Deschutes County Transportation System Plan

EXECUTIVE SUMMARY

The Deschutes County Transportation System Plan addresses transportation needs throughout the County over the next twenty years (1996-2016). The County transportation system provides connections between Deschutes County and adjacent counties, as well as between the urban and rural areas within the County. The transportation network involves many different modes, including auto, bike, pedestrian, rail and transit.

The Plan provides an overview of the existing transportation system in the County and addresses both short and long-term transportation needs. In the short-term, the study identifies and provides recommended solutions to immediate safety and congestion problems. For the future, the study looks at the next 20 years in Deschutes County, and identifies through goals and policies, how best to move people and goods efficiently throughout the County. Long-term projects are identified and prioritized.

The Plan contains many pages of background information and facts, including data on the County's 943 road miles of maintenance jurisdiction, 80 percent of which are paved. The County currently maintains approximately 123 miles of urban roads within city limits and urban growth boundaries (UGBs). Approximately 200 miles of principal arterials in the County are designated State Highways. Twenty-one percent (21%) of County roads carry more than 1,500 vehicles per day. There are twelve bridges with restrictive load limits, on the County road system. Between 1991 and 1995, there were 2,528 reported crashes on County roads outside of urban areas. Of the total number of accidents, 70 were fatal, 1,073 involved injury (170 serious), and 1,375 involved only property damage. Less than one percent (1%) of all crashes in the County were fatal. However, a driver and their passengers are three times as likely to be killed in a crash occurring on a rural road. The Plan identifies six intersections on the County road system for safety-related improvements.

The Plan examines the status of other modes of transportation in the County including bicycle, air, public transit and rail. Generally, the approximately 750 paved miles of County-maintained roads provide the most efficient and safest routes for bicycle commuters and recreational riders to travel between home, work and school. The existing public transit system consists of intercity providers such as Greyhound, demand responsive "dial-a-ride" services and the Mt. Bachelor Super Shuttle. There are designated rideshare areas in Wickiup Junction, south Redmond, north Bend and Sisters. The nearest passenger rail station is located in Klamath County at Chemult. The Burlington Northern & Santa Fe Railroad provides freight rail service. The general aviation, public-use airports in the County are located at Redmond, Bend, Sunriver and Sisters (Eagle Air).

State population projections estimate the County population in 2016 at 172,427 with 79,530 persons or 46 percent living in the incorporated cities of Bend, Redmond and Sisters. Population and employment projections were used to estimate future traffic on the road network and highlight future deficiencies. The analysis showed that the road network necessary to serve the future population is essentially in place. Because of the rural nature of

much of the County, any anticipated development will occur on a rural scale and should have only minor impacts on the transportation system. However, increasing traffic volumes are projected on the state-owned highway system, especially in the South County area where most of the future countywide growth is anticipated. The rate of development is anticipated to continue and should use up available rural lots over the next twenty years, resulting in rural "buildout".

In response to Deschutes County's efforts to involve the public in the planning process, this Plan addresses issues raised:

- At two TSP public open houses;
- Through a public survey,
- At multiple meetings with the Deschutes County Planning Commission,
- At meetings held in La Pine, Terrebonne and Tumalo regarding rural community planning,
- Through written correspondence,
- At multiple meetings held with the County Bicycle and Pedestrian Advisiory Committee, and
- At meetings with the La Pine Transportation Advisory Group.

The issues raised include:

- High speeds through rural communities
- Safety issues at many County intersections
- Highway access from County roads
- Lack of road shoulder width for bicycle use
- Secondary road access to isolated subdivisions
- Ice build-up on roads and highways
- Condition of roads, deferred maintenance

The Plan supports the goals and policies outlined in the Highway 97 Corridor Strategy, which was adopted by the Oregon Transportation Commission, as well as the rural community plans for La Pine, Terrebonne and Tumalo, which were adopted by the Deschutes County Board of Commissioners.

The Plan also provides policies and project recommendations to meet the requirements of the Transportation Planning Rule (Statewide Goal 12, OAR 660-12). Deschutes County is required by Goal 12 to adopt standards and policies in the Transportation System Plan that encourage multimodal travel and reduce reliance on the single-occupant automobile. The Rule also requires that Deschutes County set standards and policies to promote and enhance pedestrian, bicycle, and transit travel. A complete list of the proposed transportation goals and policies that address all modes of transportation is provided in the Plan.

Depending on the combination of projects chosen for short-term implementation and long-term programming, the following are the costs for the County Transportation System Plan projects over the next 20 years.

Project Summary

Previously Committed Projects	Total $ 940,000
Short-term, High Priority Projects	Total $11,051,080
Long-term, Priority Projects	Total $43,957,740
Bridge Projects	Total $647,900
Long-term, Non-Prioritized Projects	Total $57,139,174
Total 20-Year Combined Project Costs:	**$112,147,994**

The ability of the County to fund needed projects is in doubt. With the limited future funding opportunities available, the project outlook is questionable. Under current funding levels there are no resources available for capital projects outside of the County's previously committed projects. In addition, if road preservation takes precedence over new projects, the projected funding available for road operations, maintenance and preservation (OM&P) alone over the next three years is already $8.1 million below the Road Department's estimated minimum desired level of OM&P.

Projected Shortfalls:

1998-1999	$2.4 million
1998-2000	$2.8 million
1998-2001	$2.9 million
	$8.1 million

The minimum desired level of OM&P is based on the Road Department's 1992-93 Operations Plan, which defined levels of service. The dollar figures from this study have been adjusted to reflect 1998 costs. Also, the mileage figures used to calculate the total OM&P costs have been adjusted to reflect the transfer of Bend UGB roads to the City of Bend as of July 1, 1998.

If all the projects (excluding the non-prioritized projects) are combined into a twenty-year plan amount, the resulting $55,656,720 would amount to an expenditure of approximately $2.8 million per year.

1. INTRODUCTION

1.1 SETTING

Deschutes County (Figure 1.1.F1) is adjacent to and on the east side of the Cascade Mountain range, approximately 160 miles southeast of Portland and mid-way between the Washington and California borders. In 1995, the County had a certified total population of 94,100. Deschutes County includes the incorporated cities of Bend (pop. 30,630), Redmond (pop. 10,585), Sisters (pop. 775), and an unincorporated area totaling 52,110. The 3,055 square miles covered by the County provide for a diverse economy combining tourism, recreation, manufacturing, industry and services. As the most populous city in Central Oregon, Bend forms the hub of activities for Central Oregon, as well as many parts of Eastern Oregon, and therefore contains many more businesses than other cities of similar population size. Deschutes County is served by a network of state highways providing access, north to the Columbia Gorge, south to California, east to Idaho and west to the cities of Eugene, Albany, Salem and Portland in the Willamette Valley.

The Deschutes County Transportation System Plan (TSP) addresses both short and long-term transportation needs. In the short-term, the study identifies and provides recommended solutions to immediate safety and congestion problems. For the future, the study looks at the next 20 years in Deschutes County, and identifies through goals and policies, how best to efficiently move people and goods throughout the County. Long-term projects are identified and prioritized. Planning for the transportation needs within the Bend, Redmond and Sisters urban growth boundaries is covered by those cities' respective transportation system plans.

The purpose of the TSP is to develop a transportation system that meets the needs of the residents of Deschutes County, as well as regional and state needs. This plan addresses a balanced transportation system that includes automobile, bicycle, rail, transit, air, pedestrian and pipelines. It reflects existing land use plans, policies and regulations that affect the transportation system and includes options to finance future projects.

1.2 TRANSPORTATION SYSTEM PLAN REQUIREMENTS

The Deschutes County Transportation System Plan is required to address the statewide requirements outlined in Goal 12 and its implementing administrative rule, the Transportation Planning Rule (OAR Chapter 660, Division 12). Goal 12 affects all levels of government by requiring that transportation plans be coordinated among state and local agencies. In addition to the State (Oregon Department of Transportation, ODOT, the Land Conservation and Development Commission, LCDC) the local agencies influenced by the Deschutes County TSP include the cities of Bend, Redmond and Sisters.

GOAL 12

Goal 12 is one of nineteen separate statewide planning goals adopted by the State of Oregon in the 1970's. These goals were designed to be implemented through inclusion in regional and local comprehensive plans. Under Goal 12, local governments, regions and metropolitan areas (MPOs) must adopt transportation plans which:

> "...provide and encourage a safe, convenient and economic transportation system."

Specifically, each transportation plan:

> "...shall (1) consider all modes of transportation including mass transit, air, water, pipeline, rail, highway, bicycle and pedestrian; (2) be based upon an inventory of local, regional and state transportation needs; (3) consider the differences in social consequences that would result from utilizing differing combinations of transportation modes; (4) avoid principal reliance upon any one mode of transportation; (5) minimize adverse social, economic and environmental impacts and costs; (6) conserve energy; (7) meet the needs of the transportation disadvantaged by improving transportation services; (8) facilitate the flow of goods and services so as to strengthen the local and regional economy; and (9) conform with local and regional comprehensive land use plans."

The Deschutes County Comprehensive Plan was prepared in 1979 and codified in April 1993. The Plan included a chapter on transportation, which addressed countywide issues.

TRANSPORTATION PLANNING RULE (TPR)

In April, 1991, the Land Conservation and Development Commission (LCDC) adopted a new administrative rule, the Transportation Planning Rule (OAR 660, Division 12), governing transportation planning and project development at local, regional and statewide levels.

Under the Transportation Planning Rule, Deschutes County must identify a system of transportation facilities and services adequate to meet regional transportation needs (outside of the Bend, Redmond and Sisters Urban Growth Boundaries). Transportation system plans (TSPs) to be prepared and adopted must be consistent with the state and local TSPs (Bend, Redmond and Sisters).

Two important aspects of this rule are that it ties land use to transportation and that it mandates that transportation planning reduce reliance on any one mode of transportation.

COMPONENTS OF A TRANSPORTATION SYSTEM PLAN

A transportation system plan (TSP) is defined as:

> "...a plan for one or more transportation facilities that are planned, developed, operated and maintained in a coordinated manner to supply continuity of movements between modes, and within and between geographic and jurisdictional areas."

The transportation system plan represents the "first phase" of transportation planning. The TSP establishes land use controls, through the establishment of goals and policies, and a network of facilities and services to meet overall transportation needs. The "second phase" is transportation project development, during which the local government determines the exact location, alignment, and preliminary design of improvements identified in the TSP (OAR 660-12-010(1).

MULTI-MODAL PLANNING

The Transportation Planning Rule (TPR) emphasizes the adoption of multi-modal TSPs. This emphasis is an attempt by the state to reduce the singular reliance on automobiles occurring at an increasing pace throughout Oregon. The Rule encourages transportation solutions that:

"...support a pattern of travel and land use in urban areas which will avoid the air pollution, traffic and livability problems faced by other areas of the country."

The Rule emphasizes multi-modal improvements in urban areas. However, goals and policies that support multi-modal solutions can be applied to the rural areas of the County.

THE TSP AS A LAND USE DECISION

According to OAR 660-12-025(1), adoption of the TSP is a land use decision:

"...regarding the need for transportation facilities, services and major improvements and their function, mode and general location."

The adoption of a TSP is subject to review by the Land Conservation and Development Commission (LCDC) and appeal to the State Land Use Board of Appeals (LUBA).

TRANSPORTATION PLANNING RULE REQUIREMENTS FOR DESCHUTES COUNTY

The Rule applies differently to cities, counties, metropolitan planning organizations (MPOs) and the Oregon Department of Transportation (ODOT). For purposes of compliance, Deschutes County falls into the second of four categories, that being an urban area of between 2,500 and 25,000 population located outside of areas governed by metropolitan planning organizations (MPOs). Since Deschutes County also has characteristics of the next higher category of requirements, several additional tasks are required by LCDC. To comply with the Rule, Deschutes County shall:

"establish a system of transportation facilities and services adequate to meet identified local transportation needs and shall be consistent with local TSPs and adopted elements of the state TSP."

Transportation needs are defined as:

> "...estimates of the movement of people and goods consistent with acknowledged comprehensive plans and requirements of this rule. Needs are typically based on projections of future travel demand resulting from a continuation of current trends as modified by policy objectives, including those expressed in Goal 12 and this rule, especially those for avoiding principal reliance on any one mode of transportation [i.e., the automobile]" (OAR 660-12-005(16).

Under OAR 660-12-055, cities and counties outside of MPOs (such as Deschutes County) are required to complete TSPs for their planning areas by May 1997. However, individual ODOT Region managers have the ability to grant contract extensions as funding allows. Deschutes County has been granted a contract extension until December 31, 1997. The County is required to include the following plan elements in its TSP to comply with the Transportation Planning Rule:

- A Street System Plan for Motor Vehicles
- A Bicycle Facility Plan
- A Pedestrian Circulation Plan
- A Public Transportation Plan
- A Rail Transportation Plan
- An Air, Water and Pipeline Plan
- A Transportation System and Demand Management Plan
- Cost Estimates
- A Project Priority Listing
- A Transportation Financing Plan

1.3 DEVELOPING A TRANSPORTATION SYSTEM PLAN

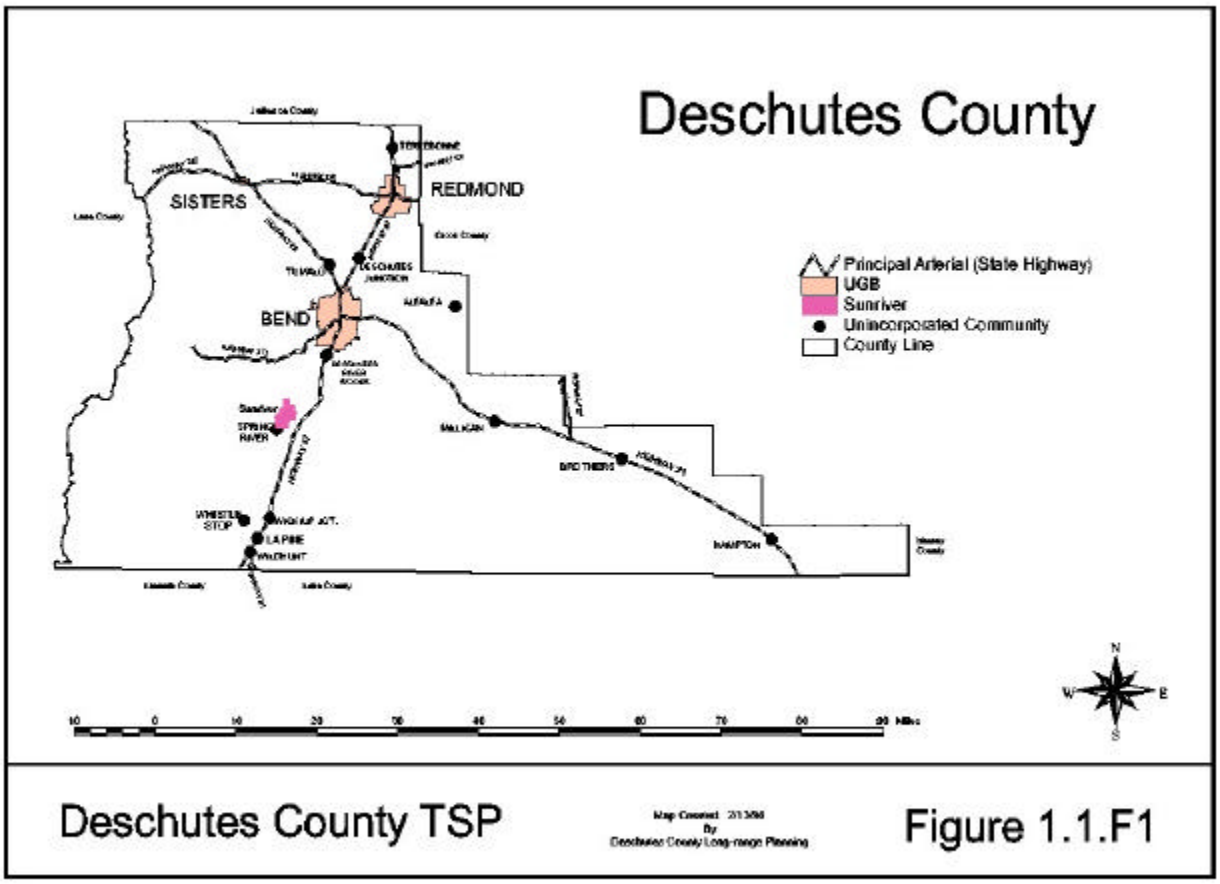
Under the Transportation Planning Rule, Deschutes County must identify a system of transportation facilities and services adequate to meet the regional needs and then prepare a transportation system plan which is consistent with the Oregon Transportation Plan (state TSP) and other local TSPs (Bend, Redmond and Sisters). The Oregon Transportation Plan contains specific criteria and guidelines for local and regional jurisdictions, which form the basis for determining consistency with the state plan.

Performing the analyses and preparing the plan elements described in the guidelines enable Deschutes County and other communities to develop an efficient transportation system, comply with the Transportation Planning Rule, and achieve consistency with other planning jurisdictions including the Oregon Department of Transportation (ODOT). Several key performance standards can be used as indicators to determine the adequacy of a transportation system plan. The following elements are addressed by the Deschutes County Transportation System Plan in order to achieve an adequate plan for the region and satisfy the requirements of the Transportation Planning Rule:

- Public and Interagency Involvement
- Plan Consistency
- Consistency with State and Local Plans
- Reduced Auto Reliance
- Network of Streets

Transportation Accessibility

- Efficient Transportation Management
- Safe and Convenient Walking and Bicycling
- Minimize Adverse Economic, Social, Environmental, and Energy Consequences
- Intermodal Linkage and Passenger Services Coordination
- Minimizing Conflicts Between Modes
- Fundable Plan
- Enabling Ordinances
- Facility/Corridor Protection Ordinances
- Development Ordinances to Encourage Alternate Mode Usage



The plan is broken down into the following specific tasks to be completed in a predetermined order.

REVIEW OF EXISTING PLANS, POLICIES AND STANDARDS

Chapter 2 provides a review and evaluation of all current plans and policies affecting Deschutes County, an inventory of the existing Transportation System, and deficient transportation facilities in the County. As a part of the review process, initial meetings were held with the County Transportation Advisory Committee (CTAC), County Planning Commission, County staff and the public. These meetings produced a set of goals and objectives for the Transportation System Plan.

The review involved the following six-step process:

1) Review and evaluation of the existing comprehensive land use and transportation plans.
2) Review of local and state plans.
3) Analysis of existing land uses and vacant lands.
4) Review of existing ordinances, as well as zoning, subdivision, and engineering standards.
5) Review of existing, significant transportation studies.
6) Review of existing capital improvement programs and/or public facilities plans.

INVENTORY OF EXISTING TRANSPORTATION SYSTEMS

A significant part of developing a transportation system plan is to inventory the existing physical facilities, services and conditions of the transportation system (streets, bikeways, etc.). This task seeks to determine the extent, nature and condition of the facilities and systems already in place to determine how the current system functions.

INVENTORY OF NATURAL AND CULTURAL ENVIRONMENTAL CONSTRAINTS

Although a detailed inventory is not required for this system level of planning, any environmental features associated with the existing and planned transportation facilities need to be identified. Examples of environmental features are wetlands, significant natural areas, historic buildings, cemeteries, parks, schools and scenic areas.

POPULATION AND EMPLOYMENT FORECASTS

Chapter 3 provides a transportation forecast in order to determine the future transportation needs in the County. The County inventoried existing land uses, as well as demographic and economic data outside of the Bend and Redmond Urban Growth Boundaries. Population, employment and traffic forecasts were made based on historic and existing data. In addition to trending historical growth patterns, existing and planned land uses were examined to predict future development growth and to forecast the traffic generated from that development. These forecasts help one to understand the existing transportation system and form the basis for projecting future travel needs. The Transportation Planning Rule requires that forecasts address a 20-year period beginning in the year that the TSP was originally planned for adoption in Deschutes County (1996), therefore, the projections were estimated out to the year 2016.

DETERMINE TRANSPORTATION NEEDS

Chapter 4 addresses the transportation needs of the County based on the outcome of the forecasts and inventory analysis and the concerns of a wide range of Deschutes County residents.

Other Roadway Needs

Several additional needs of the transportation system are not specified in the Transportation Planning Rule but they need to be included because they directly affect the transportation-financing plan, which is required by the Rule. The additional needs include:

- Safety needs, including traffic accident data covering at least three years, knowledge of existing unsafe roadway sections or intersections, and a review of any existing traffic safety studies.

- Bridge needs, an inventory of existing bridges and other structures in the transportation system and any needed repairs, widening or replacement.

- Reconstruction needs, based on a prioritized list of existing, substandard roadway sections.

- Operation/Maintenance needs, including the ongoing needs of patching, chip sealing, sweeping, etc., for the continued safe operation of public roadways.

Public Transportation Needs

This requirement addresses two separate needs, one being the mobility needs of the public and the other being the system design considerations (level of service). In general mobility needs fall into two categories: accessibility to jobs in urban areas and the mobility needs in rural areas. Primarily, Deschutes County has rural mobility needs since most of the areas outside the urban growth boundaries fall into the rural category. The TSP requires the determination of demand for public transportation and then the appropriate system design to satisfy that demand. As part of the TSP, the County completed an inter-urban transit feasibility analysis and an associated public survey to determine need.

Bikeway Needs

The bicycle element of the plan addresses the Countywide needs for bicycle transportation and draws upon the existing Deschutes County Master Bikeway Plan (March 1992) for recommendations for new and upgraded facilities. Additional recommendations are provided based upon community input and changes in land use and the street network.

Pedestrian Needs

The need for sidewalks is limited outside of urban growth boundaries and the business districts of the larger unincorporated communities. In most cases the pedestrian volumes, and width of the paved or graded shoulders are such that pedestrians can effectively travel without sidewalks.

TRANSPORTATION SYSTEM PLAN

Chapter 5 outlines the transportation system plan with recommended goals and policies, as well as a list of proposed transportation projects. The project list is prioritized based on various criteria including safety, costs and need.

FINANCING PLAN

Chapter 6 addresses various financing options.

2.1 EXISTING TRANSPORTATION GOALS AND OBJECTIVES

In the state of Oregon, a clear hierarchy exists with regard to the role of statewide comprehensive planning and its relationship to regional and local planning. The state provides clear direction on the types of issues that need to be addressed in local plans and how possible problem-solving solutions can be developed.

Deschutes County has several previous plans and guidelines available that give direction for development of the local transportation system plan. The documents most appropriate to review for Deschutes County are the Deschutes County Comprehensive Plan, the Oregon Transportation Plan, and the Oregon Highway Plan. The Oregon Transportation Plan includes specific action items as a means of attaining the statewide transportation goals. The existing goals and objectives from these plans are outlined below. In addition, the comprehensive plans for Bend, Redmond and Sisters were also reviewed as part of this project.

DESCHUTES COUNTY COMPREHENSIVE PLAN

The current comprehensive plan for Deschutes County was the first comprehensive plan developed in the County. After a major planning effort involving many citizens and agency personnel, the plan was adopted in 1979, then later codified in 1993. From the goals and objectives set forth in the plan, it is apparent that many of the goals set forth in 1979 are still relevant in 1998. The following are the existing County transportation goals:

1. To provide a balanced, safe, efficient and integrated transportation system which reflects environmental, economic and social considerations.

2. To serve the existing, proposed and future land uses with an efficient, safe, attractive roadway network.

3. To provide expansion of opportunities for rail and air transportation for passengers and freight.

4. To provide opportunity for the development of public transit systems.

5. To provide a system for safe and efficient transportation and recreation routes for pedestrians, bicyclists, and equestrians.

6. To decrease the adverse effects of the automobile domination of existing transportation systems.

DESCHUTES COUNTY MAJOR ROADS CAPITAL IMPROVEMENT PLAN (MRCIP)

The current draft Deschutes County Major Roads Capital Improvement Program (MRCIP) (Table 2.1.T1) was adopted by the County Board of Commissioners in 1996.

Table 2.1.T1
1997-98 Draft Deschutes County MRCIP Projects

Program Year	Road	Location	Project Type	Project Description	County Road Funds	Other Funds	Total Cost
1998	U.S. 97	Terrebonne	Sidewalks	Install sidewalks along portions of U.S. 97	$0	$60,000[1]	$60,000
1998	Various	La Pine	Sidewalks	Install sidewalks along portions of U.S. 97, Huntington, 1st, 3rd, and 4th Streets	$17,600	$70,400[2]	$88,000
1998	Reed Market	Bend	Construction	Extend Reed Market Road from U.S. 97 to Blakely Road	$186,000	$264,000[3]	$450,000
1998	Deschutes Market Rd.	Deschutes Junction	Realignment	Relocate existing intersection with U.S. 97, to the south	$110,000	$3,000,000[4]	$3,110,000
1998			Purchase	Right-of-way acquisition	$20,000		$20,000
Total					$473,600	$3,814,400	$4,288,000

DESCHUTES COUNTY PAVEMENT MANAGEMENT SYSTEM

Deschutes County is divided up into five road maintenance areas (North, West, Central, South and East). The pavement management system addresses ongoing maintenance of County roads generally related to sealing, widening, overlay and deferred pavement maintenance and preservation activities. Road conditions are routinely monitored by road crews and graded based on condition and need.

DESCHUTES COUNTY BICYCLE MASTER PLAN

The Deschutes County Bicycle Master Plan was adopted in March 1992 as a resource element of the Deschutes County Year 2000 Comprehensive Plan. The Plan provided goals and objectives, policy recommendations, classifications of bicycle facilities, location of bicycle facilities, bicycle parking and other transportation issues related to bike facilities. Many of the policies identified in the Plan have since been implemented through adopted County Ordinances. The emphasis of the Bicycle Master Plan is to develop an overall network of bikeways to connect the urban areas, recreation areas and destination resorts.

CITY OF BEND, TRANSPORTATION SYSTEM PLAN

Currently, the City of Bend is developing a transportation system plan that covers the area within the Bend Urban Growth Boundary (UGB). The Bend project is running concurrent with this transportation system plan for Deschutes County. Results and recommendations from this plan will be incorporated into the County TSP.

[1] ODOT Bicycle and Pedestrian Program Grant

[2] ODOT Bicycle and Pedestrian Program Grant

[3] System Development Charge (SDC) Funds

[4] ODOT

CITY OF BEND, BEND MUNICIPAL AIRPORT MASTER PLAN

In 1994, CenturyWest Engineering completed an update of the 1979 Bend Municipal Airport Master Plan. However, the 1994 updated Plan has not been adopted by Deschutes County and therefore is not recognized as a planning reference document. The County Comprehensive Plan recognizes the original 1979 Airport Plan as "…a guide for development, although it is not a part of this plan." (Comp Plan)

CITY OF REDMOND TRANSPORTATION SYSTEM PLAN

The City of Redmond has identified the following goals in its draft Transportation System Plan:

1. Reduce through-traffic, congestion and improve circulation along Highway 97, especially along the 5th and 6th Street Couplet.

2. Enhance east-west circulation.

3. Identify roadway system needs to serve undeveloped areas so that steps can be taken to preserve rights-of-way and maintain adequate traffic circulation.

4. Increase the use of alternative travel modes through improved safety and service.

REDMOND MUNICIPAL AIRPORT (ROBERTS FIELD) MASTER PLAN

The existing master plan dates from 1988 and is currently being updated. The County recognizes the existing Plan as the guiding document for airport-related development and land use in the airport environs.

CITY OF SISTERS, TRANSPORTATION SYSTEM PLAN

A TSP for the City of Sisters, as required by the Planning Rule and the Oregon Department of Transportation, has not yet been initiated, but is anticipated to begin sometime in FY '98-'99. Without a Sisters TSP, the County has made generalized estimates regarding future growth and needs for the Sisters community.

OREGON STATE TRANSPORTATION PLAN

The Oregon Transportation Commission in 1992 adopted the current statewide transportation plan. The State Plan addresses all statewide transportation issues from air, rail and highway development, to alternative commute modes such as transit, bicycling and walking. The full text of the plan is included in Appendix A. Goals from the Oregon Transportation Plan are:

Goal 1: Provide for a balanced, efficient, accessible and environmentally responsible transportation system that connects places, modes and carriers, while maintaining safety and financial responsibility.

Goal 2: To develop a multi-modal transportation system that provides access to the entire state, supports acknowledged comprehensive land use plans, is sensitive to regional differences and supports livability in urban and rural areas.

Goal 3: To promote the expansion and diversity of Oregon's economy through the efficient and effective movement of goods, services and passengers in a safe, energy efficient and environmentally sound manner.

Goal 4: To implement the Transportation Plan by creating a stable but flexible financing system, by using good management practices, by supporting transportation research and technology, and by working cooperatively with federal, regional and local governments, Indian tribal governments, the private sector and citizens.

Preferred Alternative

The Plan identifies a "Preferred Alternative" that meets all policy goals by:

- Identifying a multi-modal system including air, rail, auto, truck, bus, bicycle, pedestrian, waterway transportation and pipelines to be implemented by the Year 2012.

- Establishing minimum levels of service to be achieved by each mode of transportation.

- Identifying other major improvements beyond minimum levels of service.

- Identifying the transportation corridors and facilities that serve statewide and interstate functions.

- Identifying transportation system and facility management processes that must be put into place, including local transportation demand management (TDM) and financing principles.

- Identifying land use patterns that must be put into effect to achieve the goals of the transportation plan.

- Identifying local, state and federal roles in implementing the plan and setting planning and performance criteria for modal implementation plans and local and regional transportation plans.

- Estimating the financial requirements to implement the plan.

The Preferred Alternative includes the following specific recommendations, which apply to incorporated areas of **Deschutes County**, to be in place by the Year 2012:

- Walking and bicycle trips at double the present rate;

- Full implementation of the LCDC Transportation Rule.

The preliminary cost estimate for the preferred alternative to be implemented statewide is approximately $12 billion over the next 17 years. This amount includes all local, state and federal commitments. Fifty-seven percent (57%) of the funding is earmarked for roads, streets and highways, with the remainder pledged for new investments in railroads, ports, aviation, intercity bus and transit.

OREGON STATE HIGHWAY PLAN

The Oregon State Highway Plan was adopted by the Oregon Transportation Commission in 1991, and represents the highway element of the Oregon State Transportation Plan. The Plan (in Appendix B) identifies state highway needs up to the year 2012 and sets policies on how to address those needs. The categories of needs are divided into the following: Level of Importance (LOI), Access Management, Access Oregon Highways (AOH), and Truckload Restrictions. Note that this Plan only affects highways, not arterials, collectors or local roads. Where a highway section is severely constrained by intensive land use or other physical or environmental limitations, and where service levels are substandard, ODOT's objective will be to maintain current service levels. On highway sections that are not constrained, but are substandard and not scheduled for improvement, ODOT's objective will be to maintain and, to the extent possible, improve the LOS. Table 2.1.T2 lists the state standards for level of service (LOS), while Figure 2.1.F1 identifies the state policy regarding state highway level of importance (LOI).

Table 2.1.T2

1991 Oregon Highway Plan Level of Service (LOS) Standards
Levels For Design Hour Operating Conditions Through a 20-Year Horizon

LOI	Highway	Through Unincorporated Communities (1)	Rural Areas (2)
Interstate	none in county	None in county	none in county
Statewide	20, 97, 126	C	B
Regional	31	C	C
District	27, 242, 370, 372	D	C

1) Rural unincorporated communities (i.e., La Pine, Wickiup Jct., Tumalo, Terrebonne, etc.).

2) Rural areas are areas outside of urban growth boundaries (UGBs) but not including unincorporated communities.

These LOS standards are used by ODOT when making operating decisions, such as access management decisions, and when coordinating with local comprehensive planning. It is ODOT's objective to maintain the LOS at or above the listed standards.

Figure 2.1.F1

1991 Oregon Highway Plan Level of Importance (LOI) Policy

Level of Importance	Description

Interstate Highways None in Deschutes County

Statewide Highways

Function The primary function of highways at this level is to provide connections and links to larger urban areas, ports and major recreation areas that are not directly served by interstate highways. Statewide highways provide links to the interstate system and alternate links to other states. A secondary function is to provide links and connections for intra-urban and intra-regional trips. Connections are primarily with roadways that serve areas of regional significance or scope.

Statewide routes generally serve centers of 5,000 or more population, have route lengths of 50 miles or more, do not parallel other statewide routes within 25 miles, connect at each end with interstate routes, statewide routes or major recreational areas, and carry at least 500 vehicles per day.

Management Objective The management objective is to provide for safe and efficient high-speed continuous-flow operation in rural areas and high to moderate-speed operations with limited interruptions of flow in urban and urbanizing areas.

Regional Highways

Function The primary function of highways at this level is to provide connections and links to areas within regions of the state, between small urbanized areas and larger population centers, and to higher level (interstate/statewide) facilities. A secondary function is to serve land uses in the vicinity of these highways.

Management Objective The management objective is to provide for safe and efficient high-speed continuous-flow operation in rural areas, except where there are significant environmental constraints, and moderate to low-speed operation in urban and urbanizing areas with moderate interruptions to flow.

District Highways

Function The primary function of highways at this level is to serve local traffic and land access.

Highways included in this level primarily serve local functions and are of relatively low significance from a statewide perspective. They are often routes that held a higher function during the development of Oregon's highway system. With the passage of time and the construction of other through routes, the importance of these highways from a statewide perspective has diminished. They now serve a similar function to county roads and city streets.

Management Objective The management objective is to provide for safe and efficient moderate to high-speed continuous-flow operation in rural areas reflecting the surrounding environment, and moderate to low speed operation in urban and urbanizing areas with a moderate to high level of interruptions to flow.

ACCESS MANAGEMENT POLICY

The Access Management policy focuses on statewide access control measures and targets those areas of emerging development rather than retrofitting already built-up areas. The Highway 97 corridor between Redmond and Bend is an example of an emerging development area. The *1991 Highway Plan* identifies the following six access management categories into which specific highway segments will be placed. The segments are assigned a category in conjunction with the development of highway corridor plans.

Category 1 - The highway segments provide for the efficient and safe high speed and high volume traffic movements, in interstate, interregional, intercity, and some intracity routes in the largest urbanized areas. The segments do not provide direct land access. Access control and other methods will be used on nearby cross streets in the area of interchanges to protect the operation of those interchanges. This category will apply to all interstate highways that function like freeways.

Category 2 - These highway segments provide for efficient and safe high speed and high volume traffic movements on interstate, interregional, intercity and longer distance intracity routes. They should not provide direct land access. Highly controlled intersections and medians distinguish these segments. Traffic signals should be avoided. Where they must be installed, their effect on mainline traffic flow should be minimized. Grade separations should be considered for high volume cross streets or other cases where signals are not appropriate. Some category 2 facilities may be developed into category 1 facilities over time. This category includes many of the statewide facilities.

Category 3 - These highway segments provide for efficient and safe medium to high speed and medium to high volume traffic movements on interregional, intercity and longer distance intracity routes. These segments are appropriate for areas that have some dependence on the highway to serve land access and where financial and social costs of attaining full access control would substantially exceed benefits. This category includes some of the statewide facilities.

Category 4 - These highway segments provide for efficient and safe medium to high speed and medium to high volume traffic movements, on higher function interregional and intercity highway segments. They also may carry significant volumes of longer distance intracity trips. They are appropriate for routes passing through areas that have moderate dependence on the highway to serve land access and where the financial and social costs of attaining full access control would substantially exceed benefits. This

category includes a small part of the statewide facilities and most regional facilities.

Category 5 - These highway segments provide for efficient and safe medium speed and medium to high volume traffic movements on intercity, intracity and intercommunity routes. There is a reasonable balance between direct access and mobility needs within this category.

Category 6 - These highway segments provide for efficient and safe slower to medium speed and low to high volume traffic movements on intracity and intercommunity routes. This category will be assigned only where there is little value in providing for high-speed travel. Providing for reasonable and safe access to abutting property is a major purpose of this access category.

The Highway 97 corridor plan is the only one completed in the County so far. The corridor plan for Highway 20 is in process. Local highway segments fall into the following categories:

Category 2 U.S. 97: for its entire length outside of the urban growth boundaries of Bend, Redmond and Sisters, except for the specific areas listed below.
U.S. 20: from the Sisters eastern UGB to the Bend western UGB.

Category 3 U.S. 20: from the Jefferson County Line to the Sisters western UGB.
OR 126: may be category 3 or 4

Category 4 U.S. 20: from Bend eastern UGB to Lake County.
U.S. 97: specific sections within Terrebonne and La Pine.
OR 31, OR 370 and OR 372

Category 6 OR 27

ACCESS OREGON HIGHWAYS (AOH) SYSTEM

The AOH system was developed to focus limited state resources on significant highway segments that provide access through and between major cities, regional centers and interstate cities. The primary goal is to maintain the efficient flow of traffic along these highways, protect right-of-way for future development, guide land uses by coordination with local comprehensive plans, and promote alternative modes and congestion management tools in areas that highway improvements are not cost-effective. In Deschutes County, Highways 20, 97 and 126 are all classified as Access Oregon Highways. The complete goals can be found in Appendix C.

TRUCK LOAD RESTRICTIONS

The State Transportation Commission has set a goal of 96 percent of all Oregon highways be modernized to the point of being approved for continuous heavy truck (< 80,000 lbs.) usage by the year 2010. It is up to the ODOT Region Engineer to program reconstruction or resurfacing projects in the six-year state transportation improvement program (STIP) to meet the Commission's goals. The remaining four percent of highways do not have the potential to carry significant truck traffic; therefore they are to be left "as is".

HIGHWAY 97 CORRIDOR STRATEGY

In 1995, ODOT completed phase 1 (strategy development) of a corridor-planning project for the entire length of Highway 97 from Madras to the California border. The applicable section through Deschutes County identified strategies necessary for ODOT to implement the Oregon Transportation Plan and the Oregon Highway Plan. The Corridor Strategy assumes implementation of near-term projects within the corridor that have been previously approved for construction. The strategy development process for the US 97 corridor included several public meetings and workshops where corridor issues, concerns and opportunities were discussed. The overall goal for the US 97 corridor was based on input received from these meetings and relevant technical information on the transportation trends, projections and safety. While the strategy applies corridorwide, much of the emphasis is clearly on *urban areas* and therefore not directly applicable to the County TSP. The complete Corridor Plan can be found in Appendix D.

