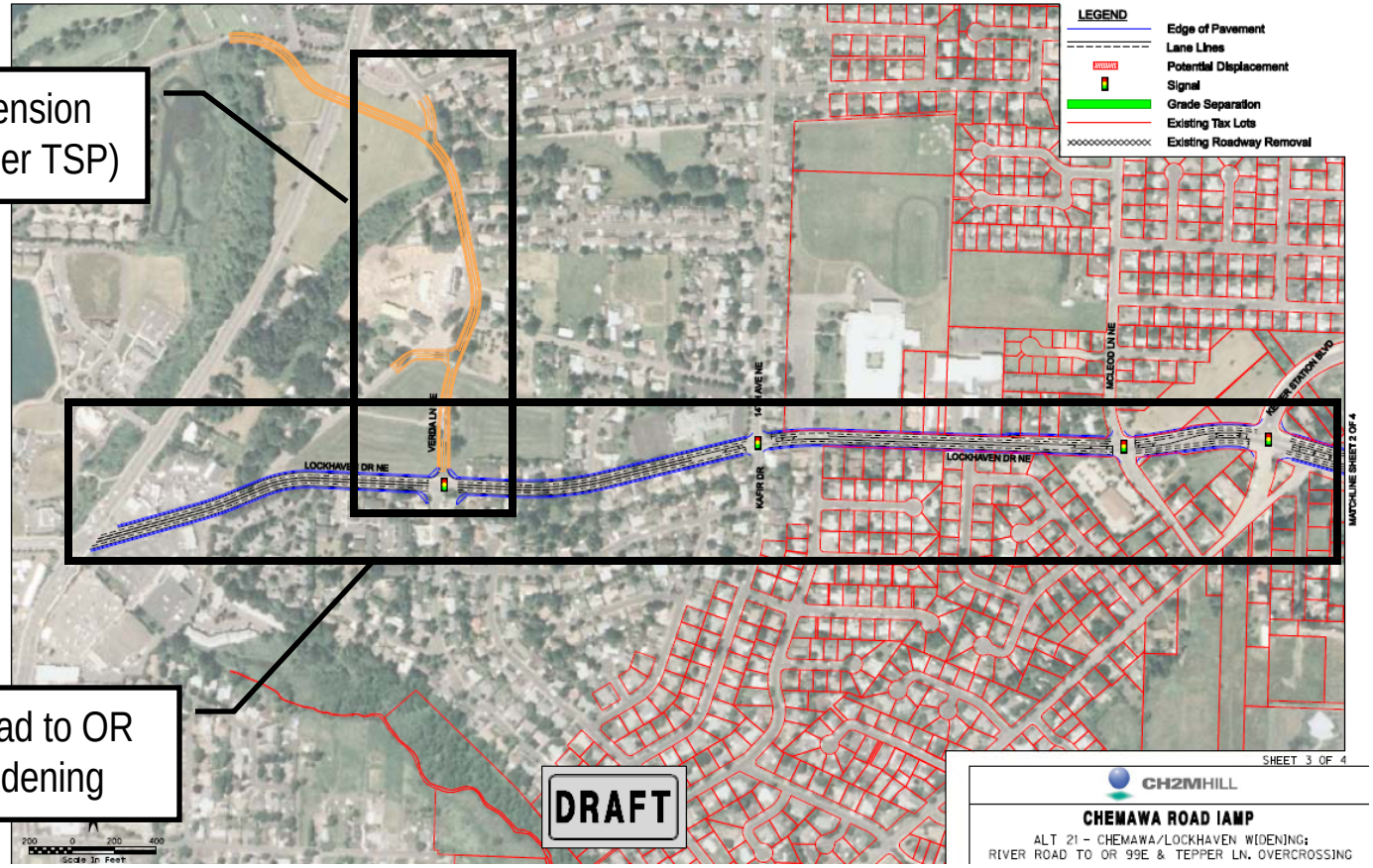


# Design Refinements: Alternative 23 - Central



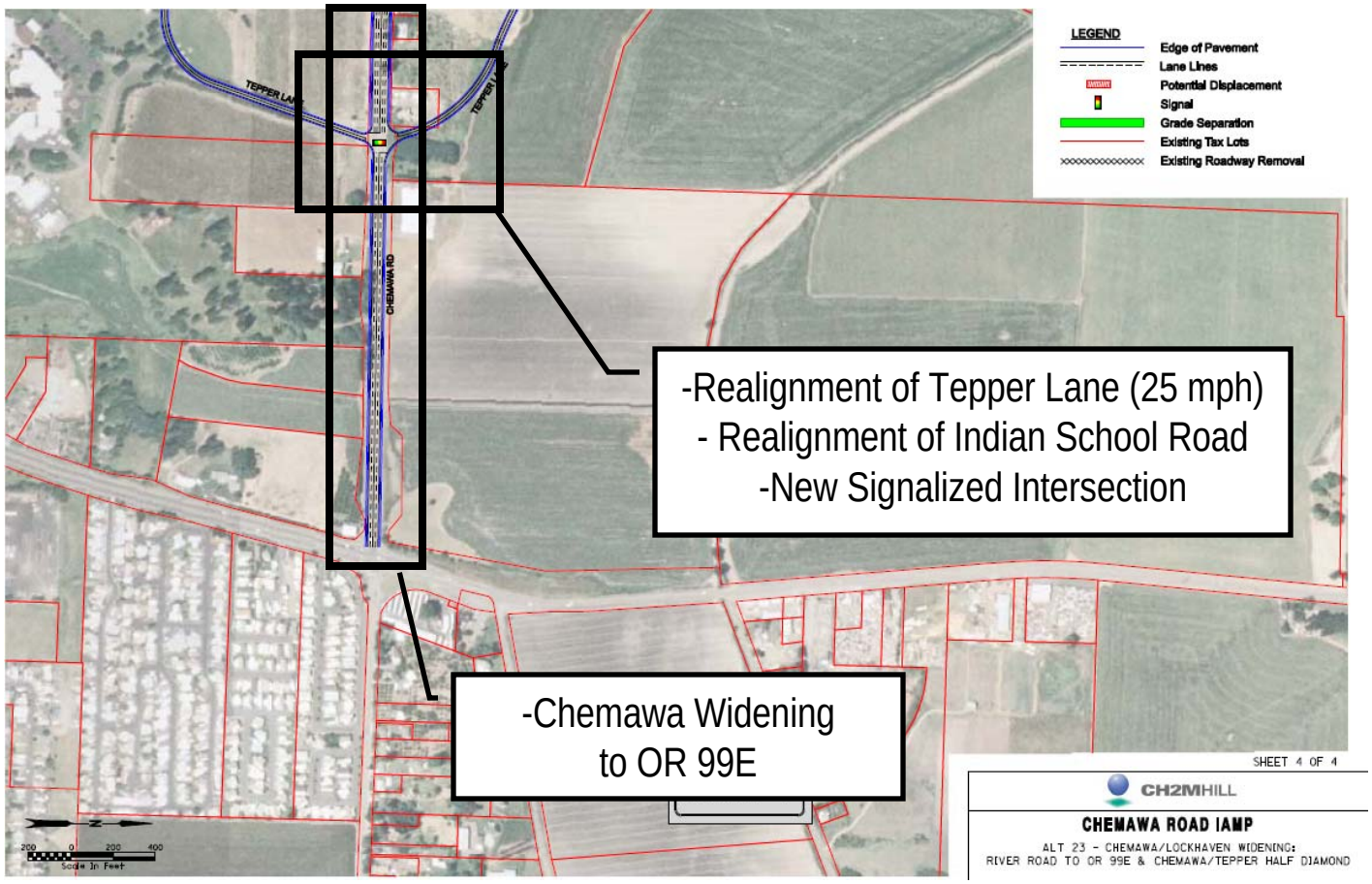
# Design Refinements: Alternative 23 - West

Verda Extension
(Part of Keizer TSP)




River Road to OR
99E Widening

# Design Refinements: Alternative 23 - East

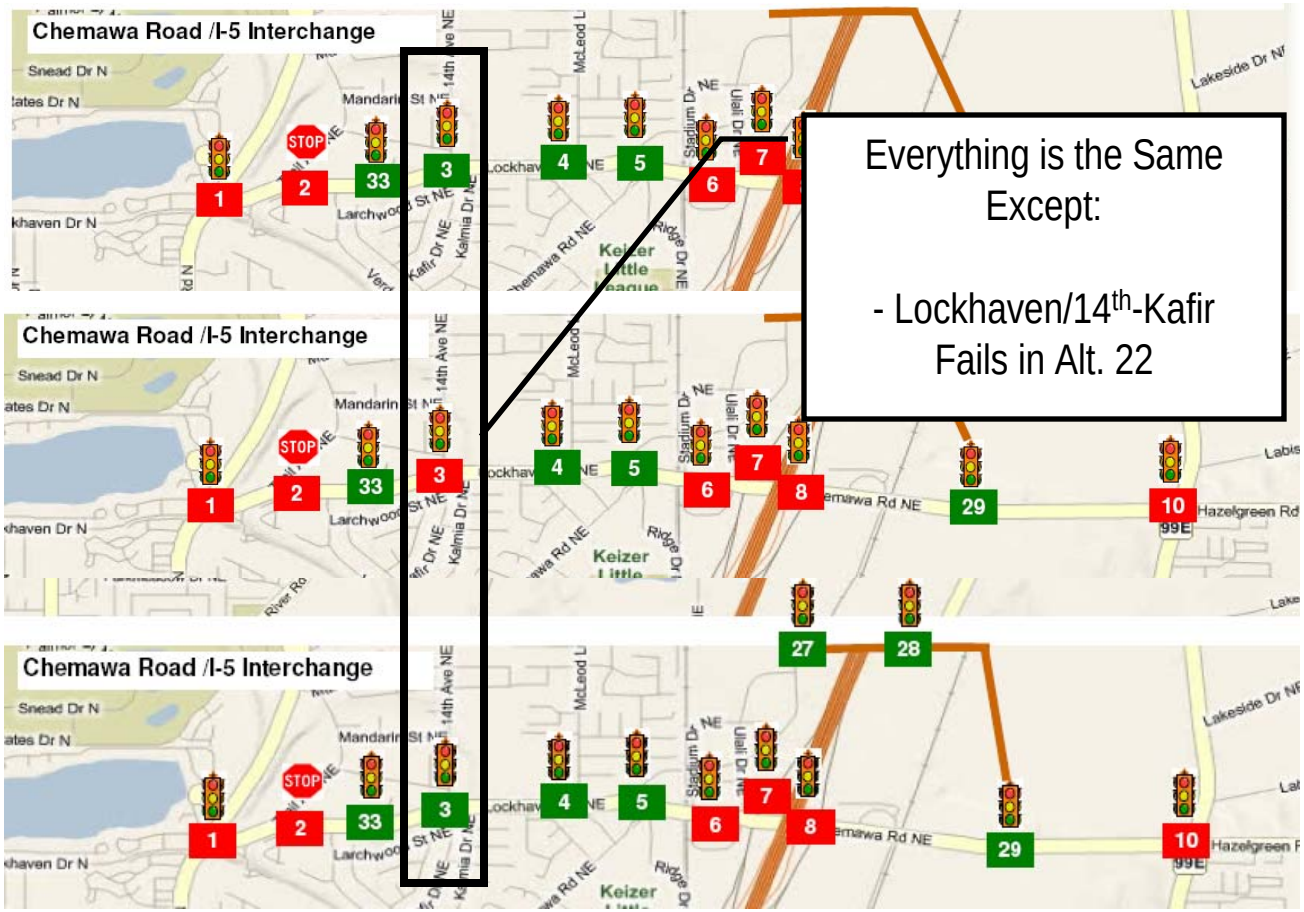


# Intersection Analysis Results: Mobility Standards

Alternative 21

Alternative 22

Alternative 23

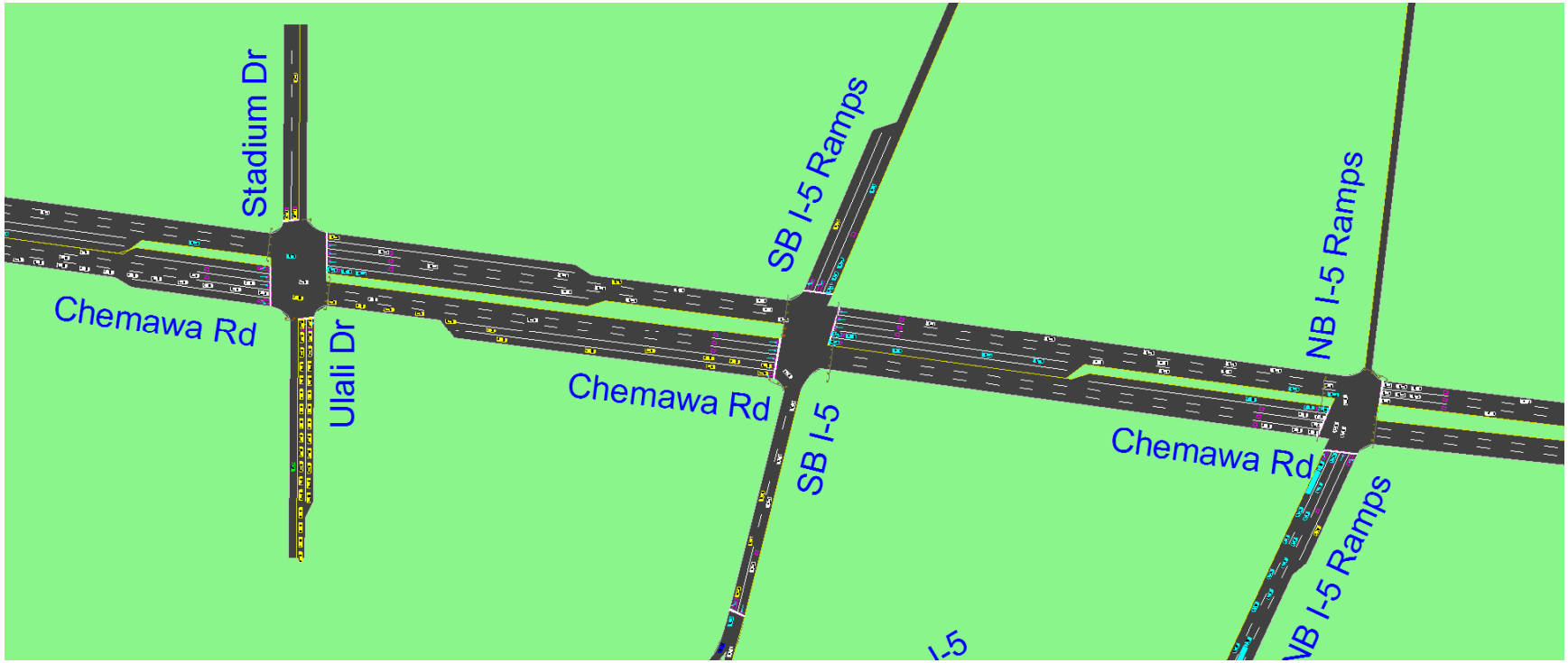


# Intersection Analysis Results: Delay and V/C Ratio

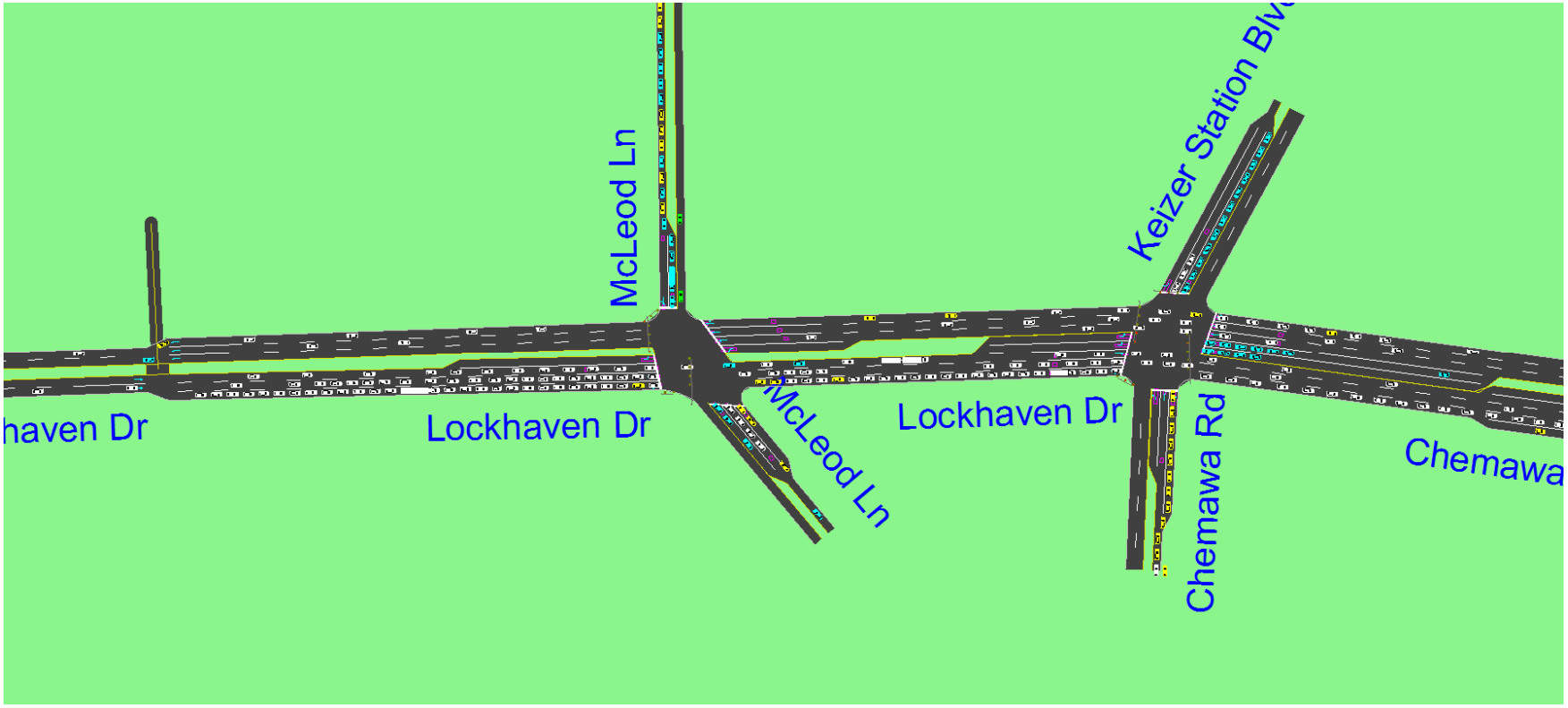
**Chemawa IAMP Intersection Operations - DRAFT (Adopted Land Use)**

| | | | Alt. 1 | | Alt. 6 | | Alt. 21 | | Alt. 22 | | Alt. 23 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Description | Jurisdiction | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C | Delay | V/C |
| 1 | Lockhaven Drive at River Road | Keizer | -12.2 | 0.02 | 13.7 | 0.05 | -40.2 | -0.20 | -11.5 | -0.18 | -45.5 | -0.20 |
| 2 | Trail Avenue at Lockhaven Drive | Keizer | -188.4 | -0.33 | 204.5 | 0.42 | -581.8 | -1.74 | 265.4 | -1.56 | -589.5 | -1.74 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | Keizer | -114.1 | -0.45 | 24.0 | 0.12 | -127.2 | -0.57 | -82.5 | -0.22 | -127.1 | -0.57 |
| 4 | Lockhaven Drive at McLeod Lane | Keizer | -11.8 | -0.16 | 5.7 | 0.08 | -9.9 | -0.12 | -9.3 | -0.13 | 10.0 | 0.11 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | Keizer | -16.0 | -0.15 | -8.1 | -0.10 | -11.2 | -0.16 | -9.2 | -0.12 | -10.8 | -0.16 |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | ODOT | -44.5 | -0.20 | 1.0 | -0.02 | -43.8 | -0.23 | -43.2 | -0.23 | -29.7 | -0.21 |
| 7 | Chemawa Road at Southbound I-5 interchange ramp | ODOT | -15.4 | -0.04 | 7.3 | -0.04 | -24.5 | -0.16 | -24.6 | -0.16 | -17.7 | -0.08 |
| 8 | Chemawa Road at Northbound I-5 interchange ramp | ODOT | -13.7 | -0.05 | 6.6 | 0.01 | -31.1 | -0.10 | -37.1 | -0.10 | -37.0 | -0.11 |
| 9 | Chemawa Road at Indian School Road | ODOT | -9.8 | -0.18 | -11.7 | -0.21 | N/A | | N/A | | N/A | |
| 10 | Chemawa Road at Pacific Highway 99E | ODOT | 2.8 | 0.03 | 0.2 | -0.01 | 5.9 | 0.09 | 10.2 | 0.06 | 9.2 | 0.07 |
| 11 | Hazelgreen Road at Cordon Road | Marion County | 2.0 | -0.05 | 31.7 | 0.16 | 29.8 | 0.20 | 29.8 | 0.19 | 35.9 | 0.19 |
| 12 | Cordon Road at Kale Street | Marion County | -1.3 | -0.02 | 0.4 | -0.01 | -0.5 | -0.01 | -0.5 | -0.02 | -0.1 | -0.03 |
| 13 | Portland Road at Kale Street | ODOT | -6.5 | -0.04 | -5.8 | -0.03 | -3.9 | -0.02 | -8.2 | 0.00 | -2.8 | -0.02 |
| 14 | Portland Road at Lancaster Drive | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | -8.23 | 0.0 | -8.26 | 0.0 | -8.27 |
| 15 | Portland Road at Blossom Drive | ODOT | 0.0 | -0.49 | -467.7 | -2.11 | -613.2 | -3.72 | -615.9 | -3.73 | -643.3 | -3.73 |
| 16 | Chemawa Road at Verda Lane | Keizer | -49.9 | -0.14 | -42.5 | -0.18 | -48.5 | -0.58 | -20.3 | -0.54 | -46.6 | -0.57 |
| 17 | Salem Parkway at Verda Lane-Hyacinth Street | ODOT | -7.1 | 0.04 | -12.5 | 0.02 | -28.6 | -0.08 | -24.9 | -0.09 | n/a | n/a |
| 18 | Portland Road at Hyacinth Street | ODOT | 17.4 | 0.08 | 19.0 | 0.09 | 18.0 | 0.09 | 20.4 | 0.09 | 16.1 | 0.05 |
| 19 | Portland Road- Pacific Highway 99E at Astoria Street-Ward Street | ODOT | -6.3 | 0.00 | 0.4 | 0.01 | 4.5 | 0.01 | -1.3 | 0.01 | 64.2 | 0.10 |
| 20 | Brooklake Road at Pacific Highway 99E | ODOT | -14.6 | -0.05 | -21.0 | -0.07 | -19.3 | -0.05 | -19.3 | -0.05 | -20.0 | -0.06 |
| 21 | Brooklake Road at I-5 NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | n/a | n/a | 0.0 | -9.28 | 0.0 | -9.33 |
| 22 | Brooklake Road at I-5 SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | n/a | n/a | 0.0 | -9.14 | 0.0 | -9.35 |
| 23 | Brooklake Road at River Road | Marion County | -13.8 | 0.10 | -12.8 | 0.03 | 0.0 | 0.04 | 0.2 | 0.07 | -0.5 | 0.03 |
| 24 | Perkins Road at 35th Avenue NE | Marion County | -11.6 | -0.14 | -20.0 | -0.29 | -13.9 | -0.59 | -12.6 | -0.58 | -22.2 | -0.59 |
| 25 | Hyacinth-Verda/Salem Pkwy NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 26 | Hyacinth-Verda/Salem Pkwy SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 27 | Radiant/SB Ramps | ODOT | 0.0 | 0.00 | 27.7 | 0.40 | 0.0 | 0.00 | 0.0 | 0.00 | 2.7 | 0.43 |
| 28 | Radiant/NB Ramps | ODOT | 0.0 | 0.00 | 4.8 | 0.31 | 0.0 | 0.00 | 0.0 | 0.00 | 33.6 | 0.85 |
| 29 | Radiant/Chemawa | Keizer | 0.0 | 0.00 | 16.1 | 0.79 | 51.9 | 0.87 | 42.4 | 0.87 | 16.6 | 0.73 |
| 30 | Brooks SPUI | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 31 | Quinaby/NB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| 32 | Quinaby/SB Ramps | ODOT | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 |
| | **Chemawa Interchange Vicinity - Delay Savings over Baseline** | | **-111.2** | | **0.8** | | **-120.5** | | **-123.4** | | **-85.2** | |

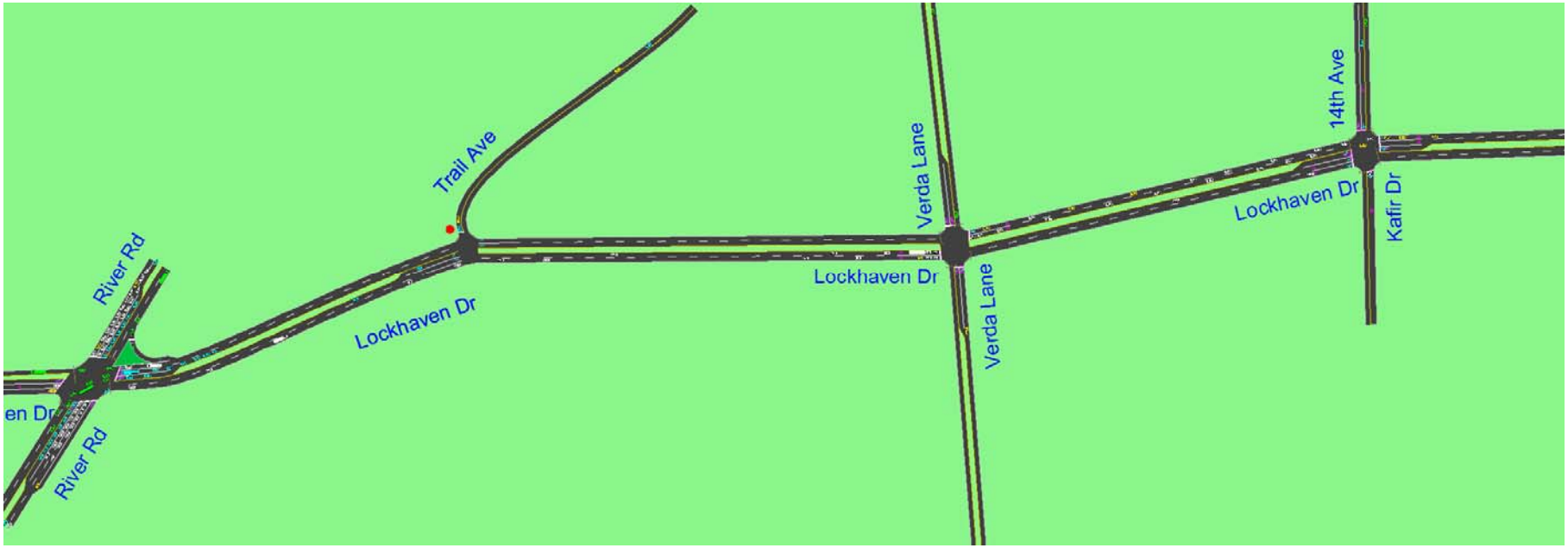
# Queuing Analysis: Alt 21 – NB Ramps to Stadium



# Queuing Analysis: Alt 21 – Keizer Station Blvd. to McLeod

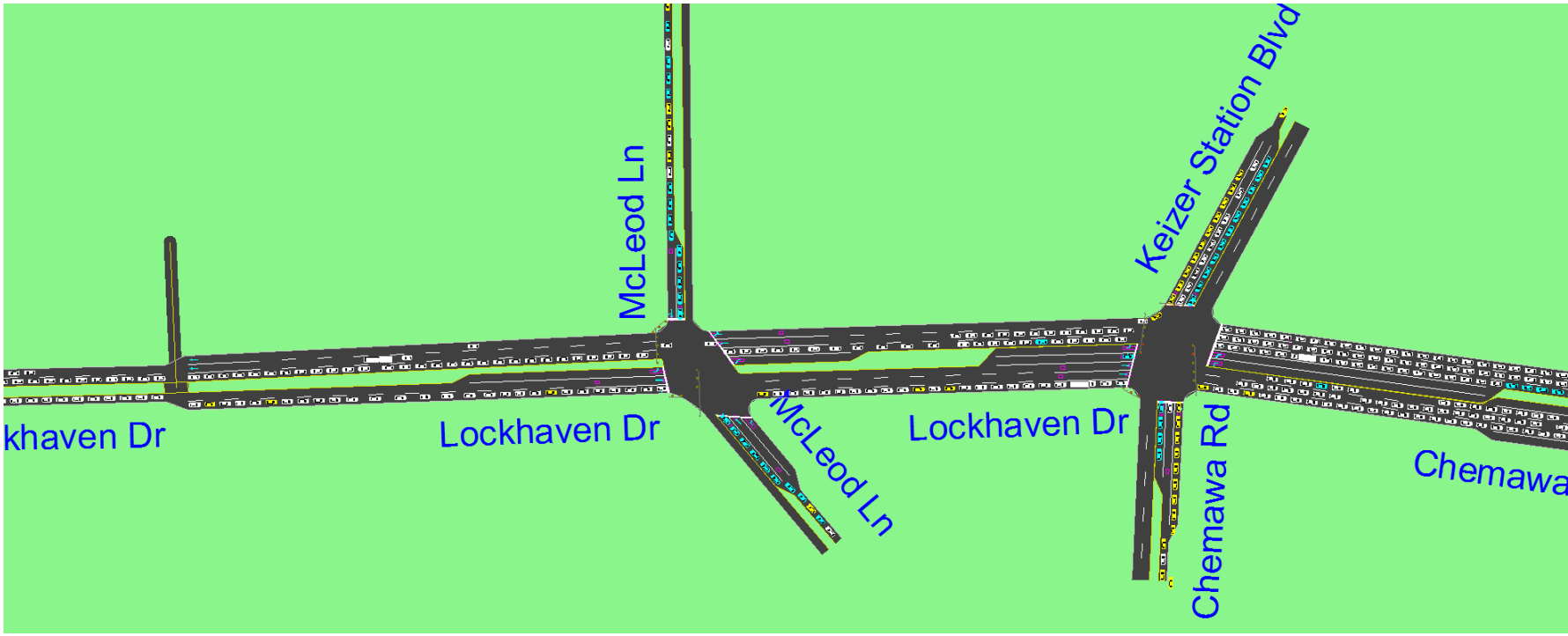


# Queuing Analysis: Alt 21 – 14th Ave to River Road

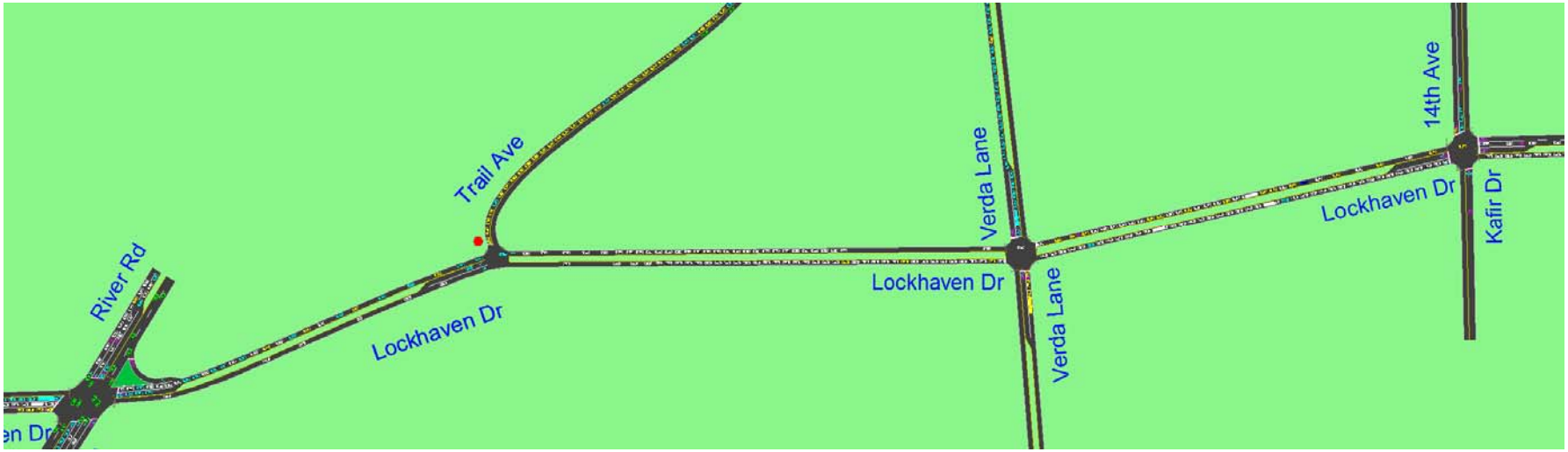


# Queuing Analysis: Alt 22 – NB Ramps to Stadium

# Queuing Analysis: Alt 22 – Keizer Station Blvd. to McLeod



# Queuing Analysis: Alt 22 – 14th Ave to River Road



# Freeway Analysis Results:

| ID # | Location | Segment Type | Facility^ | Future Baseline Adopted Land Use (2031) | | Future Adopted Land Use Alt. 1 (2031) | | Future Adopted Land Use Alt. 6 (2031) | | Future Adopted Land Use Alt. 21 (2031) | | Future Adopted Land Use Alt. 22 (2031) | | Future Adopted Land Use Alt. 23 (2031) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio |
| N1 | NB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.80 | 0.75 | 0.63 | 0.75 | 0.63 | 0.75 | 0.62 | 0.75 | 0.63 | 0.75 | 0.62 |
| N2 | NB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.40 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.68 | | | | | | | | | | |
| N3 | NB I-5 Mainline South of On-Ramp from OR 99E Business | Basic | Mainline | 0.80 | 0.70 | 0.75 | 0.71 | 0.75 | 0.71 | 0.75 | 0.70 | 0.75 | 0.71 | 0.75 | 0.70 |
| N4 | NB On-Ramp from OR 99E Business/Salem Parkway | Merge | Ramp | 0.80 | 0.84 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.84 | | | | | | | | | | |
| N5 | NB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.83 | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| N6 | NB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.79 | 0.75 | 0.90 | 0.75 | 0.91 | 0.75 | 0.91 | 0.75 | 0.88 | 0.75 | 0.91 |
| | | | Mainline | 0.80 | 0.85 | 0.75 | 0.85 | 0.75 | 0.86 | 0.75 | 0.86 | 0.75 | 0.92 | 0.75 | 0.86 |
| N7 | NB I-5 Mainline North of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.84 | 0.75 | 0.86 | 0.75 | 0.86 | 0.75 | 0.86 | 0.75 | 0.85 | 0.75 | 0.86 |
| S1 | SB I-5 Mainline North of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.99 | 0.75 | 1.00 | 0.75 | 1.00 | 0.75 | 1.00 | 0.75 | 0.99 | 0.75 | 1.00 |
| S2 | SB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.33 | 0.75 | 0.97 | 0.75 | 1.11 | 0.75 | 1.04 | 0.75 | 1.00 | 0.75 | 1.04 |
| | | | Mainline | 0.80 | 0.89 | 0.75 | 1.00 | 0.75 | 0.98 | 0.75 | 0.98 | 0.75 | 0.98 | 0.75 | 0.90 |
| S3 | SB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.89 | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | | Does not Exist | |
| S4 | SB Off-Ramp to OR 99E Business | Diverge | Ramp | 0.80 | 0.77 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.66 | | | | | | | | | | |
| S5 | SB I-5 Mainline South of Off-Ramp to OR 99E Business | Basic | Mainline | 0.80 | 0.68 | 0.75 | 0.72 | 0.75 | 0.69 | 0.75 | 0.70 | 0.75 | 0.73 | 0.75 | 0.70 |
| S6 | SB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.96 | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | | Does Not Exist | |
| | | | Mainline | 0.80 | 0.89 | | | | | | | | | | |
| S7 | SB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.88 | 0.75 | 0.71 | 0.75 | 0.68 | 0.75 | 0.70 | 0.75 | 0.70 | 0.75 | 0.70 |

APPENDIX I

# Recommended Alternative 10 Percent Design Package Drawings

LEGEND

- Phase 1
- Phase 2
- Phase 3
- Other Planned Projects
- Projects for Future Consideration
- Signal
- Existing Tax Lots
- Existing I-5
- Existing Railroad
- BPA Tower/ Right of Way

NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS. THE ALIGNMENTS OF TEPPER LANE, INDIAN SCHOOL ROAD, AND 35TH AVENUE ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL ROADWAY ALIGNMENTS WILL BE DEVELOPED BY WORKING WITH PROPERTY OWNERS.

Phase 2: 35th Street Realignment

Phase 2: Lengthen Chemawa NB and SB Ramps

Phase 2: Tepper Overcrossing and East Tepper Drive

Verda Extension (Other Planned Project)

Phase 1: Verda Extension to I-5 OR99E Widening

Phase 3: NB Ramps Partial Clover "B"

Phase 2: Indian School Road Realignment

Phase 1: I-5 to OR99E Widening

Phase 2: Portland Road to Chemawa Road Auxiliary Lanes

INSET 1

N

500 0 500 1000

Scale In Feet

CH2MHILL

# CHEMAWA ROAD IAMP

## 10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE ALL PHASES

MARION COUNTY

04/30/12

**LEGEND**

- Proposed Channelization
- Proposed Bike Lane and Sidewalk
- Proposed Channelization By Others
- Signal
- Existing Channelization
- Existing Tax Lots
- Existing Roadway Removal
- Existing BPA Towers
- Existing Railroad

**NOTE:**

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.

Typical Section A
Lockhaven Dr between Verda Lane & Kafir Dr.

