City of La Pine

TRANSPORTATION SYSTEM PLAN

October 2013

VOLUME 2

LA PINE TRANSPORTATION SYSTEM PLAN: VOLUME 2

The following documents make up the content of Volume 2 of the La Pine Transportation System Plan (TSP). This material supports the Volume 1 of the TSP.

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Plan & Policy Review

Technical Memorandum 1: Plan & Policy Review

This memorandum summarizes existing plans, policies, standards, rules, regulations, and other applicable federal, state, regional, and local documents as they pertain to development of the City of La Pine Transportation System Plan (TSP). This summary will serve as a reference for the project team throughout the project, and if new policies are proposed as part of the TSP they will be reviewed for consistency with existing policies.

The documents reviewed by the City of La Pine and Kittelson & Associates, Inc. (KAI) are identified in Table 1 and summarized in the following sections.

Table 1 Documents and Policies Reviewed

Document/Policy	Page Reference
Applicable Statewide Policies	
Statewide Planning Goal 12 (OAR chapter 660 division 012, known as the Transportation Planning Rule or TPR)	2
Oregon Transportation Plan (OTP)	2
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STATE OF OREGON/ODOT

Transportation Planning Rule-OAR Chapter 600 Division 012

Statewide Planning Goal 12, known as the Transportation Planning Rule (TPR), requires cities, counties, Metropolitan Planning Organizations, and ODOT to develop Transportation System Plans (TSPs) that support the provision of a safe, convenient, and economic transportation system. Per Goal 12, there are nine basic requirements of TSPs, as outlined below.

- All modes must be considered.
- The plans must be based on an inventory of local, regional and statewide needs.
- The social consequences of utilizing different combinations of modes must be considered.
- No one mode shall be relied upon as the principal form of transportation.
- Adverse social, economic, and environmental impacts and costs must be minimized.
- Energy must be conserved.
- The needs of the transportation disadvantaged shall be met by improving transportation services.
- The flow of goods and services shall be facilitated to strengthen local and regional economies.
- The TSP must conform with local and regional comprehensive plans.

The City of La Pine's TSP will meet the requirements of the TPR.

Oregon Transportation Plan (2006)

The Oregon Transportation Plan (OTP) is the state's long-range multimodal transportation plan. This plan provides the framework for prioritizing transportation improvements based on future revenue conditions. The OTP is the overarching policy document among a series of plans that together form the state's Transportation System Plan. The plan calls for a transportation system that has a modal balance, is both efficient and accessible, provides connectivity among rural and urban places and between modes, and is environmentally and financially stable.

The Plan outlines the following seven goals, each with associated policies, to guide local, regional and state transportation plans:

- **Goal 1 – Mobility and Accessibility**: Enhance the state's economic vitality and quality of life by providing a balanced, multimodal transportation system. Promote transportation choices that are efficient, integrated, and cost-effective.
- **Goal 2 – Management of the System**: Improve the efficiency of the transportation system by optimizing operations and management. Manage transportation assets to extend their life and reduce maintenance costs.
- **Goal 3 – Economic Vitality:** Expand and diversify the state's economy by transporting people, goods, services and information in safe, energy-efficient and environmentally

sound ways. Provide Oregon with a competitive advantage by promoting an integrated freight system.

- **Goal 4 – Sustainability**: Provide a transportation system that meets today's needs without compromising the ability of future generations to meet their needs with respect to the environment, the economy and communities perspectives.
- **Goal 5 – Safety and Security**: Build, operate and maintain the transportation system so that it is safe and secure. Take into account the needs of all users: operators, passengers, pedestrians and property owners.
- **Goal 6 – Funding the Transportation System**: Create revenue sources that support a viable transportation system today and in the future. The goal recognizes that it is essential to maximize existing resources, invest strategically, consider return on investment and provide equity among rural and urban areas, equity among income groups and access to transportation options throughout Oregon.
- **Goal 7 – Coordination, Communication and Cooperation**: Foster coordination, communication and cooperation between transportation users and providers so various means of transportation function as an integrated system. Work to help all parties align interests, remove barriers and offer innovative, equitable solutions.

The OTP, as the guiding document for regional and local TSPs, establishes goals, policies, strategies and initiatives that address the core challenges and opportunities facing transportation in Oregon. The OTP includes modal components that outline recommendations for standards for various forms of transportation. Table 2 identifies the relevant modal elements as well as the year of adoption by the OTC. Further details on the modal elements are summarized below.

Table 2 OTP Modal Plan Components

Oregon Transportation Plan Element	Year Adopted
Highway Plan	Originally adopted in 1999 (with subsequent amendments); Access Management and Mobility Standards Amendments in 2011
Bicycle/ Pedestrian Plan	Originally adopted in 1995; Second Part of Plan updated in 2011 and retitled the Oregon Bicycle and Pedestrian Design Guide
Freight Plan	Adopted in 2011
Public Transportation Plan	Adopted in 1997
Rail Plan	Adopted in 2001
Aviation Plan	Adopted in 2007

Oregon Highway Plan (with 2006 & 2012 amendments)

The Oregon Highway Plan (OHP) defines policies and investment strategies for Oregon's state highways for the next 20 years. The OHP has three main elements:

- A vision for the future of the State highway system that describes economic and demographic trends in Oregon, future transportation technologies, the policy and legal context of the Highway Plan, and pertinent information on the current highway system.
- Goals, policies, and actions items for system definition, system management, access management, travel alternatives, and environmental and scenic resources.
- An analysis of the 20-year State highway needs, revenue forecasts, descriptions of investment strategies and implementation strategies, and performance measures.

The OHP provides policy and investment guidance for local corridor plans and TSPs, but it leaves the responsibility for identifying specific projects and modal alternatives to the individual plans.

The OHP has been amended several times since its original adoption in 1999. These amendments have addressed items such as the designation of expressways, changes in mobility standards, designation of Special Transportation Areas, and other changes affecting the classification and standards for highways throughout the state.

Several of the policies in the OHP pertinent to the La Pine TSP are described below.

OHP Goal 1: System Definition

- **Policy 1A, State Highway Classification System**: This policy identifies functions and objectives for state highways in order to serve different types of traffic. Greater mobility is expected on interstate and statewide highways than on regional or district highways. The facility classification is used to guide planning, management and investment decisions regarding state highway facilities.

  Through La Pine, US 97 is classified as a Statewide Highway with Expressway designation.
- **Policy 1B, Land Use and Transportation**: This policy establishes the relationship between the highway and adjacent land uses. It emphasizes development patterns that maintain state highways for regional and intercity mobility, and supports compact development. This policy is designed to clarify how ODOT will work with local governments and others to link land use and transportation in transportation plans, facility and corridor plans, plan amendments, access permitting and project development.
- **Policy 1C, State Highway Freight System**: This policy identifies the need to balance the movement of goods and services with other uses and the importance of maintaining efficient through movement on major freight routes.

US 97 is a designated freight route in La Pine.

- **Policy 1E, Lifeline Routes**: This policy identifies the need to provide a secure lifeline network of streets, highways and bridges to facilitate emergency services response, and to support rapid economic recovery after a disaster.

  US 97 is a designated Lifeline Route.

- **Policy 1F, Highway Mobility Standards**[1]: This policy provides standards to ensure a reliable and acceptable level of mobility on the highway system. These standards:
  - Identify state highway mobility performance expectations for planning and plan implementation;
  - Evaluate the impacts on state highways of amendments to transportation plans, acknowledged comprehensive plans and land use regulations; and
  - Guide operations decisions such as managing access and traffic control systems to maintain acceptable highway performance.

  The current OHP's mobility targets use maximum volume to capacity ratios as the primary metric. If a different metric is used (e.g. Travel Time Reliability), coordination with ODOT on how it complies with OHP Policy 1F is necessary.

  The mobility standards are to be applied over a 20-year planning horizon when developing state, regional or local transportation plans. When evaluating highway mobility for amendments to transportation system plans, acknowledged comprehensive plans and land use regulations, local governments should use the planning horizons in adopted local and regional transportation system plans or a planning horizon of 15 years from the proposed date of amendment adoption, whichever is greater. **Policy 1G, Major Improvements**: This policy requires maintaining performance and improving safety by improving efficiency and management before adding capacity. ODOT works with regional and local governments to address highway performance and safety.

  The applicable standard for US 97 through La Pine is a mobility standard of 0.70.s

OHP Goal 2: System Management

- **Policy 2B, Off-System Improvements**: Helps local jurisdictions adopt land use and access management policies.

- **Policy 2E, Intelligent Transportation Systems**: consider a broad range of Intelligent Transportation Systems services to improve system efficiency and safety in a cost-effective manner.

  Variable message signs displaying roadway conditions are currently in place in La Pine south of 1st Street.

[1] The Oregon Transportation Commission reviewed and adopted changes to Policy 1F in December 2011.

- **Policy 2F, Traffic Safety**: continually improve safety for all highway system users with solutions involving engineering, education, enforcement and emergency medical services.
- **Policy 2G, Rail and Highway Compatibility**: increase safety and efficiency by reducing conflicts between rail and highway users.

  Improvements to the Wickiup Junction are currently being considered for funding by ODOT, the County and the City.

OHP Goal 3: Access Management

- **Policy 3A, Classification and Spacing Standards**: Access spacing standards for driveways and approaches to the state highway system are identified, including the location, spacing and type of road and street intersections and approach roads on state highways. The adopted spacing standards, which can be found in Appendix C of the OHP, include standards for each highway classification. Generally, the access spacing distance increases as either the highway's importance or posted speed increases.

  Within the downtown, the OHP identifies a minimum spacing of 500 feet for US 97. North of 1st Street and south of Finley Butte, US 97 is classified as an Urban Expressway resulting in a minimum spacing standard of 2,640 feet.
- **Policy 3D, Deviations**: defines general policies and procedures for deviations from adopted access management standards and policies.

OHP Goal 4: Travel Alternatives

- **Policy 4A, Efficiency of Freight Movement**: This policy identifies the need to maintain and improve the efficiency of freight movement on the state highway system and access to intermodal connections. The State seeks 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.

Oregon Bicycle/Pedestrian Plan

The Oregon Bicycle and Pedestrian Plan is divided into two parts: the Policy and Action Plan and the Bicycle and Pedestrian Design Guide. The first section was adopted in 1995, while the second was updated in 2011. The Plan outlines key characteristics that should be considered relative to providing for bicycles and pedestrians when planning and designing state facilities. The Oregon Bicycle and Pedestrian Plan does not define specific standards for non-ODOT facilities. However, the plan recommends that land use patterns, transportation system layout, public transportation system design, and other related issues consider the impact to both bicycle and pedestrian users and facilities. To this end, the plan provides specific design recommendations for bicycle and pedestrian friendly facilities.

The Bicycle and Pedestrian Design Guide recognizes the role that safe, attractive, convenient and easy to use bicycle and pedestrian facilities play in the provision of the state and local transportation systems. To address these issues, the design guide includes seven chapters that provide guidance on on-road bikeways, restriping, bicycle parking, walkways, street crossings, intersections and shared use paths.

Oregon Freight Plan

The purpose of the Oregon Freight Plan (OFP) is to "improve freight connections to local, state, regional, national and global markets in order to increase trade-related jobs and income for Oregon workers and businesses." The OFP addresses challenges facing the freight system, including system operation and development, safety, communications, environmental considerations, and funding.

The OFP identifies US 97 as a major freight route for the state of Oregon. Further, La Pine has identified lands east of US 97 as high priority industrial development. The TSP will need to consider ways to efficiently connect the industrial lands to the statewide transportation system.

Oregon Public Transportation Plan

As a modal element of the OTP, the Oregon Public Transportation Plan provides a long range vision for the public transportation system in Oregon. This system incorporates public and private transportation providers and is comprised of ridesharing and volunteer programs, taxi and minibus service, and inter-city and intra-city bus and passenger rail services. The Public Transportation Plan outlines three primary goals and associated policies and strategies that guide public transportation through the year 2015.

The Plan recognizes that the public transportation must grow to accommodate a growing population. However, in recognition of limited resources, the Plan prioritizes elements that deliver service to "those Oregonians most dependent on the public transportation system (seniors, disabled, low-income, and youth)".

Within La Pine, fixed route transit service is not provided today, though regional service is provided through Cascades East Transit (CET) and Central Cascade Lines, Inc. (CCL). CET connects the La Pine Park and Ride lot with the Bend Hawthorne Station Monday through Friday on Route 4. CCL provides a similar service, with additional connections in La Pine at the senior center, South County Building, or park and ride lot, connecting riders to their desired location in Bend.

Oregon Rail Plan

The Oregon Rail Plan, adopted in 2001, serves as a comprehensive assessment of the state's rail systems. The Plan focuses on three elements: Rail Policies and Planning Process, Freight Rail, and Passenger Rail. For each of these elements, the Plan summarizes state goals and objectives, measures current and past performance, and updates rail related revenues and costs. The Rail Policies and Planning Process focuses specifically on increasing accessibility and mobility to create a more integrated and connected rail system. The Freight and Passenger elements focus on the development and challenges of the freight and passenger rail systems, respectively.

A Burlington Northern Santa Fe (BNSF) Mainline runs through the City of La Pine. The BNSF intersects US 97 at an at-grade crossing within Wickiup Junction. This Junction has been the subject of considerable study by Deschutes County, as discussed below.

OAR Chapter 734, Division 051

ODOT had adopted OAR 734-051 to establish procedures and criteria to govern highway approaches, access control, spacing standards, medians and restriction of turning movements in compliance with statewide planning goals, in a manner compatible with acknowledged comprehensive plans and consistent with state law and the OTP. Any new street or driveway connections, as well as any changes to existing street or driveway connections, to state roads within the city's urban growth boundary must be in compliance with these rules.

OAR 734-051 policies address the following:

- bringing existing and future approaches into compliance with access spacing standards, and ensure the safe and efficient operation of the highway;
- the purpose and components of an access management plan; and
- requirements regarding mitigation, modification and closure of existing approaches as part of project development.

The access management standards adopted by ODOT and applicable to the City of La Pine's TSP are summarized in Appendix C of the Oregon Highway Plan. OHP Policies 3A and 3C establish access management objectives for state highways based on facility type and set standards for spacing of approaches. These standards have also been adopted as part of OAR 734-051, which provides the regulatory basis for implementation.

Statewide Transportation Improvement Program (2012-2015)

The Statewide Transportation Improvement Program (STIP) is Oregon's four-year transportation capital improvement program that identifies the funding for, and scheduling of, transportation projects and programs. It includes projects on the federal, state, county and city transportation systems, multimodal projects (highway, passenger rail, freight, public transit, bicycle and pedestrian) and projects in the National Parks, National Forests and Indian tribal lands. Oregon's STIP covers a four-year construction period, but is updated every two years in accordance with federal requirements. The currently approved program is the 2012-2015 STIP. The Draft 2015-2018 STIP is currently under development.

When adopted, the 2015-2018 STIP should be reviewed for projects to consider during the development of La Pine's TSP for complementary or conflicting traffic impacts. The approved 2012-2015 STIP identifies two projects within the City of La Pine, as summarized in 3.

Table 3 2012-2015 Approved STIP Projects within the City of La Pine

Section	Total Cost	Description	Status	Year (FFY)
US 97 @ 1st St.	$801,000	Intersection Improvements	Design	2014
US 97 @ Wickiup Junction Development	$3,518,000	Develop Plans and Environmental Documents for Intersection and Improvements and Land Acquisition	Land Purchase	2012

REGIONAL PLANS

Central Oregon Rail Plan

The Central Oregon Rail Plan, adopted in 2009, identifies a regional strategy to address rail safety and congestion in Crook, Jefferson, and Deschutes Counties. The Plan primarily addresses rail crossings and freight mobility relative to expected population growth in central Oregon. The Plan identifies possible safety and congestion issues caused by at-grade railway crossings, and proposes methods for improving or eliminating these crossings. The Central Oregon Rail Plan also discusses procedures for preserving and enhancing freight mobility to improve local economies and quality of life.

In the City of La Pine, the Plan specifically addresses the high priority at-grade crossing of the BNSF line and US 97 at Wickiup Junction. An ODOT project to grade separate this crossing is discussed below.

Deschutes County Comprehensive Plan

The 2030 Deschutes County Comprehensive Plan provides a "blueprint for land use conservation and development." Adopted in 2011, the twenty-year plan identifies goals and policies that are consistent with statewide planning, community values and vision. The Plan highlights programs, community involvement, and inter-government coordination in the areas of resource management, rural growth, and urban growth.

The Community Vision within the Plan relates to a quality of life for Deschutes County residents that is based on a "healthy natural environment, a community of caring people, a strong and diverse economy, access to a wide variety of outdoor recreational opportunities, the rural character of the region, and maintaining a balance between property rights and community interests."

The Transportation Chapter of the Plan (23.60) will be updated following adoption of the Deschutes County Transportation System Plan in 2012.

Deschutes County Transportation System Plan

The Deschutes County Transportation System Plan will be formally adopted on November 19, 2012. The revised TSP updates the prior plan horizon from 2016 to 2030. Between 2010 and 2030 the TSP anticipates supporting an increase of 108,000 persons (69 percent growth), and identifies $306.2 million in total needed improvement project costs, the majority of which are identified for the State Highway system (78 percent of the total, including 71% of the high-priority projects). Funding for the overall project list (or even high priority projects) has not been identified.

The County TSP contains 18 broad goals that address operations, safety, modal elements, infrastructure, demand management, asset management, standards, classifications, access, and future plan updates.

The TSP requires level-of-service "D" be maintained at the collector and arterial intersections under county jurisdiction. The City of La Pine will also need to adopt standards for city collector intersections.

The TSP identifies the need for the Wickiup Junction interchange. There are no other projects of significance outlined within the County's TSP within the city of La Pine.

The City of La Pine will coordinate with Deschutes County staff to ensure consistency between the city and county TSPs.

CITY PLANS AND POLICIES

City of La Pine Comprehensive Plan

To be provided by city staff.

City of La Pine Land Use Code

To be provided by city staff.

City of La Pine Buildable Lands Inventory

To be provided by city staff.

La Pine Parks and Recreation District Comprehensive Plan

The La Pine Park and Recreation District provides jurisdiction over 85 acres of land that includes the City of La Pine. The Park District was established in 1990 (within Deschutes County at the time). Comprehensive Plan establishes a twenty year plan for the improvement and development of district administration, park and recreation facilities, and recreational programs. The Plan was adopted in 2005 and contains an Annual Plan, Five-Year Action Plan, and Facility Master Plan to focus on both short term and long term goals. Based on extensive community input, the Plan identified the following primary goals:

- Goal 1: Create a sustainable organization and build organizational capacity.
- Goal 2: Improve existing parks and facilities.
- Goal 3: Plan for future parks and facilities.
- Goal 4: Improve existing recreation programs.
- Goal 5: Plan for future recreation programs.

The plan identifies potential locations for new neighborhood and community parks. As part of the development of the TSP, evaluation of pedestrian and bicycle accessibility to existing and potential new park facilities will be addressed.

Highway 97/La Pine Corridor Plan

The US 97/La Pine Corridor Plan, completed in June 2011, examines transportation needs for the downtown La Pine corridor between 1st and 6th Streets. The Plan addresses potential short and long terms improvements in safety, multi-modal efficiency and comfort, and vehicular and freight circulation along the corridor. This Plan considers expected development of La Pine and incorporates input from the public and the project advisory team to make recommendations on the preferred corridor alternative. These recommendations are outlined in Table 4 below.

Table 4 Highway 97/La Pine Corridor Plan Recommendations

Intersection	Description
US 97 @ 1st St.	• Signalized intersection and realignment • Encourage rural to downtown speed transition • Additional Turn Lanes
US 97 @ 4th St.	• High visibility pedestrian treatments • Pedestrian refuge island in center median
US 97 @ Finley Butte/Morson St.	• Signalized intersection and realignment • Left turn lanes

ODOT recently implemented some near term objectives of the plan, most notably reducing US 97 through downtown La Pine to a 3-lane cross-section.

Wickiup Junction Plan

Wickiup Junction is the only at-grade railway/highway crossing on US 97 in the State of Oregon. Per ODOT documents, there is a documented safety problem at this intersection that requires mitigation. ODOT, Deschutes County and the City of La Pine have completed a number of studies and a design effort to explore long-range improvements that will enhance the safety and operations of this crossing. They are currently pursuing the overcrossing design concept shown in Figure 1, which realigns US 97 to the east and constructs a grade-separated rail crossing to the south of its current location. As part of these efforts, the Burgess Road intersection with US 97 will be relocated.

Figure 1 Wickiup Junction Concept Plan, June 2012

REFERENCES:

1. City of La Pine, *Highway 97/ La Pine Corridor Plan, 2011.*
2. City of La Pine, *La Pine Parks and Recreation District Comprehensive Plan*, *2005.*
3. City of La Pine, *Wickiup Junction Plan, 2012.*
4. Deschutes County, *Deschutes County Comprehensive Plan*, *2010.*
5. Deschutes County, *Deschutes County Transportation System Plan*, *1996.*
6. Oregon Department of Transportation. *Oregon Administrative Rule Chapter 660 Division 12, 2012.*
7. Oregon Department of Transportation. *Oregon Administrative Rule Chapter 734 Division 51, 2012.*
8. Oregon Department of Transportation. *Oregon Bicycle and Pedestrian Plan, 2011*.
9. Oregon Department of Transportation. *Oregon Freight Plan, 2011*.
10. Oregon Department of Transportation. *Oregon Highway Plan, 1999.*
11. Oregon Department of Transportation. *Oregon Rail Plan, 2001*.
12. Oregon Department of Transportation. *Oregon Transportation Plan, 2006.*
13. Oregon Department of Transportation. *Public Transportation Plan, 1997*.
14. Oregon Department of Transportation. *Statewide Transportation Improvement Program, 2012*.
15. Oregon Department of Transportation. *Central Oregon Rail Plan, 2009*.

Appendix 2
Transportation Impact Analysis Requirements

TRANSPORTATION IMPACT ANALYSIS REQUIREMENTS

This section summarizes the purpose and recommended draft text to supplement the Transportation Impact Analysis Requirements identified within Deschutes County Code Chapter 17.16. The intent is to provide the City of La Pine with increased discretion in how it assesses the impact of new development on the public roadway system, an increased emphasis and priority towards roadway safety, and increased consideration of the multi-modal elements relevant to an urban environment.

1. **Purpose:** Identify appropriate threshold requirements for traffic impact studies within the City.

   Development generating less than 200 weekday or weekend daily trip ends and less than 20 weekday p.m. peak hour trip ends will be required to address all of the Site Traffic Report (STR) elements of DCC 17.16.115 as well as additional items as listed below. Developments generating 200 or more weekday or weekend daily trip ends or 20 or more weekday p.m. peak hour trips will be required to address all elements of the Traffic Impact Analysis (TIA) identified in DCC 17.16.115 as well as items listed below.

   Discussion: This text clarifies what the City considers to be a "significant impact" on a transportation facility and adopts trip thresholds that are identical to Deschutes County.

2. **Purpose:** require development to collaborate with City, County, and ODOT staff regarding study needs and critical study assumptions.

   The applicant shall meet with City staff in a pre-application conference to discuss study requirements and analysis assumptions (trip generation, distribution, horizon period, analysis periods, etc.). The applicant may also be required to meet with ODOT and County staff as applicable. A project site plan identifying intended uses, size, access, and other pertinent details should be provided in advance.

   Discussion: This text ensures that the City of La Pine and other affected jurisdictions receive appropriate notification and an opportunity to collaboratively discuss the study needs prior to receipt of an application. The application needs to contain adequate information for jurisdiction staff to understand its potential impacts and corresponding study needs.

3. **Purpose:** Allow the City to determine completeness rather than a checklist-style approach. This flexibility allows the City to respond to the specific project impacts given a site's location and adjacent land uses.

   The City, in collaboration with Deschutes County and ODOT shall determine when a traffic study has satisfied all the requirements of the development's impact analysis. Incomplete reports shall be returned for completion.

   Discussion: The unique nature of individual developments and individual sites may require additional assessment or considerations be appropriately addressed and adequately assessed (e.g., pedestrian crossing issues, emergency response concerns, site deliveries, etc.), with the determination of adequacy at the discretion of review staff.

4. **Purpose:** Provides the City discretion in what a traffic study is required to assess.

   Additional analyses may be required at the City's discretion to address specific safety or operational needs associated with a proposed land use.

   Discussion: Provides further clarity that the purpose of the traffic study is not to complete a checklist but to provide a full understanding of the potential impacts, mitigation needs, and ensure the design is compatible from a roadway maintenance, management, and operations standpoint.

5. **Purpose:** Emphasize the safety implications of an application that goes beyond simple historical crash rates. The crash analysis needs to consider the actual environment, pre-existing conditions, and should help inform the City of potential needs regardless of improvement responsibility.

   Crash data shall be obtained from ODOT for all study intersections to assess historical crash trends. Crash records are to be reviewed to identify crash patterns, and are to be supplemented with field observations of conditions and factors that may affect safety. Where crash trends are identified the applicant must also identify potential improvements or considerations. Responsibility of providing the improvements as approval conditions will remain at the discretion of the City based on severity, proportionality, and other factors.

   Discussion: The purpose of the safety evaluation is not only to meet a burden of proof related to development impacts, but to also assist the City in its planning and identification of citywide safety needs. Crash rates alone (crashes per million entering vehicles) are a poor indicator of potential problems and may not identify specific movement (e.g. eastbound left-turning) crash patterns. Intersections with crash rates below 1.0 crashes per million entering vehicles may still have safety deficiencies if all the reported crashes occur in a single location or on a specific movement.

6. **Purpose:** Remove the sole focus on the automotive system. Requires an assessment of the multimodal facilities and potential conflicts between modes.

   All traffic assessments (TIA and STRs) shall address any impacts to pedestrian and bicycle facilities, crossings, and general safety, accessibility, and connectivity. Assessments shall also identify any transit facilities or stops within ¼ mile of the site.

   Discussion: The purpose of this statement is to allow a better integration of land uses with the pedestrian, bicycle, and transit system. This can be especially useful in the vicinity of schools and school zones.

7. **Purpose:** Enable City staff to perform an objective and holistic look at how the site can be served and how adjacent properties will also be served in the future. Allows the City to implement access management for the subject property and develop an access plans that will allow for development or redevelopment of future properties.

   Site plans must include diagrams of existing access, proposed access, surrounding roadways/alleys, and access spacing from adjacent parcel access points. An accompanying analysis must include a discussion of the applicability of shared access with adjoining parcels or provision of shared access easements for future development of adjoining parcels.

   Discussion: This text enables the City to not only provide access to the proposed site plan application, but also allows City staff to look at adjacent properties and ensure that access plans are in place to meet long-term roadway management objectives and make efficient use of the roadway hierarchy.

8. **Purpose:** Document where deviations from standards are proposed as part of the study methodology.

   Site trip generation calculations, including pass-by, internal, or other trip reductions must be based on information contained in current editions of standard reference manuals. In the absence of applicable data, a minimum of three site specific studies of comparable uses must be performed. The data collection methodologies must be reviewed by City staff prior to application in the study.

   Discussion: Materials within the ITE Trip Generation manuals can be dated or inappropriate to address the range of land use applications and flexibility should be provided. However, this flexibility should be provided along with adequate information for the City to ensure that the data estimation methodology conforms with sound engineering practice and the data collection methodologies used within the ITE manuals.

9. **Purpose:** Require applicants to provide diagrams showing that delivery and emergency vehicles can be appropriately accommodated on-site.

   Turning movement diagrams must be submitted for all commercial, industrial and retail applications illustrating delivery, emergency, and passenger vehicle access and circulation within the site. Truck turning diagrams may also be required along routes beyond the site frontage where deemed appropriate by the City.

   Discussion: This provision helps sites function without truck loading occurring along the public roadway system and ensures emergency responders have adequate access to buildings.

10. **Purpose:** Requires that the investment in infrastructure provides reasonable longevity beyond a single application. This provision will ensure that traffic signals, roundabouts, and all-way stop-controlled intersections are appropriately sized or planned for expansion over time.

Modifications to intersection control should consider horizon period volume conditions based on growth and the horizon period identified within the City or County TSP. This analysis is intended to inform planning efforts to ensure that right-of-way acquisition and future widening needs are anticipated.

Discussion: Traffic signals, roundabouts, and other intersection forms should be adequately planned to accommodate needed future expansion without placing the burden of reconstruction costs on the City. This provision will help to ensure that the placement of signal poles, right-of-way dedications, and placement of conduit is provided in a way that minimizes the disruption reconstruction places on the traveling public.

11. **Purpose:** Establish vehicular performance goals that recognize the need to create a balanced multimodal system.