The Corridor Strategy objective for the U.S. 97 Corridor are intended by ODOT to embody the overall goal for the Corridor and establish direction and provide guidance for corridor-wide transportation plans and enhancements over the next 20 years. The Deschutes County Board of Commissioners in October 1995 endorsed the Corridor Strategy. Once endorsed, the Strategy became the guiding document for detailed transportation system planning and comprehensive planning, which will establish corridor improvement priorities for state funding; thereby ensuring that future transportation facilities and services optimize the needs of Oregon's Corridor stakeholders.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP) 1998-2002

Each year, ODOT updates a five-year capital improvement program that contains a list of projects proposed for development and construction. Table 2.1.T3 identifies the draft STIP projects located in Deschutes County. The projects are prioritized and follow the policy directions of the Oregon Transportation Commission (OTC), and reflect work done in:

- The 1992 Oregon Transportation Plan;
- Consultation and partnership with local government officials and the public;
- Projects and needs identified by mode plans and management systems developed in compliance with the Intermodal Surface Transportation Efficiency Act (ISTEA);
- Strategies developed during the first phase of Corridor Plans;

Table 2.1.T3
1998-2002 Draft STIP Projects in Deschutes County

Program Year	Road	Project	Project Type	Project Description	Cost
1998	None	Central Oregon Carpool/TDM Program	Various	Maintain, operate carpool program, promote alternate modes through TDM	$38,000
1998	US 97	South Bend Scale Relocation	Relocation	Relocate weigh scale	$1,000,000
1998	US 97	Bend Parkway, Unit 3A	Modernization	Construct new roadway	$12,911,000
1998	US 20	NW Jack Pine – Odem Medo	Preservation	Millout/inlay, upgrade ADA, intersections and sidewalks	$518,000
1999	None	Central Oregon Carpool/TDM Program	Various	Maintain, operate carpool program, promote alternate modes through TDM	$38,000
1999	US 20	Jack Lake Rd – Sisters Section	Preservation	Millout/inlay, preservation overlay	$2,419,000
1999	US 97	Bend Parkway, Unit 3B	Modernization	Construct new roadway	$5,335,000

2000	**None**	**Central Oregon Carpool/TDM Program**	**Various**	**Maintain, operate carpool program, promote alternate modes through TDM**	**$42,000**
2000	**US 97**	**Empire Ave - China Hat Rd**	**Preservation**	**Millout/inlay, preservation overlay**	**$2,245,000**
2000	**US 20**	**Arnold Ice Cave – Horse Ridge**	**Preservation**	**Millout/inlay travel lanes, preservation overlay**	**$1,128,000**
2001	**None**	**Central Oregon Carpool/TDM Program**	**Various**	**Maintain, operate carpool program, promote alternate modes through TDM**	**$42,000**
2002*	**OR 126**	**11th St. – Redmond East C.L.**	**Modernization**	**Widen and realign roadway**	**$6,970,000**
2002*	**US 97**	**Wickiup Jct. Overcrossing**	**Operational**	**Realign Hwy 97 east of Wickiup Jct. and construct RR overcrossing**	**$5,000,000**
2002*	**US 97**	**Burgess Rd PFH 157-1(1)**	**Modernization**	**3.4 mile reconstruction**	**$2,340,000**
2002*	**US 97**	**South Century Dr PFH 92-1(1)**	**Modernization**	**10.8 mile reconstruction**	**$3,000,000**
				Total**	**$25,716,000**

Note: * No funding has been identified for these projects.
** Excludes unfunded projects.

- The Oregon Transportation Initiative (OTI) which directed ODOT to address, first and foremost, the maintenance, operation and preservation of the existing system;
- The Governor's Coastal Salmon Restoration Initiative; and
- ODOT's Community-Based Solutions Strategy (in coordination with the Governor's Community Solutions Team).

The current STIP responds to Oregon's needs in a continuing challenge, which is made more difficult in the face of dwindling revenues. Due to the Balanced Budget Amendment, federal revenues are projected to decrease approximately 3 percent per year. This means a projected reduction in federal revenues of 9 percent for 1998, 12 percent for 1999, and so on. The draft STIP reflects the revenue reduction by adding few new projects. New federal guidelines also require that the final STIP be fiscally constrained. Therefore, ODOT can no longer include construction projects where funding is uncertain. However, the draft is not fiscally constrained yet, but will likely show a funding level approximately 20 percent less in its final version.

OREGON AVIATION SYSTEM PLAN

The Aviation System Plan is due to be adopted incrementally by the Oregon Transportation Commission. This plan will identify a base airport system, system funding

needs and gaps, and recommend various strategies to pay for the system. It will also recommend policies to guide the state in protecting, maintaining and developing the airport system. It will provide an inventory and forecasts for airports statewide. Some key issues that affect the Plan include:

- Local governments own most public use airports
- The federal government owns most of the navigational system.
- The FAA determines funding levels and prioritization of expenditures for nationally recognized NPIAS airports.
- U.S. Congress proposes to severely limit or eliminate general aviation airport funding altogether.

OREGON BICYCLE AND PEDESTRIAN PLAN

In June 1995, the Oregon Transportation Commission adopted the Oregon Bicycle and Pedestrian Plan. The plan represents a modal element of the Oregon Transportation Plan and serves to guide cities, counties and others in establishing facilities on local transportation systems. The plan focuses on existing street systems in urban areas, where short trips are more realistic and where most congestion problems occur. The plan found that existing statewide conditions are generally good for bicyclists on rural highways, not very good or poor for bicyclists and pedestrians on many urban highways. Also, local systems with good walking and cycling conditions were highlighted as examples to emulate. The plan acknowledges that ODOT will provide appropriate pedestrian and bicycle facilities to meet the following goal and actions:

Goal: To provide safe, accessible and convenient bicycling and walking facilities and to support and encourage increased levels of bicycling and walking.

Action 1: Provide bikeway and walkway systems that are integrated with other transportation systems.

Action 2 Create a safe, convenient and attractive bicycling and walking environment.

Action 3: Develop education programs that improve bicycle and pedestrian safety.

Each action is refined with specific strategies. After determining needs and priorities, the plan provides for the establishment of bike and walking facilities in the following ways:

- Rural highways will have shoulders widened in the course of modernization projects, as well as on many preservation overlays, where warranted.

Cost to Implement the Plan: The overall cost to retrofit the existing urban highway system with appropriate facilities is estimated at $150 to $200 million. This would require expending $7.5 to $10 million per year to accomplish the goal in 20 years; this doubles the current ODOT expenditures on pedestrian and bicycle facilities.

GOVERNOR'S TRANSPORTATION INITIATIVE

To better identify the statewide transportation needs, including the differences between regions, Governor Kitzhaber established regional fact-finding citizen committees to meet

with government agencies and the public throughout Oregon. For ease of implementation, the regions followed existing ODOT statewide boundaries. ODOT Region 4 encompasses Central Oregon from Klamath Falls north to Hood River. The Central Oregon Committee identified existing needs in Deschutes County, funding shortfalls, identified possible future funding sources, and developed the following summary recommendations that were reported to the Governor in June 1996.

In general, the Committee established that the underlying premise for all its recommendations was that the cost responsibility for improvements fell to those who benefit most. However, the Committee also recognized that not only the direct users benefit from transportation system improvements. The Committee felt that the following recommendations would have the most impact on the region's transportation needs:

- Increasing partnerships between government entities, and establishing public and private partnerships for highway maintenance and transit systems. By working together to stretch limited resources, city, county and state governments can cut costs and accomplish tasks more efficiently. Costs can be reduced by locating similar services, such as maintenance offices, together, or by working together across jurisdictional boundaries to address priority concerns.

- Need to have more flexibility in regulations/policies and better intergovernmental cooperation and coordination.

- Support community efforts to achieve a land-use pattern that reduces the infrastructure costs and improves livability: mixed-use zoning, higher density and avoidance of commercial strips.

- Move trucks off main streets through the development of truck routes or bypasses around downtown districts. Make improvements to the local road system so it can handle heavier trucks. Where necessary, limit truck travel through congested areas to non-peak hours only.

- Increase the $50,000 limit on state-operated maintenance projects when public agencies can do the work more economically than private contractors.

- Institute a studded tire and traction device fee at a level that matches the damage they cause.

- Decentralize design standards to the regions to allow for exceptions that better meet the needs of the region and communities.

- Support a constitutional amendment to allow increases in vehicle registration fees to be used for non-highway uses. The increase would be applied statewide, and that amount would be distributed to counties for alternative modes, or for other transportation-related uses if there were no alternative mode needs. The distribution should be pro-rata.

- Modify the "Little Davis-Bacon Act" to reduce labor costs on maintenance and preservation projects.

- Provide incentives for (and where appropriate require) development to incorporate design/management features that facilitate alternative modes, such as connectivity of sidewalks/bike paths, bike parking, etc. To provide an incentive to developers, encourage legislative change that would allow variable SDCs if development reduces its impact on the system.

- Provide the 10 percent matching funds for non-commercial airports to take advantage of the federal funds available for runway repairs by raising all aviation fuel taxes and/or using lottery funds.

- Establish local regional transportation committees to address region-wide issues. Delegate much of the decision-making authority on major projects.

- Educate the public about the relationship between land-use and transportation, and the need for adequate transportation funding.

The Committee met with Governor Kitzhaber in May 1996, to discuss the issues in Central Oregon and arrived at the following priorities:

- Preserving and maintaining the existing transportation system is the highest priority for the Central Oregon region. The favored “Tier 1" strategy was to focus on highways and local roads that function as “truck routes”, and provide a network of truck routes to get trucks off “main streets”. However, these roads must have an adequate base to handle to the weight of trucks using them. The Committee identified the approximate rural highway mileage involved in ODOT Region 4 and assigned the cost of $17 million per year for twenty years to cover costs. ODOT estimated that a 2-3 cent gas tax increase and weight-mile fee would address the Tier 1 needs over the twenty-year period.

- Increase ODOT’s partnerships with counties, primarily for maintenance activities. Reduce the bureaucracy that restricts state, county and local governments from using their forces for simple contract operations.

- Greater flexibility in decision-making by shifting decision-making responsibilities to the regional level. Eliminate restrictive administrative policies that limit a region's ability to respond to local needs.

- Maintain good access to the Willamette Valley and Portland, and expanding Highway 97 to four lanes.

- Simplify the project development process. The amount of “process” should fit the size of the project.

- There exists a significant backlog of modernization projects that still need to be done in Central Oregon to maintain the transport of goods and people. Land-use planning and alternative modes are not a “magic bullet” for a region that has vast distances and small population centers. The creation of a regional transportation advisory committee to establish priorities for modernization has merit, provided the scope of the committee is narrowly focused on transportation needs.

- Between corridor planning, the State Transportation Improvement Plan, the recent GTI process and other public involvement efforts, ODOT goes to the public "well" too often and confuses the public.

OREGON TRAVEL BEHAVIOR SURVEY

In general, rural areas normally lack data regarding the travel behavior of residents. The U.S. Census database has a limited usefulness due to the configurations of the tracts used to group the information and the age of the 1990 data. 1n 1996, ODOT funded a consultant study to perform a travel behavior phone survey of rural residents in eight counties in Oregon. The survey respondents kept a travel diary for two days, documenting their trip frequency, characteristics and purpose. A total of 1,208 households were recruited to do the survey, with an actual 775 completing valid surveys. The full report is included in Appendix E. The following is a report summary:

Surveys Completed	775 households
Representative zip codes	97701, 02, 07, 56, 59, & 60
Overall response rate	32%
Average Trip Generation	8 trips per household per day
Percentage who telecommute	8%
Percentage with flexible /shift work schedules	32%
Percentage full or part time students	24%
Percentage who use private vehicle	88.3%
Percentage who walk	6.5%
Percentage who bike	0.8%
Percentage who use something else	4.4%

(Section 2.2a)

2.2 EXISTING TRANSPORTATION SYSTEM AND CURRENT NEEDS

EXISTING ROAD SYSTEM

Deschutes County is responsible for maintaining approximately 943 total miles within the County system. Out of the total miles maintained by the County, approximately 750 miles are paved and 193 are unpaved. An additional 1,200 miles of unpaved roads are dedicated to the public but not in the County system. Most of the rural roads are located in the western part of the County along the major state highway corridors. In the other, mostly unpopulated areas, roads totaling approximately 410 miles are under the jurisdiction of the U.S. Forest Service, U.S. Bureau of Land Management, the Oregon State Forestry Division, or the Oregon State Parks Division. Of the 750 paved miles of public roads located in the County, many are controlled by the local jurisdictions within the three incorporated cities (Bend, Redmond and Sisters). However, the County maintains approximately 120 miles of urban roadways within UGB's. Of the 120 urban road miles the County maintains, approximately 27 miles are within city limits. An additional 200 miles of roadways (state highway system) are controlled by ODOT.

As part of the TSP process, staff has made an extensive inventory of the existing county street network. The County Road Department as part of its pavement management system maintains base level, physical inventory information for County roads. The County Road Department on a rotating cycle also collects traffic volume count information. This rotating cycle produces updated peak-hour and daily traffic volume totals once every two to four years for most arterial and collector roads in the County. This existing database provided a starting point for a detailed physical inventory of all county arterial and collector roads. The traffic count data for the state highways come from the 1996 traffic volume tables published by ODOT. The results of the inventory are used to define existing street and road capacities, define short-term improvement projects and form the basis for long-term transportation alternatives.

TYPES OF ROADS IN DESCHUTES COUNTY

There are many types of roads in Deschutes County. The following are some definitions and examples of the types of roads commonly found in the County.

Road - means the entire right of way of any public or private way that provides ingress to or egress from property by means of vehicles or other means or that provides travel between places by means of vehicles. "Road" includes, but is not limited to:

- Ways described as streets, highways, throughways or alleys;
- Road related structures that are in the right of way such as tunnels, culverts or similar structures; and
- Structures that provide for continuity of the right-of-way such as bridges.

Public Road - means a road over which the public has a right of use that is a matter of public record. Maintenance of public roads, including plowing and repair, is the

responsibility of the adjoining property owners. There are far more miles of public roads in rural Deschutes County than there are miles of County roads or state highways.

County Road - means a public road under the jurisdiction of a county that has been designated as a county road under ORS 368.016. County roads are maintained (paved, repaired, plowed, bladed) by the County. A public road becomes established as a County Road by order of the County Commissioners. Huntington and Burgess Roads are examples of County Roads.

Local Access Road - means a public road that is not a county road, state highway or federal road.

Private Road - Private roads have not been dedicated to the public. These roads do not come under County, City or State jurisdiction. Examples of private roads include those in Sunriver, Eagle Crest and Black Butte Ranch. Roads created by easements between two parties can also be considered private roads.

Easement - An access or road easement occurs when one person allows another person to drive (cross) their property. The property owner granting the easement still owns the land under the easement, but the other party has a legal right to use the easement. The public, except for invited visitors, does not have a right to use the easement.

State Highway - A State Highway is a public road, maintained by the Oregon Department of Transportation.

In addition, the US Forest Service and the Bureau of Land Management have roads on their lands in Deschutes County that they maintain and have jurisdiction over.

Many improved, gravel surfaced or paved roads were constructed as a condition of approval of a subdivision of land. Other public roads have been improved through the formation of a *Special Road District*. People living within an area may form a special road district to improve and maintain the roads within a specially designated geographical area such as a subdivision. The residents forming the district agree to pay property taxes to support the special district. Road District Commissioners are appointed by the Deschutes County Board of Commissioners to operate the special road district. The special road district improves and maintains the roads within the district to the level agreed to by the residents of the district.

County residents may also petition the Deschutes County Board of Commissioners to form a *Local Improvement District* (LID) to get their road improved, usually involving the paving of a gravel or dirt road. Public roads improved under the LID process may be accepted by the Deschutes County Commissioners as a County-maintained road. Under an LID, property owners agree to pay for road improvements.

ROAD SYSTEM CONFIGURATION

Functional classification describes how the public road system should operate. Roads are grouped by their similar characteristics in providing mobility and/or land access. Within the County, there are six rural road classifications and nine urban classifications. An explanation of the various road classifications used in Deschutes County is found in Table 2.2.T2. There are three designated urban areas within the County where the urban standards generally apply, with

the rest of the County using the rural standards. Table 2.2.T1 provides a mileage and maintenance responsibility breakdown of the various County road classifications.

The following represents a general overview of state highways, street functional classifications and a listing of County roads falling under each category. Figure 2.2.F1 identifies the current Deschutes County Road System. Complete data lists for all County highways, arterials and collectors can be found in Appendix F.

The physical inventory of County roads included the following elements as required by the state Transportation Planning Rule (TPR):

- Road Classification and Jurisdiction
- Right-of-way Width
- Number of Travel Lanes
- Lane Width
- Inclusion of Sidewalks
- Bike Facility Type (if present)
- Location of Traffic Control Devices/Signals
- General Pavement Condition

Table 2.2.T1
***Deschutes County Road Mileage and Maintenance Responsibility by Functional Classification**

Deschutes County	Urban Arterial	Urban Collector	Urban Local	Rural Arterial	Rural Collector	Rural Local	Total Miles
County-Maintained ***(747 miles paved, 196 miles unpaved)***	35	24	64	181	223	416	943
Public Roads ***(all unpaved)***							1,200
Subtotal:	**35**	**24**	**64**	**181**	**223**	**416**	**2,143**

*Note: Mileage prior to the transfer of County road jurisdiction within the Bend UGB to the City of Bend on July 1, 1998.

Table 2.2.T2

Road Functional Classifications

Rural

Principal Arterial:

- Trip length and travel density characteristics representative of substantial statewide or interstate travel; and

- Penetrates urban boundaries, or comes within 10 miles of the center of an urban area of 25,000 population or greater, and are within 20 minutes travel time (off-peak) of the center of the area via a minor arterial road.
- Movement of interstate goods and services.

Arterial:

- Links cities, larger towns, and other major traffic generators, providing interregional and intercounty service; and
- Spaced at distances so that all developed areas are within reasonable distance of an arterial highway; and
- Provides service to corridors with trip length and travel density greater than that predominately served by rural collector or local systems.
- Serves the more important intra-county travel corridors.
- Movement of goods and services.
- Includes Federal Forest Highways.

Collector:

- Spaced at intervals to collect traffic from local roads and provide all developed areas a reasonable distance from a collector road; and
- Provides service to the remaining smaller communities; and
- Links locally important traffic generators with rural destinations.

Local:

- Primarily provides access to adjacent land/properties; and
- Accommodates travel over short distances as compared to arterials and collectors.

Urban

Principal Arterial:

- Serves the major activity centers in a metropolitan area, and also serves the highest traffic corridors and satisfies the longest trip desires; and
- Carries the major portion of trips entering and leaving the urban area, as well as the majority of the through traffic desiring to bypass the city.

Arterial:

- Provides service to trips of moderate length at a somewhat lower level of travel mobility than principal arterials; and
- Distributes travel to geographic areas smaller than those served by principal arterials, while not penetrating specific neighborhoods; and
- Spacing varies from 1/2 to 1 mile in downtown areas, to 2 to 3 miles in areas outside downtown.

Collector:

- Provides both land access and traffic circulation within residential neighborhoods, commercial, and industrial areas; and
- Distributes trips from arterials through these areas to their final destination, and conversely, collects traffic from local streets and channels it onto arterials.

Local:

- Provides access to adjacent land and access to higher classified roads; and
- Provides lowest level of travel mobility including no bus routes; and
- Carries less than 1,500 vehicles per day.

Highways / Principal Arterials

Highways have the responsibility of facilitating traffic movement through and between urban areas, regions and between states. The 1991 Oregon State Highway Plan identifies four levels of functional importance (LOI) assigned to highways, and these can either be U.S., Oregon State, or local highways; Interstate, Statewide, Regional, and District.

All roads in Deschutes County classified as ***principal arterial*** roads are state highways. The principal arterial system consists of a connected network of continuous routes having the following characteristics:

1. Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.

2. Serve all, or virtually all, urban areas of 50,000 population and over and a large majority of those with population of 25,000 and over.

3. Provide an integrated network without stub connections except where unusual geographic or traffic flow conditions dictate otherwise.

With the exception of interstates, Deschutes County has representative examples of every highway road classification. The principal arterial system is displayed in Figure 2.2.F2.

The U.S. highways in the County consist of:

US Highway 97 –

Known as the Dalles-California Highway, Highway 97 is the principal ***statewide*** north-south route through central Oregon, extending from California to the Columbia River. It also serves as the main thoroughfare through the cities of Redmond and Bend, and the unincorporated community of La Pine. Congestion on Highway 97 has been an ongoing problem for the communities of Bend and Redmond in particular, due to the increasing volumes of freight and logging truck traffic combined with local residential traffic generated by the rapid growth experienced in recent years.

US Highway 20 –

Various segments are commonly known as the Santiam Highway, the Sisters-Bend Highway, or the Millican-Burns Highway. Highway 20 is one of the principal statewide east-west routes through Central Oregon, extending from the Oregon coast at Newport, via Albany to Sisters and Bend then on via Burns to the Idaho border at Ontario. Highway 20 forms the principal thoroughfare for trucks and autos from the Willamette Valley over the Cascades to central Oregon. All of the traffic generated, passes through downtown Sisters, then splits east of Sisters to either Redmond (on OR 126) or Bend.

The Oregon State highways consist of:

OR Highway 126 –

Statewide OR 126 extends west to east through Central Oregon, originating on the Oregon coast in Florence. It passes through the Willamette Valley via Eugene, through the Cascades as the McKenzie Highway, then through Sisters and Redmond and on to Prineville, then connecting to US Highway 26 and on to eastern Oregon. Through Redmond, Highway 126 uses several local streets before exiting town.

OR Highway 31 –

OR 31, a Regional highway, also referred to as the Fremont Highway. It originates from US 97 just south of La Pine and extends southeast to US 395 at Valley Falls connecting the south part of Deschutes County with the US 395 corridor in northeastern California.

OR Highway 242 –

Otherwise known as the Old McKenzie Highway, OR 242 connects with US 20 at the City of Sisters, and extends westward over McKenzie Pass to a connection with OR 126. Closed in winter, OR 242 is considered a District highway.

OR Highway 27 -

OR 27, a minor District highway also known as the Crooked River Highway, has a short (gravel) section located in Deschutes County. It connects to Highway 20 at a point between Millican and Brothers and extends north to Prineville. OR 27 is the only gravel-surfaced state highway in Oregon.

OR Highway 372 –

Another District highway, OR 372 is also known as the Cascade Lakes Highway and Century Drive. This highway connects the City of Bend with Mt. Bachelor to the west. Beyond Mt. Bachelor, the Cascade Lakes Highway becomes a Forest Service arterial serving the high country lakes south of Mt. Bachelor all the way to the Klamath County line.

OR Highway 370 –

Known as the O'Neil Highway, this District highway originates at a point on US 97 between Redmond and the community of Terrebonne, and extends eastward to the City of Prineville.

Powell Butte Highway –

Powell Butte Highway is a former state highway that is now a rural arterial within Deschutes County. It originates at Highway 20 east of Bend and connects the City of Bend northeastward past the Bend Municipal Airport to OR 126 near Powell Butte in Crook County. The portion of the highway within Deschutes County was formerly a state highway but is now the responsibility of Deschutes County. In Crook County, this highway is still a state facility.

Rural Minor Arterials / Collectors

Lower down in the functional classification hierarchy are the ***minor arterial*** (including federal forest highways) and ***collector*** streets and roads that enable people to move between the neighborhoods where they live, to the places they work, shop, and go to school. Streets are generally classified in the following order according to the amount of traffic they are designed to handle, and their allowable design speeds.

The rural minor arterial road system should, in conjunction with the principal arterial system, form a rural network having the following characteristics:

1. Link cities and larger towns (and other traffic generators, such as major resort areas, that are capable of attracting travel over similarly long distances) and form an integrated network providing interstate and intercounty travel.

2. Be spaced at such intervals, consistent with population density, so that all developed areas of the State are within a reasonable distance of an arterial highway.

3. Provide (because of the previous two characteristics) service to corridors with trip lengths and travel density greater than those predominantly served by rural collector or local systems. Minor arterials constitute routes whose design should be expected to provide for relatively high overall travel speeds, with minimum interference to through movement.

The County rural ***minor arterials,*** generally located in the north and central part of the County consist of:

Redmond Area (Figure 2.2.F3)

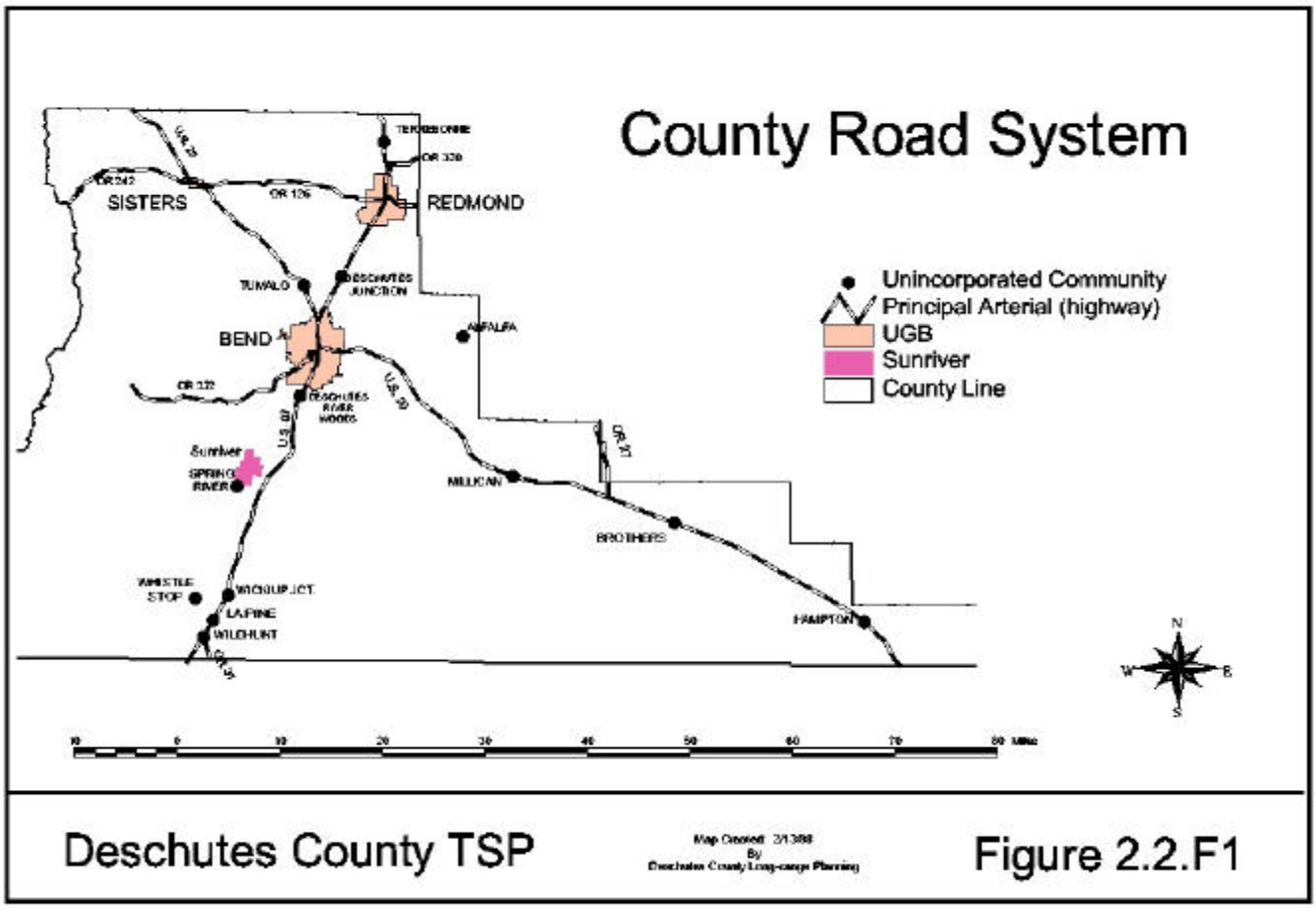
NE 9th Street-	Redmond UGB to Highway 97 (ROW needed)
NW 31st Street -	NW Sedgewick Avenue to NW Lower Bridge Way
NW Almeter Way -	Northwest Way to NW Sedgewick Avenue
S Canal Blvd. -	SW 39th Street to Tumalo Road
NW Helmholtz Way -	W Antler Avenue to NW Maple Avenue
SW Helmholtz Way -	W Antler Avenue to SW Obsidian Avenue
Holmes Road -	Highway 126 to NW Lower Bridge Way
Lower Bridge Way -	Highway 97 to Holmes Road
NW Maple Avenue -	Redmond UGB to Northwest Way
NW Maple Avenue -	35th Street to NW Helmholtz Way (ROW needed)
Northwest Way -	W Maple Avenue to NW Almeter Way
Smith Rock Way -	Terrebonne Railroad Crossing to Crook County Line

Bend Area (Figure 2.2.F4)

Alfalfa Market Road -	Powell Butte Highway to Johnson Ranch Road
Brookswood Blvd. -	Buck Canyon Drive to Baker Road
Butler Market Road -	Bend UGB to Powell Butte Highway
Deschutes Market Rd.-	Highway 97 to Butler Market Road
Johnson Market Road -	Shevlin Park to Tyler Road
NE Neff Road -	Bend UGB to Powell Butte Highway
OB Riley Road -	Glen Vista Road to Tumalo (rural service center boundary)
Old Redmond-Bend Hwy. -	Tumalo Road to Highway 20
Powell Butte Highway -	Highway 20 to Crook County Line
Shevlin Park Road -	Tumalo Creek Bridge to Shevlin Park
Willard Road -	Johnson Ranch Road to Crook County Line

Federal Forest Highways

Cascades Lakes Highway -	Mt. Bachelor to Klamath County line
Skyliners Road -	Bend UGB to Tumalo Falls
Edison Butte Rd. (FS Rd. #45) -	FS Rd. #40 to Century Drive
Conklin Rd. (FS Rd. #41) -	Spring River Rd. to Century Drive
Three Trappers Road -	Spring River Road to Cascade Lakes Highway
Paulina Lake Road -	Paulina Creek to East Lake
South Century Drive -	Deschutes River to Cascade Lakes Highway
Pringle Falls Loop -	Burgess Road to South Century Drive
Elk Lake Road -	Loop to and from Cascade Lakes Highway
Cultus Lake Road -	Cascade Lakes Highway to Cultus Lake
Twin Lakes Road -	South Century Drive to South Twin Lake
Keefer Road -	South Century Drive to north end of Crane Prairie Res.
China Hat Road -	End of pavement (near Knott) to Klamath County line



Deschutes County TSP

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Figure 2.2.F1

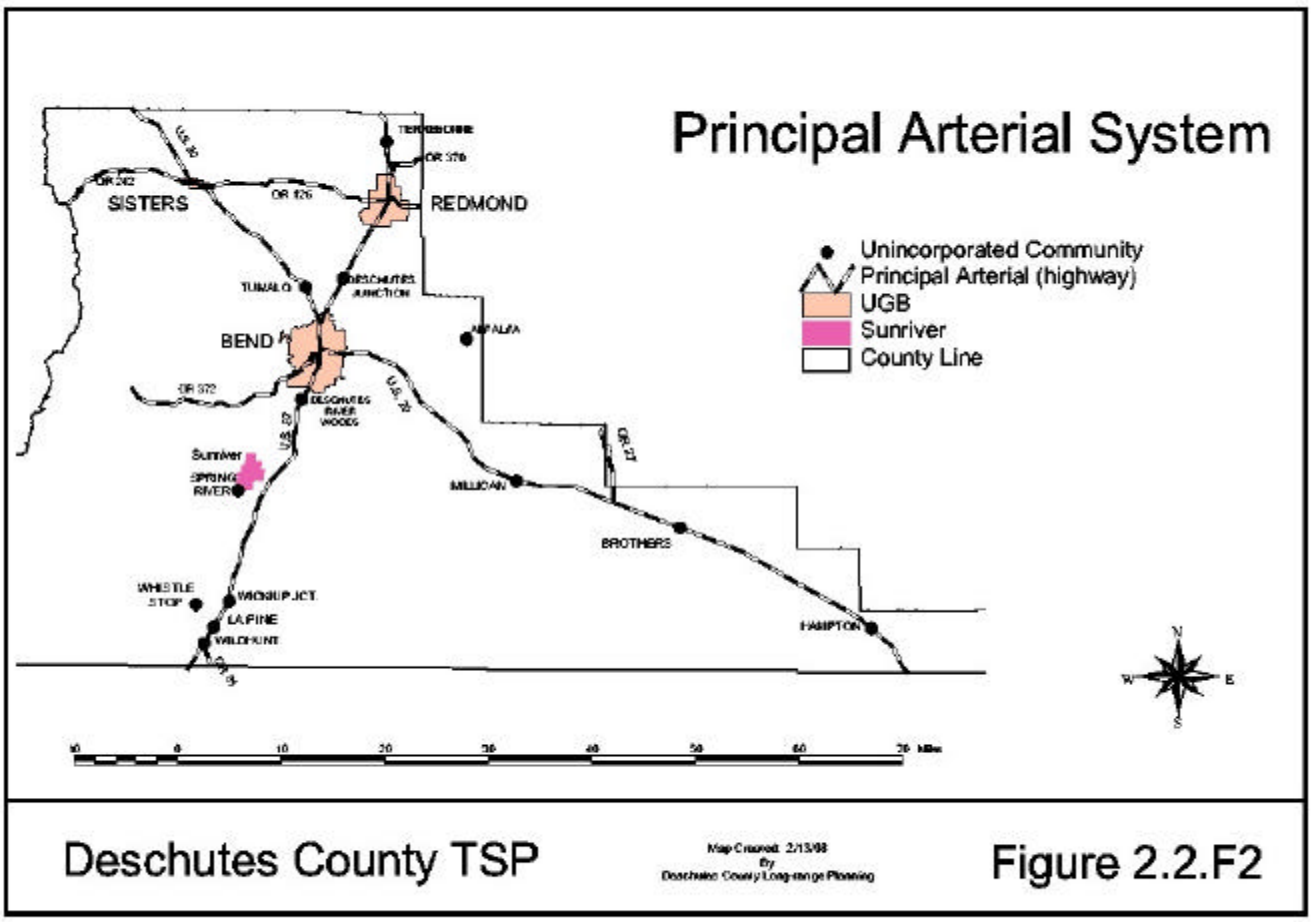

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Figure 2.2.F2

Rural Collectors

The collector street system provides land access and traffic circulation within residential neighborhoods, and commercial and industrial areas. It differs from the arterial system in that facilities on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Conversely, the collector street also collects traffic from local streets in residential neighborhoods and channels it into the arterial system. In the central business district, and other areas of like development and traffic density, the collector system may include the street grid, which forms a logical entity for traffic circulation.