CH2MHILL

# CHEMAWA ROAD IAMP

## 10% DESIGN PACKAGE

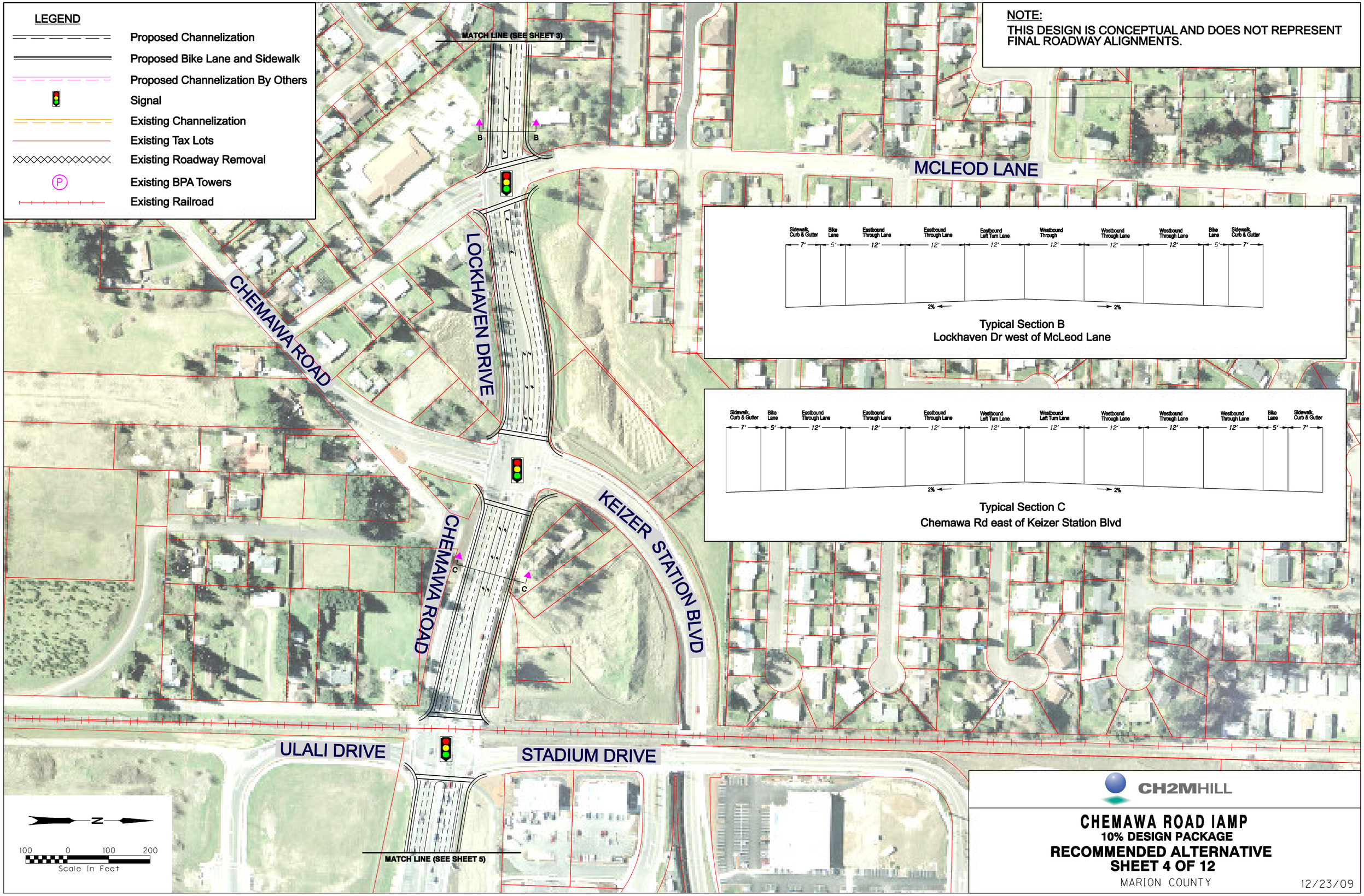
## RECOMMENDED ALTERNATIVE

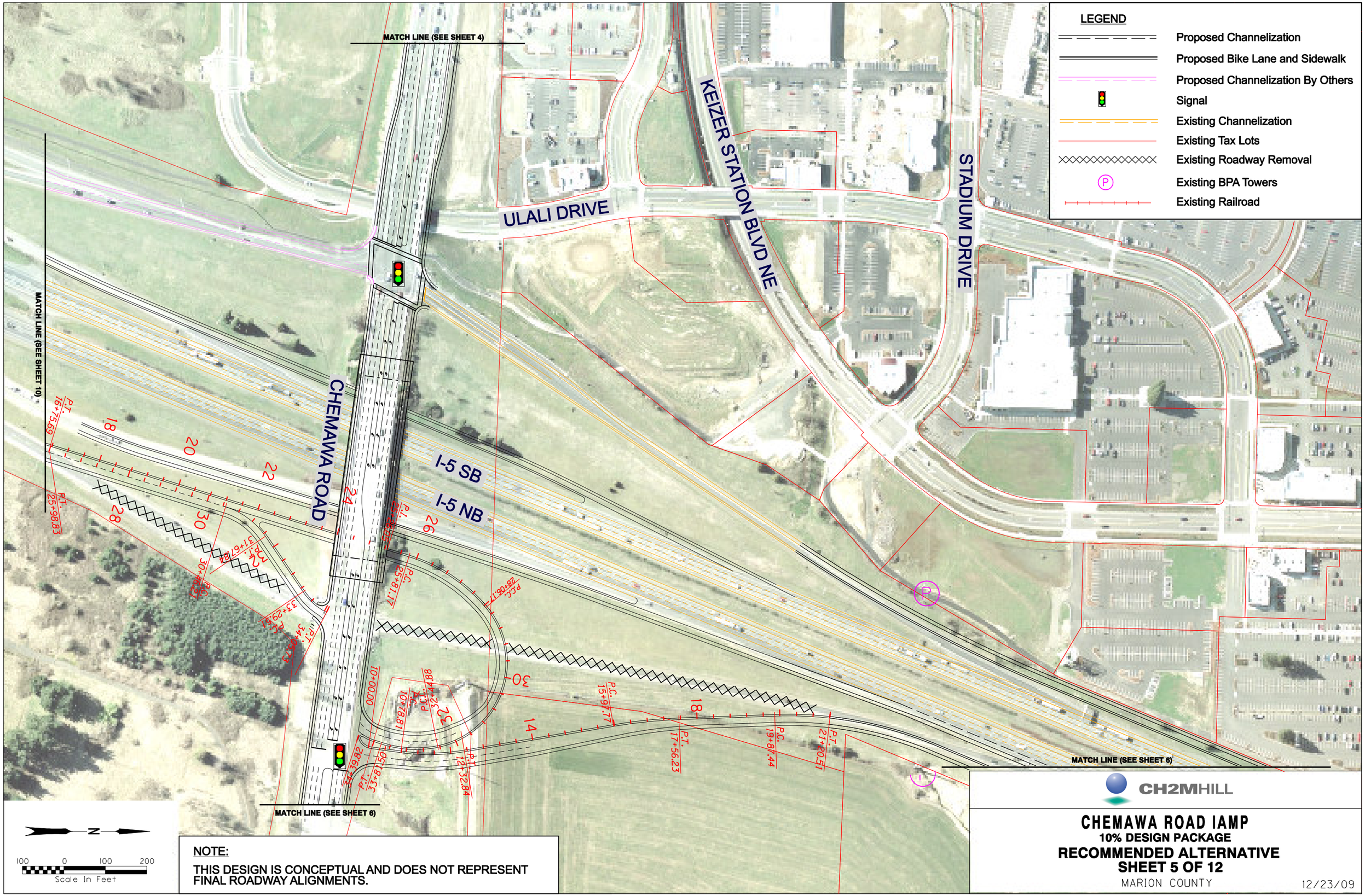
## SHEET 2 OF 12

MARION COUNTY

12/23/09

LEGEND
Proposed Channelization
Proposed Bike Lane and Sidewalk
Proposed Channelization By Others
Signal
Existing Channelization
Existing Tax Lots
Existing Roadway Removal
Existing BPA Towers
Existing Railroad
NOTE:
THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.
MATCH LINE (SEE SHEET 2)
KAFIR DRIVE
14TH AVENUE
LOCKHAVEN DRIVE
KLICITAT DRIVE
MATCH LINE (SEE SHEET 4)
N
100 0 100 200
Scale In Feet
CH2MHILL
CHEMAWA ROAD IAMP
10% DESIGN PACKAGE
RECOMMENDED ALTERNATIVE
SHEET 3 OF 12
MARION COUNTY
12/23/09


LEGEND
Proposed Channelization
Proposed Bike Lane and Sidewalk
Proposed Channelization By Others
Signal
Existing Channelization
Existing Tax Lots
Existing Roadway Removal
Existing BPA Towers
Existing Railroad
NOTE:
THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.
MATCH LINE (SEE SHEET 3)
MCLEOD LANE
LOCKHAVEN DRIVE
CHEMAWA ROAD
KEIZER STATION BLVD
ULALI DRIVE
STADIUM DRIVE
MATCH LINE (SEE SHEET 5)
B
C
Sidewalk, Curb & Gutter
Bike Lane
Eastbound Through Lane
Eastbound Left Turn Lane
Westbound Through
Westbound Through Lane
7′
5′
12′
2%
Typical Section B
Lockhaven Dr west of McLeod Lane
Westbound Left Turn Lane
Typical Section C
Chemawa Rd east of Keizer Station Blvd
N
100 0 100 200
Scale In Feet
CH2MHILL
CHEMAWA ROAD IAMP
10% DESIGN PACKAGE
RECOMMENDED ALTERNATIVE
SHEET 4 OF 12
MARION COUNTY
12/23/09




NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.

CH2MHILL

# CHEMAWA ROAD IAMP

## 10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE

## SHEET 5 OF 12

MARION COUNTY

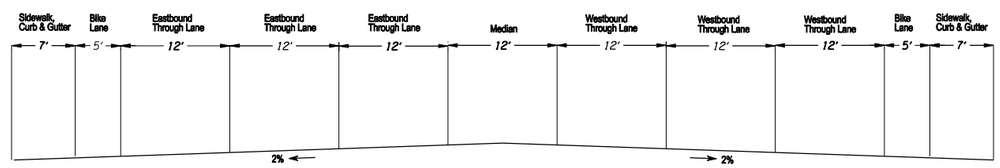
12/23/09

## LEGEND

- Proposed Channelization
- Proposed Bike Lane and Sidewalk
- Proposed Channelization By Others
- Signal
- Existing Channelization
- Existing Tax Lots
- Existing Roadway Removal
- Existing BPA Towers
- Existing Railroad

## NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS. THE ALIGNMENTS OF TEPPER LANE, INDIAN SCHOOL ROAD AND, 35TH AVENUE ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL ROADWAY ALIGNMENTS WILL BE DEVELOPED BY WORKING WITH PROPERTY OWNERS.




Typical Section D

Chemawa Road between Union Pacific Rail Road Crossing & Tepper Rd extension

MATCH LINE (SEE SHEET 5)

MATCH LINE (SEE SHEET 11)

MATCH LINE (SEE SHEET 7)

INDIAN SCHOOL ROAD

CHEMAWA ROAD

TEPPER RD EXTENSION

UNION PACIFIC R.R.

INDIAN SCHOOL (PRIVATE DRIVE)

URBAN GROWTH BOUNDARY

STA 30+28.23 IS Line
= STA 27+85.79 TE Line

10+00.00

P.T. 12+07.18

P.C. 12+09.38

P.C.C. 15+94.14

P.I. 18+14.02

P.C. 18+52.46

P.T. 21+36.68

P.C. 24+48.70

P.T. 29+16.53

P.I. 27+26.58

14 16 18 20 22 24 26 28 30 32 34 36

N

100 0 100 200

Scale In Feet

CH2MHILL

# CHEMAWA ROAD IAMP

10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE

SHEET 6 OF 12

MARION COUNTY

12/23/09

NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.

LEGEND

- Proposed Channelization
- Proposed Bike Lane and Sidewalk
- Proposed Channelization By Others
- Signal
- Existing Channelization
- Existing Tax Lots
- Existing Roadway Removal
- Existing BPA Towers
- Existing Railroad

MATCH LINE (SEE SHEET 6)

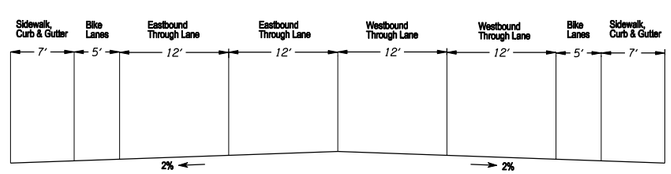
INDIAN SCHOOL (PRIVATE DRIVE)

URBAN GROWTH BOUNDARY

E

E

CHEMAWA ROAD




Typical Section E

Chemawa Road between Tepper Rd extension and Portland Rd

N

100 0 100 200

Scale In Feet

MATCH LINE (SEE SHEET 8)

CH2MHILL

# CHEMAWA ROAD IAMP

## 10% DESIGN PACKAGE

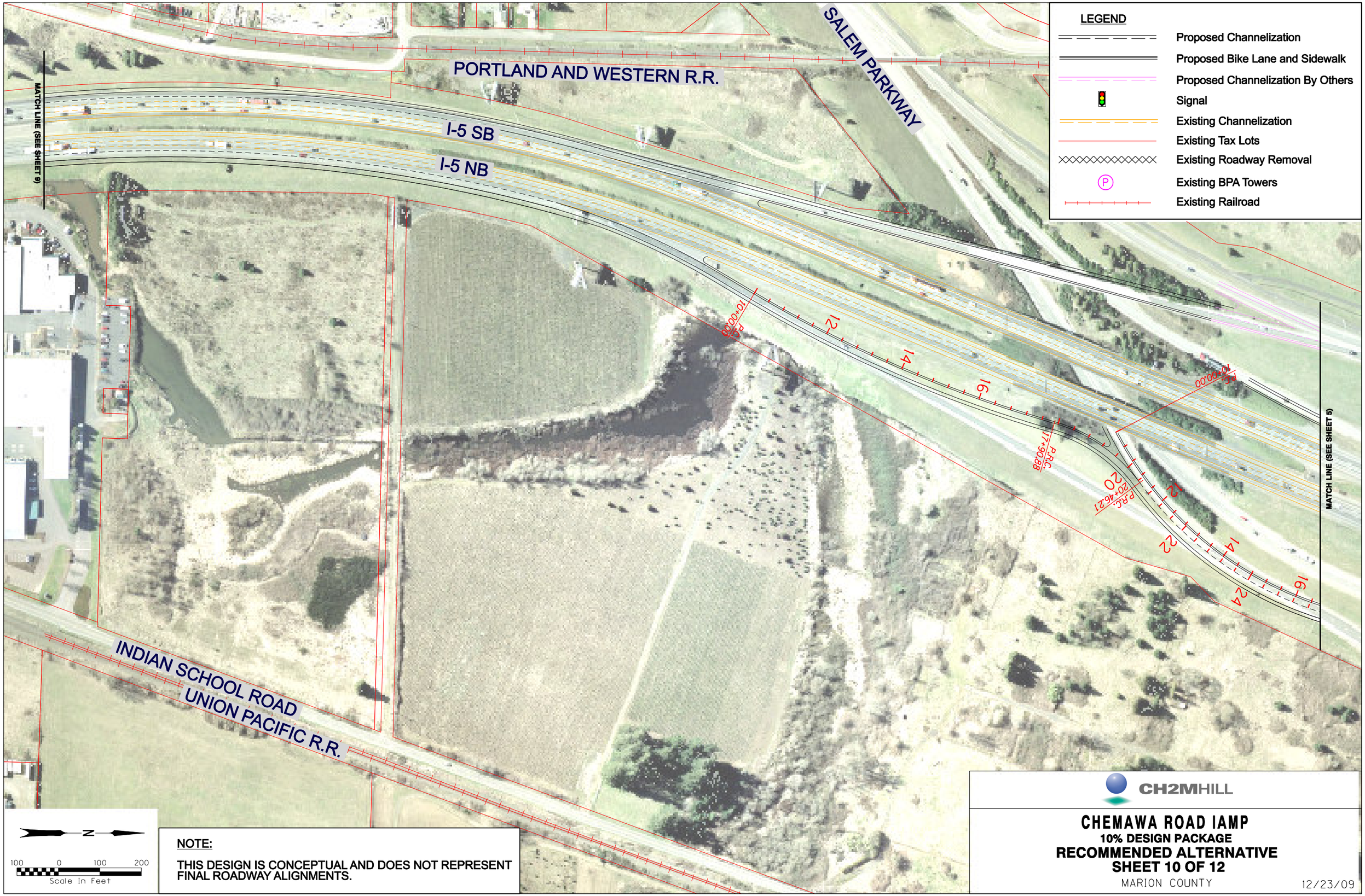
## RECOMMENDED ALTERNATIVE

## SHEET 7 OF 12

MARION COUNTY

12/23/09

NOTE:
THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.
LEGEND
Proposed Channelization
Proposed Bike Lane and Sidewalk
Proposed Channelization By Others
Signal
Existing Channelization
Existing Tax Lots
Existing Roadway Removal
Existing BPA Towers
Existing Railroad
MATCH LINE (SEE SHEET 7)
PORTLAND ROAD
PACIFIC HWY EAST
LABISH GARDEN ROAD
LAKESIDE DRIVE
HAZELGREEN ROAD
URBAN GROWTH BOUNDARY
N
100 0 100 200
Scale In Feet
CH2MHILL
CHEMAWA ROAD IAMP
10% DESIGN PACKAGE
RECOMMENDED ALTERNATIVE
SHEET 8 OF 12
MARION COUNTY
12/23/09




NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.

CH2MHILL

# CHEMAWA ROAD IAMP

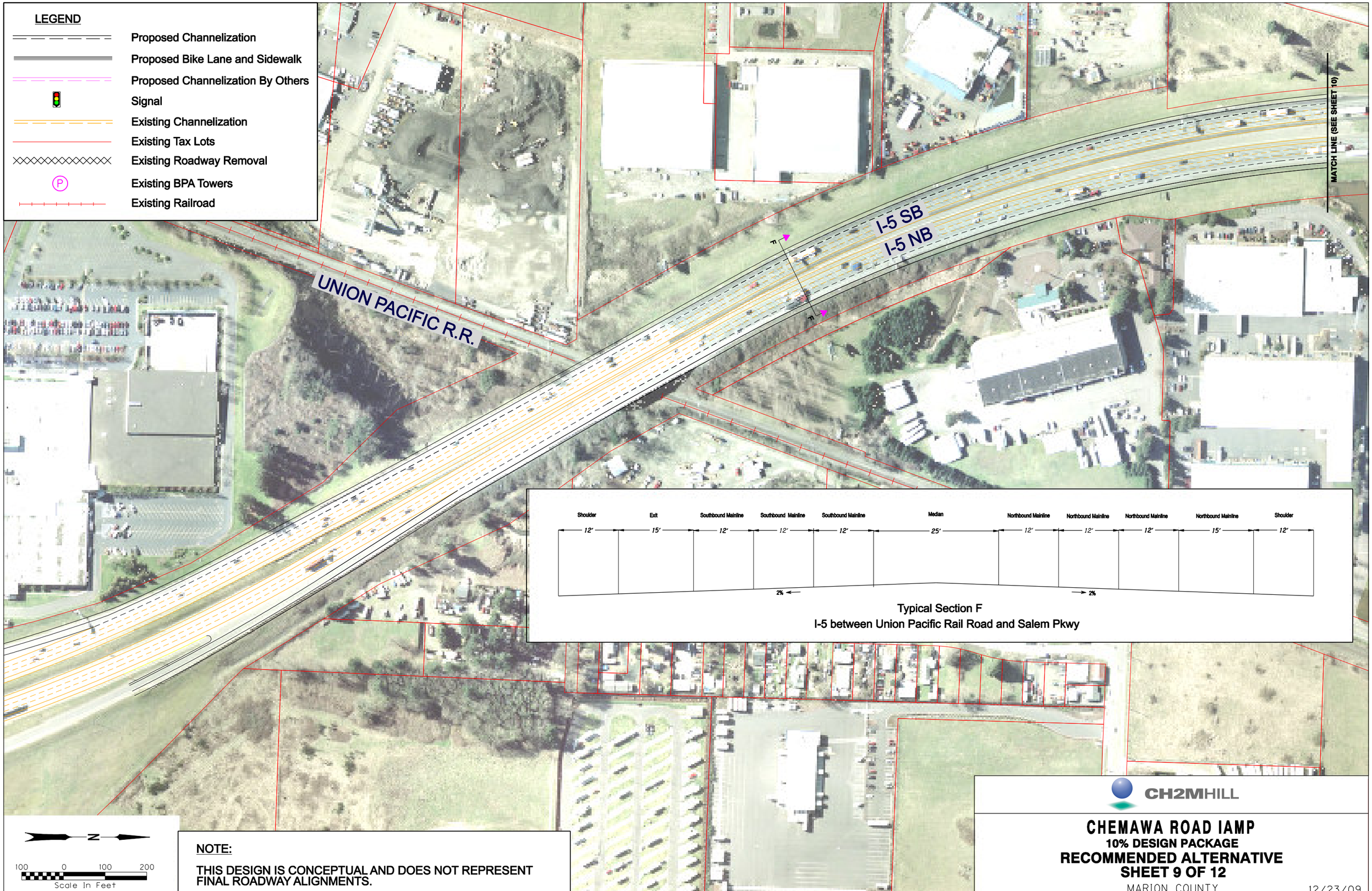
## 10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE

## SHEET 10 OF 12

MARION COUNTY

12/23/09




NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.

CH2MHILL

# CHEMAWA ROAD IAMP

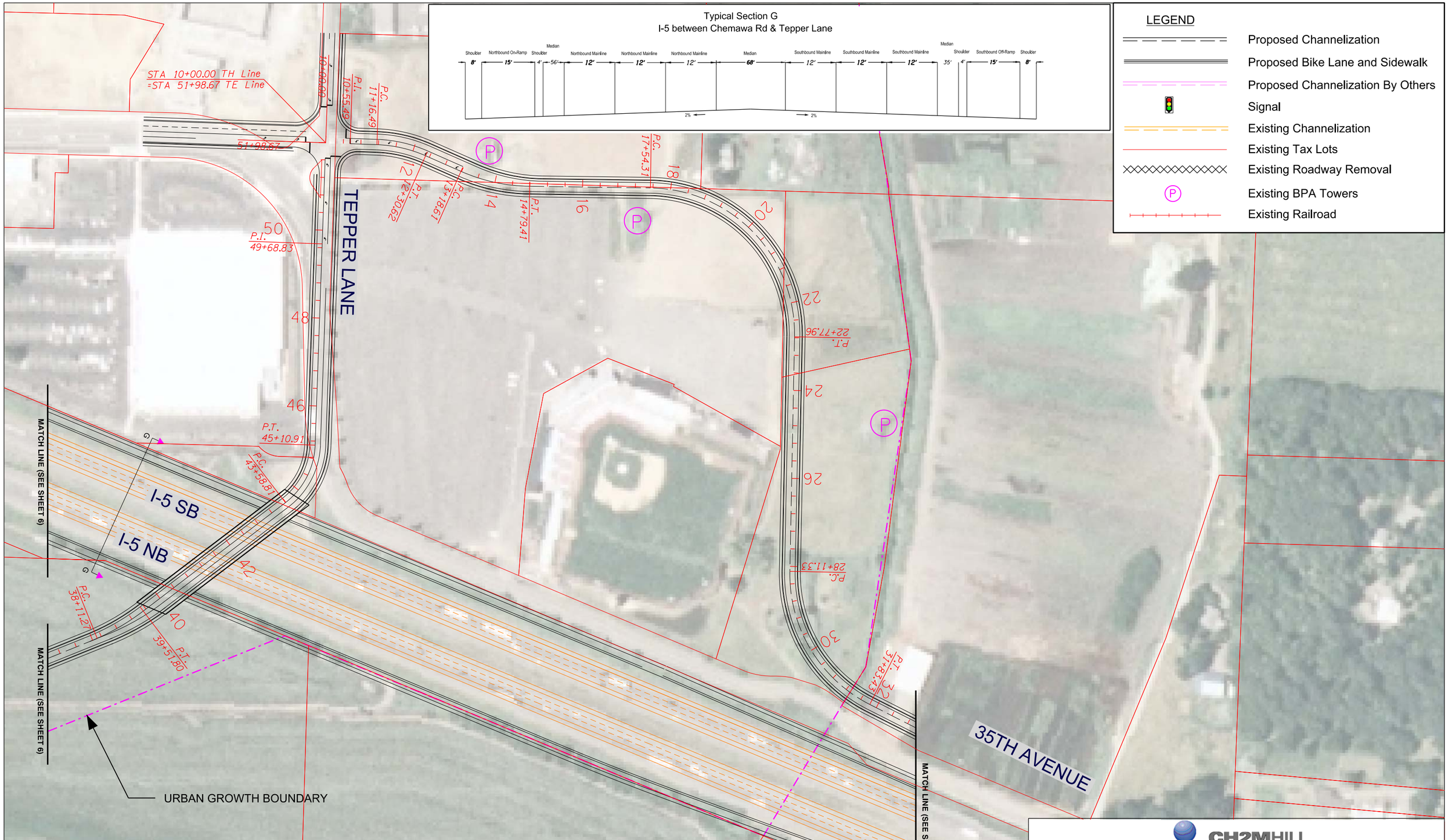
## 10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE

## SHEET 9 OF 12

MARION COUNTY

12/23/09




NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS. THE ALIGNMENTS OF TEPPER LANE, INDIAN SCHOOL ROAD, AND 35TH AVENUE ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL ROADWAY ALIGNMENTS WILL BE DEVELOPED BY WORKING WITH PROPERTY OWNERS.

CH2MHILL

# CHEMAWA ROAD IAMP

**10% DESIGN PACKAGE**

**RECOMMENDED ALTERNATIVE**

**SHEET 11 OF 12**

MARION COUNTY

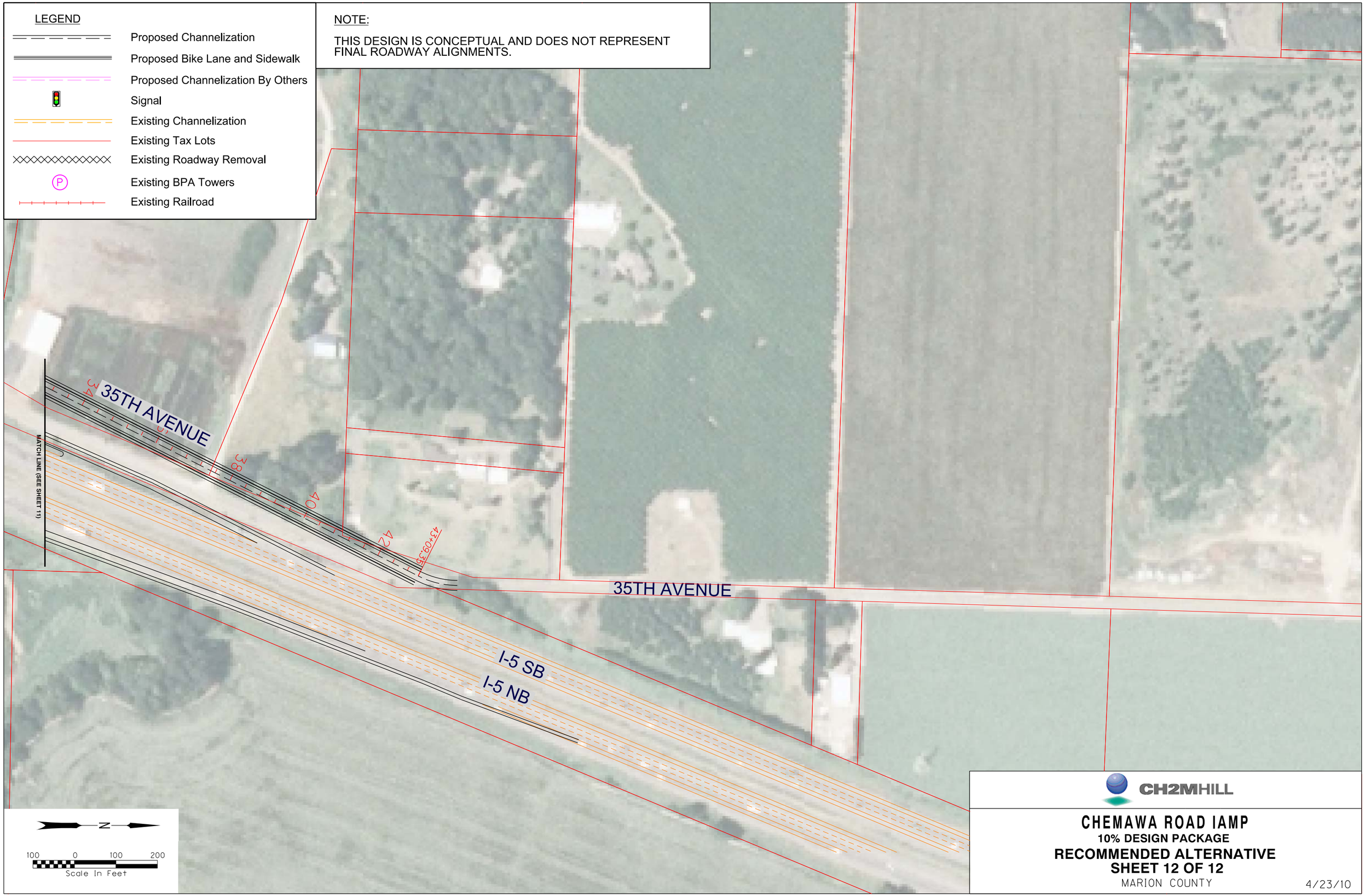
04/23/10

LEGEND

- Proposed Channelization
- Proposed Bike Lane and Sidewalk
- Proposed Channelization By Others
- Signal
- Existing Channelization
- Existing Tax Lots
- Existing Roadway Removal
- Existing BPA Towers
- Existing Railroad

NOTE:

THIS DESIGN IS CONCEPTUAL AND DOES NOT REPRESENT FINAL ROADWAY ALIGNMENTS.




CH2MHILL

# CHEMAWA ROAD IAMP

10% DESIGN PACKAGE

## RECOMMENDED ALTERNATIVE

SHEET 12 OF 12

MARION COUNTY

4/23/10

APPENDIX J

# Recommended Alternative Traffic Analysis by Phases

Table B.1

Chemawa Road IAMP – 2031 95th Percentile Queue Results: Key Intersections Alternatives Summary

| ID | Intersection | Approach | Lane Group | Existing Storage (feet) | Queue (feet, except where noted) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Baseline | Ph 1-2 | Ph 1-3 |
| 1 | Lockhaven Drive at River Road | EB | Left | 205 | 240 | 220 | 230 |
| | | | Thru | 380 | 750 | 730 | 750 |
| | | | Right | 300 | 350 | 330 | **400** |
| | | WB | Left | 125 | 190 | **320** | **330** |
| | | | Left/Thru | 870 | 890 | N/A | N/A |
| | | | Thru | 870 | N/A | 1120 | 1130 |
| | | | Right | 125 | 180 | 180 | 180 |
| | | NB | Left | 195 | 200 | **250** | **260** |
| | | | Thru | -- | 440 | 460 | 450 |
| | | | Right | 195 | 350 | 340 | 320 |
| | | SB | Left | 160 | 210 | 210 | 210 |
| | | | Thru/Right | -- | 380 | 370 | 370 |
| 2 | Lockhaven Drive at Trail Avenue | EB | Left | 140 | 90 | **110** | **130** |
| | | | Thru | -- | 1220 | 1240[1] | 1240[1] |
| | | WB | Thru/Right | 740 | >1/4 mile | *910* | *1180* |
| | | SB | Left/Right | **--** | 1030 | 1060 | 1060 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Drive | EB | Left | 120 | 180 | *130* | *130* |
| | | | Thru/Right | -- | 1280 | 1200 | 1160 |
| | | WB | Left | 100 | 90 | **120** | **150** |
| | | | Thru/Right | 240 | >1/4 mile | *590* | *590* |
| | | NB | Left/Thru/Right | -- | 190 | **280** | **300** |
| | | SB | Left/Thru | -- | 430 | 440 | 440 |
| | | | Right | 300 | 320 | *180* | *190* |
| 4 | Lockhaven Drive at McLeod Lane | EB | Left | 260 | 240 | *120* | *140* |
| | | | Thru/Right | -- | 350 | **820** | **810** |
| | | WB | Left | 130 | 60 | *20* | *50* |
| | | | Thru/Right | -- | 770 | *610* | *610* |
| | | NB | Left | 95 | 70 | *50* | *50* |
| | | | Thru | -- | 220 | *190* | *170* |
| | | | Right | 95 | 130 | 130 | 120 |
| | | SB | Left | 100 | 130 | 140 | 140 |
| | | | Thru/Right | 340 | 570 | 580 | 600 |
| 5 | Lockhaven Drive at Chemawa Road-Keizer Station Blvd. | EB | Left | 180 | 140 | **180** | **180** |
| | | | Thru/Right | -- | 620 | 600 | 600 |
| | | WB | Left | 375 | 430 | 410 | 430 |
| | | | Thru/Right | -- | 730 | *470* | *520* |
| | | NB | Left | 105 | 160 | *90* | *100* |
| | | | Thru | -- | 330 | *280* | *280* |
| | | | Right | 170 | 290 | 280 | *260* |
| | | SB | Left | 235 | 350 | 320 | *310* |
| | | | Thru | -- | 360 | **400** | **410** |
| | | | Right | 235 | 290 | *150* | *150* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | **Chemawa Road at Stadium Drive-Ulali Drive** | EB | Left | 195 | 40 | *30* | 40 |
| | | | Thru | 620 | 740 | **890** | **880** |
| | | | Right | 195 | 100 | **270** | **230** |
| | | WB | Left | 385 | 510 | *280* | *410* |
| | | | Thru | 780 | 880 | 830 | 850 |
| | | | Right | 360 | 650 | *430* | *470* |
| | | NB | Right | 270 | 450 | 460 | 460 |
| | | SB | Right | -- | 120 | **220** | **240** |
| 7 | **Chemawa Road at I-5 SB Ramps** | EB | Thru | -- | 920 | 870 | 840 |
| | | | Right | 480 | 500 | **590** | **580** |
| | | WB | Left | 350 | 430 | **460** | **490** |
| | | | Thru | 800 | 970 | 930 | 1000 |
| | | SB | Left/Thru | -- | 510 | **780** | **660** |
| | | | Right | 250 | 410 | *340* | *340* |
| 8 | **Chemawa Road at I-5 NB Ramps** | EB | Left | 350 | 120 | 130 | 110 |
| | | | Thru | -- | 390 | *300* | 400 |
| | | WB | Thru | 440 | 480 | N/A | N/A |
| | | | Right | 440 | 60 | N/A | N/A |
| | | | Thru/Right | | N/A | 480 | 330 |
| | | NB | Left | -- | 580 | **1130** | >1/4 mile[2] |
| | | | Thru | -- | 310 | **1150** | N/A |
| | | | Right | 165 | 130 | **150** | N/A |
| 9 | **Chemawa Road at Indian School Road** | EB | Left | 75 | 70 | N/A | N/A |
| | | | Thru | -- | 80 | N/A | N/A |
| | | WB | Thru | -- | 370 | N/A | N/A |
| | | SB | Left/Right | -- | 450 | N/A | N/A |
| 10 | **Chemawa Road at OR 99E** | EB | Left | 140 | 200 | 210 | 200 |
| | | | Thru | -- | >1/4 mile | >1/4 mile[3] | >1/4 mile[3] |
| | | | Right | 140 | 200 | 190 | 190 |
| | | WB | Left | 75 | 120 | 130 | 120 |
| | | | Thru/Right | 720 | >1/4 mile | >1/4 mile | >1/4 mile |
| | | NB | Left | 300 | 330 | *260* | *210* |
| | | | Thru | 600 | >1/4 mile | *310* | *230* |
| | | | Right | 95 | 70 | *60* | 70 |
| | | SB | Left | 140 | 210 | *180* | 200 |
| | | | Thru | -- | 760 | 750 | 740 |
| | | | Right | 95 | 150 | 160 | 160 |
| 17 | **OR 99E Bus (Salem Pkwy) at Verda Lane-Hyacinth Street** | EB | Left | 150 | 170 | *150* | 170 |
| | | | Thru | -- | 1070 | *930* | *950* |
| | | | Right | -- | 1130 | *620* | *1010* |
| | | WB | Left | 285 | 250 | 250 | *220* |
| | | | Thru | 300 | 660 | 650 | 660 |
| | | | Right | 160 | 240 | 230 | 250 |
| | | NB | Left | 210 | 270 | 270 | 270 |
| | | | Thru | -- | 1160 | 1170 | 1080 |
| | | | Right | 210 | 300 | 300 | 290 |
| | | SB | Left | 240 | 190 | 190 | **220** |
| | | | Thru/Right | -- | 1240 | 1230 | 1240 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **18** | **OR 99E at Hyacinth Street** | EB | Left | 270 | 330 | 340 | 330 |
| | | | Left/Thru | -- | 880 | 890 | 880 |
| | | | Right | 940 | 1060 | 1120 | 1080 |
| | | WB | Left | 70 | 120 | 120 | 120 |
| | | | Thru/Right | 310 | 890 | 880 | 860 |
| | | NB | Left | 120 | 170 | 180 | 180 |
| | | | Thru/Right | -- | >1/4 mile | >1/4 mile | >1/4 mile |
| | | SB | Left | 225 | 300 | 310 | 280 |
| | | | Through | -- | >1/4 mile | >1/4 mile | >1/4 mile |
| | | | Right | 225 | 260 | 270 | 260 |
| **21** | **Brooklake Road at I-5 NB Ramps** | EB | Left | 215 | 220 | 230 | 210 |
| | | | Thru | -- | 550 | *420* | *410* |
| | | WB | Thru/Right | 510 | >1/4 mile | >1/4 mile | >1/4 mile |
| | | NB | Left/Thru | -- | 740 | 730 | 740 |
| | | | Right | 25 | 80 | *60* | *70* |
| **22** | **Brooklake Road at I-5 SB Ramps** | EB | Thru/Right | -- | 680 | *480* | *450* |
| | | WB | Left | 215 | 300 | 280 | *270* |
| | | | Thru | 680 | >1/4 mile | >1/4 mile | 1280 |
| | | SB | Left/Thru | -- | 730 | 720 | 720 |
| | | | Right | 25 | 30 | *20* | *20* |
| **29** | **Chemawa Road at Tepper Lane** | EB | Left | 300 | N/A | 360 | 340 |
| | | | Thru/Right | -- | N/A | >1/4 mile | >1/4 mile |
| | | WB | Left | 150 | N/A | 40 | 40 |
| | | | Thru/Right | -- | N/A | 730 | 560 |
| | | NB | Left | 150 | N/A | 30 | 30 |
| | | | Thru/Right | -- | N/A | 50 | 50 |
| | | SB | Left | 250 | N/A | 320 | 310 |
| | | | Thru/Right | -- | N/A | 1100 | 900 |
| **33** | **Lockhaven Drive at Verda Lane** | EB | Thru/Right | 730 | >1/4 mile | >1/4 mile | >1/4 mile |
| | | WB | Thru | 690 | 1270 | *650* | *820* |
| | | | Right | 150 | 210 | **580** | **790** |
| | | | Thru/Right | 690 | N/A | N/A | N/A |
| | | NB | Left | 150 | 110 | 110 | 130 |
| | | | Thru/Right | 320 | 280 | **450** | **310** |
| | | SB | Left | 150 | 190 | 200 | 190 |
| | | | Thru/Right | -- | 770 | **890** | 830 |