    City performance standards are a Level of Service "D" and a volume-to-capacity ratio less than 0.90 for signalized and all-way stop-controlled intersections. A volume-to-capacity ratio of less than 0.90 and a Level of Service "E" must be maintained for the critical movement at unsignalized and at roundabout-controlled intersections. A queuing analysis must be performed to assess whether existing turn lane storage is adequate to accommodate 95th percentile vehicular queuing during the peak hour. At the City's discretion, an assessment of conditions during peak periods outside of the weekday evening commute period (4:00 to 6:00 p.m.) may be required. Mitigation to satisfy intersection performance standards should also consider impacts to the multi-modal system and provide adequate accommodations to maintain a safe and efficient multi-modal system.

    Discussion: Level of Service, volume-to-capacity ratios, and queuing are separate intersection operational performance metrics that describe different attributes of an intersection. Intersection Level of Service describes the delay drivers experience and is most relevant metric for the traveling public. Volume-to-capacity ratios describe the physical ability of an intersection to accommodate the combination of movements, and queue analyses identify if the vehicular demand is physically able to efficiently use the available lanes without blocking other movements or other adjacent access points. Not meeting any one of these three standards would be considered unacceptable and require some type of mitigation, noting that capacity mitigation should also consider the multi-modal system. The relatively high unsignalized delay tolerance (LOS "E") allows for more congestion without the need for expensive infrastructure investments.

12. **Purpose:** Provide the City with the flexibility to modify the traffic study guidelines based on site-specific needs. This provision may be applicable for master-planned areas where infrastructure needs and timing has already been established.

    The City retains the discretion to reduce or supplement these traffic study guidelines, as appropriate, based on the specific project, location, and potential impacts.

Discussion: Master-planned land uses should be required to demonstrate compliance with the master plan, but the requirement for a full Transportation Impact Analysis may be unnecessary if the proposed application is compliant and the impacts have already been assessed.

Appendix 3
Existing Conditions Analysis & System Inventory

Existing Conditions Analysis and System Inventory

This memorandum summarizes the existing transportation system within La Pine City limits, providing information related to the performance of the City's transportation system, the supporting infrastructure, and population and employment. This summary of inventory and operations is intended to inform the status of the current system to identify improvement needs, opportunities, and priorities.

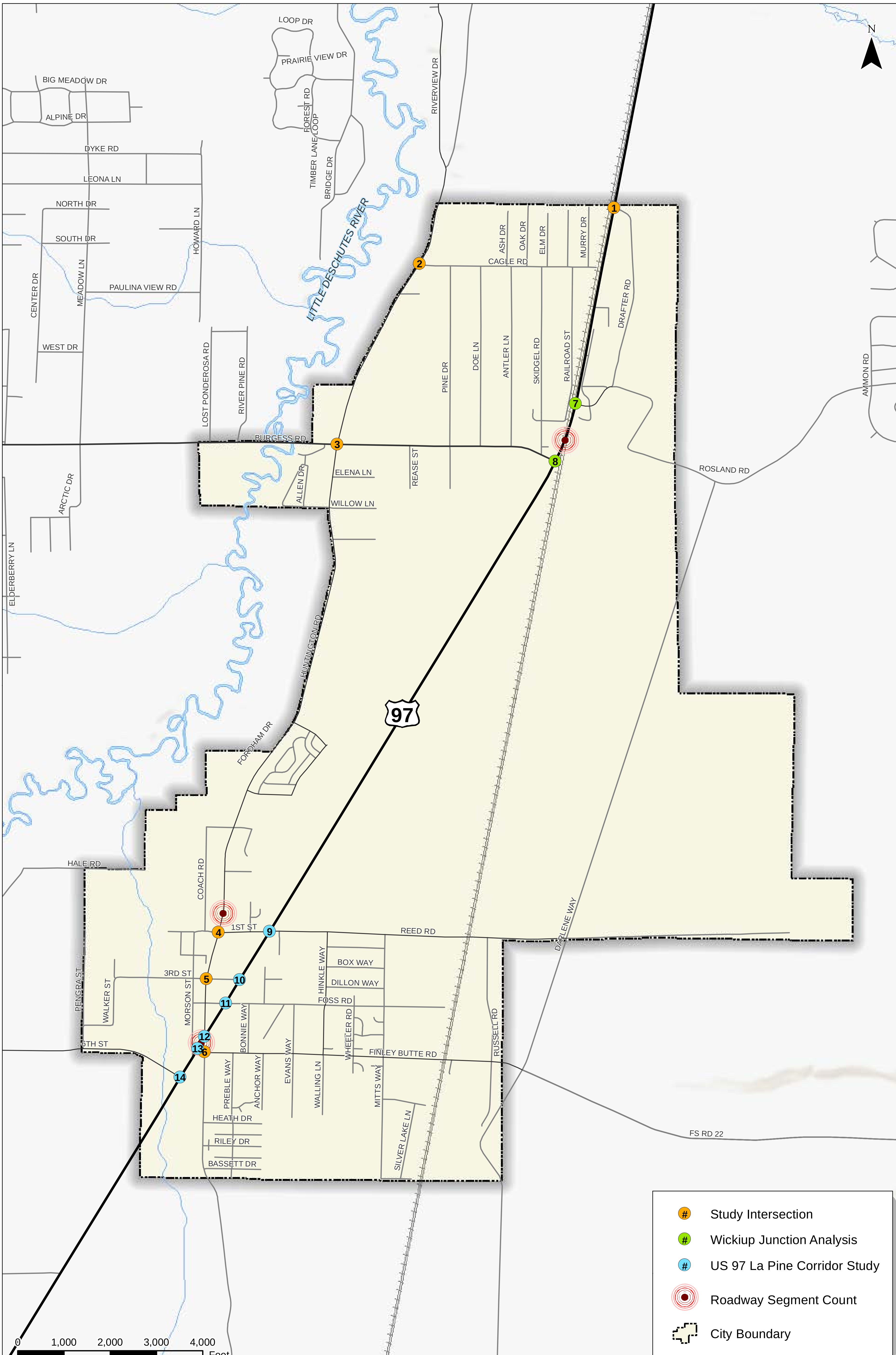
This analysis includes the following elements:

- Traffic Volume Inventory
- Traffic Operations Analysis
- Intersection Geometric Review
- Citywide Crash Review
- Roadway Ownership Review
- Roadway Surface Review
- Pedestrian & Bicycle Facility Review
- Access Management Analysis
- Intermodal Connections Analysis

TRAFFIC VOLUME INVENTORY

Weekday commute period traffic volumes were collected throughout the City to identify the current travel patterns and roadway usage. These counts were collected between 2010 and 2012 at the locations illustrated in Figure 1, and were obtained specifically for the City TSP effort as well as from prior analyses.

In addition, 72-hour roadway tube counts were collected on the Huntington Road and US 97 corridors, which provide critical commute, recreation, and service connections north toward Sunriver and Bend. The locations of these tube counts are also illustrated in Figure 1.



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Traffic Count Locations
La Pine, Oregon

Figure
1

Coordinate System: NAD 1983 HARN StatePlane Oregon South FIPS 3602 Feet Intl
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The 72-hour tube counts are used to highlight the traffic volume changes throughout the day, as shown in Exhibit 1 and 2. As shown in Exhibit 1, traffic volumes on US 97 near Finley Butte a relatively consistent between the late morning and early evening commute period.

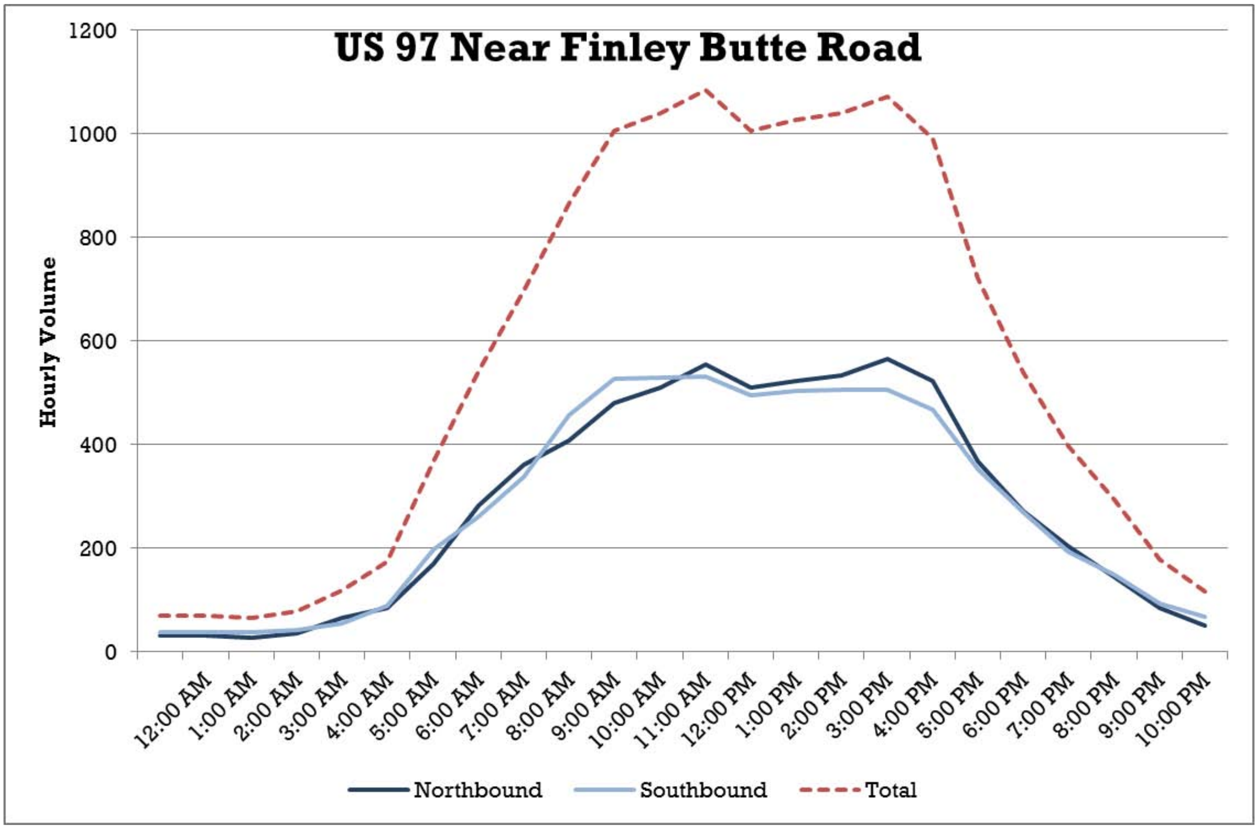


Exhibit 1. US 97 Near Finley Butte – Weekday Average Daily Traffic

Exhibits 1 and 2 each highlight the difference in travel characteristics between regional highway trips (predominant near the Wickiup Junction) and intracity trips that occur within the downtown area. It was noted that within the La Pine core area (between 1st Street and 6th Street) peak travel occurs around the noon hour, but shows very minor change throughout the day with only slightly higher travel volumes as compared to the typical 4:00 p.m. to 6:00 p.m. evening peak.

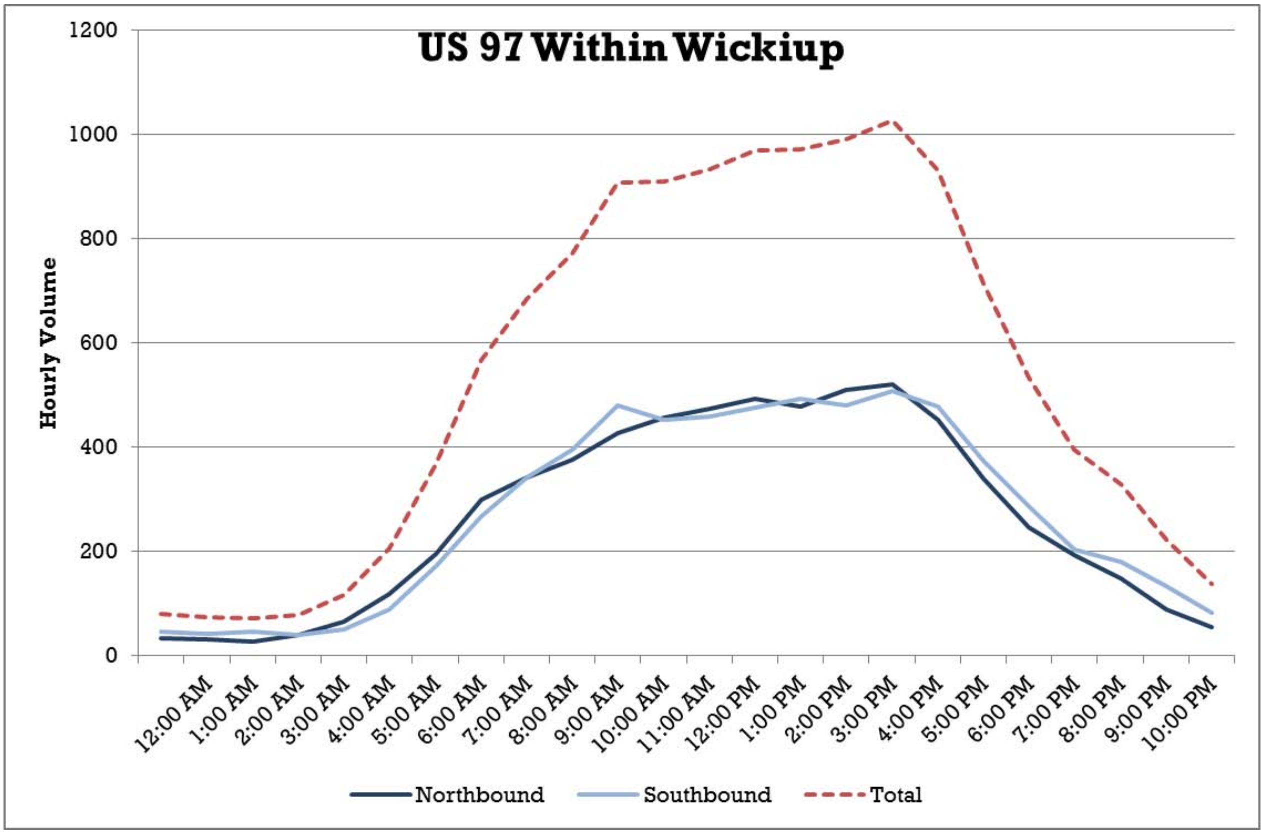


Exhibit 2. US 97 Within Wickiup – Weekday Average Daily Traffic

Each of these profiles show that the traffic volumes experienced within La Pine are more influenced by a consistent regional/statewide travel demand that occurs throughout the course of the day rather than a more typical morning and evening commute peaking that is often experienced in other communities. Therefore, the traffic operations that are reported for the weekday p.m. peak hour (as discussed below) are fairly reflective of the conditions that occur between mid-morning and the evening commute period.

OPERATIONAL ANALYSIS RESULTS

Key intersections within La Pine were reviewed to identify if point or system capacity improvements are needed today. The analysis was conducted at each of the study locations identified in Figure 1.

Typically, intersection performance is compared against an adopted standard. However, the City of La Pine does not have adopted intersection performance standards and has historically deferred to Deschutes County requirements (as contained within Deschutes County Code 17.16). The County requires that its intersections operate at Level of Service “D” or better during the peak fifteen minutes of a weekday peak hour.

State mobility targets for US 97 are summarized within the Oregon Highway Plan and its amendments. The mobility target varies based on the highway classification, location, posted speed, and functional designation. Throughout La Pine, US 97 is a *Statewide Highway* and *Freight*

Route. The highway is a designated *Expressway* between Ponderosa Drive in Bend south to 1st Street, with the designation resuming at Finley Butte and continuing south beyond the City boundary to Potter Street in Crescent. This designation places a higher priority for throughput on the highway. In addition, the posted speed on US 97 varies within City limits; the posted speed is 50 mph in Wickiup, 55 mph between Wickiup and the City core, and 35 mph in downtown La Pine.

Based on the OHP and Deschutes County policy, the applicable performance standards are summarized in Table 1. This table also summarizes the existing operational conditions at the study locations.

Table 1
Existing Conditions Intersection Results, Weekday PM Peak Hour

Intersection	Jurisdiction	Traffic Control	Standard	Critical Movement	LOS	Delay	V/C	Meets Standard?
1. US 97/ Drafter Rd	ODOT	Side-street Stop	0.95[1]	NBL	C	16.4	0.27	Yes
2. Huntington Rd/ Cagle Rd	La Pine	Side-street Stop	LOS D	WB	A	9.1	0.05	Yes
3. Huntington Rd/ Burgess Rd	La Pine	Signal	LOS D	N/A	B	17.1	0.41	Yes
4. Huntington Rd/ 1st St	La Pine	Signal	LOS D	N/A	C	31.3	0.49	Yes
5. Huntington Rd/ 3rd St	La Pine	Side-street Stop	LOS D	EB	B	14.3	0.13	Yes
6. Huntington Rd/ Finley Butte Rd	La Pine	Side-street Stop	LOS D	NB	B	10.6	0.06	Yes
US 97/La Pine Corridor Study (2010 Conditions)								
7. US 97/1st St/ Reed Rd	ODOT	Side-street Stop	0.95[1]	EB	C	16.8	0.36	Yes
8. US 97/ William Foss Rd – 4th St	ODOT	Side-street Stop	0.95[1]	EB	B	13.2	0.27	Yes
9. US 97/ Huntington Rd	ODOT	Side-street Stop	0.95[1]	EB	B	12.0	0.25	Yes
10. US 97/ Finley Butte Rd	ODOT	Side-street Stop	0.95[1]	WB	B	14.3	0.12	Yes
11. US 97/ 6th St	ODOT	Side-street Stop	0.95[1]	WB	B	12.6	0.10	Yes
Wickiup Junction Study (2005 Conditions)								
12. US 97/ Burgess Rd	ODOT	Side-street Stop	0.95[1]	EB	Not Reported		0.51	Yes
13. US 97/ Rosland Rd	ODOT	Side-street Stop	0.95[1]	WB	Not Reported		0.43	Yes

[1] Operations reflect the relevant threshold for the stop-controlled sidestreet movement; mainline highway operations vary between 0.80 north of 1st Street and south of Finley Butte (designated expressway segments) and 0.85 within the City core.

As shown in Table 1, all of the study intersections currently operate acceptably. As was noted within the US 97/La Pine Corridor Study, the atypical configuration of many of the highway intersections coupled with the high speeds result in queuing and delays that are observed to be longer than those reported. This is further discussed below.

Intersection Geometric Review

Within La Pine the roadway network generally follows a north-south pattern, with US 97 intersecting diagonally across the City. This configuration results in a number of "skewed" intersections that do not cross the highway at right angles. These "skews" result in varying turning speeds for northbound and southbound drivers, require a sharper turn for larger vehicles, and provide an unconventional viewing angle for drivers approaching the intersections. This configuration also increases the pedestrian and bicycle crossing distances and exposure.

Exhibit 3 shows the approach angle of Morson Street, presenting one of the most extreme configurations from within the City. At this intersection the northbound

Exhibit 3. Aerial imagery showing the Morson Street alignment with US 97 (prior to the road diet).

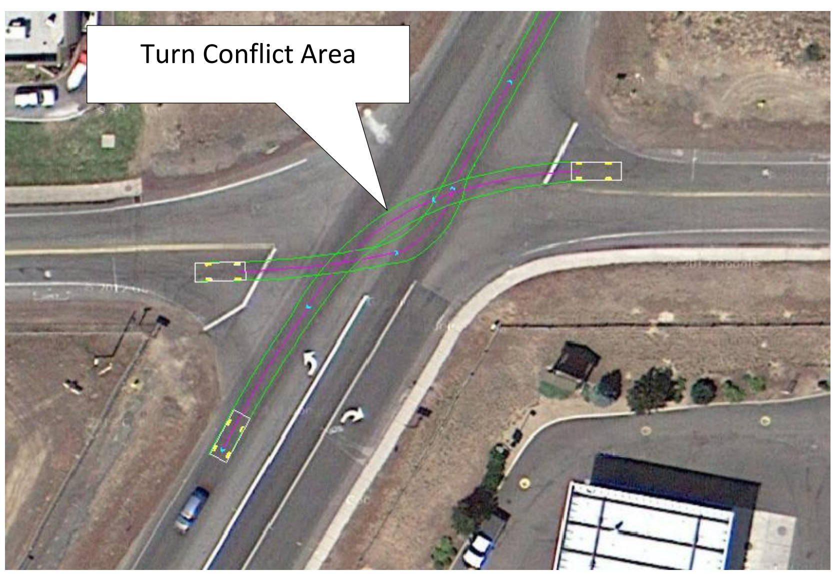


Exhibit 4. 1st Street – Reed Road example of conflicts that occur due to intersection offset.

left-turn from US 97 onto Morson occurs at a high speed due to the flat turning angle, whereas the southbound right-turn from the highway occurs at a low speed.

Intersection offset is another concern in La Pine. The slight mis-alignment of intersection legs can create conflicts for turning vehicles whose paths may cross, as illustrated in Exhibit 4. The approximately 15-foot offset at 1st Street – Reed Road (where the east leg is located slightly to the north) is an example of this poor offset.

COLLISION HISTORY REVIEW

Crashes within the City of La Pine were reviewed for the five-year period between 2007 and 2011. Crash data was obtained from reported crashes that are collected and compiled by ODOT. Crash reports are required for crashes exceeding $1,500 in property damage or resulting in any type of injury.

Citywide Crash Trends

Throughout the past five years there have been a total of 132 reported crashes within the City. These crashes have involved 235 vehicles and 264 persons. Annual crashes over the past few years have fluctuated between 21 and 34 with no strong trend noted in the data, as shown in Exhibit 5.

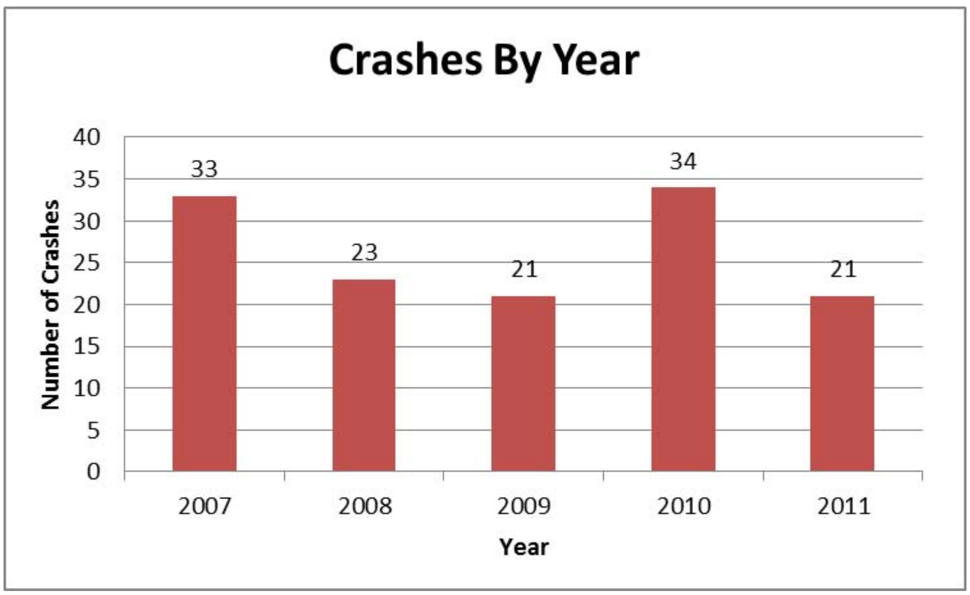


Exhibit 5. Annual summary of total City of La Pine crashes.

Crash severity was also reviewed over this period. Of the 132 crashes, two were reported as fatalities, 59 resulted in injuries, and 71 were non-injury (property damage only) collisions. One of the fatal crashes occurred at 8:00 p.m. on December 16, 2010 at the Rosland Road intersection with US 97. The crash reports show that the westbound driver was not wearing a seatbelt and did not yield to highway traffic while turning left from Rosland Road, and was struck by a northbound semi-truck. Alcohol was reported as a contributing factor.

The second fatality occurred at 10:00 p.m. on Sunday, May 29, 2011 approximately 2,000 feet north of 1st Street along US 97. A pedestrian, wearing dark clothing, was on the highway when struck by a southbound vehicle. The crash report shows that neither drugs, alcohol, nor speed were contributing factors in this crash.

Other notable trends that were identified through review of the crash records include the following:

- 48% (64 total) of all reported crashes occur along US 97 (including both fatalities and 26 of the 59 injury crashes)
- December included the highest number of crashes of any month (26 total), with nearly double the number of crashes that occur in June (14 total) when traffic volumes are highest.
- Approximately 17% (23 total) of reported crashes occur on icy roadway conditions.
- There were 11 semi-trucks with trailers involved within the reported crashes.
- Twenty-one percent of crashes involved drivers between the ages of 50 and 59 (21%).
- There were four alcohol-involved crashes, no crashes that were reported as drug-involved.
- Four crashes occurred within a school zone, and one within a work zone.
- Twenty-seven crashes cited excessive speed as a crash cause.
- Turning crashes are the most common crash within La Pine (50 total, 38%), followed by angle crashes (26 total, 20%) and fixed-object collisions (23 total, 17%).

Based on the review of the reported crash data, future system improvements, design, and policy should consider the following:

- Increased emphasis on highway safety from an access, geometrics, and winter maintenance perspective.
- Consider design treatments within La Pine that address the needs of an older population.
- Continue to invest in treatments that inform or enforce appropriate speeds for roadway conditions and context throughout the City.

Pedestrian and Bicycle Crashes

Crashes involving pedestrians and bicycles within La Pine were specifically reviewed to help identify facility or crossing needs that enhance the comfort, convenience and safety for edestrians and cyclists. Over the past five years, there were two pedestrian crashes and one reported crash involving a bicyclist. Further detail of these crashes is discussed below for reference. However, review of these crashes did not reveal any safety-related patterns that require mitigation.

The two pedestrian crashes include the fatality on US 97 north of 1st Street as previously described. The second pedestrian crash occurred at the Finley Butte intersection occurred on Monday, August 8, 2011 at 4:00 p.m. The crash reports indicate that a 19-year old female driver failed to yield the right-of-way to the pedestrian. The weather was reported as clear, dry, and sunny at the time of the crash.

The bicycle-involved crash occurred on at 1:00 p.m. on Friday, July 2, 2009 along a rural portion of Huntington Road about 500 feet north of the Crescent Creek subdivision. Limited data was available regarding the specific conditions of the crash, but the collision was reported as a non-motorist illegally in the roadway, and no error was identified on the part of the driver.

Corridor Crash Trends

Two corridors within La Pine, US 97 and Huntington Road, contain a high proportion of the overall crashes. Each of these corridors was further reviewed to identify roadway-specific safety trends.

US 97

There were 64 reported crashes including 16 crashes within Wickiup Junction, 4 crashes between Wickiup and the City core, and the remainder (44) between 1st Street and 6th Street along US 97 within the five-year period. Twenty-six of these crashes resulted in some type of injuries, including 2 fatalities, 18 non-incapacitating injuries, and 22 possible injuries (as reported). It should be noted that these historical crash records do not reflect the 2012 restriping of US 97 into a three-lane cross-section and other on-going speed treatments.

The following trends were noted for crashes along US 97:

- The crash records show that drivers over the age of 40 are involved in more of the highway crashes and are more often at-fault.
- There were nine crashes that involved trucks with trailers on the highway.
- 20 reported crashes occurred outside of daylight hours (low-light conditions, 31%).
- Nearly 27% of highway crashes occurred on snow or ice.
- The top crash causes cited were the following:
  - Failure to yield right-of-way (22)
  - Speed too fast for conditions (within legal limits, 14)
  - Passed stop sign (12)
- Five of the highway crashes involved a driveway access.

Based on these patterns, specific to US 97 safety treatments should focus on the following:

- Implementing illumination along the highway, particularly at intersections within the City core area and rural to urban transitions.
- Improved speed compliance through design, education, information, and enforcement.
- Focus on design aspects that will better support an older population such as larger street signs and illumination.

Huntington Road

There were 44 reported crashes along Huntington Road north of US 97 over the past five years, excluding a single crash at the intersection with US 97. Crash trends have generally decreased over the analysis period, with 2011 exhibiting the lowest number of crashes of all five years. None of the reported crashes along this corridor cited drug or alcohol impairment.

Review of crash trends noted the following:

- Driver age was a significant factor in the crashes, with drivers in the 50 to 59 age category at fault in 38% of the crashes on this corridor.

- Over half of all the reported crashes on Huntington Road occurred at the two signalized intersections with 1st Street (9 crashes) and Burgess Road (17 crashes). The Burgess Road intersection was signalized in 2009 so many of these crashes reflect the prior stop-controlled configuration.
- The vast majority of reported crashes occurred with dry roadway surface conditions (35 of 44) and during daylight hours (36).

A summary of crashes at the Huntington Road/Burgess Road intersection is further addressed within the next section.