The rural ***collectors*** in the County are identified below by general geographic area:

Redmond Area (Figure 2.2.F3)

NE 1st Street -	NE Knickerbocker Avenue to NE Wilcox Avenue
NE 5th Street -	O'Neil Highway to NE Eby Avenue
NW 10th Street -	Redmond UGB to NW Pershall Way
NW 19th Street -	NW Odem Way to NW Lower Bridge Way
NW 35th Street -	NW Hemlock Avenue to NW Upas Avenue
NW 43rd Street -	NW Lower Bridge Way to NW Chinook Drive
NE 17th Street -	NE Upas Avenue to O'Neil Highway
NW 59th Street -	NW Kingwood Avenue to NW Maple Avenue
SW 61st Street -	S. Canal Blvd. to Highway 97
SW 63rd Street -	SW Catlow Way to SW Obsidian Avenue
SW 67th Street -	Beginning of grid to SW Catlow Way
NW 67th Street -	Beginning of grid to NW Kingwood Avenue
Buckhorn Road -	Highway 126 to NW Lower Bridge Way
N Canal Blvd. -	O'Neil Highway to Highway 97
SW Catlow Way -	SW 67th Street to SW 63rd Street
NE Cayuse Avenue -	NE 5th Street to NE 9th Street
NW Chinook Drive -	NW 43rd Street to Jefferson County line
Cline Falls Highway -	Highway 126 to Tumalo UC
NW Coyner Avenue -	Pershall Way to NW Helmholtz Way
NE Eby Avenue -	beginning of grid to NE 5th Street
NW Eby Avenue -	beginning of grid to Highway 97
NW Helmholtz Way -	NW Maple Avenue to NW Coyner Avenue
SW Helmholtz Way -	canal bridge to S. Canal Blvd.
NW Ice Avenue -	NW Wimp Way to NW 43rd Street
NE King Way -	Redmond UGB to NE 17th Street
NW Kingwood Ave. -	NW 59th Street to NW 67th Street
NE Knickerbocker Avenue -	NE 1st Street to NE 5th Street
NW Maple Avenue -	NW Helmholtz Way to NW 59th Street
NE Negus Way -	Redmond UGB to NE Upas Avenue
SW Obsidian Avenue -	SW 35th Street to SW 63rd Street
NW Odem Avenue -	NW 10th Street to Northwest Way
NW Pershall Way -	Highway 97 to NW Coyner Avenue
NW Upas Avenue -	Northwest Way to NW 35th Street
SW Wickiup Avenue -	SW Helmholtz Way to SW 58th Street
NE Wilcox Avenue -	NE 1st Street to Crook County line

Sisters Area (Figure 2.2.F5)

Gist Road -	Highway 20 to Varco Road
Buffalo Road -	Wilt Road to Mountain View Road
Camp Polk Road -	Highway 126 to Sisters UGB
Cloverdale Road -	Highway 20 to Highway 126
Fryrear Road -	Highway 20 to Highway 126
Indian Ford Road -	Camp Polk Road to Green Ridge Road
Three Creek Road -	Sisters UGB to Forest Service Road #1600-210
Wilt Road -	Camp Polk Road to end Pavement
Unnamed -	Three Creeks Road to Highway 126 (South UGB)
Unnamed -	Highway 126 to Barclay Drive (East UGB)
Unnamed -	Three Creeks Road to Highway 20 (South and West UGB)
Unnamed -	Barclay Court/Camp Polk Loop to Highway 20/126 to Highway 242

Bend Area (Figure 2.2.F4)

Arnold Market Road -	Rickard Road (west) to 90 degree left turn
Baker Road -	Highway 97 to Shoshone Road (west)
SE Bear Creek Road -	Bend UGB to Ten Barr Road
Bennett Road -	Alfalfa Market Road to NE Bear Creek Road
Cinder Butte Road -	Baker Road to Minnetonka Lane
Dickey Road -	Butler Market Road to Erickson Road
Dodds Road -	Highway 20 to Alfalfa Market Road
Erickson Road -	Highway 20 to Dickey Road
Gosney Road -	Highway 20 to 90 degree right-turn
Hamby Road -	Highway 20 to Butler Market Road
Hamehook Road -	Butler Market Road to Deschutes Market Road
Johnson Ranch Road -	Alfalfa Market Road to Crook County line
McGrath Road -	Morrill Road to Stenkamp Road
Minnetonka Lane -	Kiowa Road to Cherokee Road
Plainview Road -	Highway 20 to Gist Road
Rickard Road -	Knott Road to Highway 20
Stenkamp Road -	McGrath Road to Alfalfa Market Road
Ward Road -	Highway 20 to Arnold Market Road

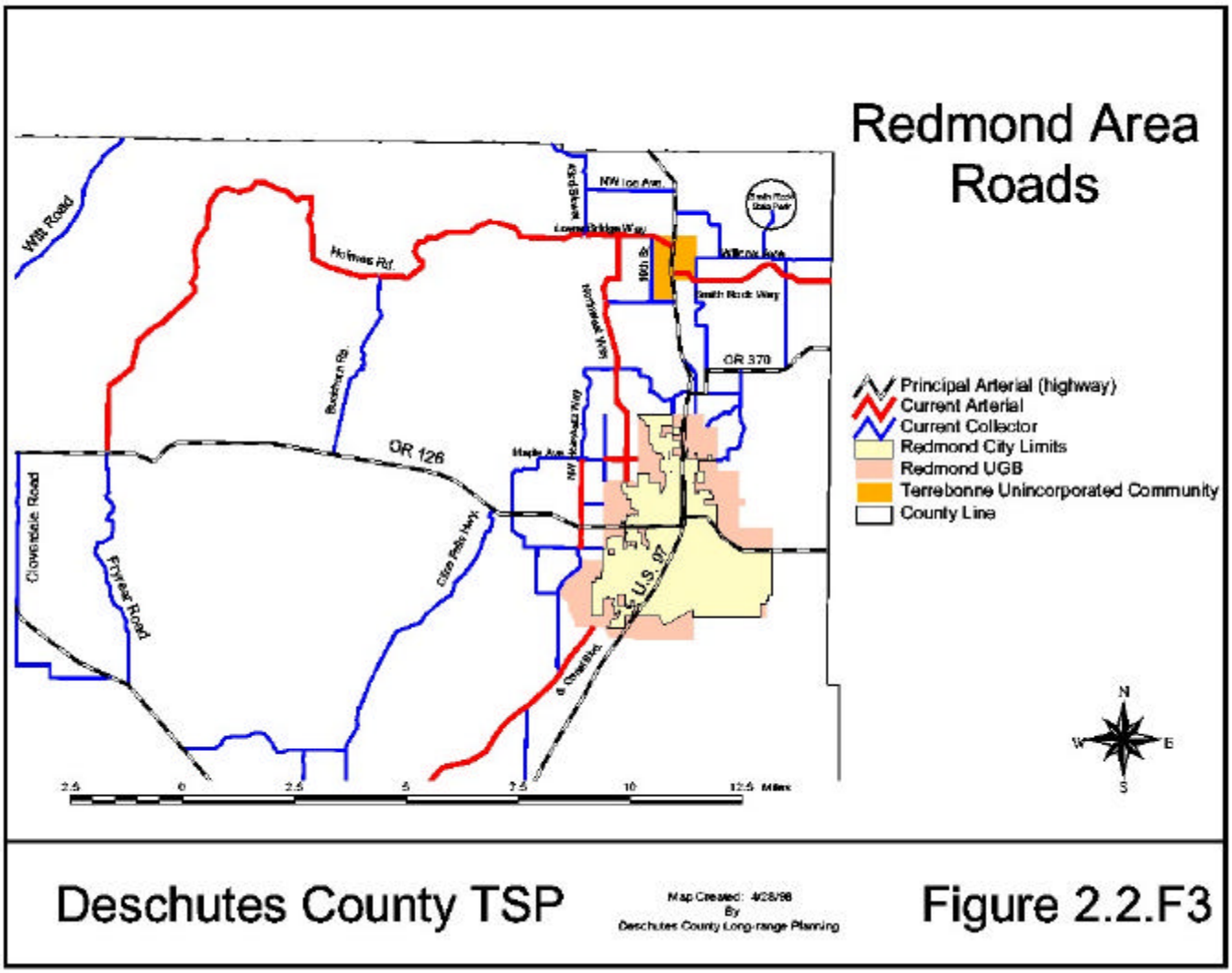
Tumalo Area (Figure 2.2.F6)

Bailey Road -	Tumalo RSC to Tumalo Reservoir Road
Couch Market Road -	Highway 20 to Collins Road
Deschutes Pleasant Ridge Rd -	Highway 97 to Deschutes Market Road
Johnson Market Road -	Tyler Road to Tumalo Reservoir Road
Tumalo Road -	Highway 97 to Tumalo RSC
Tumalo Reservoir Rd.-	OB Riley Road to Collins Road
Gerking Market Road -	Highway 20 to Innes Market Road
Collins Road -	Couch Market Road to Tumalo Reservoir Road
Innes Market Road -	Highway 20 to Cline Falls Highway

Sunriver and South County Area (Figure 2.2.F7)

5th Street -	Amber Lane to La Pine State Recreation Road

6th Street -	Highway 97 to Dorrance Meadow Road
Amber Lane -	Deep Woods Road to 5th Street
Burgess Road -	Highway 97 to Sunset Court
Cottonwood Road -	Highway 97 to Railroad crossing
Day Road -	Burgess Road to Amber Lane
Dorrance Meadow Road -	Burgess Road to 6th Street
Finley Butte Road -	Highway 97 to Darlene Way
Huntington Road -	South Century Drive to La Pine RSC
La Pine State Recreation Rd -	Highway 97 to Foster Road (FS #4205)
Lazy River South Drive -	Huntington Road to Otter Drive
Masten Road -	Highway 97 to end of pavement
Paulina Lake Road -	Highway 97 to Paulina Creek Bridge
Prairie Drive -	Highway 97 to Huntington Road
Reed Road -	Highway 97 to Darlene Way
Riverview Drive -	Otter Drive to Huntington Road
South Century Drive -	Highway 97 to Deschutes River Bridge
Spring River Road -	South Century Drive to Forest Service boundary
Vandevert Road -	Highway 97 to South Century Drive



Deschutes County TSP

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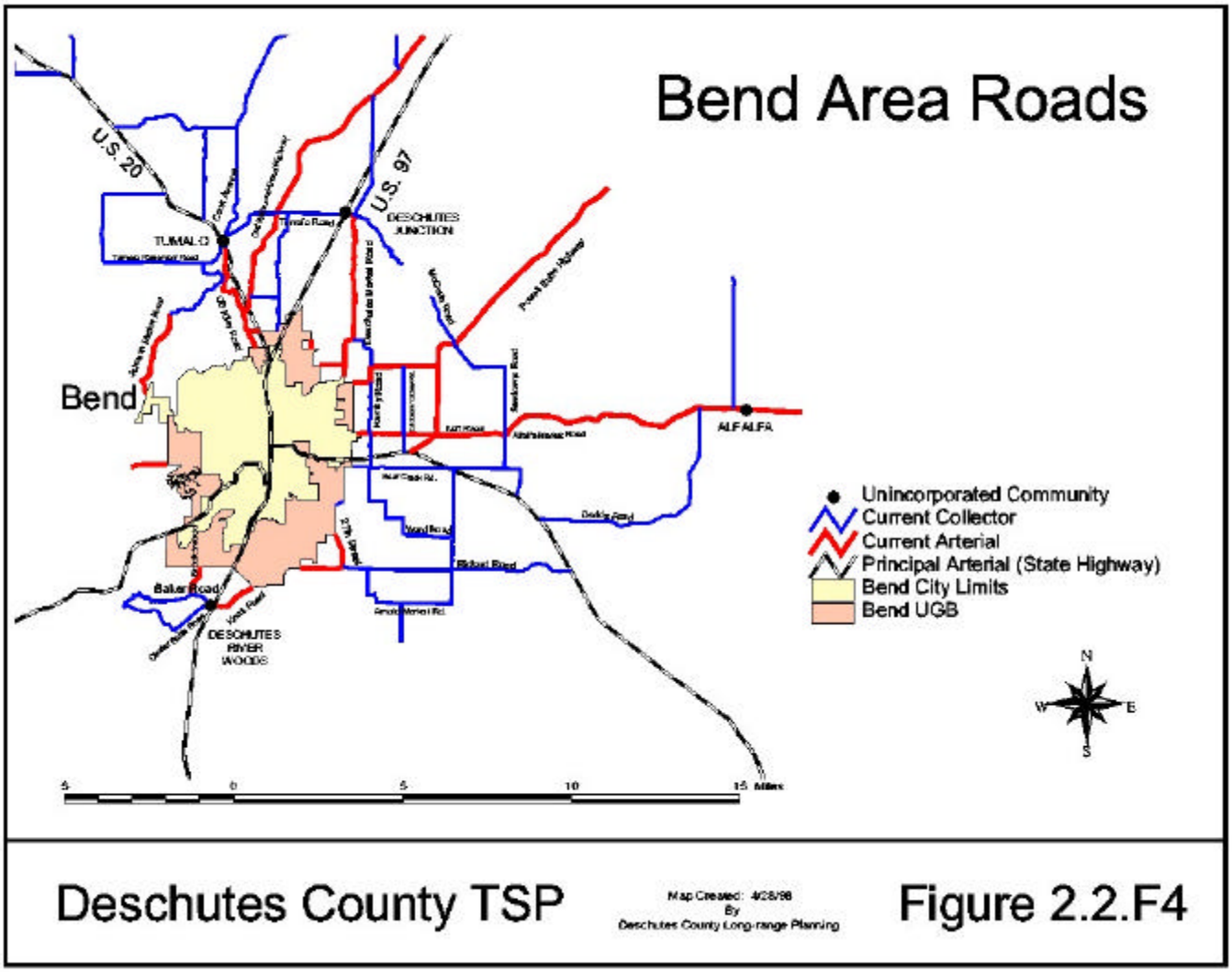
Figure 2.2.F3



Deschutes County TSP

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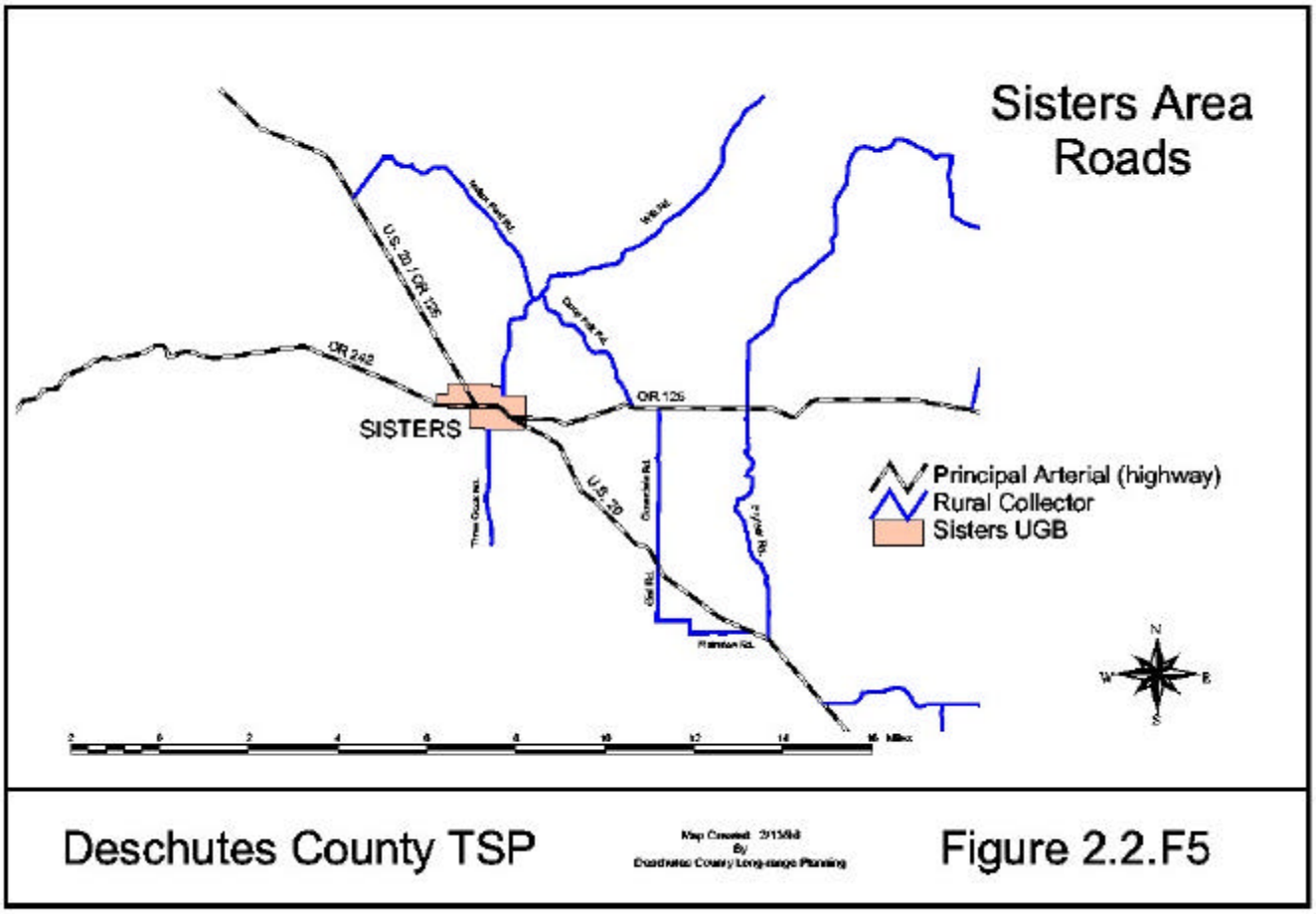
Figure 2.2.F4



Deschutes County TSP

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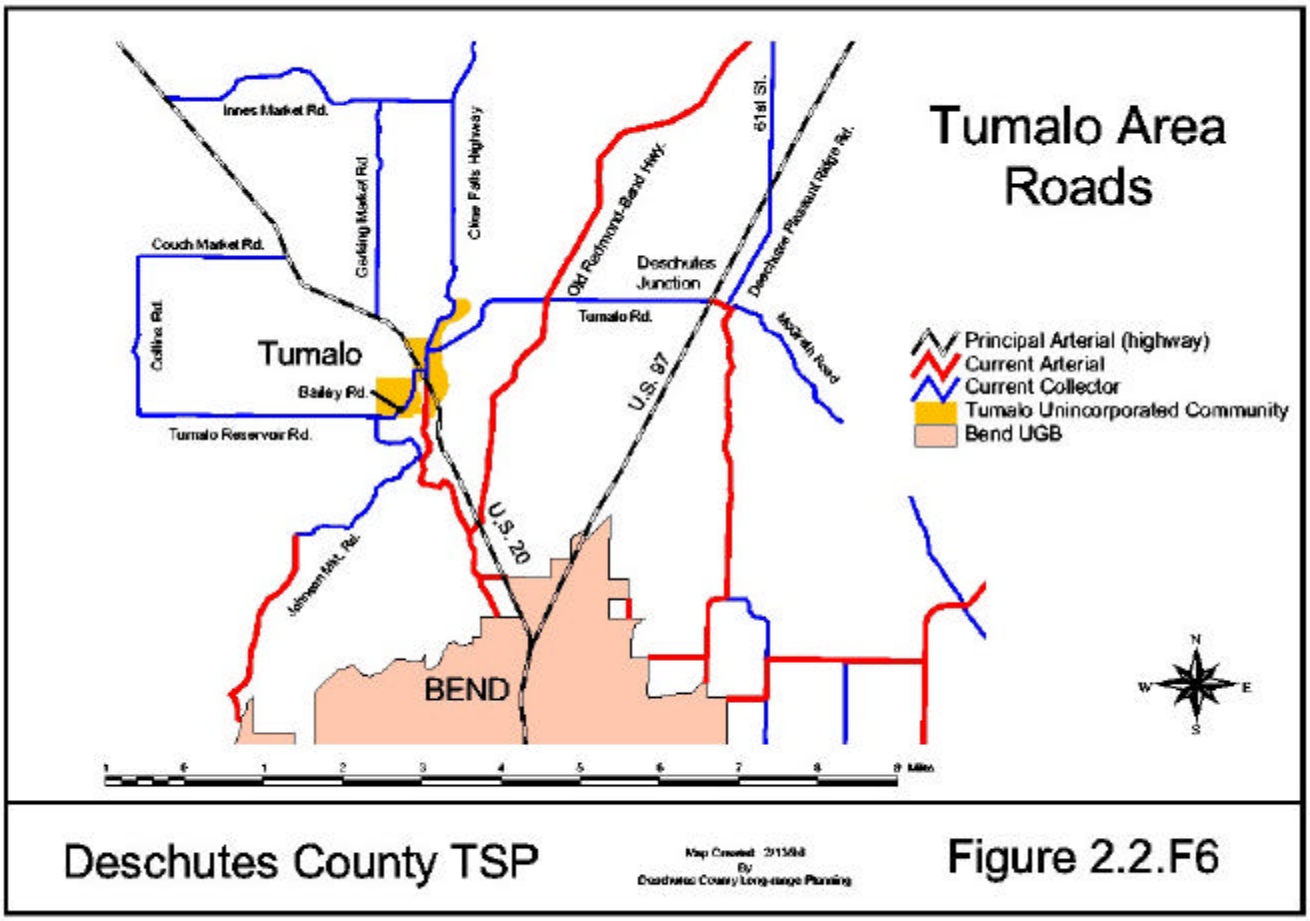
Figure 2.2.F5



Deschutes County TSP

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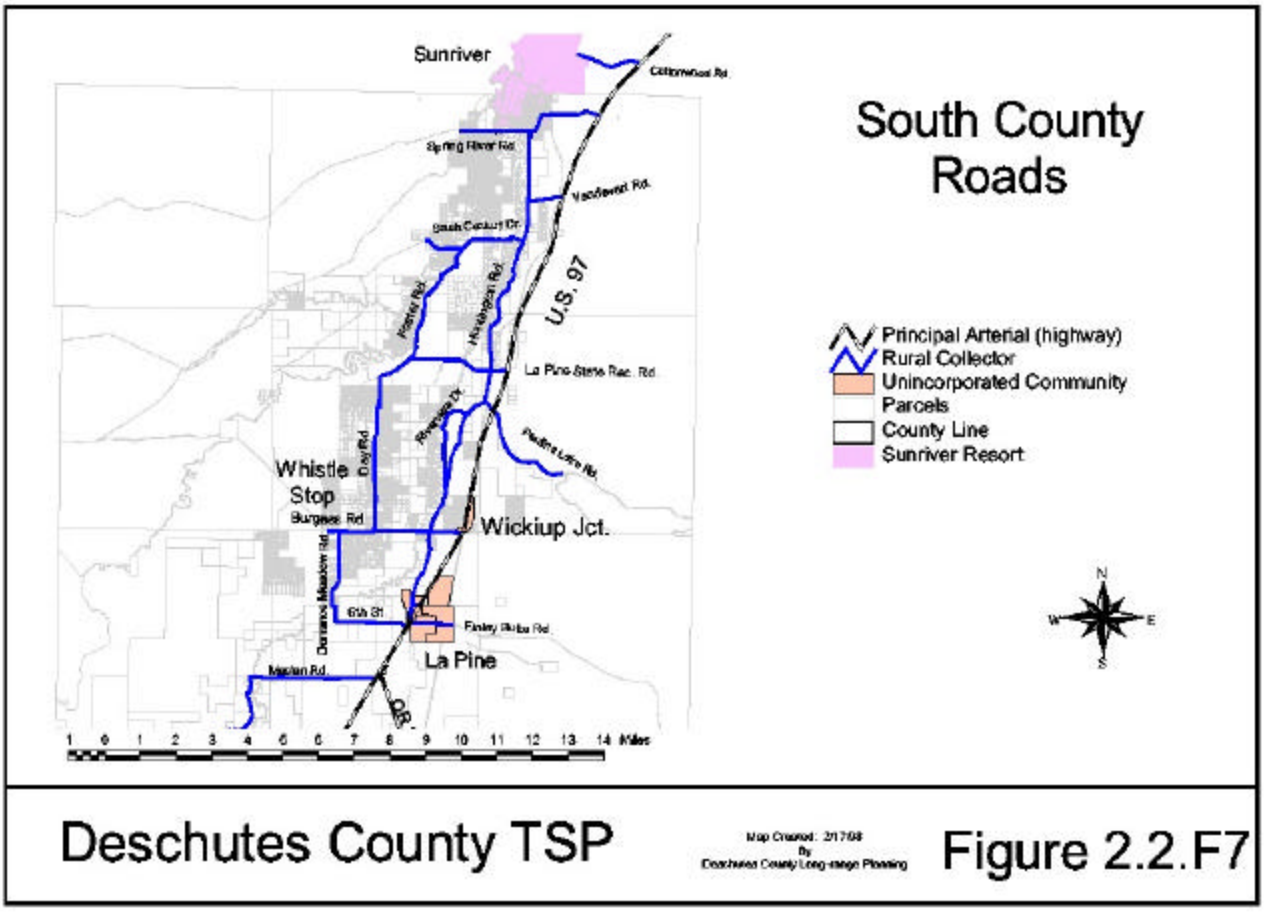
Figure 2.2.F6



Deschutes County TSP

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Figure 2.2.F7

(Section 2.2b)

TRAFFIC CONTROL DEVICES

Traffic Signals - No traffic signals occur in the rural areas of the County.

Flashing Warning Lights - Red and/or yellow flashing warning lights generally are located at intersections where a full stop light control is not yet warranted and four-way stop signs would not meet the need to balance safety concerns and through traffic movement. Yellow flashing lights can also occur at school crossings and railroad crossings, etc. Often, typical speeds on the roads approaching an intersection may not give drivers enough time to react, therefore flashing red lights are placed over the intersection to alert drivers in advance of a four-way stop. In some cases, the yellow flashing light is facing traffic on the cross street with a higher functional classification and the red flashing light faces drivers on the lesser classified street causing them to stop before entering the intersection. Commonly, a red or yellow flashing light facing all intersecting streets would denote similar functional classifications. These warning lights occur in the County at the following intersections shown on Figure 2.2.F8:

1. Highway 97 *(yellow)* / Smith Rock Way *(red)*
2. Highway 97 (yellow) / O'Neil Highway (red)
3. Highway 97 (yellow) / Deschutes Market Road (red)
4. Old Redmond-Bend Highway (red) / Tumalo Road (red)
5. Highway 20 (yellow) / Hamby Road (red)
6. Powell Butte Highway (yellow) / Neff Road (red)
7. Highway 97 (yellow) / South Century Drive (Sunriver exit) (red)
8. Huntington Road (red) / Burgess Road (red)
9. Highway 97 (yellow) / William Foss Road (flashes only during periods when school children may be present)
10. Butler Market Road (red) / Hamby (yellow)

TRAFFIC VOLUMES

The Deschutes County Road Department conducts average daily traffic (ADT) and peak hour traffic volume counts on a rotating basis for most arterials and collector roads in the County. Each road is counted on average, once every two to four years. The traffic count information was assembled in a spreadsheet. For road segments not counted in 1996, a trend analysis was used to establish a 1996 estimated traffic volume. Table 2.2.T4 identifies the County roads with a significant volume (>3,000 ADT) in 1996. Most County roads carry a very low volume due to their mostly rural nature. Of the 404 County-maintained rural arterials and collectors, only 21% (88.5 miles) carry 1,500 or more average daily trips. The County rural road with the highest ADT volume in 1996 was Baker Road, just west of Highway 97, with 9,090 ADT. The complete listing of County road and state highway volumes for 1996, as well as 2016 estimates are contained in Appendix I.

State highway traffic volumes within Deschutes County vary widely. The traffic count information comes from the Oregon Department of Transportation's document "1996 Traffic Volume Tables". The heaviest traveled highway in the County is Highway 97 with 1996 average daily volumes ranging from 8,800 at the northern county line to 40,800 within the City of Bend, and 5,200 at the south county line. The next most traveled highway is Highway 20 with ADTs ranging from 4,100 west of Black Butte Ranch to 9,000 within Sisters, to 16,000 within Bend,

then dropping off significantly east of Powell Butte Highway to 3,700 then decreasing easterly through Millican, Brothers and Hampton to approximately 1,500.

LEVEL OF SERVICE

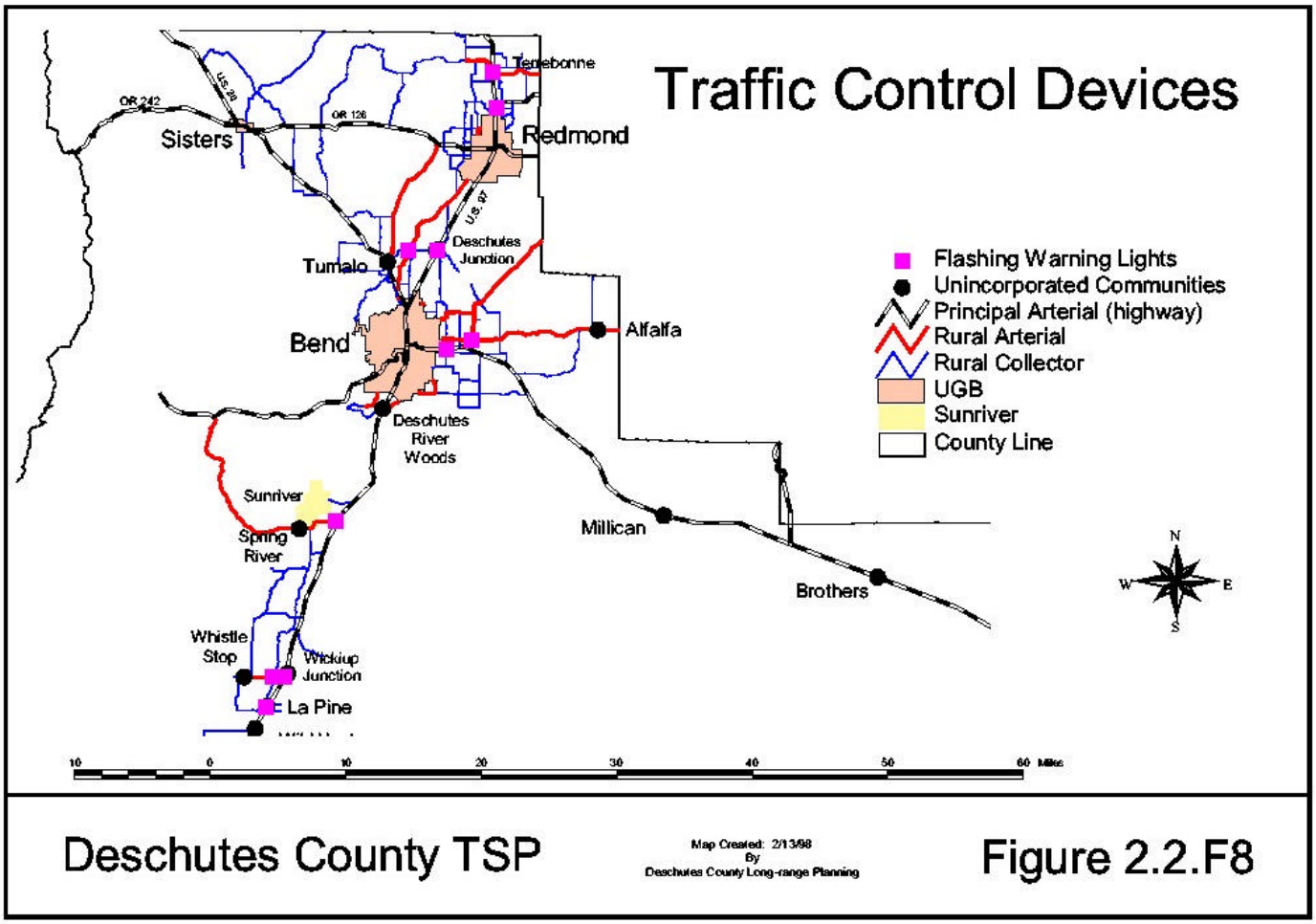
In order to effectively communicate about traffic flow and traffic capacity conditions, the engineering and planning professions have adopted a concept of level of service to describe traffic conditions and associated traffic flow rates. Six levels of service designations ranging from A to F are typically recognized by the transportation professions.

For rural, two-lane roads in the County, the peak hour traffic volumes were assumed to be ten percent (10%) of the average daily traffic amount, then further adjusted to reflect a desirable flow rate. The LOS calculations for the highway segments also used a 10% peak hour amount, but were not adjusted for desirability because of the likelihood that a greater number of through trips using the highways would spread the average daily traffic amounts more uniformly over the day. Level of service can vary based on many factors, including terrain, lane width, design speed, number of accesses, number of heavy trucks and RVs, etc. For Deschutes County, LOS was determined based on the relationship of general capacity to average daily traffic (ADT) for level terrain. For a ten- percent (10%) peak hour flow, the corresponding ADT and LOS are identified in Table 2.2.T3.

The capacity of a given transportation facility or road is a measure of its ability to accommodate a moving stream of people or vehicles. A level of service definition generally describes a motorist's perception in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. This capacity forms the basis for most transportation planning and design decisions and actions. Table 2.2.T4 and Figures 2.2.F9-F11 identify the estimated LOS for County roads in 1996. Table 2.2.T5 and Figure 2.2.F12 show the estimated 1996 LOS for highway segments in the County.

Most planning applications deal with future conditions and involve estimates of traffic, transit or pedestrian flows. Therefore, reasonable order-of-magnitude estimates of capacity are usually adequate. Transportation capacity reflects the ability of a roadway to carry vehicles or people, under the prevailing conditions of operation. In general, capacity represents the maximum hourly rate (usually the peak hour) at which a number of people or vehicles pass a given point within a specific time period under prevailing conditions. The ***desirable*** flow rate is usually somewhat less since it introduces the qualitative aspect of a specified *level of service* (LOS).

Level of service at unsignalized *intersections* is commonly evaluated by using the amount of time delay drivers perceive as they wait to enter or cross an intersection. All intersections in the unincorporated areas of Deschutes County are currently unsignalized. Two-way stop or yield controls are common on arterial streets and highways. As cross-street volumes increase, these intersections can reach capacity limits and produce significant delays to cross-street vehicles as well as accident potential. Four-way stop control is often an interim phase preceding signalization. Calculations of unsignalized intersection capacity are based on a simplifying assumption that minor street traffic does not affect the traffic flow on the major street. In reality, when congestion occurs, the major flows are probably affected to some degree by minor street traffic and left turns, all conflicting traffic movements affect minor street traffic.



Deschutes County TSP

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Figure 2.2.F8

Table 2.2.T3

Generalized County Road and Highway ADT/LOS

Level of Service	Characteristics	*Highway* ADT	*County* ADT
A	A free-flow condition with individual users unaffected by the presence of others in the traffic stream.	2,400	1,700
B	Stable flow with a high degree of freedom to select speed and operating conditions but with some influence from other users.	4,800	3,400
C	Restricted flow which remains stable but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably at this level.	7,900	5,700
D	High-density flow in which speed and freedom to maneuver are severely restricted and comfort and convenience have declined even though flow remains stable.	13,500	9,600
E	Unstable flow at or near capacity levels with poor levels of comfort and convenience.	22,900	16,300
F	Forced flow in which the amount of traffic approaching a given point exceeds the amount that can be served, and queues form which are characterized by stop and go waves, poor travel times, low comfort and convenience, and increased accident exposure.	> 22,900	> 16,300

Note: ADT based on 10% peak hour factor, then modified (for County roads) to reflect a ***desirable*** *flow.*

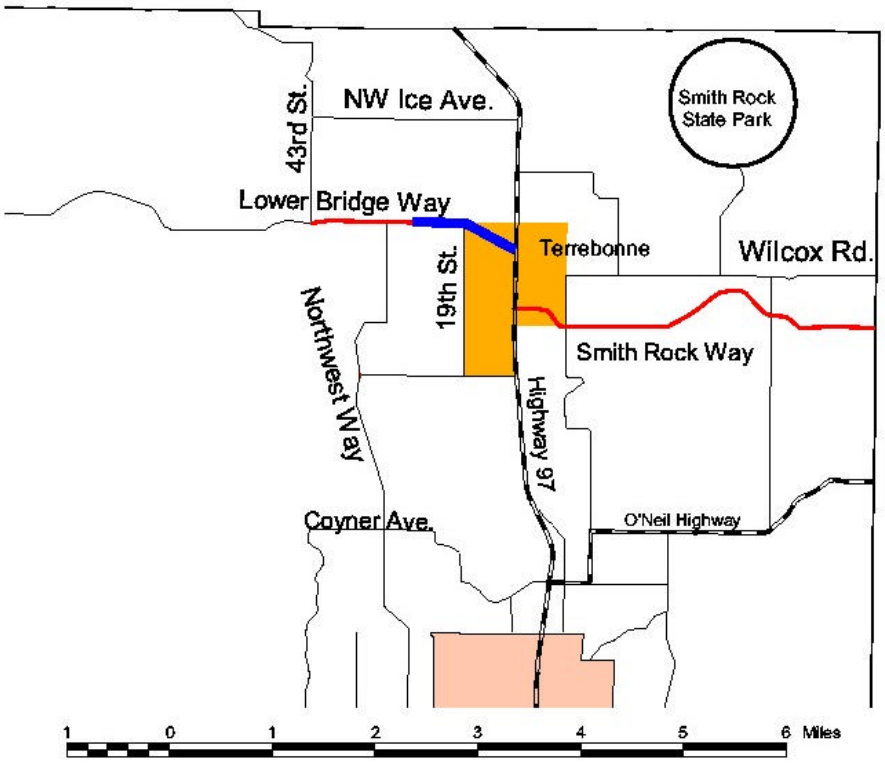
Table 2.2.T4
Top County 1996 Rural Road Volumes and Estimated LOS

Rank	Rd-Sg	Dir	Road Name	From	To	1996 ADT	1996 PM Peak	Est. LOS	Functional Class
1	3006-10		BAKER RD	HWY 97	LAKEVIEW DR	*9,090*	*909*	*D*	Collector
2	3161-50	SE	27TH ST	FERGUSON RD	RICKARD RD	*7,900*	*790*	*D*	Arterial
3	4106-20		BURGESS RD	PINE DR	GLENWOOD DR	*7,240*	*620*	*D*	Collector
4	4106-30		BURGESS RD	GLENWOOD DR	LOST PONDEROSA RD	*6,290*	*629*	*D*	Collector
5	4106-40		BURGESS RD	LOST PONDEROSA RD	DEER FIELD DR	*5,340*	*534*	*C*	Collector
6	4112-10		SOUTH CENTURY DR	SEWAGE TREATMENT RD	SPRING RIVER RD	**5,266**	**474**	*C*	Collector
7	4101-30		HUNTINGTON RD	BURGESS RD	EVERGREEN LN	*5,220*	*522*	*C*	Collector
8	3006-20		BAKER RD	LAKEVIEW DR	SHOSHONE RD E	*4,870*	*487*	*C*	Collector
9	1171-10		COOK AVE	TUMALO RD	HWY 20	**4,774**	**401**	*C*	Collector
10	4106-50		BURGESS RD	DEER FIELD DR	STEARNS RD	*4,400*	*440*	*C*	Collector
11	3181-70		DESCHUTES MARKET RD	YEOMAN RD	BUTLER MARKET RD	**4,285**	**383**	*C*	Arterial
12	3181-60		DESCHUTES MARKET RD	J D ESTATES DR	YEOMAN RD	*4,270*	*427*	*C*	Arterial
13	3181-50		DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	*4,260*	*426*	*C*	Arterial
14	3181-40		DESCHUTES MARKET RD	UGB - BEND	HAMEHOOK RD	**4,241**	**275**	*C*	Arterial
15	3181-30		DESCHUTES MARKET RD	PIONEER LOOP	UGB - BEND	*4,210*	*421*	*C*	Arterial
16	3181-20		DESCHUTES MARKET RD	DALE RD	PIONEER LOOP	*4,180*	*418*	*C*	Arterial
17	3181-10		DESCHUTES MARKET RD	HWY 97	DALE RD	**4,142**	**376**	*C*	Arterial
18	1148-80		CLINE FALLS HWY	UGB – TUMALO	TUMALO RD	*3,930*	*393*	*C*	Collector
19	4112-25		SOUTH CENTURY DR	VANDEVERT RD	HUNTINGTON RD	*3,760*	*376*	*C*	Collector
20	4106-10		BURGESS RD	HWY 97	PINE DR	*3,640*	*364*	*C*	Collector
21	2177-10		LOWER BRIDGE WAY	HWY 97	NW 27TH ST	**3,601**	**326**	*C*	Arterial
22	4112-30		SOUTH CENTURY DR	HUNTINGTON RD	SNOW GOOSE RD	*3,590*	*359*	*C*	Collector
23	4106-60		BURGESS RD	STEARNS RD	DORRANCE MEADOW RD	*3,450*	*345*	*C*	Collector
24	1148-70		CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	*3,450*	*345*	*C*	Collector
25	3518-45		POWELL BUTTE HWY	MCGRATH RD	BUTLER MARKET RD	*3,440*	*344*	*C*	Arterial
26	4111-10		DAY RD	BURGESS RD	NORTHWOOD DR	**3,434**	**294**	*C*	Collector
27	3518-60		POWELL BUTTE HWY	NEFF RD	HWY 20	*3,390*	*339*	*B*	Arterial
28	4112-05		SOUTH CENTURY DR	HWY 97	SEWAGE TREATMENT RD	**3,384**	**294**	*B*	Collector
29	3182-60		BUTLER MARKET RD	UGB - BEND	HAMBY RD	*3,260*	*326*	*B*	Arterial
30	3518-40		POWELL BUTTE HWY	MILE POINT	MCGRATH RD	*3,220*	*322*	*B*	Arterial
31	2130-40	S	CANAL BLVD	SW HELMHOLTZ WAY	SW 61ST ST	**3,210**	**330**	*B*	Arterial
32	4111-20		DAY RD	NORTHWOOD DR	DEEDON RD	*3,180*	*318*	*B*	Collector
33	1148-60		CLINE FALLS HWY	CONNARN RD	EDGE HILL DR	*3,160*	*316*	*B*	Collector
34	4101-40		HUNTINGTON RD	BURGESS RD	UGB - LAPINE	*3,140*	*314*	*B*	Collector
35	3022-10		CINDER BUTTE RD	BAKER RD	LAKEVIEW RD	*3,050*	*305*	*B*	Collector
36	3518-35		POWELL BUTTE HWY	MILE POINT	MILE POINT	*3,020*	*302*	*B*	Arterial

Code:	ADT:	LOS:
	> 16,300	F
	9,600 - 16,300	E
	5,700 - 9,600	D
	3,400 - 5,700	C
	1,700 - 3,400	B
	< 1,700	A

Note: Numbers in BOLD are actual 1996 counts, others are Deschutes County estimates.