**Notes:**

Queue lengths rounded up to the nearest ten feet

Existing storage for through-lanes displayed when queue extends the distance to the next intersection

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

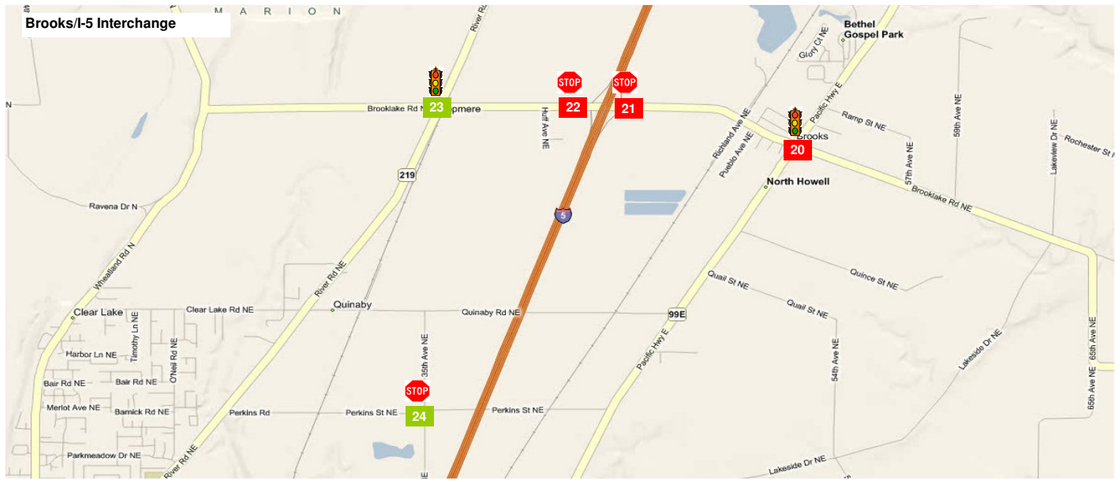
**Bold** font indicates queue has worsened from baseline (a 10% or greater change which could represent a noticeable impact to drivers)

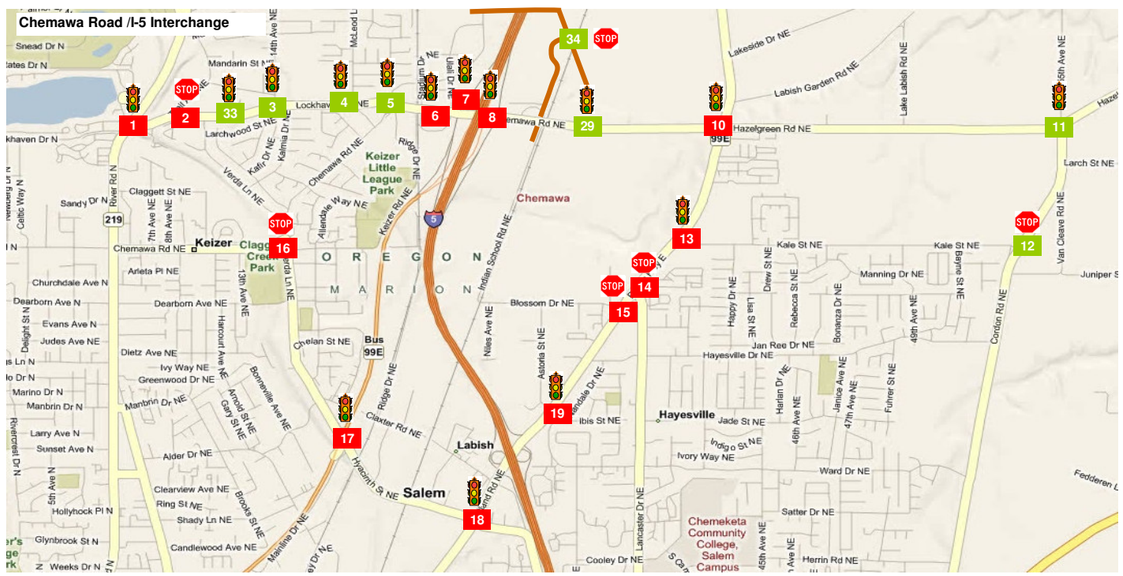
*Italic* font indicates queue has improved from baseline (a 10% or greater change which could represent a noticeable improvement to drivers)

[1] Queuing is a result of oversaturated conditions at downstream intersections

[2] Movement is a SBR, but represents the same vehicles as NBL in all the other alternatives, so it is listed here for comparison sake

[3] Movement exceeds storage, but storage is different for the Baseline versus the alternatives




| 1 | Lockhaven Dr. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 1.10 | Jurisdiction: Keizer | |
| Delay (s): | 107.2 | Standard: | 0.87 |
| LOS : | F | PHF | 0.87 |

3.8%
170 810 225
200
335 3.0%
505
110
5.0% 235
190
175 1150 455
1.3%

| 2 | Lockhaven Dr. & Trail Ave. | | |
|---|---|---|---|
| V/C Ratio: | 0.77(1.89)^ | Jurisdiction: Keizer | |
| Delay (s): | 484.8 | Standard: | 0.87 |
| LOS : | F | PHF | 0.97 |

0.0%
155 0 25
15
885 1.3%
0
95
1.8% 820
0

| 3 | Lockhaven Dr. & 14th Ave./Kafir Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Keizer | |
| Delay (s): | 20.1 | Standard: | 0.87 |
| LOS : | C | PHF | 0.91 |

1.6%
35 15 80
245
1220 1.5%
55
75
2.4% 1060
25
30 25 20
6.9%

| 4 | Lockhaven Dr. & McLeod Ln. | | |
|---|---|---|---|
| V/C Ratio: | 0.69 | Jurisdiction: Keizer | |
| Delay (s): | 16.9 | Standard: | 0.87 |
| LOS : | B | PHF | 0.97 |

1.2%
110 50 220
400
1380 0.7%
25
95
1.3% 1050
15
30 65 35
0.0%

| 5 | Lockhaven & Chemawa/Keizer Station | | |
|---|---|---|---|
| V/C Ratio: | 0.81 | Jurisdiction: Keizer | |
| Delay (s): | 30.8 | Standard: | 0.87 |
| LOS : | C | PHF | 0.97 |

0.4%
120 85 205
20
1665 0.8%
905
185
1.1% 1080
40
20 105 425
0.3%

| 6 | Chemawa Rd. & Stadium Dr./Ulali Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.92 | Jurisdiction: ODOT | |
| Delay (s): | 26.5 | Standard: | 0.87 |
| LOS : | C | PHF | 0.98 |

0.8%
295 0 0
525
2295 0.9%
130
15
0.7% 1650
45
0 0 845
0.7%

| 7 | Chemawa Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | |
| Delay (s): | 29.3 | Standard: | 0.87 |
| LOS : | C | PHF | 0.97 |

3.2%
445 5 105
0
2505 1.3%
380
0
0.7% 760
1735

| 8 | Chemawa Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 1.03 | Jurisdiction: ODOT | |
| Delay (s): | 62.4 | Standard: | 0.87 |
| LOS : | E | PHF | 0.94 |

35
1190 0.7%
0
105
1.7% 760
0
1695 5 250
1.9%

| 9 | Chemawa Rd. & Indian School Rd. | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 10 | Chemawa Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 0.88 | Jurisdiction: ODOT | |
| Delay (s): | 42.5 | Standard: | 0.75 |
| LOS : | D | PHF | 0.97 |

1.0%
230 1020 115
90
445 2.7%
135
190
1.6% 545
535
545 815 175
0.8%

| 11 | Hazelgreen Rd. & Cordon Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.88 | Jurisdiction: Marion County | |
| Delay (s): | 42.5 | Standard: | LOS E |
| LOS : | D | PHF | 0.95 |

1.3%
30 135 15
15
400 3.2%
110
40
2.5% 410
385
240 125 75
1.4%

| 12 | Cordon Rd. & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.42(0.43)^ | Jurisdiction: Marion County | |
| Delay (s): | 23.0 | Standard: | LOS D |
| LOS : | C | PHF | 0.94 |

1.2%
30 600 0
15
0.0% 0
95
90 425 0
1.6%

CH2MHILL

# FIGURE B.1a Chemawa Road IAMP Traffic Analysis

**2031 Recommended Alternative: Phases 1 & 2: Chemawa/Lockhaven Limited Widening & Tepper Overcrossing**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

**Notes:**

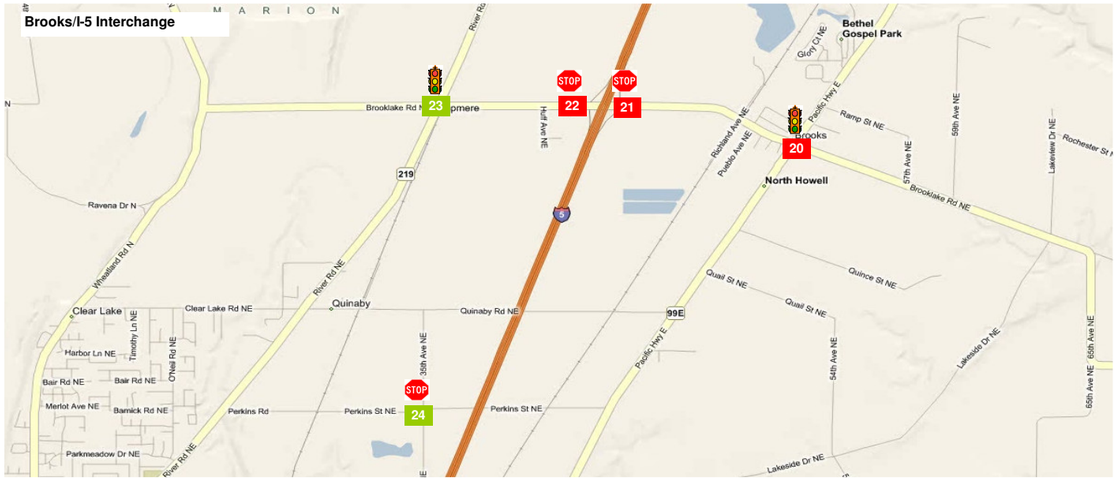
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

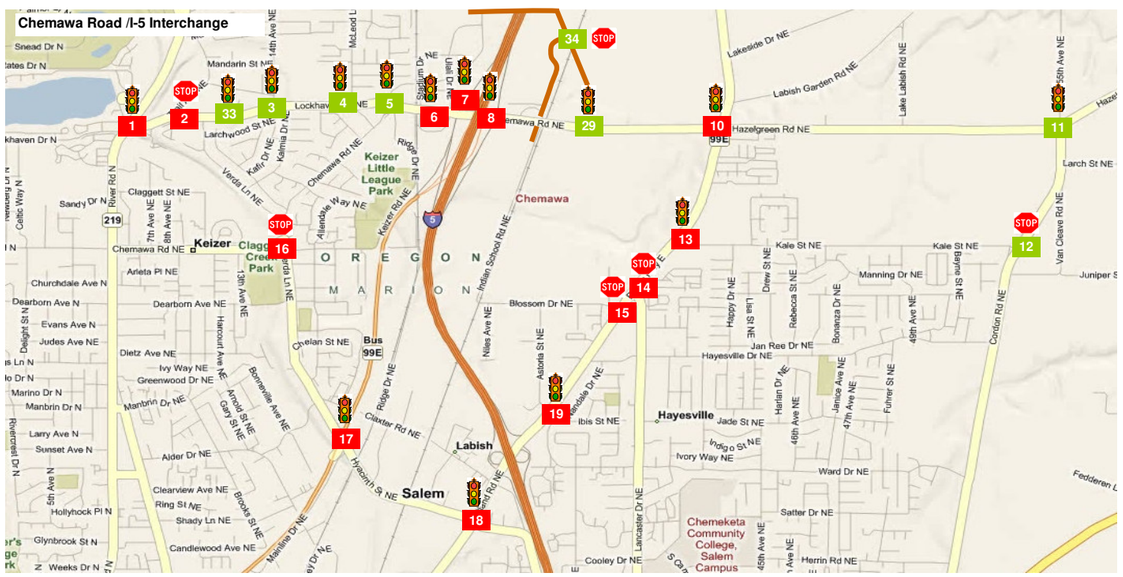
**Legend:**

Volume Diagram

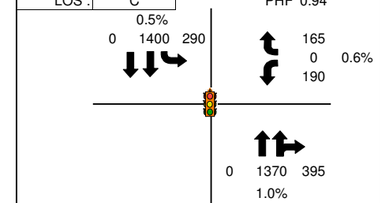
SB HV %
SBR SBT SBR
WBR WB
WBT HV %
WBR
EB HV%
EBL
EBT
EBR
NBR NBT NBR
NB HV %

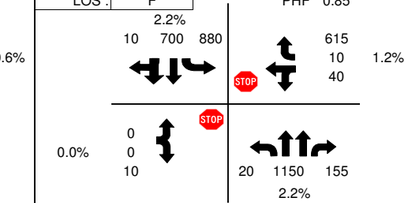
555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

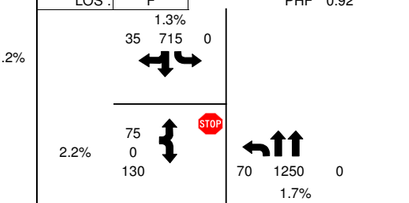


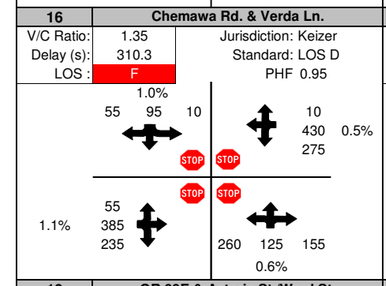

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | V/C Ratio: | 1.76(1.74)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(1.70)^ | Jurisdiction: ODOT |
| Delay (s): | 22.5 | Standard: 0.75 | Delay (s): | 368.1 | Standard: 0.75(0.85)^ | Delay (s): | 384.1 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |

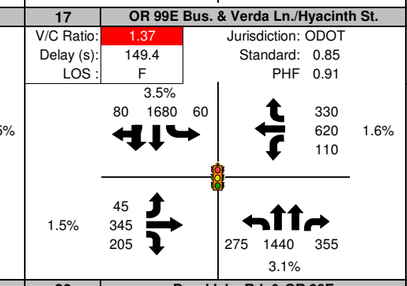


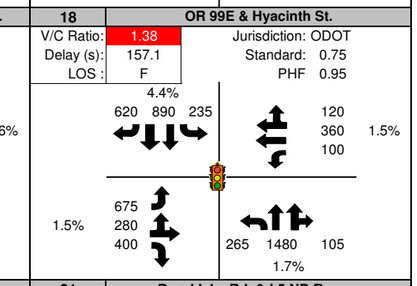



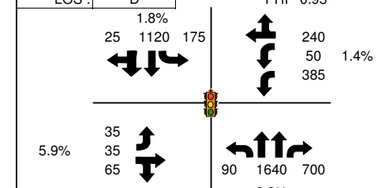

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.35 | Jurisdiction: Keizer | V/C Ratio: | 1.37 | Jurisdiction: ODOT | V/C Ratio: | 1.38 | Jurisdiction: ODOT |
| Delay (s): | 310.3 | Standard: LOS D | Delay (s): | 149.4 | Standard: 0.85 | Delay (s): | 157.1 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |

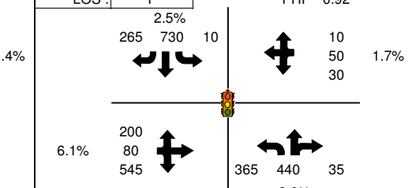


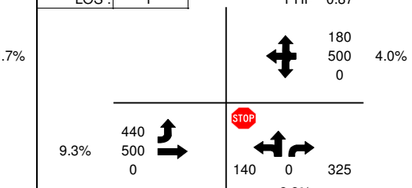



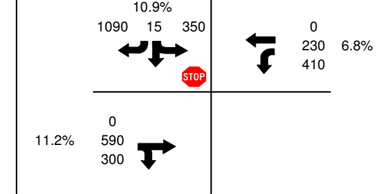

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | V/C Ratio: | 1.41 | Jurisdiction: ODOT | V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 49.3 | Standard: 0.75 | Delay (s): | 180.0 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |

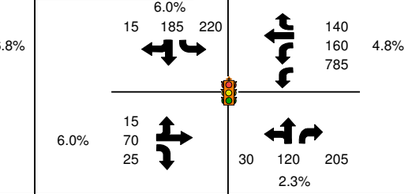


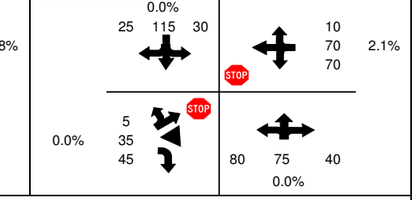




| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.86(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.61 | Jurisdiction: Marion County | V/C Ratio: | 0.12(0.54)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 33.9 | Standard: LOS E | Delay (s): | 26.1 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | D | PHF 0.89 |



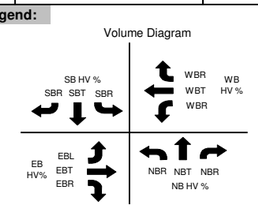




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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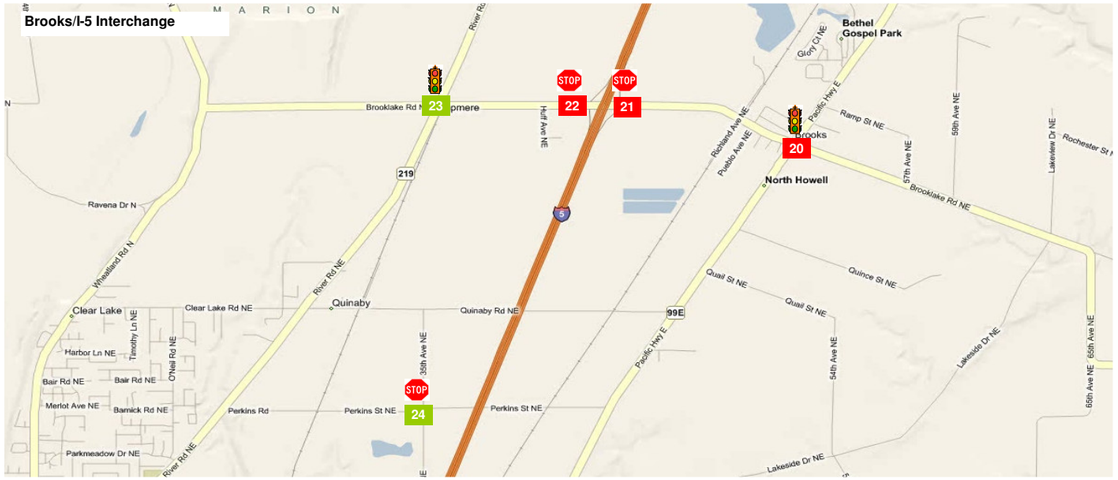
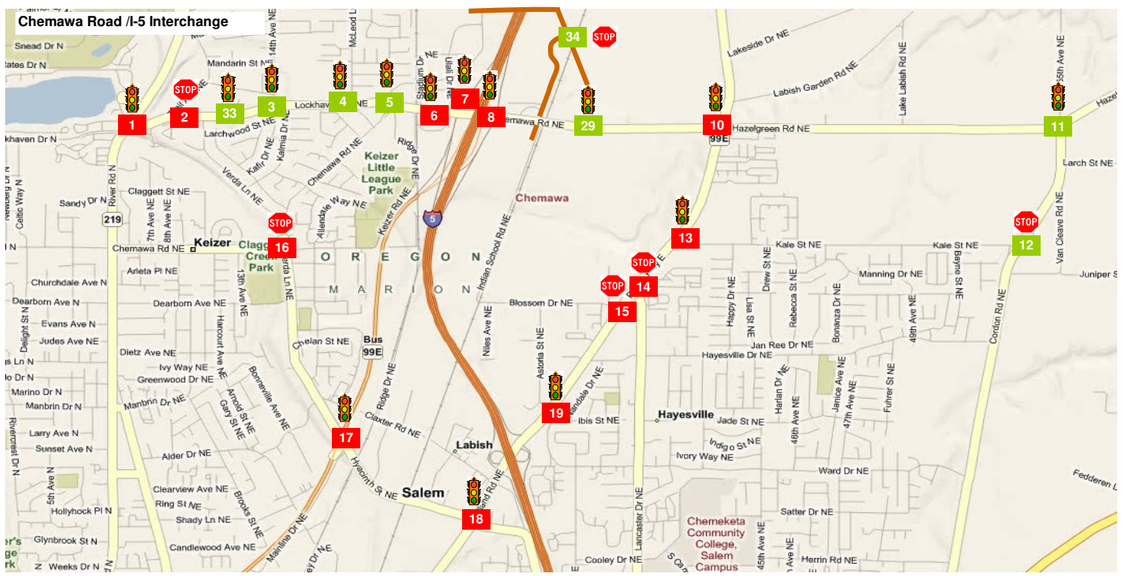
# FIGURE B.1a Chemawa Road IAMP Traffic Analysis

**2031 Recommended Alternative: Phases 1 & 2: Chemawa/Lockhaven Limited Widening & Tepper Overcrossing**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**




| 25 | Hyacinth/NB Salem Pkwy Ramps | 26 | Hyacinth/SB Salem Pkwy Ramps | 27 | Tepper Lane/SB Ramps |
|---|---|---|---|---|---|
| V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: |
| Delay (s): | Standard: | Delay (s): | Standard: | Delay (s): | Standard: |
| LOS : | PHF | LOS : | PHF | LOS : | PHF |
| Does Not Exist in Alternative | | Does Not Exist in Alternative | | Does Not Exist in Alternative | |

| 28 | Tepper Lane/NB Ramps | 29 | Chemawa Road/E. Tepper Lane | 30 | Brooklake/I-5 Ramps (SPUI) |
|---|---|---|---|---|---|
| V/C Ratio: | Jurisdiction: | V/C Ratio: 0.66 | Jurisdiction: Marion County | V/C Ratio: | Jurisdiction: ODOT |
| Delay (s): | Standard: | Delay (s): 44.2 | Standard: LOS E | Delay (s): | Standard: |
| LOS : | PHF | LOS : D | PHF 0.92 | LOS : | PHF |
| Does Not Exist in Alternative | | 2.0%; 280 5 470; 275 / 940 / 5; 2.1%; 2.0%; 205 / 795 / 10; 5 10 5 | | Does Not Exist in Alternative | |

| 31 | Quinaby Road/NB Ramps | 32 | Quinaby Road/SB Ramps | 33 | Verda Lane/Lockhaven Dr. |
|---|---|---|---|---|---|
| V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: | Jurisdiction: ODOT | V/C Ratio: 0.82 | Jurisdiction: Keizer |
| Delay (s): | Standard: | Delay (s): | Standard: | Delay (s): 18.3 | Standard: 0.87 |
| LOS : | PHF | LOS : | PHF | LOS : B | PHF 0.92 |
| Does Not Exist in Alternative | | Does Not Exist in Alternative | | 2.0%; 50 0 300; 485 / 800 / 0; 2.1%; 2.0%; 0 / 805 / 40; 50 0 55; 2.0% | |

| 34 | Indian School Road/E. Tepper Lane |
|---|---|
| V/C Ratio: 0.52(0.33)^ | Jurisdiction: Marion County |
| Delay (s): 40.0 | Standard: LOS E |
| LOS : E | PHF 0.92 |
| 2.0%; 20 500; 1.5%; 65 / 255; STOP; 125 365; 2.0% | |

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# FIGURE B.1a Chemawa Road IAMP Traffic Analysis

## 2031 Recommended Alternative: Phases 1 & 2: Chemawa/Lockhaven Limited Widening & Tepper Overcrossing Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

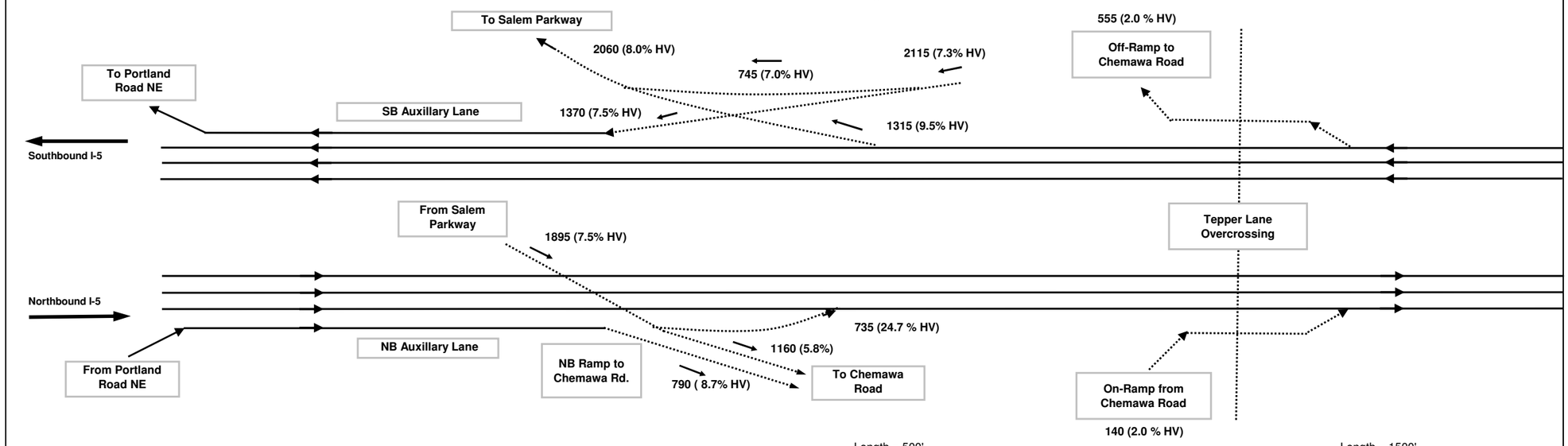
**Legend:**

Volume Diagram

SB HV %; SBR SBT SBR; WBR WBT WBR; WB HV %; EB HV%; EBL EBT EBR; NBR NBT NBR; NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
STOP Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S4: Salem Pkwy Off | | S3: SB I-5 Mainline | S2: Chemawa Road Off-Ramp | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 1.0% | 1.0% | 1.0% | 1.0% | 6.4% | | 8.6% |
| | PHF | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-2 | Volume | 5840 | 4470 | 1315 | | 5785 | 555 | | 6340 |
| | Flow Rate^ | 1625 | 1530 | 1350 | 4585 | 1900 | 640 | 6265 | 2350 |
| | V/C | 0.69 | 0.65 | 0.64 | 0.65 | 0.99 | 0.30 | 0.89 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| | | | | Length = 750' | | | Length = 750' | | |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N4: Salem Pkwy On | | N5: NB I-5 Mainline | N6: Chemawa Road On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 24.7% | | 9.3% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-2 | Volume | 5345 | 4555 | 735 | | 5290 | 140 | | 5430 |
| | Flow Rate^ | 1460 | 1650 | 3860 | 5875 | 1970 | 3835 | 6080 | 1995 |
| | V/C | 0.62 | 0.70 | 0.84 | 0.83 | 0.99 | 0.83 | 0.86 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| | | | | Length = 500' | | | Length = 1500' | | |

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## FIGURE B.1b Chemawa Road IAMP Traffic Analysis

**2031 Recommended Alternative: Phases 1 & 2: Chemawa/Lockhaven Limited Widening & Tepper Overcrossing**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

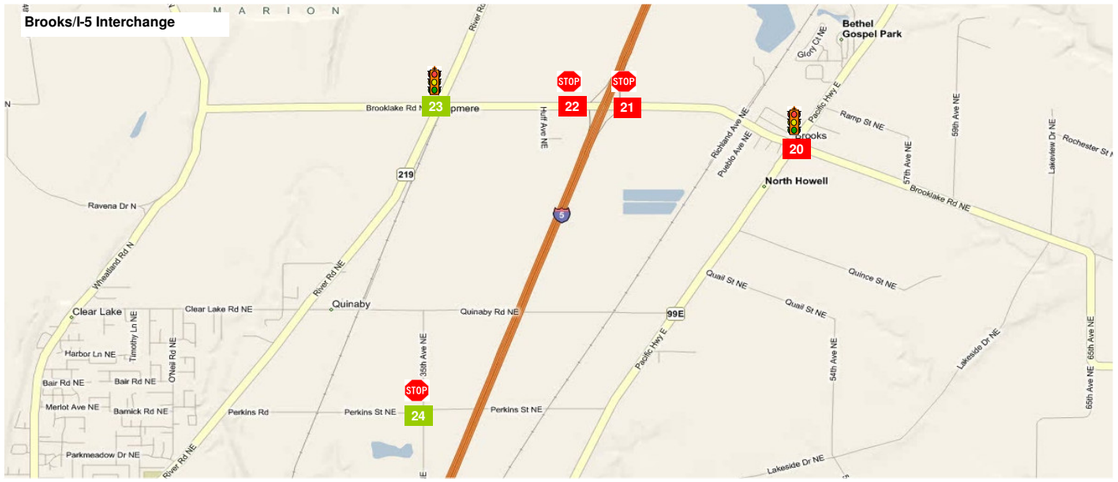
Meets Mobility Standard
Fails Mobility Standard

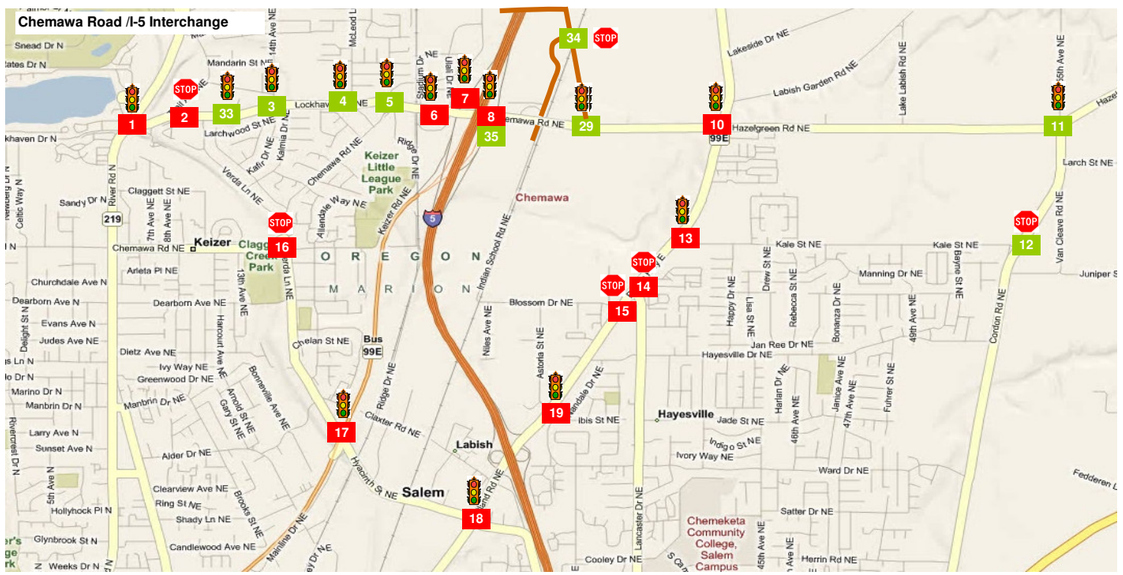
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

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# FIGURE B.2a Chemawa Road IAMP Traffic Analysis

**2031 Recommended Alternative: Phases 1 - 3: Chemawa/Lockhaven Limited Widening & Parclo B Ramp**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

## 1 Lockhaven Dr. & River Rd.

V/C Ratio: 1.05 | Delay (s): 105.0 | LOS: F
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.87

3.8%: 175 805 230
195 / 335 3.0% / 505
5.0%: 105 / 235 / 190
175 1115 450 — 1.3%

## 2 Lockhaven Dr. & Trail Ave.

V/C Ratio: 0.59(1.87)^ | Delay (s): 482.1 | LOS: F
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97

0.0%: 145 0 25
15 / 890 1.3% / 0
1.8%: 95 / 820 / 0

## 3 Lockhaven Dr. & 14th Ave./Kafir Dr.

V/C Ratio: 0.85 | Delay (s): 18.2 | LOS: B
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.91

1.6%: 35 15 70
230 / 1220 1.5% / 55
2.4%: 70 / 1070 / 25
30 25 20 — 7.0%

## 4 Lockhaven Dr. & McLeod Ln.

V/C Ratio: 0.69 | Delay (s): 17.2 | LOS: B
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97

1.2%: 100 50 220
395 / 1375 0.7% / 25
1.3%: 95 / 1050 / 15
30 65 35 — 0.0%

## 5 Lockhaven & Chemawa/Keizer Station

V/C Ratio: 0.81 | Delay (s): 29.5 | LOS: C
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97

0.4%: 125 85 200
20 / 1650 0.8% / 900
1.1%: 185 / 1080 / 40
20 100 425 — 0.3%

## 6 Chemawa Rd. & Stadium Dr./Ulali Dr.

V/C Ratio: 0.91 | Delay (s): 26.3 | LOS: C
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.98

0.8%: 280 0 0
565 / 2290 0.9% / 170
0.7%: 10 / 1660 / 35
0 0 870 — 0.7%

## 7 Chemawa Rd. & I-5 SB Ramps

V/C Ratio: 0.99 | Delay (s): 34.6 | LOS: C
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.97

3.2%: 525 5 100
0 / 2500 1.3% / 330
0.7%: 0 / 775 / 1755

## 8 Chemawa Rd. & I-5 NB Ramps

V/C Ratio: 1.03 | Delay (s): 33.8 | LOS: C
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.94

0.0%: 1710 0 0
35 / 1120 0.0% / 0
1.7%: 105 / 1305 / 0

## 9 Chemawa Rd. & Indian School Rd.

V/C Ratio: | Delay (s): | LOS:
Jurisdiction: | Standard: | PHF

**Does Not Exist in Alternative**

## 10 Chemawa Rd. & OR 99E

V/C Ratio: 0.91 | Delay (s): 42.9 | LOS: D
Jurisdiction: ODOT | Standard: 0.75 | PHF 0.97

1.0%: 255 1045 125
90 / 440 2.7% / 145
1.6%: 235 / 575 / 560
485 740 175 — 0.8%

## 11 Hazelgreen Rd. & Cordon Rd.

V/C Ratio: 0.90 | Delay (s): 44.2 | LOS: D
Jurisdiction: Marion County | Standard: LOS E | PHF 0.95

1.3%: 45 135 15
15 / 400 3.2% / 110
2.5%: 60 / 420 / 395
230 125 70 — 1.4%

## 12 Cordon Rd. & Kale St.

V/C Ratio: 0.43(0.43)^ | Delay (s): 23.3 | LOS: C
Jurisdiction: Marion County | Standard: LOS D | PHF 0.94

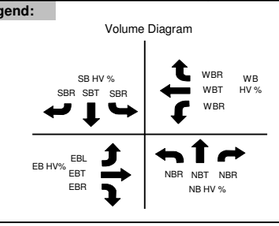
1.2%: 30 610 0
0.0%: 15 / 0 / 95
90 410 0 — 1.6%

**Notes:**

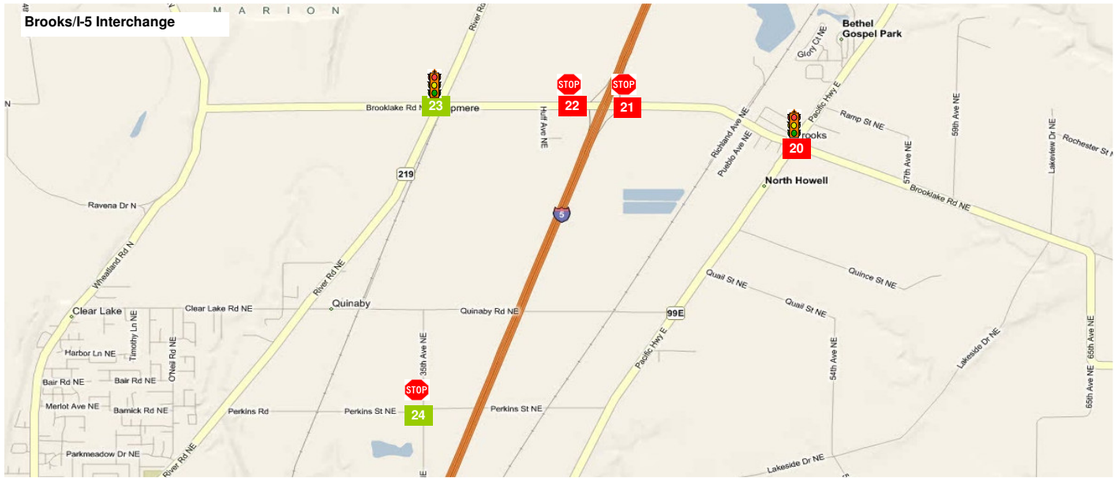
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