Intersection Crashes

There were two intersections within the City that experienced a relatively high number of crashes (approximately double all other intersections in the City): Huntington Road/Burgess Road and US 97/1st Street – Reed Road. Crashes at each of these intersections were further reviewed to identify potential crash trends that could suggest some type of geometric deficiency.

US 97/1st Street – Reed Road Intersection

The intersection of US 97 and 1st Street experienced 16 crashes over the past five years, exhibiting a relatively stable number of crashes per year despite recent land use changes in the area. The reported crashes were nearly all turning or angle crashes (13 total) with failure to yield as the primary crash cause. Drug or alcohol impairment was not cited as a factor in any of the crashes, and the majority occurred during daylight hours (14 total). While seven of the crashes involved some degree of injury, all of these injuries were reported as minor (non-incapacitating or possible injury).

ODOT has been working to implement treatments at this intersection to address the high speed rural transition to an urban environment, and recently installed a speed sign with a driver feedback display. Intersection improvements have been planned and are partially funded within the ODOT Statewide Transportation Improvement Program (STIP).

Huntington Road/Burgess Road Intersection

The intersection of Burgess and Huntington Road contained stop-control on the north-south Huntington Road approaches until 2009, when the intersection was signalized. The design of the intersection included LED illumination and battery back-up systems to help maintain signal operations during power failures given the high intersection approach speeds and rural surrounding area.

As shown in Exhibit 6, with exception of 2010, crashes have been declining since a peak in 2007. Review of only the 2010 and 2011 crash data shows that the crashes included three fixed object collisions (these involved a tree, mailbox, and ditch), two rear-end crashes, and one incident involving a deer. Review of these crashes did not identify any trends or indicate a need for further review.

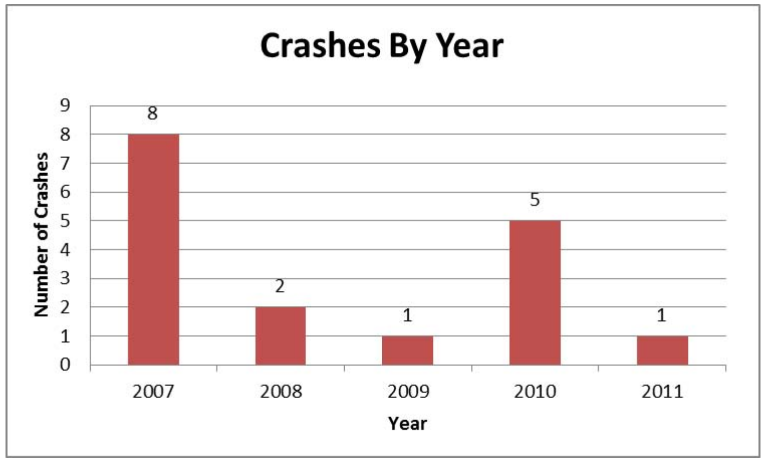


Exhibit 6. Huntington and Burgess intersection crash trend

Transportation Infrastructure Inventory

This section of the report details the existing City population, land use, and supporting transportation infrastructure. This inventory is intended to inform the future identification of TSP alternatives by highlighting system opportunities, gaps, and the relationships that exist between these different elements.

LAND USE INVENTORY

The City of La Pine recently developed a Comprehensive Plan that establishes a land use vision for the City over the next 20 years. As stated within the plan, *"A Comprehensive Plan is a blueprint for community land use decision making to ensure that needs of the community are met as growth occurs over the term of the planning period."* Exhibit 7 shows the Comprehensive Plan designations within the city.

As shown, the City is divided into three neighborhoods, each containing some mix of residential, retail, and employment uses. These are generally the Wickiup area (Neighborhood 1), the downtown core (Neighborhood 3), and the area separating the two (Neighborhood 2). Throughout the City, the majority of residential lands are located on the west side of the city, the majority of industrial lands are located on the east side of the city, and the majority of commercial lands are located along US 97 within downtown La Pine.

Further, as highlighted in Exhibit 7, there are a number of natural and man-made barriers that require additional connectivity considerations within the TSP. These include the floodplains that are located along the Little Deschutes and bordering the west side of the City's commercial lands in the southern neighborhood, US 97, and the BNSF line.

The location of existing activity centers, such as the City's commercial areas, schools, churches, and public service centers, also require special transportation considerations. These and other activity centers within La Pine are shown in Figure 2.

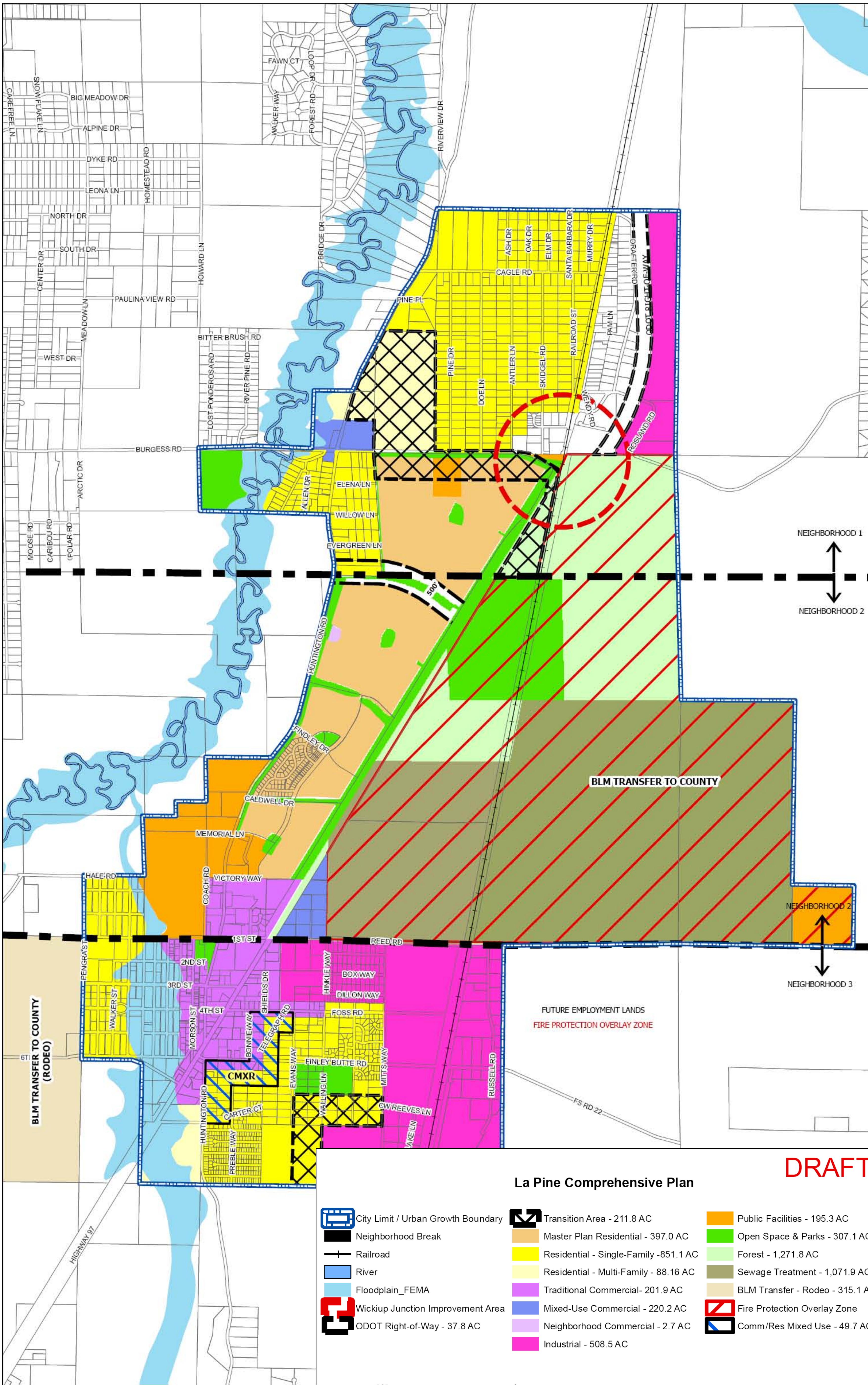
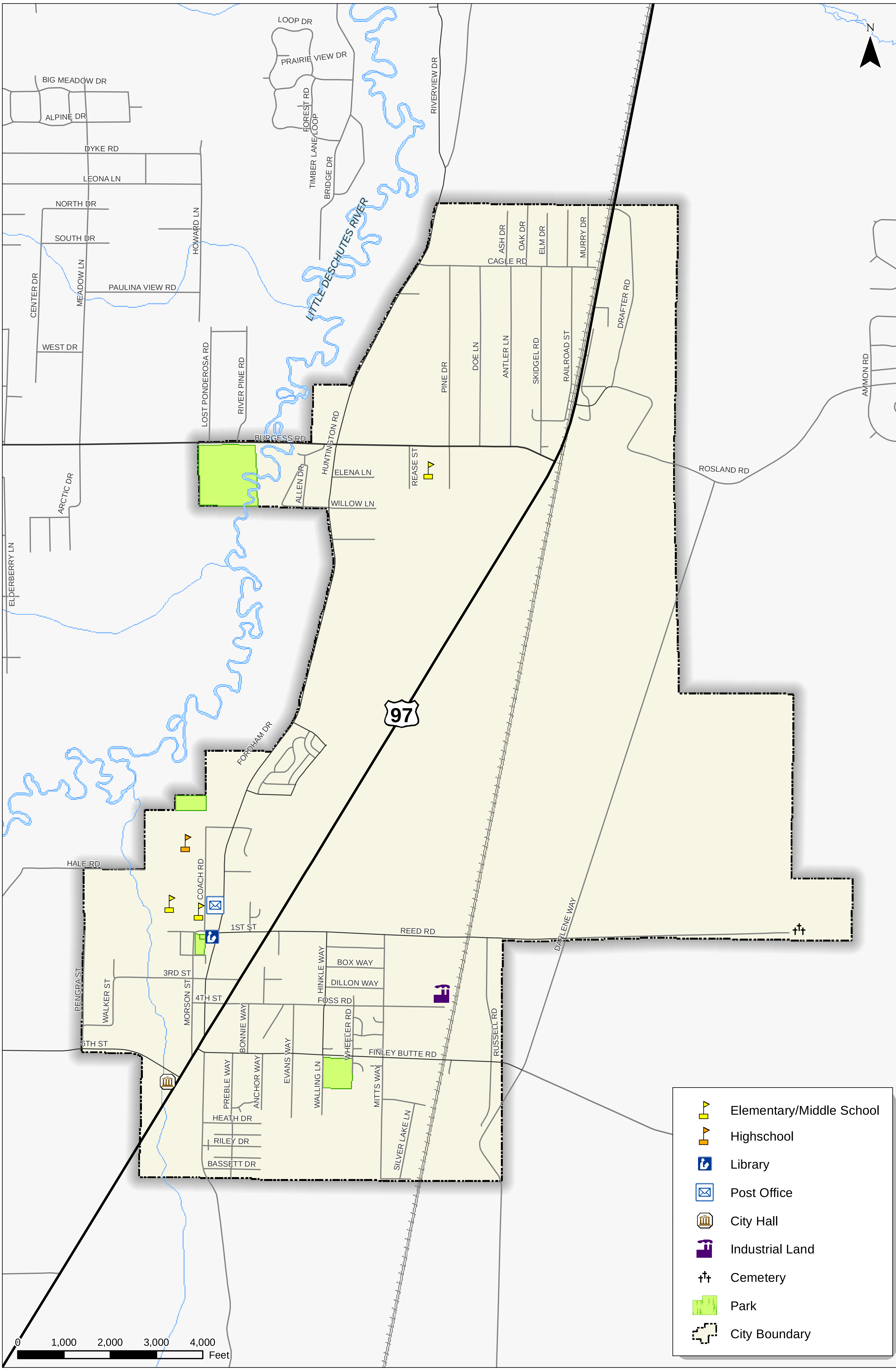


Exhibit 7. La Pine Comprehensive Plan Map



Activity Centers
La Pine, Oregon

Figure
2

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Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

The City, County and State have identified an economic development priority for the provision of large lot industrial sites for future development. Within La Pine, these lands are located in the southeast quadrant of the city. This area has been managed by the Deschutes County-funded La Pine Industrial Group (LIGI). Transportation service to these lands and other potential employment areas will be critical to the future growth and prosperity of La Pine. As stated within the Comprehensive Plan:

> *"Community leaders will continue to aggressively focus efforts on attracting large industrial development and reducing barriers to all economic development. It is anticipated that these efforts will bring forth industries that rely on a large number of employees and create additional family-wage jobs in the community. Community leaders have made it clear that large industrial development is needed in addition to the sectors identified in the predicted trend data. Likewise, there is a companion goal to reduce the daily commute for local residents by the creation of additional family wage jobs within the community."*

POPULATION AND DEMOGRAPHICS

The population of La Pine is relatively small (approximately 1,680 persons based on July 2011 data), but the community serves a much broader area of Deschutes County with goods, services, and employment (approximately 10,000 persons). La Pine has a high proportion of retirement-age residents. A population breakdown by age of the head of household is shown in Table 2.

Table 2
La Pine Population Demographics

Age of Household	Total	Percent of Total
15 to 24 years	57	2.4
25 to 34 years	239	10.3
35 to 44 years	404	17.3
45 to 54 years	487	20.9
55 to 64 years	400	17.2
65 years and over	744	31.9

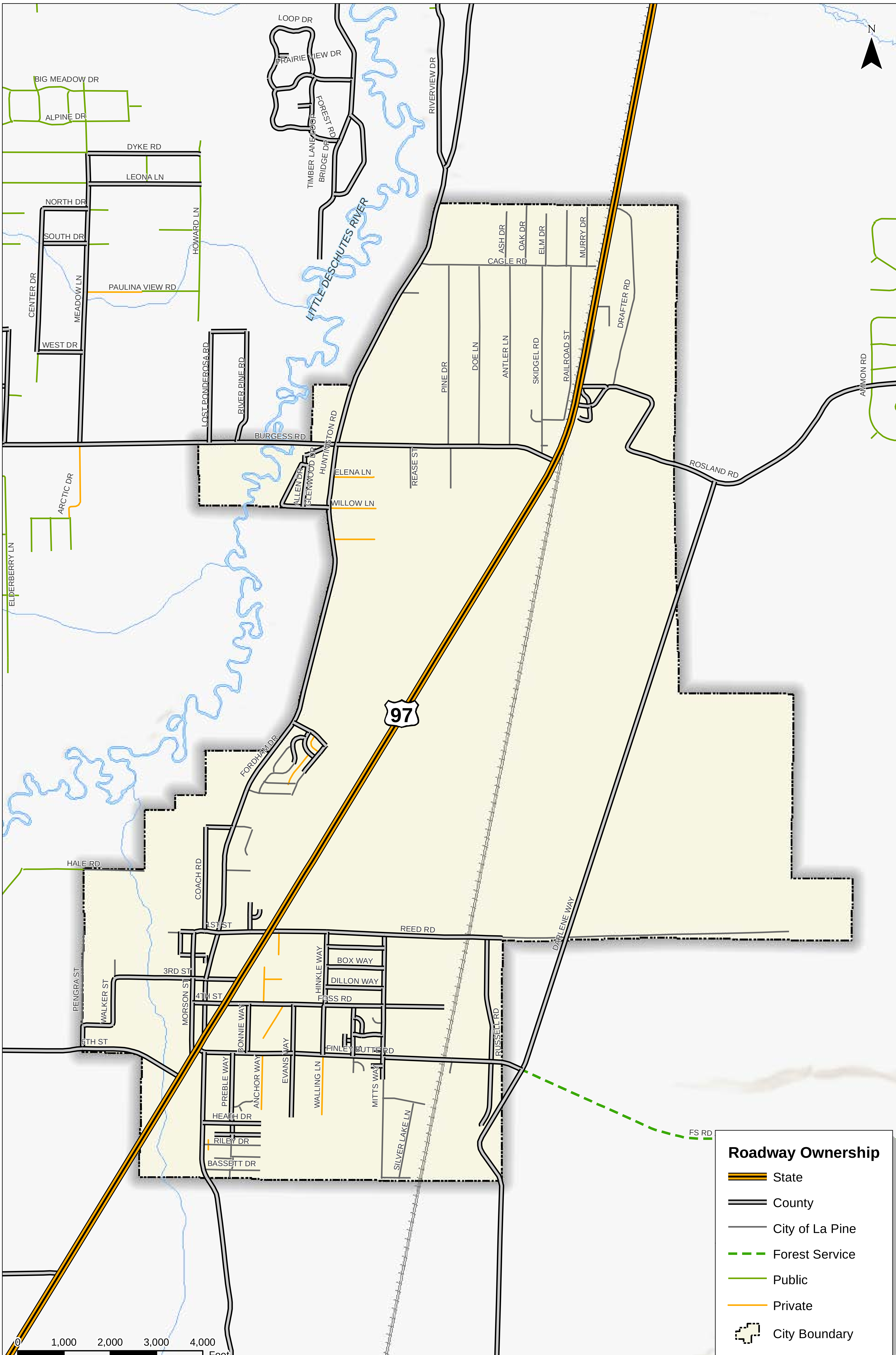
Source: La Pine Comprehensive Plan, 2000 Census

ROADWAY OWNERSHIP REVIEW

The roadways in La Pine are owned by a mixture of State (ODOT), Deschutes County, City of La Pine, Forest Service, and private owners. US 97 (Ashton Eaton Boulevard) is maintained by the State and is the only ODOT facility within city limits. The County has jurisdiction over the majority of the City's arterial and collector system, and the city's ownership is limited to the local roadway system. Roadway jurisdiction is shown in Figure 3.

ROADWAY SURFACE REVIEW

Throughout the City, road surfaces are a combination of asphalt, gravel, and dirt surfaced. Gravel and dirt surfaced roads accommodate limited vehicle speeds and carrying capacity and are not suitable for classification as higher-order urban facilities without improvements. Figure 4 illustrates the City's roadway inventory by surface type.



Roadway Ownership
La Pine, Oregon

Figure
3

Coordinate System: NAD 1983 HARN StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

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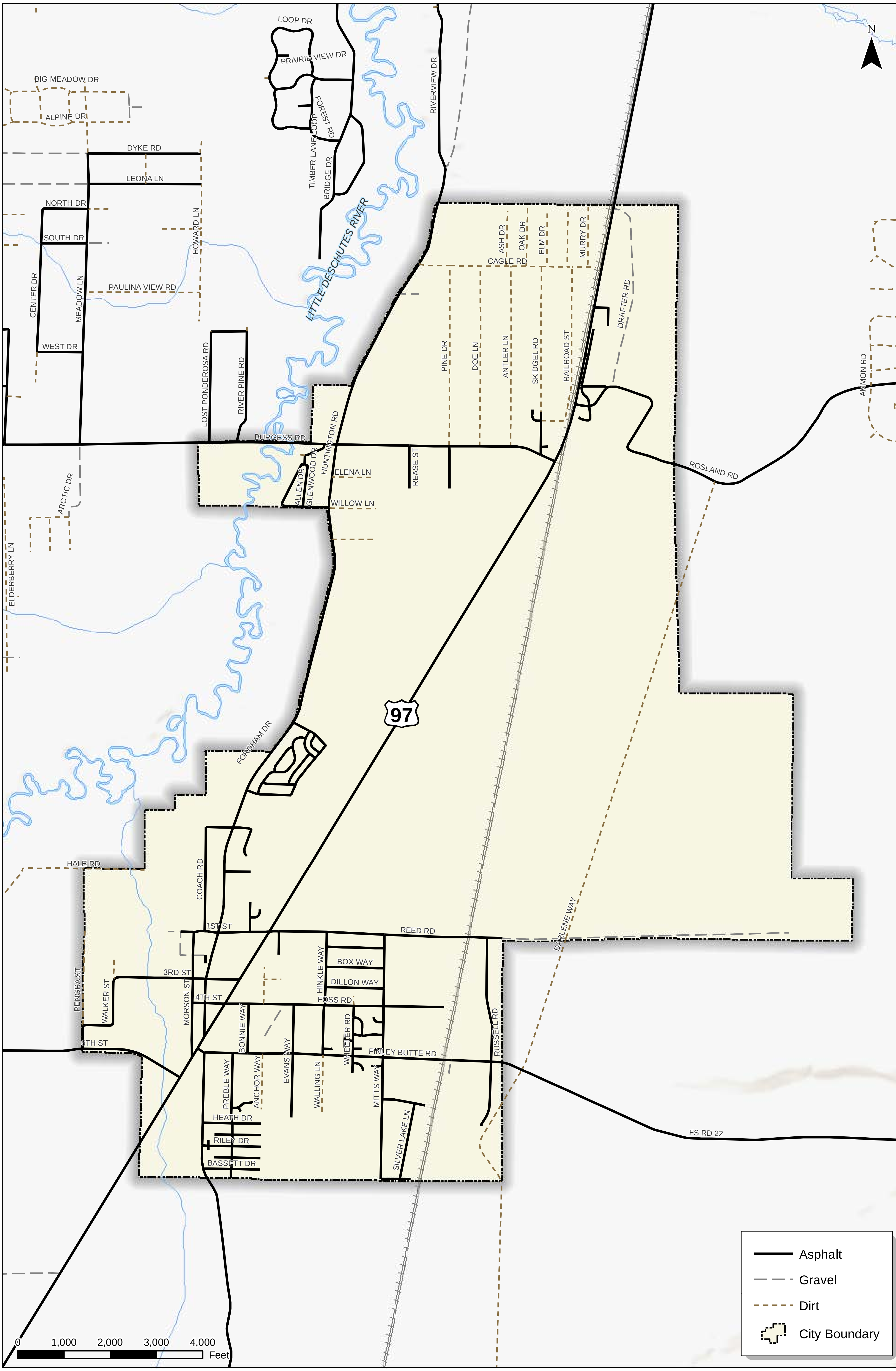

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Roadway Surface Material
La Pine, Oregon

Figure
4

Coordinate System: NAD 1983 HARN StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

PEDESTRIAN AND BICYCLE FACILITIES

Figure 5 illustrates the location of pedestrian facilities throughout La Pine based on a review of aerial photography. While this figure illustrates the presence of sidewalks, it does not convey which facilities are clear of obstacles and obstructions (such as vaults, utilities, storm grates, or poles). As shown, pedestrian facilities within the city are limited and are discontinuous in areas where present.

Dedicated bicycle facilities were recently installed along US 97 through downtown La Pine in the form of buffered bicycle lanes. Other roadways in La Pine contain wide shoulders that can accommodate bicyclists (such as Huntington Road), but no other dedicated bicycle facilities exist.

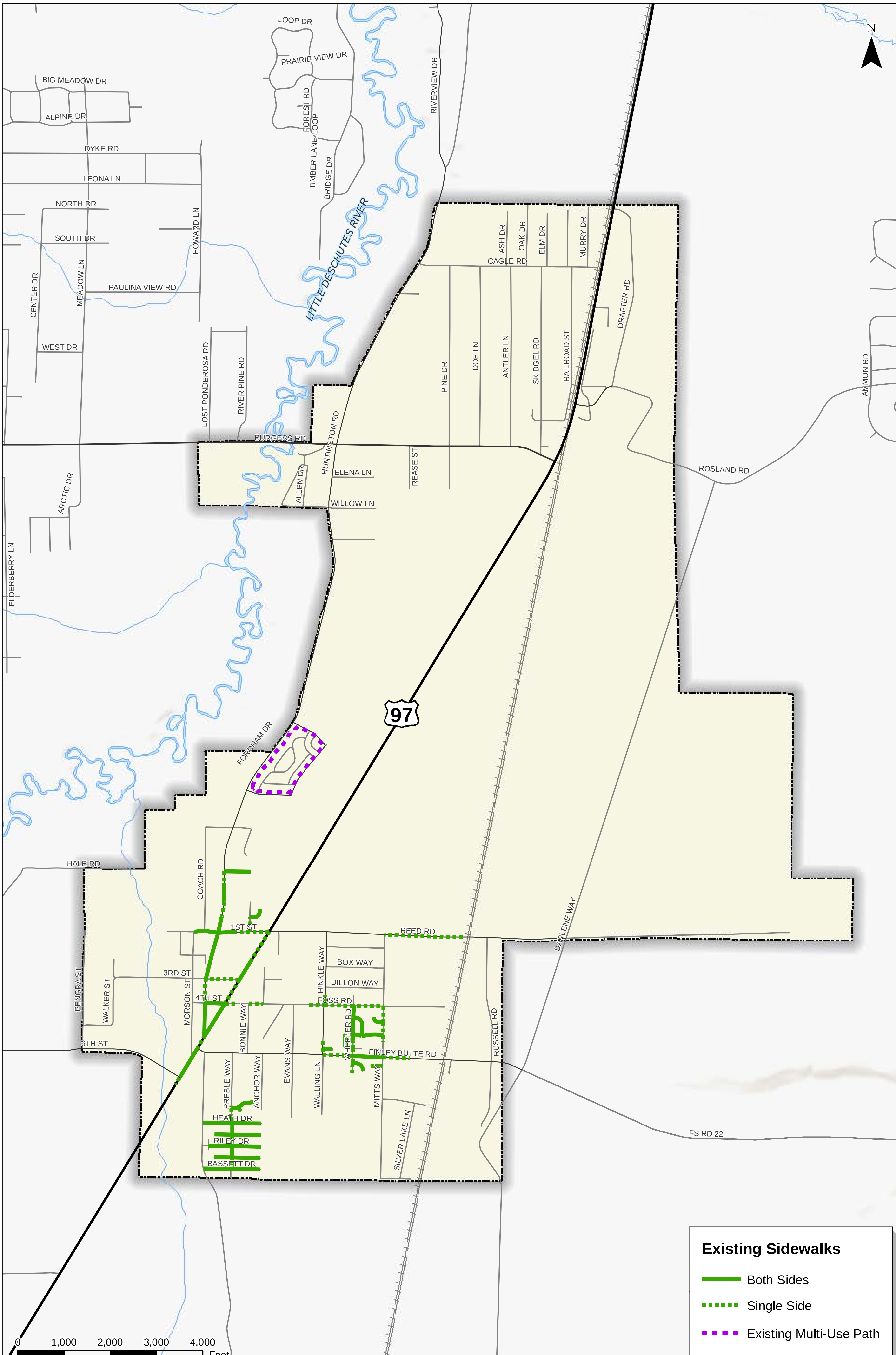
RAIL INVENTORY

A Burlington Northern Santa Fe (BNSF) rail line runs through La Pine, mostly on the east side of the city. Within Wickiup, the railway crosses US 97 just north of Burgess Road with an extreme skew angle. ODOT is currently pursuing funding to grade-separate the Wickiup Junction, which would also include modifications to the adjacent roadway network, most notably the rerouting of the Burgess Road and US 97 intersection.

No passenger rail service is available within La Pine. The closest passenger rail service is provided through AMTRAK, and is available in Chemult located approximately 35 miles to the south on US 97. From Chemult passenger rail service is provided to Eugene and California.

AIR TRANSPORTATION INVENTORY

No airport facilities exist within La Pine. The closest commercial airline service is available at Roberts Field in Redmond, Oregon which is approximately 45 miles to the north on US 97. Kingsley Field in Klamath Falls, Oregon is located approximately 100 miles to the south, but also provides commercial services. General aviation airport options are available in Sunriver and also in Bend.



Existing Pedestrian Facilities
La Pine, Oregon

Figure
5

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Coordinate System: NAD 1983 HARN StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

ACCESS MANAGEMENT ANALYSIS

Exhibit 8 illustrates the relationship between access and mobility. Facilities such as US 97 (generically classified as a Principal Arterial) that have a high mobility purpose allow less access to the system, whereas local streets, such as those in neighborhoods, contain multiple driveways and provide low throughput.

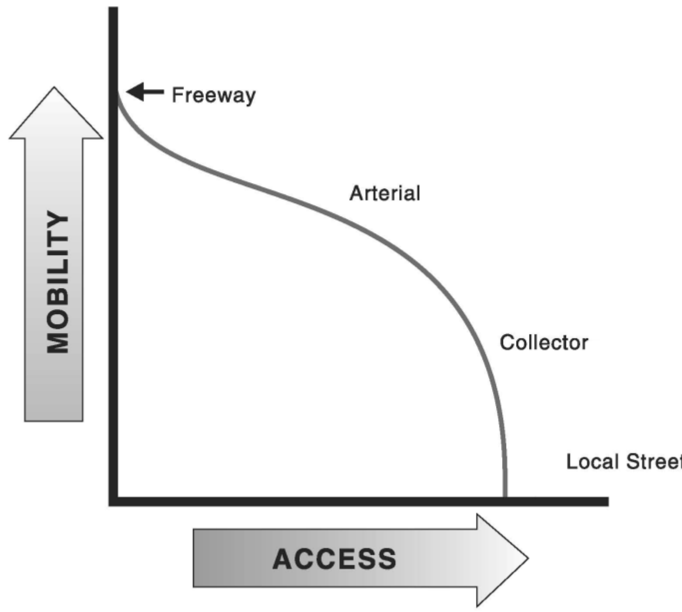


Exhibit 8. Roadway classification and function.