LOS estimates are based on the Highway Capacity Manual, and a 10% peak hour traffic flow being Modified to arrive at a desirable flow.



1996 North County ADT

- 3,400-5,700 ADT (LOS "C")
- Principal Arterial (State Highway)
- Rural Arterial
- Rural Collector
- Terrebonne Unincorporated Community
- Redmond UGB
- County Line

N W E S

Deschutes County TSP

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Figure 2.2.F9

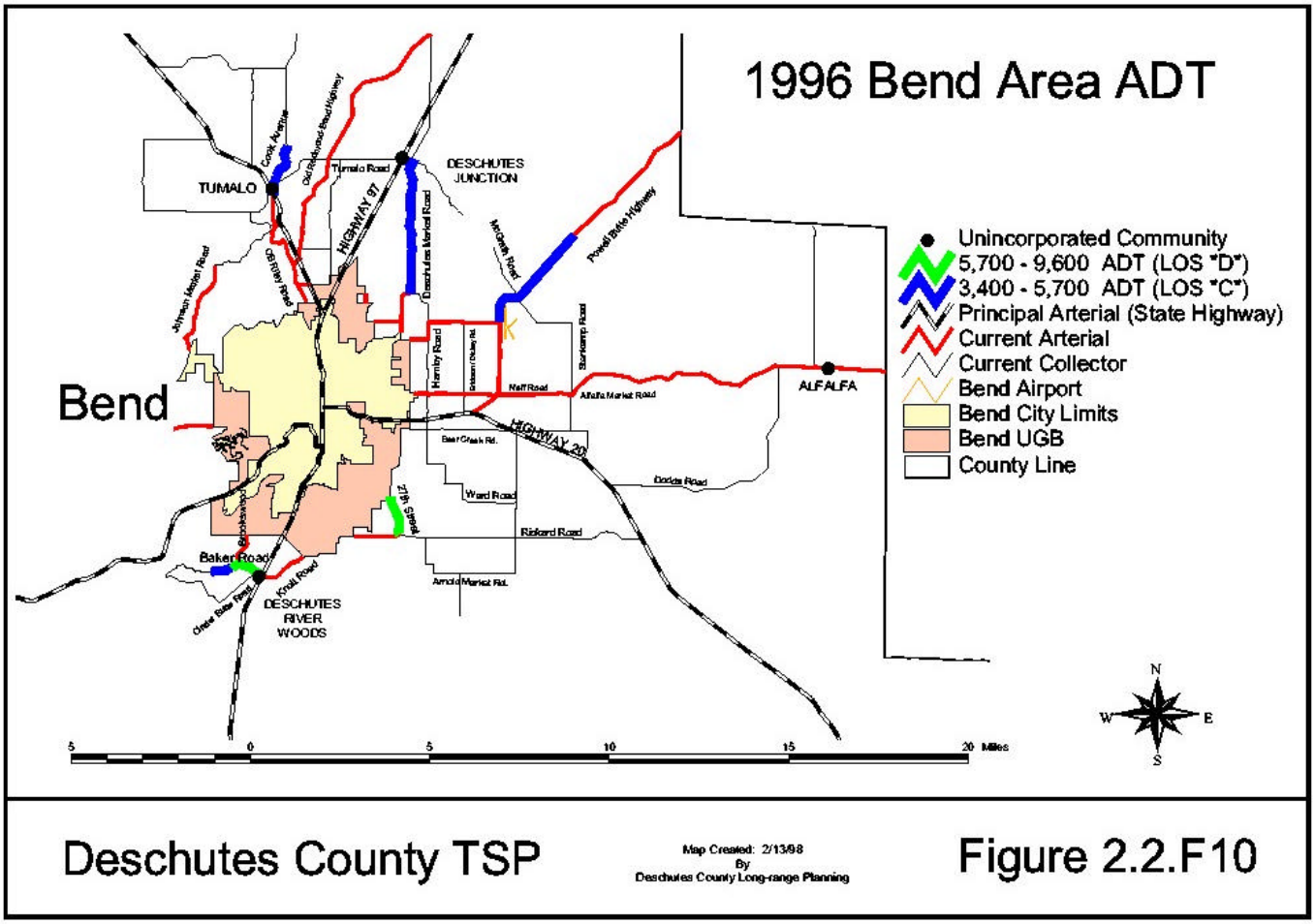

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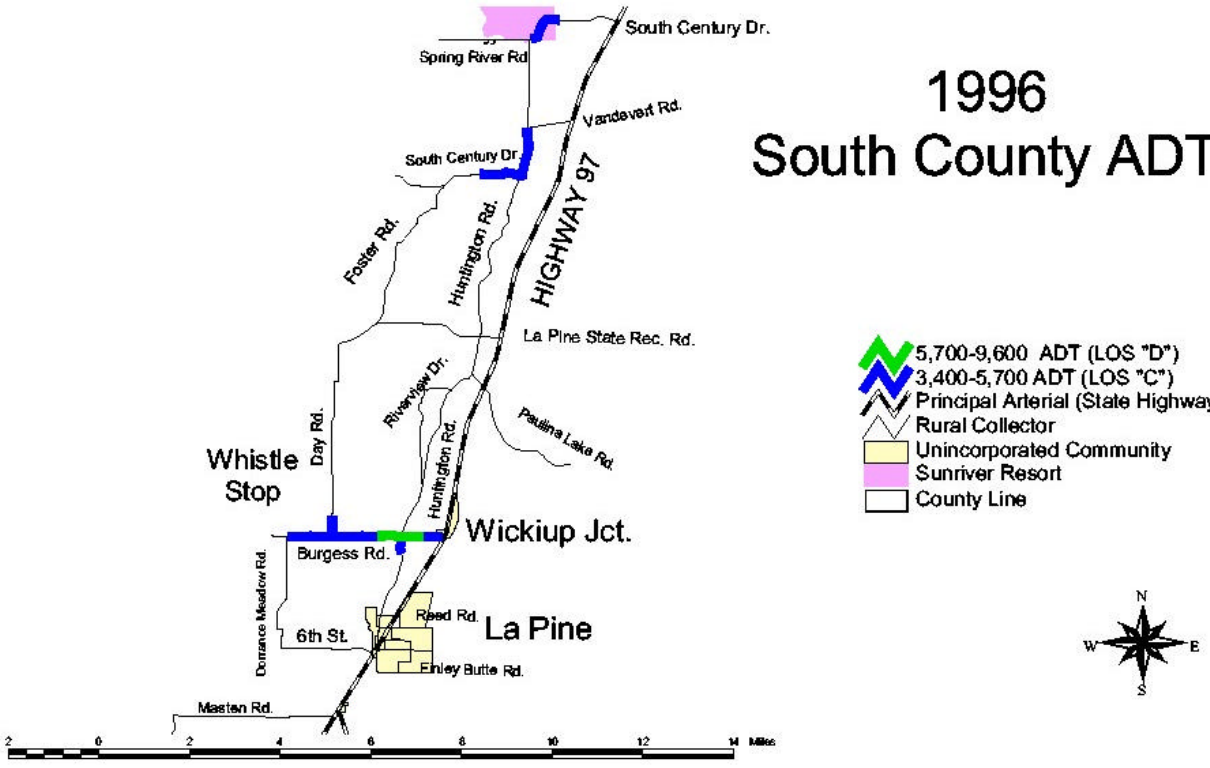
Figure 2.2.F10



Deschutes County TSP

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Figure 2.2.F11

Table 2.2.T5
ODOT 1996 Highway Volumes and Estimated LOS

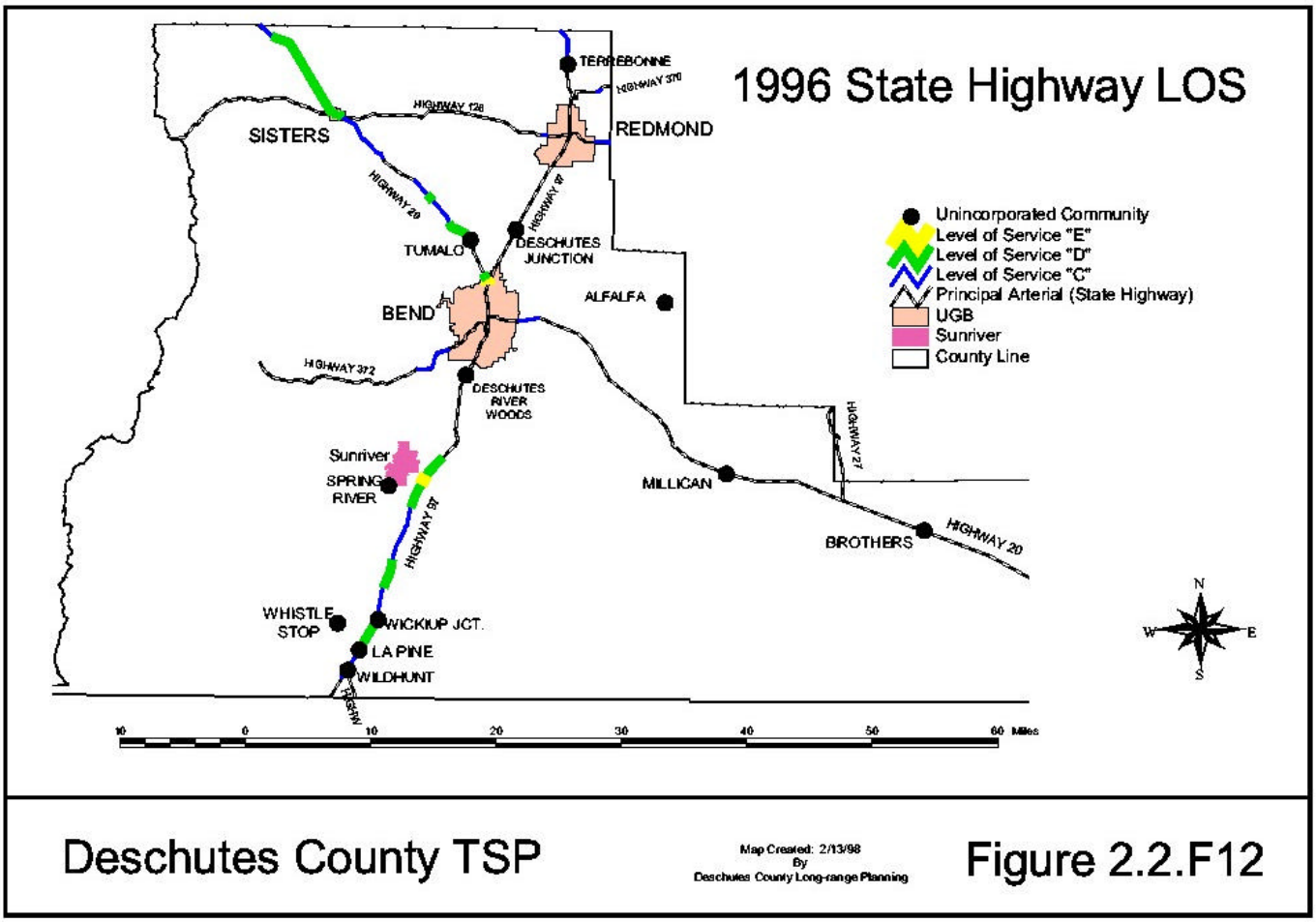
Rank	Hwy #	Highway Name	Route #	Location	Mile Point	1996 ADT	1996 PM Peak	Est. LOS
1	4	DALLES-CALIF. HWY.	US 97	SOUTH CENTURY DR.	153.09	8,100	*810*	*E*
2	4	DALLES-CALIF. HWY.	US 97	"A" AVENUE (TERREBONNE)	115.87	11,200	1,120	*D*
3	4	DALLES-CALIF. HWY.	US 97	COTTONWOOD DR.	151.10	10,750	1,075	*D*
4	15	MCKENZIE HWY	OR 126	HWY 20	92.32	10,100	1,010	*D*
5	15	MCKENZIE HWY	OR 126	ELM ST.	92.51	9,800	980	*D*
6	15	MCKENZIE HWY	OR 126	LOCUST ST.	92.95	8,950	895	*D*
7	16	SANTIAM HWY.	US 20/126	MCKENZIE HWY	100.03	8,900	890	*D*
8	16	SANTIAM HWY.	US 20/126	SANTIAM PASS RD.	99.53	8,375	838	*D*
9	16	SANTIAM HWY.	US 20/126	TOLLGATE RD.	98.33	7,850	785	*D*
10	17	MCKENZIE-BEND	US 20	CLINE FALLS HWY.	14.77	7,400	740	*D*
11	4	DALLES-CALIF. HWY.	US 97	LAPINE STATE REC. RD.	160.60	7,400	740	*D*
12	16	SANTIAM HWY.	US 20/126	INDIAN FORD RD.	94.91	7,325	*733*	*D*
13	4	DALLES-CALIF. HWY.	US 97	PAULINA LAKE RD.	161.76	7,300	*730*	*D*
14	4	DALLES-CALIF. HWY.	US 97	1 ST STREET (LAPINE)	167.49	7,300	*730*	*D*
15	16	SANTIAM HWY.	**US 20/126**	**BLACK BUTTE RANCH (09-014)**	93.19	**6,800**	**1,156**	*D*
16	17	MCKENZIE-BEND	US 20	INNES MARKET RD.	9.71	6,700	*670*	*D*
17	4	DALLES-CALIF. HWY.	US 97	JEFFERSON COUNTY LINE	112.86	8,800	*880*	*C*
18	4	DALLES-CALIF. HWY.	US 97	VANDERVERT RD.	155.51	7,500	*750*	*C*
19	4	DALLES-CALIF. HWY.	US 97	BURGESS RD.	165.20	7,300	*730*	*C*
20	17	MCKENZIE-BEND	US 20	COUCH MARKET RD.	12.28	7,050	*705*	*C*
21	7	MILLICAN-BURNS	US 20	ERICKSON RD.	4.55	7,000	*700*	*C*
22	17	MCKENZIE-BEND	US 20	TWEED RD.	10.07	6,875	*688*	*C*
23	4	DALLES-CALIF. HWY.	US 97	OR 31 (FREMONT HWY.)	169.67	6,700	*670*	*C*
24	17	MCKENZIE-BEND	US 20	FRYREAR RD.	7.87	6,600	*660*	*C*
25	17	MCKENZIE-BEND	US 20	CLOVERDALE RD.	4.77	6,400	*640*	*C*
26	17	MCKENZIE-BEND	US 20	HARRINGTON LOOP	3.21	6,300	*630*	*C*
27	17	MCKENZIE-BEND	US 20	OR 126	0.11	6,200	*620*	*C*
28	15	MCKENZIE HWY	OR 126	HELMHOLTZ WAY	109.64	6,000	*600*	*C*
29	41	OCHOCO HWY	OR 126	REDMOND CITY LIMITS	2.32	5,700	*570*	*C*
30	41	OCHOCO HWY	OR 126	CROOK COUNTY LINE	3.58	4,700	*470*	*C*
31	16	SANTIAM HWY.	US 20/126	CAMP SHERMAN RD.	90.91	4,500	*450*	*C*
32	16	SANTIAM HWY.	US 20/126	JEFFERSON COUNTY LINE	80.77	4,100	*410*	*C*
33	7	MILLICAN-BURNS	US 20	POWELL BUTTE HIGHWAY	4.83	3,700	*370*	*C*
34	372	CENTURY DR.	OR 372	INN OF THE 7TH MTN.	7.14	3,600	*360*	*C*
35	372	CENTURY DR.	OR 372	DILLON FALLS RD.	7.60	3,600	*360*	*C*
36	15	MCKENZIE HWY	OR 126	HWY 20	93.08	3,500	*350*	*C*
37	370	O'NEIL HWY	OR 370	NE 33RD ST.	2.57	1,600	*160*	*C*

Code:

Generalized ADT:	LOS:
> 22,900	F
13,500 - 22,900	E
7,900 - 13,500	D
4,800 - 7,900	C
2,400 - 4,800	B
< 2,400	A

Note: Locations in BOLD denote permanent recorder stations. Numbers in BOLD are actual 1995 counts, ITALICS are County estimates, and others are ODOT estimates.

LOS estimates furnished by ODOT.



Deschutes County TSP

Map Created: 2/13/98
By
Deschutes County Long-range Planning

Figure 2.2.F12

FIRE DISTRICTS

Within Deschutes County there are a total of seven rural fire protection districts (RFPD). Two of the districts, Redmond #1 and Bend #2, include the urban growth boundaries of Redmond and Bend. The other five districts provide mostly rural fire protection. In addition, the U.S Forest Service also provides fire protection to parts of Deschutes County, and the Sunriver resort maintains its own fire department. All of the fire district areas are shown on Figure 2.2.F13. The following is a listing of the fire protection districts by area:

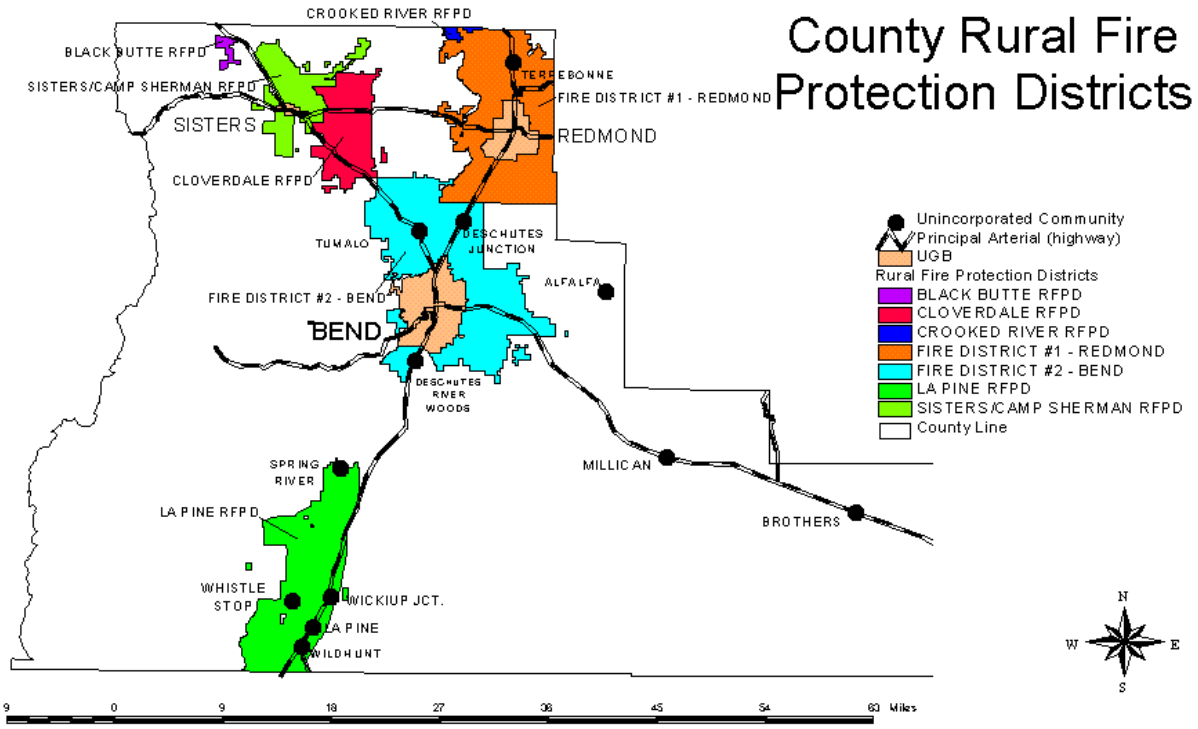
- Redmond RFPD #1 - Redmond Area/North County
- Bend RFPD #2 - Bend Area/East County
- Crooked River RFPD - North County/Terrebonne/Redmond/part of Jefferson County
- Black Butte RFPD - Black Butte Ranch Area
- Sisters/Camp Sherman RFPD - Sisters and Camp Sherman Area
- Cloverdale RFPD - Cloverdale Area between Sisters and Bend
- La Pine RFPD - South County Area between Sunriver and La Pine

District fire stations are located at/on:

- Redmond RFPD #1 - Dogwood Street (Redmond)
74th Street (Redmond)
C Avenue (Terrebonne)
- Bend RFPD #2 - Hamby Road
- Crooked River RFPD - Crooked River Ranch (Jefferson County)
- Black Butte RFPD - Black Butte Ranch
- Sisters/Camp Sherman RFPD - Elm Street (Sisters)
- Cloverdale RFPD - Highway 126
- La Pine RFPD - Huntington Road
South Century Drive
Burgess and Day

ACCIDENT STATISTICS

In 1996, the grant-funded Deschutes County Safe Communities program was initiated in an effort to reduce transportation-related injuries of all types. The program links accident data with medical information to identify the most significant problems and then develop solutions. Focus areas include safety equipment for bicyclists and safe cycling education programs for school children. Program Staff used the state accident database, from the Accident Data Unit at ODOT, to evaluate accident data for the period 1991 - 1996. During the '91-'95 time period there were a total of 2,518 crashes reported on County roads and highways outside of urban areas. Of the total number of accidents, 70 were fatal, 1,073 involved injury (170 serious), and 1,375 were property damage only accidents. Safe Communities staff has also identified the difference in accident occurrences between the County in general and the rural areas. Countywide, fatal accidents accounted for 1.2 percent of the total number of accidents, while fatal accidents just in the rural area accounted for 2.8 percent of the total. Injury accidents made up 4.4 percent of the County total, while in just the rural areas; they accounted for 6.8 percent of the total.



Deschutes County TSP

Map Created: 2/10/98
By
Deschutes County Long-range Planning

Figure 2.2.F13

ACCIDENT ISSUES

The Safe Communities Group has identified the following six most important issues that should be addressed within the first year of the program:

1. Reengineering high incident areas where the greatest numbers of accidents have occurred.

2. Develop better data sources and improve the quality of information.

3. Address the high percentage of ice-related crashes, injuries, and fatalities on the Highway 97 corridor between Bend and La Pine.

4. Evaluate the costs and impacts of traffic accidents, and direct program activities where there is a chance for the greatest improvement.

5. Focus on injury and fatality information, with reduced emphasis on property damage and minor injury events.

6. Educate drivers as to changes in road usage; examples include the higher speed rural roads at the edges of the urban centers which are rapidly becoming more populated with more pedestrians and school children present.

The top rural accident locations for County roads and for state highways are identified in Figure 2.2.F14 and Tables 2.2.T6 and 2.2.T7.

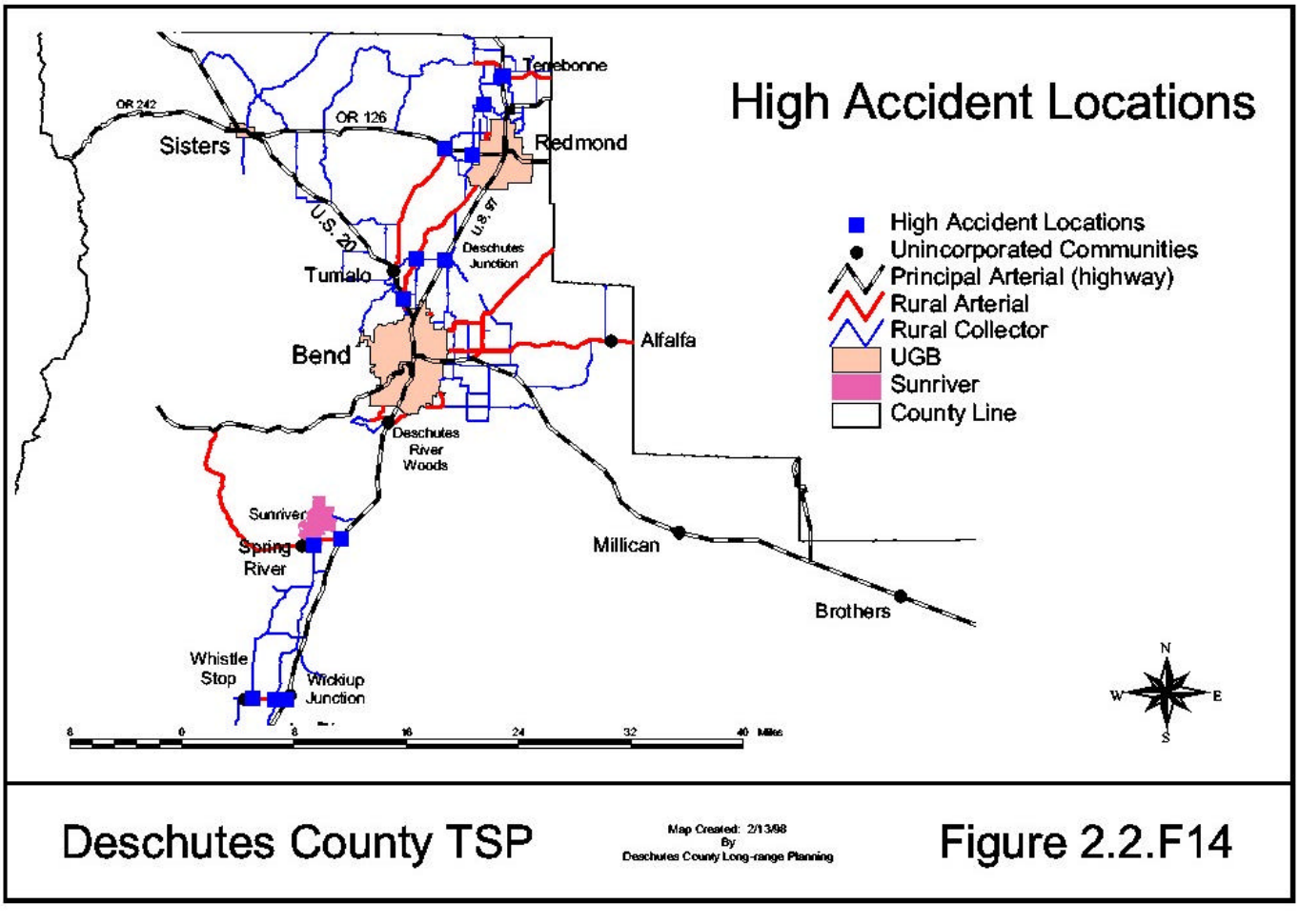
PAVEMENT TYPE / CONDITION

Out of the 943 roadway miles that the County maintains, 625 miles (66%) are paved while the other 318 miles (34%) are either dirt or aggregate. There is only one unpaved principal arterial in the County and that is Highway 27 which runs north to Crook County (Prineville Reservoir). It connects to Highway 20 at a point located approximately 30 miles east of Bend, between Millican and Brothers. There are no unpaved rural arterials, but several miles of unpaved rural collectors. The unpaved sections of collectors currently handle low daily traffic volumes and are identified in Figure 2.2.F15. The unpaved arterials/collectors are shown in Table 2.2.T8.

ROADWAY WIDTH / STREET STANDARDS

Road and Street Standards

Table 2.2.T9 identifies the current design and development standards for streets and roads in the unincorporated areas of Deschutes County both within and outside of the applicable Urban Growth Boundaries. The unincorporated communities of Terrebonne and Tumalo have different standards that were adopted in 1997 and are included in Appendix G.



Deschutes County TSP

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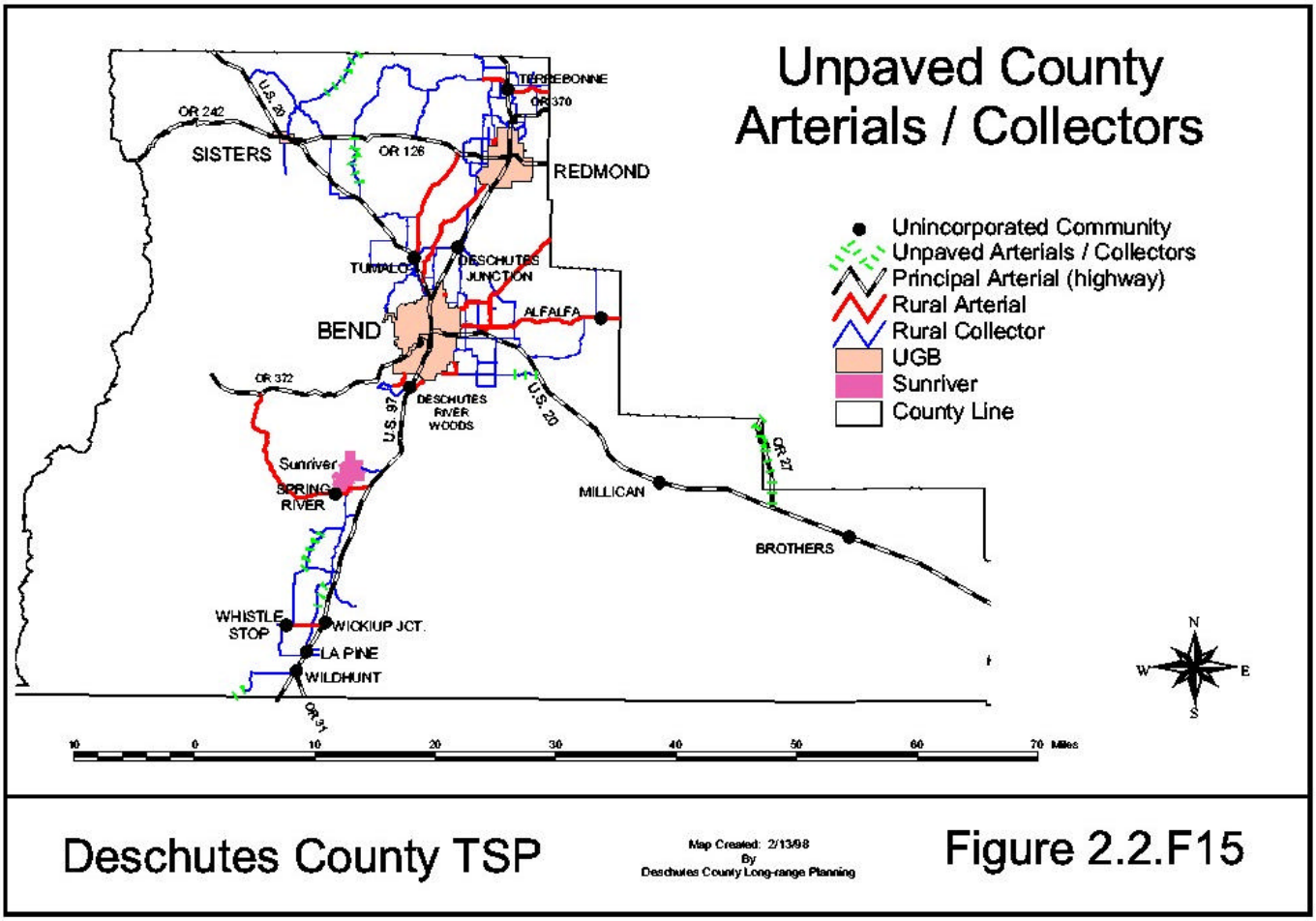
Deschutes County Long-range Planning

Figure 2.2.F14



Deschutes County TSP

Map Created: 2/13/98
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Deschutes County Long-range Planning

Figure 2.2.F15

Table 2.2.T6

Top County Road Accident Locations 1991-1996

Rank	Intersection	Intersection ADT (1996)	Accidents	Traffic Control	ADT per Accident	Recent Improvement
1	**Old Redmond-Bend Highway and Tumalo Road**	**3,295**	**19**	**Flashing light**	**173**	**Flashing light added**
2	**Burgess Road and Huntington Road**	**6,020**	**19**	**Flashing light**	**317**	**Flashing light added**
3	Neff Road and Hamby Road	3,985	12	Flashing light	332	Under study
4	Coyner Avenue and Northwest Way	1,535	12	Twsc	128	None
5	**Smith Rock Way and 11th Street (Terrebonne)**	**1,430**	**7**	**Twsc**	**204**	**Added stop signs on 11th**
6	Burgess Road and Day Road	3,715	7	Twsc	531	None
7	**South Century Drive and Spring River Road**	**4,005**	**7**	**Twsc**	**572**	**Added left-turn lane**

Note: **Bold** intersections have had recent improvements or are currently programmed for improvement projects.
twsc = two-way stop controlled

Table 2.2.T7

Top Highway Accident Locations 1991-1996

Rank	Intersection	Intersection ADT	Accidents	Traffic Control	ADT per Accident
1	**Highway 97 and Deschutes Market Road (Interchange under construction)**	**9,900**	**36**	**Flashing light**	**275**
2	Highway 97 and South Century Drive	5,890	17	Flashing light	346
3	**Highway 97 and Wickiup Junction (Burgess Rd.) (Realignment completed)**	**5,625**	**13**	**Flashing light**	**433**
4	**Highway 126 and Cline Falls Highway (Interchange completed)**	**3,315**	**12**	**twsc**	**276**
5	Highway 126 and Helmholtz Way	3,600	10	twsc	360
6	Highway 20 and Old Redmond-Bend Highway	6,540	10	twsc	654

Note: **Bold** intersections are currently programmed for improvement projects.
twsc = two-way stop controlled

Table 2.2.T8
Deschutes County Unpaved Arterials/Collectors

Class	Road Segment	Length (mi.)	ADT
Arterial	Highway 27 from Highway 20 to Crook County line	3.5	40
Collector	Huntington Road from N. Riverview Dr. to S. Riverview Dr.	1.3	<50
Collector	Foster Road from La Pine State Rec. Rd. To S. Century Dr.	3.8	<200
Collector	Fryrear Road from NW Transfer Cntr. Rd. To Hwy. 126	4.4	180
Collector	Northern portion of Wilt Road	4.5	80
Collector	Masten Road from end of pavement to Klamath County line	0.75	<100
Collector	Rickard Road from Blackfoot Trail to Highway 20	1.8	60

BRIDGE CONDITION

The County Road Department maintains a list of the 120 various bridges throughout Deschutes County and their weight limits. Many of the bridges are relatively new, constructed of reinforced concrete, and are able to withstand many years of use before repairs or replacement is necessary. However, some others are old flatbed railroad cars that were converted to bridges. The Oregon Department of Transportation (ODOT) assesses bridge condition for all bridges over twenty feet in length. The County checks all bridges less than twenty feet long. Replacement or major renovation projects are added to the Major Roads Capital Improvement Program each year by the Road Department as funding becomes available. Table 2.2.T10 identifies the bridge locations, cost to upgrade and their respective weight limits.

Table 2.2.T9
Current County Road Standards

Road Type	Class	Generalized Average Daily Traffic (ADT)	Right-of-Way Width	Pavement Width	No. of Lanes	Bike Lanes	Sidewalks	On-Street Parking
Urban Roads								
Arterial	Principal	<15,000-40,000	80'-100'	60'-80'	3-5	6'	5'min.	no
	Minor	<5,000-18,000	80'	36'-52'	2-3	6'	5'min.	no
Collector		<1,000-9,000	60'-80'	36'-52'	2-3	6'	5'min.	maybe
Industrial		<500-4,500	60'	40'	2	no	5'min.	maybe
Frontage		<1,500	40'-60'	28'	2	maybe	[1]5'min.	no
Local		<400-1,500	60'	36'	2	no	5'min.	yes
Cul-de-sac		<400	60'	36'	1.5	no	5'min.	yes
Private		<400-1,500	n/a	[2]24'-28'	1.5-2	no	no	no
Alley		>400	20'	20'	1.5	no	no	no
Rural Roads								
Arterial	Principal	<14-30,000	80'-100'	36'-70'	2-4	[3]6'	no	no
	Minor	<2-15,000	80'	28'-36'	2	5'	no	no
Collector		<500-2,000	60'	28'-36'	2	no	no	maybe
Frontage			40'-60'	28'	2	no	no	no
Local		<200-1,200	60'	28'	1.5-2	no	no	yes
Partition		<400	60'	20'	1.5	no	no	no

[1]Sidewalks are required only on the side of the road abutting the development.

[2]24-foot paved width allowed if separate ped./bike path (8'wide min.) is provided.

[3]6-foot lanes required on rural arterials and collectors (with curbs) with more than 50 bicycle average daily trips.

(Section 2.2c)

Table 2.2.T10
County Bridges

BRIDGE LOCATION	COST TO UPGRADE	WEIGHT LIMIT
NE 17th Street	$42,100	12 Tons
SW 27th Street (UGB)	$36,000	12 Tons
NE 41st Street	$38,900	11 Tons
SW Glacier Avenue (UGB)	$31,250	14 Tons
Holmes Road	$31,250	12 Tons
Johnson Market Road	$49,200	15 Tons (posted)
NE King Way (UGB)	$32,100	13 Tons
Tetherow Road	$152,700	10 Tons
Wilcox Avenue	$27,300	16 Tons
Woodside Road	$55,600	15 Tons
Gribbling Road	$86,000	5 Tons (posted)
Cascade Lakes (Fall River)	$65,500	5 Tons (posted)

BIKE FACILITIES

The 1979 Deschutes County Comprehensive Plan directed that

"The County shall develop and adopt a County-wide systems plan for bike paths (bikeways) and trails which provides access to various destinations in and between urban areas and rural service centers."