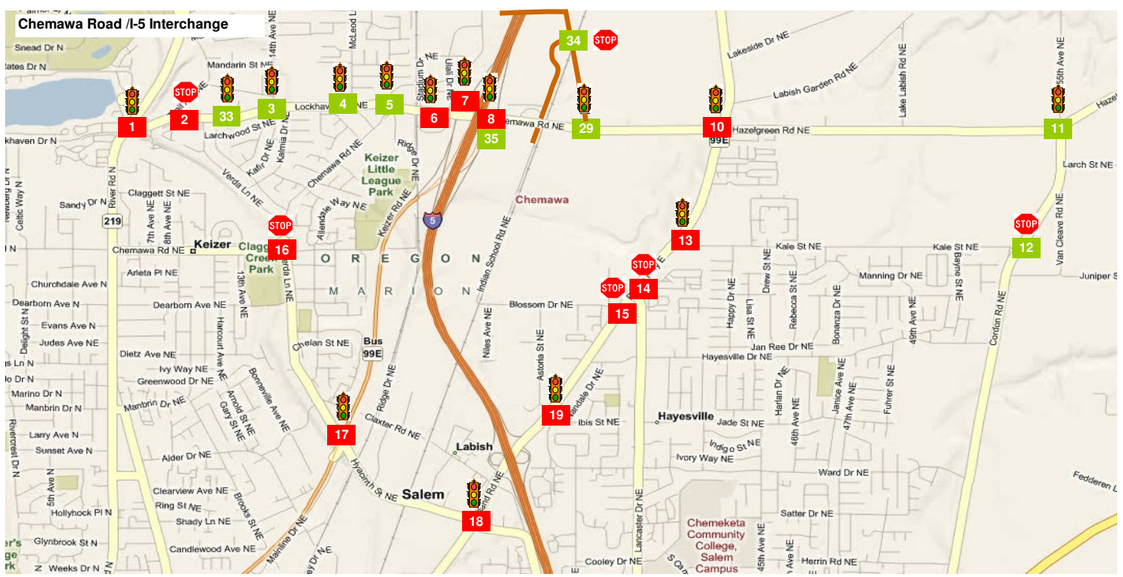
**Legend:**

Volume Diagram

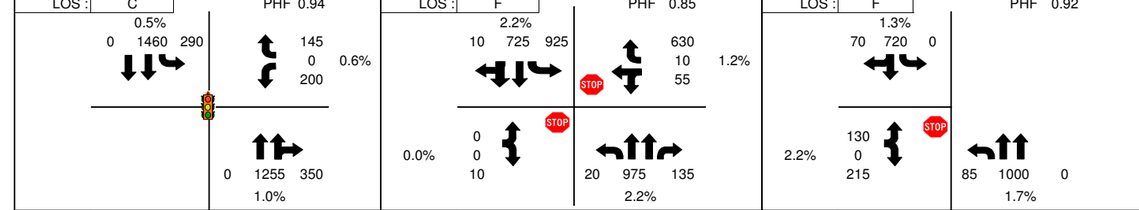



555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

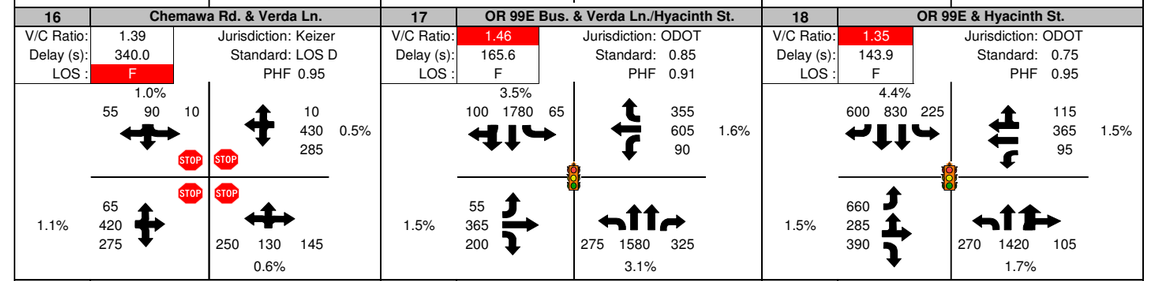


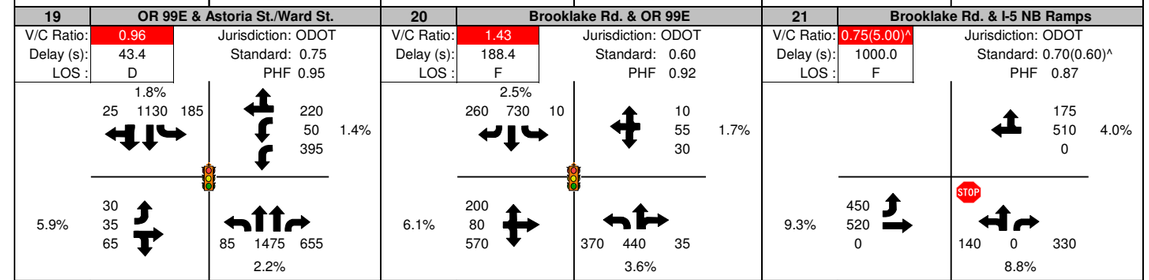

| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.88 | Jurisdiction: ODOT | V/C Ratio: | 1.56(1.53)^ | Jurisdiction: ODOT | V/C Ratio: | 0.32(2.72)^ | Jurisdiction: ODOT |
| Delay (s): | 20.9 | Standard: 0.75 | Delay (s): | 272.7 | Standard: 0.75(0.85)^ | Delay (s): | 831.6 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |



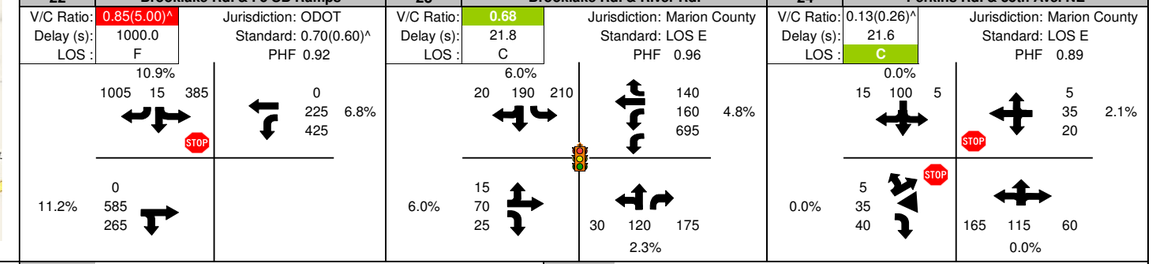

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.39 | Jurisdiction: Keizer | V/C Ratio: | 1.46 | Jurisdiction: ODOT | V/C Ratio: | 1.35 | Jurisdiction: ODOT |
| Delay (s): | 340.0 | Standard: LOS D | Delay (s): | 165.6 | Standard: 0.85 | Delay (s): | 143.9 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |




| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.96 | Jurisdiction: ODOT | V/C Ratio: | 1.43 | Jurisdiction: ODOT | V/C Ratio: | 0.75(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 43.4 | Standard: 0.75 | Delay (s): | 188.4 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | D | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |



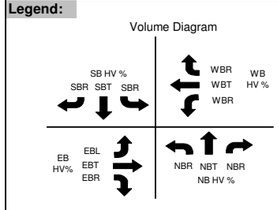

| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.85(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.68 | Jurisdiction: Marion County | V/C Ratio: | 0.13(0.26)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 21.8 | Standard: LOS E | Delay (s): | 21.6 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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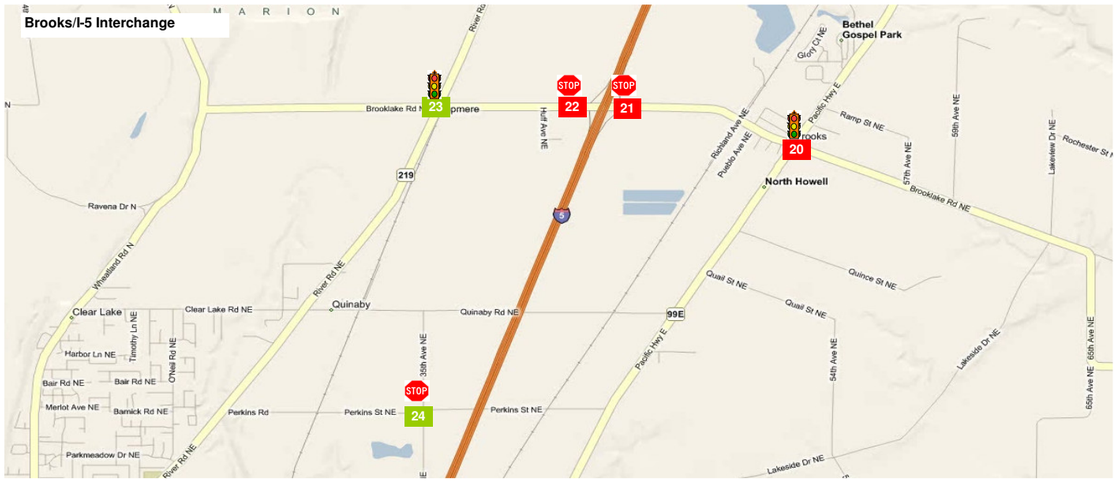
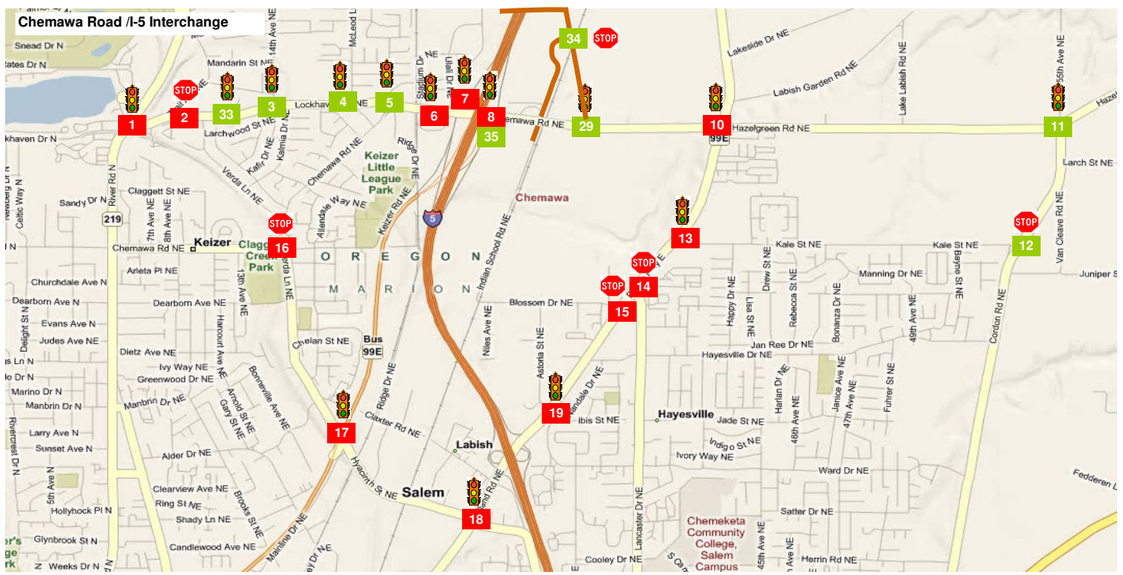
# FIGURE B.2a Chemawa Road IAMP Traffic Analysis

## 2031 Recommended Alternative: Phases 1 - 3: Chemawa/Lockhaven Limited Widening & Parclo B Ramp Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio




**CH2MHILL**

# FIGURE B.2a Chemawa Road IAMP Traffic Analysis

## 2031 Recommended Alternative: Phases 1 - 3: Chemawa/Lockhaven Limited Widening & Parclo B Ramp Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio

### 25 Hyacinth/NB Salem Pkwy Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction: ODOT
Standard:
PHF

**Does Not Exist in Alternative**

### 26 Hyacinth/SB Salem Pkwy Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction: ODOT
Standard:
PHF

**Does Not Exist in Alternative**

### 27 Tepper Lane/SB Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction:
Standard:
PHF

**Does Not Exist in Alternative**

### 28 Tepper Lane/NB Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction:
Standard:
PHF

**Does Not Exist in Alternative**

### 29 Chemawa Road/E. Tepper Lane

V/C Ratio: 0.69
Delay (s): 32.2
LOS : D
Jurisdiction: Keizer
Standard: LOS D
PHF 0.92

2.0%
250 5 470
275
900 2.0%
5
400
2.0% 895
10
5 10 5
2.0%

### 30 Brooklake/I-5 Ramps (SPUI)

V/C Ratio:
Delay (s):
LOS :
Jurisdiction: ODOT
Standard:
PHF

**Does Not Exist in Alternative**

### 31 Quinaby Road/NB Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction: ODOT
Standard:
PHF

**Does Not Exist in Alternative**

### 32 Quinaby Road/SB Ramps

V/C Ratio:
Delay (s):
LOS :
Jurisdiction: ODOT
Standard:
PHF

**Does Not Exist in Alternative**

### 33 Verda Lane/Lockhaven Dr.

V/C Ratio: 0.82
Delay (s): 18.1
LOS : B
Jurisdiction: Keizer
Standard: 0.87
PHF 0.92

2.0%
55 0 300
485
800 2.0%
0
0
2.0% 805
40
50 0 60
2.0%

### 34 Indian School Road/E. Tepper Lane

V/C Ratio: 0.31(0.53)^
Delay (s): 58.5
LOS : F
Jurisdiction: Marion County
Standard: 0.75
PHF 0.92

2.0%
20 470
65
1.5%
255
125 560
2.0%

### 35 Chemawa Road/Parclo B Ramps

V/C Ratio: 0.00
Delay (s): 0.0
LOS : A
Jurisdiction: ODOT
Standard: n/a
PHF 0.94

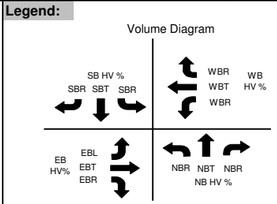
0
2830 2.0%
0
0
2.0% 875
0
0 0 535
2.0%

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

Volume Diagram

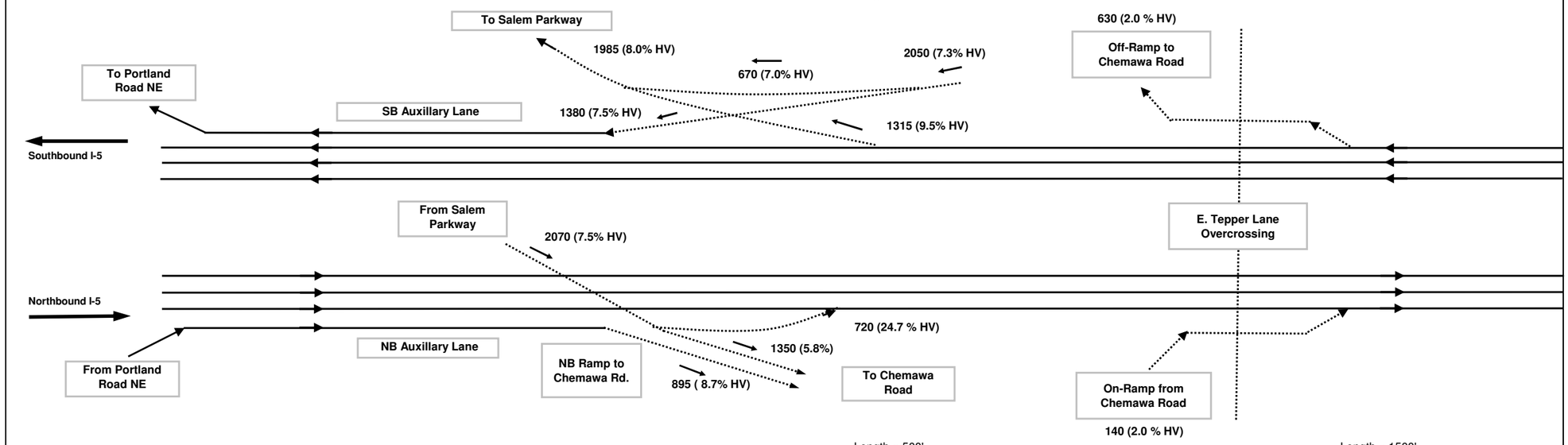



555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S4: Salem Pkwy Off | | S3: SB I-5 Mainline | S2: Chemawa Road Off-Ramp | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 1.0% | 1.0% | 1.0% | 1.0% | 6.4% | | 8.6% |
| | PHF | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-3B | Volume | 5775 | 4395 | 1315 | | 5710 | 630 | | 6340 |
| | Flow Rate^ | 1605 | 1505 | 1350 | 4510 | 1955 | ## 725 | 6180 | 2350 |
| | V/C | 0.68 | 0.64 | 0.64 | 0.64 | 0.99 | 0.34 | 0.88 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750'

Length = 750'




Length = 500'

Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N4: Salem Pkwy On | | N5: NB I-5 Mainline | N6: Chemawa Road On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 24.7% | | 9.3% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-3B | Volume | 5400 | 4505 | 720 | | 5225 | 140 | | 5365 |
| | Flow Rate^ | 1475 | 1630 | 3810 | 5805 | 1945 | 3790 | 6005 | 1970 |
| | V/C | 0.63 | 0.69 | 0.83 | 0.82 | 0.99 | 0.82 | 0.85 | 0.84 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE B.2b Chemawa Road IAMP Traffic Analysis

**2031 Recommended Alternative: Phases 1 - 3: Chemawa/Lockhaven Limited Widening & Parclo B Ramp**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

APPENDIX K

# Environmental Issues of Preferred Alternative

# Chemawa Road IAMP: Environmental Issues of the Recommended Alternative

PREPARED FOR: Terry Cole
Project Management Team

PREPARED BY: Larry Weymouth

DATE: October 10, 2010

The recommended alternative has very few environmental and permitting implications. Most of the roadway improvements of the recommended alternative are to existing streets through already developed urban areas. The alignments of new roadways do not appear to cross any critical habitat, wetlands, or 303(d) streams identified in the SKATS 2031 RTSP Update (see attached drawings). There are no records of special status fish, wildlife, or plant species reported by Oregon Natural Heritage Information Center (ORNHIC) to occur within the study area, and suitable habitat for listed species was not observed (Parametrix, OTIA III *Baseline Environmental Report* #18, 2004). A review of ORNHIC data showed no documented populations of state or federally listed rare plant species within two miles of bridge 07855E. None of the streams in the study area are listed in StreamNet. Also, none of the streams in the study area are listed as Essential Salmon Habitat by the Oregon Department of State Lands.

However, wetlands and hydric soils are known to exist in the vicinity of the alignments, which would require a field investigation at potential sites prior to final design and permitting. Some of the proposed new roadways are outside of the Urban Growth Boundary of Salem and Keizer and would cross into EFU-zoned land in Marion County. Permitting of these sections of new roadway outside of the cities' UGBs will require a Statewide Planning Goal 3 Agricultural Lands Exception to the Comprehensive Plan of Marion County, which must meet the tests listed in OAR 660-004-0020. Further, OAR 660-012-0070 outlines the applicable criteria for granting exceptions for transportation improvements on rural lands, and the Marion County Rural Zone Code MCC 17.136.050 (J)(4) for conditional transportation uses in an EFU zone.

The following sections of new roadway (as depicted in the 10% Design Package drawings) cross EFU-zoned land and will require a Goal exception and Conditional Use permit from Marion County:

- Extension of 35th Avenue (from approximately Station 31 to Station 43, shown on Sheets 11 & 12 of 12)
- East Tepper Drive (from approximately Station 14 to Station 23, shown on Sheet 6 of 12)

Other sections of new roadway in largely undeveloped rural areas east of I-5 cross either land zoned Public Services (PS) or Public and Private Educational Services (PE) by the City

of Salem. Transportation facilities are an allowed use in these zones. Salem's Chemawa Quadrant Northeast Overlay Zone (Chapter 136.090) has some provisions regarding setbacks; this zone would not affect roadway improvements.

The City of Keizer has been investigating the expansion of the Urban Growth Boundary, and this IAMP considered the traffic implications of a hypothetical UGB expansion scenario (see Section 4.3.2). Appendix C of this IAMP includes more detailed information about this alternative land use investigation. If the UGB were to be extended by Keizer into the area crossed by the 35th Avenue extension, or by Salem into the area crossed by the Tepper Road extension, a Goal exception would not be required. Regardless, the recommended alternative of this IAMP is based on the adopted UGB and not on speculation about future UGB expansions.

Additional information on the natural and built environment is in the Chemawa IAMP Task 6 Technical Memorandum for the, Environmental Reconnaissance (Pennington et al, CH2M HILL, May 15, 2008).

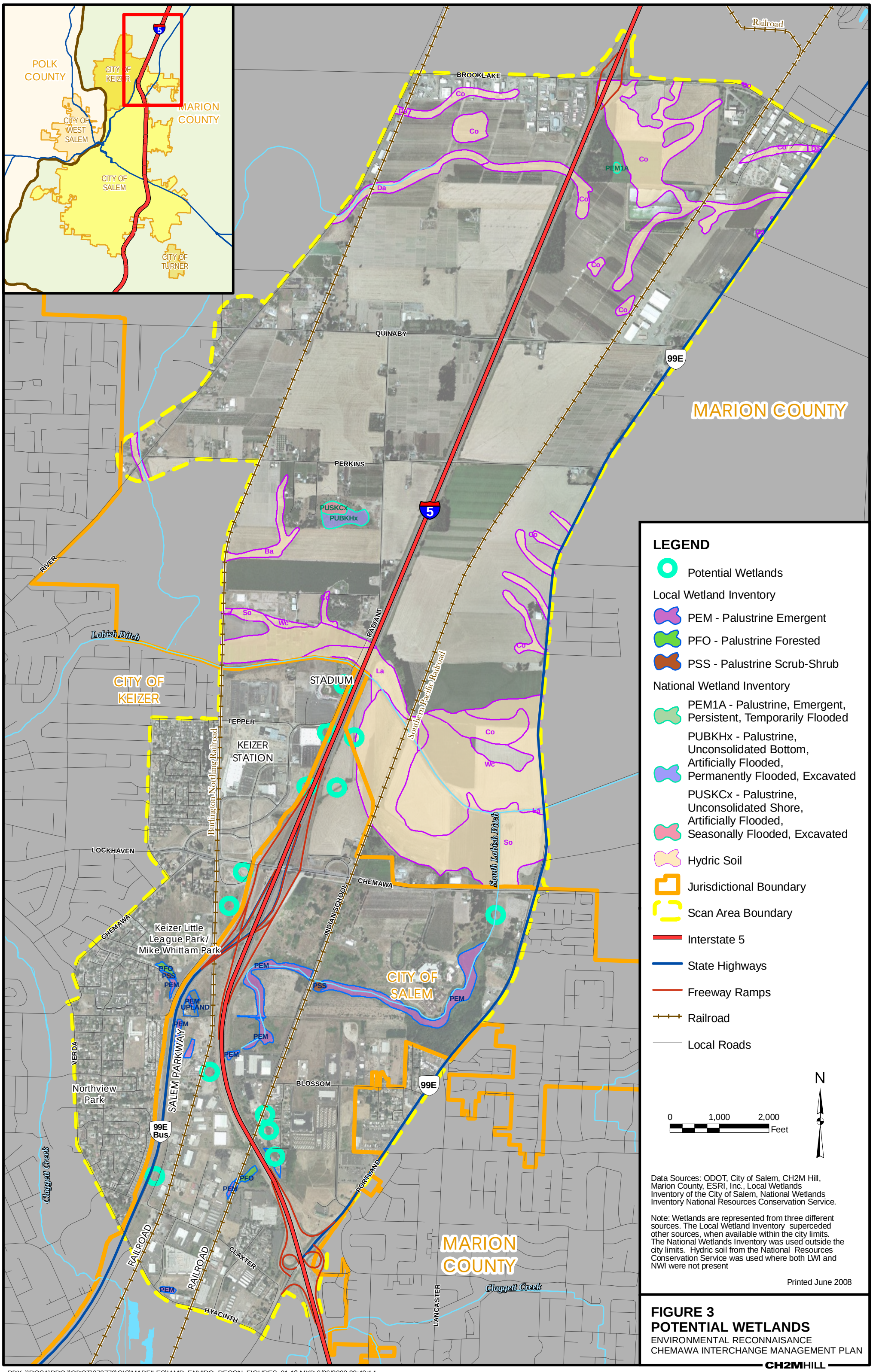


**FIGURE 3**
**POTENTIAL WETLANDS**
ENVIRONMENTAL RECONNAISANCE
CHEMAWA INTERCHANGE MANAGEMENT PLAN

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PDX \\ROSA\PROJ\ODOT\370776\GIS\MAPFILES\IAMP_ENVIRO_RECON_FIGURES_01-16.MXD 6/26/2008 09:49:14

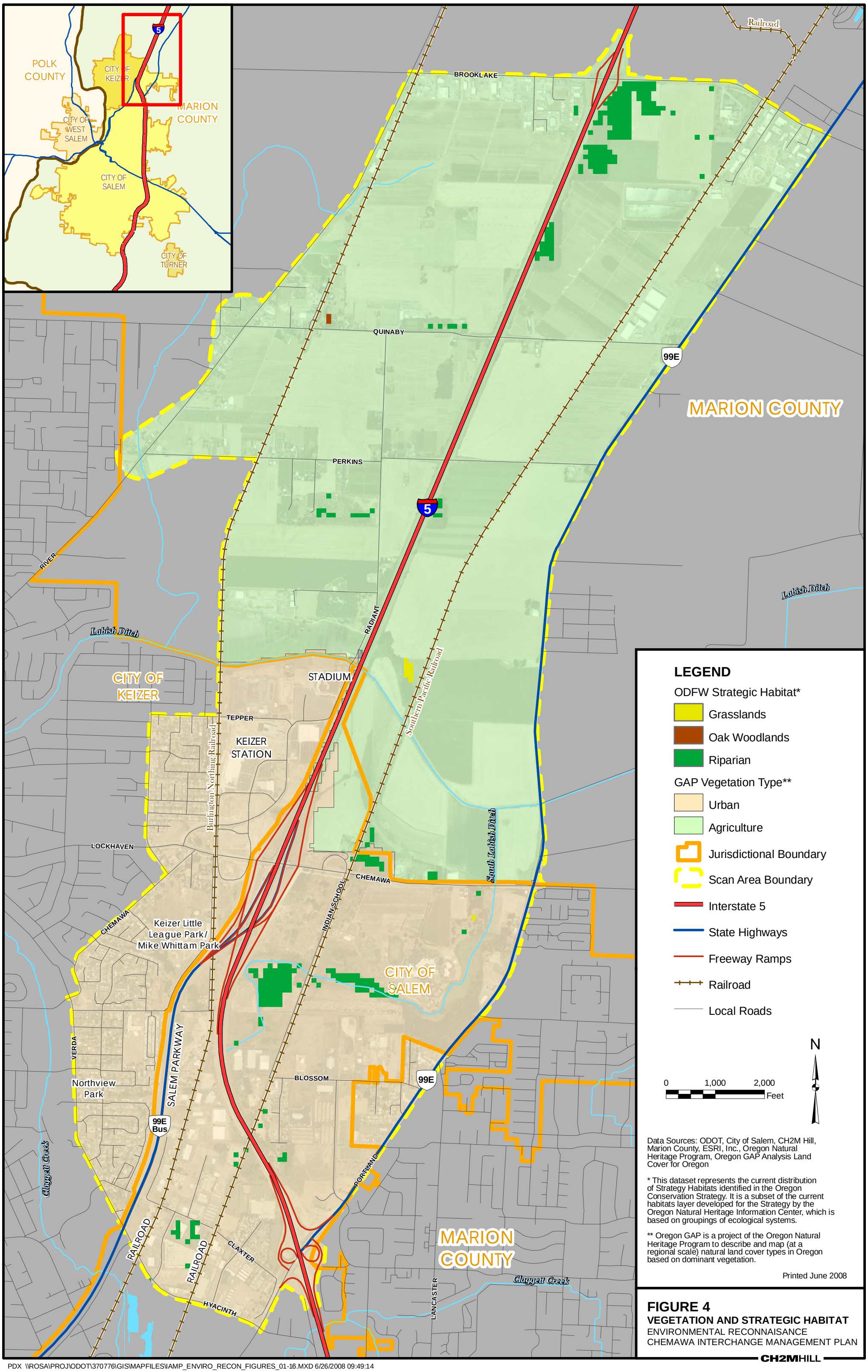


**FIGURE 4**
**VEGETATION AND STRATEGIC HABITAT**
ENVIRONMENTAL RECONNAISANCE
CHEMAWA INTERCHANGE MANAGEMENT PLAN

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APPENDIX L

# Design Exceptions

# OREGON DEPARTMENT OF TRANSPORTATION
## DESIGN EXCEPTION REQUEST

| For Roadway Section Office use only | |
|---|---|
| **Control No:** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Section Name:** | Chemawa Interchange | | | | | **Route No.:** | I-5 |
| **Highway Name:** | Pacific Highway | | | | | **Highway No.:** | 1 |
| **County Name:** | Marion | **Region:** | 2 | **Key No.:** | | **EA No.:** | |

**PROJECT DATA**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Functional Classification:** | | 11 - Urban Principal Arterial - Interstate | | | | | |
| **Current ADT (Year):** | | 80,000 (2008) | | | **Design ADT (Year):** | 112,050 (2031) | |
| **% Trucks:** | 7.8% | **Freight Route:** | ☒ Yes ☐ No | | | | |
| **Posted Speed:** | 60 | **Design Speed:** | 70 | | **Bid Date:** | January 1, 2020 | |
| **Funding:** | | Undetermined | | | | | |
| **Current Estimate:** | | $134,000,000 | | **Additional Cost to Meet Standard:** | | | |
| **Cost over $5 M :**<br>**Cost over $1 M :** | **Yes** ☒<br>**Yes** ☐ | **Design Standard** | **3R** ☐<br>**4R** ☒ | **SIP Category:** | **(1-5)**<br>3 | **Top 10% SPIS Site:** | **Yes** ☐<br>**No** ☒ |
| **NHS:**<br>**Non NHS:** | ☒<br>☐ | **Federal Highway Approval Required:** | | | **Yes** ☒ **No** ☐ | | |

| **Design Exceptions** | | |
|---|---|---|
| ☐ Design Speed | ☐ Pavement Cross Slope | ☐ Design Life and V/C Ratio |
| ☐ Lane Width | ☐ Superelevation | ☐ Bike Lane/Multi-Use Path Width |
| ☐ Shoulder Width/Shy Distance | ☐ Clear Zone | ☐ Sidewalk Width |
| ☐ Bridge Width | ☐ Structural Capacity | ☐ Median Width |
| ☐ Horizontal Alignment | ☐ ADA Standards | ☐ Parking Width |
| ☐ Vertical Alignment | ☐ Spiral Length | ☐ Diagonal Parking |
| ☐ Grade | ☐ Superelevation Runoff | ☐ Bridge Rail |
| ☐ Stopping Sight Distance | ☐ Pavement Design Life | ☒ Vertical Clearance |
| ☒ Interchange Spacing | | ☐ (Other) |

**Description of Exception:**
The Oregon Highway Plan (OHP) calls for the crossroads of urban interchanges to be 3 miles apart. The existing distance between Chemawa Road and Portland Road is 1.56 mile. This project does not change that distance.

The OHP calls for ends of ramp tapers to be 1 mile apart in urban areas. The tapers between Chemawa Road and Portland Road are 0.65 mile apart. The project would constuct auxilliary lanes, so these substandard distances would not be on the I-5 mainline.

The OHP calls for the crossroads of rural interchanges to be 6 miles apart. The existing distance between Chemawa Road and Brooklake Road is 3.25 miles. This project does not change that distance.

The OHP calls for ends of ramp tapers to be 2 miles apart in rural areas. The tapers between Chemawa Road and Brooklake Road are currently 2.16 miles apart, which meets the standard. The project would constuct auxilliary lanes, which removes the merge points for Salem Parkway and Chemawa Road from the I-5 mainline, but the auxilliary lane will merge 0.63 mile north of the existing Chemawa on-ramp merge, which reduces the ramp spacing to Brooklake Road to 1.53 mile.



Form Updated: 21FEB2008

The OHP calls for the nearest full-movement intersection to be 1,320' from the closest interchange ramp intersection. The Chemawa Road intersection with Ulali Drive/Stadium Drive is only 790' from the southbound I-5 ramps. This intersection allows right in, right out, and left in. The configuration of this intersection is the result of negotiations between ODOT, the City of Keizer and the developer of Keizer Station. In a Fully Developed Urban area, right in/right out intersections are allowed at 750' from the ramp intersection. In discussing the Chemawa Road at-grade railroad crossing, the Interchange Area Management Plan suggests that eliminating the left turns into Ulali and Stadium may be needed to secure approval for a widened crossing. This would eliminate the need for a design exception at this point.

The minimum clearance standard over I-5 is 17'4". The clearance for southbound I-5 under the Chemawa Road structure is 16'8".

**Description of Project** (From Prospectus):
This interchange serves as the primary freeway access point for the City of Keizer. Connections to and from the north are also provided for the Salem Parkway at this location. Salem Parkway is a primary freeway connection for the City of Salem.
Projected future growth in the Keizer and Salem areas will cause the I-5 Chemawa Road Interchange to experience operational problems due to a lack of capacity. The recent development of the Keizer Station commercial area has included significant improvements to the interchange, but 2031 projections indicate that additional capacity will be needed.
This project could be constructed in phases with the first phase being the widening of the Chemawa Road/Lockhaven Drive corridor from OR 99E westerly to Verda Lane. The second phase would be the construction of auxilliary lanes on I-5, an additional I-5 overcrossing and the construction of East Tepper Drive. East Tepper Drive would provide an interchange bypass by connecting to Chemawa Road and 35th Avenue. The auxilliary lanes would improve the ramp spacing for the Chemawa, Salem Parkway, and Portland Road ramps. The third phase would be the construction of a parclo B loop ramp to serve the northbound to westbound movement.

**Location of Design Feature:**
The first issue of this design exception is the interchange spacing. The Chemawa Interchange is the middle of three relatively closely spaced interchanges. The interchange to the south is Portland Road and the interchange to the north is Brooklake Road (Brooks Interchange). Measuring from crossroad to crossroad, the Portland Road and Brooklake Road Interchanges are only 4.81 miles apart.

The second element of the exception is the Ulali/Stadium intersection which is located approximately 800' west of the Chemawa Interchange.

The last element of the exception is the Chemawa overcrossing structure.

**Crash History & Potential: (Specifically as it applies to requested exception)**
There are no SPIS sites within the area of these improvements. None of the segments had a crash rate higher than the statewide average.

For 2002-2006, there were 144 crashes in the section that includes both the Chemawa Road and the Portland Road Interchanges. The most prevelent were rear-end crashes (63). Most of the rest were side-swipe (32), fixed object (23) and turning (19). The crash rate was 0.42 per million vehicle miles traveled compared to a statewide average of 0.55 per million vehicle miles traveled.

The Ulali/Stadium intersection was recently constructed and did not have a five-year history in 2008.

The Chemawa overcrossing was not struck by a high load in the study period.

**Reasons For Not Attaining Standard: (Such As Cost/ Benefit, Crash History, Environmental, Etc.)**

This project does not move the Chemawa Interchange, so the spacing deficiencies with Portland Road and Brooklake Road are an existing condition. Moving the Chemawa Interchange is not an option, since it is already too close to the next interchange in both directions.

Even eliminating the Chemawa Interchange would not allow the Portland Road to Brooklake Road spacing meet the guidelines. Eliminating the Chemawa Interchange would still leave the half interchange for Salem Parkway that would violate the spacing standards. In any case, eliminating the Chemawa Interchange is not an option, since it is the primary access to I-5 for the City of Keizer.

If the westbound left turn onto Ulali Drive were eliminated in the future, there would be no need for a design exception for that intersection. Therefore, the design exception request is for the interim time.

The Chemawa overcrossing structure is only 8" below the vertical clearance standard. It is a weathering steel girder bridge that could be raised by raising the ground level bearing pads. If it were raised, a design exception would not be needed. This project would require that this bridge be widened. It could also be raised at that time. An easy route around this restriction exists with the southbound off- and on-ramps.

**Effect on Other Standards:**
As stated, the interchange spacing deficiencies also apply to the adjacent interchanges, Portland Road and Brooklake Road.

The intersection spacing deficiency does not effect any other intersection.

The vertical clearance deficiency does not effect any other structure.

**Compatibility with Adjacent Sections:**
These exceptions have no effect on adjacent sections.

**Probable Time before Reconstruction of Section:**
The construction for this project is unknown, likely more than ten years out, maybe as long as twenty. So, the next phase of reconstruction after that is many years into the future.

**Mitigation For Exception Included In Design:**
While the location of the interchanges cannot be modified to increase the spacing, the addition of the auxilliary lanes will improve the interaction of the Chemawa Road, Salem Parkway and Portland Road ramps which are closely spaced.

The spacing standards for the Chemawa to Brooks Interchanges is based on this area being rural. There is a real possibility that much of this area may be brought into the Keizer Urban Growth Boundary in the future. If this area were converted to urban, the existing spacing would meet the standards.

The elimination of the westbound left turn at Ulali Drive would mitigate that element of this design exception. The project does include the relocation of the Indian School Road/Chemawa Road intersection east of the interchange to a location that does meet the spacing standard. Without that element of the project, a design exception would have been required for that intersection.

There is no mitigation built into this project for the vertical clearance restriction, but there is an easy drive-around available and as stated above, the Chemawa structure could be raised at the same time that it is widened in the future.

**Supporting Documentation (Include the appropriate Plan Section, Cross Section, Alignments Sheets & Plan Details):** See attached plan sheet.