Access standards for US 97 are contained within Oregon Administrative Rule 734-051, commonly referred to as Division 51. Temporary access rules have been in effect since January 1, 2012, and were further amended on May 3, 2012. These rules provide access management standards based on functional classification, type of area, posted speed, and segment designation. Table 4 within Division 51 cites an access spacing standard of 2,640 feet (1/2 mile spacing) on urban expressways (such as US 97 north of 1st Street and south of Finley Butte) and a 500-foot spacing standard (approximately 10.5 accesses/mile) in an urban area with a 35 mph posted speed.

Access along US 97 through the downtown core was reviewed based on the inventory conducted as part of the 2005 La Pine Special Transportation Area (STA) Plan between 1st Street and 6th Street. This inventory identified 42 accesses onto the highway along this 0.81 mile section of highway, for a density of 52 accesses per mile, or approximately five times the current access spacing standard.

Deschutes County Code Section 17.48 describes County access requirements. This code generally states that no access is permitted to arterial and collector roadways unless there is no other possible means of access, and residential access onto collectors and arterials is not allowed within 100 feet of an intersection or the maximum allowable spacing on the parcel (whichever is less).

Many of the driveways within La Pine are ill-defined and wide; limiting the width of driveways would help to define the conflict area between motorists, bicyclists and pedestrians, and inform all types of facility users of how to cross and use the accesses. The County requires that commercial access contain a maximum width of 35 feet, with residential access ranging from 14 feet (single) to 20 feet (double). Based on the La Pine STA Plan inventory, there were fifteen driveways on US 97 that would exceed the current County access width requirements.

Access was also observed along Huntington Road as it serves a key mobility function within the City. Review of this corridor shows access issues near the intersection with US 97 where there are multiple wide accesses to Huntington Road, and the distinction between the accesses, parking area, and sidewalks is not clearly defined. Exhibit 9 provides an illustration of this segment.

Exhibit 9. Southbound view along Huntington Road near the US 97 intersection.

INTERMODAL CONNECTIONS ANALYSIS

La Pine is served by Cascades East Transit (Route 30). This route runs from the Wickiup Junction Park/Ride at the intersection of Burgess Road and US 97 in La Pine to the Hawthorne Station in Bend. One intermediate stop is made at River Woods Baptist Church in Bend at the intersection of Baker Road and Cinder Butte Road.

The route is served by three northbound and three southbound buses on weekdays; no weekend service is provided. The arrival and departure times for the buses are shown in Table 3. Current fares for this route are as follows:

- Single Ride: $3.75 (Adult & Youth), $3.00 (Senior)
- Day Pass: $6:25 (Adult & Youth), $5.00 (Senior)

Ridership information for this route is shown in Exhibit 10. It should be noted that within the ridership data local Dial-a-Ride customers were required to provide increased notice for trips due to budget constraints, which has impacted ridership.

Table 3
La Pine-Bend Transit Service Schedule

Northbound			Southbound		
Wickiup Junction Park/Ride	River Woods Baptist Church	Bend	Bend	River Woods Baptist Church	Wickiup Junction Park/Ride
6:55 a.m.	7:23 a.m.	7:35 a.m.	7:40 a.m.	-	8:20 a.m.
8:25 a.m.	8:53 a.m.	9:05 a.m.	-	-	-
-	-	-	3:42 p.m.	3:54 p.m.	4:22 p.m.
4:27 p.m.	-	5:07 p.m.	5:20 p.m.	5:32 p.m.	6:00 p.m.

Source: Cascades East Transit (CET)

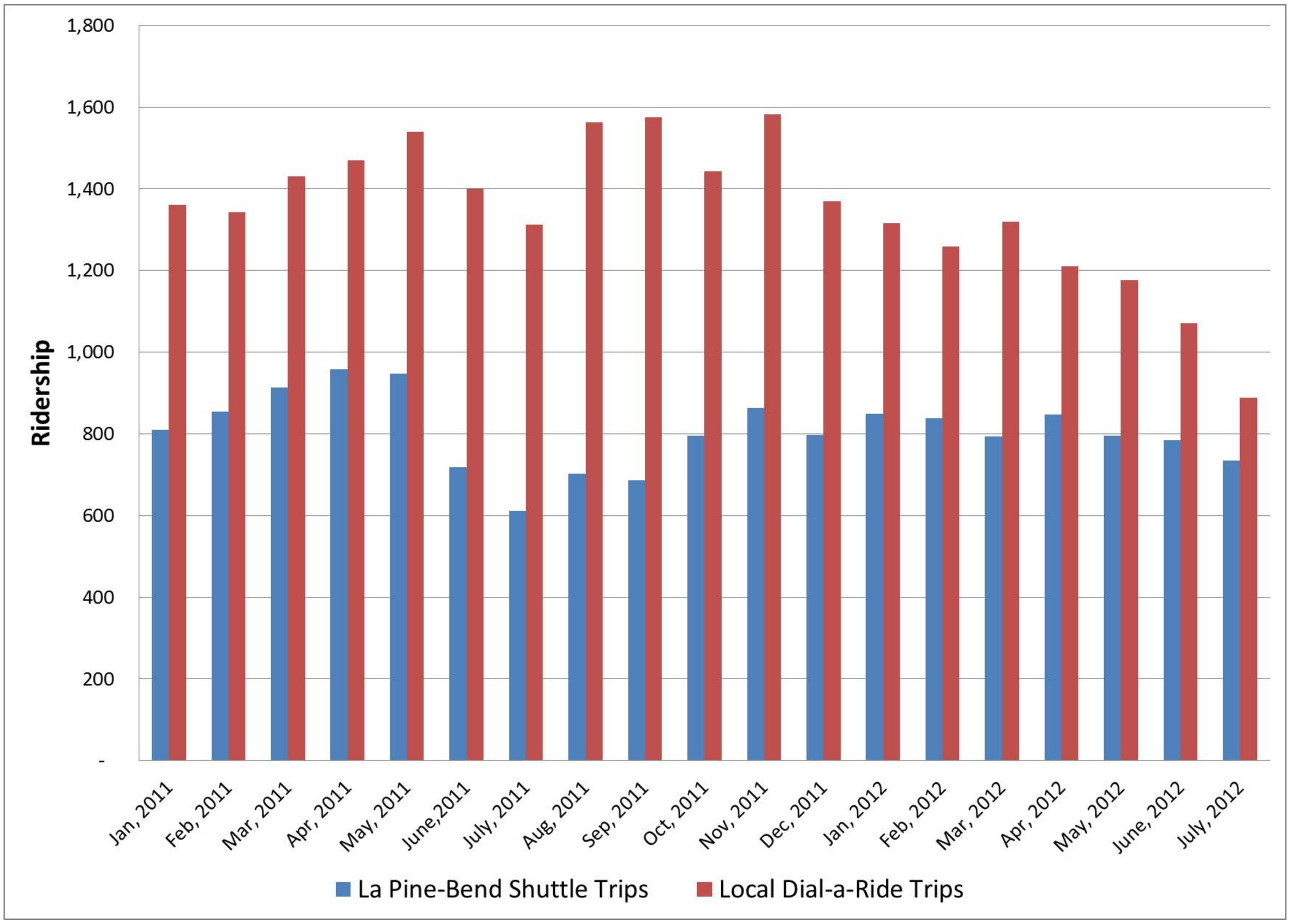
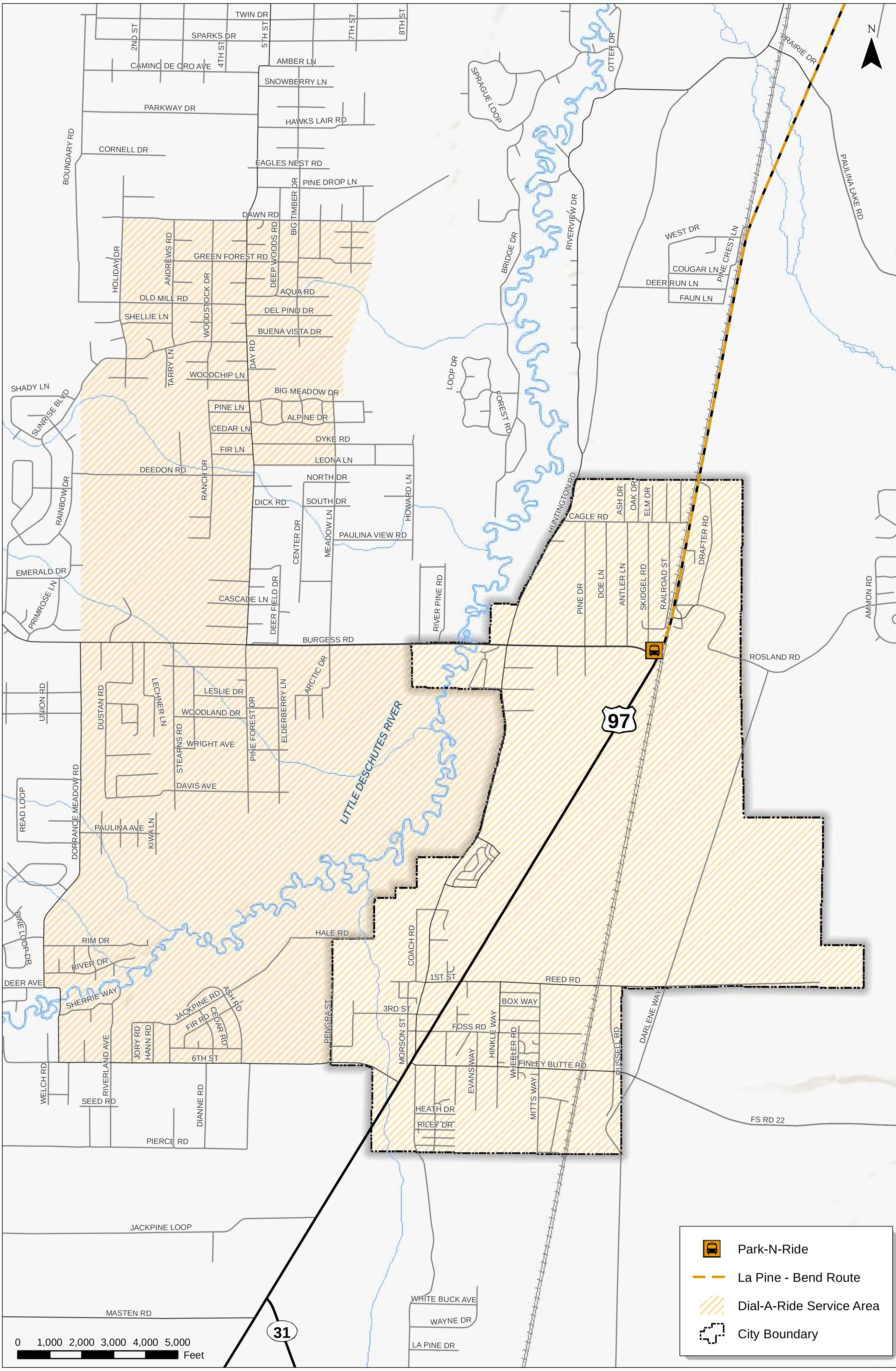


Exhibit 10. La Pine Monthly Transit Ridership Data. *Source: Central Oregon Intergovernmental Council*

Figure 6 shows the Dial-a-Ride service area in La Pine and the location of the La Pine Park-and-Ride lot near the Wickiup Junction.



City of LA PINE

Small Town - Bright Future

Intermodal Connections
La Pine, Oregon

Figure
6

Coordinate System: NAD 1983 HARN StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

H:\projfile\12450 - La Pine TSP\gis\07_Intermodal Connections.mxd - jsommerville - 2:29 PM 12/5/2012

KEY FINDINGS

A listing of key findings of the existing conditions and inventory are summarized below:

- Traffic volumes in La Pine are heavily influenced by regional travel, and do not experience the same commute peaks common in other communities.
- Intersections throughout La Pine operate acceptably today, but congestion on the highway is increased by high travel speeds and poor geometrics.
- Nearly half of all crashes in La Pine occur on US 97. The crashes involve a high proportion of older drivers, and increase in the winter months when travel volumes are lower but snow and ice are more common. A relatively high number of crashes occur on US 97 at night.
- The intersections of US 97/1st Street and Huntington Road/Burgess Road have nearly double the crashes of all other intersections in the City. The signalization of Huntington and Burgess in 2009 has helped to reduce crashes from their 2007 peaks. The US 97/1st Street intersection remains a priority, and recent efforts by ODOT are addressing speed and driver expectation issues within this rural to urban transition area.
- Access on US 97 exceeds State standards by a factor of five.
- Inventory information shows a general lack of bicycle and pedestrian facilities to interconnect the City. Transit service is only provided from the Wickiup Junction park-and-ride lot, with no service from the City core.
- Since incorporation Deschutes County continues to maintain all of the City's major roadways with exception of US 97, which is maintained by ODOT.

NEXT STEPS

This draft memorandum is provided for review and comment, and will be further discussed by the Technical Advisory Committee and Public Advisory Committee as part of the January meeting. The next memorandum will present future needs within La Pine based on projected traffic volumes and forecast roadway conditions, which will then inform areas where improvement strategies are needed.

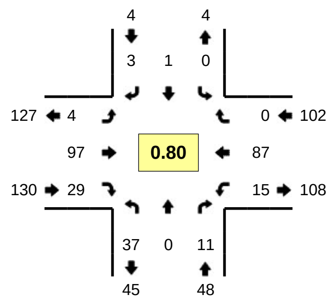
Attachments

- 2012 Traffic Count Worksheets
- Existing Conditions Worksheets
- Citywide Crash Trends

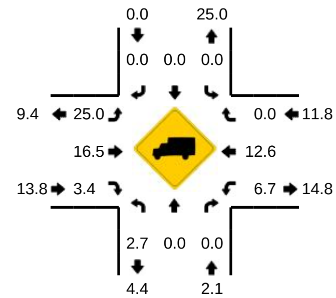
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

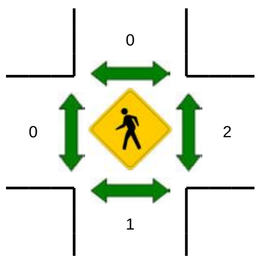
LOCATION: Huntington Rd -- Finley Butte | **QC JOB #:** 10791909

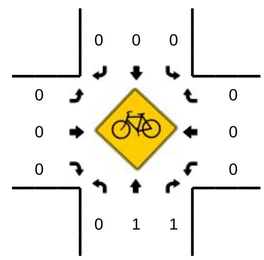
CITY/STATE: La Pine, OR | **DATE:** Tue, Aug 07 2012

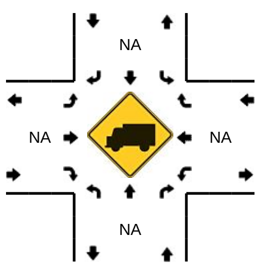


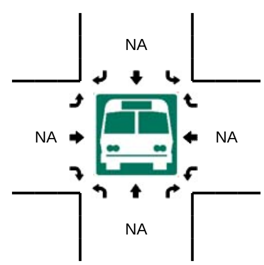
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM











5-Min Count Period Beginning At	Huntington Rd (Northbound) Left	Thru	Right	U	Huntington Rd (Southbound) Left	Thru	Right	U	Finley Butte (Eastbound) Left	Thru	Right	U	Finley Butte (Westbound) Left	Thru	Right	U	Total	Hourly Totals
3:45 PM	4	0	0	0	0	1	0	0	0	12	2	0	0	7	0	0	26	217
3:50 PM	0	0	1	0	0	0	1	0	1	6	4	0	1	4	0	0	18	222
3:55 PM	3	0	0	0	0	0	0	0	0	5	2	0	1	7	0	0	18	229
4:00 PM	0	0	0	0	0	0	0	0	1	10	2	0	1	7	1	0	22	228
4:05 PM	0	0	2	0	0	0	0	0	1	9	3	0	0	16	0	0	31	239
4:10 PM	4	0	0	0	0	0	0	0	0	5	2	0	3	9	0	0	23	238
4:15 PM	4	0	4	0	0	0	0	0	0	12	2	0	1	7	0	0	30	256
4:20 PM	3	0	1	0	0	1	2	0	0	6	1	0	6	8	0	0	28	263
4:25 PM	4	0	1	0	0	0	0	0	1	9	0	0	2	3	0	0	20	263
4:30 PM	2	0	0	0	0	0	0	0	1	4	0	0	0	8	0	0	15	256
4:35 PM	1	0	0	0	0	0	1	0	2	8	2	0	2	1	0	0	17	262
4:40 PM	0	0	0	0	0	0	0	0	0	8	2	0	1	4	0	0	15	263
4:45 PM	4	0	2	0	0	0	0	0	0	6	4	0	1	11	0	0	28	265
4:50 PM	1	0	0	0	0	0	0	0	0	11	2	0	0	6	0	0	20	267
4:55 PM	1	0	0	0	0	0	0	0	0	10	3	0	1	7	0	0	22	271
5:00 PM	4	0	1	0	0	0	0	0	0	10	5	0	1	9	0	0	30	279
5:05 PM	7	0	2	0	0	0	0	0	0	8	5	0	0	9	0	0	31	279
5:10 PM	6	0	0	0	0	0	0	0	0	5	3	0	0	14	0	0	28	284
5:15 PM	2	0	2	0	0	0	0	0	0	5	1	0	0	8	0	0	18	272
5:20 PM	2	0	0	0	0	0	0	0	0	5	0	0	2	8	0	0	17	261
5:25 PM	2	0	1	0	0	0	0	0	0	1	0	0	0	4	0	0	8	249
5:30 PM	1	0	0	0	0	0	0	0	0	6	1	0	1	14	1	0	24	258
5:35 PM	0	0	2	0	0	0	0	0	0	5	1	0	1	9	0	0	18	259
5:40 PM	1	0	0	0	0	0	0	0	0	4	3	0	0	1	0	0	9	253

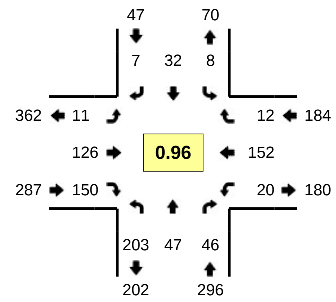
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	68	0	12	0	0	0	0	0	0	92	52	0	4	128	0	0	356
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	16	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

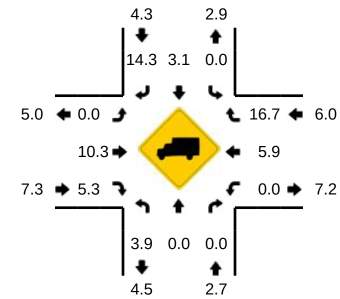
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

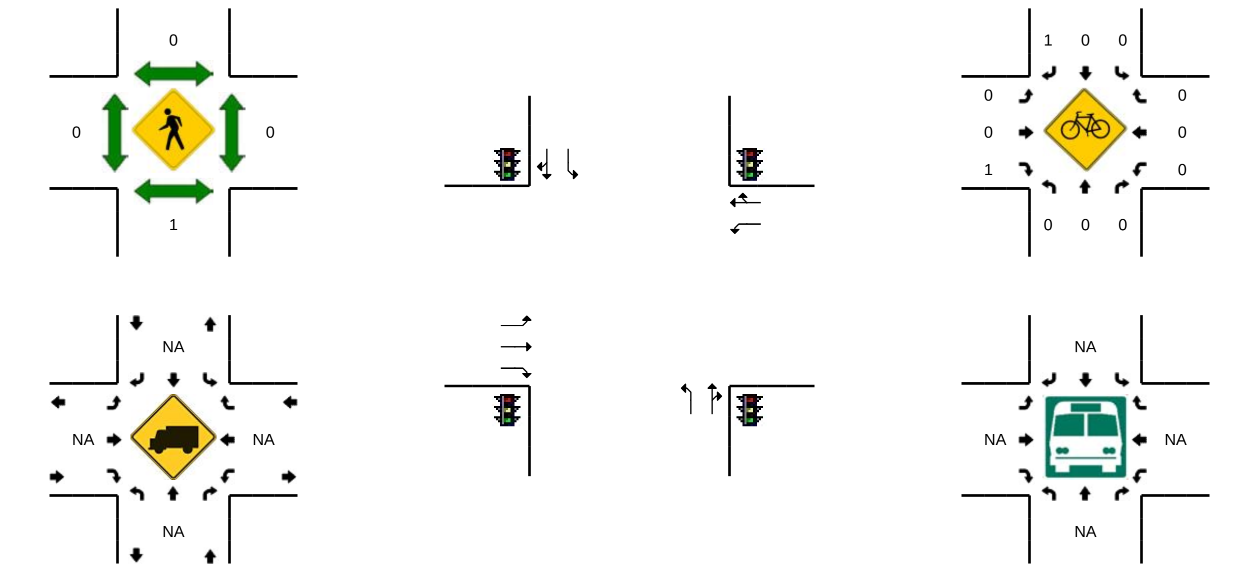
LOCATION: Huntington Rd -- Burgess Rd | **QC JOB #:** 10791908

CITY/STATE: La Pine, OR | **DATE:** Tue, Aug 07 2012



Peak-Hour: 3:55 PM -- 4:55 PM
Peak 15-Min: 4:40 PM -- 4:55 PM





5-Min Count Period Beginning At	Huntington Rd (Northbound) Left	Thru	Right	U	Huntington Rd (Southbound) Left	Thru	Right	U	Burgess Rd (Eastbound) Left	Thru	Right	U	Burgess Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
3:25 PM	15	3	1	0	0	2	1	0	2	4	10	0	0	5	1	0	44	725
3:30 PM	14	1	4	0	0	2	2	0	1	8	9	0	2	9	1	0	53	721
3:35 PM	21	3	6	0	0	1	0	0	2	9	8	0	3	7	0	0	60	713
3:40 PM	14	6	6	0	0	5	0	0	5	15	15	0	2	17	1	0	86	752
3:45 PM	17	3	7	0	1	1	0	0	0	13	9	0	0	12	1	0	64	768
3:50 PM	12	4	1	0	0	5	2	0	0	6	11	0	2	12	1	0	56	741
3:55 PM	17	4	4	0	0	2	0	0	1	6	10	0	1	10	0	0	55	741
4:00 PM	12	2	1	0	3	5	0	0	0	14	23	0	3	8	0	0	71	750
4:05 PM	15	4	6	0	0	2	0	0	1	13	13	0	3	12	2	0	71	754
4:10 PM	20	4	4	0	0	6	1	0	1	8	14	0	0	11	1	0	70	766
4:15 PM	8	7	3	0	2	4	1	0	0	10	9	0	0	11	0	0	55	748
4:20 PM	14	1	3	0	1	3	1	0	0	18	11	0	2	15	1	0	70	755
4:25 PM	14	4	5	0	1	1	0	0	3	10	15	0	3	11	3	0	70	781
4:30 PM	14	9	3	0	0	0	0	0	0	10	12	0	3	10	1	0	62	790
4:35 PM	24	4	9	0	0	1	1	0	0	9	9	0	0	19	1	0	77	807
4:40 PM	22	0	3	0	0	2	0	0	0	10	7	0	3	8	1	0	56	777
4:45 PM	19	3	2	0	0	3	2	0	0	10	12	0	1	20	2	0	74	787
4:50 PM	24	5	3	0	1	3	1	0	5	8	15	0	1	17	0	0	83	814
4:55 PM	9	6	3	0	0	4	1	0	0	3	12	0	1	10	0	0	49	808
5:00 PM	10	2	0	0	0	2	3	0	0	8	7	0	0	7	1	0	40	777
5:05 PM	28	4	1	0	0	2	0	0	1	11	8	0	1	13	0	0	69	775
5:10 PM	30	4	5	0	1	1	1	0	0	10	9	0	0	15	0	0	76	781
5:15 PM	23	3	2	0	0	1	0	0	1	9	5	0	1	7	0	0	52	778
5:20 PM	15	3	4	0	0	2	0	0	2	9	8	0	0	18	1	0	62	770

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	260	32	32	0	4	32	12	0	20	112	136	0	20	180	12	0	852
Heavy Trucks	12	0	0		0	0	0		0	12	8		0	20	4		56
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

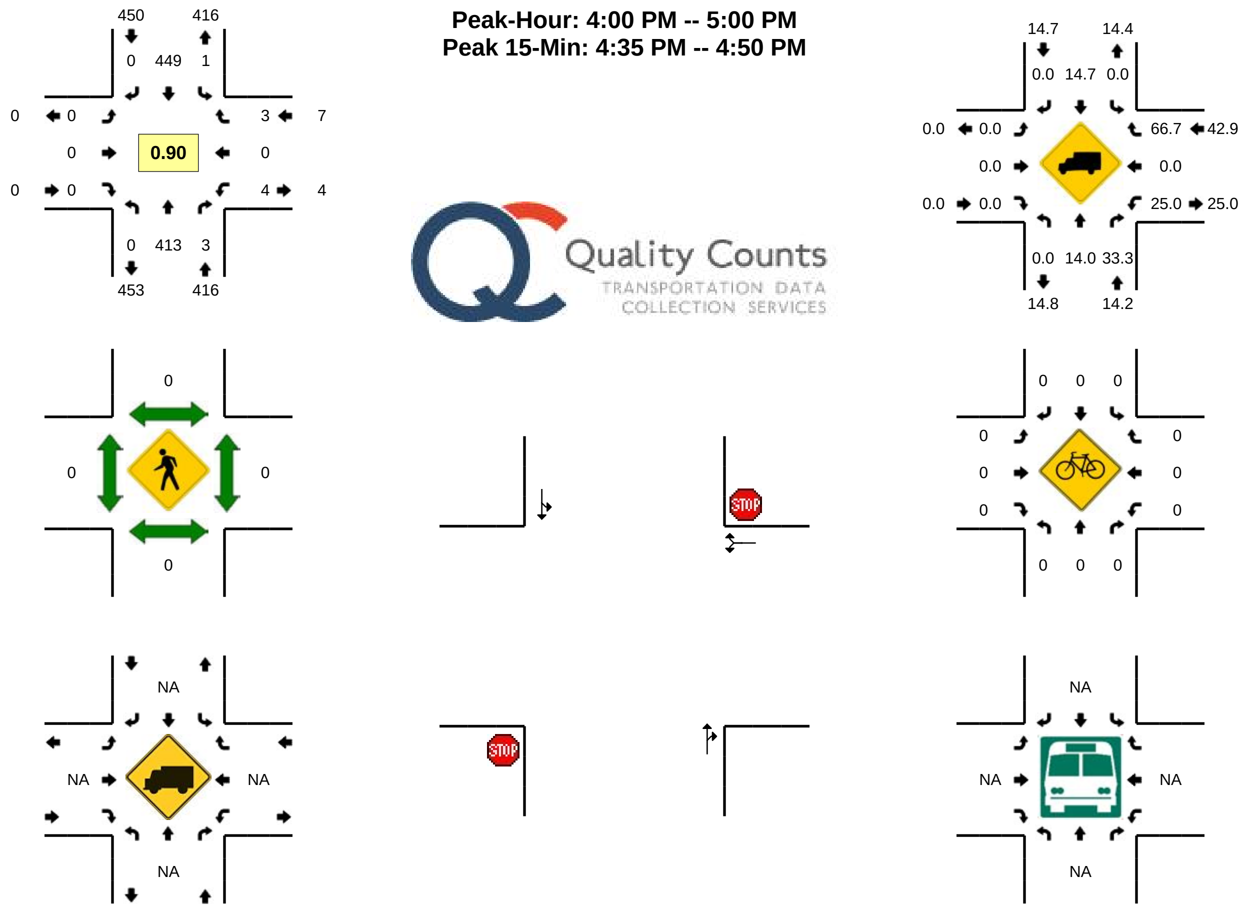
Comments:

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: US Hwy 97 -- Drafter Rd — **QC JOB #:** 10791907