The Deschutes County Bicycle Advisory Committee was formed in 1988 (pedestrian component added in 1996) to respond to this policy statement. In March 1992, the County adopted a Bicycle Master Plan as a resource element of the Deschutes County Year 2000 Comprehensive Plan. The Bicycle Master Plan provides recommendations for policies, classifications of bike facilities, location of bike facilities, bicycle parking and other transportation issues related to bike facilities. Bicycle facilities include bikeways, both paved and unpaved, and parking. Currently, bikeway design falls under the general design criteria section of the County's Title 17 (Subdivision Ordinance)**.** It states that:

1. Bikeways shall be designed in accordance with the current standards and guidelines of the State of Oregon Bicycle Master Plan, American Association of State Highway and transportation Officials (AASHTO) Guide for the Development of New Bicycle Facilities, and the Deschutes County Bicycle Master Plan.

2. All collectors and arterials shown on the County Transportation Plan map shall be constructed to include bikeways as defined by the Deschutes County Bicycle Master Plan.

3. If interim road standards are used, interim bikeways and/or walkways shall be provided. These interim facilities shall be adequate to serve bicyclists and pedestrians until the time of the road upgrade.

The most prominent element of the County bicycle system is its paved, on-road bikeways. The County and cities for several reasons have placed emphasis on these routes:

- The existing system of improved County roads, totaling approximately 750 miles, generally provides the most efficient and safest route for bicycle commuters and recreational cyclists traveling to and from home, work, school, and shopping.

- The state gas tax revenues are only available for bicycle lanes or paths constructed within public rights-of-way.

- Maintenance is easier for public agencies as part of their normal road maintenance.

Paved Bikeways

Bicycles are legally classified as vehicles, which may be ridden on most public roadways in Oregon. There are four basic types of paved bicycle facilities in Deschutes County:

- ***Shared Roadway*** - On a shared roadway facility, cyclists share the normal vehicle lanes with motorists. Shared roadway facilities are common on urban residential streets and on narrow rural roads. Shared roadways are acceptable on all streets, other than new construction of arterials and collectors. In places that bicycle travel is significant, these roadways are signed as bicycle "routes".

- ***Shoulder Bikeway*** - Smooth, paved, rural roadway shoulders provide a good area where cyclists can ride with faster moving motor vehicle traffic with few conflicts. The majority of bicycle travel on the state highway system is accommodated on shoulder bikeways. Shoulder bikeways may be used on any uncurbed street section. A shoulder bikeway shall be provided on all new construction of uncurbed arterials and collectors. In places that bicycle travel is significant, these roadways can also be signed as bicycle "routes".

- ***Bike Lane*** - Where bicycle travel is substantial and where adequate width is available, a portion of the roadway may be designated for preferential use by cyclists. Bike lanes shall be provided on all new construction of urban collectors and arterials, and on rural road segments designated as bicycle "routes". Bike lanes are more common in urban rather than rural areas.

- ***Bike / Multi-use Path*** - A bike path is a bikeway that is physically separated from motorized traffic by open space or a barrier. Bike paths may be located within the roadway right-of-way or within a dedicated bike path right-of-way. Bike paths are normally two-way facilities. Bike paths may be multi-use paths if sufficient width is provided. They generally serve corridors not served by other bikeways or pedestrian facilities and where there are few crossing roadways.

Unpaved Bikeways

With the advent of mountain bikes, previously unused trails and poor roads are opened up to potential use as inexpensive bike routes that require little more than right-of-way and signage. Deschutes County has many primitive roads and trails, most of which are on National Forest or Bureau of Land Management land, some of which are located close to urban areas. There are approximately 1,300 miles of forest highways and 450 miles of trails within the County, of which most are open to bicycles. The County controls about 500 miles of unimproved public rights-of-way.

Trails leading from southwest Bend to Benham Falls and along the Deschutes River to Sunriver are two examples of routes that offer enormous recreational potential. The U.S. Forest Service has taken the lead in recognizing the growing popularity of mountain biking and has designated many trails and roads in the County for that use.

Cyclists have always used unpaved roads and paths (smooth and hard-packed) where paved routes were unavailable. Where their incorporation into the bikeway system is appropriate, they may be classified as shared, unpaved roadways or unpaved bike paths. With the advent and growing popularity of mountain bikes, even rough, unpaved routes have become popular bikeways, creating a new classification:

- ***Mountain Bike Trail/Route -*** This category is designed to accommodate bicycle travel on unpaved roads and trails. Mountain bike trails are primarily recreational, although in some cases they may provide an interim transportation facility. Mountain bike riding is intended to be as natural an experience as possible and any improvements beyond that absolutely required for safety may deter from this experience. Often mountain bike trails are combined with nordic ski trails and with roadways that are otherwise closed to motorized vehicle traffic. Mountain bike trails generally are not shared with pack animals. Most often the only improvement needed to existing facilities is signing.

Alternative Routes

Typically, main bike routes are chosen because they are the most direct, desirable routes. Alternate routes were identified in the Plan to enhance and supplement, rather than supersede the main routes. Alternate routes are usually the most cost effective or immediate way to provide for bicycle movement through a difficult section. As such, they may serve in a primary capacity until the main route can be improved for bicycle traffic. Several high traffic sections with bike facilities in the County have alternative routes identified in Table 2.2.T11

Table 2.2.T11
Alternative Routes (Formerly considered “parallel bikeways”)

Bike Facility Location	High Traffic Area	Alternate Route
U.S. Highway 20	North of Bend	O.B. Riley Road
U.S. Highway 97	Sunriver Entrance to La Pine	S. Century Drive and Huntington Rd.
U.S. Highway 97	Sunriver to Bend	Forest Service Road #41 (unpaved)
U.S. Highway 97	Bend to Redmond	Old Redmond-Bend Highway or Cline Falls Highway

Bikeway Maps

The adopted bike facilities in the Deschutes County Bicycle Master Plan are shown on Figures 2.2.F16-18.

Typical Design Standards

Table 2.2.T12 lists the typical bike design standards currently used in Deschutes County.

Table 2.2.T12
Current County Bikeway Design Standards
(Adopted March 1992)

	On/Off Road?	Width		Vertical Clearance	Horizontal Alignment	Super-elevation	Sight Distance		Pavement Structure	Multiuse	ROW
							Grade	Distance			
Bike Path	Off	10' min. 12' if multiuse path		10' min.	35' centerline curve radius	2% min. 5% max.	2%	131'	2" A.C. on 4" aggregate base min.	Possible	15' min.
							5%	140'			
							8%	152'			
Mt. Bike Trail	Off	2' trail (new), 6' clear min.		7' min. 10' preferred						Yes	
Bike Lane	On	New *urban* arterial or collector	6'						Same as parent roadway	No	
		Existing road or *rural* arterial or collector	4'								
Shoulder Bikeway	On	No curb, 20-50 BADT	4'						Same as parent roadway	No	
		Existing curb, travel lane less than 11'	4'								
		Existing curb, 20-50 BADT	5'								
Shared Roadway	On	For new rural roads other than local or primary access	2.5'		Note: - A.C. is asphalt-concrete - BADT is bicycle average daily trip				Same as parent roadway	No	

Other Facilities

Resort Communities

There are four resort communities in the County that have developed independent bicycle networks. These networks, being privately owned, funded and maintained, are available to owners and guests of the individual communities and are not open to the general public. However, these bike facilities shall meet County construction standards and shall not impede movement within the countywide system.

- ***Sunriver*** - Sunriver is a large resort community located fifteen miles south of Bend and several miles west of Highway 97. Sunriver has a permanent population of approximately 1,300 people and a seasonally larger population of guests, vacationers and part-time residents. The Sunriver Owners Association owns approximately thirty (30) miles of paved off-road bicycle paths within the resort.

- ***Black Butte Ranch -*** Black Butte Ranch is a planned resort community located approximately ten miles west of Sisters off of Highway 20. The 1,830-acre community has a resident population of approximately 300 people and a seasonally larger population of guests, vacationers and part-time residents. The Community has approximately sixteen (16) miles of paved off-road bicycle paths.

- ***Eagle Crest Resort -*** Eagle Crest Resort is a 1,300-acre destination resort community of single-family homes and condominiums located approximately four miles southwest of Redmond. The current resident population is approximately 75 with an added 300 people as overnight or seasonal guests. Eagle Crest has approximately three to four miles of bicycle paths from six to eight feet wide.

- ***River Meadows Recreation Homes -*** River Meadows is a 160-acre private residential development located eight miles southwest of the Sunriver Resort on the Deschutes River. The development has approximately 1.5 miles of bicycle paths surrounding the development.

PEDESTRIAN SIDEWALKS/WALKWAYS

Sidewalks are currently required along some street frontages (all streets in La Pine) for new developments only in the Unincorporated Communities of La Pine, Terrebonne and Tumalo. The County standard for sidewalk width is five feet. Although most of the County's improved sidewalks occur in La Pine (Figure 2.2.F19), there are also short sections along the south sides of B Avenue and Smith Rock Way in Terrebonne, but nowhere else in the rural areas of the County.

PUBLIC TRANSPORTATION

Intercity Public Transportation

- ***Greyhound*** - Greyhound runs three daily departures from Bend. Two go northbound (to Yakima at 9:55 a.m., and Portland at 9:55 a.m.), and one southbound (to Klamath Falls at 9:15 a.m.) on Highway 97 through Deschutes County. Stops include: Redmond at the McDonald's on S. Highway 97, Bend at the Greyhound terminal on Highway 20 just east of Pilot Butte, Wickiup Junction at the rideshare center at Burgess Road and Highway 97, and Chemult (Klamath County). Greyhound also runs one daily eastbound and westbound bus between Portland and Bend via Prineville and Madras. Approximately five to ten passengers ride on weekdays and several more on weekends.

- ***CAC Transportation -*** CAC Transportation runs one daily round trip bus from Bend (Riverhouse Hotel @7:00a.m.) via the Redmond Airport (@7:20a.m.), Big "O" store in Redmond (@7:25a.m.) to Portland (Airport @ 10:45 a.m. and Union Station @ 11:15 a.m.). The return bus leaves from Portland (Union Station @ 1:30p.m. and Airport @2:00p.m.) arriving at the Riverhouse in Bend at approximately 5:45p.m.

- ***The People Mover -*** The People Mover operates one round trip bus between John Day/Prairie City (leaving 7 a.m.) and Bend/Redmond (leaving 3:30 p.m.) on Mondays, Wednesdays, and Fridays. The People Mover operates a 15-person lift-equipped van. The Deschutes County stops are located at the Greyhound station on Highway 97 in Redmond (at McDonald's) and at the Greyhound terminal on Highway 20 in Bend. Total ridership from all the communities along the route averages five to ten passengers per trip.

- ***Porter Stage Lines -*** One daily bus runs between various cities on the Oregon coast and Bend, traveling via Eugene and Sisters. The bus uses the Greyhound terminal located on Highway 20. It arrives from Eugene at 5:05 p.m. and departs at 5:30 p.m.

- ***Valley Retriever Bus Lines –*** One daily bus operates Monday through Saturday. It arrives at the Greyhound Bus Terminal in Bend from Newport, Albany and Corvallis at 9:20 a.m. It departs at 9:30 p.m. back to Albany. One run per day operates via Salem.

Fixed Route Transit

There is currently no traditional fixed-route local transit service in Deschutes County. However, the Mt. Bachelor Ski Resort Super Shuttle does operate during the winter months on a fixed-route and schedule.

- ***Mt. Bachelor Super Shuttle and Employee Shuttle*** - The ten-vehicle fleet transports more than 90,000 employees and guests between Mt. Bachelor and Bend each year. The bus functions as an employee and public (guest) shuttle to the ski area from their 580 space park & ride lot at the corner of Simpson and Colorado in Bend. The Super Shuttle service operates several morning and afternoon trips on weekends only, beginning Thanksgiving weekend, then daily from mid-December

through mid-April. Although historically a free service in past years, for the 97/98 season, the shuttle will cost a nominal fee to help defray operating costs.

Local Demand Responsive Transportation

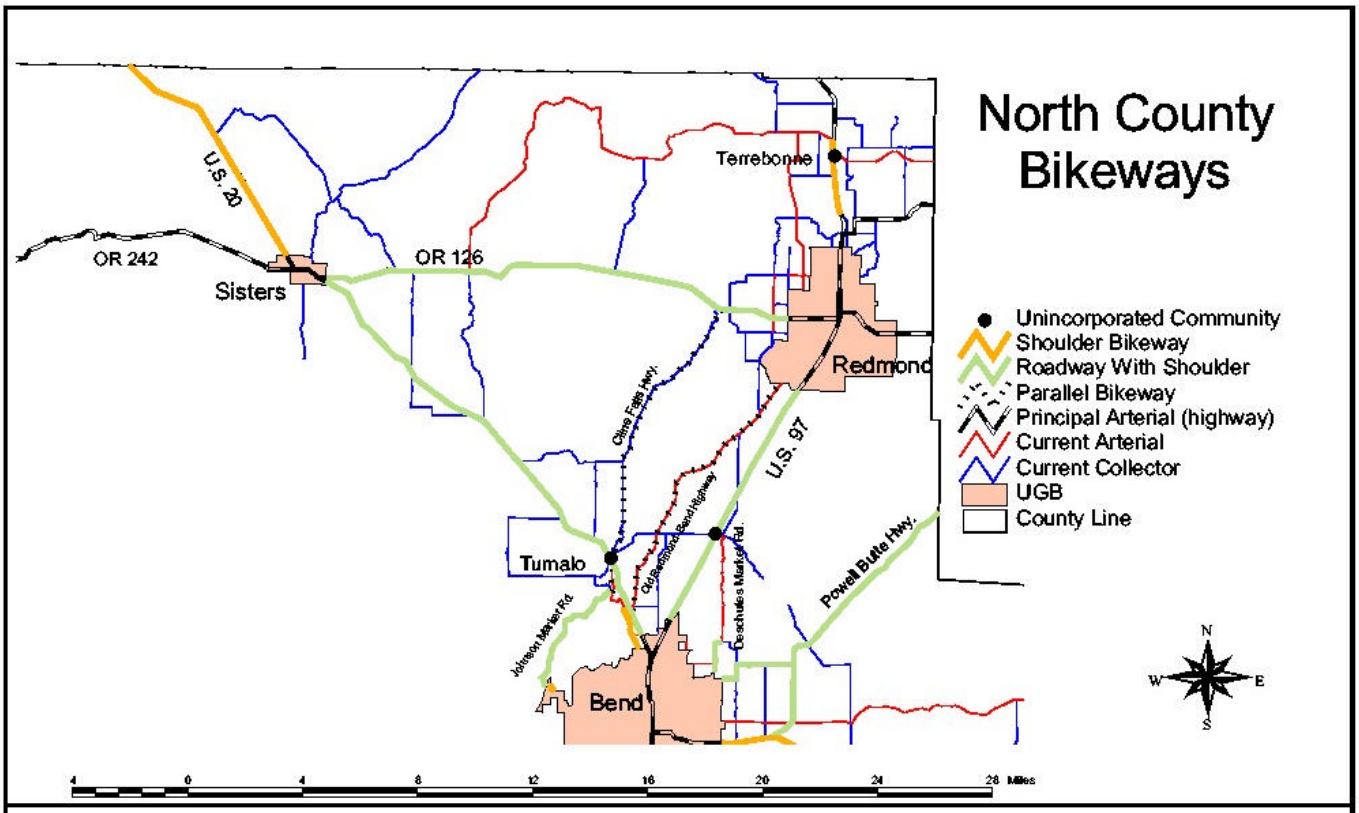
Deschutes County has a network of special transportation providers who serve the elderly and disabled population. In most cases, the general public does not have access to these special transportation services. There are several providers of special transportation services in the County, ranging from public to private, both profit and non-profit.

- ***City of Bend Dial-A-Ride -*** The City of Bend operates this service and a form of fixed-route/demand responsive system called a "scheduled route" for residents of the City of Bend and the urban area within approximately a three-mile radius of the City limits. This service is available to elderly residents aged 60 or above and disabled residents of any age. The demand responsive service operates from 8 a.m. to 8 p.m. on weekdays and 9:00 a.m. to 4:30 p.m. on weekends. The scheduled route service operates from 6:30 a.m. to 5 p.m. on weekdays only.

- ***Central Oregon Council on Aging (COCOA) Dial-A-Ride -*** Located in Redmond, the Central Oregon Council on Aging (COCOA) is a private non-profit agency that operates a demand responsive dial-a-ride system for senior citizens aged 60 and older and any disabled citizens. COCOA will transport the general public on a space-available basis. COCOA provides service outside the Bend urban area in the following locations:

La Pine - The service area includes the Fall River area east of the Deschutes River, north to Vandevert Road, and south to include Jack Pine Village. Trips out of the service area to Bend are offered one day per week with a stop in Sunriver. Service is available four days per week in the La Pine area; service hours are 8 a.m. to 3 p.m. Monday, Tuesday, and Thursday, and 8 a.m. to 5 p.m. on Wednesdays.

Redmond - The service area generally encompasses a three-mile radius of the city center five days per week and extends to a five-mile radius two days per week. Trips to Bend are offered two days per week via the Madras and Sisters dial-a-ride vans. Service is offered Monday through Friday in the Redmond area from 9 a.m. to 4 p.m.. A pre-scheduled shopper van is available Monday and Thursday.



Deschutes County TSP

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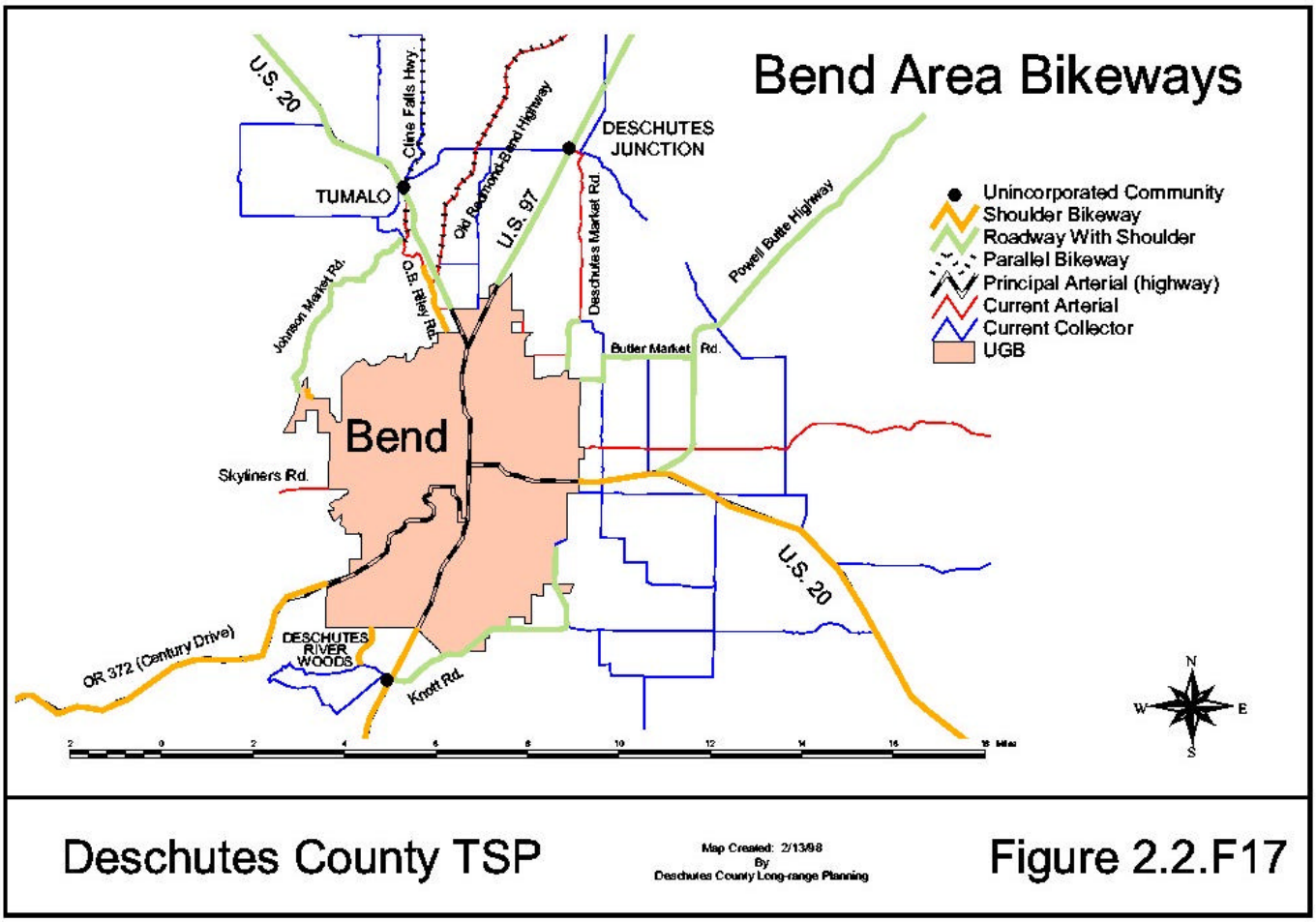
Figure 2.2.F16



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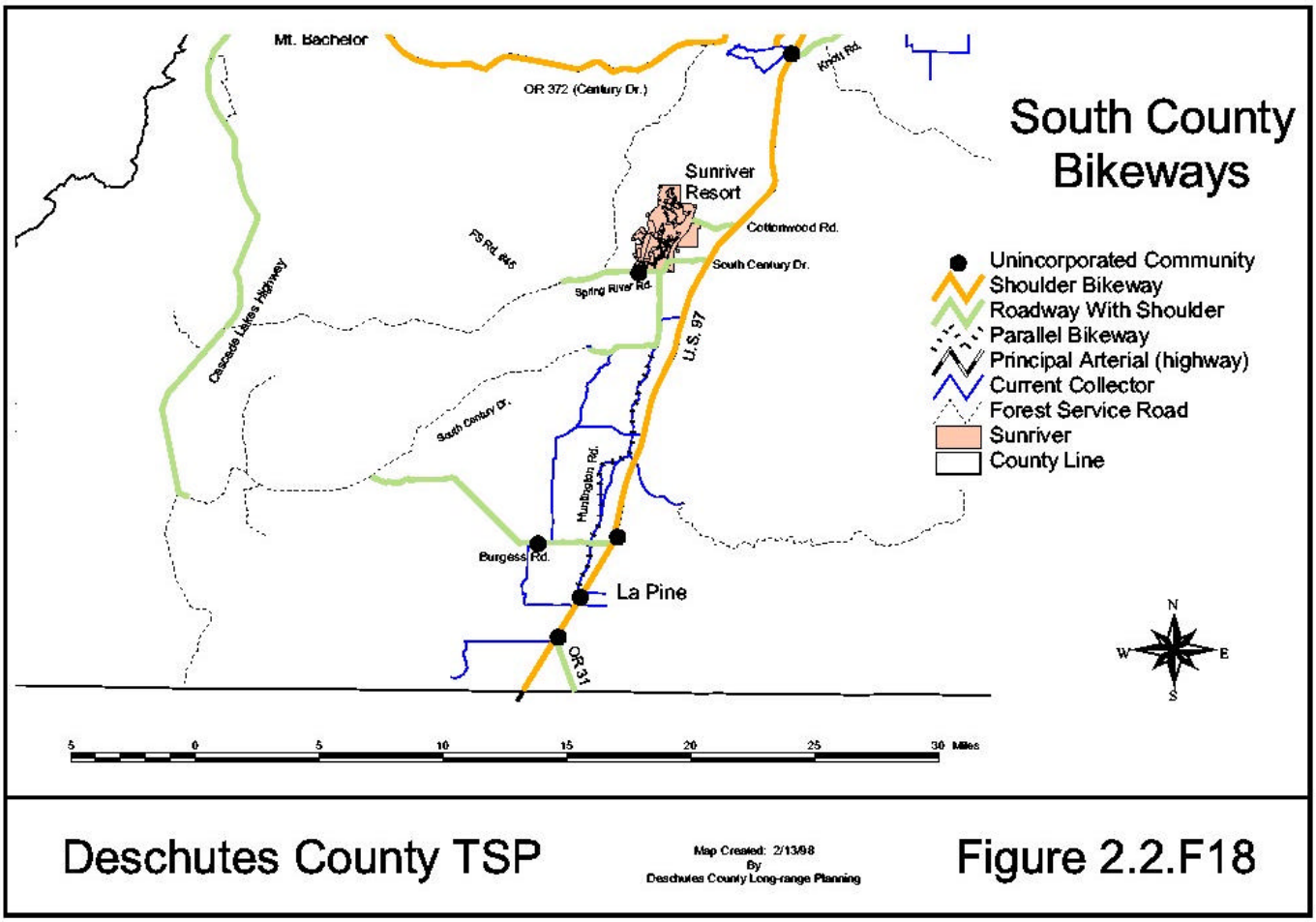

Deschutes County TSP

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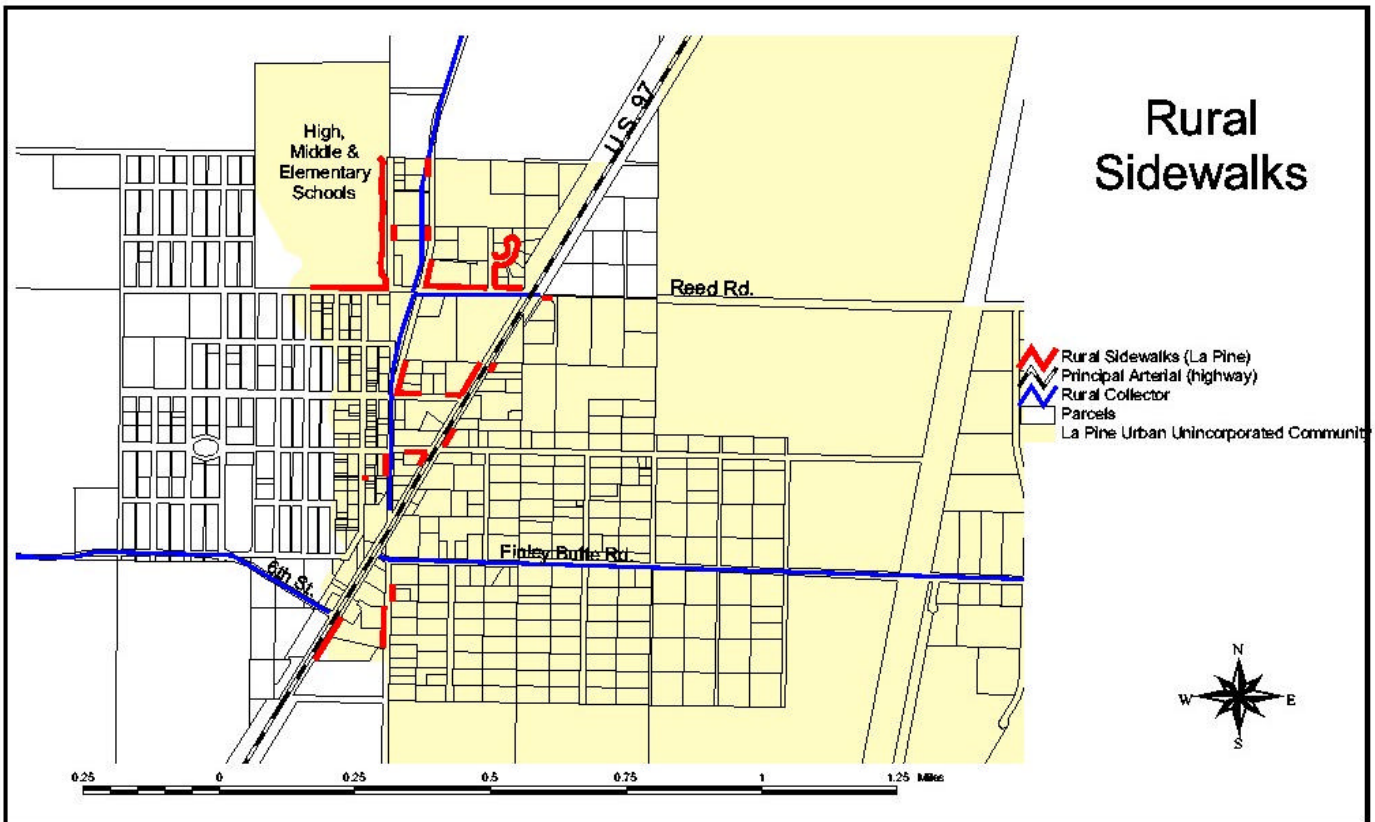

Deschutes County TSP

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Figure 2.2.F19

Sisters - The service area generally encompasses the vicinity of Sisters including the Cloverdale and Tollgate communities. Travel to Redmond is offered two days per week and to Bend one day per week. Service in Sisters is offered four days per week. The Redmond shopper van operates from 9 a.m. to 4 p.m. Monday and Thursday; the Bend van (via Redmond) runs from 9 a.m. to 3 p.m. on Wednesday, and local service is available Tuesday from 10 a.m. to 3 p.m.

- ***Opportunity Foundation of Central Oregon -*** The Opportunity Foundation of Central Oregon is a private non-profit agency that operates a demand responsive special transportation service to their program clients (70-100/day), primarily adults with disabilities. It has a residential and work center located in Redmond (and branch work center in Bend). Their service area is comprised of the Bend, Redmond, Terrebonne, and Tumalo areas in Deschutes County. Trip purposes include access to medical services, community resources, special events, recreation, home visits, competitions, and job sites. Service hours vary depending on community and work sites.

- ***Residential Assistance Program (RAP) -*** RAP is a private, non-profit organization that provides residential care and vocational training for developmentally disabled clients. Their service area is Deschutes County, but the five residential facilities are located in Bend, and the primary services are also located in Bend. Service is provided 24 hours per day (residential) but the vocational element is provided from 10 a.m. to 3 p.m. Monday through Friday.

- ***Disabled American Veterans -*** The Disabled American Veterans Chapter 14 in Bend operates a daily weekday shuttle to the VA Medical Center in Portland. This service is limited to any veteran needing transport to the medical center.

- ***Volunteer Services -*** The Oregon Department of Human Resources (DHR) Volunteer Services links DHR clients with volunteer drivers. Service hours are generally normal office hours Monday through Friday.

- ***Central Oregon Resources for Independent Living (CORIL) -*** CORIL is a private, non-profit organization that provides supported employment, recreational opportunities and independent living services. CORIL provides van transportation for its clients.

- ***Access Express -*** Access Express is a private, for-profit medical transportation service which is available to the general public.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Currently, the County, ODOT and the City of Bend jointly fund Commute Options for Central Oregon. This organization began in 1990 as a volunteer citizen's group working towards solutions to traffic congestion and pollution. They are responsible for maintaining the Central Oregon Rideshare list, promoting Commute Options Week each Spring, and acting as transportation consultants to businesses, cities, counties and other agencies interested in alternative commuting methods such as carpooling and teleworking.

RIDESHARE (PARK AND RIDE) FACILITIES

This plan makes reference to *rideshare* lots, which are more appropriate for the carpooling emphasis in Deschutes County, rather than *park & ride* lots which usually involve a fixed route transit stop (such as the Mt. Bachelor Super Shuttle). In Deschutes County, the lack of a public transit system has hampered the development of a network of commuter rideshare lots. However, the first officially designated lot is located in Wickiup Junction at the southwest corner of Highway 97 and Burgess Road. This lot is signed and paved, and has an average observed usage of approximately six to seven cars per day. Two new sites, one in Sisters and the other in south Redmond were installed in October 1997. Staff has also observed what appear to be informal rideshare areas both in the North and South County. These locations are generally used by five or fewer cars per day. Figure 2.2.F20 shows the location of the existing rideshare lots. It is likely that several informal lots exist within shopping center parking areas, etc.

Central Oregon Rideshare

Central Oregon Rideshare is a carpool matching service available to Deschutes, Crook and Jefferson County residents free of charge. The matching service is essentially a database of interested individuals which is maintained by Commute Options for Central Oregon. The program is a partnership between ODOT, the City of Bend, Deschutes County, the Oregon Department of Energy, OSU Extension Service and Commute Options for Central Oregon.

RAILROAD

Passenger Rail

Other than the occasional excursion train from Portland to Bend, no regular passenger rail service is currently available in Deschutes County. The nearest scheduled passenger rail service available to Central Oregon residents is the Amtrak “Coast Starlight” train which runs one train each way once daily (weather permitting) between Los Angeles and Seattle. The station (platform) is in Chemult, located approximately 60 miles south of Bend along Highway 97.

Freight Rail

The recent merger between the Burlington Northern and Santa Fe railroads provides freight operations on a trunk line running through Deschutes County (Figure 2.2.F21). This line connects with the Union Pacific main line at Biggs in the north and with the Southern Pacific mainline at Chemult to the south. The Burlington Northern/Santa Fe line usage varies between seasons and may increase since the merger. The line provides direct rail connections for shipping to markets in the U.S., Canada, and Mexico.

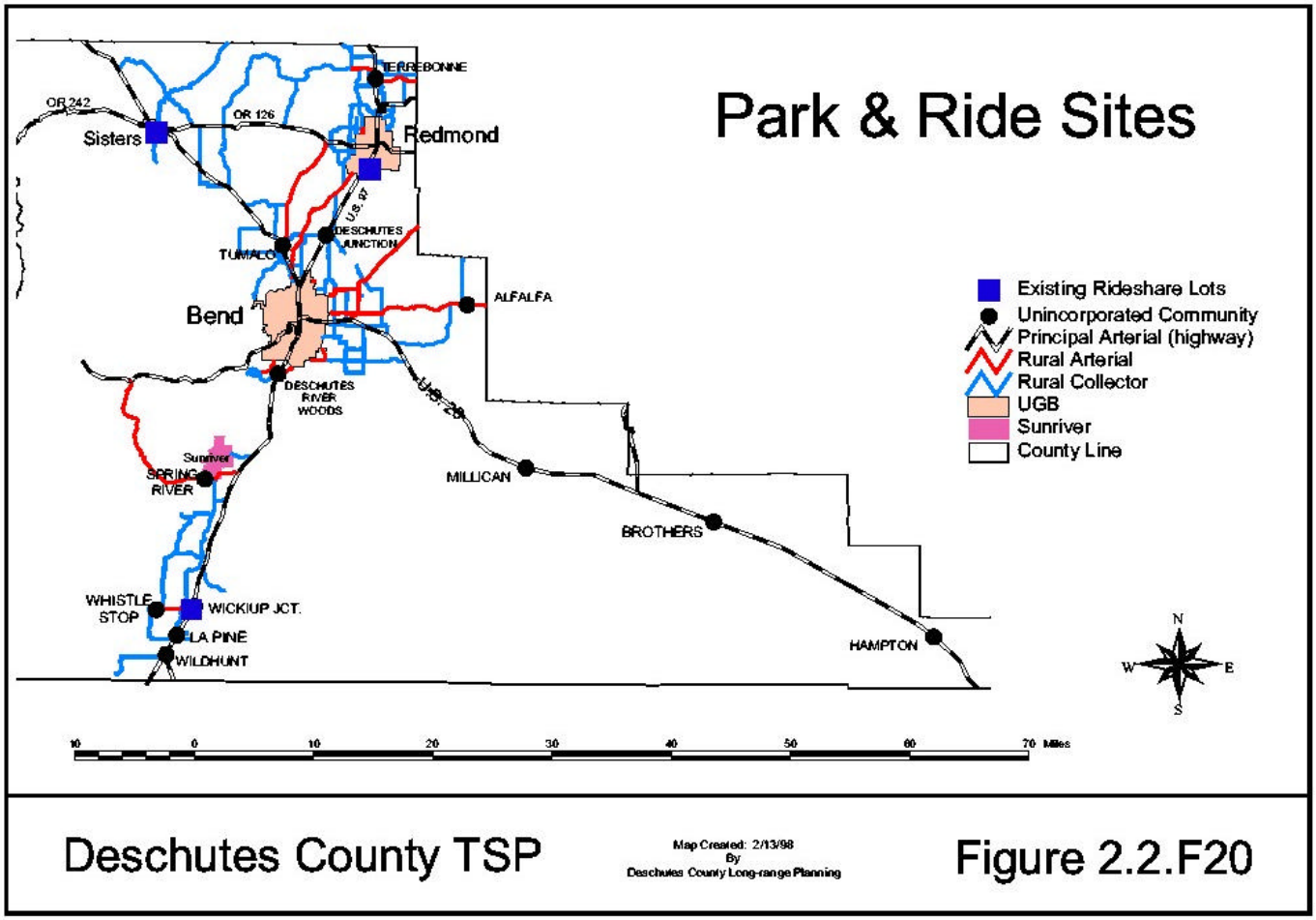

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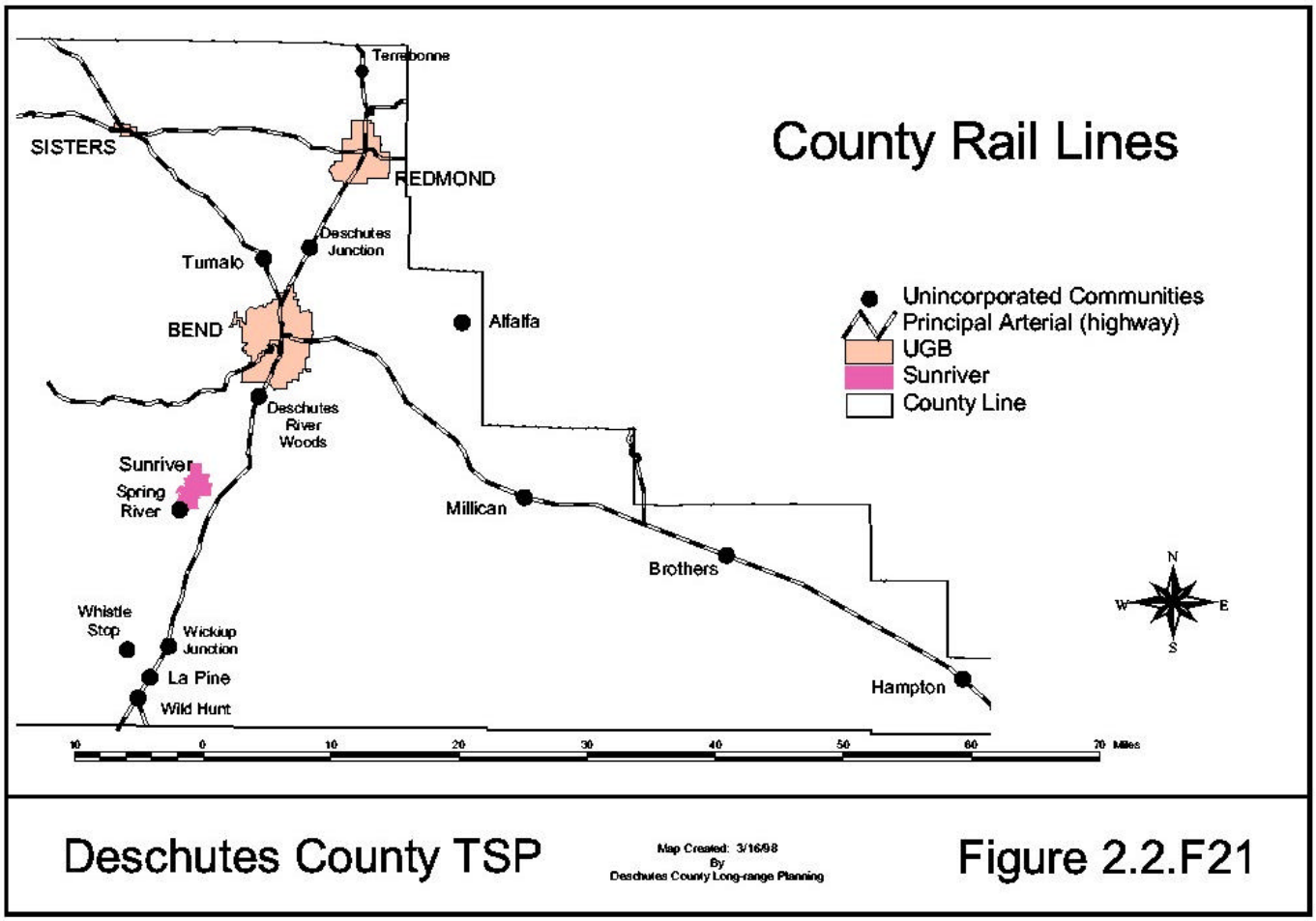
Figure 2.2.F20



Deschutes County TSP

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Figure 2.2.F21

(Section 2.2d)

MOTOR FREIGHT/TRUCKING

U.S. Highways 97, 20 and OR 126 all carry intercity and interstate freight trucking. Approximately 14 trucking companies currently operate in Deschutes County. No state highways within Deschutes County are currently designated as State Trucking Routes.