## Signatures

**Prepared By:** _____ **Date:** _____

# OREGON DEPARTMENT OF TRANSPORTATION
## DESIGN EXCEPTION REQUEST

(Engineer of Record)

| | | | | | |
|---|---|---|---|---|---|
| **Print Name:** | | **Phone:** | | | |
| **Company Name:** | | | | | |
| **Company Address:** | | | | | |
| **City:** | | **ST:** | | **Zip:** | |

**Concurred By:** _____ **Date:** _____

(ODOT Program Manager: Area Manager, District Manager, BDU, Private Public Partnerships, Local Government)

(Print Name)

**Concurred By:** _____ **Date:** _____

(ODOT Region Tech Center Manager or Region Roadway Manager)

(Print Name)

**Approved By:** _____ **Date:** _____

(State Roadway Engineer)

(Print Name)

**PREPARED BY:**

**ENGINEER OF RECORD PROFESSIONAL ENGINEER STAMP**

**APPROVED BY:**

**STATE ROADWAY ENGINEER PROFESSIONAL ENGINEER STAMP**



Form Updated: 21FEB2008

APPENDIX M

# Interchange Modification Request

CHEMAWA INTERCHANGE AREA MANAGEMENT PLAN

# FHWA Interchange Modification Request

## Interstate 5 (Pacific Highway) @ Chemawa Road
## Marion County

## Oregon Department of Transportation

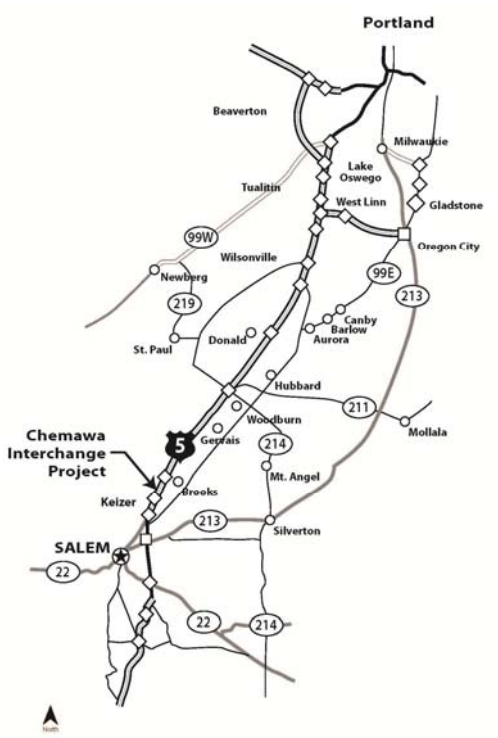
October 2010

## Background

The existing interchange is a standard diamond interchange with an embedded directional half interchange for Salem Parkway at the junction of I-5 (milepost MP 260.22) and Chemawa Road. The Chemawa Interchange connects Pacific Highway (I-5) with crossroads, Lockhaven Drive to the west and Chemawa Road to the east. The Salem Parkway also connects to I-5 within the Chemawa Interchange.

This request is to modify this interchange to a partial cloverleaf-B (northbound loop ramp beyond the overcrossing structure of I-5) with the embedded directional interchange for Salem Parkway. As part of the project, the Chemawa Road overcrossing of I-5 would be widened. In addition, an overcrossing of I-5 for East Tepper Drive would also be provided a short distance north of the Chemawa structure. The project will not increase or reduce the number of access points, but will spread these points out by constructing auxiliary lanes and lengthening some of the ramps.

*Chemawa Interchange Vicinity*




The Chemawa Interchange was added to I-5 in the 1970s. When the freeway was first constructed 20 years earlier, it included a Chemawa Road overcrossing but no connecting interchange ramps.

The interchange was modified in the 1980s when the Salem Parkway was constructed. The southbound off-ramp to Chemawa Road is a standard diamond configuration. The southbound off-ramp to Salem Parkway exits just south of the Chemawa Road overcrossing with the southbound on-ramp from Chemawa Road passing over the Salem Parkway ramp and entering I-5 south of this point. In the northbound direction, the off-ramp from I-5 merges with the northbound off-ramp from Salem Parkway before intersecting with Chemawa Road. The northbound on-ramp from Salem Parkway merges into I-5 just north of the Chemawa Road overcrossing and just south of the merge by the northbound Chemawa Road on-ramp.

The northeastern portion of Salem and all of Keizer have experienced very significant growth over the last couple of decades, putting much heavier pressure on this interchange. The population of Keizer is now 35,000, compared to 20,000 when it was incorporated in 1982.

One of the most significant and recent developments has been the 225-acre Keizer Station commercial development. The first facility in this complex to open was Keizer Stadium, home of the Salem-Keizer Volcanoes minor league baseball team, in 1997. The first retail store opened in 2005, with new openings ongoing since then, with others to come in the next few years.

As part of the Keizer Station development, Chemawa Road, Lockhaven Drive, and the I-5 interchange have undergone major revisions. Chemawa Road west of the interchange has been expanded to five lanes with a new signalized intersection west of the railroad crossing. This new intersection includes access to the north into Keizer Station. Additionally, a grade-separated access to Keizer Station has been constructed under Chemawa Road just west of the southbound ramp terminal intersections. Both I-5 off-ramps have been expanded to three lanes at the intersection with Chemawa Road.

The majority of the Keizer Station development is in the NW quadrant of the interchange. Two smaller, future elements of this development are in the SW quadrant.

Most of the property in the NE quadrant is zoned Exclusive Farm Use (EFU); however, there are 55 acres that have been annexed by public vote into the City of Salem. While this property is currently designated commercial, industrial and developing residential (City of Salem Comprehensive Plan), the owner of this property has expressed an interest in developing this property commercially, but that action cannot occur until at least 5 years following the positive annexation vote (not before 2012). The EFU property to the north and east of this annexed property is in Marion County and is also largely in floodplain.

The Federal Bureau of Indian Affairs owns 171 acres in the SE quadrant of the interchange. Part of this property is home to the Chemawa Indian School, and much of the land closest to the interchange is still available for developing future educational facilities.

The City of Keizer is currently updating its Comprehensive Plan, and expansion of the urban growth boundary near I-5 is a future possibility. The current transportation infrastructure is not sufficient to support the area's planned and approved development in a way that meets adopted state and local mobility standards. State access safety spacing standards are also not met by the current roadway design. Thus, because of the anticipated development in the interchange vicinity and lack of adequate transportation facilities based on current adopted access and mobility standards, there is a need to identify and implement policy and code measures. Such measures will help manage land uses and transportation facilities in the interchange area, and support planning for future transportation improvements to maintain mobility and ensure safe and efficient regional and local travel.

Through an extensive public involvement process, fifteen alternatives were originally developed and evaluated. Several of these alternatives involved improvements at other nearby locations to alleviate the anticipated operational problems at Chemawa Interchange. Those alternatives at other locations did not resolve the issues at Chemawa Interchange. The selected, phased alternative is a combination of three of the original alternatives. The first phase is to widen the Chemawa/Lockhaven corridor from OR 99E on the east to Verda Lane on the west. Phase 2 is to construct auxiliary lanes on I-5, lengthen the Chemawa ramps, construct the East Tepper Drive overcrossing, construct East Tepper Drive, realign 35th Avenue and realign Indian School Road. Phase 3 is to construct a parclo B loop ramp to serve the northbound to westbound turning movements at the interchange.

These project elements are shown in Figure 1.

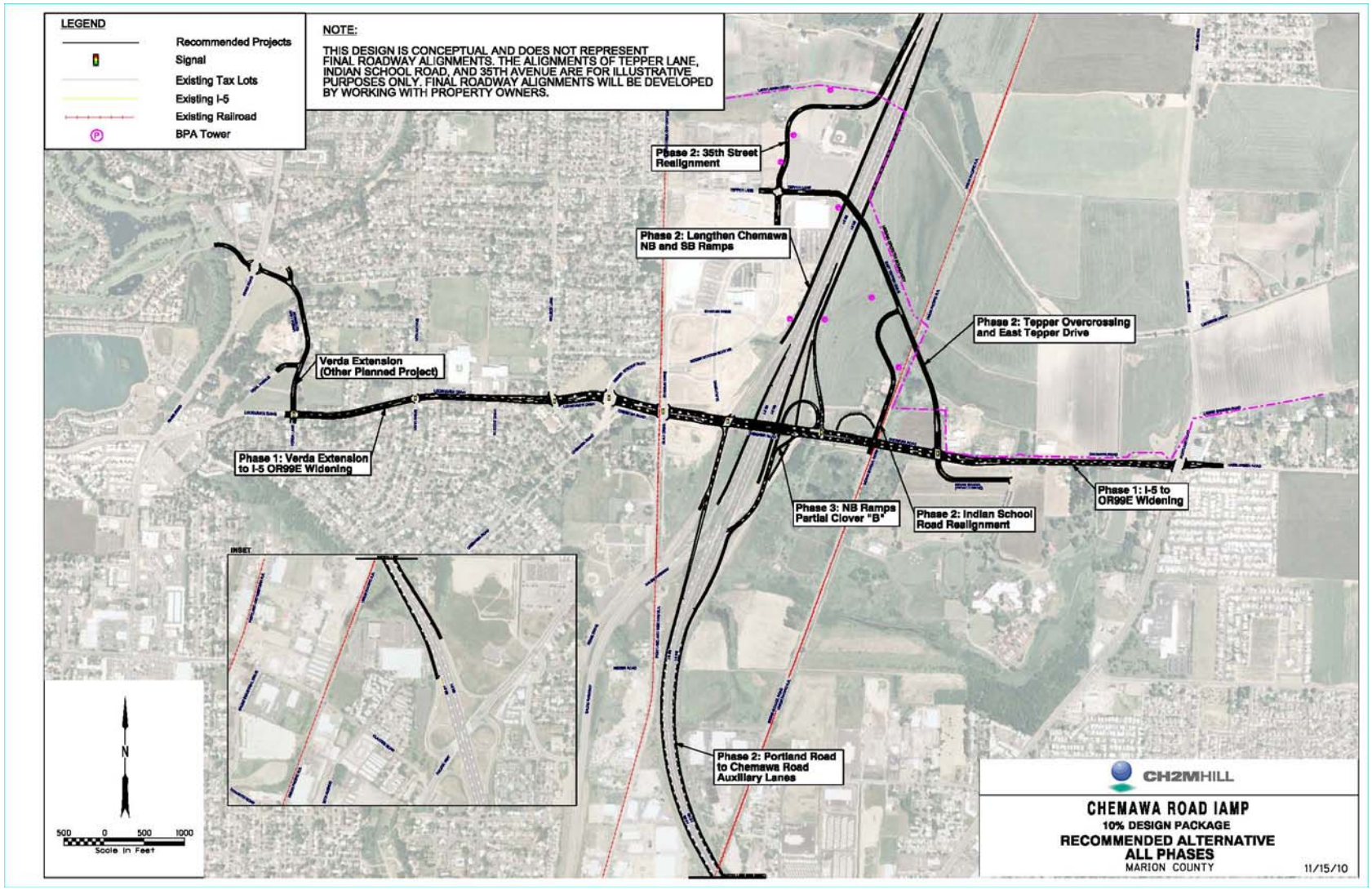



Figure 1

The purpose of this document is to request the Federal Highway Administration (FHWA) to approve the proposed modifications to the interchange. This document addresses the eight criteria contained in the 1998 Federal Interchange Policy, 23 USC 315; 49 CFR 1.48. Under this policy, revised access is considered to be a change in the interchange configuration; in this case the parclo B loop ramp to improve traffic flow. The widening of the Chemawa/Lockhaven corridor, construction of auxiliary lanes on I-5, and the construction of the East Tepper Drive overcrossing all improve interchange operation and will also be discussed.

In summary, the following discussion demonstrates that the requirements of the eight criteria are met by the project.

## Criterion 1

***The existing interchange and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands, while at the same time providing the access intended by the proposal.***

The proposed project would modify the existing interchange as part of a comprehensive solution of interchange and local system improvements to meet design-year traffic requirements. The proposed project would improve the traffic flow and safety conditions of the existing I-5/Chemawa interchange.

This comprehensive solution is needed because:

- Future 2031 "Base Case" capacities of intersections along the Chemawa/Lockhaven corridor, for the most part, do not meet OHP mobility standards. See Table 1.
- 60% of the freeway segments in the Chemawa-Portland Road area do not meet OHP mobility standards for the future 2031 "Base Case" analysis. See Table 2.

TABLE 1
Chemawa IAMP Traffic Analysis Results: Intersections

| ID | Intersection | Control Type (Existing/ Future) | Jurisdiction | Existing Conditions (2008) | | | | | Future Baseline (2031) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | | Mobility Standard | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | |
| 1 | Lockhaven Drive at River Road | Signal | City of Keizer | 0.87 (6) | 77.3 | E | 0.99 | | 0.87 | 155.4 | F | 1.31 | |
| 2 | Lockhaven Drive at Trail Avenue | TWSC | City of Keizer | 0.87 | 68.7 | F (SB) | 0.47 | LOS E | 0.87 | 645.7 | F (SB) | 0.72 | 2.15 |
| 3 | Lockhaven Drive at 14th Avenue-Kafir Dr. | Signal | City of Keizer | 0.87 | 32.9 | C | 0.94 | | 0.87 | 139.0 | F | 1.32 | |
| 4 | Lockhaven Drive at McLeod Lane | Signal | City of Keizer | 0.87 | 12.4 | B | 0.63 | | 087 | 25.3 | C | 0.86 | |
| 5 | Lockhaven Dr. at Chemawa Rd.-Keizer Station | Signal | City of Keizer | 0.87 | 26.7 | C | 0.62 | | 0.87 | 42.5 | D | 0.97 | |
| 6 | Chemawa Road at Stadium Drive-Ulali Drive | Signal | ODOT | 0.90 | 12.7 | B | 0.62 | | 0.90 | 85.7 | F | 1.19 | |
| 7 | Chemawa Road at Southbound I-5 ramp | Signal | ODOT | 0.80 | 12.4 | B | 0.75 | | 0.80 | 52.2 | D | 1.13 | |

TABLE 1
Chemawa IAMP Traffic Analysis Results: Intersections

| ID | Intersection | Control Type (Existing/ Future) | Jurisdiction | Existing Conditions (2008) | | | | | | Future Baseline (2031) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | |
| 8 | Chemawa Road at Northbound I-5 ramp | Signal | ODOT | 0.80 | | 46.2 | D | 0.88 | | 0.80 | | 103.8 | F | 1.16 | |
| 9 | Chemawa Road at Indian School Road | TWSC | ODOT | 0.90 [2] | 0.90 [3] | 14.0 | B | 0.34 | 0.18 | 0.90 [2] | 0.90 [3] | 26.9 | D | 0.42 | 0.60 |
| 10 | Chemawa Road at OR 99E | Signal | ODOT | 0.80 | | 52.7 | D | 0.83 | | 0.80 | | 65.9 | E | 1.05 | |
| 11 | Hazelgreen Road at Cordon Road | AWSC/Signal | Marion County | LOS E | 0.85 | 45.5 | E | 1.03 | | LOS E | 0.85 | 9.3 | A | 0.66 | |
| 12 | Cordon Road at Kale Street | TWSC | Marion County | LOS D | 0.90 | 12.6 | B | 0.22 | 0.18 | LOS D | 0.90 | 23.5 | C | 0.42 | 0.44 |
| 13 | OR 99E at Kale Street | Signal | ODOT | 0.80 | | 11.7 | B | 0.50 | | 0.80 | | 31.0 | C | 0.98 | |
| 14 | OR 99E at Lancaster Drive | TWSC | ODOT | 0.80 [2] | 0.90 [3] | 143.8 | F (WB) | 0.55 | 2.66 | 0.80 | 0.90 | 1000.0 | F (WB) | 1.88 | 1.86 |
| 15 | OR 99E at Blossom Drive | TWSC | ODOT | 0.80 [2] | 0.90 [3] | 24.4 | C | 0.23 | 0.45 | 0.80 | 0.90 | 1000.0 | F (EB) | 0.39 | 4.13 |
| 16 | Chemawa Road at Verda Lane | AWSC | City of Keizer | LOS E | | 92.2 | F | 1.22 | | LOS E | | 330.6 | F | 1.89 | |
| 17 | OR 99E | Signal | ODOT | 0.85 | | 67.0 | E | 0.97 | | 0.85 | | 174.3 | F | 1.46 | |

TABLE 1
Chemawa IAMP Traffic Analysis Results: Intersections

| ID | Intersection | Control Type (Existing/ Future) | Jurisdiction | Existing Conditions (2008) | | | | | | Future Baseline (2031) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | | Mobility Standard | | Average Vehicle Delay (sec) | Level-of-Service [1, 4] | V/C Ratio | |
| | Business at Verda Lane-Hyacinth St. | | | | | | | | | | | | | | |
| 18 | OR 99E at Hyacinth Street | Signal | ODOT | 0.80 | | 108.8 | F | 1.06 | | 0.80 | | 135.8 | F | 1.29 | |
| 19 | OR 99E at Astoria Street-Ward Street | Signal | ODOT | 0.80 | | 38.3 | D | 0.66 | | 0.80 | | 55.5 | D | 1.03 | |
| 20 | Brooklake Road at OR 99E | Signal | ODOT | 0.70 | | 65.4 | E | 0.85 | | 0.70 | | 199.3 | F | 1.46 | |
| 21 | Brooklake Road at I-5 NB Ramps | TWSC | ODOT | 0.75 [2] | 0.70 [3] | 1000.0 | F (NB) | 0.33 | 3.19 | 0.75 [2] | 0.70 [3] | 1000.0 | F (NB) | 0.79 | 5.00 |
| 22 | Brooklake Road at I-5 SB Ramps | TWSC | ODOT | 0.75 [2] | 0.70 [3] | 1000.0 | F (SB) | 0.70 | 4.38 | 0.75 [2] | 0.70 [3] | 1000.0 | F (SB) | 0.83 | 5.00 |
| 23 | Brooklake Road at River Road | AWSC/Signal | Marion County | LOS E | 0.85 [3] | 29.3 | D | 0.90 | | LOS E | 0.85 | 33.1 | C | 0.56 | |
| 24 | Perkins Road at 35th Avenue NE | TWSC | Marion County | LOS E | 0.90 | 10.4 | B | 0.11 | 0.03 | LOS E | 0.90 | 38.7 | E | 0.19 | 0.70 |

**NOTES:**
[1] LOS = Level of Service. Gray highlighting indicates intersection does not meet mobility standards.
[2] Indicates OHP Mobility Standard V/C ratio for uncontrolled roadway approach
[3] Indicates OHP Mobility Standard V/C ratio for stop controlled roadway approach

TABLE 1
Chemawa IAMP Traffic Analysis Results: Intersections

| | | | | Existing Conditions (2008) | | | | Future Baseline (2031) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID** | **Intersection** | **Control Type (Existing/ Future)** | **Jurisdiction** | **Mobility Standard** | **Average Vehicle Delay (sec)** | **Level-of-Service [1, 4]** | **V/C Ratio** | **Mobility Standard** | **Average Vehicle Delay (sec)** | **Level-of-Service [1, 4]** | **V/C Ratio** |

[4] Failing movement is shown in parentheses for TWSC intersections
Signal = Signalized Intersection
AWSC = All-Way Stop controlled
TWSC = Two-Way Stop controlled

TABLE 2
Chemawa IAMP Traffic Analysis Results: Freeways

| ID # | Location | Segment Type | Facility * | Existing Conditions (2008) | | Future Baseline (2031) | |
|---|---|---|---|---|---|---|---|
| | | | | Mobility Standard | V/C Ratio | Mobility Standard | V/C Ratio |
| N1 | NB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.59 | 0.80 | 0.80 |
| N2 | NB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.20 | 0.80 | 0.40 |
| | | | Mainline | 0.80 | 0.53 | 0.80 | 0.68 |
| N3 | NB I-5 Mainline South of On-Ramp from OR 99E Business | Basic | Mainline | 0.80 | 0.54 | 0.80 | 0.70 |
| N4 | NB On-Ramp from OR 99E Business/Salem Parkway | Merge | Ramp | 0.80 | 0.60 | 0.80 | 0.84 |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.84 |
| N5 | NB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.83 |
| N6 | NB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.61 | 0.80 | 0.79 |
| | | | Mainline | 0.80 | 0.64 | 0.80 | 0.85 |
| N7 | NB I-5 Mainline North of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.64 | 0.80 | 0.84 |
| S1 | SB I-5 Mainline North of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.72 | 0.80 | 0.99 |
| S2 | SB Off-Ramp to Chemawa Road | Diverge | Ramp | 0.80 | 0.30 | 0.80 | 0.33 |
| | | | Mainline | 0.80 | 0.63 | 0.80 | 0.89 |
| S3 | SB I-5 Mainline South of Off-Ramp to Chemawa Road | Basic | Mainline | 0.80 | 0.63 | 0.80 | 0.89 |
| S4 | SB Off-Ramp to OR 99E Business | Diverge | Ramp | 0.80 | 0.54 | 0.80 | 0.77 |
| | | | Mainline | 0.80 | 0.47 | 0.80 | 0.66 |
| S5 | SB I-5 Mainline South of Off-Ramp to OR 99E Business | Basic | Mainline | 0.80 | 0.48 | 0.80 | 0.68 |
| S6 | SB On-Ramp from Chemawa Road | Merge | Ramp | 0.80 | 0.65 | 0.80 | 0.96 |
| | | | Mainline | 0.80 | 0.61 | 0.80 | 0.89 |
| S7 | SB I-5 Mainline South of On-Ramp from Chemawa Road | Basic | Mainline | 0.80 | 0.60 | 0.80 | 0.88 |

**NOTES:**
Gray highlighting indicates spacing does not meet standards.
* Mainline and Ramp v/c ratios reported at merge and diverge segments per ODOT traffic analysis guidelines

Tables 1 and 2 present 2031 traffic volume to capacity ratios during weekday p.m. peak periods. The mobility standard for intersections as defined by OHP varies depending on the setting of the intersection. These are shown on Table 1. The ODOT *Highway Design Manual* sets a mobility standard of 0.80 for interstate ramps (Table 2).

The rational for selection of the recommended alternative is based on I-5 functioning as a fully access controlled, free flow facility and the Chemawa/Lockhaven corridor functioning

as a parkway and major arterial in an urban setting. Table 3 indicates the range of solutions that were considered. Common to all of these alternatives was the construction of auxiliary lanes on I-5 from the Chemawa Interchange to the Portland Road Interchange and the lengthening of the Chemawa Interchange ramps to and from the north.

TABLE 3
Solutions Considered

| Concept | Advantages/Disadvantages |
|---|---|
| **1. Chemawa/Lockhaven widening** – adds an additional lane in each direction from OR 99E to River Road. | Makes some improvement in corridor operations, but does not solve all of the congestion issues. |
| **2. Partial Cloverleaf A loop ramps** – provides loop ramps for the eastbound to northbound and westbound to southbound movements. | Eliminates the left turns from Chemawa within the interchange, but these are not the most congested movements. Mobility standards would still not be met. |
| **3. Partial Cloverleaf B loop ramp** – provides a loop ramp for the northbound to westbound movement. | Addresses the most congested movement within the interchange, but does not solve all of the congestion issues. |
| **4. Northbound to westbound flyover** – elevate the northbound to westbound portion of the northbound off-ramp to pass over Chemawa Road and merge into Chemawa Road west of the interchange. | Addresses the most congested movement within the interchange, but at a very high construction and property impact cost. |
| **5. Chemawa/Perkins split diamond** – provides ramps to and from the south at Chemawa Road and ramps to and from the north at Perkins Road. | Distributes part of the interchange traffic away from Chemawa Road, but these two roads are further apart than a normal split diamond, creating out of direction travel and the need for a connecting system of roads. |
| **6. Chemawa/Tepper split diamond** – provides ramps to and from the south at Chemawa Road and ramps to and from the north at Tepper Drive. | Distributes part of the interchange traffic away from Chemawa Road, but does not solve all of the congestion issues. |
| **7. Two roundabouts within Chemawa Interchange** – provides a roundabout at each of the two ramp terminal intersections. | Did not improve mobility projections and would limit the ability to widen Chemawa Road. |
| **8. Single roundabout for Chemawa Interchange** – provides a single large roundabout for all movements within Chemawa Interchange. | Did not resolve the mobility issues within Chemawa Interchange. |
| **9. Diamond interchange at Brooks Interchange** – provides an updated diamond interchange. | Provides needed improvements at Brooks, but did not draw traffic away from Chemawa Interchange. |
| **10.Partial Cloverleaf A ramp at Brooks Interchange** – provides a loop ramp for the northbound to westbound movement. | Provides a needed improvement at Brooks, but did not draw traffic away from Chemawa Interchange. |
| **11. Flyover at Brooks Interchange** – elevate the northbound to westbound portion of the northbound off-ramp to pass over Brooklake Road and merge into Brooklake Road west of the interchange. | Addresses the heavy northbound to westbound movement, but is costly, has significant right of way impacts and operational problems. Did not draw traffic away from the Chemawa Interchange. |
| **12. Single Point Urban Interchange (SPUI) at Brooks Interchange** – provides a new SPUI. | Provides needed improvements at Brooks, but did not draw traffic away from Chemawa Interchange. |
| **13. Diamond interchange at Quinaby Road** – | This new interchange outside of the urban growth |

TABLE 3
Solutions Considered

| Concept | Advantages/Disadvantages |
|---|---|
| provides a new interchange. | boundary did not resolve the mobility issues within Chemawa Interchange. |
| **14. Improve the Hyacinth/Verda corridor** – provides additional lanes and grade separations at Salem Parkway, Union Pacific Railroad and Portland & Western Railroad. | Provides improvements to this corridor and draws some traffic from the south, but did not draw traffic away from Chemawa Interchange. |
| **15. Extend Keizer Road** – provides an overcrossing of Salem Parkway and I-5 with a connection to Indian School Road. | Adds additional traffic in a residential neighborhood and did not resolve the mobility issues within Chemawa Interchange. |

After evaluating these alternatives against a long list of mobility, safety, economic development, livability, environmental and cost factors, a combination of three of these alternatives emerged as the best solution to the projected future capacity and operational deficiencies of the Chemawa Interchange. Widening the Chemawa/Lockhaven corridor (#1) added significant capacity, but the intersections still fell short of desired future operational standards. The Chemawa/Tepper split diamond (#6) evolved into retaining the existing Chemawa Interchange and constructing new half diamond interchange at Tepper with ramps only to and from the north. This alternative improved the operation of the Chemawa Interchange, but as with #1, the intersections were still overly congested. The Parclo B loop ramp (#3) would address the heavy northbound left turn, but did not resolve other operational issues. These alternatives lent themselves to being combined into a single alternative that provided the best, feasible future operation. It was determined that eliminating the proposed Tepper ramps did not significantly devalue the benefits of this alternative. Because of this and other reasons associated with a half interchange in this location that would be somewhat out of the norm, the Tepper half diamond became the Tepper overcrossing without any additional ramps.

Another level of evaluation using more detailed operational analysis was undertaken on a series of alternatives that were essentially phasing options for this one combined alternative. That evaluation resulted in the following phasing recommendations:

TABLE 4
Chemawa IAMP Phasing Recommendations

| | |
|---|---|
| Phase 1 | Widen Chemawa/Lockhaven corridor |
| Phase 2 | Construct I-5 auxiliary lanes<br>Lengthen Chemawa ramps to and from the north<br>Construct Tepper overcrossing<br>Construct East Tepper Drive to Chemawa Road<br>Realign Indian School Road<br>Realign 35th Avenue |
| Phase 3 | Construct Parclo B loop ramp |

## Criterion 2

***All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included for accommodating such facilities if a future need is identified.***

As discussed under Criterion 1, a wide range of alternatives were evaluated. These included crossroad widening, a variety of loop ramps, flyovers and split diamond configurations at Chemawa Interchange, improvements north of Chemawa Interchange at Quinaby Road and Brooklake Road (Brooks Interchange), and improvements south of Chemawa Interchange in the Hyacinth/Verda corridor and Keizer Road corridor. During alternatives development, the needs of trucks, buses, bicycles, and pedestrians were discussed and improvements are either part of the proposed project or not precluded by the project. The project is supportive of the Keizer Transit Center, planned for construction just west of the interchange along Chemawa Road. Specific details were considered as follows:

Ramp Metering – this solution does not fit the problem of congestion on the crossing facility being more pronounced than on the interstate facility and was deemed inappropriate during the refinement planning process.

Mass Transit and Freight Movement – the proposed solution will accommodate a better integration with mass transit through creation of design features built into the arterial design of the Chemawa/Lockhaven corridor. This corridor will be improved by relieving congestion at ramp terminal intersections and other intersections along this route.

Park and Ride – while there are no park and ride facilities included in the project, recommended improvements would be supportive of such facilities were they to be developed in the existing or undeveloped portions of Keizer Station, in the Volcanoes Stadium parking lot, in the undeveloped parcel in the northeast quadrant or even in the property owned by the federal government east of I-5.

Bike/Pedestrian – the East Tepper Drive extension would provide another east-west route that could be built in a more pedestrian and bicycle friendly manner than the current Chemawa Road through the interchange area. It would actually be a bypass around the interchange. There is a system of bike/ped separated facilities along Salem Parkway and in Keizer Station. This project is compatible with those systems.

Traffic Signal Interconnect – the analysis of the intersections along the corridor was based on optimum interface between traffic signals at these intersections.

## Criterion 3

***The proposed access point does not have a significant adverse impact on safety and operation of the interstate facility based on an analysis of current and future traffic. The operation analysis for existing conditions shall, particularly in urbanized areas, include an analysis of sections of interstate to and including at least the first adjacent or proposed interchange on either side. Crossroads and other roads and streets shall be included in the analysis to the extent necessary to assure their ability to collect and distribute traffic to and from the interchange with new or revised access points.***

The proposed interchange modification would improve safety and operation of the interstate facility and thus not have a significant adverse impact.

Currently, I-5 and the interchange area are not experiencing higher than average crash rates. With no future actions, increased congestion will no doubt cause this favorable safety picture to deteriorate.

Table 2 above outlines the projected operational problems related to the I-5 mainline. The construction of the auxiliary lanes and the lengthening of the Chemawa ramps to and from the north are specifically to address these issues.

The alternatives located north of and south of the Chemawa Interchange were an effort to spread the access trips across three interchanges. Modeling indicated that these remote solutions would not draw traffic away from the Chemawa Interchange.

The elements of the project are designed to provide more capacity through the interchange, eliminate the heaviest left turn within the interchange, and provide a bypass around the interchange. Another element not discussed in detail yet is relocating Indian School Road to eliminate the intersection on Chemawa Road that is close to the northbound ramp terminals. All of these elements working together will significantly improve the safety of the Chemawa Interchange.

The only potential design exceptions relate to interchange spacing between Brooks, Chemawa and Portland Road Interchanges, the westbound left turn into Ulali Drive that is closer than ¼ mile from the southbound ramp terminal and a very slight variance in the vertical clearance under the Chemawa structure. Except for the interchange spacing, all of these could be corrected by this project.

## Criterion 4

***The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" for special purpose access for transit vehicles, for***

***HOV's or into park and ride lots may be considered on a case-by-case basis. The proposed access will be designed to meet or exceed current standards for Federal-aid projects on the interstate system.***

The interchange modification connects public roads to the interstate and addresses all traffic movements with access management provisions. Such provisions manage risk of adverse impact to the function of the interchange during the design life of the improvements.

West of the interstate, the only direct access to Chemawa Road within the 1,320′ Oregon Highway Plan restriction is the Ulali/Stadium intersection. Right in, right out and left in movements are allowed. This arrangement was negotiated as part of the fairly recent Keizer Station development. If the left in movements were eliminated, this intersection would be compliant with OHP guidelines.

East of the interstate, the only access point within this zone is the intersection with Indian School Road. The project includes an element to realign this road to the proposed East Tepper Drive, thereby eliminating any access points within the 1,320′ zone.

As discussed above, there was a time when a half interchange at Tepper was under consideration. Since the ramps have been eliminated, this would just be an overcrossing. This would not produce the potential confusion that could be caused by a half interchange.

## Criterion 5

***The proposal considers and is consistent with local and regional land use and transportation system plans. Prior to final approval, all requests for new or revised access must be consistent with the metropolitan and/or statewide transportation plan, as appropriate, the applicable provisions of 23 CFR Part 450, and the transportation conformity requirements of 40 CFR Parts 51 and 93.***

The interchange modification and local system improvements are consistent with and included in the Keizer, Salem and Marion County Transportation System Plans and regional land use and transportation plans. Implemented separately or as a package, these project elements would improve safety and operational performance. For I-5, this project meets Oregon Highway Plan (OHP) and Highway Design Manual (HDM) standards through 2031 and accommodates growth assumptions in the current Comprehensive Plans for these three jurisdictions. For the Chemawa/Lockhaven intersections, sufficient capacity to meet the standards established in the OHP and HDM could not be provided and alternative mobility standards were established. For the four intersections under ODOT jurisdiction (Portland Road, northbound ramps, southbound ramps and Ulali Drive), the alternative standard of 0.95 was established. Three other intersections (Keizer Station Blvd, McLeod and 14$^{th}$) may influence the operation of the interchange and also required the establishment of alternative standards. These intersections are under the jurisdiction of the City of Keizer and the alternative standards vary from 0.89 to 0.99.

There has been extensive collaboration between the Cities of Keizer and Salem, Marion County and State of Oregon on plan updates.

The Cities of Keizer and Salem already have policy, development code, and city ordinance language that applies to lands designated within the city limits and UGB. These measures have been updated as part of the Comprehensive Plan and TSP updates, and include new

land use and transportation policy that legislate City authority through the following mechanisms:

- Land use controls, including Comprehensive Plan, sub-area master planning, zoning and subdivision ordinance, and overlay zoning
- Transportation controls, including transportation design and access standards

For a small element of the project that is outside of either city, the same issues hold true for Marion County.

A large parcel adjacent to the southeast quadrant of the interchange is owned by the Federal government and is home to the Chemawa Indian School. The development of the project solution was done in very close coordination with the land use plans for this property. It is expected that the only impact on this property will be the realignment of the driveway to the facility and that is being done only to provide a safer, more efficient access point.

## Criterion 6

***In areas where the potential exists for future multiple interchange additions, all requests for new or revised access are supported by a comprehensive interstate network study with recommendations that address all proposed and desired access with the context of a long-term plan.***

All elements of this project are consistent and supportive of all long-range plans for I-5. Four issues were discussed during this project development that are worthy of discussion here.

1. Brooks, Chemawa and Portland Road Interchanges are located relatively close to each other. The spacing between Brooks and Chemawa currently does not violate spacing guidelines, but it would fall slightly below that standard with the lengthening of the Chemawa ramps. If the area between Brooks and Chemawa were to come into the UGB in the future, the spacing would meet the guidelines. The spacing between Chemawa and Portland Road is already below the guidelines. It can be confidently said that the locations of these three interchanges are firmly established and will not be changing. This project utilizes this existing spacing.
2. This project development process investigated the improvement of the Brooks Interchange as a solution to the projected Chemawa Interchange congestion. Modeling at Brooks showed that congestion at Chemawa would not be improved with Brooks improvements, but it is widely recognized that improvements at Brooks are warranted on their own merit. The improvements at Chemawa are compatible with improvement at Brooks.
3. There is considerable local interest in a new interchange at Quinaby Road between Brooks and Chemawa. This project invested the impacts of a new interchange at that location, but as with Brooks, it did not improve conditions at Chemawa. If and when the City of Keizer looks at UGB expansion, this new interchange will probably be a subject of that effort. An interchange at Quinaby would violate the spacing guidelines to both Brooks and Chemawa and the impact of that would need to be addressed by a future study.

4. The Chemawa study identified that there will be future over-capacity segments of I-5 in the future. Elements of the project address those segments, but north of the study area there will still be segments that do not have adequate capacity. The solution to that issue would have to be the focus of a future study and may need to extend all of the way to the Portland metropolitan area. The project elements of the Chemawa project are compatible with anything that might come out of such a study.

## Criterion 7

***The request for a new or revised access generated by new or expanded development demonstrates appropriate coordination between the development and related or otherwise required transportation system improvements.***

The most recent and ongoing development near the interchange is the Keizer Station development. At the time of the project development, Keizer Station was partially developed in the northwest quadrant of the interchange. There is also area in the southwest quadrant that will be developed as part of Keizer Station. The project is consistent with the Keizer Station Plan (2003) with the exception of the suggestion to eliminate the left turns from Chemawa Road at the Ulali Drive/Stadium Drive intersection. The eastbound left turn may need to be eliminated to make a six-lane railroad grade crossing feasible. Eliminating the westbound left turn would satisfy one element of the OHP spacing guidelines. Several representatives from the Keizer Station developers served on the Stakeholder Advisory Committee.

The adjacent area in the northeast quadrant is the site of future development. It has been annexed by the City of Salem, but firm development plans have not yet been done. The project includes a new East Tepper Drive through this property and the realignment of Indian School Road to intersect with East Tepper Drive on this property. Those alignments have been shown on the project maps, but it has been carefully documented that these alignments are for illustration only and the actual alignments would be determined in concert with the development plans for this property.

As mentioned earlier, this project has been developed in careful concert with the future development potential of the Federal land in the southeast quadrant. Representatives of the Chemawa Indian School also served on the Stakeholder Advisory Committee.

## Criterion 8

***The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.***

The project required consistency with the National Environmental Policy Act (NEPA) process and incorporation of community values in the solutions to be evaluated. The public involvement process employed a variety of communication tools and venues that consisted of briefings for several public groups, website, Open Houses, stakeholder advisory committee (SAC), and a project management team (PMT). The PMT consists of technical planning and engineering representatives from City of Keizer, City of Salem, Marion County, FHWA, DLCD, the Salem-Keizer Area Transportation Study, and ODOT.

Threshold and evaluation criteria (including FHWA and OHP policy criteria) were developed to select alternatives for evaluation in the NEPA process. Identified alternatives included improvements along I-5, improvements at Chemawa Interchange, improvements at locations north of Chemawa Interchange, and improvements south of Chemawa Interchange. Threshold screening determined feasible and non-feasible alternatives. Evaluation criteria were used to determine the technical ratings to compare alternatives on a qualitative and quantitative basis.