CITY/STATE: La Pine, OR — **DATE:** Tue, Aug 07 2012

Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:35 PM -- 4:50 PM



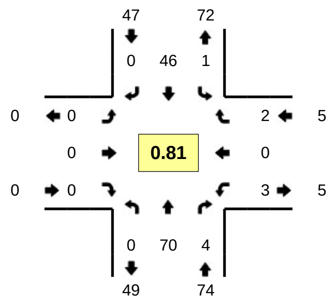
5-Min Count Period Beginning At	US Hwy 97 (Northbound) Left	Thru	Right	U	US Hwy 97 (Southbound) Left	Thru	Right	U	Drafter Rd (Eastbound) Left	Thru	Right	U	Drafter Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
3:30 PM	0	29	0	0	0	27	0	0	0	0	0	0	0	0	0	0	56	794
3:35 PM	0	41	0	0	0	36	0	0	0	0	0	0	0	0	0	0	77	811
3:40 PM	0	27	0	0	0	40	0	0	0	0	0	0	1	0	0	0	68	821
3:45 PM	0	41	2	0	0	24	0	0	0	0	0	0	0	0	0	0	67	816
3:50 PM	0	26	0	0	0	43	0	0	0	0	0	0	0	0	0	0	69	804
3:55 PM	0	24	0	0	0	25	0	0	0	0	0	0	0	0	0	0	49	798
4:00 PM	0	34	0	0	0	37	0	0	0	0	0	0	0	0	0	0	71	802
4:05 PM	0	44	1	0	0	39	0	0	0	0	0	0	1	0	0	0	85	820
4:10 PM	0	25	0	0	1	36	0	0	0	0	0	0	1	0	1	0	64	823
4:15 PM	0	35	1	0	0	31	0	0	0	0	0	0	0	0	0	0	67	823
4:20 PM	0	26	0	0	0	42	0	0	0	0	0	0	0	0	1	0	69	816
4:25 PM	0	30	1	0	0	39	0	0	0	0	0	0	0	0	1	0	71	813
4:30 PM	0	38	0	0	0	33	0	0	0	0	0	0	0	0	0	0	71	828
4:35 PM	0	36	0	0	0	39	0	0	0	0	0	0	1	0	0	0	76	827
4:40 PM	0	40	0	0	0	48	0	0	0	0	0	0	0	0	0	0	88	847
4:45 PM	0	42	0	0	0	36	0	0	0	0	0	0	1	0	0	0	79	859
4:50 PM	0	34	0	0	0	31	0	0	0	0	0	0	0	0	0	0	65	855
4:55 PM	0	29	0	0	0	38	0	0	0	0	0	0	0	0	0	0	67	873
5:00 PM	0	29	0	0	1	32	0	0	0	0	0	0	0	0	0	0	62	864
5:05 PM	0	32	0	0	0	33	0	0	0	0	0	0	0	0	1	0	66	845
5:10 PM	0	32	0	0	1	32	0	0	0	0	0	0	0	0	0	0	65	846
5:15 PM	0	37	1	0	0	38	0	0	0	0	0	0	0	0	0	0	76	855
5:20 PM	0	30	0	0	0	38	0	0	0	0	0	0	0	0	0	0	68	854
5:25 PM	0	31	0	0	1	36	0	0	0	0	0	0	0	0	0	0	68	851

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	472	0	0	0	492	0	0	0	0	0	0	8	0	0	0	972
Heavy Trucks	0	72	0		0	96	0		0	0	0		0	0	0		168
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

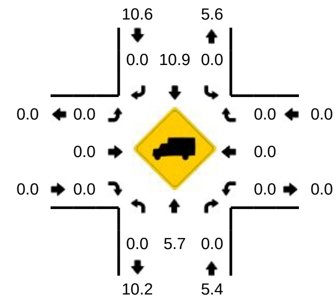
Comments:

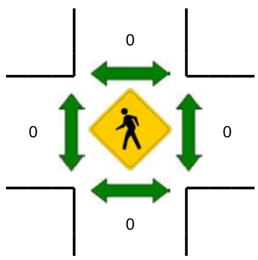
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

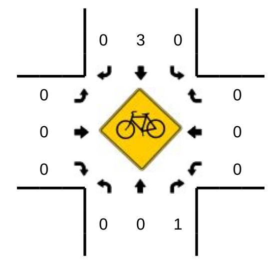
LOCATION: Huntington Rd -- Cagle St | **QC JOB #:** 10791906
CITY/STATE: La Pine, OR | **DATE:** Tue, Aug 07 2012

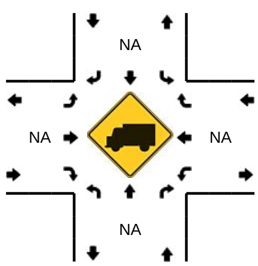


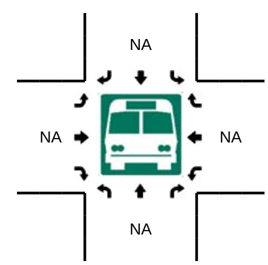
Peak-Hour: 3:40 PM -- 4:40 PM
Peak 15-Min: 3:40 PM -- 3:55 PM











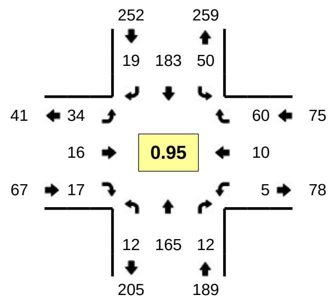
5-Min Count Period Beginning At	Huntington Rd (Northbound) Left	Thru	Right	U	Huntington Rd (Southbound) Left	Thru	Right	U	Cagle St (Eastbound) Left	Thru	Right	U	Cagle St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
3:10 PM	0	6	0	0	0	6	0	0	0	0	0	0	1	0	0	0	13	113
3:15 PM	0	5	2	0	0	1	0	0	0	0	0	0	1	0	0	0	9	111
3:20 PM	0	3	0	0	1	5	0	0	0	0	0	0	0	0	0	0	9	113
3:25 PM	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	7	114
3:30 PM	0	5	0	0	1	4	0	0	0	0	0	0	0	0	0	0	10	113
3:35 PM	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	111
3:40 PM	0	7	2	0	0	5	0	0	0	0	0	0	0	0	0	0	14	114
3:45 PM	0	6	0	0	0	3	0	0	0	0	0	0	0	0	0	0	9	120
3:50 PM	0	6	0	0	0	8	0	0	0	0	0	0	1	0	1	0	16	125
3:55 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	1	0	4	115
4:00 PM	0	5	0	0	0	7	0	0	0	0	0	0	0	0	0	0	12	117
4:05 PM	0	5	0	0	0	4	0	0	0	0	0	0	0	0	0	0	9	117
4:10 PM	0	6	0	0	0	5	0	0	0	0	0	0	0	0	0	0	11	115
4:15 PM	0	6	2	0	0	7	0	0	0	0	0	0	0	0	0	0	15	121
4:20 PM	0	2	0	0	0	3	0	0	0	0	0	0	1	0	0	0	6	118
4:25 PM	0	6	0	0	0	1	0	0	0	0	0	0	1	0	0	0	8	119
4:30 PM	0	14	0	0	1	0	0	0	0	0	0	0	0	0	0	0	15	124
4:35 PM	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	7	126
4:40 PM	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6	118
4:45 PM	0	3	0	0	1	4	0	0	0	0	0	0	0	0	0	0	8	117
4:50 PM	0	10	0	0	0	5	0	0	0	0	0	0	0	0	1	0	16	117
4:55 PM	0	5	0	0	0	4	0	0	0	0	0	0	2	0	0	0	11	124
5:00 PM	0	2	1	0	0	2	0	0	0	0	0	0	1	0	0	0	6	118
5:05 PM	0	4	0	0	0	2	0	0	0	0	0	0	1	0	0	0	7	116

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	76	8	0	0	64	0	0	0	0	0	0	4	0	4	0	156
Heavy Trucks	0	8	0		0	16	0		0	0	0		0	0	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	2	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

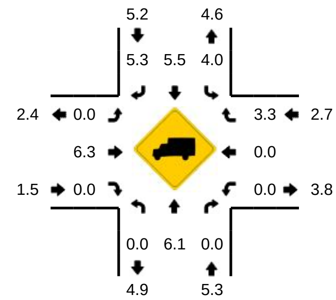
Comments:

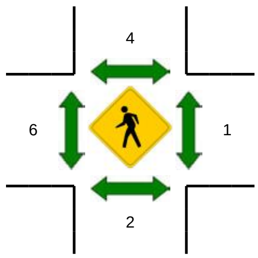
Type of peak hour being reported: Intersection Peak   Method for determining peak hour: Total Entering Volume

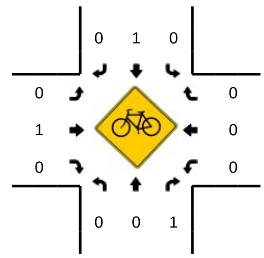
LOCATION: Huntington Rd -- 3rd St   **QC JOB #:** 10791905
CITY/STATE: La Pine, OR   **DATE:** Tue, Aug 07 2012

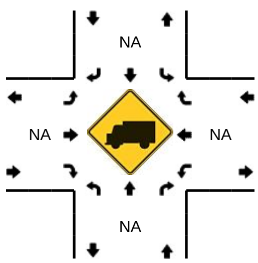


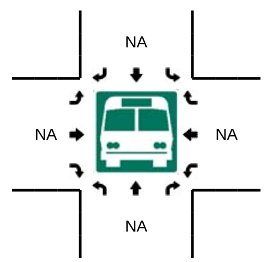
Peak-Hour: 2:10 PM -- 3:10 PM
Peak 15-Min: 2:30 PM -- 2:45 PM











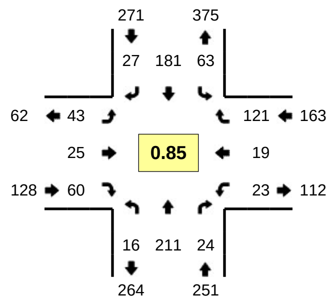
5-Min Count Period Beginning At	Huntington Rd (Northbound) Left	Thru	Right	U	Huntington Rd (Southbound) Left	Thru	Right	U	3rd St (Eastbound) Left	Thru	Right	U	3rd St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
2:00 PM	0	14	0	0	4	16	1	0	5	0	1	0	0	0	3	0	44	
2:05 PM	0	12	3	0	3	9	3	0	1	0	3	0	1	1	5	0	41	
2:10 PM	2	17	1	0	5	13	4	0	2	0	4	0	1	2	3	0	54	
2:15 PM	3	8	0	0	5	11	1	0	2	1	1	0	1	0	7	0	40	
2:20 PM	1	12	2	0	5	13	3	0	0	0	1	0	0	2	3	0	42	
2:25 PM	1	20	1	0	0	15	1	0	3	1	2	0	0	0	4	0	48	
2:30 PM	1	19	3	0	6	16	1	0	5	0	1	0	0	0	8	0	60	
2:35 PM	0	12	1	0	1	18	2	0	4	1	1	0	2	1	2	0	45	
2:40 PM	1	12	0	0	4	18	2	0	2	2	1	0	0	0	7	0	49	
2:45 PM	0	13	0	0	8	15	1	0	4	1	2	0	0	1	5	0	50	
2:50 PM	3	12	1	0	1	20	1	0	1	4	0	0	0	0	3	0	46	
2:55 PM	0	13	0	0	5	15	2	0	3	1	2	0	0	1	4	0	46	565
3:00 PM	0	15	1	0	4	12	1	0	3	4	2	0	0	0	4	0	46	567
3:05 PM	0	12	2	0	6	17	0	0	5	1	0	0	1	3	10	0	57	583
3:10 PM	0	14	1	0	2	12	1	0	3	2	2	0	0	2	2	0	41	570
3:15 PM	0	9	1	0	2	12	5	0	2	2	2	0	0	0	6	0	41	571
3:20 PM	0	8	1	0	3	7	0	0	3	2	1	0	0	0	5	0	30	559
3:25 PM	0	12	1	0	2	18	1	0	1	1	0	0	0	1	8	0	45	556
3:30 PM	1	11	1	0	4	13	1	0	2	2	2	0	0	0	3	0	40	536
3:35 PM	0	6	1	0	3	13	4	0	3	5	2	0	2	0	4	0	43	534
3:40 PM	1	12	1	0	3	7	1	0	3	3	1	0	0	0	4	0	36	521
3:45 PM	0	12	0	0	3	14	4	0	4	2	1	0	0	1	5	0	46	517
3:50 PM	0	8	0	0	4	12	0	0	1	1	2	0	1	1	4	0	34	505
3:55 PM	2	8	0	0	4	11	1	0	1	1	1	0	0	0	6	0	35	494

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	8	172	16	0	44	208	20	0	44	12	12	0	8	4	68	0	616
Heavy Trucks	0	12	0		4	20	4		0	0	0		0	0	0		40
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

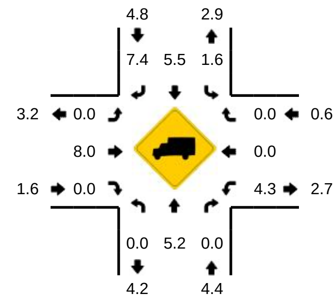
Comments:

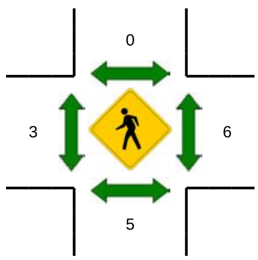
Type of peak hour being reported: Intersection Peak	Method for determining peak hour: Total Entering Volume

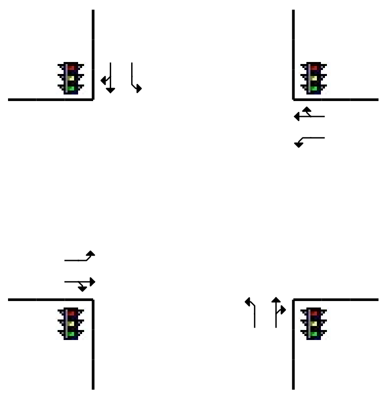
LOCATION: Huntington Rd -- 1st St	**QC JOB #:** 10791904
CITY/STATE: La Pine, OR	**DATE:** Tue, Aug 07 2012

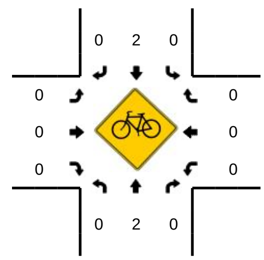


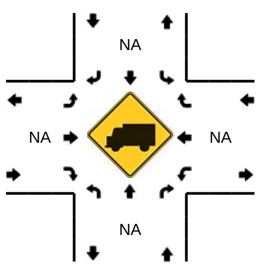
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

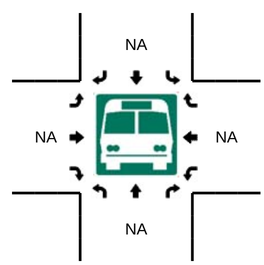












5-Min Count Period Beginning At	Huntington Rd (Northbound) Left	Thru	Right	U	Huntington Rd (Southbound) Left	Thru	Right	U	1st St (Eastbound) Left	Thru	Right	U	1st St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
3:30 PM	3	16	0	0	4	15	1	0	4	3	4	0	4	1	15	0	70	765
3:35 PM	0	13	3	0	4	11	1	0	2	1	5	0	2	3	7	0	52	748
3:40 PM	5	12	1	0	7	10	3	0	2	3	2	0	5	0	6	0	56	744
3:45 PM	0	17	2	0	11	16	3	0	4	1	2	0	1	0	11	0	68	737
3:50 PM	2	9	4	0	6	8	1	0	2	1	6	0	1	0	5	0	45	720
3:55 PM	2	17	2	0	6	11	1	0	1	0	4	0	3	4	6	0	57	705
4:00 PM	1	13	2	0	6	20	3	0	2	0	8	0	2	0	10	0	67	709
4:05 PM	3	14	2	0	7	14	2	0	5	1	4	0	1	2	11	0	66	702
4:10 PM	1	17	3	0	9	17	3	0	6	1	9	0	3	3	7	0	79	734
4:15 PM	2	11	1	0	4	13	2	0	5	1	4	0	1	2	8	0	54	729
4:20 PM	1	17	2	0	6	13	1	0	2	0	5	0	1	0	11	0	59	728
4:25 PM	2	27	1	0	3	16	1	0	2	4	6	0	2	5	13	0	82	755
4:30 PM	1	23	1	0	7	14	2	0	7	2	6	0	6	1	14	0	84	769
4:35 PM	1	16	5	0	6	14	4	0	6	3	5	0	3	0	10	0	73	790
4:40 PM	1	13	1	0	3	19	1	0	1	0	3	0	0	2	10	0	54	788
4:45 PM	0	24	3	0	5	15	0	0	4	2	6	0	1	0	12	0	72	792
4:50 PM	0	20	2	0	2	13	4	0	2	4	2	0	2	2	6	0	59	806
4:55 PM	3	16	1	0	5	13	4	0	1	7	2	0	1	2	9	0	64	813
5:00 PM	3	7	0	0	8	12	2	0	1	3	5	0	0	2	13	0	56	802
5:05 PM	3	24	2	0	4	13	1	0	2	2	2	0	0	1	4	0	58	794
5:10 PM	4	18	0	0	3	15	0	0	2	1	0	0	1	5	9	0	58	773
5:15 PM	2	20	0	0	3	8	0	0	0	2	0	0	1	0	10	0	46	765
5:20 PM	1	18	0	0	5	14	0	0	0	3	5	0	1	2	9	0	58	764
5:25 PM	1	14	1	0	4	10	1	0	0	2	2	0	0	0	5	0	40	722

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	16	264	28	0	64	176	28	0	60	36	68	0	44	24	148	0	956
Heavy Trucks	0	12	0		0	12	0		0	0	0		0	0	0		24
Pedestrians		8				0				0				4			12
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

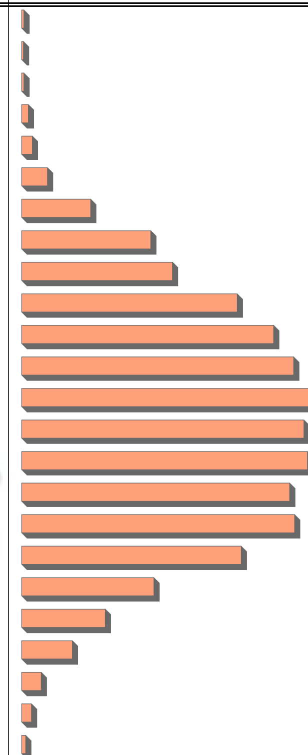
Comments:

Type of report: Tube Count - Volume Data

LOCATION: Huntington Rd north of 1st
SPECIFIC LOCATION: 20 ft from 1st
CITY/STATE: La Pine, OR

QC JOB #: 10791903
DIRECTION: NB/SB
DATE: Sep 25 2012 - Sep 27 2012

Start Time	Mon	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		5	5	6		5			5	
1:00 AM		8	2	2		4			4	
2:00 AM		5	5	6		5			5	
3:00 AM		16	15	13		15			15	
4:00 AM		22	29	20		24			24	
5:00 AM		58	59	58		58			58	
6:00 AM		160	148	156		155			155	
7:00 AM		298	296	275		290			290	
8:00 AM		346	358	312		339			339	
9:00 AM		510	493	448		484			484	
10:00 AM		565	558	**576**		566			566	
11:00 AM		**654**	**610**	569		**611**			**611**	
12:00 PM		**690**	627	627		**648**			**648**	
1:00 PM		640	**644**	617		634			634	
2:00 PM		652	625	**648**		642			642	
3:00 PM		663	582	561		602			602	
4:00 PM		682	549	608		613			613	
5:00 PM		501	482	497		493			493	
6:00 PM		315	295	280		297			297	
7:00 PM		210	155	198		188			188	
8:00 PM		115	124	104		114			114	
9:00 PM		42	45	45		44			44	
10:00 PM		28	13	25		22			22	
11:00 PM		8	10	8		9			9	
Day Total		7193	6729	6659		6862			6862	
% Weekday Average		104.8%	98.1%	97.0%						
% Week Average		104.8%	98.1%	97.0%		100.0%				
AM Peak Volume		11:00 AM 654	11:00 AM 610	10:00 AM 576		11:00 AM 611			11:00 AM 611	
PM Peak Volume		12:00 PM 690	1:00 PM 644	2:00 PM 648		12:00 PM 648			12:00 PM 648	



Comments:

Report generated on 10/4/2012 3:42 PM

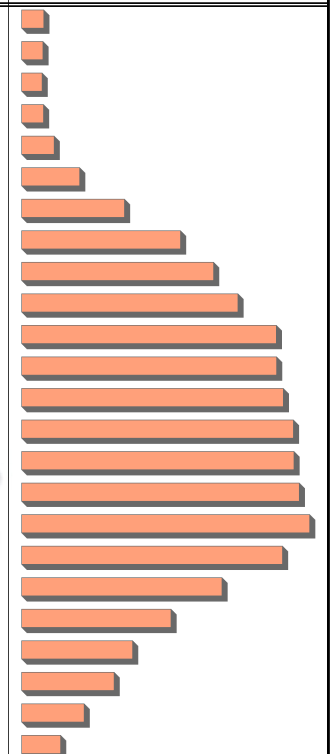
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: US 97 within Wickiup Junction
SPECIFIC LOCATION: 30 ft from Wickiup Junction
CITY/STATE: La Pine, OR

QC JOB #: 10791902
DIRECTION: NB/SB
DATE: Aug 07 2012 - Aug 09 2012

Start Time	Mon	Tue 07-Aug-12	Wed 08-Aug-12	Thu 09-Aug-12	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		92	63	83		79			79	
1:00 AM		76	66	85		76			76	
2:00 AM		72	63	83		73			73	
3:00 AM		78	79	78		78			78	
4:00 AM		111	117	119		116			116	
5:00 AM		204	211	205		207			207	
6:00 AM		345	355	402		367			367	
7:00 AM		556	565	580		567			567	
8:00 AM		626	736	693		685			685	
9:00 AM		742	784	789		772			772	
10:00 AM		859	**936**	933		909			909	
11:00 AM		**885**	854	**990**		**910**			**910**	
12:00 PM		926	898	978		934			934	
1:00 PM		956	965	989		970			970	
2:00 PM		928	**999**	990		972			972	
3:00 PM		937	997	1039		991			991	
4:00 PM		**1025**	988	**1071**		**1028**			**1028**	
5:00 PM		907	953	934		931			931	
6:00 PM		691	711	744		715			715	
7:00 PM		549	516	533		533			533	
8:00 PM		376	366	446		396			396	
9:00 PM		333	324	332		330			330	
10:00 PM		227	192	251		223			223	
11:00 PM		130	137	149		139			139	
Day Total		12631	12875	13496		13001			13001	
% Weekday Average		97.2%	99.0%	103.8%						
% Week Average		97.2%	99.0%	103.8%		100.0%				
AM Peak Volume		11:00 AM 885	10:00 AM 936	11:00 AM 990		11:00 AM 910			11:00 AM 910	
PM Peak Volume		4:00 PM 1025	2:00 PM 999	4:00 PM 1071		4:00 PM 1028			4:00 PM 1028	



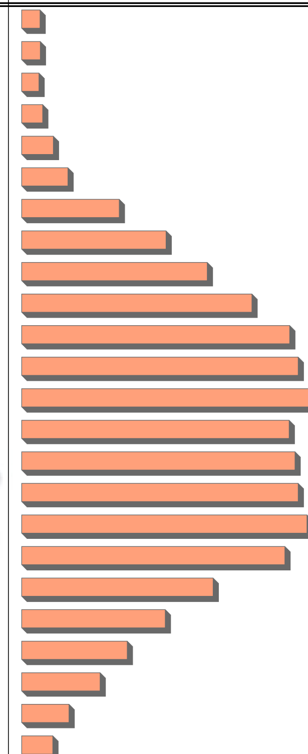
Comments:

Type of report: Tube Count - Volume Data

LOCATION: US 97 near Finley Butte
SPECIFIC LOCATION: 24 ft from Finley Butte
CITY/STATE: La Pine, OR

QC JOB #: 10791901
DIRECTION: NB/SB
DATE: Aug 07 2012 - Aug 09 2012

Start Time	Mon	Tue 07-Aug-12	Wed 08-Aug-12	Thu 09-Aug-12	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		73	53	80		69			69	
1:00 AM		67	65	77		70			70	
2:00 AM		62	60	72		65			65	
3:00 AM		84	67	85		79			79	
4:00 AM		111	131	115		119			119	
5:00 AM		181	176	164		174			174	
6:00 AM		356	351	394		367			367	
7:00 AM		537	555	536		543			543	
8:00 AM		693	689	712		698			698	
9:00 AM		858	873	866		866			866	
10:00 AM		**1063**	947	1013		1008			1008	
11:00 AM		1029	**1009**	**1081**		**1040**			**1040**	
12:00 PM		1082	1053	**1121**		**1085**			**1085**	
1:00 PM		1005	993	1021		1006			1006	
2:00 PM		1020	1008	1055		1028			1028	
3:00 PM		999	**1062**	1059		1040			1040	
4:00 PM		**1123**	1001	1094		1073			1073	
5:00 PM		948	999	1024		990			990	
6:00 PM		716	689	754		720			720	
7:00 PM		526	532	561		540			540	
8:00 PM		376	362	453		397			397	
9:00 PM		320	277	287		295			295	
10:00 PM		176	159	199		178			178	
11:00 PM		107	115	129		117			117	
Day Total		13512	13226	13952		13567			13567	
% Weekday Average		99.6%	97.5%	102.8%						
% Week Average		99.6%	97.5%	102.8%		100.0%				
AM Peak		10:00 AM	11:00 AM	11:00 AM		11:00 AM			11:00 AM	
Volume		1063	1009	1081		1040			1040	
PM Peak		4:00 PM	3:00 PM	12:00 PM		12:00 PM			12:00 PM	
Volume		1123	1062	1121		1085			1085	



Comments:

Report generated on 10/4/2012 3:41 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	3	413	3	1	449
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	3	459	3	1	499
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	962	461			462	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	962	461			462	
tC, single (s)	6.6	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.9			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	258	487			1110	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	462	500
Volume Left	4	0	1
Volume Right	3	3	0
cSH	323	1700	1110
Volume to Capacity	0.02	0.27	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	16.4	0.0	0.0
Lane LOS	C		A
Approach Delay (s)	16.4	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	1	69	2	2	46
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	4	1	78	2	2	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	135	79			80	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	135	79			80	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	862	987			1531	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	6	80	54
Volume Left	4	0	2
Volume Right	1	2	0
cSH	885	1700	1531
Volume to Capacity	0.01	0.05	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.1	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	129	160	21	173	205	99	8	44
v/c Ratio	0.03	0.45	0.42	0.09	0.57	0.30	0.10	0.01	0.06
Control Delay	14.9	24.8	7.9	17.8	26.7	8.6	6.1	6.9	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	24.8	7.9	17.8	26.7	8.6	6.1	6.9	10.1
Queue Length 50th (ft)	2	34	0	5	45	22	5	1	6
Queue Length 95th (ft)	14	87	42	21	106	81	42	7	28
Internal Link Dist (ft)		2039			2235		805		1087
Turn Bay Length (ft)	125		200	225		150		125	
Base Capacity (vph)	385	676	680	236	685	674	947	644	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.19	0.24	0.09	0.25	0.30	0.10	0.01	0.06