AIR TRANSPORTATION

With the passage of SB 1113 in 1995, ODOT is proposing that the County establish an "airport zone" for each of the public use airports in the County to assure the continuation of airport and airport-related uses there. State Rule OAR 660-13, was adopted in December 1996 by the Land Conservation and Development Commission. In July 1997, the state passed HB 2605 which modified Oregon Statutes regarding airport planning and will have an as yet undetermined effect on OAR 660-13. Currently, County airport-specific zoning exists at the Bend Airport (AD Zone) and the Sunriver Airport (Airport District within the Planned Community Zone). There are seven existing public use airports in the County. Four of these airports have improved (paved) runways, and offer a range of services, from the availability of commercial passenger flights arriving and departing daily at Redmond Municipal Airport, to the Sisters (Eagle Air) Airport which offers no services or runway navigational aids. Figure 2.2.F22 shows the location of the four public-use airports in Deschutes County, while Table 2.2.T14 identifies the current level of development for the improved airports. Figure 2.2.F23 identifies the locations of the private or "personal-use" airports in the County.

Public-Use Airports

Regional/Commercial Service

- ***Redmond Municipal Airport -*** The Redmond Municipal Airport is located in the southeast corner of the City of Redmond, south of OR 126 and east of Highway 97. Non-stop commercial flights to and from Central Oregon are available via Portland and Seattle. Horizon Air and United Express provide a combined ten daily non-stop flights to Portland. In addition, Horizon Air has two daily non-stop flights to Seattle, whereas United Express provides through service via Portland directly to Seattle. From Portland, daily connecting flights are available to other national as well as international destinations. Redmond also provides airfreight package express service via FedEx, Airborne and UPS Air. For planning purposes, the Redmond airport is classified as a small commercial service or business-class general aviation airport (SCSB).

  Annual enplanements (boardings) for the ten-year period between 1987 and 1997 are shown in Table 2.2T13. The average growth in boardings has been seventeen percent per year, but the last three years have only seen a more moderate eight percent growth per year.

Municipal

For planning purposes, the Bend and Sunriver airports are classified as medium size general aviation (MGA) airports due to runway dimensions and operational characteristics.

- ***Bend Municipal Airport*** - The Bend Municipal Airport is a public general aviation airport located 5.5 miles northeast of Bend on Powell Butte Highway. It provides charter flights, service, and rental cars.

- ***Sunriver Airport*** - The Sunriver Airport is a privately owned general aviation airport located at the Sunriver destination resort 15 miles south of Bend and several miles west of Highway 97. The airport is open to the public year-round offering fuel and service. Rental cars can be arranged as well as transportation to the Sunriver Lodge.

The Sisters (Eagle Air) Airport is classified as a small size general aviation (SGA) airport.

- ***Sisters Airport*** - Twenty miles northeast of Bend, the Sisters Airport is a privately owned, public-use general aviation airport located 0.25 miles north of the Town of Sisters on Camp Polk Road. The airport is open to the public, but no instrument navigation aids, fuel or services are available. The airport is unattended and supports locally based aircraft, but primarily accommodates recreation-oriented traffic. The airport has certain operational limitations, which are associated with runway orientation, prevailing winds, and high elevation terrain located approximately 2,000 feet northeast of runway #2.

In addition to the four public-use airports previously listed, the following airstrips are registered aviation facilities with ODOT Aeronautics as of December 1994 (Figure 2.2.F23). These facilities may or may not be currently in use. They are mostly private "personal use" airports and are in most cases no more than dirt landing strips.

Private-Use Airports and Heliports:

Recognized by ODOT as having three or more based aircraft in 1994:

- Cline Falls Airpark (6 mi. W of Redmond at Cline Falls)
- Juniper Airpark (10 mi. SE of Bend)
- Pilot Butte Airport (S. of Pilot Butte in City of Bend)

Less than three based aircraft in 1994:

- Don Stevenson Ranch Airport (4 mi. S of Bend)
- Fall River Fish Hatchery Airport (31 mi. SSW of Bend at Fall River)
- Gopher Gulch Airport (3 mi. NW of Bend)
- Pine Ridge Ranch Airport (5 mi. NE of Sisters)
- The Citadel Airport (9 mi. NE of Sisters)
- St. Charles Heliport (2 mi. E of Bend at the Medical Center)
- Whippet Field Airport (6 mi. NE of Sisters)
- La Pine Heliport (S edge of La Pine)
- Freight Wagon Field Airport (5 mi. S. of Redmond)
- Sage Ranch Airport (9 mi. SE of Sisters)
- Cinder Butte Heliport (3.4 mi. N of Redmond)

Airfreight Service

Airfreight is available at the Redmond Airport through United Express and Horizon Air. Express package services are provided by Federal Express (FedEx), Airborne, United Parcel Service (UPS), and the U.S. Postal Service Express Mail.

Table 2.2.T13

Roberts Field – Redmond Municipal Airport
Enplanements 1987-1997

ROBERTS FIELD - REDMOND MUNICIPAL AIRPORT

ANNUAL ENPLANEMENTS (boardings) 1987-1997

Month	1986	1987	1988	1994	1995	1996	1997	10-Year Average Per Year Growth	94 - '97 Average Per Year Growth
January	1,882	4,002	4,880	6,988	7,869	8,510	8,610	18%	7%
February	1,696	4,507	4,627	6,335	10,477	8,813	8,526	23%	15%
March	1,895	5,218	5,136	7,086	8,567	8,748	9,062	22%	9%
April	1,628	4,337	4,530	6,651	7,194	7,791	8,630	22%	9%
May	1,800	3,919	4,136	6,755	8,150	8,308	9,105	19%	11%
June	1,907	4,135	4,880	8,118	9,435	9,507	9,834	19%	7%
July	1,954	3,935	4,803	8,671	10,254	10,052	9,968	18%	5%
August	2,079	4,375	5,497	9,527	11,067	10,531	10,730	19%	4%
September	2,212	3,438	4,460	8,434	8,375	9,843	9,965	16%	6%
October	1,970	3,165	4,241	7,864	8,456	9,014	9,175	16%	5%
November	3,187	2,964	4,130	7,386	7,621	7,578	n/a		
December	3,619	4,408	5,081	8,917	8,309	8,835	n/a		
Total	**25,829**	**48,403**	**56,401**	**92,732**	**105,774**	**107,530**	**93,605**	**17%**	**8%**

Source: City of Redmond

Table 2.2.T14

Deschutes County Public Use Airport Inventory

Airport	Redmond[1]	Bend[2]	Sunriver	Sisters
Planning Classification	SCSB	MGA	MGA	SGA
Number of Runways	2	1	1	1
Runway Surface	Asphalt	Asphalt	Asphalt	Asphalt
Lights	HIRL	MIRL	LIRL	None
Runway Elevation	3,077'	3,453'	4,159'	3,168'
Approach Type	Precision (P) and Non-Precision (NP)	Visual (V) and Non-Precision (NP)	Non-Precision (NP)	Visual (V)
Annual Operations (Est.)	35,000	28,800	10,800	1,400
Runway Length	(#4-22) 7,040' (P) (#10-28) 7,000' (NP)	5,005'	5,500'	3,550
Runway Width	150'	75'	65'	50'
Imaginary Surfaces				
PS – Primary Surface	1,000'x7,400'	500'x5,405'	500'x5,900'	250'x3,950'
RPZ – Runway Protection Zone	(P) 1,000'x2,500'x1,750' (NP) 500'x1,700'x1,010'	(NP) 500'x1,000'x800' (V) 500'x1,000'x650'	(NP) 500'x1,700'x1,010'	(V) 250'x1,000'x450'
Precision Approach Surface	1,000'x40,000'x16,000'			
Non-Precision Approach Surface	500'x10,000'x3,500'	(#16) 500'x10,000'x3,500'	500'x10,000'x3,500'	
Visual Approach Surface		(#34) 500'x5,000'x1,250'		250'x5,000'x1,250'
Horizontal Surface (Radius)	10,000'	10,000'	10,000'	5,000'
Horizontal Surface (Elevation above sea level)	3,227'	3,603'	4,309'	3,318'
Conical Surface (irregular)	7:1 slope	7:1 slope	7:1 slope	7:1 slope

Classification (Planning Template):	Standard Assumptions: Runway Length	Annual Operations	Approach Type
SGA = Small General Aviation Airport	3,000'	10,000	Visual
MGA= Medium General Aviation Airport	5,000'	30,000	Non-Precision (one min.)
SCSB= Small Commercial Service/Business Airport	6,000'	50,000	Precision (one min.)

Sources: ODOT Airport Land Use Compatibility Guidelines, November 1994; and Deschutes County, 1997

[1]Data derived from Airport Master Plan Update 1988-2008.

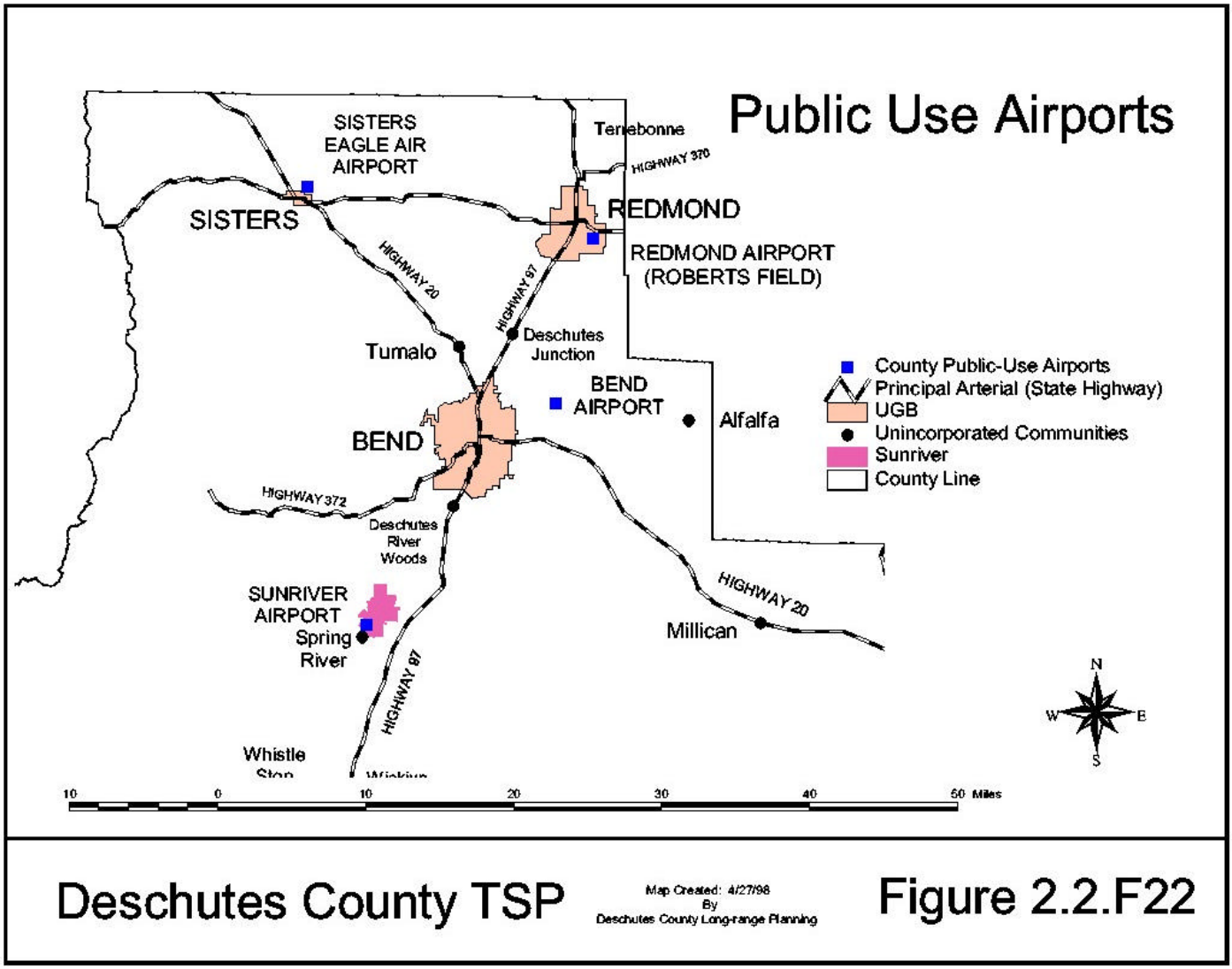
[2]Data derived from Bend Municipal Airport Master Plans, 1980 and 1994

WATER-BORNE TRANSPORTATION

No commercial river transport services or port districts are located in Deschutes County.

PIPELINE TRANSPORTATION

The Pacific Gas Transmission Company operates two natural gas transmission lines from Canada to California that generally follow the Highway 97 corridor through Deschutes County.



Deschutes County TSP

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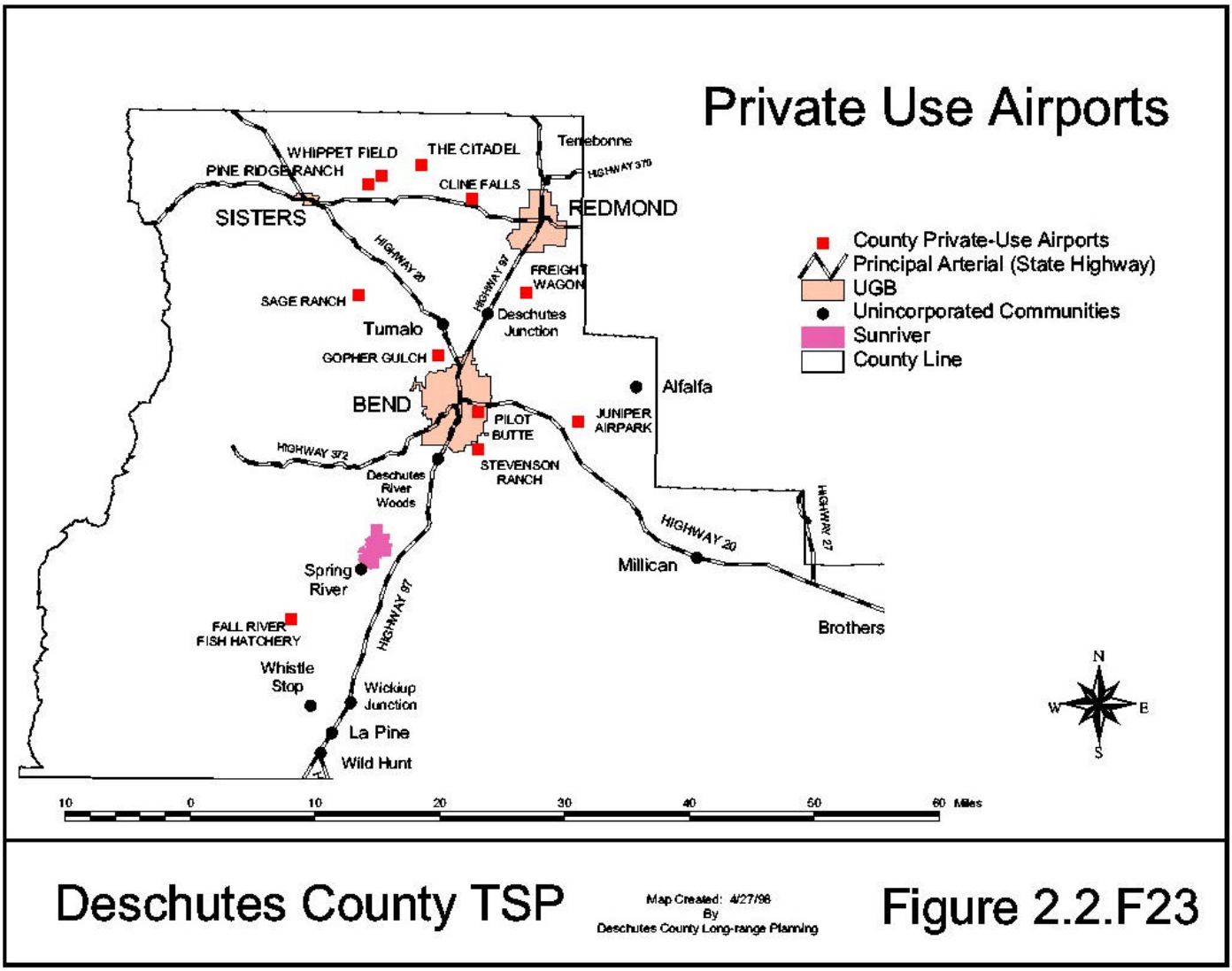
Figure 2.2.F22



Deschutes County TSP

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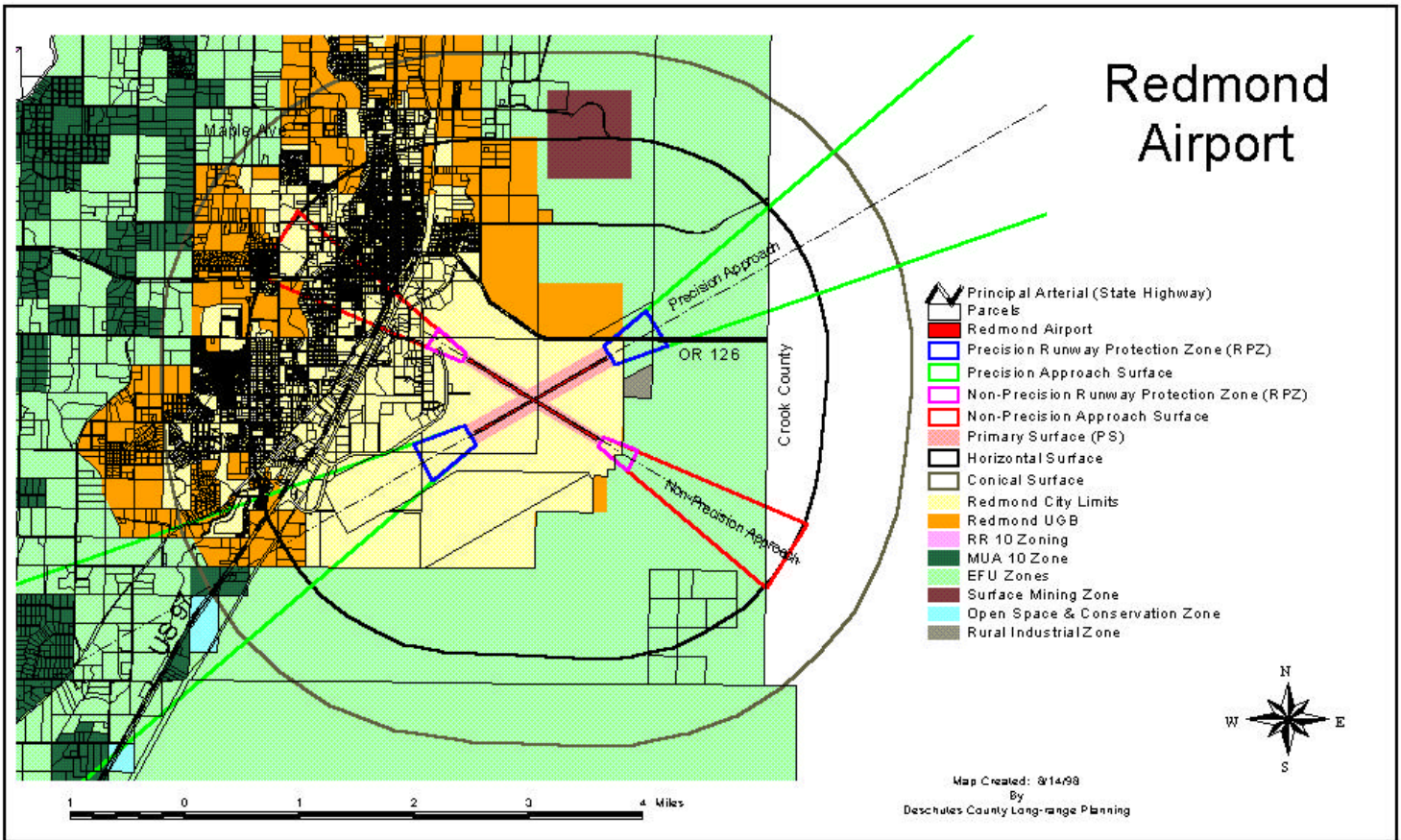
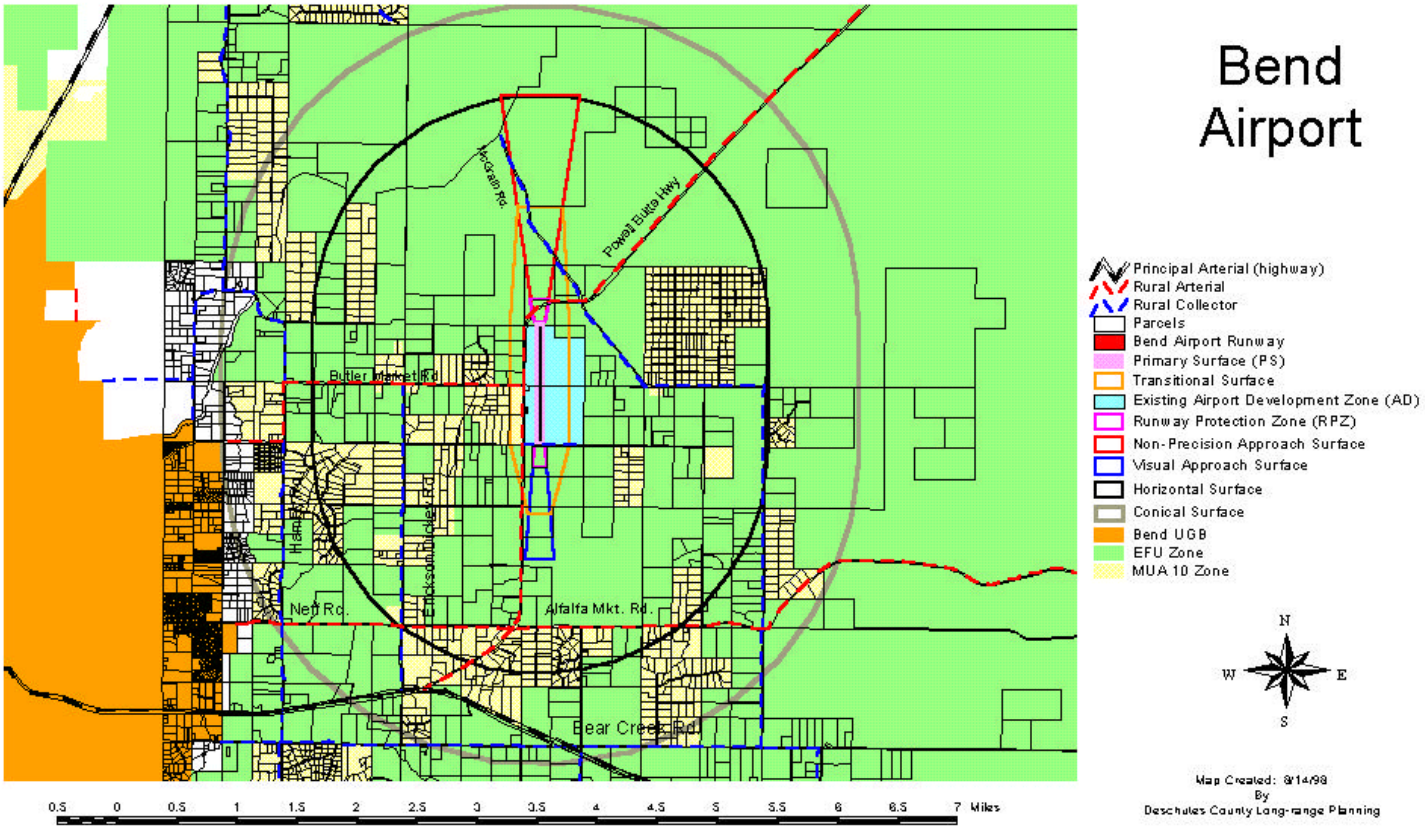
Figure 2.2.F23



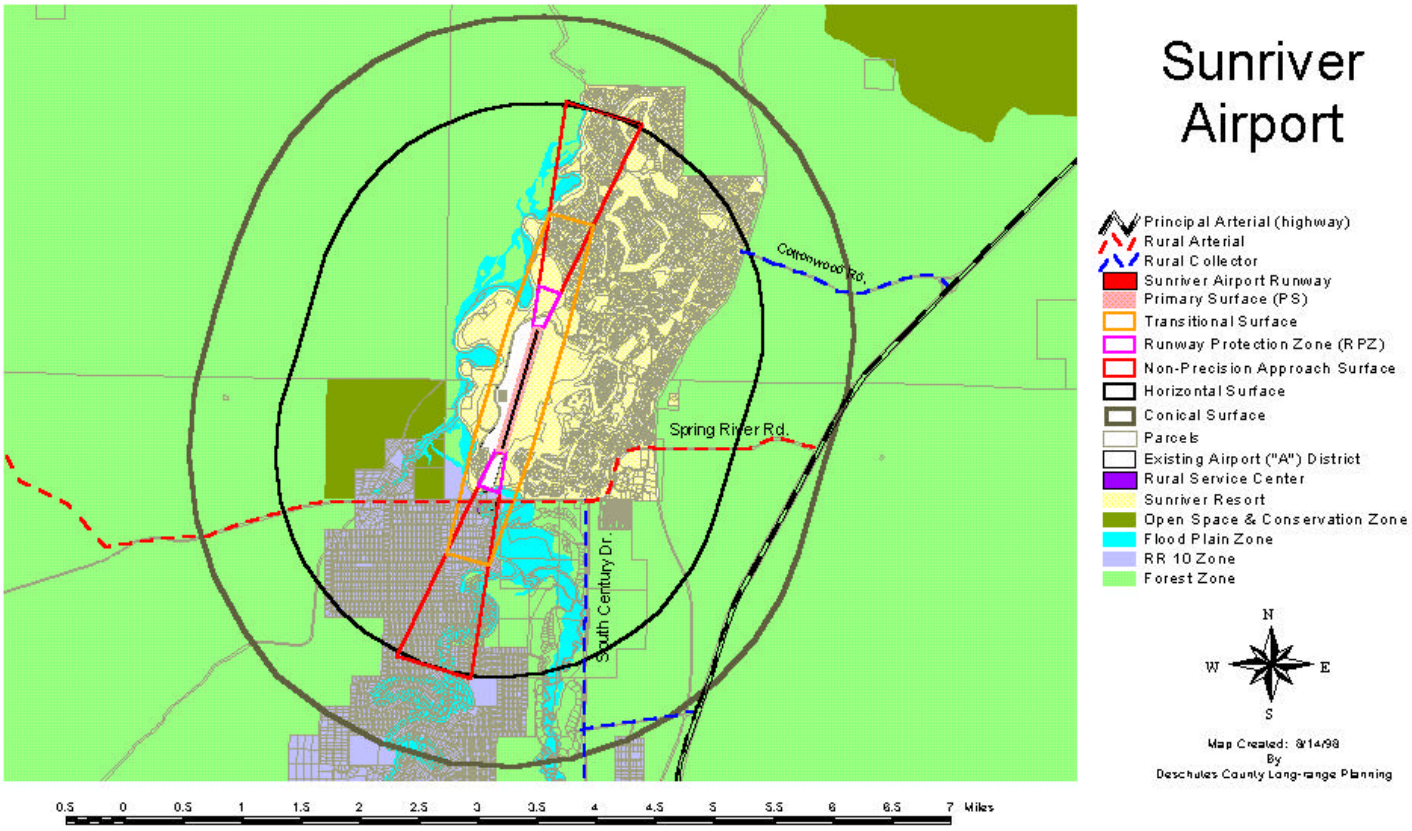
Deschutes County TSP

Figure 2.2.F24a



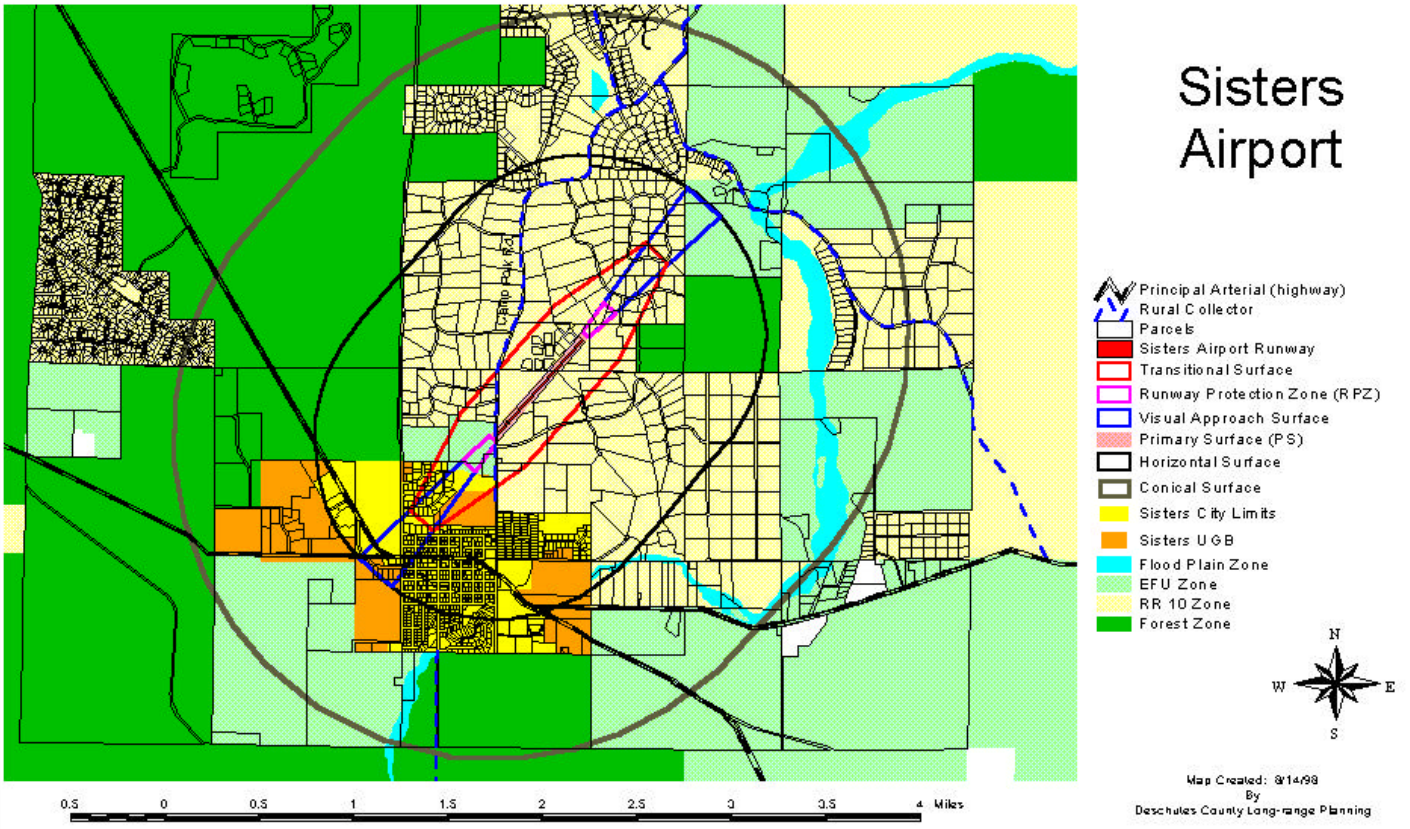
Deschutes County TSP

Figure 2.2.F24b



Deschutes County TSP

Figure 2.2.F24c



Deschutes County TSP

Figure 2.2.F24d

2.3 EXISTING LAND USE, POPULATION AND EMPLOYMENT

ANALYSIS OF EXISTING LAND USES AND VACANT LANDS

From the review of land use patterns, locations, densities and types of development, staff is able to analyze the current travel patterns in the county and the transportation needs of the residents. A key element in this analysis is the identification of all vacant developable land and currently platted parcels within the county. Developable land in the county occurs in several different land-use categories. The focus of this chapter is the identification of the Unincorporated Communities, the MUA-10 and RR-10 zones (Exception Areas), and the other areas that also have some development potential. The location of these developable parcels and vacant land has a bearing on where future county residents will live and work.

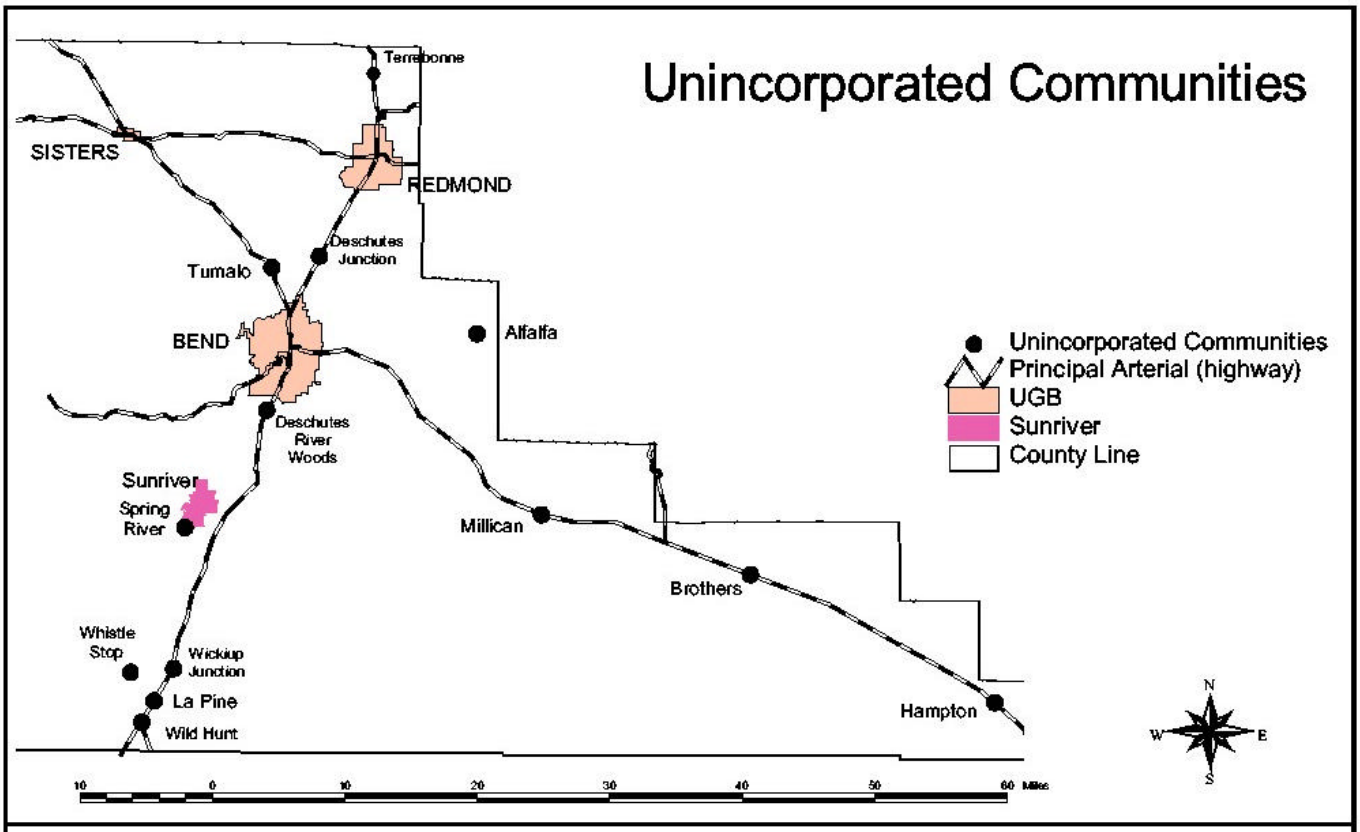
Current Land Use Patterns

In general, Deschutes County has historically developed in a linear pattern along the main highways that traverse the county. The Highway 97 corridor from Terrebonne south to La Pine is the most developed, followed by the Highway 20 corridor between Sisters and Bend. Most of the development in the County is confined to a three-mile wide band along the major highways. Bend, Sisters and Redmond have developed into regional nodes that provide goods and services for the larger geographic areas that surround them. These cities have urban growth boundaries (UGBs) which limit residential and commercial development to specific densities and locations. The County TSP addresses the areas outside of the UGBs.