The interchange modification and local system improvements are consistent with relevant federal, state, regional, and local plans and policies, including but not limited to:

- National Environmental Policy Act (1969)
- Federal Interchange Policy (1998)
- Oregon Transportation Plan, Oregon Highway Plan (1999)
- Statewide Planning Goals, Transportation Planning Rule (OAR660-012),, State Agency Coordination Program (1990) (OAR731-0015)
- Transportation System Plan and Comprehensive Plan for the City of Keizer (2000 TSP, amended 2004)(1987 Comp Plan, amended 1995 & 2003)
- Transportation System Plan and Comprehensive Plan for the City of Salem (2007 TSP)(1992 Comp Plan, amended 2004)
- Rural Transportation Plan (1998, amended 2005) and Comprehensive Plan for Marion County (1981, amended 1994, 1998, 2000, 2001, 2002 & 2005)
- SKATS 2031 Regional Transportation Plan (2007)

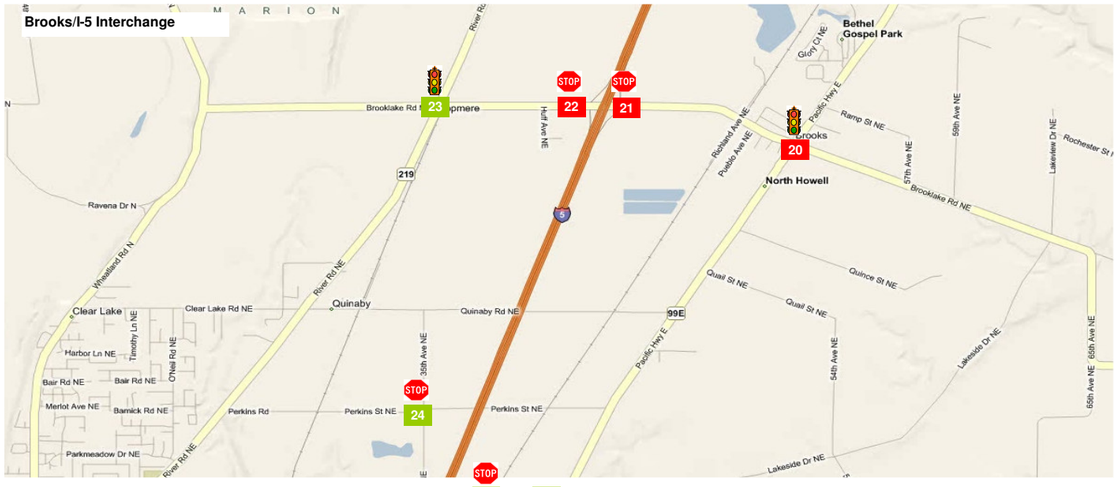
The recommended alternative has very few environmental and permitting implications. Most of the roadway improvements of the recommended alternative are to existing streets through already developed urban areas. The alignments of new roadways do not appear to cross any critical habitat, wetlands, or 303(d) streams identified in the SKATS 2031 RTSP Update. There are no records of special status fish, wildlife, or plant species reported by Oregon Natural Heritage Information Center (ORNHIC) to occur within the study area, and suitable habitat for listed species was not observed. A review of ORNHIC data showed no documented populations of state or federally listed rare plant species within two miles of the project area. None of the streams in the study area are listed in StreamNet and none are listed as Essential Salmon Habitat by the Oregon Department of State Lands. However, wetlands and hydric soils are known to exist in the vicinity of the alignments, which would require a field investigation at potential sites prior to final design and permitting. Some of the proposed new roadways are outside of the Urban Growth Boundary of Salem and Keizer and would cross into EFU-zoned land in Marion County. Permitting of these sections of new roadway outside of the cities' UGBs will require a Statewide Planning Goal 3 Agricultural Lands Exception to the Comprehensive Plan of Marion County. The 35th Avenue realignment and East Tepper Drive cross EFU-zoned land and will require a Goal exception and Conditional Use permit from Marion County. Other sections of new roadway in largely undeveloped rural areas east of I-5 cross either land zoned Public Services (PS) or Public and Private Educational Services (PE) by the City of Salem. Transportation facilities

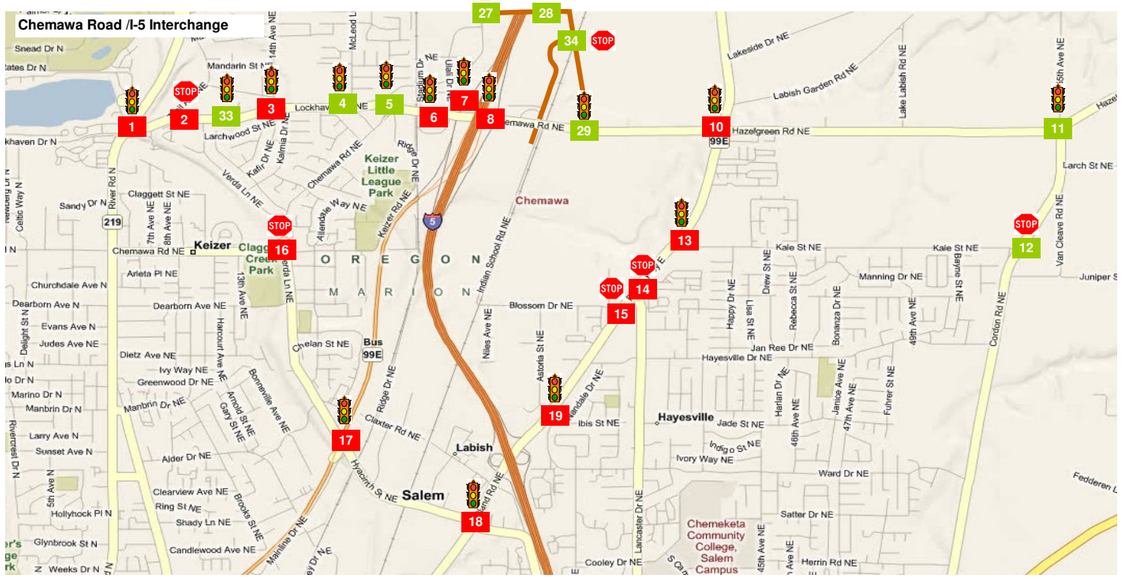
are an allowed use in these zones. Salem's Chemawa Quadrant Northeast Overlay Zone (Chapter 136.090) has some provisions regarding setbacks in this zone, but would not affect roadway improvements.

The City of Keizer has been investigating the expansion of the Urban Growth Boundary, and this IAMP considered the traffic implications of a hypothetical UGB expansion scenario. If the UGB were to be extended by Keizer into the area crossed by the 35th Avenue realignment, or by Salem into the area crossed by East Tepper Drive, a Goal exception would not be required. Regardless, the recommended alternative is based on the adopted UGB and not on speculation about future UGB expansions.

APPENDIX N

# Traffic Analysis for Projects for Future Consideration

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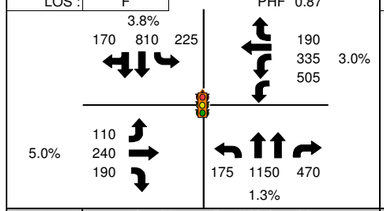
# FIGURE C.1a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: 2031 Chemawa/Lockhaven Limited Widening & Tepper Half Diamond Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

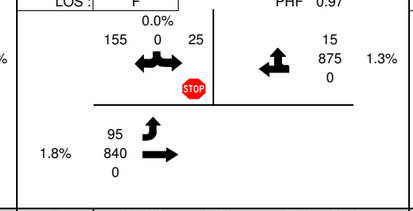
## 1 Lockhaven Dr. & River Rd.

V/C Ratio: 1.10 | Delay (s): 106.4 | LOS : F
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.87



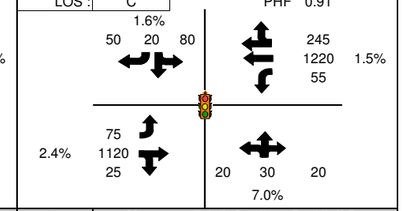

## 2 Lockhaven Dr. & Trail Ave.

V/C Ratio: 0.58(1.73)^ | Delay (s): 411.1 | LOS : F
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97



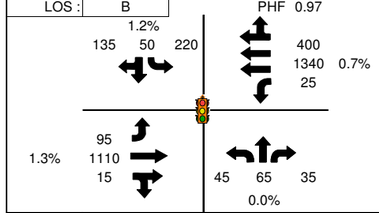

## 3 Lockhaven Dr. & 14th Ave./Kafir Dr.

V/C Ratio: 0.89 | Delay (s): 22.3 | LOS : C
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.91



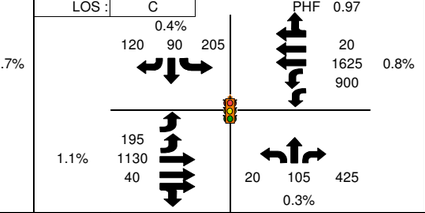

## 4 Lockhaven Dr. & McLeod Ln.

V/C Ratio: 0.68 | Delay (s): 18.7 | LOS : B
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97



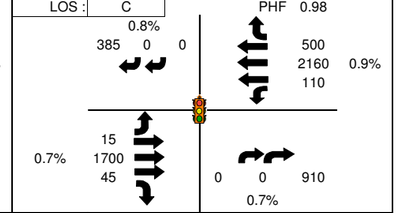

## 5 Lockhaven & Chemawa/Keizer Station

V/C Ratio: 0.82 | Delay (s): 31.1 | LOS : C
Jurisdiction: Keizer | Standard: 0.87 | PHF 0.97



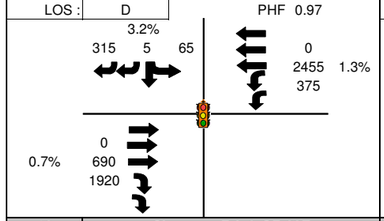

## 6 Chemawa Rd. & Stadium Dr./Ulali Dr.

V/C Ratio: 0.94 | Delay (s): 31.9 | LOS : C
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.98



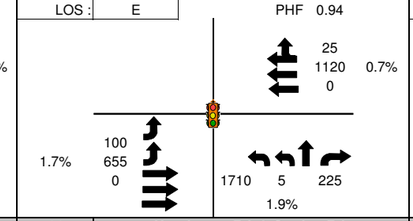

## 7 Chemawa Rd. & I-5 SB Ramps

V/C Ratio: 1.03 | Delay (s): 39.3 | LOS : D
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.97




## 8 Chemawa Rd. & I-5 NB Ramps

V/C Ratio: 1.02 | Delay (s): 64.7 | LOS : E
Jurisdiction: ODOT | Standard: 0.87 | PHF 0.94



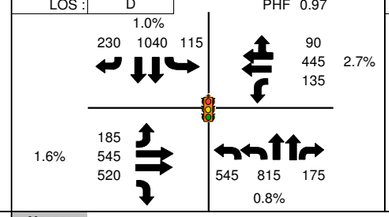

## 9 Chemawa Rd. & Indian School Rd.

V/C Ratio:
Delay (s):
LOS :
Jurisdiction:
Standard:
PHF

**Does Not Exist in Alternative**

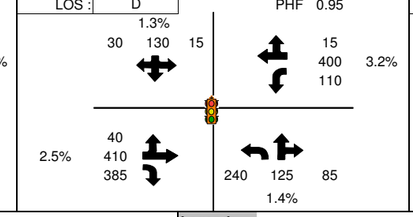
## 10 Chemawa Rd. & OR 99E

V/C Ratio: 0.88 | Delay (s): 45.0 | LOS : D
Jurisdiction: ODOT | Standard: 0.75 | PHF 0.97



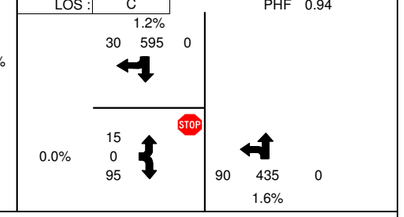

## 11 Hazelgreen Rd. & Cordon Rd.

V/C Ratio: 0.85 | Delay (s): 39.0 | LOS : D
Jurisdiction: Marion County | Standard: LOS E | PHF 0.95




## 12 Cordon Rd. & Kale St.

V/C Ratio: 0.42(0.43)^ | Delay (s): 23.0 | LOS : C
Jurisdiction: Marion County | Standard: LOS D | PHF 0.94

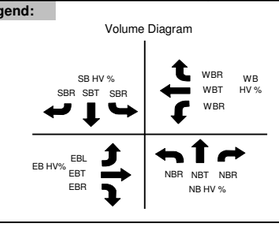



**Notes:**

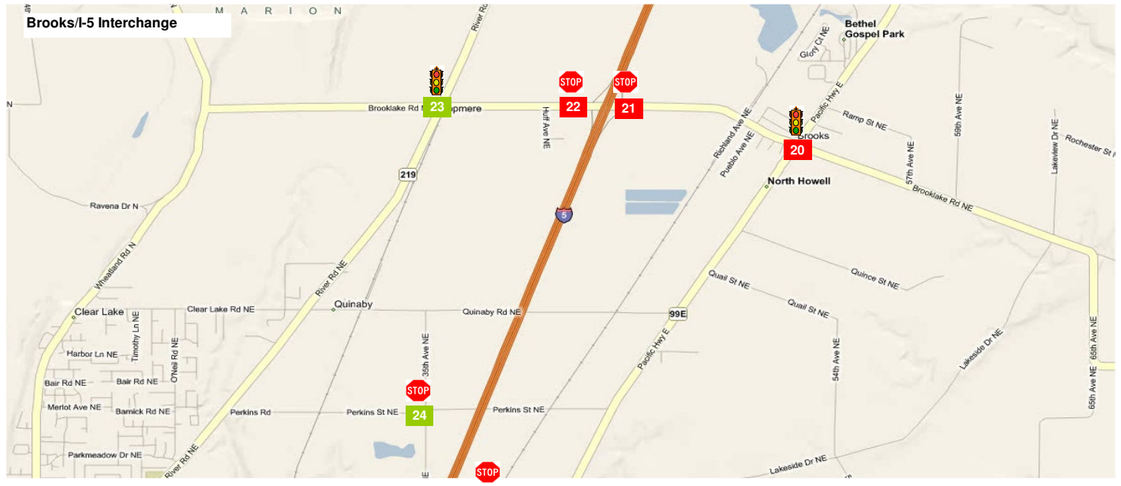
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

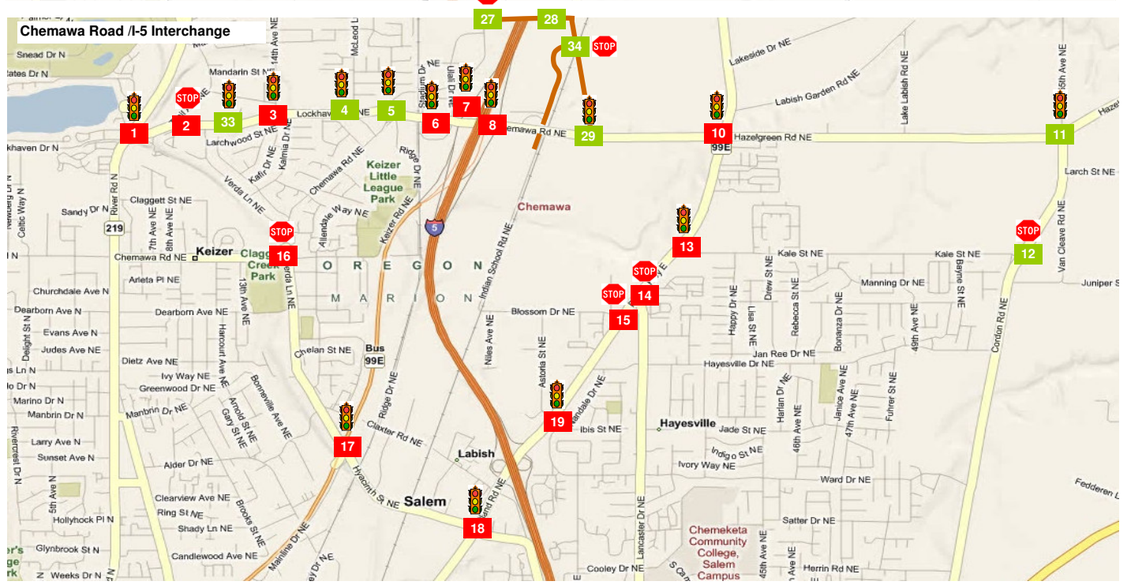
**Legend:**

Volume Diagram




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection




| 13 | OR 99E & Kale St. | | 14 | OR 99E & Lancaster Dr. | | 15 | OR 99E & Blossom Dr. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | V/C Ratio: | 1.76(1.74)^ | Jurisdiction: ODOT | V/C Ratio: | 0.40(1.63)^ | Jurisdiction: ODOT |
| Delay (s): | 23.3 | Standard: 0.75 | Delay (s): | 364.4 | Standard: 0.75(0.85)^ | Delay (s): | 356.7 | Standard: 0.75(0.85)^ |
| LOS : | C | PHF 0.94 | LOS : | F | PHF 0.85 | LOS : | F | PHF 0.92 |
| 0.5% | 0 1405 290 | 165 / 0 / 190 0.6% | 2.2% | 15 700 880 | 615 / 10 / 40 1.2% | 1.3% | 35 700 0 | |
| | | 0 1370 395 1.0% | 0.0% | 0 / 0 / 10 | 20 1150 155 2.2% | 2.2% | 75 / 0 / 120 | 70 1250 0 1.7% |

| 16 | Chemawa Rd. & Verda Ln. | | 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | 18 | OR 99E & Hyacinth St. | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.32 | Jurisdiction: Keizer | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 1.37 | Jurisdiction: ODOT |
| Delay (s): | 286.7 | Standard: LOS D | Delay (s): | 159.3 | Standard: 0.85 | Delay (s): | 150.8 | Standard: 0.75 |
| LOS : | F | PHF 0.95 | LOS : | F | PHF 0.91 | LOS : | F | PHF 0.95 |
| 1.0% | 55 80 10 | 10 / 430 / 255 0.5% | 3.5% | 90 1755 65 | 330 / 620 / 105 1.6% | 4.4% | 615 865 235 | 120 / 360 / 95 1.5% |
| 1.1% | 55 / 385 / 215 | 260 125 155 0.6% | 1.5% | 45 / 330 / 205 | 275 1460 330 3.1% | 1.5% | 655 / 280 / 380 | 265 1465 105 1.7% |

| 19 | OR 99E & Astoria St./Ward St. | | 20 | Brooklake Rd. & OR 99E | | 21 | Brooklake Rd. & I-5 NB Ramps | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 1.03 | Jurisdiction: ODOT | V/C Ratio: | 1.40 | Jurisdiction: ODOT | V/C Ratio: | 0.67(5.00)^ | Jurisdiction: ODOT |
| Delay (s): | 56.7 | Standard: 0.75 | Delay (s): | 179.1 | Standard: 0.60 | Delay (s): | 1000.0 | Standard: 0.70(0.60)^ |
| LOS : | E | PHF 0.95 | LOS : | F | PHF 0.92 | LOS : | F | PHF 0.87 |
| 1.8% | 25 1085 165 | 240 / 50 / 385 1.4% | 2.5% | 260 735 10 | 10 / 50 / 30 1.7% | | | 140 / 500 / 0 4.0% |
| 5.9% | 35 / 35 / 65 | 90 1640 695 2.2% | 6.1% | 205 / 85 / 555 | 330 435 35 3.6% | 9.3% | 425 / 520 / 0 | 160 0 325 8.8% |

| 22 | Brooklake Rd. & I-5 SB Ramps | | 23 | Brooklake Rd. & River Rd. | | 24 | Perkins Rd. & 35th Ave. NE | |
|---|---|---|---|---|---|---|---|---|
| V/C Ratio: | 0.83(5.00)^ | Jurisdiction: ODOT | V/C Ratio: | 0.59 | Jurisdiction: Marion County | V/C Ratio: | 0.04(0.36)^ | Jurisdiction: Marion County |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | Delay (s): | 20.4 | Standard: LOS E | Delay (s): | 16.5 | Standard: LOS E |
| LOS : | F | PHF 0.92 | LOS : | C | PHF 0.96 | LOS : | C | PHF 0.89 |
| 10.9% | 1000 15 375 | 0 / 235 / 425 6.8% | 6.0% | 20 195 210 | 140 / 155 / 710 4.8% | 0.0% | 25 70 25 | 10 / 85 / 45 2.1% |
| 11.2% | 0 / 570 / 265 | | 6.0% | 15 / 65 / 25 | 30 120 165 2.3% | 0.0% | 5 / 35 / 35 | 55 65 20 0.0% |

**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**

Volume Diagram

SB HV %, SBR SBT SBR, WBR WBT WBR, WB HV %, EB HV%, EBL EBT EBR, NBR NBT NBR, NB HV %

555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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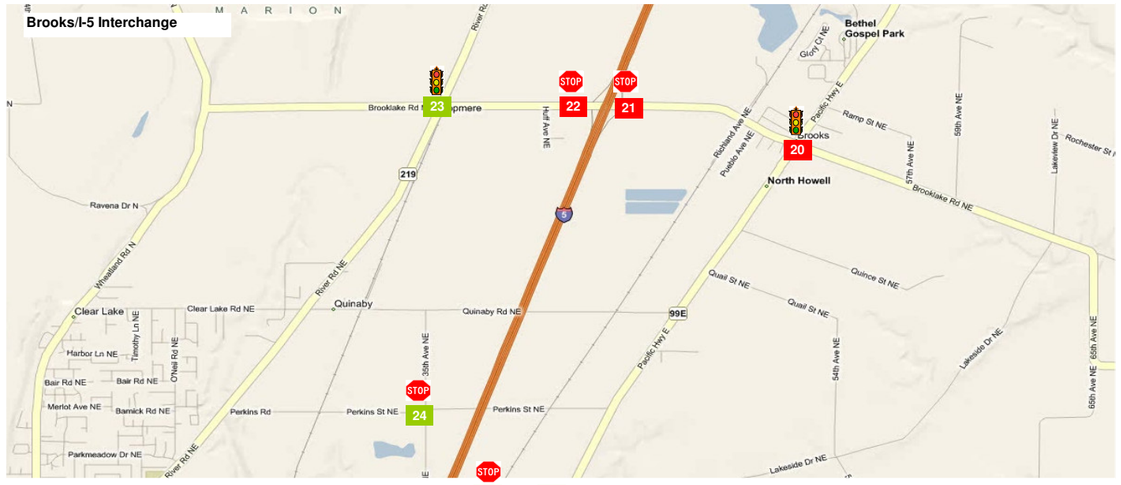
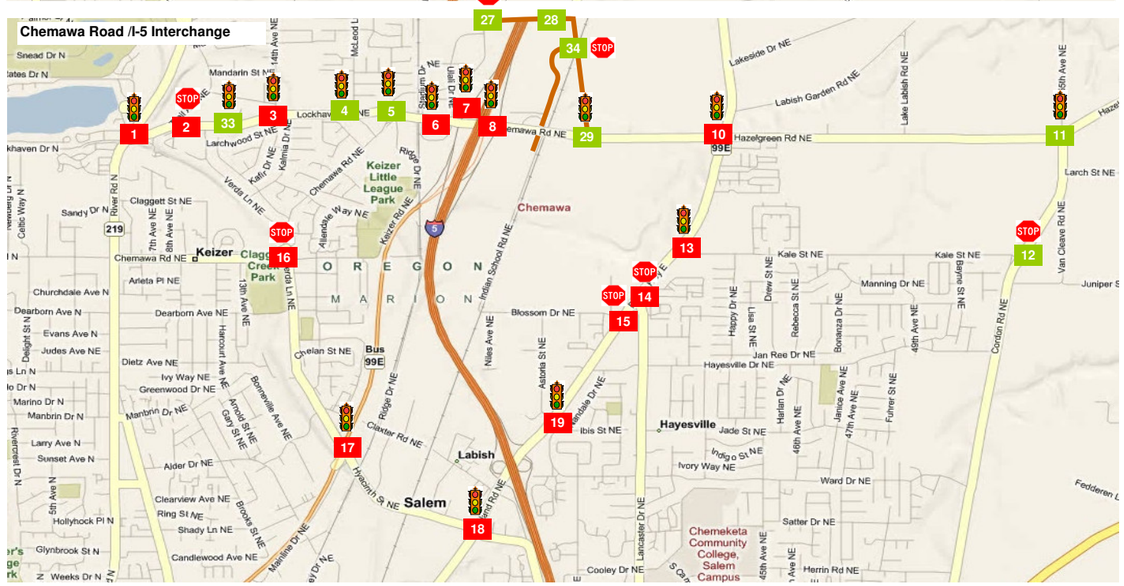
# FIGURE C.1a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: 2031 Chemawa/Lockhaven Limited Widening & Tepper Half Diamond**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**



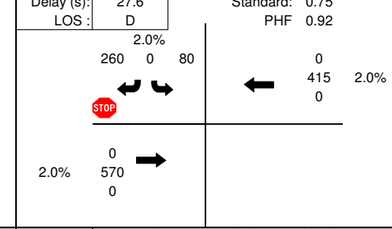

| 25 | Hyacinth/NB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

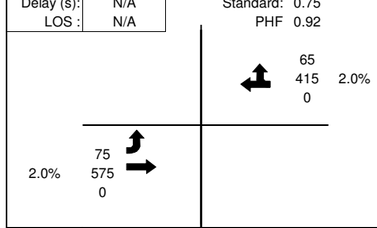
| 26 | Hyacinth/SB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

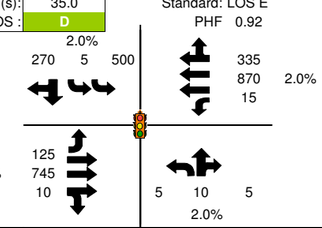
| 27 | Tepper Lane/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.36(0.46)^ | Jurisdiction: ODOT | |
| Delay (s): | 27.6 | Standard: | 0.75 |
| LOS : | D | PHF | 0.92 |




| 28 | Tepper Lane/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | N/A | Jurisdiction: ODOT | |
| Delay (s): | N/A | Standard: | 0.75 |
| LOS : | N/A | PHF | 0.92 |




| 29 | Chemawa Road/E. Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.61 | Jurisdiction: Marion County | |
| Delay (s): | 35.0 | Standard: | LOS E |
| LOS : | D | PHF | 0.92 |




| 30 | Brooklake/I-5 Ramps (SPUI) | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

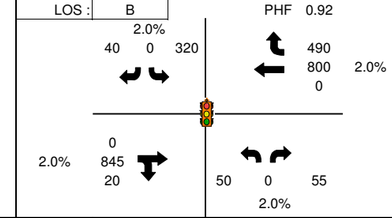
| 31 | Quinaby Road/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

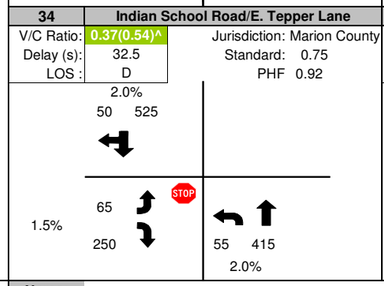
| 32 | Quinaby Road/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

**Does Not Exist in Alternative**

| 33 | Verda Lane/Lockhaven Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.79 | Jurisdiction: Keizer | |
| Delay (s): | 16.3 | Standard: | 0.87 |
| LOS : | B | PHF | 0.92 |



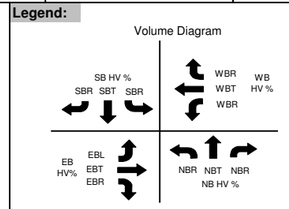

| 34 | Indian School Road/E. Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.37(0.54)^ | Jurisdiction: Marion County | |
| Delay (s): | 32.5 | Standard: | 0.75 |
| LOS : | D | PHF | 0.92 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis
11. All volumes are based off of adopted land uses

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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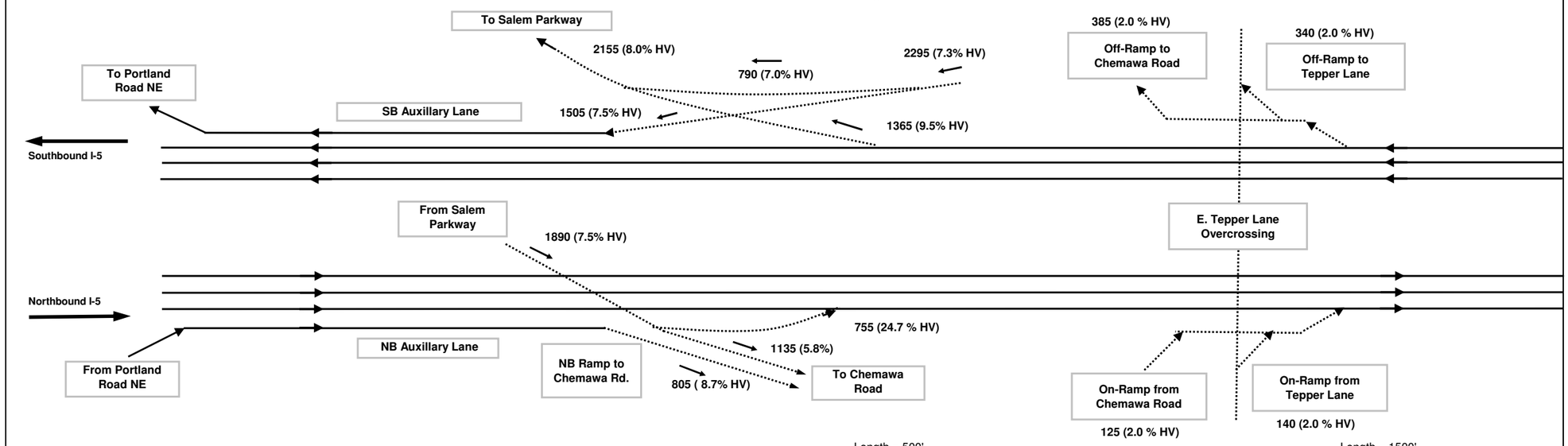
# FIGURE C.1a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: 2031 Chemawa/Lockhaven Limited Widening & Tepper Half Diamond**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S4: Salem Pkwy Off | | S3: SB I-5 Mainline | S2: Chemawa Road/Tepper Lane Off-Ramp | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 1.0% | 1.0% | 1.0% | 1.0% | 6.4% | | 8.6% |
| | PHF | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Full Widening | Volume | 5805 | 4300 | 1365 | | 5665 | 725 | | 6390 |
| | Flow Rate^ | 1615 | 1470 | 1400 | 4410 | 1940 | 835 | 6120 | 2370 |
| | V/C | 0.69 | 0.63 | 0.67 | 0.63 | 0.99 | 0.40 | 0.87 | 1.01 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| | | | | Length = 750' | | | Length = 750' | | |




| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N4: Salem Pkwy On | | N5: NB I-5 Mainline | N6: Chemawa Road/Tepper Lane On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 24.7% | | 9.3% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Full Widening | Volume | 5375 | 4570 | 755 | | 5325 | 265 | | 5590 |
| | Flow Rate^ | 1465 | 1655 | 3895 | 5920 | 1985 | 4000 | 6250 | 2050 |
| | V/C | 0.62 | 0.70 | 0.85 | 0.84 | 0.99 | 0.87 | 0.89 | 0.87 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE C.2b Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: 2031 Chemawa/Lockhaven Limited Widening & Tepper Half Diamond**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

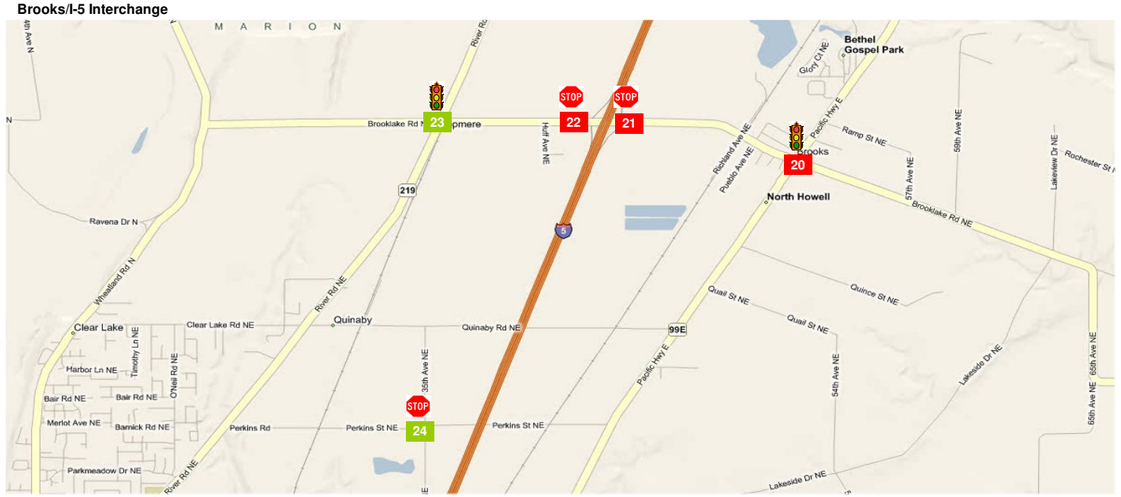
### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

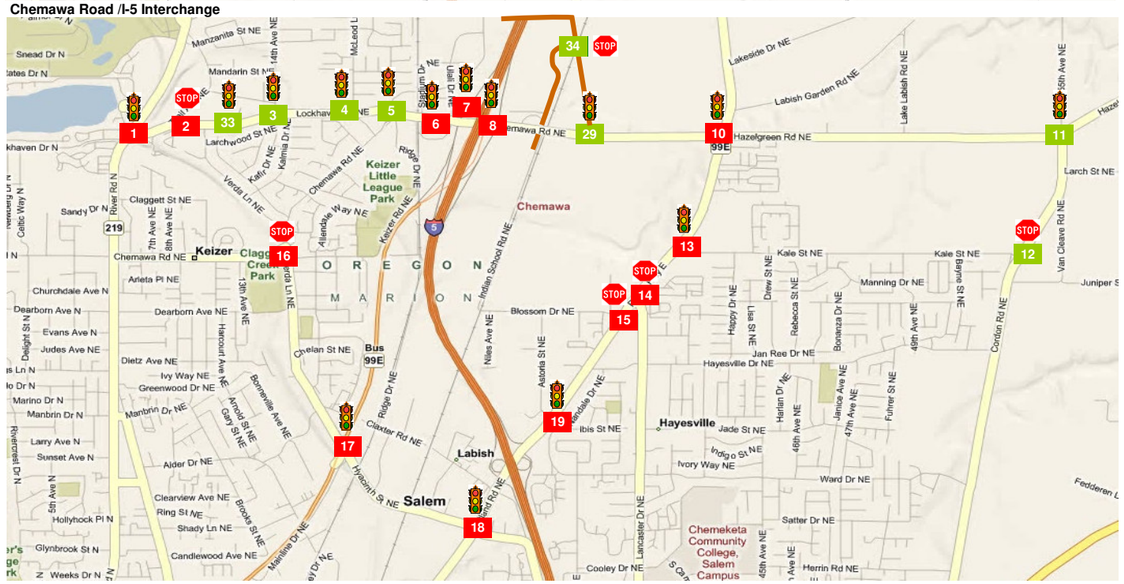
Collector-Distributor Road; Ramps
Mainline Freeway

N

**Brooks/I-5 Interchange**




**Chemawa Road /I-5 Interchange**

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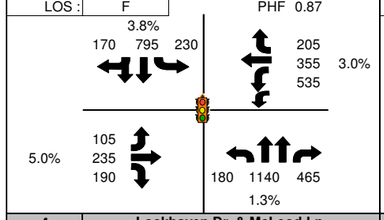
# FIGURE C.2a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: Chemawa/Lockhaven Full Widening w/Tepper Overcrossing**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

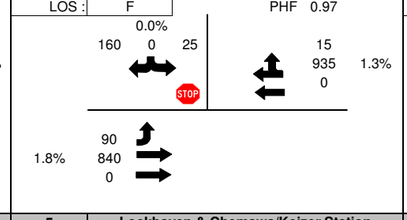
## 1 Lockhaven Dr. & River Rd.

| | | |
|---|---|---|
| V/C Ratio: | 1.11 | Jurisdiction: Keizer |
| Delay (s): | 117.0 | Standard: 0.87 |
| LOS : | F | PHF 0.87 |



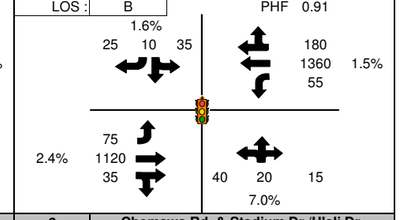

## 2 Lockhaven Dr. & Trail Ave.

| | | |
|---|---|---|
| V/C Ratio: | 0.41(0.87)^ | Jurisdiction: Keizer |
| Delay (s): | 63.9 | Standard: 0.87 |
| LOS : | F | PHF 0.97 |



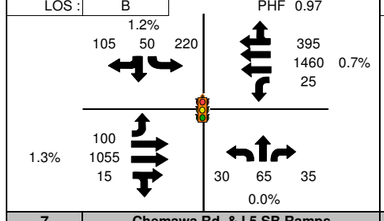

## 3 Lockhaven Dr. & 14th Ave./Kafir Dr.

| | | |
|---|---|---|
| V/C Ratio: | 0.75 | Jurisdiction: Keizer |
| Delay (s): | 12.9 | Standard: 0.87 |
| LOS : | B | PHF 0.91 |



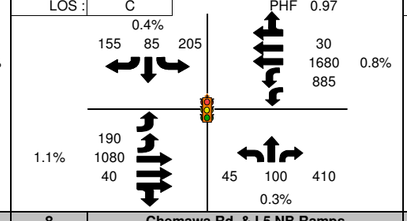

## 4 Lockhaven Dr. & McLeod Ln.

| | | |
|---|---|---|
| V/C Ratio: | 0.75 | Jurisdiction: Keizer |
| Delay (s): | 16.4 | Standard: 0.87 |
| LOS : | B | PHF 0.97 |



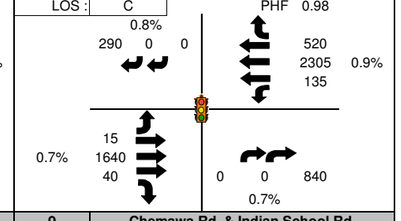

## 5 Lockhaven & Chemawa/Keizer Station

| | | |
|---|---|---|
| V/C Ratio: | 0.85 | Jurisdiction: Keizer |
| Delay (s): | 29.8 | Standard: 0.87 |
| LOS : | C | PHF 0.97 |



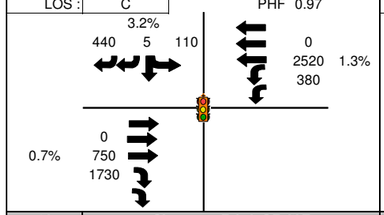

## 6 Chemawa Rd. & Stadium Dr./Ulali Dr.

| | | |
|---|---|---|
| V/C Ratio: | 0.91 | Jurisdiction: ODOT |
| Delay (s): | 26.8 | Standard: 0.87 |
| LOS : | C | PHF 0.98 |



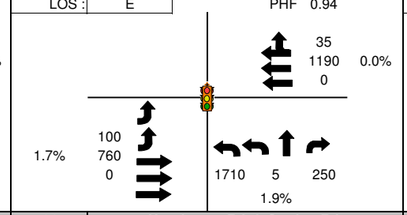

## 7 Chemawa Rd. & I-5 SB Ramps

| | | |
|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT |
| Delay (s): | 27.7 | Standard: 0.87 |
| LOS : | C | PHF 0.97 |