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	123	152	20	152	12	195	49	45	8	34	8
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	5.0	5.0	4.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1591	1383	1662	1606		1599	1625		1662	1621	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.65	1.00		0.69	1.00	
Satd. Flow (perm)	1134	1591	1383	769	1606		1090	1625		1213	1621	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	129	160	21	160	13	205	52	47	8	36	8
RTOR Reduction (vph)	0	0	135	0	5	0	0	24	0	0	4	0
Lane Group Flow (vph)	11	129	25	21	168	0	205	76	0	8	40	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	0%	10%	5%	0%	7%	17%	4%	0%	0%	0%	3%	12%
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.9	9.5	9.5	9.8	9.8		33.9	29.9		27.3	26.6	
Effective Green, g (s)	10.9	9.5	9.5	9.8	9.8		33.9	29.9		27.3	26.6	
Actuated g/C Ratio	0.18	0.16	0.16	0.16	0.16		0.57	0.50		0.46	0.44	
Clearance Time (s)	3.0	5.0	5.0	4.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	0.2	2.0	2.0	0.2	2.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	219	253	220	136	263		652	813		559	721	
v/s Ratio Prot	c0.00	0.08		0.00	c0.10		c0.02	0.05		0.00	0.02	
v/s Ratio Perm	0.01		0.02	0.02			c0.16			0.01		
v/c Ratio	0.05	0.51	0.12	0.15	0.64		0.31	0.09		0.01	0.05	
Uniform Delay, d1	20.2	23.0	21.6	21.3	23.3		6.5	7.8		8.9	9.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.6	0.1	0.2	3.7		0.1	0.2		0.0	0.1	
Delay (s)	20.2	23.6	21.6	21.5	27.1		6.6	8.1		8.9	9.6	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		22.4			26.5			7.1			9.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	100	27	164	19	276	74	245
v/c Ratio	0.19	0.21	0.11	0.33	0.07	0.44	0.28	0.33
Control Delay	21.4	7.9	21.0	7.4	20.7	13.5	25.9	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	7.9	21.0	7.4	20.7	13.5	25.9	9.7
Queue Length 50th (ft)	9	4	5	3	3	36	13	15
Queue Length 95th (ft)	39	34	25	39	20	113	#65	100
Internal Link Dist (ft)		495		687		283		345
Turn Bay Length (ft)			175				150	
Base Capacity (vph)	266	885	256	930	266	943	261	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.11	0.11	0.18	0.07	0.29	0.28	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	25	60	23	19	121	16	211	24	63	181	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.87		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1501		1591	1523		1659	1645		1630	1612	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	1501		1591	1523		1659	1645		1630	1612	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	51	29	71	27	22	142	19	248	28	74	213	32
RTOR Reduction (vph)	0	58	0	0	118	0	0	7	0	0	9	0
Lane Group Flow (vph)	51	42	0	27	46	0	19	269	0	74	236	0
Confl. Peds. (#/hr)			5	5			3		6	6		3
Confl. Bikes (#/hr)								2			2	
Heavy Vehicles (%)	0%	8%	0%	4%	0%	0%	0%	5%	0%	2%	6%	7%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.1	6.5		0.5	5.9		0.5	10.3		1.9	11.7	
Effective Green, g (s)	1.1	6.5		0.5	5.9		0.5	10.3		1.9	11.7	
Actuated g/C Ratio	0.03	0.18		0.01	0.17		0.01	0.29		0.05	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	277		23	255		24	481		88	536	
v/s Ratio Prot	c0.03	0.03		0.02	c0.03		0.01	c0.16		c0.05	0.15	
v/s Ratio Perm												
v/c Ratio	0.98	0.15		1.17	0.18		0.79	0.56		0.84	0.44	
Uniform Delay, d1	17.0	12.0		17.4	12.6		17.3	10.5		16.5	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	117.4	0.3		246.2	0.3		94.5	1.4		48.1	0.6	
Delay (s)	134.4	12.3		263.5	12.9		111.8	11.9		64.6	9.8	
Level of Service	F	B		F	B		F	B		E	A	
Approach Delay (s)		53.5			48.3			18.4			22.5	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	9	19	3	14	56	6	180	6	57	187	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	27	10	21	3	15	62	7	198	7	63	205	15
Pedestrians		7			2			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1070	
pX, platoon unblocked												
vC, conflicting volume	630	565	221	582	569	204	228			206		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	630	565	221	582	569	204	228			206		
tC, single (s)	7.1	6.5	6.3	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	92	98	97	99	96	93	100			95		
cM capacity (veh/h)	339	412	791	348	409	840	1344			1363		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	80	211	284
Volume Left	27	3	7	63
Volume Right	21	62	7	15
cSH	443	667	1344	1363
Volume to Capacity	0.13	0.12	0.00	0.05
Queue Length 95th (ft)	11	10	0	4
Control Delay (s)	14.3	11.1	0.3	2.0
Lane LOS	B	B	A	A
Approach Delay (s)	14.3	11.1	0.3	2.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

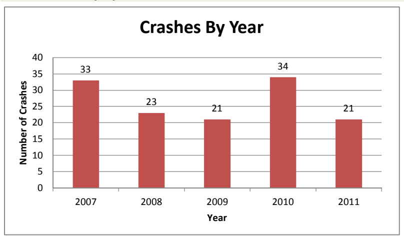
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	98	23	18	87	1	24	0	10	0	1	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	7	121	28	22	107	1	30	0	12	0	1	4
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	109			150			308	304	139	318	318	108
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109			150			308	304	139	318	318	108
tC, single (s)	4.3			4.2			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			98			95	100	99	100	100	100
cM capacity (veh/h)	1393			1405			626	599	885	618	589	951

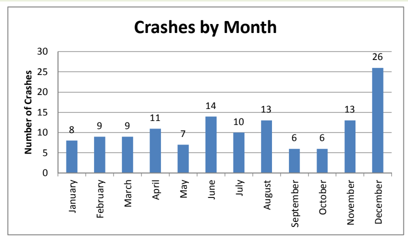
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	157	131	42	5
Volume Left	7	22	30	0
Volume Right	28	1	12	4
cSH	1393	1405	685	824
Volume to Capacity	0.01	0.02	0.06	0.01
Queue Length 95th (ft)	0	1	5	0
Control Delay (s)	0.4	1.4	10.6	9.4
Lane LOS	A	A	B	A
Approach Delay (s)	0.4	1.4	10.6	9.4
Approach LOS			B	A

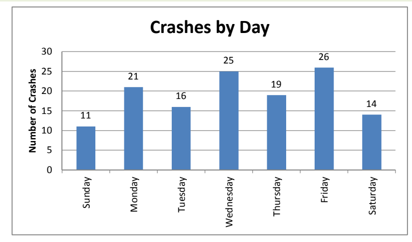
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

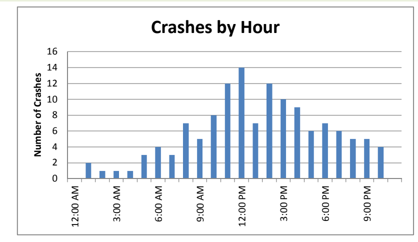
Project Name:	La Pine TSP
Project Number	
Query Information:	La Pine (2007 to 2011)
Date Queried:	3-Dec-12
Data Provider:	ODOT Crash Analysis Reporting Unit
Analyst:	JWB
Summary Date:	12/5/2012
Text File Name:	
Filters Applied:	None

Crash Summary by Date and Time

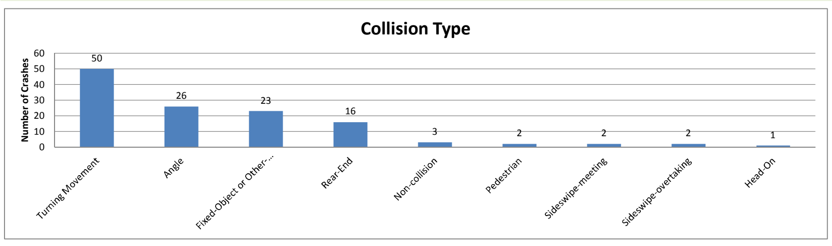


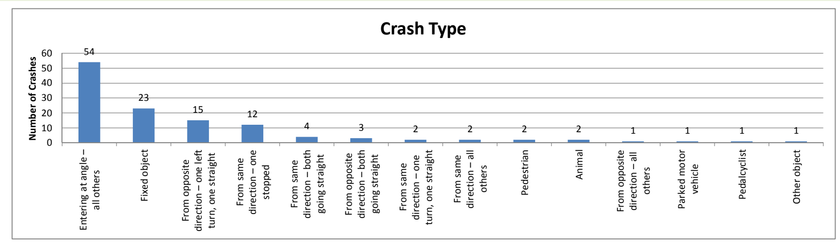




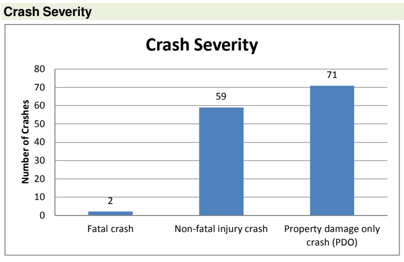


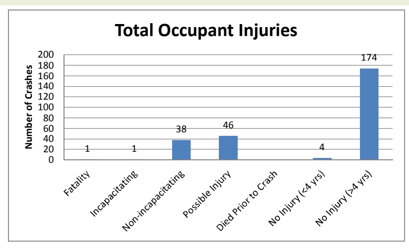
Crash Summary by Type



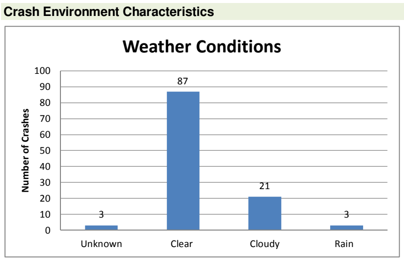


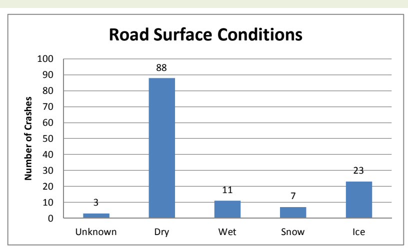
Crash Severity

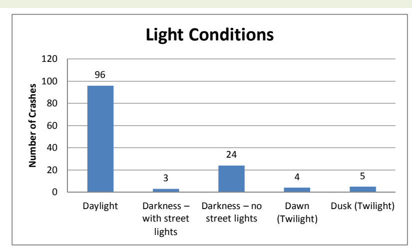




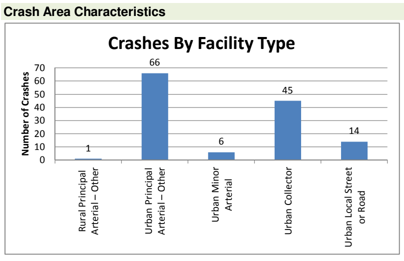
Crash Environment Characteristics

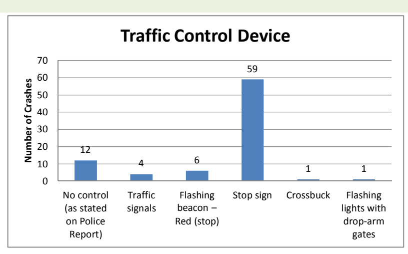


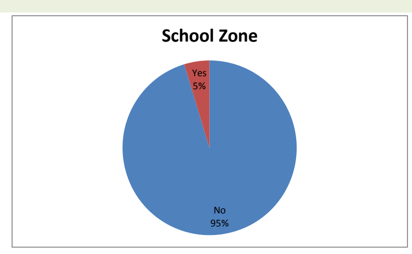


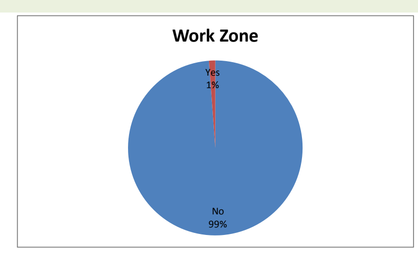


Crash Area Characteristics

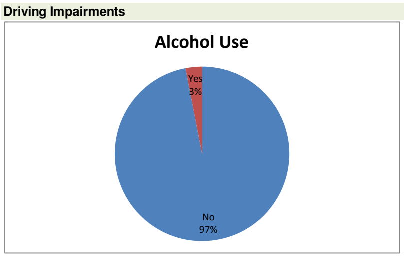


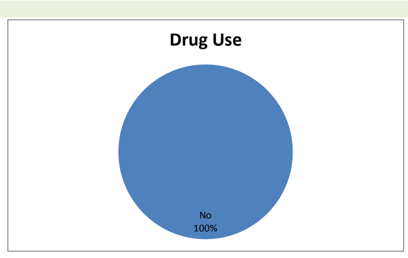




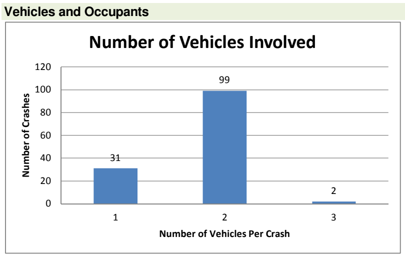


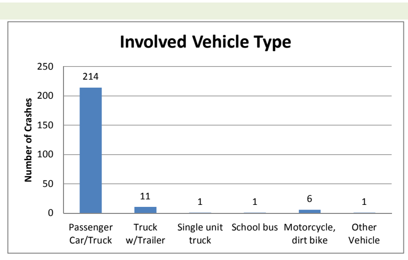
Driving Impairments

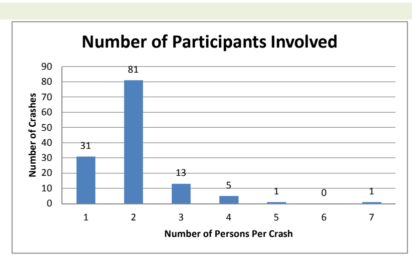




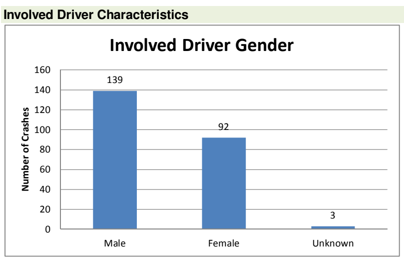
Vehicles and Occupants

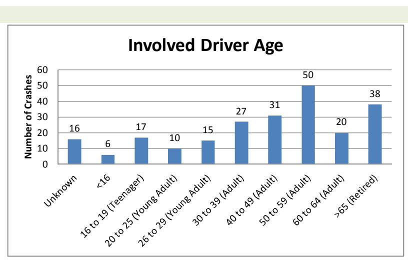


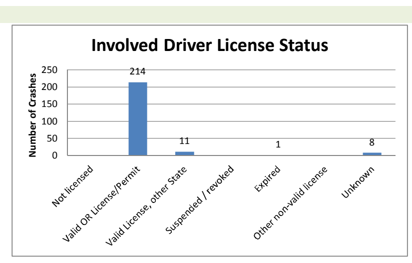


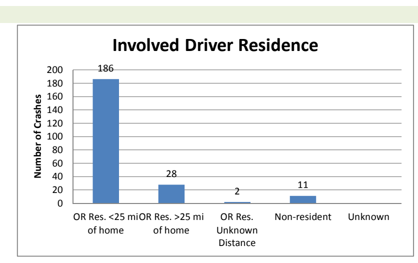


Involved Driver Characteristics

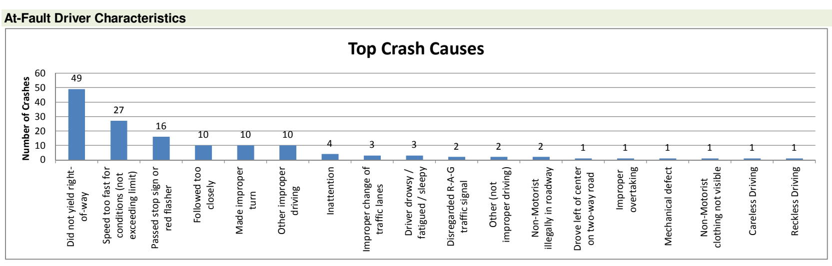


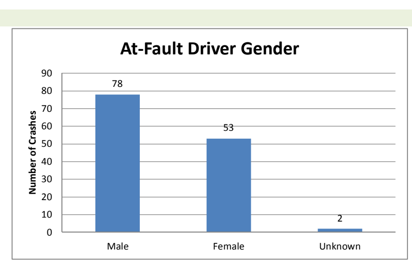


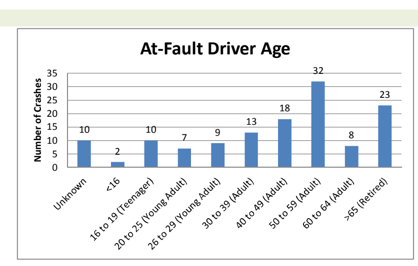




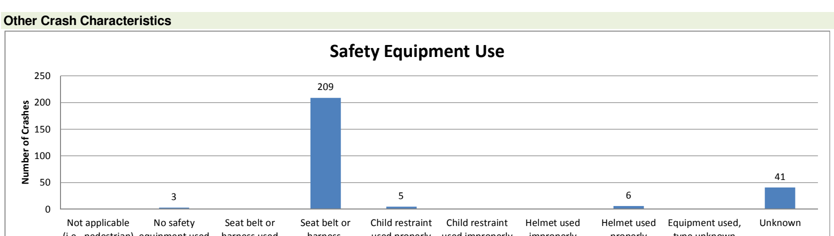
At-Fault Driver Characteristics

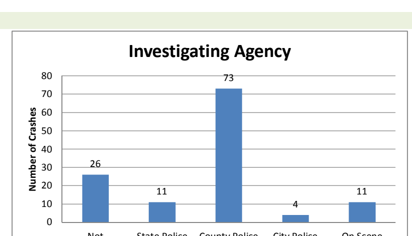






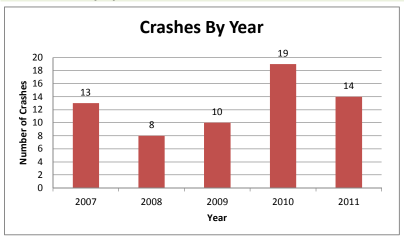
Other Crash Characteristics

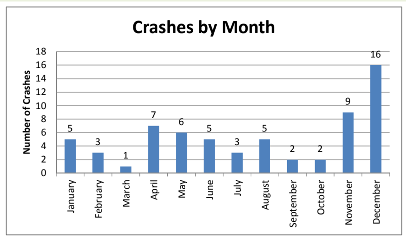


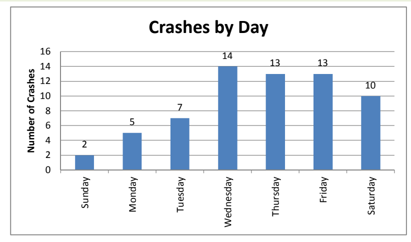


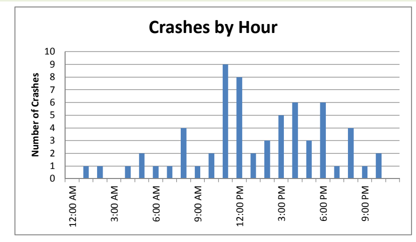
Project Name:	La Pine TSP
Project Number	
Query Information:	US 97 Crashes
Date Queried:	January 2007 through December 2011
Data Provider:	ODOT Crash Analysis Reporting Unit
Analyst:	
Summary Date:	12/6/2012
Text File Name:	
Filters Applied:	:

Crash Summary by Date and Time

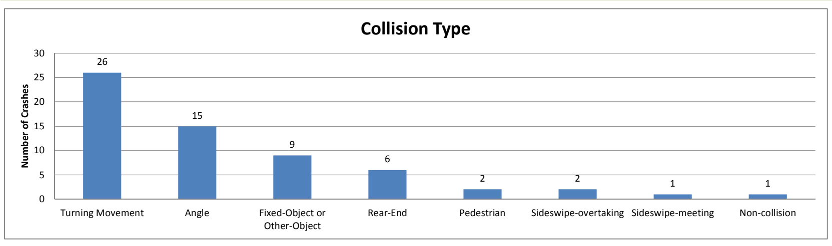


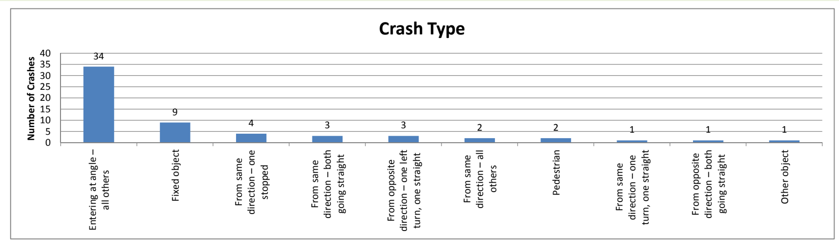




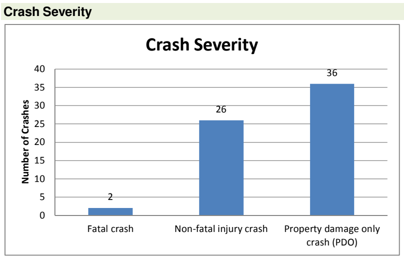


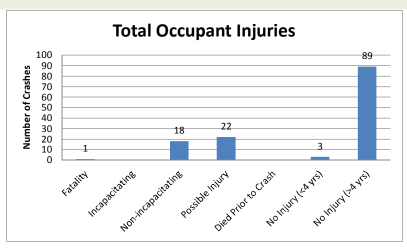
Crash Summary by Type



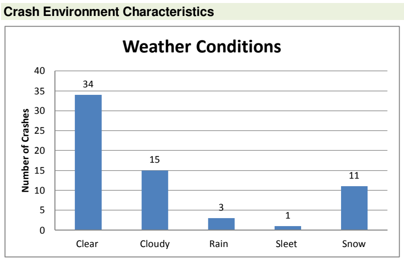


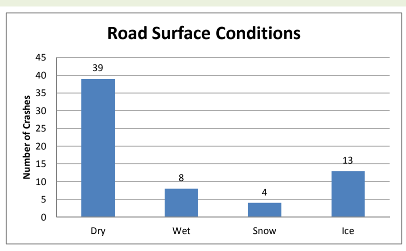
Crash Severity

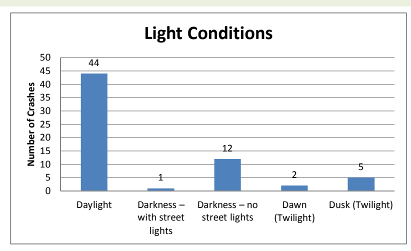




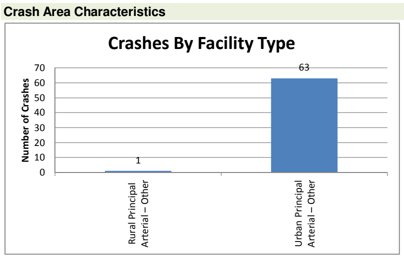
Crash Environment Characteristics

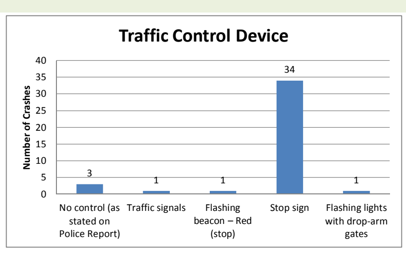


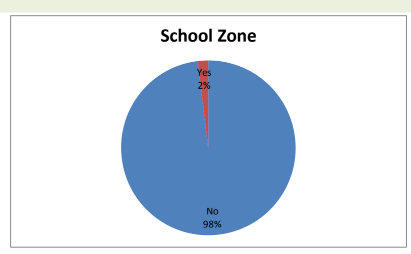


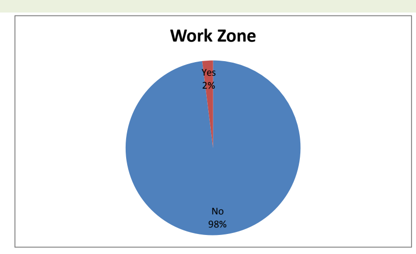


Crash Area Characteristics

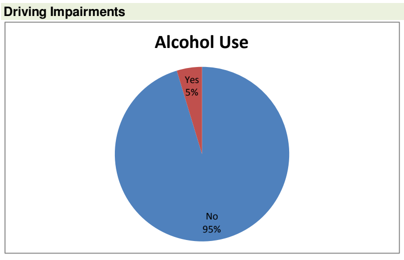


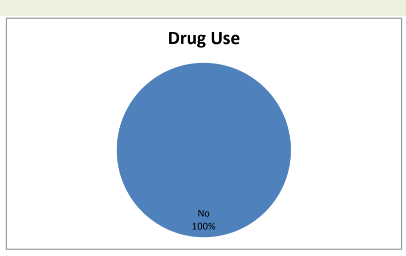




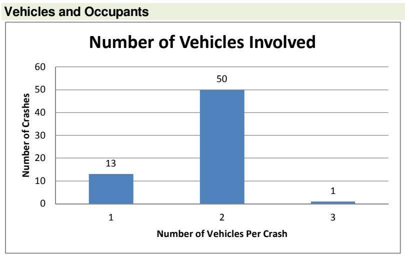


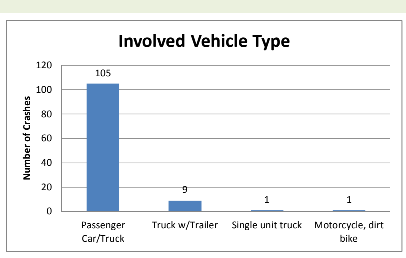
Driving Impairments

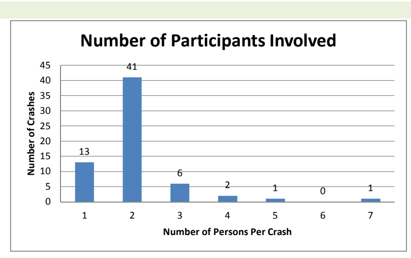




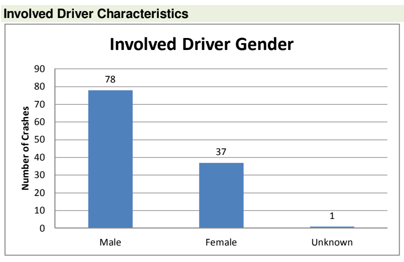
Vehicles and Occupants

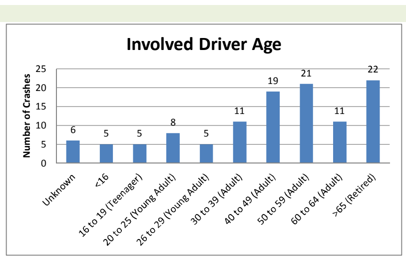


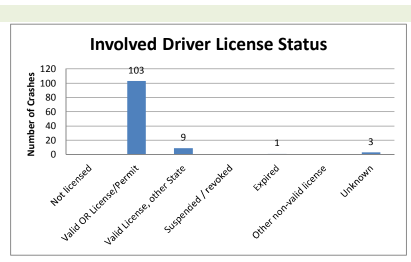


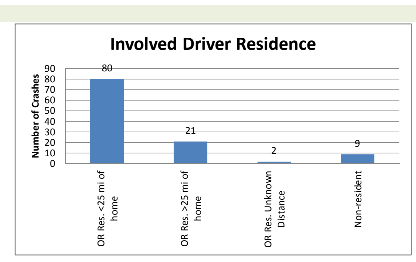


Involved Driver Characteristics

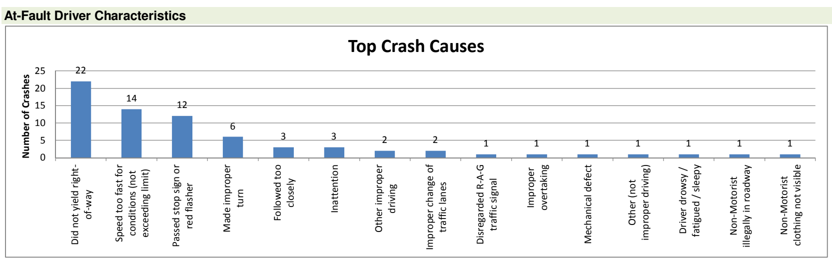


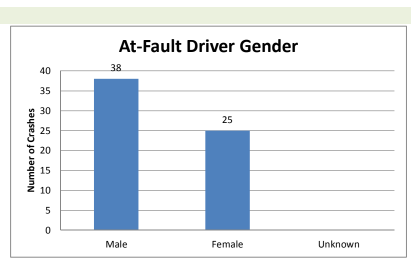


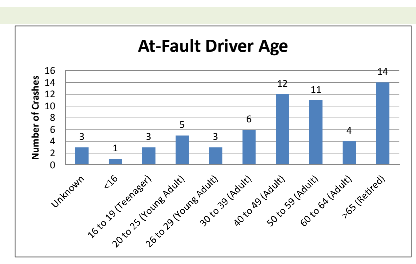




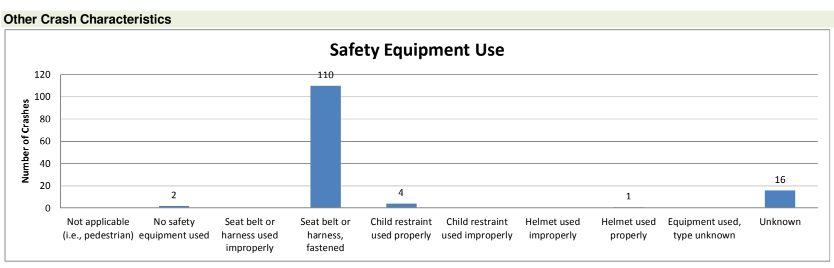
At-Fault Driver Characteristics

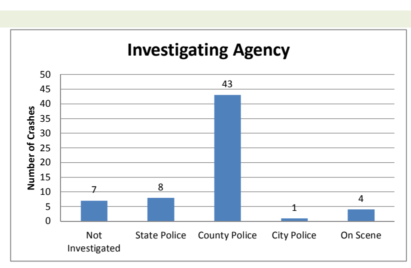






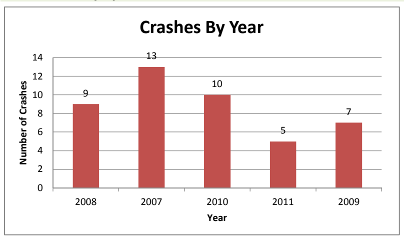
Other Crash Characteristics

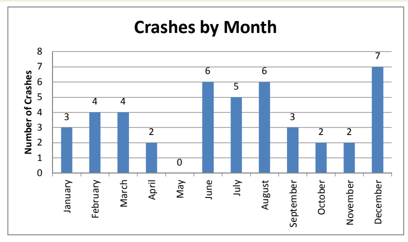


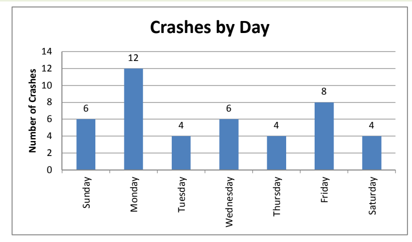


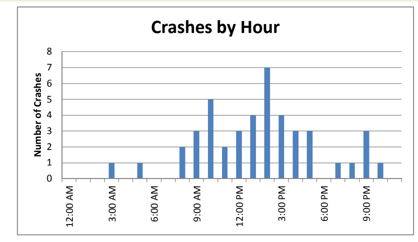
Project Name: La Pine TSP
Project Number
Query Information: Huntington Road
Date Queried:
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst:
Summary Date: 12/6/2012
Text File Name:
Filters Applied: :