Unincorporated Communities (UC)

Some unincorporated areas in the County have developed and remained as local-serving commercial uses, providing goods and services geared specifically for the surrounding rural residential and farming uses. These local-serving communities are defined by OAR 660-22 as Unincorporated Communities. However, not all UCs are categorized the same. The County maintains land use data on every property in the County, with special consideration devoted to the UCs because these are the only areas outside of UGBs that can develop commercial and industrial uses. In the County, there are 13 designated Unincorporated Communities (Figure 2.3.F1 and Table 2.3.T1), under the following subcategories:

- ***Urban Unincorporated Community -*** La Pine, Sunriver
- ***Rural Community -*** Terrebonne, Tumalo
- ***Rural Service Center -*** Wickiup Junction, Alfalfa, Brothers, Hampton, Millican, Spring River and Whistle Stop
- ***Resort –*** Black Butte Ranch, Inn of the Seventh Mountain
- ***Other Exception Areas –*** Wild Hunt, Deschutes Junction and Deschutes River Woods



Deschutes County TSP

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Figure 2.3.F1

Table 2.3.T1
Unincorporated Community Summary

Community	Total Existing Lots	Total Developed Lots	Total Vacant Lots	Properties With Development Constraints	Total Area (acres)	Potential New Lots	New Lot % of Total
Alfalfa	5	2	3	0	21	1	0%
Black Butte Ranch	1,290	1,140	150	174	1,830	150	3%
Brothers	2	1	1	2	49	14	0%
Deschutes Junction	4	2	2	4	19	3	0%
Deschutes River Woods	2	1	1	1	5	10	0%
Hampton	3	3	0	3	95	57	1%
Inn of the 7th Mountain	473	371	102	465		102	2%
La Pine	404	232	172	4	969	1,269	**29%**
Millican	1	1	0	1	36	28	1%
Spring River	19	4	15	19	12	0	0%
Sunriver	4,338	3,311	1,027	858	3,373	0	0%
Terrebonne	569	409	160	60	786	1,233	**28%**
Tumalo	270	155	115	270	700	1,354	**31%**
Whistle Stop	10	7	3	10	8	2	0%
Wickiup Junction	55	26	29	53	79	92	2%
Wild Hunt	5	5	0	2	2	17	0%
Total	**7,450**	**5,670**	**1,780**	**1,068**	**7,983**	**4,332**	**100%**

The individual UC's vary in the extent of current development and degree of development potential. Areas such as La Pine have over a thousand potential new lots (if public water and sewer were available) versus communities like Millican with 28 potential lots. Table 2.3.T1 shows that Tumalo, La Pine and Terrebonne are the rural service centers that possess the most potential for regional impact from the development of new lots (mostly residential) in the County.

Activity Centers

The individual trip purposes of County residents were not identified in the Oregon Travel Behavior Study. However, studies in other areas have shown that the main sources of vehicle trips are journeys to work, school and shopping. The activity centers for the unincorporated communities are mainly schools (La Pine, Terrebonne and Tumalo) and local-serving retail. The fringe areas of urban growth boundaries (UGB) also attract trips from rural residents who rely on schools and services there.

MUA-10 AND RR-10 EXCEPTION AREAS

The remaining unincorporated properties in the County, outside of UGBs and Unincorporated Communities, are either developed with low density residential, recreational, or agricultural uses, or are vacant.

Of the existing lots that can be developed, most are found in the Rural Residential 10-acre minimum (RR-10) and Multiple Use Agricultural 10-acre minimum (MUA-10) zones (Figure 2.3.F2). In 1979 the county identified lands that were not suitable for commercial farm or forest use. These lands are known as "exception areas" because they are excepted from Statewide Planning Goals 3 (agriculture) and 4 (forest). There are currently 23,995 tax lots in these zones, and of those, 10,814 (45%) are vacant. Eighty percent (80%) of the existing vacant residential lots are less than one acre in size, and can still be developed (barring any other land use constraints) even though they now fall in a 10-acre minimum zone.

The exception area locations roughly correspond to the Unincorporated Communities previously identified, but cover much more area. Table 2.3.T2 identifies the distribution of the existing MUA-10 and RR-10 lots in the exception areas throughout the County. The table indicates that the most of the lots are less than one acre in size, and are located in the South County areas of Sunriver South and La Pine North. Based on the number of existing vacant lots in these two areas alone, the potential exists for the development of approximately 6,300 new residences. While many of the existing lots have development constraints (i.e., floodplain), the actual development potential remains high.

Currently, there are 252 existing 20+ acre, divisible tax lots in the County. If these lots were legally divided, there would only be 739 (approx.) new ten-acre lots created, amounting to less than ten percent (10%) of the total vacant parcels in the County.

Potential Impact

The analysis of *potential development impact areas* (PDIAs) is addressed under the population projection section in Chapter 3. Oregon State University students under an ODOT grant, which paralleled the work done by Deschutes County Staff, identified in the previous section, identified the PDIAs. When the cumulative effect of both the rural service centers and the MUA-10/RR-10 zones are considered together, the development potential becomes clearer. Table 2.3.T3 summarizes the overall impact of the amount of vacant, developable land in the County. Future PDIA impacts to specific roads is addressed in Chapter 3.

Addressed separately, the UC and MUA-10/RR-10 areas have different types of development potential. The UCs have the most potential for the creation of new lots (of varying sizes) with the least constraints to development. These UC areas occur primarily in Tumalo and Terrebonne. The MUA-10 and RR-10 areas have the most vacant existing lots, but also have more constraints to development. These exception areas are mostly in the South County between Sunriver and La Pine.

Table 2.3.T2
MUA-10 and RR-10 Exception Area Data

MUA-10 Exception Area	Total Lots	Developed Lots	Vacant Lots	Constrained Lots	Lots < 1 acre	Potential New Lots	% of Total Lots
Plainview	669	434	235	273	331	35	0.5%
Terrebonne	981	598	383	313	700	25	0.4%
Tumalo	1,442	1,061	381	769	794	84	1.4%
Bend East	1,525	1,310	215	72	890	10	0.2%
Redmond West	1,498	1,134	364	707	1,167	30	0.5%
MUA-10 Total	6,115	4,537	1,578	2,134	3,882	184	3.0%
RR-10 Exception Area							
Deschutes River Woods	2,553	1,646	907	1,144	2,494	92	0.5%
La Pine North	6,234	3,457	2,777	6,718	5,585	23	0.1%
Sisters	2,015	1,135	880	690	1,541	201	1.1%
Bend East	813	390	423	2	637	106	0.6%
Bend North/Tumalo	730	321	409	362	601	51	0.3%
Redmond/Terrebonne	483	210	273	239	344	64	0.3%
Sunriver South	5,052	1,485	3,567	5,025	4,861	18	0.1%
RR-10 Total	17,880	8,644	9,236	14,180	16,063	555	3.0%
MUA-10 & RR-10 Total	**23,995**	**13,181**	**10,814**	**16,314**	**19,945**	**739**	

Table 2.3.T3
UC / MUA-10 / RR-10 Cumulative Potential Impacts

County Land Category	Total Existing Lots	% of Total	Total Developed Lots	Total Vacant Lots	Potential New Lots	% of Total	Properties with Constraints
Unincorporated Communities	3,112	11%	2,359	753	4,332	85%	1,068
MUA-10	6,115	23%	4,537	1,578	184	4%	2,134
RR-10	17,880	66%	8,644	9,236	555	11%	14,180
Total	**27,107**	**100%**	**15,540**	**11,567**	**5,071**	**100%**	**17,382**
Potential New Development (vacant lots + potential lots)					**16,638**		

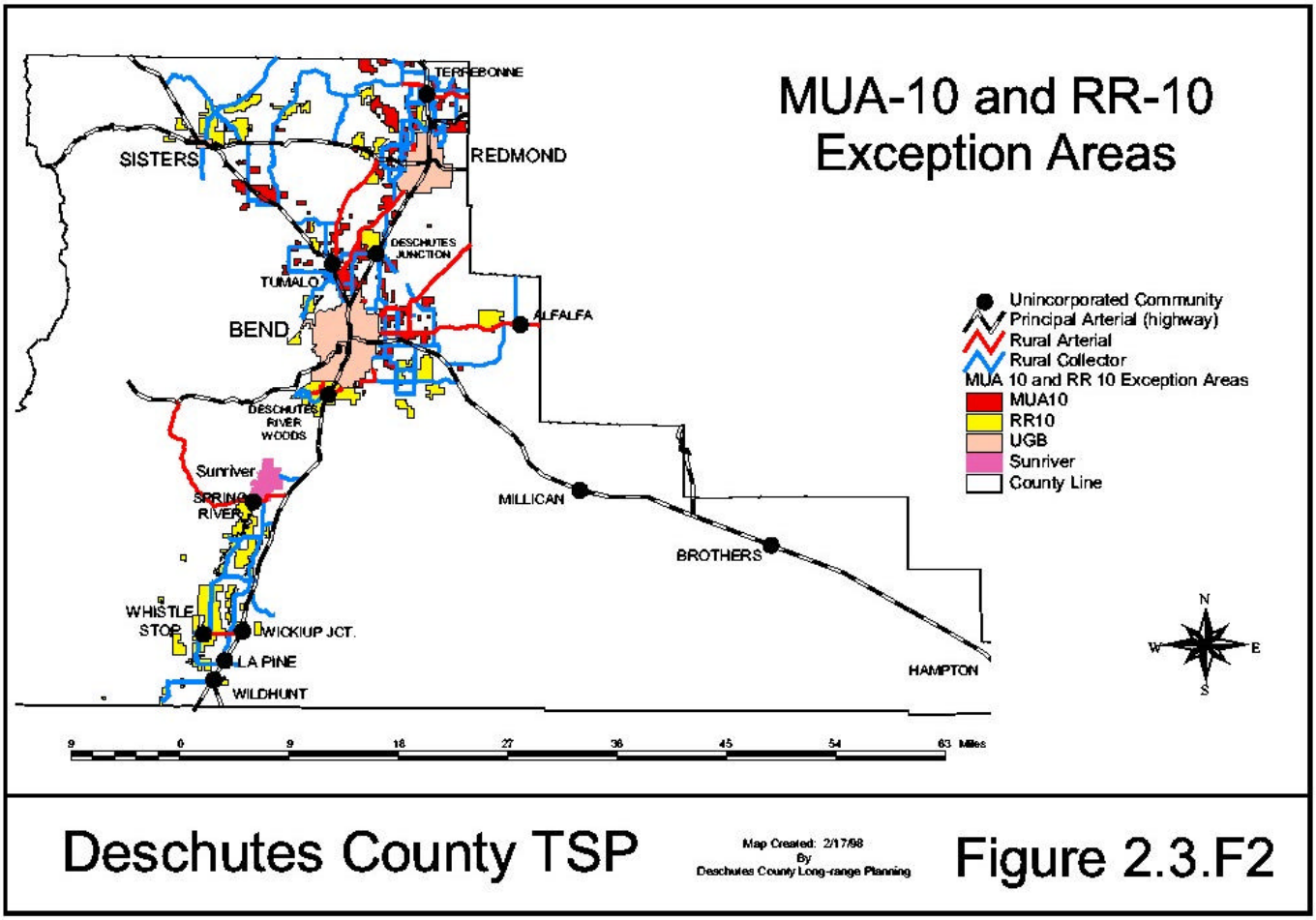

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Figure 2.3.F2

Development Constraints

In Deschutes County, several types of overlay zones exist, whose purpose it is to guide the location, or siting of new development on particular properties in an effort to lessen the impact of that development. Examples of zones which could influence MUA-10 and RR-10 areas include:

- ***Flood Plain Zone (FP)*** – Seeks to protect the public from the hazards associated with flood plains; to conserve important riparian areas along rivers and streams for the maintenance of fish and wildlife resources; and to preserve significant scenic and natural resources while balancing the public interests with those of individual property owners in the designated areas.

- ***Landscape Management Combining Zone (LM) -*** to maintain scenic and natural resources of the designated areas and to maintain and enhance scenic vistas and natural landscapes as seen from designated roads, rivers and streams.

- ***Wildlife Area Combining Zone (WA)*** - to conserve important wildlife areas in Deschutes County; to protect an important environmental, social and economic element of the area; and to permit development compatible with the protection of the wildlife resource. Examples include deer winter range areas, significant elk habitat, and antelope range and deer migration corridors.

- ***Surface Mining Impact Area Combining Zone (SMIA) -*** to protect the surface mining resources of Deschutes County from new development which conflicts with the removal and processing of a mineral and aggregate resource while allowing owners of property near a surface mining site reasonable use of their property.

- ***Airport Height Combining Zone (AH) -*** to protect persons and property on the ground in the airport environs, as well as pilots using the airport facilities. This combining zone also seeks to preserve the function of public-use airports as increased development pressure around airports continues to threaten their existence.

These zones generally have the effect of guiding rather than precluding development. On the other hand, in some County locations, the issue of septic system feasibility does have the potential to limit development. Taken as a whole, the combination of existing vacant lots and potential new lots in UC's and MUA-10/RR-10 areas could have a significant impact on the function of the County's transportation system. Since most of the exception area lots are located in relatively compact corridors in the County, if even half of the 16,638 lots develop, the resulting 41,600-66,552 potential new daily auto trips (5-8 trips per day per dwelling) could put a strain on existing transportation facilities in the future.

Other Development Areas

Outside of the RR-10 and MUA-10 zones, much of the remaining land in the county falls into the Exclusive Farm Use (EFU) or Forest Use (FU) zones (Figure 2.3.F5), and as such, should not develop with a significant amount of residential use. In spite of the RR-10 and MUA-10 development potential, the vast majority of county land still remains in public

ownership (United States Forest Service, Bureau of Land Management, State of Oregon), and therefore is unlikely to be developed.

Figure 2.3.F6 identifies the County lands that are currently zoned either Open Space (OS) or Flood Plain (FP). For all practical purposes, Open Space properties have minimal development potential, while Flood Plain areas will allow structural development with a Conditional Use Permit if an alternative location outside the flood plain in not available.

Another potential development area is the Rural Industrial (RI) and Surface Mining (SM) areas shown on Figure 2.3.F5. Even though these parcels are spread throughout the county, they do not amount to a significant amount of developable land. These parcels generally have the potential for localized impacts to the surrounding communities, rather than impacts to the region as a whole.

POPULATION

Each year, The Center for Population Research and Census at Portland State University estimates population for each city and county in Oregon. Deschutes County reviews the draft estimates and adjusts the estimates according to local trends before the final numbers are released. The 1995 estimates for each incorporated city and the total county are shown in Table 2.3.T4

Historically, the U.S. Census has recorded Deschutes County population every decade since 1920. Over the past 70 years, the population has increased an average of 37 percent every ten years, and as high as 104 percent between 1970 and 1980. In fact, Deschutes County has been the fastest growing county in Oregon for many years. Over that same 70-year period, the percentage of people living in the unincorporated areas of the County has steadily decreased relative to the urban areas. Although countywide population growth is expected to continue, the rate is expected to taper off as developable rural land is used up. Growth that will occur will be focused in the urban areas as they build out and slowly increase density.

Table 2.3.T4
Deschutes County Population

Jurisdiction	***1995 Population***
Sisters Urban Area	945
Redmond Urban Area	12,585
Bend Urban Area	39,720
Unincorporated Area	40,850
County Total	**94,100**

EMPLOYMENT

Current employment data for Deschutes County were derived from the 1996 Central Oregon Factbook and the Central Oregon Area Profile published by the Central Oregon Economic Development Council. Total employment in the County for 1995 equaled 34,608 employees. Of the largest employers in the County, only a few are located outside of the urbanized areas of Bend, Redmond or Sisters. Some of the companies have a dispersed workforce, but a main

office located within an urban area. It is anticipated that the quality of life factors that have been drawing a skilled workforce to Deschutes County for many years will continue. That same attractiveness also contributes to the higher than average unemployment rate due to the number of available workers. The 1995 County unemployment rate was at 7 percent, compared to 4.8 percent for all of Oregon and a national average of 5.6 percent. Table 2.3.T5 identifies the significant rural area employers.

Table 2.3.T5
Deschutes County Significant Rural Employers

Employer	Location	Number of Employees
Bend-La Pine School District	Primarily Bend	1,600
Mt. Bachelor (seasonal)	Mt. Bachelor	850
State of Oregon	Primarily Bend	762
Deschutes County	Primarily Bend	650
Deschutes National Forest	Primarily Bend	627
Sunriver Resort	Sunriver	600
Black Butte Ranch	Black Butte Ranch	184
Inn of the 7th Mountain	Bend Area	170
Major Employer Total		**5,443**

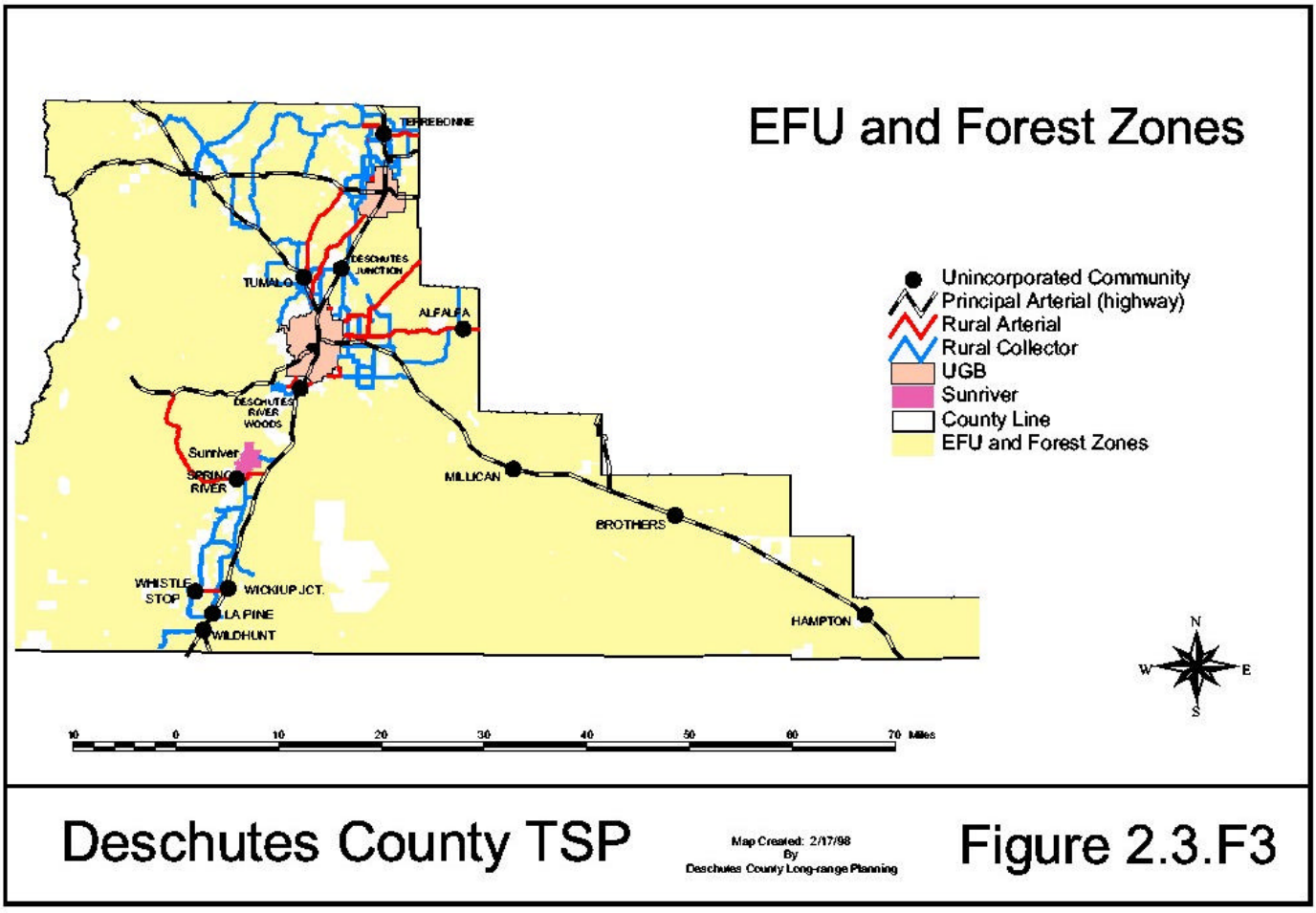

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Figure 2.3.F3

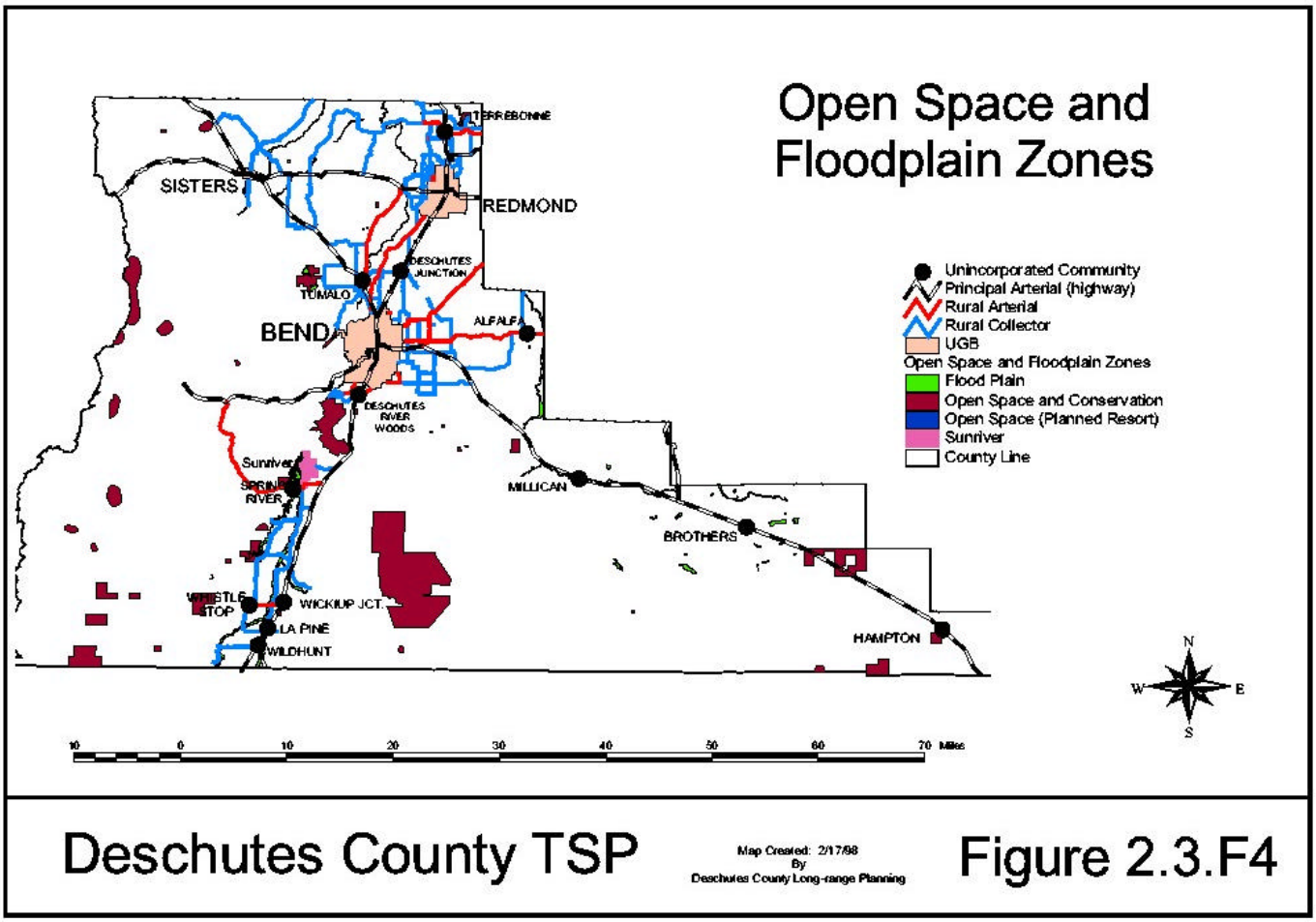

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Figure 2.3.F4

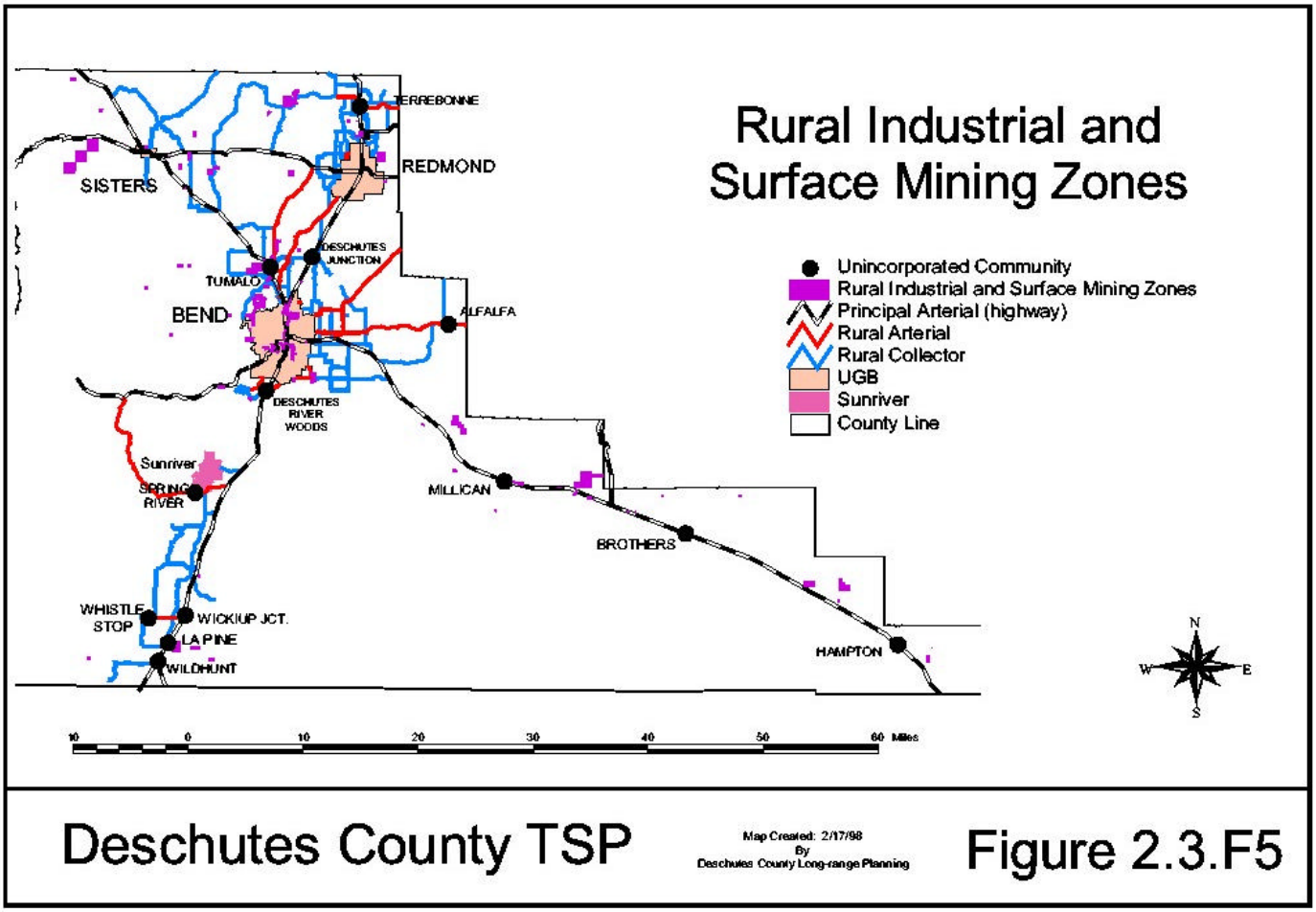

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Figure 2.3.F5

How employees currently get to work is an important factor involved when addressing the future transportation needs of the County. Deschutes County "journey to work" trip data from the 1990 Census for each of the incorporated cities, and the County in general, are presented in Table 2.3.T6. The results indicate that solo drivers dominate work trips in the County, particularly the unincorporated areas. This is not surprising given the lack of a traditional fixed-route public transit system, a generally low density residential development pattern, marginal winter weather, ample free work site parking and lack of significant vehicle traffic congestion. All these factors lead to a lack of commuter incentive to carpool, bike, or walk to work, or telecommute.

According to the 1990 Census, in spite of the disincentives to using alternative modes, Deschutes County did achieve a 21.5% mode split when looking at all the alternatives to driving alone to work. The time it takes employees to travel to work gives an indication of how far their commute is and if there is an opportunity to capture some of those trips with alternate modes. Table 2.3.T7 shows the comparison between communities and the unincorporated area based on information from the 1990 Census.

On average, bicycle and walking are possible alternatives to vehicular travel when the trip distance is 3 miles or less for cycling trips or ½ mile for walking, which equates to approximately 10 minutes of vehicular travel. It is likely that home to work commute times currently greater than 10 minutes are not good candidates for alternative modes. A more reasonable approach would be to target those employees with demand management techniques such as telecommuting and ridesharing. Based on the data, the unincorporated areas have the least propensity for alternative modes such as walking and cycling based on the lower percentage of travel times less than 10 minutes. However, it is the percentage of bicycling and walking trips that the State Transportation Plan targets for Deschutes County to double over current levels.

Table 2.3.T6

1990 Deschutes County Journey To Work Trip Mode									
Trip Type		Bend	%	Redmond	%	Sisters	%	**Unincorporated**	**%**
Private Vehicle	Drive Alone	7,852	75%	2,323	75%	164	58%	**28,975**	**78%**
Carpool		1,343	13%	400	13%	46	16%	**4,766**	**13%**
Motorcycle		19	0.2%	10	0.3%	0	0.0%	**62**	**0.2%**
Public Transit		31	0.3%	0	0.0%	0	0.0%	**63**	**0.2%**
Bicycle		263	2.5%	18	0.6%	11	3.9%	**436**	**1.2%**
Walk		497	4.8%	160	5.2%	39	13.8%	**1,146**	**3.1%**
Other		62	0.6%	35	1.1%	0	0.0%	**270**	**0.7%**
Work at Home		359	3.4%	155	5.0%	22	7.8%	**1,558**	**4.2%**
Total Trips		**10,426**	**100%**	**3,101**	**100%**	**282**	**100%**	**37,276**	**100%**

Table 2.3.T7

1990 Deschutes County Travel Time To Work								
Travel Time	**Bend**	**%**	**Redmond**	**%**	**Sisters**	**%**	**Unincorporated**	**%**
< 10 minutes	3,261	32%	1,212	41%	145	56%	8,148	23%
10 – 20 minutes	5,106	51%	655	22%	23	9%	16,241	45%
> 20 minutes	1,709	17%	1,079	37%	92	35%	11,347	32%
Total Commuters	10,076	100%	2,946	100%	260	100%	35,736	100%

OREGON TRAVEL BEHAVIOR SURVEY

In general, rural areas normally lack data regarding the travel behavior of residents. The U.S. Census database has a limited usefulness due to the configurations of the tracts used to group the information and the age of the 1990 data. 1n 1996, ODOT funded a consultant study to perform a travel behavior phone survey of rural residents in eight counties in Oregon. The survey respondents kept a travel diary for two days, documenting their trip frequency, characteristics and purpose. A total of 1,208 households were recruited to do the survey, with an actual 775 completing valid surveys. The full report is included in Appendix E. The following is a report summary:

Surveys Completed	775 households
Representative zip codes	97701, 02, 07, 56, 59, & 60
Overall response rate	32%
Average Trip Generation	8 trips per household per day
Percentage who telecommute	8%
Percentage with flexible /shift work schedules	32%
Percentage full or part time students	24%
Percentage who use private vehicle	88.3%
Percentage who walk	6.5%
Percentage who bike	0.8%
Percentage who use something else	4.4%

3. TRANSPORTATION FORECAST

3.1 GENERAL BACKGROUND

Travel forecasting generally involves a series of data inputs, conversion of the data into future *vehicle* or *person* trips over some future planning period and distribution and assignment of those trips to the road network. In most urbanized areas, the transportation modeling process is done with computer programs that can be highly refined to deal with small geographic areas. Within Deschutes County, both Bend and Redmond have benefited from the use of computer modeling to forecast future road volumes. In those places, the urban areas could be divided into small, multi-block areas known as *traffic analysis zones*. In simple terms, once the traffic analysis zones or "TAZs" are identified, the computer assigns trips to those zones based on whether an individual zone has more trip *attractions* (employment, retail, etc.) or *productions* (residential). Finally, the computer identifies the expected traffic volumes on the affected streets. However, the drawbacks to computer modeling for a large county include the expense, the inaccuracy of the data and the timeliness of data updates.

Currently, there is no travel forecasting computer model for the unincorporated areas of Deschutes County. Without a model, two basic alternatives could be used. The simplest "trending" alternative is to project historical traffic growth trends out towards some future year. The other, "cumulative analysis" alternative, involves the use of existing traffic, historical growth rates, population, employment and dwelling unit forecasts, and the location of likely future growth, to project traffic. *Potential development impact areas* (PDIAs) and the County Geographic Information System (GIS) database were used to identify the future growth areas. Under an ODOT grant, students from Oregon State University identified PDIAs throughout Deschutes County in 1995. For the most part, PDIAs are groupings of exception areas that are currently zoned by the County as either: RR10, MUA10 or UC. The results of the PDIA analysis turned out approximately the same as the results of the rural exception land inventory that was done concurrently by Deschutes County. The majority of the land under these zones is already subdivided with individual lots, many less than one to two acres in size. Any land that exists within these zones that is not currently subdivided, and has the potential to be subdivided or partitioned, would need to meet the ten-acre minimum lot size. The vacant existing lots and the potential new lots (ten-acre) were added together to estimate the potential number of dwellings that could be expected in these areas. Depending on the area and existing road volumes, either one or both analysis methods were utilized to reach the final projections.

Where practical, staff divided the PDIA areas into groups (Figures 3.1.F1-F4) that could be expected to add traffic onto selected County roads. The roads identified for analysis were those that had significant traffic volumes in 1996 based on their current functional classification and level of improvement. The PDIA areas, combined with the most recent existing traffic volumes, formed the basis for the analysis used to arrive at the future road volumes. Both analysis methods were used to come up with a reasonable traffic projection. While not as precise as a computer model, this *cumulative* analysis method does give a relatively good idea of future traffic impacts using the best available data.