## 8 Chemawa Rd. & I-5 NB Ramps

| | | |
|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT |
| Delay (s): | 64.5 | Standard: 0.87 |
| LOS : | E | PHF 0.94 |



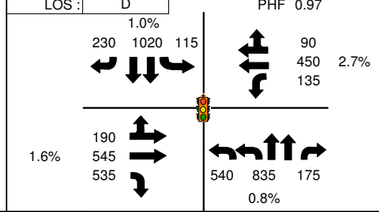

## 9 Chemawa Rd. & Indian School Rd.

| | | |
|---|---|---|
| V/C Ratio: | | Jurisdiction: |
| Delay (s): | | Standard: |
| LOS : | | PHF |

**Does Not Exist in Alternative**

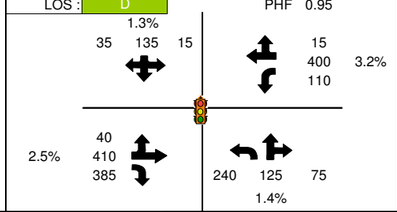
## 10 Chemawa Rd. & OR 99E

| | | |
|---|---|---|
| V/C Ratio: | 0.88 | Jurisdiction: ODOT |
| Delay (s): | 41.8 | Standard: 0.75 |
| LOS : | D | PHF 0.97 |



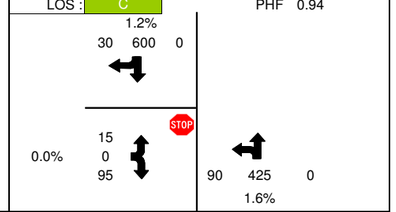

## 11 Hazelgreen Rd. & Cordon Rd.

| | | |
|---|---|---|
| V/C Ratio: | 0.86 | Jurisdiction: Marion County |
| Delay (s): | 39.1 | Standard: LOS E |
| LOS : | D | PHF 0.95 |




## 12 Cordon Rd. & Kale St.

| | | |
|---|---|---|
| V/C Ratio: | 0.42(0.43)^ | Jurisdiction: Marion County |
| Delay (s): | 23.0 | Standard: LOS D |
| LOS : | C | PHF 0.94 |

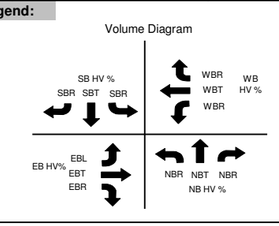



**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

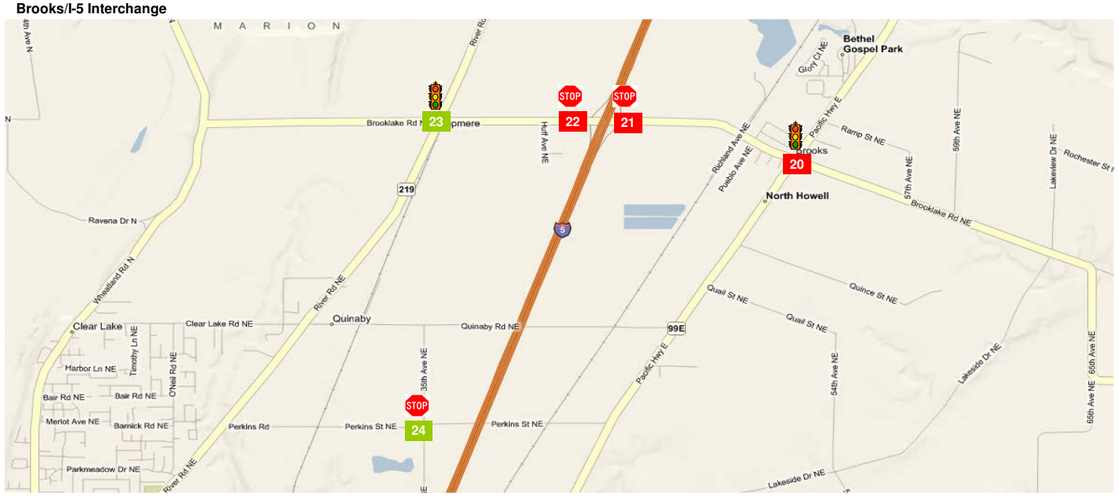
**Legend:**

Volume Diagram

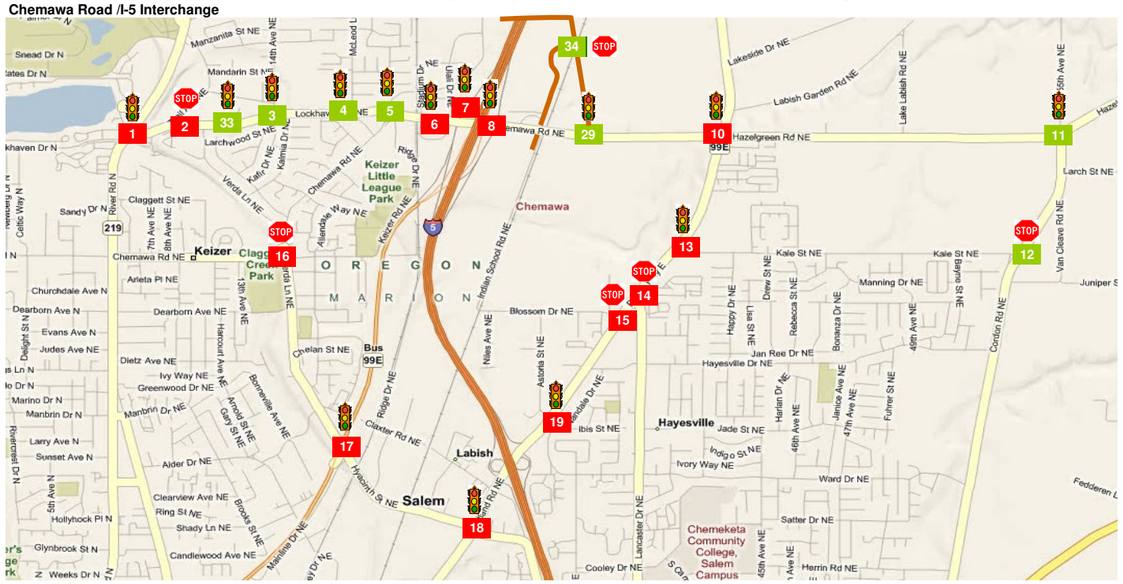



555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

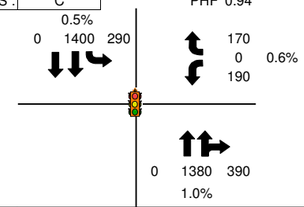
Brooks/I-5 Interchange



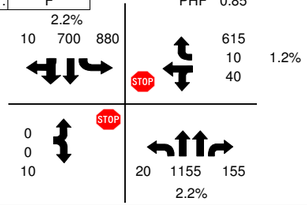

Chemawa Road /I-5 Interchange



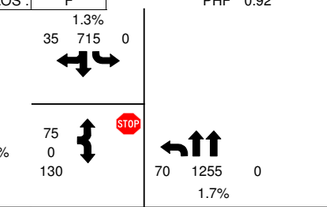

| 13 | OR 99E & Kale St. | | |
|---|---|---|---|
| V/C Ratio: | 0.98 | Jurisdiction: ODOT | |
| Delay (s): | 23.5 | Standard: 0.75 | |
| LOS : | C | PHF 0.94 | |



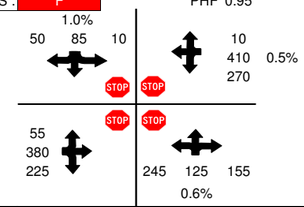

| 14 | OR 99E & Lancaster Dr. | | |
|---|---|---|---|
| V/C Ratio: | 1.77(1.74)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.85 | |



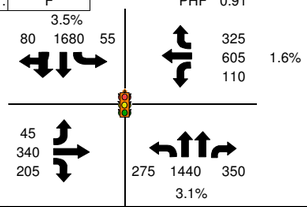

| 15 | OR 99E & Blossom Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.41(1.70)^ | Jurisdiction: ODOT | |
| Delay (s): | 386.8 | Standard: 0.75(0.85)^ | |
| LOS : | F | PHF 0.92 | |



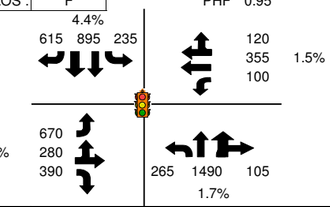

| 16 | Chemawa Rd. & Verda Ln. | | |
|---|---|---|---|
| V/C Ratio: | 1.31 | Jurisdiction: Keizer | |
| Delay (s): | 282.1 | Standard: LOS D | |
| LOS : | F | PHF 0.95 | |



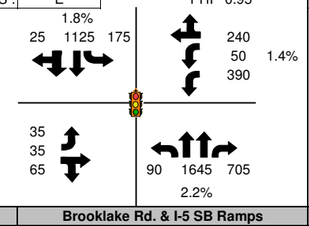

| 17 | OR 99E Bus. & Verda Ln./Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.36 | Jurisdiction: ODOT | |
| Delay (s): | 144.1 | Standard: 0.85 | |
| LOS : | F | PHF 0.91 | |



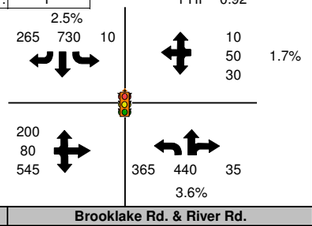

| 18 | OR 99E & Hyacinth St. | | |
|---|---|---|---|
| V/C Ratio: | 1.38 | Jurisdiction: ODOT | |
| Delay (s): | 154.2 | Standard: 0.75 | |
| LOS : | F | PHF 0.95 | |



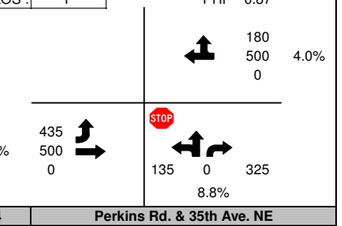

| 19 | OR 99E & Astoria St./Ward St. | | |
|---|---|---|---|
| V/C Ratio: | 1.04 | Jurisdiction: ODOT | |
| Delay (s): | 56.7 | Standard: 0.75 | |
| LOS : | E | PHF 0.95 | |



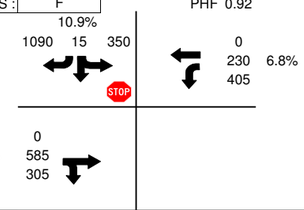

| 20 | Brooklake Rd. & OR 99E | | |
|---|---|---|---|
| V/C Ratio: | 1.41 | Jurisdiction: ODOT | |
| Delay (s): | 180.0 | Standard: 0.60 | |
| LOS : | F | PHF 0.92 | |



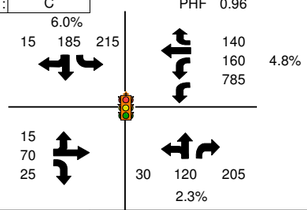

| 21 | Brooklake Rd. & I-5 NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.72(5.00)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | |
| LOS : | F | PHF 0.87 | |



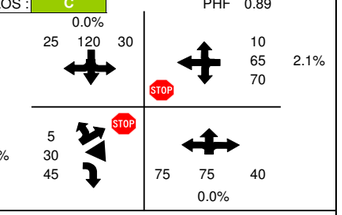

| 22 | Brooklake Rd. & I-5 SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | 0.86(5.00)^ | Jurisdiction: ODOT | |
| Delay (s): | 1000.0 | Standard: 0.70(0.60)^ | |
| LOS : | F | PHF 0.92 | |




| 23 | Brooklake Rd. & River Rd. | | |
|---|---|---|---|
| V/C Ratio: | 0.63 | Jurisdiction: Marion County | |
| Delay (s): | 22.0 | Standard: LOS E | |
| LOS : | C | PHF 0.96 | |




| 24 | Perkins Rd. & 35th Ave. NE | | |
|---|---|---|---|
| V/C Ratio: | 0.06(0.52)^ | Jurisdiction: Marion County | |
| Delay (s): | 24.8 | Standard: LOS E | |
| LOS : | C | PHF 0.89 | |

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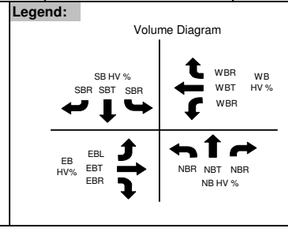
# FIGURE C.2a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: Chemawa/Lockhaven Full Widening w/Tepper Overcrossing**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

**Notes:**

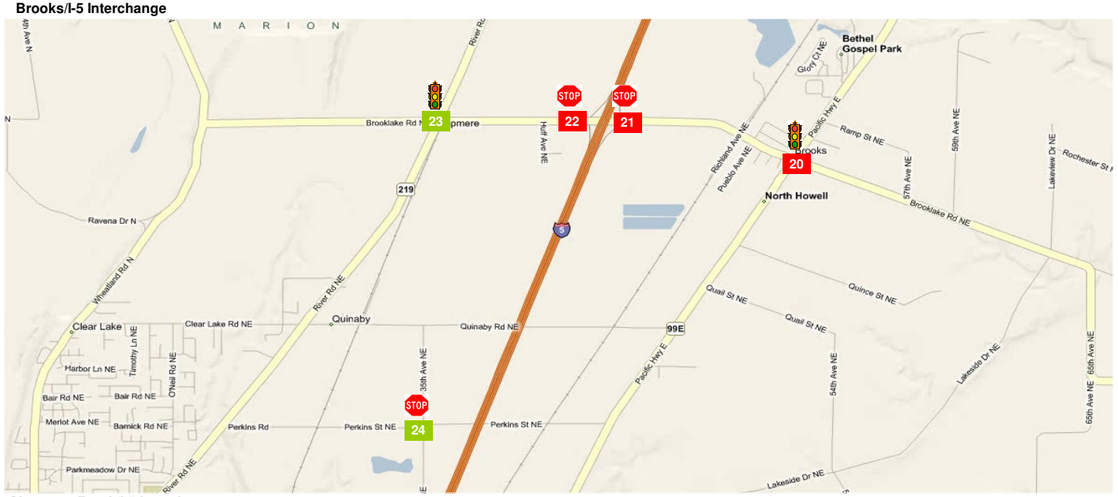
1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**

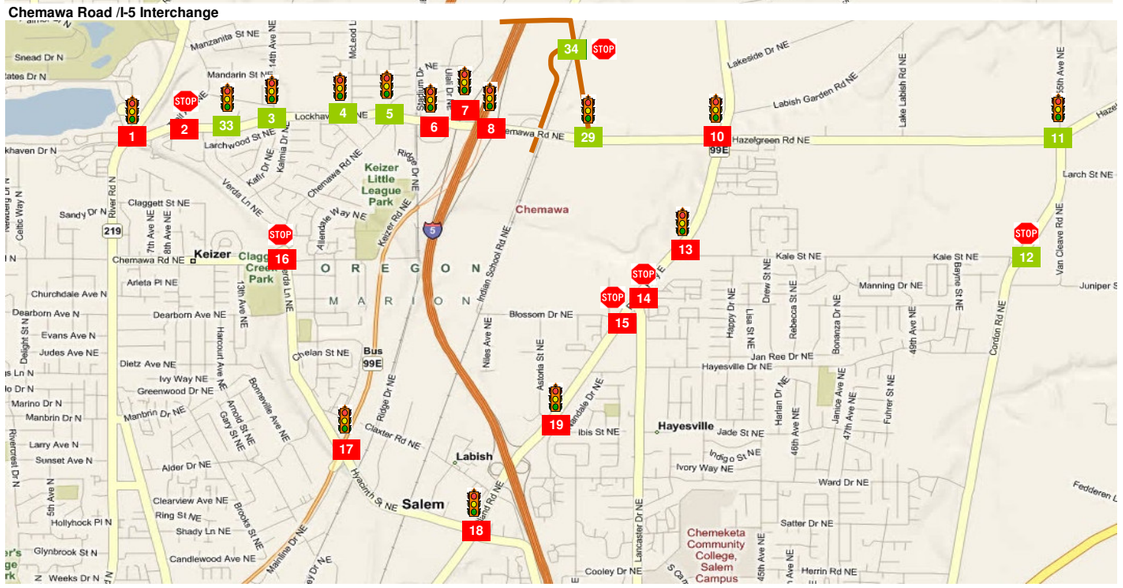



555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

Brooks/I-5 Interchange




Chemawa Road /I-5 Interchange




| 25 | Hyacinth/NB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

| 26 | Hyacinth/SB Salem Pkwy Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

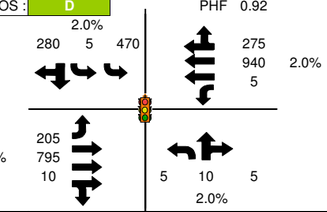
| 27 | Tepper Lane/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

| 28 | Tepper Lane/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

| 29 | Chemawa Road/E. Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.66 | Jurisdiction: Marion County | |
| Delay (s): | 42.3 | Standard: LOS E | |
| LOS : | D | PHF | 0.92 |




| 30 | Brooklake/I-5 Ramps (SPUI) | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

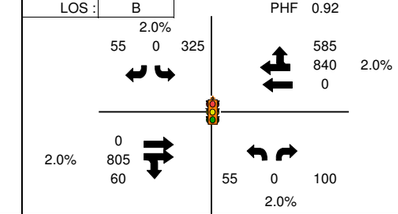
| 31 | Quinaby Road/NB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

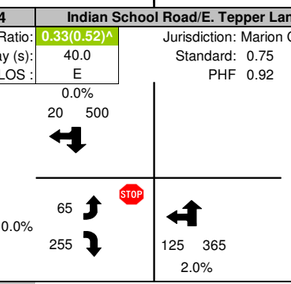
| 32 | Quinaby Road/SB Ramps | | |
|---|---|---|---|
| V/C Ratio: | | Jurisdiction: ODOT | |
| Delay (s): | | Standard: | |
| LOS : | | PHF | |

Does Not Exist in Alternative

| 33 | Verda Lane/Lockhaven Dr. | | |
|---|---|---|---|
| V/C Ratio: | 0.74 | Jurisdiction: Keizer | |
| Delay (s): | 16.4 | Standard: | 0.75 |
| LOS : | B | PHF | 0.92 |



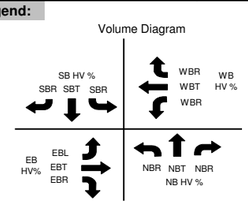

| 34 | Indian School Road/E. Tepper Lane | | |
|---|---|---|---|
| V/C Ratio: | 0.33(0.52)^ | Jurisdiction: Marion County | |
| Delay (s): | 40.0 | Standard: | 0.75 |
| LOS : | E | PHF | 0.92 |




**Notes:**

1. Mobility Standards are based of of jurisdiction that intersection is located in
2. The reported Peak Hour Factor (PHF) is for the overall intersection
3. Truck Percentages calculated from raw counts
4. System Peak hour is 4:30-5:30 PM
5. All 30th Highest Hour volumes were seasonally adjusted
6. A green box on the map represents an acceptable mobility standard
7. A red box on the map represents a failing mobility standard
8. Intersection map source: Microsoft Live Maps
9. "Standard" corresponds to the intersection's mobility standard
10. Balanced 30th Highest Volumes were used in the existing condition analysis

**Legend:**




555 Turning Movement Volume
PHF Peak Hour Factor
HV% Percent Heavy Vehicles
LOS: Level-of-Service
V/C: Volume to Capacity Ratio
^ Uncontrolled(Controlled) Approach V/C
Channelization
Stop Controlled Intersection
Signalized Intersection

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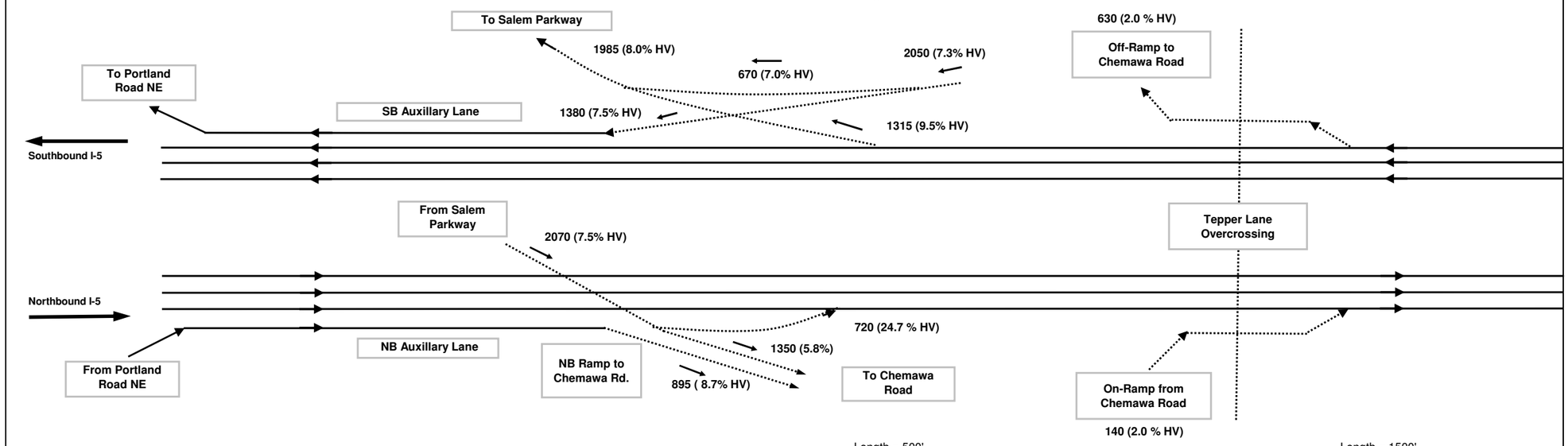
# FIGURE C.2a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: Chemawa/Lockhaven Full Widening w/Tepper Overcrossing**
**Volumes, Channelization, Delay, Level-of-Service, & V/C Ratio**

**DRAFT - FOR INTERNAL REVIEW ONLY**

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT | DIVERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | S7: SB I-5 Mainline | S5: SB I-5 Mainline | S4: Salem Pkwy Off | | S3: SB I-5 Mainline | S2: Chemawa Road Off-Ramp | | S1: SB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 2100 | 7050 | 2350 | 2100 | 7050 | 2350 |
| | Heavy Vehicle % | 8.8% | 1.0% | 1.0% | 1.0% | 1.0% | 6.4% | | 8.6% |
| | PHF | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-3B | Volume | 5840 | 4470 | 1315 | | 5785 | 555 | | 6340 |
| | Flow Rate^ | 1625 | 1530 | 1350 | 4585 | 1980 | 640 | 6240 | 2350 |
| | V/C | 0.69 | 0.65 | 0.64 | 0.65 | 0.99 | 0.30 | 0.89 | 1.00 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

Length = 750' Length = 750'




Length = 500' Length = 1500'

| Scenario | Output Summary | BASIC SEGMENT | BASIC SEGMENT | MERGE | | BASIC SEGMENT | MERGE | | BASIC SEGMENT |
|---|---|---|---|---|---|---|---|---|---|
| | | N1: NB I-5 Mainline | N3: NB I-5 Mainline | N4: Salem Pkwy On | | N5: NB I-5 Mainline | N6: Chemawa Road On-Ramp | | N7: NB I-5 Mainline |
| Parameters | Facility Type | Mainline | Mainline | Ramp | Mainline | Mainline | Ramp | Mainline | Mainline |
| | Max Flow Rate | 2350 | 2350 | 4600 | 7050 | 2350 | 4600 | 7050 | 2350 |
| | Heavy Vehicle % | 4.6% | 4.0% | 24.7% | | 9.3% | 18.6% | | 6.4% |
| | PHF | 0.96 | 0.96 | 0.90 | | 0.96 | 0.90 | | 0.96 |
| 2031 Rec. Alternative: Phases 1-3B | Volume | 5410 | 4560 | 740 | | 5300 | 135 | | 5435 |
| | Flow Rate^ | 1475 | 1650 | 3870 | 5890 | 1975 | 3835 | 6085 | 1995 |
| | V/C | 0.63 | 0.70 | 0.84 | 0.84 | 0.99 | 0.83 | 0.86 | 0.85 |
| | Mobility Standard | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

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## FIGURE C.2a Chemawa Road IAMP Traffic Analysis

**Projects for Future Consideration: Chemawa/Lockhaven Full Widening w/Tepper Overcrossing**
**Freeway Volumes and V/C Ratio**

### Assumptions

1. PHF = 0.90 if not available
2. Driver Population Factor: 0.98
3. Level Terrain is assumed for all segments
4. Freeway Base FSS: 65 mph, Ramp FFS: 45 mph
5. Lane width: 12 feet, Right shoulder clearance: > 6 feet
6. All Volumes are 30th Highest Volume balanced
7. System Peak Hour is 4:30-5:30 PM

Meets Mobility Standard
Fails Mobility Standard

### Legend/Notes:

^ Flow Rate represents unit in ODOT Analysis Procedure Manual
FFS: Free-flow speed
PHF: Peak Hour Factor
L: Length of Merge/Diverge Segment
V/C: Volume to Capacity Ratio
HV: Heavy Vehicle
V/C calculated from HCM 2000 Manual
Image is not to Scale

Collector-Distributor Road; Ramps
Mainline Freeway

N

APPENDIX O

# Public and Stakeholder Involvement Summary

# Chemawa Road IAMP Public Involvement Summary

The following report summarizes the public involvement/public information work conducted during the development of the Interchange Area Management Plan. Interviews, public meetings and briefings were held with neighbors, business interests and local community organizations. Information materials like the project website, Podcasts and quarterly newsletters provided project updates to the general public. The project's two committees, the Project Management Team and the Stakeholder Advisory Committee, provided ongoing guidance to the team through development of the plan.

**Interviews**

Twenty interviews were conducted at the initiation of the process with individuals representing business, residents, property owners, local governments, interest groups and other organizations with an interest in the I-5 Interchange at Chemawa Road. The purpose was to assess community interests to inform the development of project goals and to identify potential conflicts before they negatively impacted the project. No negative relationships or potential conflicts were identified and participants provided helpful information about their interests and those of the people or groups they represent. Participants were asked how the interchange impacted them or the members of their organization and generally about concerns related to the interchange. They were asked if they had any unique access issues that they were concerned about. Each person interviewed was also asked about their experience working with the project's partners (City of Keizer and Salem, Marion County and ODOT).

**Project Committees**

Two committees were created to guide the process and provide important community feedback through the project. They were strategically selected to represent the interest of all partners in the IAMP and to provide a venue for representatives of the public to follow and contribute to the plan's development.

The Stakeholder Advisory Committee (SAC) comprised of community group representatives, property owners, developers and residents provided consensus-based advice and input to the Project Management Team (PMT). The PMT represented staff from local agencies and jurisdictions including the City of Keizer, the City of Salem, Marion County, ODOT, Cherriots and the State of Oregon. The PMT was an advisory body to the team of Oregon Department of Transportation senior staff and project consultants through the development of the IAMP.

The following is a list of meetings for the two committees including the decisions or directions set by the committee at each meeting.

**Committee Meetings**

| Date | Agenda Topics | Decisions/Direction |
|---|---|---|
| April 18, 2008 PMT<br>April 21, 2008 SAC | • Committee Protocols<br>• Project interview Summary<br>• Summary of Policy/Plan Review | PMT Protocols approved. SAC membership discussed.<br>SAC established regular meeting schedule. |
| April 30, 2008 PMT only | • Process for Identifying Transportation Deficiencies<br>• Methodologies for Future "No-build" Traffic Analysis<br>• Environmental Analysis Update | PMT directed team to continue analysis. |

| | | |
|---|---|---|
| | • Review of Plans and Policies | |
| May 21, 2008 PMT<br>May 27, 2008 SAC | • Process for Identifying Transportation Deficiencies<br>• Future "No-build" Traffic Analysis<br>• Stakeholder Interview Summary<br>• Problem Statement/ Purpose & Need Statement<br>• Evaluation Criteria | PMT approved extending invitations to 2 new SAC members. PMT recommended project identity concepts. PMT directed team to continue with its analysis methodologies and assumptions.<br><br>SAC approved Committee Protocols. |
| June 18, 2008 PMT<br>June 24, 2008 SAC | • Review Future Conditions TM<br>• Problem/Purpose & Need Statement<br>• Evaluation Criteria & Evaluation Framework | PMT provided direction for the draft problem/purpose statement and the draft evaluation criteria. |
| July 30, 2008<br>(Joint meeting) | • Review Evaluation Framework<br>• Identify Draft Alternatives | PMT and SAC accepted the goals and objectives.<br>PMT and SAC identified draft alternatives. |
| August 20, 2008 PMT<br>August 26, 2008 SAC | • Evaluation Framework<br>• Discuss Alternative Packages | PMT forms a subcommittee to finalize the evaluation framework. |
| | | |
| September 24, 2008 PMT<br>September 30, 2008 SAC | • Finalize and Approve Evaluation Framework<br>• Screening of Alternative Packages | PMT accepted the evaluation framework.<br>PMT suggested changes to initial alternative screening. |
| October 22, 2008 PMT<br>October 28, 2008 SAC | • Screening of Alternative Packages | PMT accepted initial alternative screen. PMT narrowed range of alternatives from 15 to 5.<br>Subcommittee formed to establish parameters for the expanded UGB scenario.<br>SAC recommends change to the PMT's narrowed range of alternatives to remove Keizer Rd Extension (Alternative #15). |
| | | |
| February 18, 2009 PMT<br>February 24, 2009 SAC | • Doubleline Drawings<br>• Quantitative Evaluation of 5 Alternative Packages<br>• Travel Demand Modeling<br>• Review Traffic Operational Analysis | PMT accepts SAC recommendation. |
| April 1, 2009 PMT<br>April 7, 2009 SAC | Expanded UGB scenario<br>• Quantitative Evaluation of 5 Alternative Packages<br>• Travel Demand Modeling<br>• Review Traffic Operational Analysis | PMT and SAC form subcommittee to identify combinations of alternatives and different packages. |
| | | |
| June 10, 2009 PMT<br>June 16, 2009 SAC | • Alternative and Refinement Review<br>• Analysis Results<br>• Sub-Group Meeting Objectives | PMT and SAC agree with the direction of the analysis |
| July 22, 2009 PMT | Evaluation Framework | PMT and SAC accept the completed |

| | | |
|---|---|---|
| July 28, 2009 SAC | • Draft Recommended Alternative<br>o Design Drawings<br>o Traffic Analysis | evaluation framework. |
| September 9, 2009 PMT<br>September 15, 2009 SAC | • Draft Recommended Alternative<br>• Public Outreach Plan | PMT and SAC accept the draft recommended alternatives. |
| October 21, 2009 PMT<br>October 28, 2009 SAC | • Open House Summary | |

**Briefings**

The project team worked diligently to identify groups and organizations that may have interest in the project. The team contacted several organizations and asked for the opportunity to present information. The following is a list of briefings the team attended during IAMP development.

- Chemawa Indian School Board—Fall 2008
  Terry Cole attended one the Board's quarterly meetings held at the school to provide information about the project.
- Keizer Chamber of Commerce—July 9, 2008 and November, 2009.
  Rick Kuehn, Ch2MHill, attended a monthly luncheon of the Keizer Chamber of Commerce to provide information about the purpose of the IAMP and sought feedback about the community's needs. In November, Mr. Kuehn presented recommended alternatives to the group's Economic Development Committee.
- North Gateway Redevelopment Advisory Board (NGRAB)—December 2008, October 2009
  Rick Kuehn, Ch2MHill attended two Advisory Board meetings to share the results of the initial traffic analysis and then update the group on the project's draft recommendations.
- Individual meeting with SuAnn Reddick and Cassie Ross—Spring, 2009
  The team met with SuAnn Reddick, Chemawa Indian School representative on the SAC, and Cassie Ross, former School Board member to discuss project alternatives near the school property.
- North Salem Business Association—May, 2009
  Rick Kuehn, Ch2MHill, attended a business association meeting to provide information and seek feedback about the IAMP's draft recommendations.
- Bonneville Power Administration (BPA)—June, 2009
  Rick Kuehn, Ch2MHill, attended a staff meeting at Bonneville Power Administration to provide information and seek feedback about the IAMP's draft recommendations.
- Private Conference call with Dale Frank, Tony Martin from the City of Salem—July 2009
  Dale Frank represents the owner of a large property that boarders I-5 to the east, north of Chemawa Road. In this conversation, the team provided Mr. Frank, who could not attend SAC meetings, information about the project. The team talked about the IAMP's draft recommendations in relation to this property and, with help from City of Salem staff talked the different infrastructure needs for the property.
- RiverFair—August, 2009
  Rick Kuehn, Ch2MHill and staff from JLA attended this annual community event in Keizer to share information about the project including draft recommendations.
- Northgate Neighborhood Association—October, 2009
  Rick Kuehn, Ch2MHill, attended a neighborhood association meeting to provide information and seek feedback about the IAMP's draft recommendations.

**Project Website**
The project website was developed and made publically available early in the process. It became the central location for project information and served as a resource for the public and committee members. The site included a general project description of the project, maps and presentations. The project's two committees were explained and the schedule of upcoming meetings was kept current. Committee meeting materials (meeting agendas and meeting summaries) were posted before and after each committee meeting. Maps, reports and presentations were also provided on the website as they were finalized by the project team.

**Project Newsletters and Podcasts**
The community received updates about the project through three informational newsletters. The newsletters were mailed to an area surrounding the interchange and posted on the project website. Two project Podcasts were created. The first one mirrored the material from the second project newsletter and the second Podcast mirrored the third newsletter. They offered a fun, creative and convenient way for community members to learn about the IAMP and its recommendations outside of a traditional public meeting.

Each newsletter was mailed to 6500-7434 addresses in a radius around the interchange. To expand the reach of the third newsletter, it was mailed to an additional 273 absentee property owners. In addition, immediately adjacent property owners, government representatives, previously interviewed stakeholders, environmental and freight groups received newsletters with notice about the meeting. Additional newsletters were made available at Keizer and Salem City Hall, the Keizer Library and the Keizer Chamber of Commerce.

The last newsletter included a statement in Spanish and a local hotline number for requesting project information in Spanish.

**Open Houses**
Two events were held to share information and invite feedback from the greater communities in Marion County, Salem and Keizer. The first was held July, 2008 and the second on October 14, 2009. Both were open house events; project information was shared and staff engaged participants in discussion and answered their questions. A comment form was used at each. It provided the primarily tool for recording the feedback received. At the second open house, the comment form was also made available online for a week before and a week following the open house. Feedback received was recorded in an open house report and shared with the two project committees after the event.

**Meeting Notification**
Several methods were used to reach the interested public in and around the project area. All notice included names, titles and contact information for project staff. In addition to the project newsletters, an email notification was sent (55 addresses for the first open house and 123 addresses for the second open house). The list included individuals who had expressed interest in the project, local businesses, organizations, members of the PMT and SAC, City Councilors from Salem and Keizer, the Transit District Board, local faith-based organizations and the Mid-Willamette Area Commission on Transportation (MWACT).

Before the July 2008 event, the Statesman Journal ran an article on the project and open house, which many meeting attendees mentioned at the open house. A display ad ran in the June 27th and July 4th editions of the Keizer Times newspaper. The Statesman Journal ran an article on the project and open house on October 7,

2009. The October 9th edition of the Keizer Times newspaper included a meeting announcement and it was posted online on October 13, 2009. The City of Keizer and Salem websites also announced the meeting. Both CVTV and Keizer Channel 23 televised announcements of the open house.

A press release was sent to media contacts through ODOT's Region 2 office before each event. The project website also advertised the open house on its front page.

The majority of meeting attendees who completed comment forms at the first meeting noted that they heard about the Open House through the project newsletter. The majority of participants who completed comment form during the second event noted that they heard about the Open House through an article in the Statesman Journal. Others heard about the opportunity to participate by receiving a newsletter at their home or place of business.

**Title VI Notification**

Project information, particularly in anticipation of an open house, was shared with the public in a variety of ways to make it easier for all members of the community to participate. Meeting venues were selected that were ADA accessible and adequately served by public transportation. Notices for open house events were posted on the project's website, the newspaper and on community television. The project website is available in English and in Spanish. The online survey provided an alternative way to attending the second open house. A comment form on the project website provided a venue throughout the project for community members to share comments.

Notice for the second open house included a statement in Spanish that said project information could be made available in Spanish. The notice included a hotline phone number that is answered in Spanish. Spanish translation was available at the second open house

## Committee Membership

### Project Management Team

| Name | Organization |
|---|---|
| Terry Cole | ODOT Region 2 |
| Dan Fricke | ODOT Region 2 |
| Derryl James | ODOT Region 2 |
| Dorothy Upton | ODOT Region 2 |
| Rodney Thompson | ODOT Region 2 |
| Nate Brown | City of Keizer (Planning) |
| Rob Kissler | City of Keizer (Public Works) |
| Kevin Watson | City of Keizer (Assistant to the City Manager) |
| Stephen Dickey | Salem-Keizer Transit |
| Les Sasaki | Marion County |
| Karen Odenthal | Marion County (Public Works) |
| Glenn Gross | City of Salem (Community Development) |
| Julie Warncke | City of Salem (Transportation) |
| Jill Corcoran | City of Salem (North Gateway Redevelopment Advisory Board) |
| Anthony Boesen | FHWA |
| Raymond Jackson | Salem-Keizer Area Transportation Study |
| Matt Crall | State Department of Land Conservation and Development |

### Stakeholder Advisory Committee

| Name | Organization |
|---|---|
| John Schaad | Bonneville Power Administration |
| Alan Roodhouse | Keizer Station Owner |
| Sam Brentano | Marion County Board |
| Pat Ehrlich | Gubser Neighborhood Association |
| Christine Dieker | Keizer Chamber of Commerce |
| SuAnn Reddick | Chemawa Indian School |
| Jerry Lelack | Keizer Bikeways Committee |
| Rick Nelson | The Volcanoes Baseball |
| Eric F. Scott, PE | Confederated Tribes of Grand Ronde (Also represented the Siletz Tribe) |
| Chuck Bennett | City of Salem City Council |
| Cathy Clark | City of Keizer City Council |
| Randy Jackson | Keizer Fire District |
| Larry Epping | Property Owner |
| Dan Goffin | Marion Co Farm Bureau |
| Tim Potter | ODOT Area 3 Manager |
| Scott Lawrence | Keizer Station Owner- Donahue Schriber |
| Fred VanNatta | Keizer Station Owner- Northwest National |
| Dale Frank | Dale Frank & Associates, Inc. |

Jeanne Lawson Associates, Inc.
public involvement specialists

# IAMP: I-5 Interchange at Chemawa Road
# Stakeholder Interview Summary

***Overview***

Twenty interviews were conducted with individuals representing business, residents, property owners, local governments, interest groups and other organizations with an interest in the I-5 Interchange at Chemawa Road. Participants were asked how the interchange impacted them or the members of their organization and generally about concerns related to the interchange. They were asked if they had any unique access issues that they were concerned about. Each person interviewed was also asked about their experience working with the project's partners (Cities of Keizer and Salem, Marion County and ODOT).