Crash Summary by Date and Time

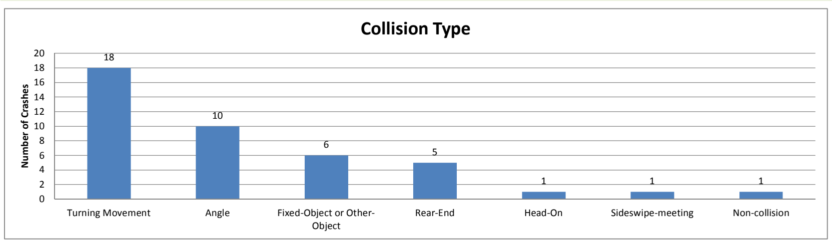


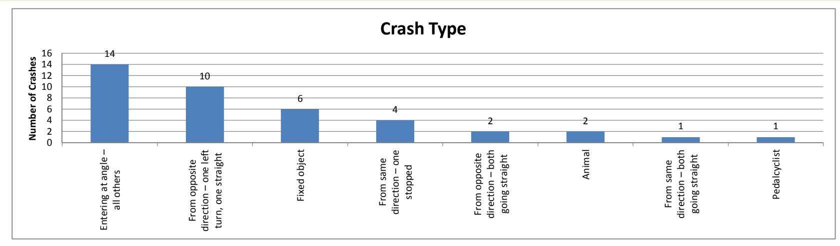




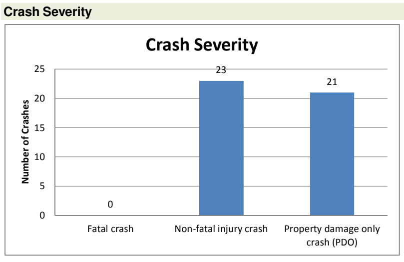


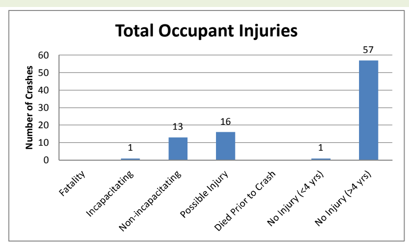
Crash Summary by Type



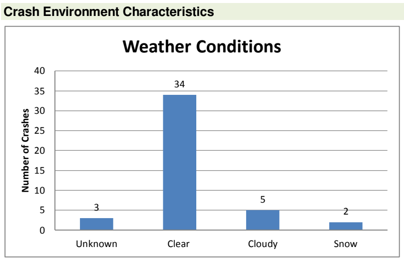


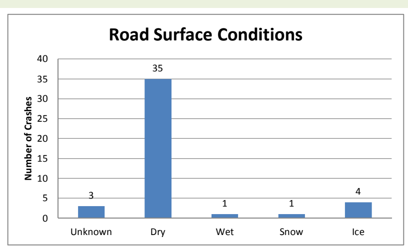
Crash Severity

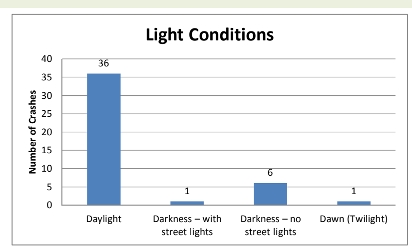




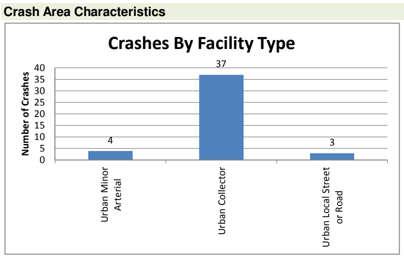
Crash Environment Characteristics

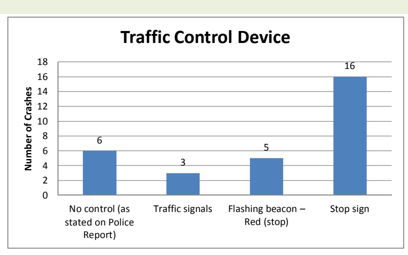


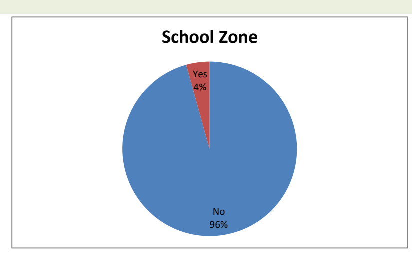


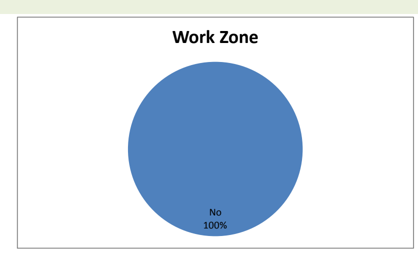


Crash Area Characteristics

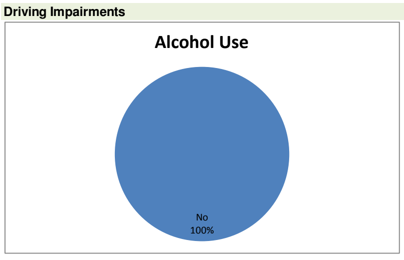


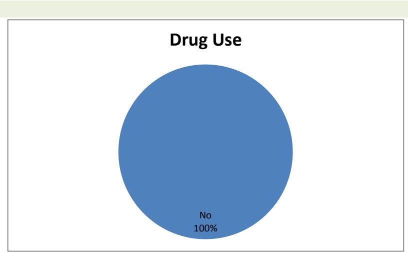




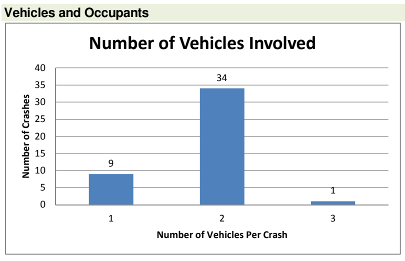


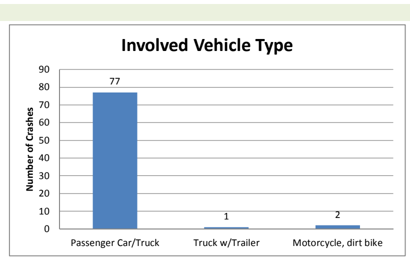
Driving Impairments

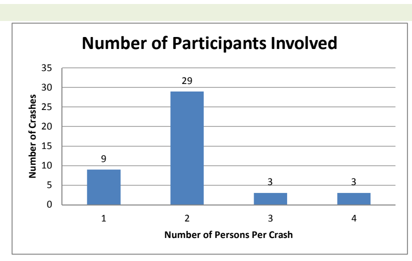




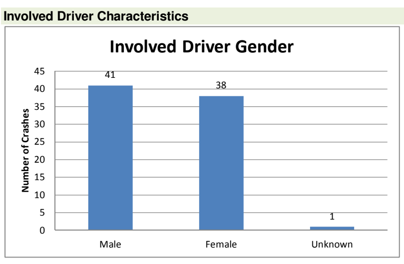
Vehicles and Occupants

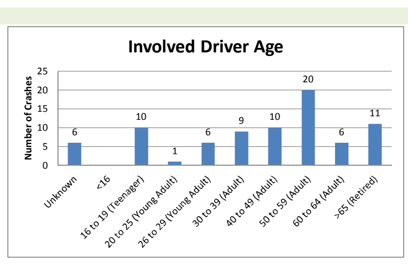


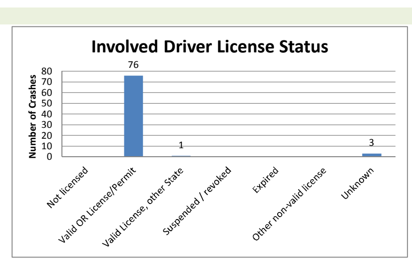


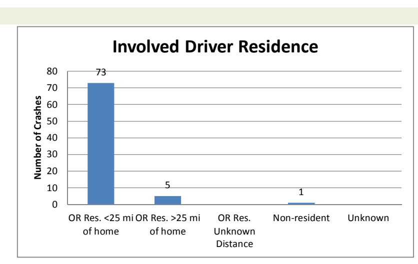


Involved Driver Characteristics

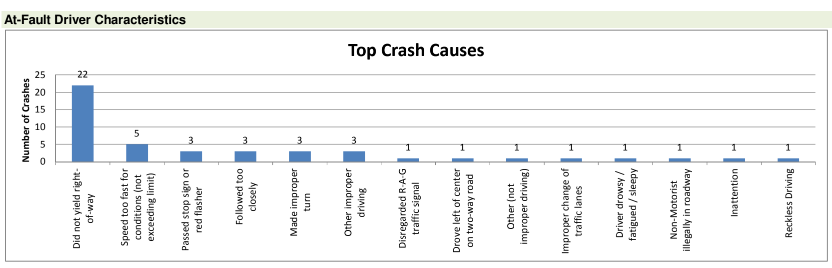


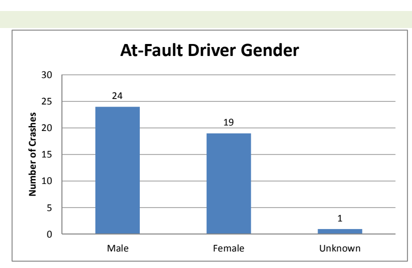


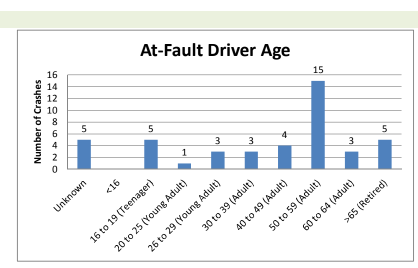




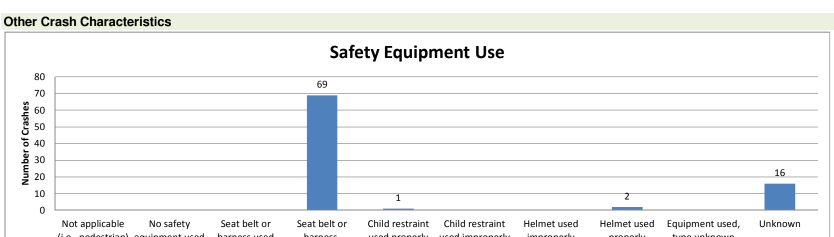
At-Fault Driver Characteristics

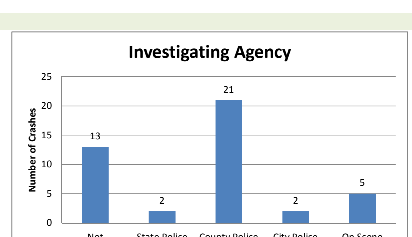






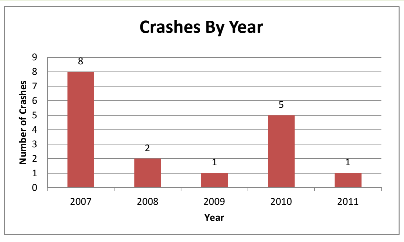
Other Crash Characteristics

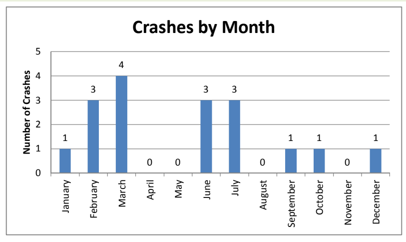


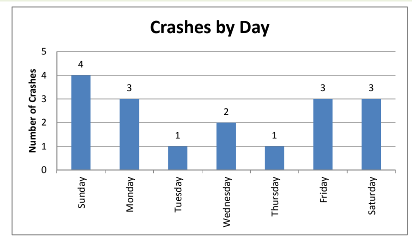


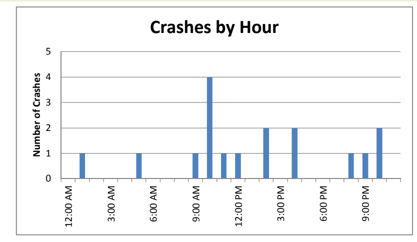
Project Name: La Pine TSP
Project Number
Query Information: Huntington/Burgess Intersection
Date Queried:
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst:
Summary Date: 12/6/2012
Text File Name:
Filters Applied: :

Crash Summary by Date and Time

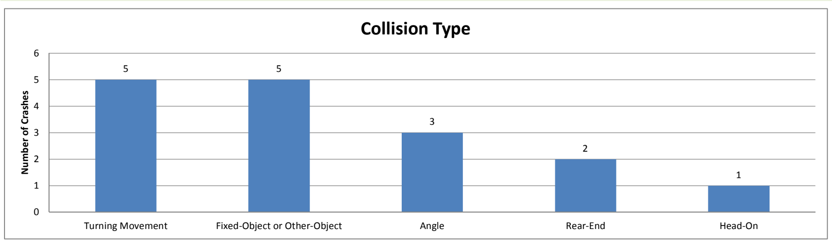


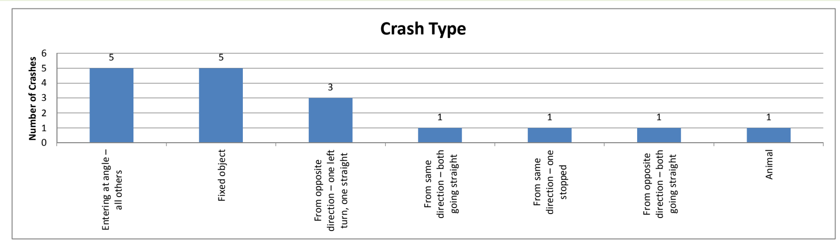




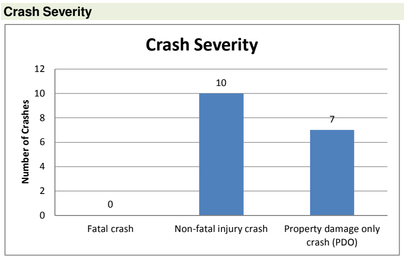


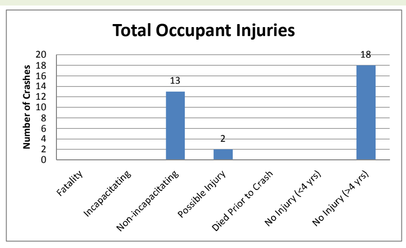
Crash Summary by Type



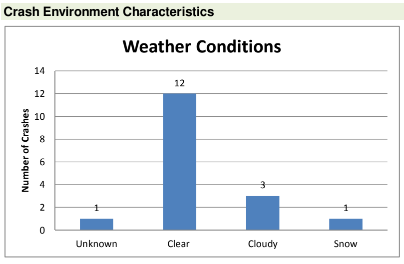


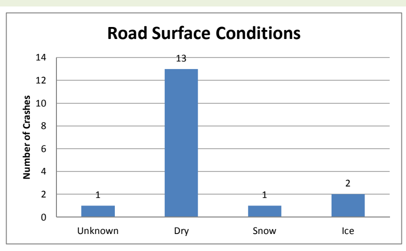
Crash Severity

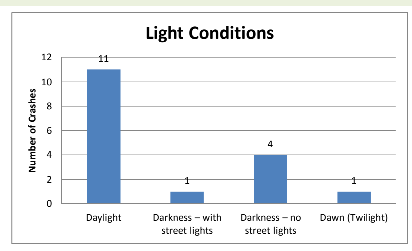




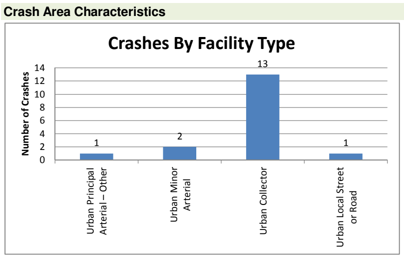
Crash Environment Characteristics

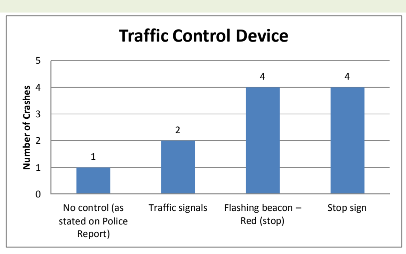


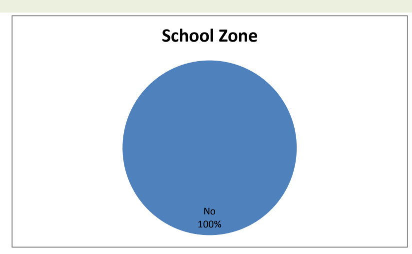


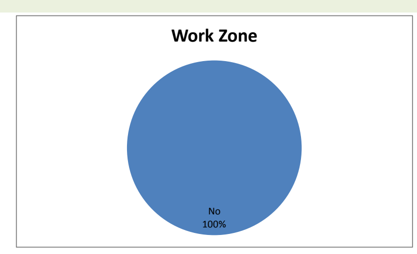


Crash Area Characteristics









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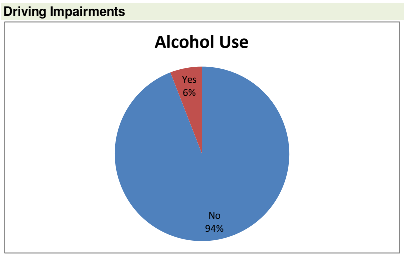

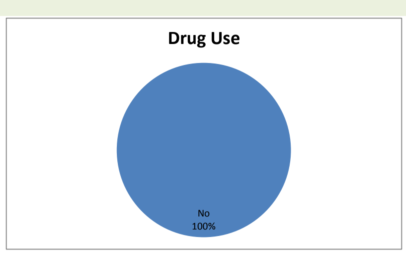

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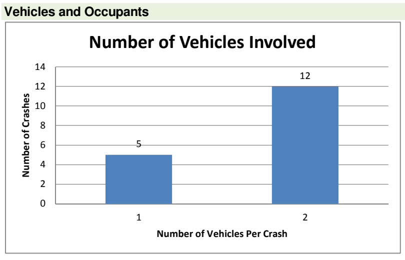

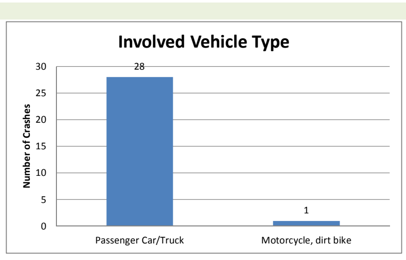

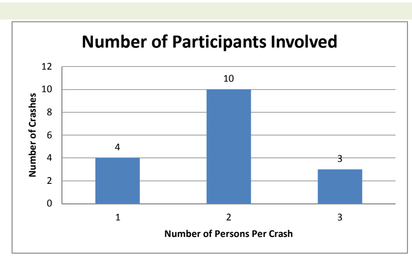

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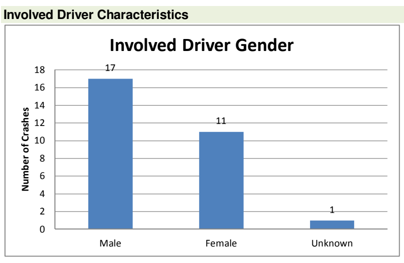

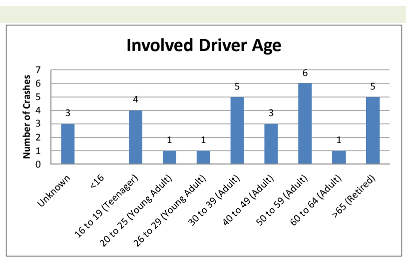

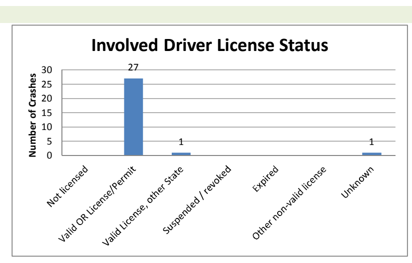

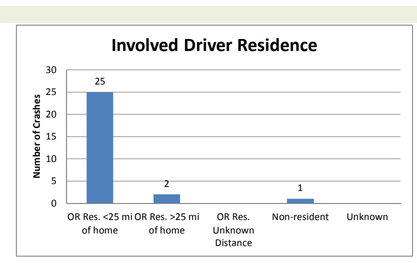

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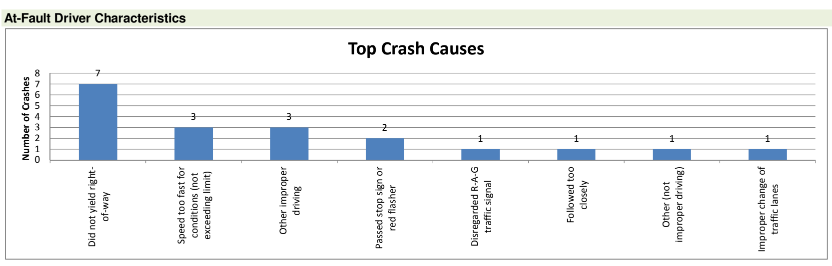

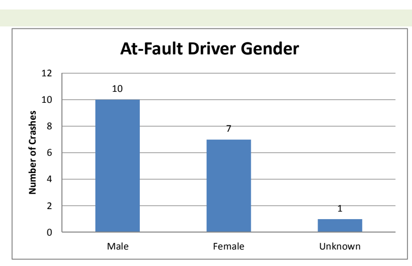

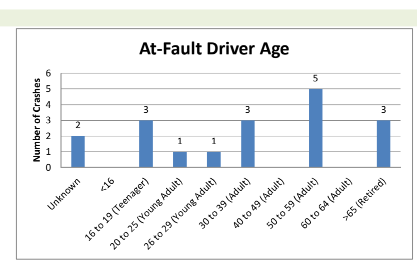

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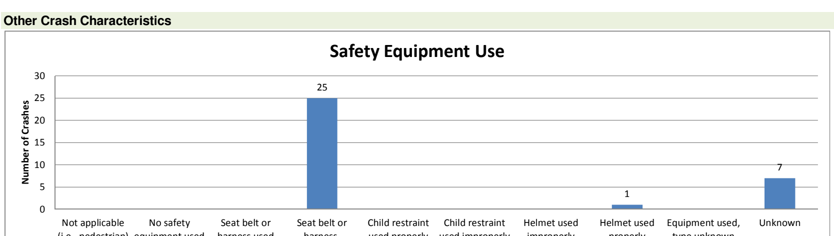

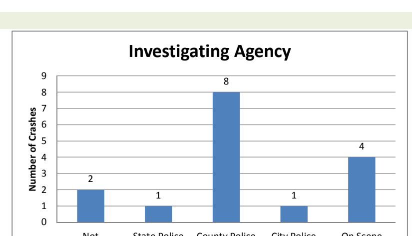

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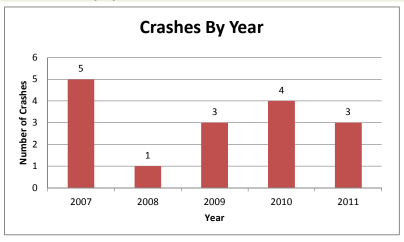

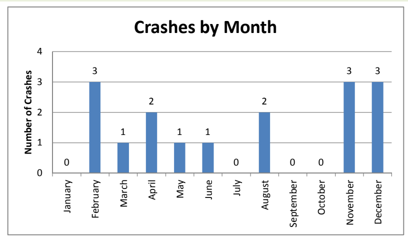

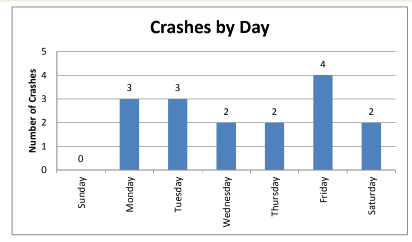

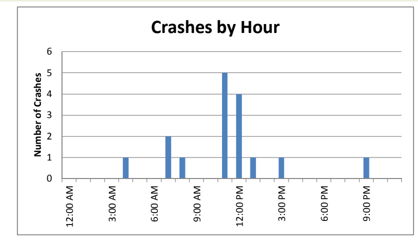

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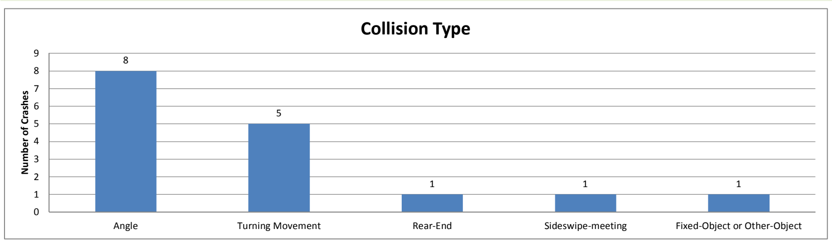

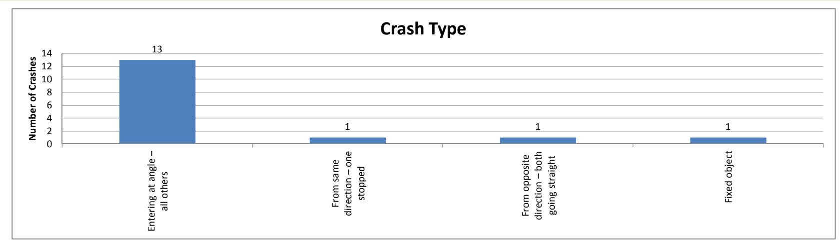

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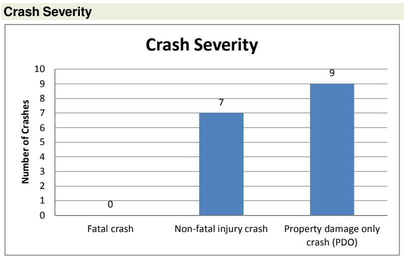

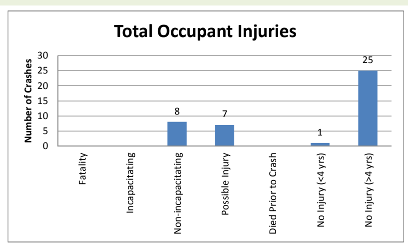

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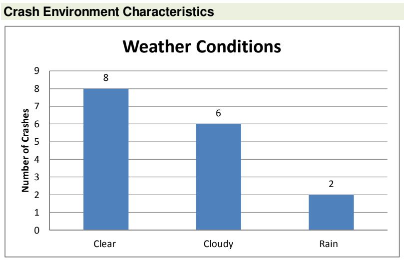

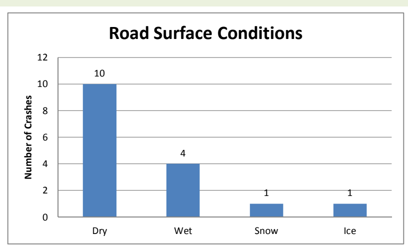

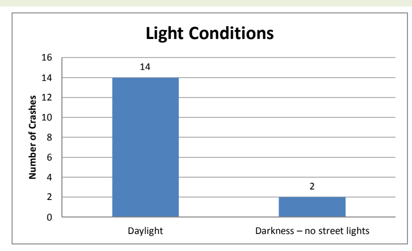

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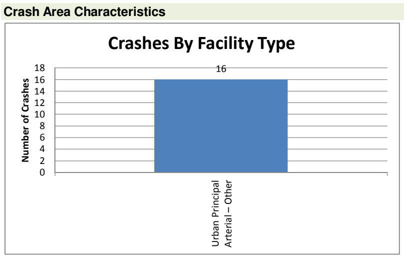

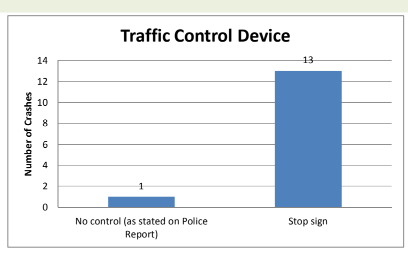

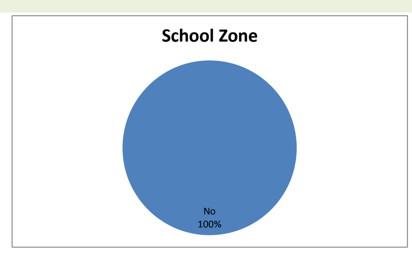

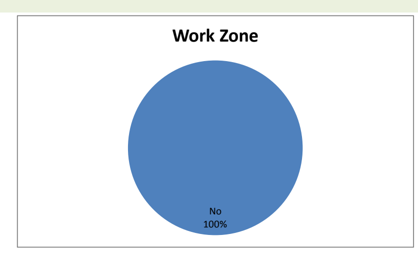

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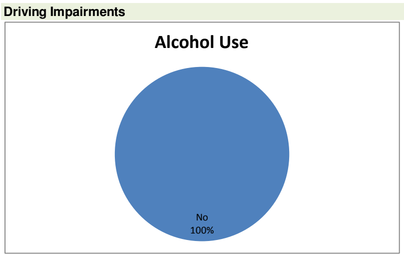

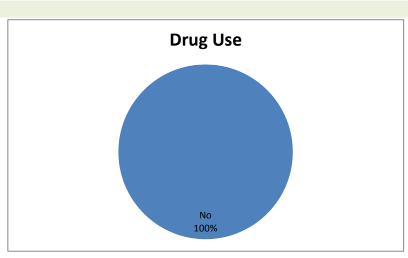

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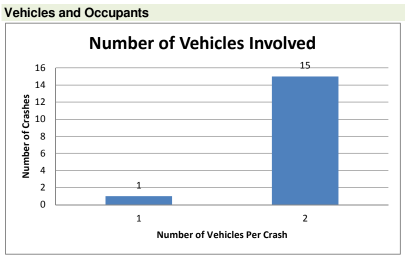

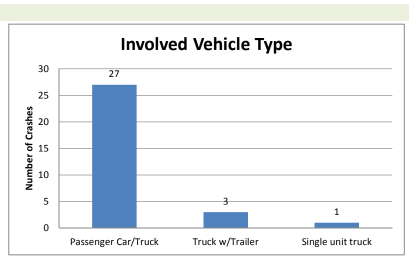

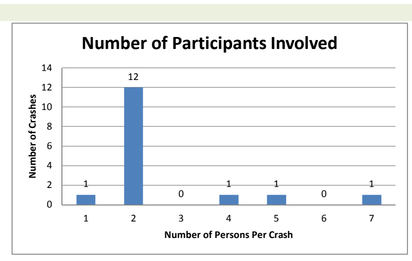

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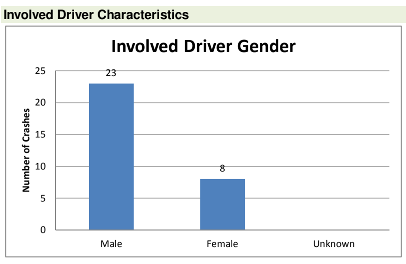

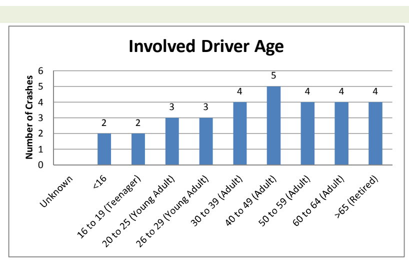

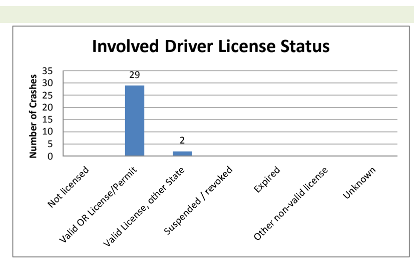

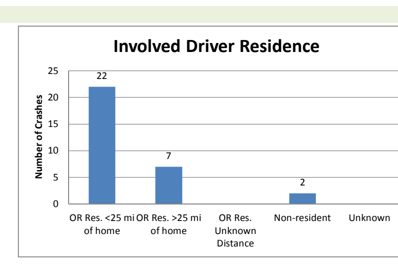

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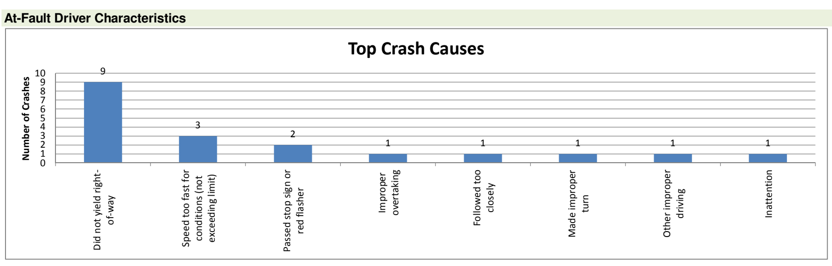

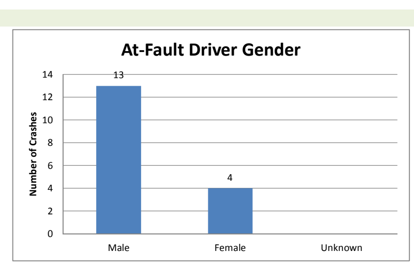

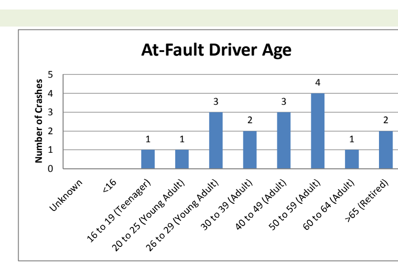

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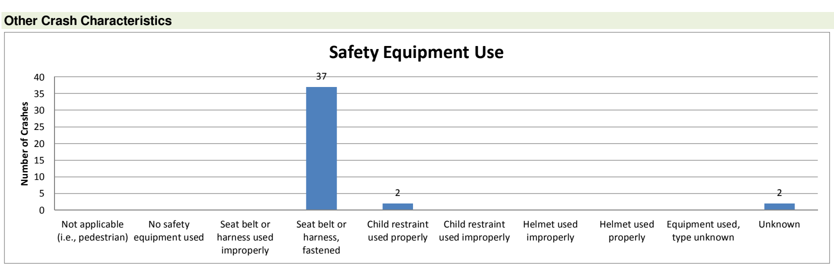
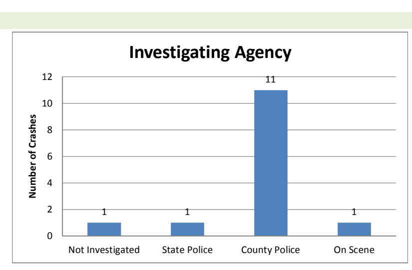




Appendix 4
Future No-build Conditions & Needs Analysis

Future No-Build Conditions & Needs Analysis

This memorandum summarizes the future no-build transportation system analysis for the La Pine Transportation System Plan (TSP) development. In addition, this memorandum documents the transportation deficiencies that were identified through analysis for this TSP or by previous studies conducted and referenced for this effort.

BACKGROUND

The US 97 corridor through La Pine has been analyzed in recent years by two different studies. The most recent, completed in July 2011, is the US 97/La Pine Corridor Plan, which analyzed the US 97 corridor through downtown La Pine, 1st Street/Reed Road to 6th Street. The second study, completed in September 2012, analyzed US 97 through the Wickiup area and included the Burgess Road and Rosland Road intersections. Each study analyzed a future year of 2032, which is generally consistent with a 20-year horizon period for the La Pine TSP. As such, the analysis results, findings, and recommendations of those studies will be incorporated into the TSP with amendments to reflect changes that have since occurred.

FORECASTING METHODOLOGY

While the US 97 corridor has been analyzed previously, a forecasting approach is needed for the study intersections that are primarily on City and County roadway facilities. The forecasting approach applied to those intersections is described below.

The Deschutes County Travel Demand Model prepared by ODOT's Transportation Planning and Analysis Unit (TPAU) includes the La Pine area on the southern edge of the model. However, as part of the US 97/La Pine Corridor Plan, the model was determined to not be reliable predictor of arterial, collector, and local street travel demand within city limits largely owing to the low resolution within this area and growth assumptions that were prepared prior to adoption of the City's current Comprehensive Plan. As such, the US 97/La Pine Corridor Plan applied a range of growth factors to bound the analysis and determine the potential sensitivity of impacts to the transportation system based on either a low (1 percent/year) or high (2.7 percent/year) growth scenario. This range was selected to capture historical rates at the time of the study (2010, low-growth scenario) and forecasts included in the previously conducted Wickiup Junction Analysis (2005, high-growth scenario). This analysis showed little change in transportation needs regardless of which growth rate was applied within La Pine.

Based on this approach and the of citywide La Pine travel growth identified within the model, the analysis conducted for intersections 1-6 assumed a growth factor of 2 percent per year for all movements. Two areas within La Pine were further reviewed to ensure this approach reasonably assesses the future demands:

- La Pine Industrial Group, Inc. (LIGI) manages industrial-zoned lands on the southeast side of the City. These areas include the Newberry Business Park, Finley Butte Industrial Park, and an 80-acre of shovel-ready industrial site along the BNSF mainline.
- The City is considering incorporation of future Rodeo/fairgrounds lands whose primary access would be provided from 6th Street.

Review of the LIGI property shows that their development could increase traffic demands beyond the projected annual rate of 2 percent. However, as the US 97/La Pine Corridor Plan identifies signalization projects at the 1st Street – Reed Road and Finley Butte intersections with US 97, ample capacity is provided and higher growth would not change the system needs at these locations.

Review of the Rodeo site highlights potential loading on 6th Street that could easily exceed the growth rates alone. However, this land is currently outside of the City UGB and would only serve occasional events. As is typical, event traffic is best considered as part of a separate event management plan. As such, event needs should be considered within the framework of the TSP as a potential event center.

OPERATIONAL ANALYSIS RESULTS

The operational analysis results conducted or referenced for this analysis are shown in Table 1.

Table 1
Future Conditions Intersection Results, Weekday PM Peak Hour (2032)

Intersection	Jurisdiction	Traffic Control	Standard	Critical Movement	LOS	Delay	V/C	Meets Standard?
1. US 97/ Drafter Rd	ODOT	Side-street Stop	0.95[1]	NBL	D	26.8	0.40	Yes
2. Huntington Rd/ Cagle Rd	La Pine	Side-street Stop	LOS D	WB	A	9.5	0.07	Yes
3. Huntington Rd/ Burgess Rd	La Pine	Signal	LOS D	N/A	B	18.7	0.59	Yes
4. Huntington Rd/ 1st St	La Pine	Signal	LOS D	N/A	C	32.0	0.64	Yes
5. Huntington Rd/ 3rd St	La Pine	Side-street Stop	LOS D	EB	C	23.8	0.31	Yes
6. Huntington Rd/ Finley Butte Rd	La Pine	Side-street Stop	LOS D	NB	B	12.3	0.11	Yes
US 97/La Pine Corridor Study (2032 Conditions)								
7. US 97/1st St - Reed Rd	ODOT	Side-street Stop	0.95[1]	EB	F	>50	>1.0	**No**
8. US 97/ William Foss Rd – 4th St	ODOT	Side-street Stop	0.95[1]	EB	F	>50	>1.0	**No**
9. US 97/ Huntington Rd	ODOT	Side-street Stop	0.95[1]	EB	D	34.1	0.72	Yes
10. US 97/ Finley Butte Rd	ODOT	Side-street Stop	0.95[1]	WB	D	33.9	0.71	Yes
11. US 97/ 6th St	ODOT	Side-street Stop	0.95[1]	EB	F	>50	>1.0	No
Wickiup Junction Study (2032 Conditions)								
12. US 97/ Burgess Rd	ODOT	Side-street Stop	0.95[1]	EB	Not Reported		>1.0	**No**
13. US 97/ Rosland Rd	ODOT	Side-street Stop	0.95[1]	WB	Not Reported		>1.0	**No**

[1] Operations reflect the relevant threshold for the stop-controlled sidestreet movement; mainline highway operations vary between 0.80 north of 1st Street and south of Finley Butte (designated expressway segments) and 0.85 within the City core.

Intersections 1-6 assumed a 2 percent annual growth from existing conditions.

Intersections 7-11 assumed a 2.7 percent annual growth from existing conditions.

Intersections 12 and 13 applied cumulative analysis growth scenario.

As shown in Table 1, the study intersections located on the La Pine local street system are forecast to continue to operate acceptable with ample reserve capacity, whereas along US 97 congestion will increase. The following intersections along US 97 are expected to experience operational issues in the future:

- US 97/Rosland Road
- US 97/Burgess Road
- US 97/1st Street/Reed Road
- US 97/William Foss Road
- US 97/6th Street

These intersections were previously studied as part of the two US 97 corridor studies discussed earlier. As such, mitigation measures have been developed to address most of the deficiencies identified. These improvements, other planned improvements, and overall transportation system needs are discussed in the following sections.

FUTURE NEEDS ANALYSIS

Based on the existing conditions analysis and inventory, findings of this analysis, and the findings of studies referenced, the following list identifies the needs of the La Pine area. Infrastructure considerations are illustrated in Figure 1.

Wickiup Junction

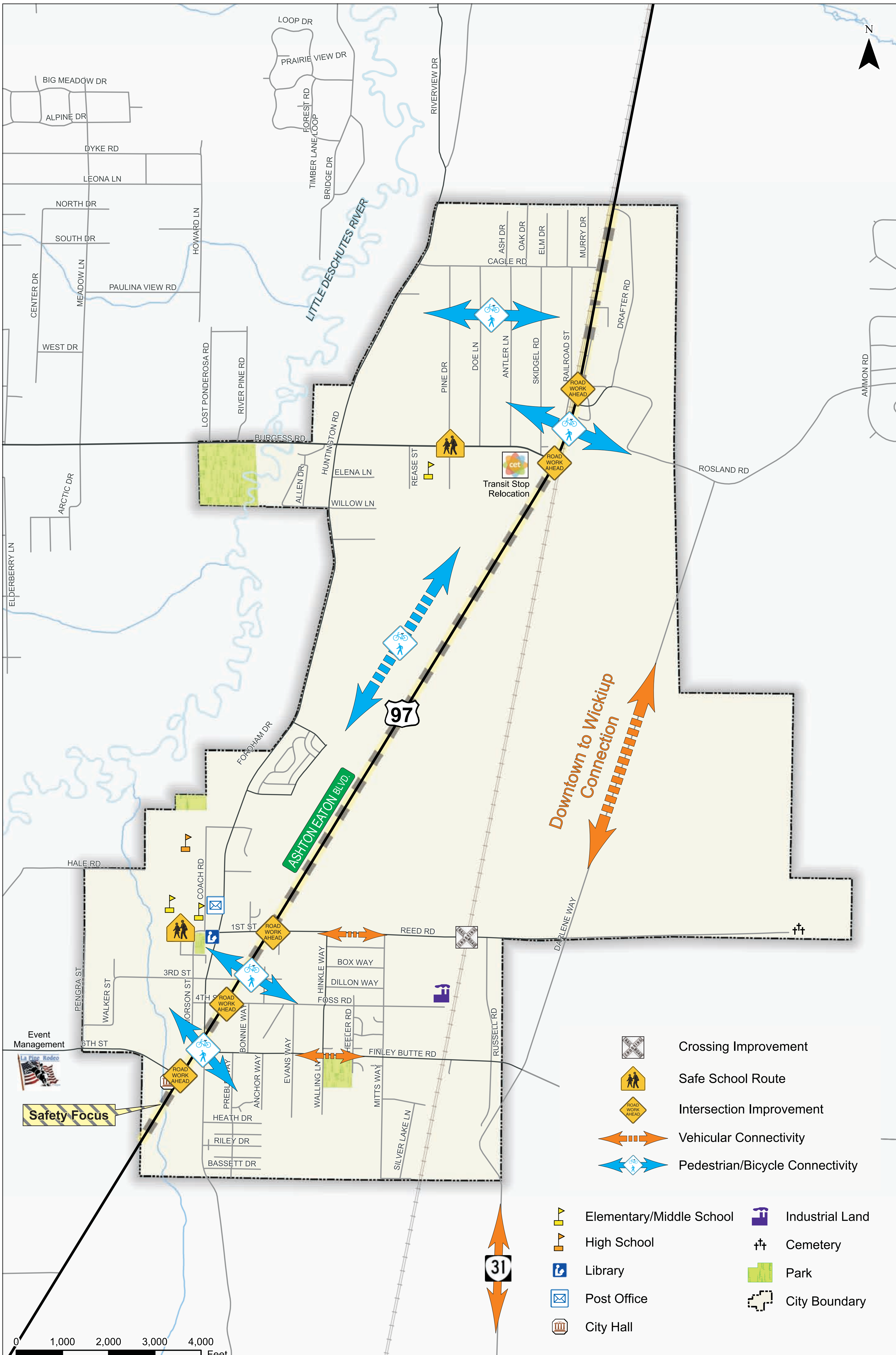
US 97 is expected to become increasing difficult to access or cross in the Wickiup area of La Pine due to increasing highway demands. The existing at-grade rail crossing south of Burgess Road has been identified as a high priority for mitigation due to safety and operational concerns.

Identified Mitigation Measure: The Wickiup Junction area is the subject of a planned improvement that would provide a grade-separated overcrossing of the existing rail line for US 97 and provide improved for motorists on Burgess Road to access the highway. No improvements are planned to address congestion at Rosland Road, which also serves Gordy's Truck Stop and as an access to other commercial uses. No funding is currently allocated for the proposed improvement.

US 97/1st Street/Reed Road

The intersection of US 97/1st Street/Reed Road is a major intersection within La Pine, providing access to local schools, the LIGI industrial lands, emergency services facilities, senior center, library, and other key areas of the city. The existing configuration of the intersection has an offset alignment, creating a challenging and potentially confusing environment for drivers approaching the intersection from Reed Road and 1st Street. This intersection is expected to operate in excess of applicable performance measures in the future.

Identified Mitigation Measure: A traffic signal is planned to be installed at the intersection. In conjunction with that effort, plans are in place to modify the geometry of the intersection to eliminate the existing offset nature of the approaches. Partial funding is currently available for this improvement, but no funding has yet been identified to further develop a supporting local street network to improve access to 1st Street.



La Pine Transportation Needs
La Pine, Oregon

Figure
1

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Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl
Data Source: Deschutes County

US 97/Finley Butte Road

The intersection of US 97/Finley Butte Road is expected to operate acceptably in the future under a no-build scenario, but will require improvements due to system issues and needs.

Identified Mitigation Measures: Finley Butte provides a critical connection to recreation areas to the east, to include an improved (active) at-grade BNSF rail crossing with lights and gates. The alignment of Morson Street was identified to be realigned to connect as a new western leg to the intersection, helping to form a local north-south network connecting the southern downtown area to 1st Street, forming the western loop of a local roadway network. The realigned intersection would be signalized, and would provide another critical connection to the LIGI lands east of the highway.

US 97/6th Street

The intersection of US 97/6th Street is expected to operate unacceptably in the future based on travel growth projections. 6th Street provides access to La Pine and US 97 for a number of residential users who live in unincorporated Deschutes County to the west.

Identified Mitigation Measure: Improvements surrounding the 6th Street intersection have considered connections into Morson Street along with speed treatments for northbound vehicles on US 97. No specific alignment has yet been identified for this facility. Current discussions of fairground/rodeo access from 6th will need to be considered.

Other Issues and Needs

Based on the findings of the inventory analysis and existing conditions, the following should also be addressed by the TSP:

Transportation System Connectivity

The existing La Pine transportation system relies heavily on US 97, particularly for connectivity between the Wickiup area and downtown La Pine. Huntington Road provides an alternative north-south route, but only serves users on the west side of the highway. Users on the east side of the highway must use US 97 to travel between these two areas or cross the highway to access Huntington Road. Other connectivity issues that have been identified include:

- East-west connections within the Cagle subdivision, most notably for bicycle and pedestrian users.
- Pedestrian access across US 97 within Wickiup and downtown La Pine.
- Trail system connectivity between the downtown and Wickiup, particularly along the west side of the highway where the majority of the developable lands are located.
- Pedestrian connectivity should also be considered for recreational trips, such as those to existing and planned parks and trails.

Safety

The safety review conducted for this project identifies nearly half of all crashes on US 97. Addressing highway safety, particularly given the high-speed and mix of urban and rural development patterns, will be a critical need. This includes designs that account for an older population in La Pine, a high incidence of nighttime crashes, and access considerations. Other safety issues noted include general information to drivers about roadway conditions.

Roadway Surfaces

While most roads in La Pine have an asphalt surface, many currently have gravel or dirt surfaces as well. The upgrade of some of these roadways to a more durable surface could help improve the overall functionality of the overall transportation system by providing more reliable and efficient connections.

Roadway Ownership

The roadway ownership is La Pine is a mixture of state, county, local, and private ownership. While this ownership structure could continue in the future, addressing some roadway ownership issues may ease potential maintenance, improvement, and/or legality issues in the future. The process for transferring County roadway facilities to the City will need to be addressed.

Roadway Classification

The local roadways in La Pine are not currently classified based on a roadway classification system. As such, no set improvement standards or standard cross-sections are in place. The creation of these standards, along with designation of functional purpose (freight route, bicycle route, pedestrian/school route) and the classification of roadways based on these standards is a key goal of this TSP.

Transportation Analysis Standards and Policies

Similar to roadway classifications, no transportation analysis standards or policies exist within La Pine. The city has typically relied upon Deschutes County standards. This practice could continue in the future, but the city should evaluate as part of this effort if modified standards or policies should be adopted.

Attachments

- Future No-Build Conditions Worksheets

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	4	614	4	1	667
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	4	682	4	1	741
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1428	684			687	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1428	684			687	
tC, single (s)	6.6	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.9			2.2	
p0 queue free %	95	99			100	
cM capacity (veh/h)	132	354			917	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	687	742
Volume Left	7	0	1
Volume Right	4	4	0
cSH	176	1700	917
Volume to Capacity	0.06	0.40	0.00
Queue Length 95th (ft)	5	0	0
Control Delay (s)	26.8	0.0	0.0
Lane LOS	D		A
Approach Delay (s)	26.8	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	1	103	3	3	68
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	7	1	116	3	3	76
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	201	117			119	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201	117			119	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	791	940			1481	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	119	80
Volume Left	7	0	3
Volume Right	1	3	0
cSH	809	1700	1481
Volume to Capacity	0.01	0.07	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.5	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	16.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	16	193	238	32	257	305	148	13	67
v/c Ratio	0.04	0.55	0.49	0.13	0.64	0.50	0.17	0.02	0.10
Control Delay	16.5	26.9	7.0	16.4	26.2	15.0	7.7	9.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	26.9	7.0	16.4	26.2	15.0	7.7	9.3	12.5
Queue Length 50th (ft)	3	53	0	8	72	43	10	2	10
Queue Length 95th (ft)	17	122	47	27	154	#161	64	12	42
Internal Link Dist (ft)		2039			2235		805		1087
Turn Bay Length (ft)	125		200	225		150		125	
Base Capacity (vph)	405	624	688	256	634	612	887	574	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.31	0.35	0.13	0.41	0.50	0.17	0.02	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	183	226	30	226	18	290	73	67	12	51	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	5.0	5.0	4.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1591	1384	1662	1606		1599	1624		1662	1616	
Flt Permitted	0.60	1.00	1.00	0.38	1.00		0.63	1.00		0.66	1.00	
Satd. Flow (perm)	1050	1591	1384	661	1606		1065	1624		1160	1616	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	193	238	32	238	19	305	77	71	13	54	13
RTOR Reduction (vph)	0	0	191	0	5	0	0	35	0	0	8	0
Lane Group Flow (vph)	16	193	47	32	252	0	305	113	0	13	59	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			1									1
Heavy Vehicles (%)	0%	10%	5%	0%	7%	17%	4%	0%	0%	0%	3%	12%
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.3	12.5	12.5	14.2	14.2		34.2	30.1		27.4	26.7	
Effective Green, g (s)	13.3	12.5	12.5	14.2	14.2		34.2	30.1		27.4	26.7	
Actuated g/C Ratio	0.21	0.20	0.20	0.22	0.22		0.54	0.47		0.43	0.42	
Clearance Time (s)	3.0	5.0	5.0	4.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	0.2	2.0	2.0	0.2	2.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	227	312	271	171	357		605	766		504	676	
v/s Ratio Prot	c0.00	0.12		0.00	c0.16		c0.03	0.07		0.00	0.04	
v/s Ratio Perm	0.01		0.03	0.04			c0.24			0.01		
v/c Ratio	0.07	0.62	0.17	0.19	0.71		0.50	0.15		0.03	0.09	
Uniform Delay, d1	20.3	23.5	21.3	19.9	22.9		9.6	9.6		10.5	11.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	2.6	0.1	0.2	5.1		0.2	0.4		0.0	0.3	
Delay (s)	20.3	26.0	21.5	20.1	28.0		9.8	10.0		10.5	11.5	
Level of Service	C	C	C	C	C		A	A		B	B	
Approach Delay (s)		23.4			27.1			9.9			11.3	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	75	149	40	245	28	411	111	363
v/c Ratio	0.47	0.37	0.26	0.55	0.18	0.72	0.72	0.44
Control Delay	35.8	9.9	26.3	9.9	24.6	23.9	54.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	9.9	26.3	9.9	24.6	23.9	54.9	13.2
Queue Length 50th (ft)	20	8	10	8	7	91	30	51
Queue Length 95th (ft)	#69	43	34	47	27	#224	#105	#188
Internal Link Dist (ft)		495		687		283		345
Turn Bay Length (ft)			175				150	
Base Capacity (vph)	158	636	152	711	158	633	155	821
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.23	0.26	0.34	0.18	0.65	0.72	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	37	89	34	28	180	24	314	36	94	269	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.87		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	1499		1599	1523		1658	1644		1630	1612	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1662	1499		1599	1523		1658	1644		1630	1612	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	75	44	105	40	33	212	28	369	42	111	316	47
RTOR Reduction (vph)	0	85	0	0	175	0	0	6	0	0	7	0
Lane Group Flow (vph)	75	64	0	40	70	0	28	405	0	111	356	0
Confl. Peds. (#/hr)			5	5			3		6	6		3
Confl. Bikes (#/hr)								2			2	
Heavy Vehicles (%)	0%	8%	0%	4%	0%	0%	0%	5%	0%	2%	6%	7%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.1	9.2		1.4	8.5		0.7	18.5		4.1	21.9	
Effective Green, g (s)	2.1	9.2		1.4	8.5		0.7	18.5		4.1	21.9	
Actuated g/C Ratio	0.04	0.19		0.03	0.17		0.01	0.38		0.08	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	280		46	263		24	618		136	718	
v/s Ratio Prot	c0.05	0.04		0.03	c0.05		0.02	c0.25		c0.07	c0.22	
v/s Ratio Perm												
v/c Ratio	1.06	0.23		0.87	0.26		1.17	0.65		0.82	0.50	
Uniform Delay, d1	23.6	17.0		23.8	17.6		24.2	12.7		22.2	9.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	123.2	0.4		83.5	0.5		239.4	2.5		30.0	0.5	
Delay (s)	146.7	17.4		107.3	18.2		263.7	15.2		52.2	10.3	
Level of Service	F	B		F	B		F	B		D	B	
Approach Delay (s)		60.7			30.7			31.1			20.1	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	37	13	28	4	21	83	9	267	9	85	278	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	41	14	31	4	23	91	10	293	10	93	305	23
Pedestrians		7			2			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1070	
pX, platoon unblocked												
vC, conflicting volume	933	836	325	863	843	301	336			305		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	933	836	325	863	843	301	336			305		
tC, single (s)	7.1	6.5	6.3	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	78	95	96	98	92	88	99			93		
cM capacity (veh/h)	189	278	691	208	276	741	1228			1253		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	86	119	313	422
Volume Left	41	4	10	93
Volume Right	31	91	10	23
cSH	276	521	1228	1253
Volume to Capacity	0.31	0.23	0.01	0.07
Queue Length 95th (ft)	32	22	1	6
Control Delay (s)	23.8	13.9	0.3	2.4
Lane LOS	C	B	A	A
Approach Delay (s)	23.8	13.9	0.3	2.4
Approach LOS	C	B		

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	146	34	27	129	1	36	0	15	0	1	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	11	180	42	33	159	1	44	0	19	0	1	5
Pedestrians					3			1				
Lane Width (ft)					12.0			12.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	160			223			457	452	205	472	472	160
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	160			223			457	452	205	472	472	160
tC, single (s)	4.3			4.2			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.4			2.3			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	99			97			91	100	98	100	100	99
cM capacity (veh/h)	1332			1321			493	489	813	480	476	891

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	233	194	63	6
Volume Left	11	33	44	0
Volume Right	42	1	19	5
cSH	1332	1321	558	759
Volume to Capacity	0.01	0.03	0.11	0.01
Queue Length 95th (ft)	1	2	9	1
Control Delay (s)	0.4	1.5	12.3	9.8
Lane LOS	A	A	B	A
Approach Delay (s)	0.4	1.5	12.3	9.8
Approach LOS			B	A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix 5
Adopting Ordinances

Adopting ordinances to be added by City of La Pine after adoption.