***Interchange Function***

Generally, participants reported that the interchange currently functions quite well. Several interview participants said that the interchange works better than it did previously. Bonneville Power Administration service vehicles and visitors to the Volcanoes baseball stadium have found that the new cloverleaf, designed with the Keizer Station development, has really improved the function of the interchange. Even when there is a freight train in the area, visitors can still get into and out of the stadium area for a game. So far, the Volcanoes management reports that customers of the businesses at Keizer Station do not cause traffic conflicts with activities at the stadium. Concerns were expressed about what full build out at Keizer Station might bring in terms of traffic.

***Transit and Bicycle access***

Participants in the interviews said that transit should be considered in the future, although there is no service in the vicinity currently.

The area was described as "complicated" for bikes. The Keizer Bikeways Committee, a group sponsored and supported by the City of Keizer, reported successes for cyclists in the Keizer Station Development Plan including an underpass for bikes and pedestrians under Chemawa Road. On-going construction has made the road a rough one for cyclists, but generally the north-south movement has improved in the area. Crossing I-5 or traveling east-west, on the other hand, is very difficult for cyclists. The southbound and northbound off ramps are wider than they used to be. They report that many people have stopped riding in the area because of safety concerns.

One interviewee mentioned that a new interchange at Quinaby Road would benefit cyclists because they cannot currently cross I-5 at Brooklake Road.

***Importance for the Keizer Community***

This is an important access point for the City of Keizer. Although it was reported that some of Keizer's residents currently use the Brooks interchange, the Chemawa interchange provides Keizer's main access to I-5. As one interviewee said, "Chemawa Interchange is critical to the livability and economic vitality of the city. Keizer is very invested in the interchange's proper function." A couple of specific reasons were mentioned for its importance. Many people in Keizer use the I-5 corridor to work in Wilsonville and

Portland. A representative of the Gubser neighborhood, just west of the interchange said that people choose to live in this community because of the convenient access to I-5. The Keizer business community considers this access point critical to their success. In addition, industrial uses on Salem Parkway rely on this interchange for the movement of goods. One participant pointed out that not only is this interchange important to the Keizer Community, but Keizer is the northern gateway to the entire Willamette Valley and this interchange represents that gateway. Some in the Keizer community are working now to create a visitor center for travelers at the Keizer Station development.

The retail businesses at Keizer Station draw a considerable portion of their market from West Salem that is connected to this area via Salem Parkway. For them, access along Salem Parkway and into the Keizer Station development is critical to their success.

The focus of traffic into Keizer via Chemawa/Lockhaven Road has driven some to identify a need for a new interchange on I-5. The location mentioned in these interviews was at Quinaby Road. It was explained that growth boundary discussions in Keizer lead to the identification of this need, but that it was a necessity even without a northern expansion of the City. Several of those interviewed shared concerns about focusing traffic on the Chemawa Interchange because of the impact to Keizer if the function of the interchange were to deteriorate over time. A few of those interviewed mentioned Woodburn as a mistake they didn't want to see replicated here. The Brooks and the Hayesville interchanges (north and south of the Chemawa Interchange) were said to be important to the function of the interchange at Chemawa—participants said they didn't want to see this area examined in isolation, and they also didn't want to see all of the area's traffic funneled into Chemawa alone. Quinby Road is a preferred location for this new interchange because it has good connections to Salem Parkway and 35th Avenue.

The new interchange was needed, some said, because of a basic concern about safety. The Brooks interchange is used heavily by trucks carrying freight and the interchange is not designed well to accommodate that freight traffic plus additional passenger vehicles (cars, buses, bikes). A concern was shared that new uses in the Brooks interchange area, including Chemeketa Community College, that bring more people into this interchange, will mean more dangerous conflicts between trucks and cars.

One participant from Keizer expressed concern about changes to the interchange caused by future development on the eastside of the interchange. They were very concerned about development on that side damaging the function of the interchange and because of Keizer's reliance on this one access point, negatively impacting the Keizer community.

***Salem Concerns and Issues***

It was pointed out that "there is tremendous potential for growth" east of the interchange on Hazelgreen Road east to Cordon Road. As mentioned previously, participants from the west side of the freeway who had already participated in a high level of transportation planning for the future of the

interchange expressed the desire that development on the east side of the interchange be subject to the same level of work and sacrifice that they were.

Although a lot of questions remain in participant's minds about the potential for changes in this area, one significant development that was mentioned in the interview process was an approved 500+ unit subdivision on Hazelgreen Road 1.5 miles east of the interchange. Concerns were expressed about how much land around the interchange might develop and what the impact to the City of Salem may be. The President of the Marion County Farm Bureau expressed concern about the loss of prime farm land for urban development. He reported that this area contains some of the highest quality land for farming in the entire country.

Specific access concerns were shared by the Northgate Neighborhood Association. They reported that the access provided from Indian School Road onto Lockhaven Drive was important to neighbors. They also shared a concern about congestion on Portland Road at Hazelgreen/Chemawa Road. The intersection gets bottlenecked today and that could get worse in the future with new residential, retail and transit demands.

The City of Salem is concerned about intercity bridges that take people through Salem to reach other places. They City expressed worry about the impact this type of cut-through may have on Salem's neighborhoods. That concern has been an issue for them in the Salem River Crossing process. Other interviewees mentioned this project, also referred to as the "Third Bridge" project. They thought there may be opportunities for information sharing between that project and this one, specifically, transportation data. It was also pointed out that this project, if constructed, would have a major impact on traffic volumes at this interchange because of the new connection provided, via the Salem Parkway to I-5.

***Concerns about Project Partners***

Very few concerns were shared about the partners involved in this process (ODOT, City of Salem, City of Keizer). Most interviewed reported very positive working relationships with each group. One interviewee expressed concern about ODOT's lack of transparency, particularly in terms of project funding. Another shared concern about how long it takes ODOT to "get things done." The following are a couple of the statements heard about ODOT, "their projects seem to start and stop." It is "hard to get ODOT to do things." Although no one specifically mentioned it as a concern, it was pointed out by more than one interview participant that the process to reach agreement on the transportation improvement required as a result of the Keizer Station development was hard fought and emotional. One interviewee said, "all parties had to give."

***History of the Interchange***

Some participants in the interviews shared stories about what has occurred in the past at this interchange.

The property in the northeast quadrant of the interchange area, just to the east of the interchange was recently annexed into the City of Salem. At the time, the property was owned by Coleson and Coleson Construction and has come to be known as the "Coleson and Coleson" property. When the annexation request was made, a transportation plan was provided by the applicant that proposed a loop road through a property south of Hazelgreen Road owned by the Bureau of Indian Affairs. This property is occupied by the Chemawa Indian School, and the loop road was proposed through their historic campus which they report is on the US Register of Historic Places. Board members and staff from the Chemawa Indian School opposed this proposal. A new owner is negotiating the purchase of this property. That owner is interested in developing retail and auto sales on the site.

***Public Involvement Resources***

One participant shared ideas about how to reach the public to encourage their participation in the process. Ideas mentioned included coordination with the City of Salem and Keizer, Newspapers (Statesman Journal and Keizer Times), Salem and Keizer Chambers of Commerce, Neighborhood Associations.

APPENDIX P

# Local Agency Code Amendments

# APPENDIX P – LOCAL AGENCY CODE AMENDMENTS

## CITY OF KEIZER

### Section X.XXX

### CIOD - CHEMAWA INTERCHANGE OVERLAY DISTRICT

### X.XXX.010 Purpose

The purpose of the CIOD – Chemawa Interchange Overlay District is the long-range preservation of operational efficiency and safety of the I-5/Chemawa Interchange and to implement the I-5/Chemawa Interchange Area Management Plan (IAMP). The I-5/Chemawa Interchange is located at the north ends of the Cities of Keizer and Salem in the central western portion of Marion County. The interchange serves a wide range of land uses and a very large geographic area. These land uses are primarily residential, commercial, educational services, and agricultural. Access to traveler services and industrial uses are not primary functions of the interchange.

The Chemawa Interchange is the primary access to I-5 for the City of Keizer and its predominantly residential land uses as well as Keizer Station, a developing commercial area that is located in the NW and SW quadrants of the interchange. The Chemawa Indian School, in the southeast quadrant of the interchange, is a large educational use in the interchange area and will likely continue to grow on its existing site. The area northeast of the interchange includes land within Salem city limits, which is planned to be developed as a "gateway" business park with supportive commercial services. Land on the east side of the interchange also includes county-zoned agricultural parcels.

### X.XXX.020 Boundary of the CIOD

The boundary of the CIOD is shown on the Keizer Comprehensive Land Use Plan Map and Zoning Map.

### X.XXX.030 Applicability

The provisions of this section shall apply to all Type II, III, and IV land use applications pursuant to Section 3.101 for parcels wholly or partially within the CIOD, as defined by Section X.XXX.020. The standards of the CIOD shall supersede where conflicts arise between the standards of the CIOD and those contained within other sections of the Keizer Development Code.

### X.XXX.040 Permitted Land Uses

Uses allowed in the underlying zoning district are allowed subject to other applicable provisions in the Development Code and Chapter 2, Zoning Districts.

### X.XXX.050 Access Management

In addition to the standards and requirements of Sections 2.302, Street Standards, and 2.303, Off Street Parking and Loading, parcels wholly or partially within the CIOD are

governed by the Access Management Plan in the I-5/Chemawa IAMP (Section 5.2). The following applies to land use and development applications for parcels within the overlay district that are subject to Section X.XXX, Site Plan Review.

A. Access Approval

1. Access to local streets within the CIOD shall be subject to joint review by the City and the Oregon Department of Transportation (ODOT) and, where applicable, by Marion County. Coordination of this review will occur pursuant to Section X.XXX.070.

2. Approval of an access permit is an Type I decision and is based on the standards contained in this section, the provisions of Sections 2.302, Street Standards, and 2.303, Off Street Parking and Loading in the Keizer Development Code, and the Access Management Plan in the I-5/Chemawa IAMP (Section 5.2). Where the recommendations of the Access Management Plan conflict with other access and spacing requirements in Section 2.301, Street Standards, Development Code, the Access Management Plan shall govern.

**X.XXX.060 Transportation Demand Management**

A. The Cities and County shall enhance transportation demand management (TDM) programs in the Interchange Management Area. The programs should include but not be limited to the following elements, which are based on TDM program elements adopted by the City of Salem in its TSP.

1. Rideshare hotline;

2. Carpool and vanpool formation and matching services;

3. Information for the public about transit service, vanpools, bicycle and pedestrian routes, teleworking, park-and-ride facilities, ridesharing organizations, and special needs transportation services that is available online, on a hotline, and in materials at public institutions;

4. Person-to-person outreach at community events, at community group events and meetings, and in schools, including K-8 bicycle and walking safety programs;

5. Services to employers, including commuting surveys and individualized trip reduction plans;

6. Targeted marketing of alternative transportation modes to groups with the greatest potential for reducing single-occupancy vehicle (SOV) trips including employers and employment sites, students, and community members identified through neighborhood and localized surveys; and

7. Coordination with other agencies and organizations with similar goals.

## X.XXX.070 Administration

This section delineates the responsibilities of the City and ODOT to monitor and evaluate vehicle trip generation on the Chemawa Interchange from development approval under this section.

A. Transportation Assessment Report

For all development applications located within the CIOD, the applicant shall prepare and submit to the City a Transportation Assessment Report that documents the following:

1. Expected weekday p.m. peak hour trip generation.

2. Off-site improvements that will be constructed as part of the development.

3. Proposed site-access driveways and streets that are in conformance with the requirements of Section 2.302, Street Standards, Section 2.303, Off Street Parking and Loading, and the IAMP Access Management Plan (Section 5.2) to ensure that adequate intersection sight distance and traffic control will be provided.

4. An on-site parking and circulation plan to ensure safe and efficient travel for all modes of travel, including turn movement templates (AutoTurn analysis) for anticipated trucks and emergency service vehicles.

B. Traffic Impact Analysis

For all development applications located with the CIOD that increase site traffic volume generation by 250 Average Daily Trips (ADT) or more (or as required by the City Engineer), the applicant shall prepare and submit to the City a Traffic Impact Analysis (TIA) that demonstrates the level of impact of the proposed development on the surrounding street system and the I-5/Chemawa interchange.

The determination of impact or effect, and the scope of the TIA, shall be coordinated with the provider of the affected transportation facility. The developer shall be required to mitigate impacts attributable to the project, including any impacts that may occur outside of the CIOD.

C. Agency Coordination

1. The City shall not deem the land use application complete unless it includes a Traffic Assessment Report or, if required by Section X.XXX.070B, a Transportation Impact Analysis prepared in accordance with the requirements of this Chapter.

2. The City shall provide written notification to ODOT when the application is deemed complete. This notice shall include an invitation to ODOT, City of Salem, and Marion County to participate in the City's site team review meeting, pursuant to Section 3.210, Pre-Application Conference.

3. The City/County shall also provide written notification to the transit agency and other public or quasi-public agencies that serve the IAMP Management Area when the application is deemed complete.

4. ODOT shall have at least 20 days, measured from the date completion notice was mailed, to provide written comments to the City. If ODOT does not provide written comments during this 20-day period, the City staff report will be issued without consideration of ODOT comments.

## X.XXX.080 Comprehensive Plan and Zoning Map and Text Amendments

This section applies to all Comprehensive Plan Map and Zoning Map amendments for parcels wholly or partially within the CIOD and code amendments that affect development within the CIOD.

A. Transportation Planning Rule Requirements. Applications for Comprehensive Plan amendments, Zoning Map amendments, or development regulation amendments shall determine whether the proposed change will significantly affect a collector or arterial transportation facility and must meet the requirements of Oregon Administrative Rule (OAR) 660-012-0060.

B. Limitations on Comprehensive Plan and Zoning Map and Text Amendments. To improve safety and ensure that the capacity of the I-5/Chemawa Interchange is reserved for residential, commercial, and educational service uses surrounding the interchange, consistent with the principal function of the facility, this section imposes limitations on Comprehensive Plan Land Use Plan Map and Zoning Map amendments within the IAMP Overlay District and on code amendments that affect development within the CIOD. The following actions are prohibited unless part of a legislative update of the IAMP, pursuant to the provisions of the IAMP and Subsection X.XXX.090:

   1. Legislative amendments that allow land uses that will generate traffic in excess of the number of trips generated by SKATS modeling conducted for the IAMP.

## X.XXX.090 Interchange Area Management Plan Review and Update

A. IAMP Review Triggers. In order to ensure that the interchange function and capacity is preserved, ODOT and City, shall coordinate to undertake a formal IAMP review when the following occurs:

   1. [Five to ten years] has elapsed since the date of IAMP adoption or since the last update occurred.

   2. Comprehensive Land Use Plan Map or Zoning Map amendments proposed for land within the COID that have a “significant affect” on the transportation system and/or I-5/Chemawa Interchange, pursuant to Section -0060 of the Transportation Planning Rule.

   3. Changes or conditions that are identified in the IAMP Policies and Actions occur and have the potential to change the operational or functional expectations of the current IAMP.

B. IAMP Updates.

1. If the findings and conclusions from an IAMP review demonstrate the need for an update to the plan, review participants will initiate an IAMP update process pursuant to the provisions of the IAMP.
2. An updated IAMP that results from a City-initiated review process pursuant to Section X.XXX.090, or from a Comprehensive Plan Land Use Plan Map amendment pursuant to Section X.XXX.080, shall be legislatively adopted, requiring a City Council public hearing, as an amendment to the City of Keizer Transportation System Plan and will be adopted by the OTC as an update to the Oregon Highway Plan.
3. If a proposed land use change would result in the need for additional capacity at the interchange, the initiating party also shall prepare a mitigation funding plan for ODOT and local jurisdiction review as part of an update to the IAMP.

**City of Keizer Development Code**

**2.301.04 Traffic Impact Analysis (TIA)**

D. Traffic Impact Analysis Requirements. (07/09)

1. Preparation. A Traffic Impact Analysis shall be prepared by a professional engineer in accordance with OAR 734-051-180. The traffic analysis will be paid for by the applicant. (07/09)

2. Transportation Planning Rule Compliance. See Section 3.111.05 Transportation Planning Rule Compliance. (07/09)

3. Pre-application Conference. The applicant will meet with Keizer Public Works prior to submitting an application that requires a Traffic Impact Analysis. The City has the discretion to determine the required elements of the TIA and the level of analysis expected. <u>The City shall also consult the Oregon Department of Transportation (ODOT) on analysis requirements when the proposed development is adjacent to or otherwise affects a State roadway.</u> (07/09)

## APPENDIX P – LOCAL AGENCY CODE AMENDMENTS

# Proposed Salem TSP Policies

## General Policies

*Notice of Proposed Land Use or Zone Changes in Interchange Management Areas*
The City of Salem shall provide to ODOT, other affected jurisdictions, and public transportation service providers notification about land use plan, zoning, and/or traffic related ordinance quasi-judicial or legislative changes proposed in any Interchange Management Area identified in an Interchange Area Management Plan (IAMP) adopted by the Oregon Transportation Commission (OTC). The purpose of the notification will be to provide an opportunity to review and comment on any potential traffic impacts associated with the subject proposal.

## Policies Specific to the NE Area

*Support for Continued Educational Use of the Chemawa Indian School Property*
The City of Salem supports the use of the Bureau of Indian Affairs property occupied by the Chemawa Indian School for educational purposes. Anticipated future traffic demand from this property is based upon the expectation that this property will continued to be used for educational purposes through the 2031 planning horizon. ODOT, Cherriots, Marion County, and the City of Keizer shall be given notice of any proposed changes in the zoning or land use designation of this property and provided with a timely opportunity to review and comment on the potential traffic impact that may be associated with the proposed changes.

*Chemawa Interchange Area Management Plan Review and Update*
The Oregon Transportation Commission (OTC) will provide alternative mobility standards through their adoption of the Chemawa Interchange Area Management Plan (IAMP) for several intersections within the IAMP's defined Interchange Management Area (IMA). These standards are based on forecasted transportation system operational conditions in 2031 assuming build out of the land use designations adopted by the City of Salem, the City of Keizer, and Marion County and no changes to the transportation network within the IMA as of 2010. These assumptions were used to simulate future 2031 transportation system operational conditions in the traffic model developed and maintained by the Salem-Keizer Area Transportation Study (SKATS) circa 2010. If legislatively-initiated changes that will significantly affect the alternative mobility standards within the IMA are proposed to the transportation system and/or the land use or zoning designations within the IMA, the City of Salem shall collaborate and coordinate with ODOT and other appropriate jurisdictions to update the Chemawa IAMP and the alternative mobility standards in accordance with the outcome of the legislative process.

*Definition of Chemawa Interchange Function*

The recommended interchange and transportation network improvements in the Chemawa IAMP are intended to serve the increased travel demand expected from planned and forecasted growth in Salem and Keizer. This demand will come largely from residential and commercial development as described in the Chemawa IAMP and provided for by the Salem and Keizer land use plans and zoning ordinance (circa 2010). The Chemawa interchange serves as the northern gateway to the Salem/Keizer Metropolitan Area and a wide range of land uses over a very large geographic area. Accordingly, it is the primary function of this interchange to serve statewide travel through the Salem/Keizer Metropolitan Area, and regional travel; that is, travel with one trip end in the Salem/Keizer Metropolitan Area and one outside of the area. An operationally functional Chemawa Interchange is also essential to the area's growth and economic development. Consequently, it is also a primary function of this interchange to serve the wide range of adopted land uses within Salem, Keizer, and Marion County that depend on the interchange for access to Interstate 5. These land uses are primarily residential, commercial, educational services, and agricultural.

Provision of services for I-5 travelers is a secondary, and not a primary function for this interchange. Aside from trips that serve the agricultural industry and industrial land uses in outlying small cities in Marion County like Silverton, it is also not a primary function of the Chemawa Interchange to serve industrial development. Finally, The Chemawa interchange is not intended to serve additional commercial development within the Interchange Management Area (as defined in the Chemawa IAMP) to the extent that such uses would increase trip generation during periods of peak demand over the levels already expected in association with the implementation of the Salem and Keizer land use plans and zoning ordinances (circa June 2011).

# APPENDIX P – LOCAL AGENCY CODE AMENDMENTS

## MARION COUNTY

### Section X.XXX

### CIOD - CHEMAWA INTERCHANGE OVERLAY DISTRICT

#### X.XXX.010 Purpose

The purpose of the CIOD – Chemawa Interchange Overlay District is the long-range preservation of operational efficiency and safety of the I-5/Chemawa Interchange and to implement the I-5/Chemawa Interchange Area Management Plan (IAMP). The I-5/Chemawa Interchange is located at the north ends of the Cities of Keizer and Salem in the central western portion of Marion County. The interchange serves a wide range of land uses and a very large geographic area. These land uses are primarily residential, commercial, educational services, and agricultural. Access to traveler services and industrial uses are not primary functions of the interchange.

The Chemawa Interchange is the primary access to I-5 for the County of Keizer and its predominantly residential land uses as well as Keizer Station, a developing commercial area that is located in the NW and SW quadrants of the interchange. The Chemawa Indian School, in the southeast quadrant of the interchange, is a large educational use in the interchange area and will likely continue to grow on its existing site. The area northeast of the interchange includes land within Salem County limits, which is planned to be developed as a "gateway" business park with supportive commercial services. Land on the east side of the interchange also includes county-zoned agricultural parcels.

#### X.XXX.020 Boundary of the CIOD

The boundary of the CIOD is shown on the Marion County Comprehensive Land Use Plan Map and Zoning Map.

#### X.XXX.030 Applicability

The provisions of this section shall apply to all Administrative, Quasi-judicial, or Legislative land use applications pursuant to Chapter 16.37, Application Review procedures, for parcels wholly or partially within the CIOD, as defined by Section X.XXX.020. The standards of the CIOD shall supersede where conflicts arise between the standards of the CIOD and those contained within other sections of the Marion County Rural and Urban Zone Codes.

#### X.XXX.040 Permitted Land Uses

Uses allowed in the underlying zoning district are allowed subject to other applicable zoning regulations in the Marion County Rural Zone Code, Chapter 17.

## X.XXX.050 Access Management

In addition to the standards and requirements of Title 11, Roads and Rights-of-Way, parcels wholly or partially within the CIOD are governed by the Access Management Plan in the I-5/Chemawa IAMP (Section 5.2). The following applies to land use and development applications for parcels within the overlay district that are subject to Site Plan Review.

A. Access Approval

1. Access to local streets within the CIOD shall be subject to joint review by the County and the Oregon Department of Transportation (ODOT). Coordination of this review will occur pursuant to Section X.XXX.070.

2. Approval of an access permit is an Administrative Action and is based on the standards contained in this chapter, the provisions of Title 11, Roads and Rights-of-Way, and the Access Management Plan in the I-5/Chemawa IAMP. Where the recommendations of the Access Management Plan conflict with other access and spacing requirements in the Marion County Code, the Access Management Plan shall govern.

## X.XXX.060 Transportation Demand Management

A. The County shall enhance transportation demand management (TDM) programs in the Interchange Management Area. The programs should include but not be limited to the following elements, which are based on TDM program elements adopted by the Marion County in its TSP.

1. Rideshare hotline;

2. Carpool and vanpool formation and matching services;

3. Information for the public about transit service, vanpools, bicycle and pedestrian routes, teleworking, park-and-ride facilities, ridesharing organizations, and special needs transportation services that is available online, on a hotline, and in materials at public institutions;

4. Person-to-person outreach at community events, at community group events and meetings, and in schools, including K-8 bicycle and walking safety programs;

5. Services to employers, including commuting surveys and individualized trip reduction plans;

6. Targeted marketing of alternative transportation modes to groups with the greatest potential for reducing single-occupancy vehicle (SOV) trips including employers and employment sites, students, and community members identified through neighborhood and localized surveys; and

7. Coordination with other agencies and organizations with similar goals.

## X.XXX.070 Administration

This section delineates the responsibilities of the County and ODOT to monitor and evaluate vehicle trip generation on the Chemawa Interchange from development approval under this section.

A. Transportation Assessment Report

For all development applications located within the CIOD, the applicant shall prepare and submit to the County a Transportation Assessment Report that documents the following:

1. Expected weekday p.m. peak hour trip generation.

2. Off-site improvements that will be constructed as part of the development.

3. Proposed site-access driveways and streets that are in conformance with the requirements of Title 11, Roads and Rights-of-Way, and the IAMP Access Management Plan to ensure that adequate intersection sight distance and traffic control will be provided.

4. An on-site parking and circulation plan to ensure safe and efficient travel for all modes of travel, including turn movement templates (AutoTurn analysis) for anticipated trucks and emergency service vehicles.

B. Traffic Impact Analysis

For all development applications located with the CIOD that increase site traffic volume generation by 250 Average Daily Trips (ADT) or more (or as required by the County Engineer), the applicant shall prepare and submit to the County a Traffic Impact Analysis (TIA) that demonstrates the level of impact of the proposed development on the surrounding street system and the I-5/Chemawa interchange.

The determination of impact or effect, and the scope of the TIA, shall be coordinated with the provider of the affected transportation facility. The developer shall be required to mitigate impacts attributable to the project, including any impacts that may occur outside of the CIOD.

C. Agency Coordination

1. The County shall not deem the land use application complete unless it includes a Traffic Assessment Report or, if required by Section X.XXX.070B, a Transportation Impact Analysis prepared in accordance with the requirements of this Chapter.

2. The County shall provide written notification to ODOT when the application is deemed complete. This notice shall include an invitation to ODOT and the Cities of Keizer and Salem to participate in the County's site team review meeting, pursuant to Section XX.XX.XXX, Pre-Application Requirements.

3. The County shall also provide written notification to the transit agency and other public or quasi-public agencies that serve the IAMP Management Area when the application is deemed complete.

4. ODOT shall have at least 20 days, measured from the date completion notice was mailed, to provide written comments to the County. If ODOT does not provide written comments during this 20-day period, the County staff report will be issued without consideration of ODOT comments.

## X.XXX.080 Comprehensive Plan and Zoning Map and Text Amendments

This section applies to all Comprehensive Plan Map and Zoning Map amendments for parcels wholly or partially within the CIOD and code amendments that affect development within the CIOD.

A. Transportation Planning Rule Requirements. Applications for Comprehensive Plan amendments, Zoning Map amendments, or development regulation amendments shall determine whether the proposed change will significantly affect a collector or arterial transportation facility and must meet the requirements of Oregon Administrative Rule (OAR) 660-012-0060.

B. Limitations on Comprehensive Plan and Zoning Map and Text Amendments. To improve safety and ensure that the capacity of the I-5/Chemawa Interchange is reserved for residential, commercial, and educational service uses surrounding the interchange, consistent with the principal function of the facility, this section imposes limitations on Comprehensive Plan Land Use Plan Map and Zoning Map amendments within the IAMP Overlay District and on code amendments that affect development within the CIOD. The following actions are prohibited unless part of a legislative update of the IAMP, pursuant to the provisions of the IAMP and Subsection X.XXX.090:

   1. Legislative amendments that allow land uses that will generate traffic in excess of the number of trips generated by SKATS modeling conducted for the IAMP.

## X.XXX.090 Interchange Area Management Plan Review and Update

A. IAMP Review Triggers. In order to ensure that the interchange function and capacity is preserved, ODOT and County, shall coordinate to undertake a formal IAMP review when the following occurs:

   1. [Five to ten years] has elapsed since the date of IAMP adoption or since the last update occurred.

   2. Comprehensive Land Use Plan Map or Zoning Map amendments proposed for land within the COID that have a “significant affect” on the transportation system and/or I-5/Chemawa Interchange, pursuant to Section -0060 of the Transportation Planning Rule.

   3. Changes or conditions that are identified in the IAMP Policies and Actions occur and have the potential to change the operational or functional expectations of the current IAMP.

B. IAMP Updates.

1. If the findings and conclusions from an IAMP review demonstrate the need for an update to the plan, review participants will initiate an IAMP update process pursuant to the provisions of the IAMP.
2. An updated IAMP that results from a County-initiated review process pursuant to Section X.XXX.090, or from a Comprehensive Plan Land Use Plan Map amendment pursuant to Section X.XXX.080, shall be legislatively adopted, requiring a County Commission public hearing, as an amendment to the Marion County Transportation System Plan and will be adopted by the OTC as an update to the Oregon Highway Plan.
3. If a proposed land use change would result in the need for additional capacity at the interchange, the initiating party also shall prepare a mitigation funding plan for ODOT and local jurisdiction review as part of an update to the IAMP.

## Section X.XXX.XXX

## TRAFFIC IMPACT ANALYSIS (TIA)

### X.XXX.010 Purpose

The purpose of this section of the code is to implement Section 660-012-0045 (2) (e) of the State Transportation Planning Rule that requires the County to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This section establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Analysis must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Analysis; and who is qualified to prepare the Analysis.

### X.XXX.020 Applicability

A. When Required. A Traffic Impact Analysis shall be required to be submitted to the County with a land use application, when the following conditions apply:

1. The development application involves one or more of the following actions:

   a. A change in zoning or a plan amendment designation; or

   b. The development shall cause one or more of the following effects, which can be determined by field counts, site observation, traffic impact analysis or study, field measurements, crash history, Institute of Transportation Engineers Trip Generation manual; and information and studies provided by the local reviewing jurisdiction and/or ODOT:

      1) An increase in site traffic volume generation by 250 Average Daily Trips (ADT) or more (or as required by the County Engineer). The latest edition of the Trip Generation manual, published by the Institute of Transportation Engineers (ITE) shall be used as standards by which to gauge average daily vehicle trips; or

      2) An increase in use of adjacent streets by vehicles exceeding the 20,000 pound gross vehicle weights by 10 vehicles or more per day; or

      3) The location of the access driveway does not meet minimum intersection sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate, creating a safety hazard; or

      4) The location of the access driveway does not meet the access spacing standard of the roadway on which the driveway is located; or

      5) A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or traffic crashes in the approach area.

## X.XXX.030 Traffic Impact Analysis Requirements

A. Preparation. A Traffic Impact Analysis shall be prepared by a professional engineer in accordance with OAR 734-051-180. The traffic analysis will be paid for by the applicant.

B. Transportation Planning Rule Compliance. See Section X.XXX.080(A), Transportation Planning Rule Requirements.

C. Pre-application Conference. The applicant will meet with Marion County Public Works prior to submitting an application that requires a Traffic Impact Analysis. The County has the discretion to determine the required elements of the TIA and the level of analysis expected. The City shall also consult the Oregon Department of Transportation (ODOT) on analysis requirements when the proposed development is adjacent to or otherwise affects a State roadway.

## X.XXX.040 Approval Criteria

A. Criteria. When a Traffic Impact Analysis is required, approval of the development proposal requires satisfaction of the following criteria:

1. Traffic Impact Analysis was prepared by a professional engineer in accordance with OAR 734-051-180; and

2. If the proposed development shall cause one or more of the effects in Section 2.301.03.C, above, or other traffic hazard or negative impact to a transportation facility, the Traffic Impact Analysis shall include mitigation measures that meet the County's Level-of-Service and Volume/Capacity standards and are satisfactory to the County Engineer, and ODOT when applicable; and

3. The proposed site design and traffic and circulation design and facilities, for all transportation modes, including any mitigation measures, are designed to:

   1) Have the least negative impact on all applicable transportation facilities; and

   2) Accommodate and encourage non-motor vehicular modes of transportation to the extent practicable; and

   3) Make the most efficient use of land and public facilities as practicable; and

   4) Provide the most direct, safe and convenient routes practicable between on-site destinations, and between on-site and off-site destinations; and

   5) Otherwise comply with applicable requirements of the Marion County Urban and Rural Zone Codes .

## X.XXX.050 Conditions of Approval

A. The County may deny, approve, or approve a development proposal with appropriate conditions.

1. Where the existing transportation system will be impacted by the proposed development, dedication of land for streets, transit facilities, sidewalks, bikeways, paths, or accessways may be required to ensure that the transportation system is adequate to handle the additional burden caused by the proposed use.

2. Where the existing transportation system is shown to be burdened by the proposed use, improvements such as paving, curbing, installation or contribution to traffic signals, construction of sidewalks, bikeways, accessways, paths, or streets that serve the proposed use may be required.

APPENDIX Q

# Alternative Mobility Standards

# Chemawa Road IAMP:
## Alternative Traffic Mobility Targets Overview

| | |
|---|---|
| PREPARED FOR: | Terry Cole/ODOT<br>Dorothy Upton/ODOT<br>Nate Brown/City of Keizer<br>Glenn Gross/City of Salem |
| PREPARED BY: | Tony Woody/CH2M HILL |
| CC: | Rick Kuehn/CH2M HILL |
| DATE: | October 6, 2010 (Revised July 7, 2012) |

## 1. Introduction

Several intersections within the Chemawa IAMP study area are not expected to meet ODOT, City of Keizer, or City of Salem traffic mobility standards by 2031. As a result and based on ODOT Region 2 methodologies, alternative mobility targets were established for study intersections along the Chemawa Road/Lockhaven Drive corridor that are expected to fail.

## 2. Future Traffic Operations

Nine intersections within the traffic operational influence area of the Chemawa/I-5 interchange were reviewed along Chemawa Road and Lockhaven Drive to determine if alternative mobility standards were required. Of the nine intersections evaluated, the seven intersection listed below did not meet current traffic mobility standards.

- Lockhaven Drive/14th Avenue-Kafir Drive
- Lockhaven Drive/McLeod Lane
- Lockhaven Drive/Chemawa Road-Keizer Station Blvd.
- Chemawa Road/Ulali Drive
- Chemawa Road/I-5 SB Ramps
- Chemawa Road/I-5 NB Ramps
- Chemawa Road/OR 99E-Portland Road

In addition to the nine study intersections within the operational influence area, two intersections outside of the operational influence area were not meeting traffic mobility standards; Lockhaven Drive/River Road and Lockhaven Drive/Trail Avenue. Due to the minimal interaction between these two intersections and the Chemawa/I-5 interchange, alternative mobility standards were not established at these locations.

# 3. Alternative Mobility Standards

## 3.1 Methodology

Based on ODOT Region 2 requirements and methodologies, the following process was used to establish future mobility standards.

1. All alternative mobility standard calculations must be based on all feasible improvements. For this study, all alternative mobility standards were based off of the 2031 Baseline scenario.

2. If mobility standards at an intersection or roadway segment are met using standard analysis procedures, no alternative mobility standard is needed.

3. If the volume/capacity (v/c) ratio is greater than the standard Oregon Highway Plan (OHP) or local jurisdiction mobility standard but less than capacity (v/c <1.0) during the design hour, use the standard analysis procedures and establish the alternative standard based on v/c values used in the OHP and request adoption from the Oregon Transportation Commission (OTC).

4. If the v/c ratio is greater than capacity (v/c >1.0) during the design hour after applying step 3, modify the design hour by using the peak hourly volume instead of the peak 15-minute volume. If the v/c ratio is less than capacity (v/c <1.0), establish the proposed alternate standard and request adoption from the OTC.

5. If v/c ratio is greater than capacity during the design hour after applying step 4, modify the design hour by using non-seasonally adjusted traffic volumes. If the v/c ratio is less than capacity (v/c <1.0), establish the proposed alternate standard and request adoption from the OTC.

6. If v/c ratio is greater than capacity during the design hour after applying step 5, determine the duration of the period which the non-seasonally adjusted volumes will have a v/c >1.0 and request adoption from the OTC.

## 3.2 Results of Alternative Mobility Standards

**Table 1** outlines the proposed alternative mobility standards for the intersections that are not expected to meet current mobility standards. The existing mobility standards as well as the v/c ratio with and without alternative mobility standard methods applied are shown in the table.

**Table 1:** Alternative Mobility Standards

| Intersection | Existing Mobility Standard | Alternative Mobility Standard (AMS) | V/C Ratio: No AMS | V/C Ratio: With AMS |
|---|---|---|---|---|
| Chemawa @ OR 99E | V/C 0.85 | • Apply Non-Seasonally Adjusted Volumes for Analysis<br>• Apply Hourly Peaking instead of 15-minute Peaking<br>• Increase mobility standard to V/C < 1.0 | 1.05 | 0.95 |
| Chemawa @ I-5 southbound ramps | V/C 0.87 | • Apply Hourly Peaking instead of 15-minute Peaking<br>• Increase mobility standard to V/C < 1.0 | 1.13 | 0.98 |
| Chemawa @ I-5 northbound ramps | V/C 0.87 | • Apply Non-Seasonally Adjusted Volumes for Analysis<br>• Apply Hourly Peaking instead of 15-minute Peaking<br>• Increase mobility standard to V/C < 1.0 | 1.13 | 0.89 |
| Chemawa @ Ulali/Stadium | V/C 0.87 | • Apply Hourly Peaking instead of 15-minute Peaking<br>• Increase mobility standard to V/C < 1.0 | 1.19 | 0.91 |
| Lockhaven@ Chemawa/Keizer Station | V/C 0.87 | • Increase mobility standard to V/C < 1.0 | 0.97 | 0.97 |
| Lockhaven @McLeod | V/C 0.87 | • Increase mobility standard to V/C < 1.0 | 0.89 | 0.89 |
| Lockhaven @14th | V/C 0.87 | • Apply Non-Seasonally Adjusted Volumes for Analysis<br>• Apply Hourly Peaking instead of 15-minute Peaking<br>• Increase mobility standard to V/C < 1.0 | 1.32 | 0.99 |

APPENDIX R

# Local Agency Letters of Consistency and Ordinance Adoption

# Appendix R – Location Agency Letters of Consistency and Ordinance Adoption