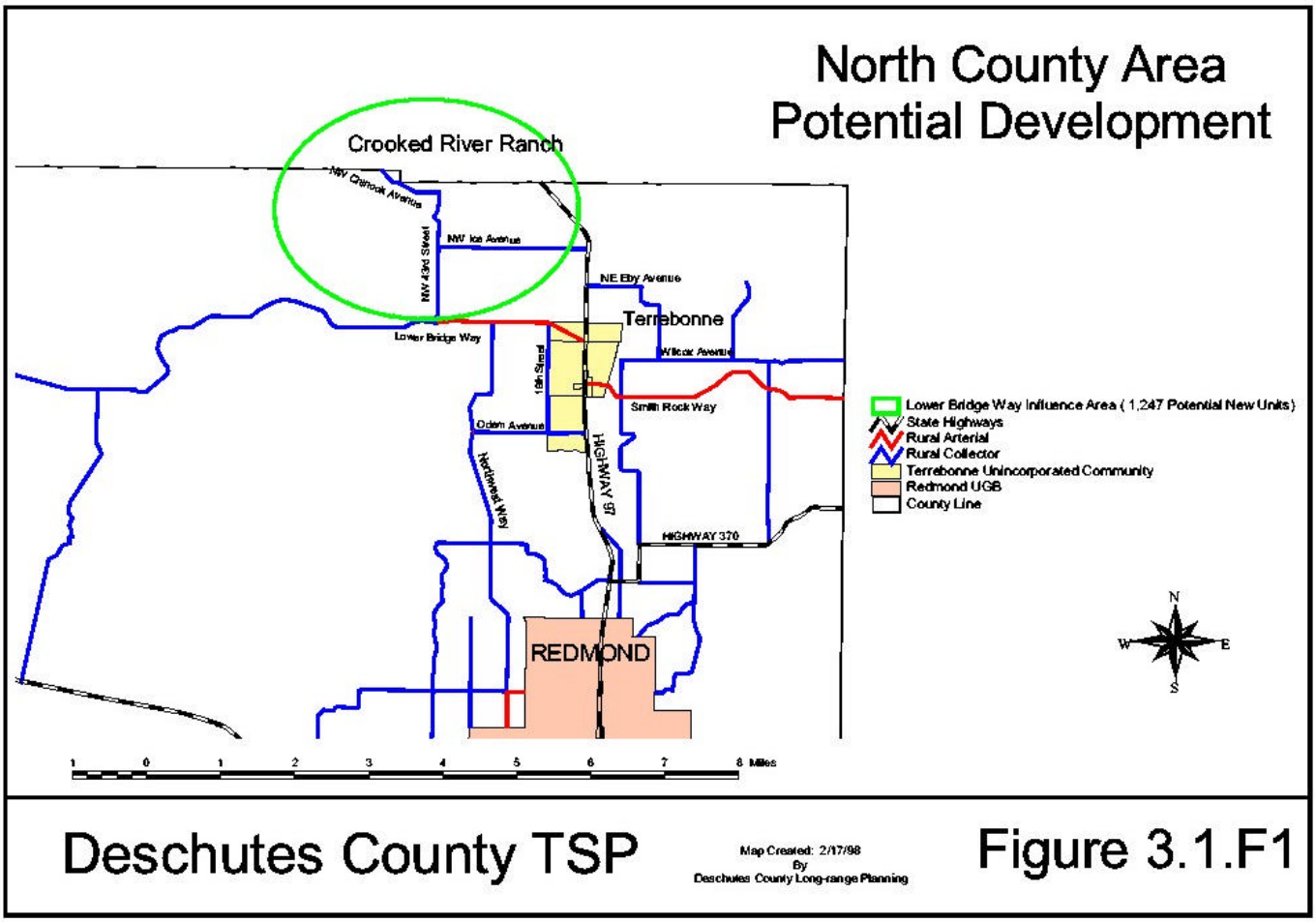

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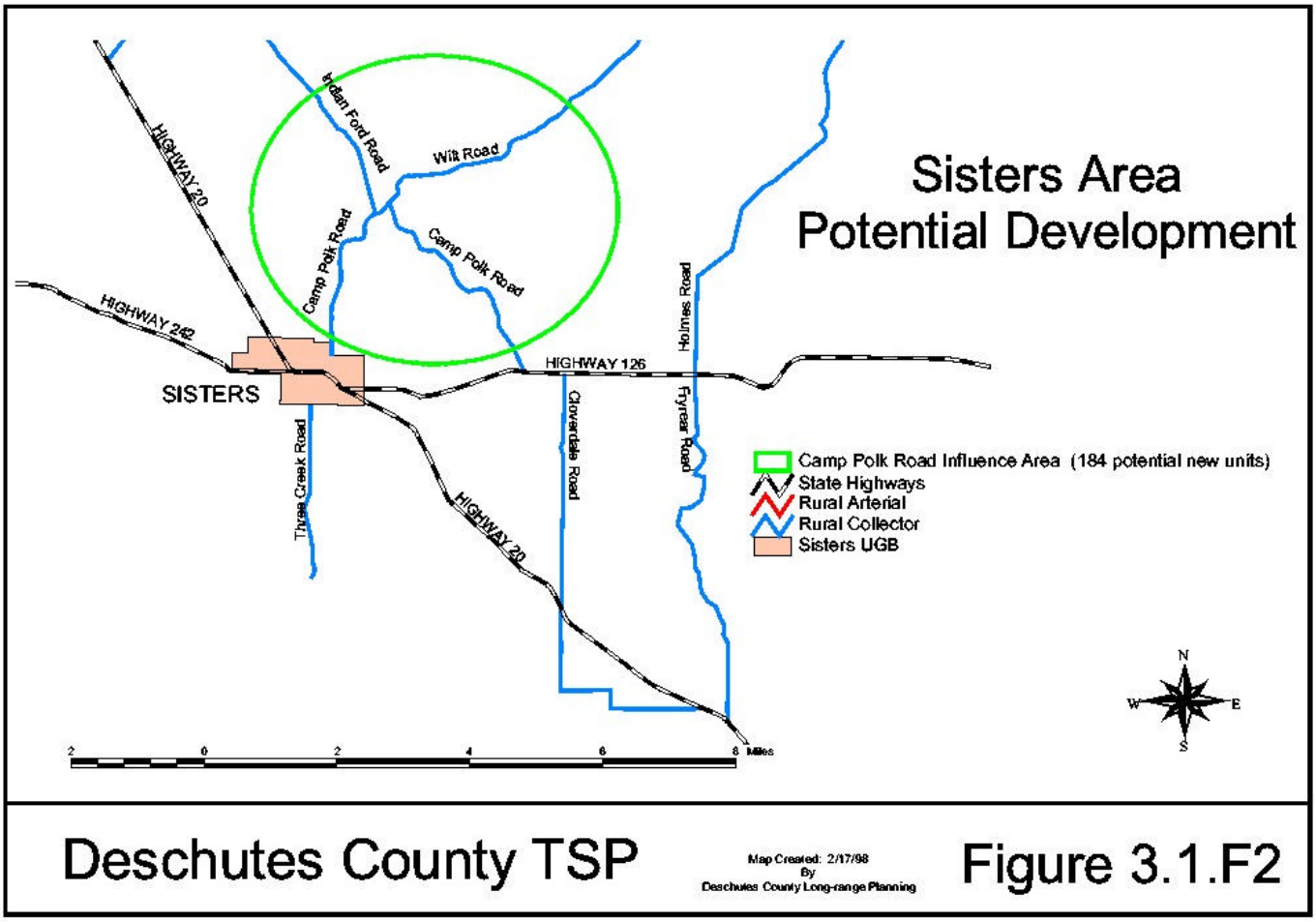
Figure 3.1.F1



Deschutes County TSP

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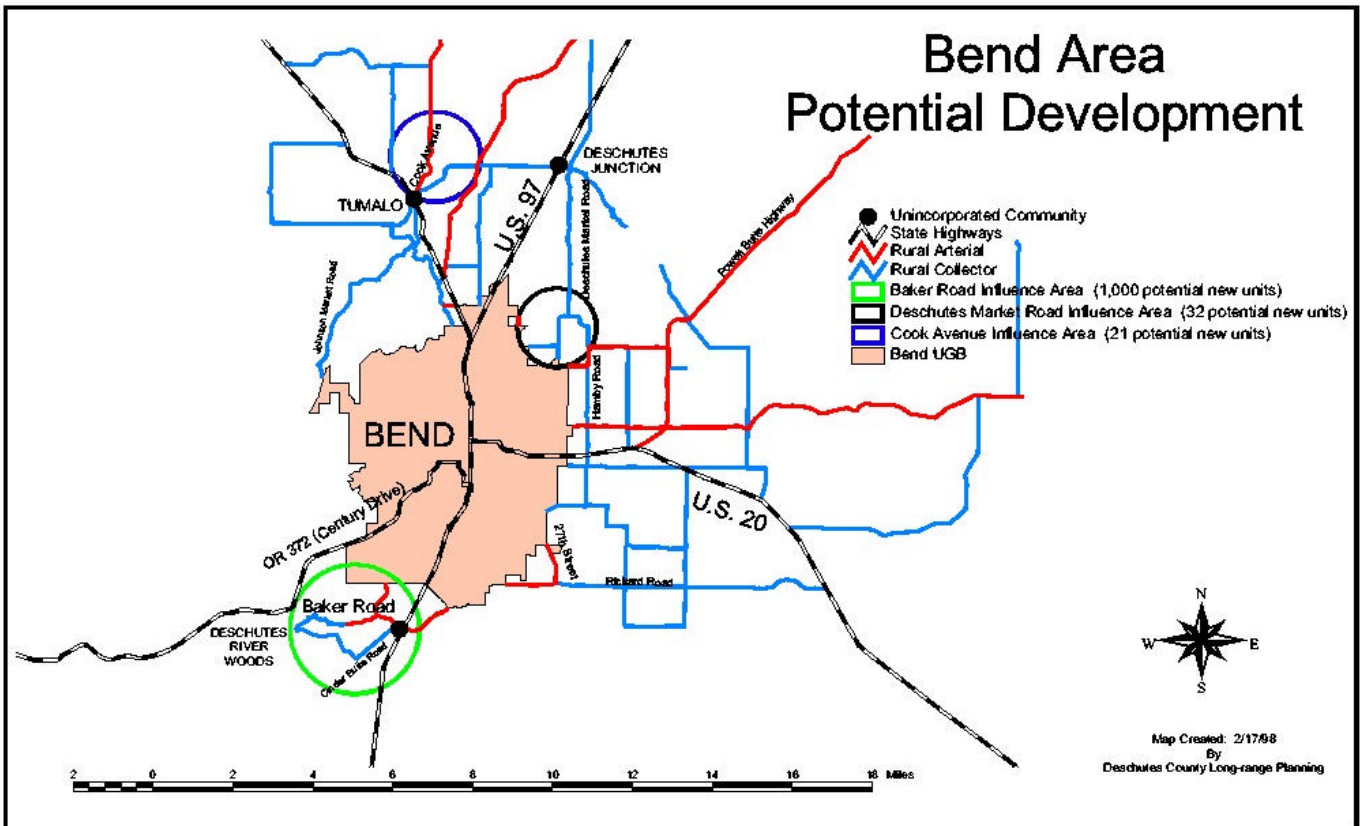
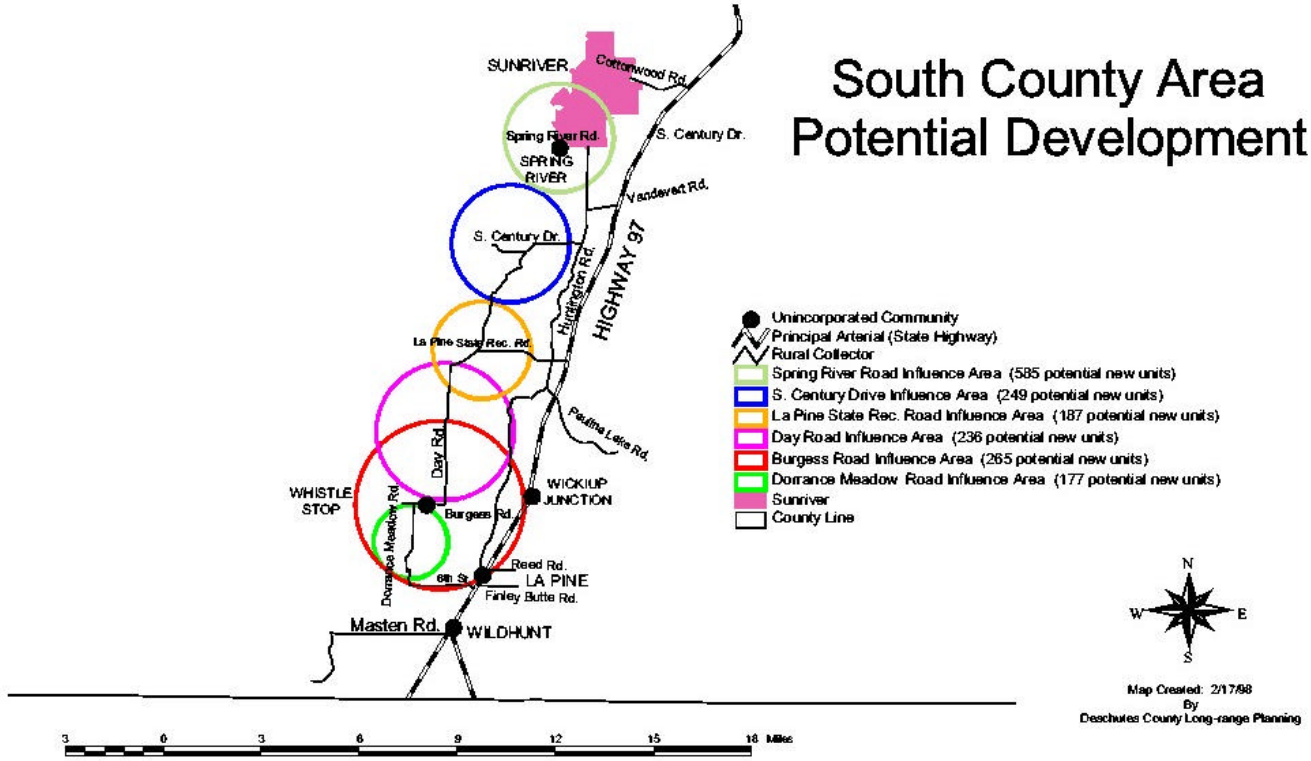
Figure 3.1.F2



Deschutes County TSP

Figure 3.1.F3



Deschutes County TSP

Figure 3.1.F4

3.2 POPULATION AND EMPLOYMENT FORECAST

POPULATION FORECAST

Historically, the U.S. Census has recorded Deschutes County population every decade since 1920. Although countywide population growth is expected to continue, the rate is expected to taper off as developable rural land is used up. The majority of new residential growth will be focused in the urban areas as they build out and slowly increase density. Table 3.2.T1 and Table 3.2.T2 indicate the trend of reduced overall population growth and the reduced share of the countywide population in the unincorporated areas of the County relative to the urban areas. The rapid growth of rural subdivisions in the 1960's and 1970's has been effectively halted through implementation of state land use laws in the early 80's. Therefore, the growth that will occur is expected to continue building out existing platted lots rather than creating new subdivisions.

As stated previously in Chapter 2, the Center for Population Research and Census at Portland State University estimates population for each county in Oregon. The draft forecast is circulated to cities and counties for comment before final adoption. Deschutes County refined the state forecast by coordinating with each of the cities in Deschutes County to come up with a revised forecast. The population projections were allocated between the cities and the unincorporated areas to arrive at a coordinated population forecast, which was then submitted back to the state. The state then revised its estimates and approved the final population estimates, which are shown in Table 3.2.T3.

Table 3.2.T1

Historic Deschutes County Population (Cities)							
Jurisdiction	**1970**	**1980**	***% Growth '70-'80***	**1990**	***% Growth '80-'90***	**1995**	***% Growth '90-'95***
City of Sisters	516	696	*34%*	679	*1%*	775	*9%*
City of Redmond	3,721	6,452	*73%*	7,163	*11%*	10,585	*47%*
City of Bend	13,710	17,263	*25%*	20,469	*18%*	30,630	*49%*
Cities Total	***17,947***	***24,411***	***36%***	***28,311***	***16%***	***41,990***	***48%***
Unincorporated Area (Rural+UGB)	**12,495**	**37,731**	***201%***	**46,647**	***23%***	**52,110**	***11%***
County Total	30,442	62,142	*104%*	74,958	*20%*	94,100	*25%*

Table 3.2.T2

Projected Deschutes County Population (*Urban Areas*)							
Jurisdiction	**1990**	**1995**	***2000***	***2005***	***2010***	***2015***	***2016***
Sisters UGB	900	945	1,095	1,262	1,391	1,539	1,568
Redmond UGB	8,635	12,585	17,186	22,515	28,204	32,409	33,250
Bend UGB	32,558	39,720	46,447	52,428	57,861	63,330	64,424
UGBs Total	***40,093***	***53,250***	***64,728***	***76,205***	***87,456***	***97,278***	***99,242***
Unincorporated Area (Exception Areas + UCs)	**32,865**	**40,850**	**48,118**	**56,638**	**63,774**	**69,936**	**71,168**
County Total	74,958	94,100	112,846	132,829	151,230	167,231	172,427

Table 3.2.T3

Projected Deschutes County Population (*Cities*)							
Jurisdiction	**1990**	**1995**	***2000***	***2005***	***2010***	***2015***	***2016***
City of Sisters	679	775	902	1,025	1,148	1,271	1,298
City of Redmond	7,163	10,585	14,501	18,852	23,753	27,388	28,226
City of Bend	20,469	30,630	35,929	40,240	44,667	49,044	50,006
Cities Total	***28,311***	***41,990***	***51,332***	***60,117***	***69,568***	***77,703***	***79,530***
Unincorporated Area (Rural+UGB)	**46,647**	**52,110**	**61,675**	**72,712**	**81,662**	**89,528**	**92,898**
County Total	74,958	94,100	112,846	132,829	151,230	167,231	172,427

Table 3.2.T4

Deschutes County Population Distribution (Cities)								
Jurisdiction	**1970**	***Share of Total***	**1980**	***Share of Total***	**1990**	***Share of Total***	**1995**	***Share of Total***
City of Sisters	516	*2%*	696	*1%*	679	*1%*	775	*1%*
City of Redmond	3,721	*12%*	6,452	*10%*	7,163	*10%*	10,585	*11%*
City of Bend	13,710	*45%*	17,263	*28%*	20,469	*27%*	30,630	*33%*
Cities Total	***17,947***	***59%***	***24,411***	***39%***	***28,311***	***38%***	***41,990***	***45%***
Unincorporated Area (Rural+UGB)	**12,495**	***41%***	**37,731**	***61%***	**46,647**	***62%***	**52,110**	***55%***
County Total	**30,442**		**62,142**		**74,958**		**94,100**	

Table 3.2.T5

Historic Deschutes County Housing Unit Data[1]								
Jurisdiction	**1970 Housing Units**	**1980 Housing Units**	**1990 Housing Units**	**Average Annual Growth**	**Vacant Units**	***% Vacant***	**Occupied Units**	**Persons per Occupied Unit**
City of Sisters	251	369	370	2%	81	22%	289	2.35
City of Redmond	1,440	2,678	2,932	5%	90	3%	2,842	2.52
City of Bend	5,039	7,848	9,004	4%	478	5%	8,526	2.40
Cities Total	***6,730***	***10,895***	***12,306***	***3%***	***649***	***5%***	***11,657***	***2.43***
Unincorporated Area (Rural+UGB)	**4,833**	**17,213**	**23,622**	**20%**	**6,062**	**26%**	**17,576**	**2.65**
County Total	**11,563**	**28,108**	**35,928**	**11%**	**6,711**	**19%**	**29,217**	**2.57**

Once the population forecasts are developed, the housing units can then be forecasted. The occupied or vacant status of housing units becomes an important criterion in determining the impact of current as well as future growth. While not significant in the urban areas, the number of vacant housing units in the unincorporated area, as shown in Table 3.2.T5, is relatively high.

[1] Sources: 1990 US Census and Deschutes County.

The high number of vacancies is related to the proliferation of seasonal, second or vacation homes that occur in the unincorporated areas. The high number of vacant units would tend to skew the population per housing unit numbers if the analysis used the *total* housing units rather than *occupied* units. The housing unit forecast depends on the actual build out of the developable lots and land as well as the rate of development. Staff did not have housing unit and vacancy rate data for the exception areas by themselves, so staff estimated that the current population per occupied housing unit ratio (*2.65*) and vacancy rate (*26%*) for the exception areas would be approximately the same as the rates for the Rural+UGB areas. These rates were assumed to remain constant over time, therefore, the future rural population (*30,318*) was divided by the housing unit ratio (*2.65*) to come up with the future number of units needed. This assumption is valid so long as the number of future units does not exceed capacity.

Future Capacity:	***15,937- 4,144 (vacant)***	***= 11,793 units***
Future Need:	***30,318 people / 2.65***	***= 11,441 units***
		352 surplus units

Table 3.2.T6 identifies the number of housing units needed in the unincorporated areas to accommodate the anticipated population increase by 2016.

Historical building permit information from Deschutes County for the five-year period between 1990 to 1994 shows that 750 new homes were constructed per year on average. If this rate of development continues throughout the twenty-year planning horizon, theoretical buildout of all available lots would occur in approximately twenty-one years. When the number of non-buildable lots are considered, the buildout of available lots could occur sooner.

Based on the analysis, the projections are sufficiently close to warrant the assumption of full build-out by 2016.

EMPLOYMENT FORECAST

Based on projections from the State Department of Economic Analysis, employment in Deschutes County is expected to remain healthy through 2016. The number of jobs added to the Central Oregon economy will keep pace with the increase in population over the same time period. The state expects that Deschutes County's share of jobs statewide will grow slightly through 2016 then flatten out and ultimately drop slightly through 2040. Table 3.2.T7 identifies the non-agricultural employment forecast for Deschutes County, while Table 3.2.T8 shows the historical and projected distribution of jobs within the County, and assumes that the ratio of jobs to population remains the same over time.

Table 3.2.T6

Projected Unincorporated Area Housing Units								
Jurisdiction	**1990 Population**	**1995 Population**	**Projected 2016 Population**	**2016 Additional Population Since 1995**	**1990 Persons per Occupied Unit**	**2016 Additional Units Needed**	**Build-out Reserve Housing Units**	
							Vacant @ 26%	**Available**
Unincorporated Area (Exception Areas)	**32,865**	**40,850**	**71,168**	**30,318**	**2.65**	**11,441**	**4,144**	**11,793**
County Total	74,958	94,100	172,427				**15,937**	

Table 3.2.T7

Deschutes County Non-Agricultural Employment Forecast									
Jurisdiction	**1990**	**1995**	***2000***	***2005***	***2010***	***2015***	***2020***	***2030***	***2040***
State Total	1,244,600	1,416,900	1,601,718	1,718,659	1,814,276	1,882,653	1,947,702	2,094,256	2,253,736
Deschutes County	**32,793**	**40,936**	**51,000**	**61,000**	**69,000**	**74,500**	**79,000**	**84,000**	**86,500**
Percent of State Total	2.6%	2.9%	3.2%	3.5%	3.8%	4.0%	4.1%	4.0%	3.8%

Source: State of Oregon, Office of Economic Analysis, January 1997

Table 3.2.T8

Deschutes County Employment Distribution Forecast (Cities)								
Jurisdiction	**1990**	**1995**	***2000***	***2005***	***2010***	***2015***	***2016***	***% of Total***
City of Sisters	273	338	420	503	568	614	622	0.8%
City of Redmond	2,725	3,372	4,194	5,016	5,674	6,126	6,209	8.2%
City of Bend	10,103	12,500	15,549	18,597	21,036	22,713	23,018	30.5%
Cities Subtotal	*13,101*	*16,210*	*20,163*	*24,116*	*27,278*	*29,453*	*29,849*	*39.5%*
Deschutes River Woods CDP	**1,045**	**1,293**	**1,608**	**1,924**	**2,176**	**2,349**	**2,381**	**3.2%**
Three Rivers CDP	**550**	**680**	**846**	**1,012**	**1,145**	**1,236**	**1,253**	**1.7%**
Terrebonne CDP	**386**	**478**	**594**	**711**	**804**	**868**	**879**	**1.2%**
UGBs	**17,711**	**22,275**	**27,789**	**33,237**	**37,597**	**40,594**	**41,138**	**54.5%**
Unincorporated Area (Rural+UGBs)	***19,692***	***24,726***	***30,837***	***36,884***	***41,722***	***45,047***	***45,651***	***60.6%***
County Total	**32,793**	**40,936**	**51,000**	**61,000**	**69,000**	**74,500**	**75,500**	**100%**

Note: CDP= census designated place

Table 3.2.T8 shows that a small portion (6.1%) of the total number of jobs within Deschutes County are located outside the UGBs in the unincorporated areas. Historically and currently, the UGBs continue to be the leading employment locations in the County and will continue to be in the foreseeable future. The data indicate that work trips from the rural residential areas will continue to be drawn to the cities and UGBs.

3.3 TRAFFIC FORECAST

As discussed previously, the lack of a computerized traffic model for the unincorporated areas of Deschutes County led to a cumulative analysis process to be used as a predictor of future traffic volumes. The County was divided up into sections that enabled a more focused traffic analysis. The areas to be analyzed generally followed the mapped areas identified in the Chapter 2 inventories of arterials and collectors. The traffic forecasts were only applied to the more significant County arterials and collectors in terms of current and potential ADT, and all the Access Oregon Highways (AOH) state highway segments. Where practical, the PDIA analysis started with the most current traffic volume data available for state and County roads. The number of possible new residential units were then converted to vehicle trips (@ 8 trips/unit), then those trips were allocated to the road network at a rate of three percent (3%) per year until theoretical buildout. Using an ADT rate of 8 trips/unit in this analysis is based on results for Deschutes County from the Oregon Travel Behavior Survey (Appendix E). The commonly used national average of 9.6 trips/unit is based on mostly urban uses. The result is future year average daily trip (ADT) road volumes, and peak hour volumes at major intersections. Where the PDIA analysis was used, the results were averaged with trend results to come up with the final forecast. In other areas that were not practical for PDIA analysis, only the 20-year trend projection was used to arrive at the final estimates.

DESCHUTES COUNTY ROADS FORECAST

The results of the County road forecast identify very few road segments that are projected to operate at volumes beyond reasonable capacity. It was assumed that any road segment with fewer than 9,600 projected ADT would operate at a LOS of "D" or better, and that LOS "D" is acceptable for County arterial and possibly some collector roads. Of all the County roads, only Baker Road leading into Deschutes River Woods is projected to operate at LOS "E" in 2016. Additional roads *approaching* LOS "E" are located in the South County and include Burgess Road west of Huntington Road in La Pine and South Century Drive near Sunriver. As most County roads consist of only two lanes, the road volumes (ADT) can be directly tied to level of service (LOS) for analysis purposes. Significant County road volumes are identified in Table 3.3.T1 and on Figures 3.3.F1-F3. The complete listing of traffic and LOS projections is in Appendix I.

ODOT STATE HIGHWAY FORECAST

ODOT provides yearly traffic counts on all the state highways running through Deschutes County. The 1996 traffic tables were used as a basis for future highway traffic projections. The ODOT Transportation Planning Section provided future (2016) traffic (ADT) and level of service (LOS) estimates for each of the state highways in Deschutes County. For the analysis, it was assumed that truck percentage, directional distribution and geometrics remain the same throughout the planning horizon. ODOT used historical growth rates based on the last twenty years of traffic volume table data. The yearly growth ranged from 0.0 to 11.4 percent. It was also assumed that the number of access points remained constant. Whereas the County road analysis related LOS directly to ADT levels, several highway segments may have high ADT levels but a correspondingly low LOS because of the presence of multilane and passing lane sections. Therefore, the most important analysis tool for highway sections becomes the LOS value rather than ADT. For multilane sections in the County, the forecasted traffic volumes are well within the capacity limits through the year 2016. However, several sections of the state

highways will be reaching capacity thresholds for two-lane sections. The sections projected to approach capacity and operate at level of service (LOS) “D” or worse are:

- Highway 126 through downtown Sisters and on either side of the City of Redmond,
- Most of Highway 20/126 between the Jefferson County line, through Sisters and Bend to Powell Butte Highway,
- Highway 97 from the Jefferson County line through Terrebonne,
- Highway 97 from Cottonwood Drive south to central La Pine, and
- Highway 372 from Bend to Dillon Falls Road on the way to Mt Bachelor.

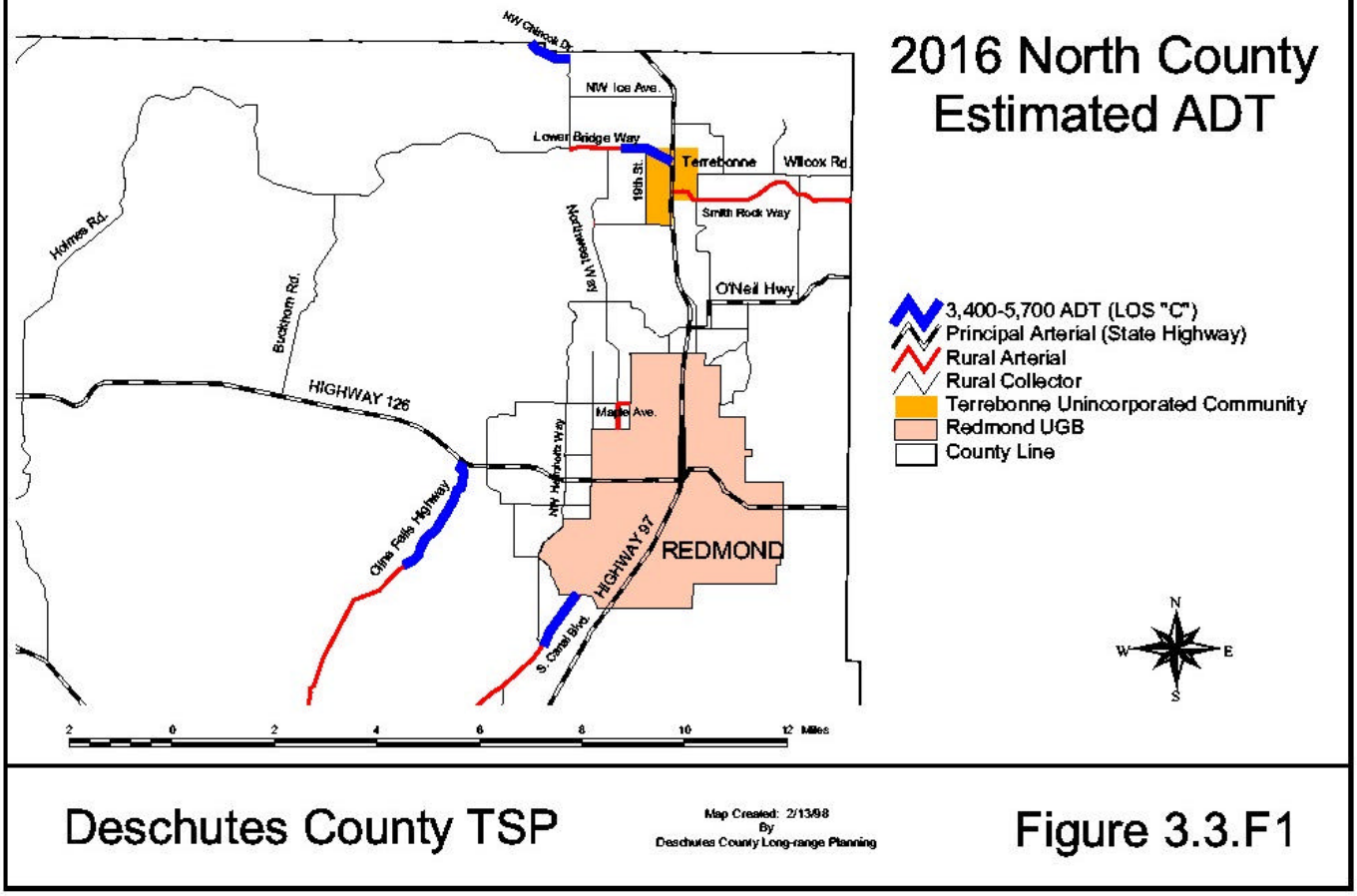
The highway road volumes are identified in Table 3.3.T2 and on Figure 3.3.F4.

Table 3.3.T1
Top County 2016 Rural Road Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
1	3006-10		BAKER RD	HWY 97	LAKEVIEW DR	13,660	1,366	Collector	E
2	3161-50	SE	27TH ST	FERGUSON RD	RICKARD RD	10,630	1,063	Arterial	E
3	4106-20		BURGESS RD	PINE DR	GLENWOOD DR	9,550	955	Collector	D
4	4106-30		BURGESS RD	GLENWOOD DR	LOST PONDEROSA RD	8,290	829	Collector	D
5	3006-20		BAKER RD	LAKEVIEW DR	SHOSHONE RD E	7,180	718	Collector	D
6	4112-10		SOUTH CENTURY DR	SEWAGE TREATMENT RD	SPRING RIVER RD	7,170	717	Collector	D
7	4106-40		BURGESS RD	LOST PONDEROSA RD	DEER FIELD DR	7,040	704	Collector	D
8	4101-30		HUNTINGTON RD	BURGESS RD	EVERGREEN LN	7,020	702	Collector	D
9	2177-10		LOWER BRIDGE WAY	HWY 97	NW 27TH ST	6,710	671	Arterial	D
10	2303-10	NW	CHINOOK DR	NW 43RD	.05 MILE WEST OF 43RD	6,240	624	Collector	D
11	4106-50		BURGESS RD	DEER FIELD DR	STEARNS RD	5,790	579	Collector	D
12	1171-10		COOK AVE	TUMALO RD	HWY 20	5,650	565	Collector	C
13	4192-10		SPRING RIVER RD	SOUTH CENTURY DR	SOLAR DR	5,540	554	Collector	C
14	1148-80		CLINE FALLS HWY	UGB – TUMALO	TUMALO RD	5,280	528	Collector	C
15	4112-25		SOUTH CENTURY DR	VANDEVERT RD	HUNTINGTON RD	5,120	512	Collector	C
16	3181-70		DESCHUTES MARKET RD	YEOMAN RD	BUTLER MARKET RD	5,100	510	Arterial	C
17	3181-50		DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	5,075	508	Arterial	C
18	3181-60		DESCHUTES MARKET RD	J D ESTATES DR	YEOMAN RD	5,075	508	Arterial	C
19	3181-40		DESCHUTES MARKET RD	UGB – BEND	HAMEHOOK RD	5,050	505	Arterial	C
20	3181-20		DESCHUTES MARKET RD	DALE RD	PIONEER LOOP	5,000	500	Arterial	C
21	3181-30		DESCHUTES MARKET RD	PIONEER LOOP	UGB - BEND	5,000	500	Arterial	C
22	4111-10		DAY RD	BURGESS RD	NORTHWOOD DR	4,970	497	Collector	C
23	3181-10		DESCHUTES MARKET RD	HWY 97	DALE RD	4,930	493	Arterial	C
24	4112-30		SOUTH CENTURY DR	HUNTINGTON RD	SNOW GOOSE RD	4,890	489	Collector	C
25	4106-10		BURGESS RD	HWY 97	PINE DR	4,800	480	Collector	C
26	1148-70		CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	4,640	464	Collector	C
27	3518-45		POWELL BUTTE HWY	MCGRATH RD	BUTLER MARKET RD	4,620	462	Arterial	C
28	4112-05		SOUTH CENTURY DR	HWY 97	SEWAGE TREATMENT RD	4,610	461	Collector	C
29	3518-60		POWELL BUTTE HWY	NEFF RD	HWY 20	4,560	456	Arterial	C
30	4106-60		BURGESS RD	STEARNS RD	DORRANCE MEADOW RD	4,545	455	Collector	C
31	3182-60		BUTLER MARKET RD	UGB – BEND	HAMBY RD	4,380	438	Arterial	C
32	2130-40	S	CANAL BLVD	SW HELMHOLTZ WAY	SW 61ST ST	4,310	431	Arterial	C
33	4111-20		DAY RD	NORTHWOOD DR	DEEDON RD	4,280	428	Collector	C
34	1148-60		CLINE FALLS HWY	CONNARN RD	EDGE HILL DR	4,250	425	Collector	C
35	4101-40		HUNTINGTON RD	BURGESS RD	UGB - LAPINE	4,220	422	Collector	C
36	3022-10		CINDER BUTTE RD	BAKER RD	LAKEVIEW RD	4,105	411	Collector	C
37	3518-35		POWELL BUTTE HWY	MILE POINT	MILE POINT	4,000	400	Arterial	C
38	3518-40		POWELL BUTTE HWY	MILE POINT	MCGRATH RD	4,000	400	Arterial	C
39	3518-50		POWELL BUTTE HWY	BUTLER MARKET RD	ERICKSON RD	4,000	400	Arterial	C

Code:	**ADT:**	**LOS:**
	> 16,300	F
	9,600 - 16,300	E
	5,700 - 9,600	D
	3,400 - 5,700	C
	1,700 - 3,400	B
	< 1,700	A

Note: Numbers are Deschutes County estimates. LOS estimates are based on the Highway Capacity Manual and a 10% peak hour traffic flow being modified to establish a desirable flow.



Deschutes County TSP

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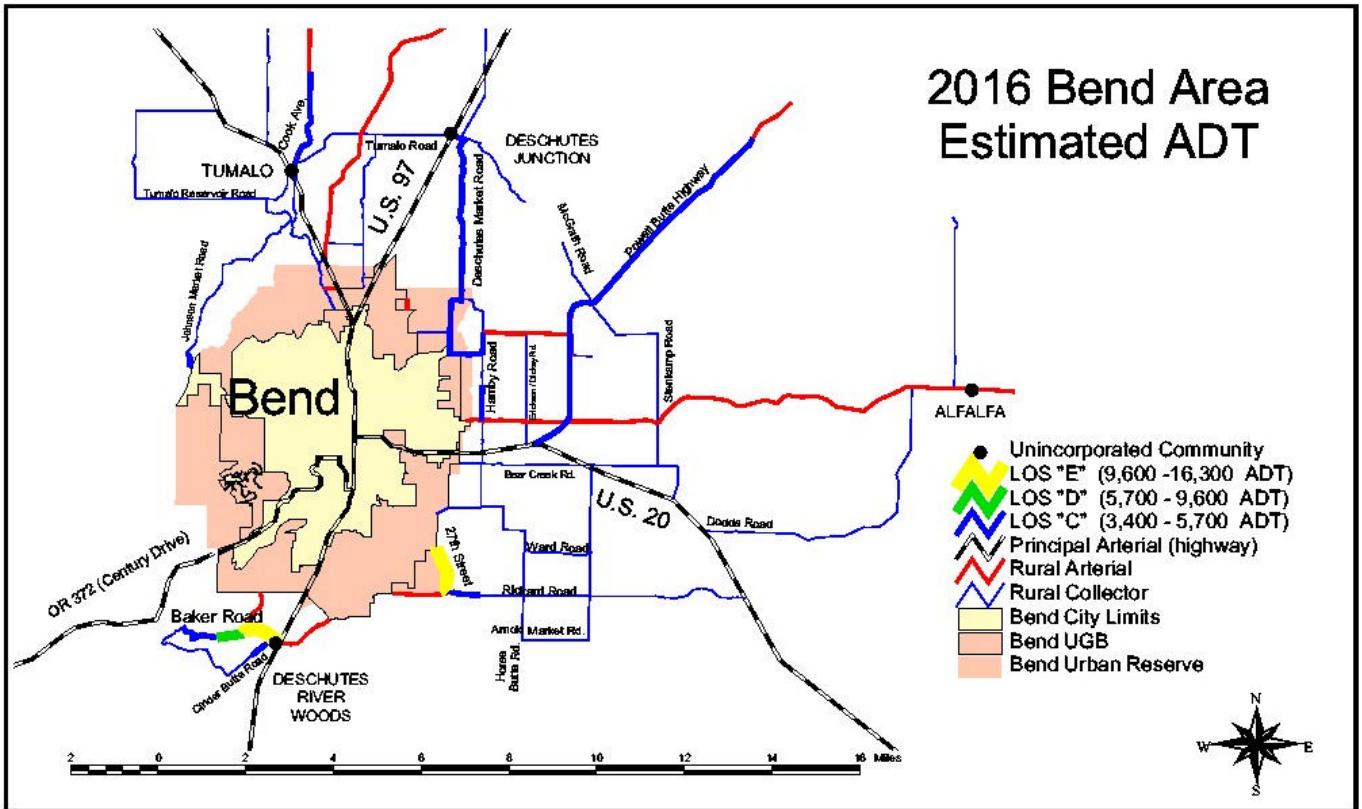
Figure 3.3.F1



Deschutes County TSP

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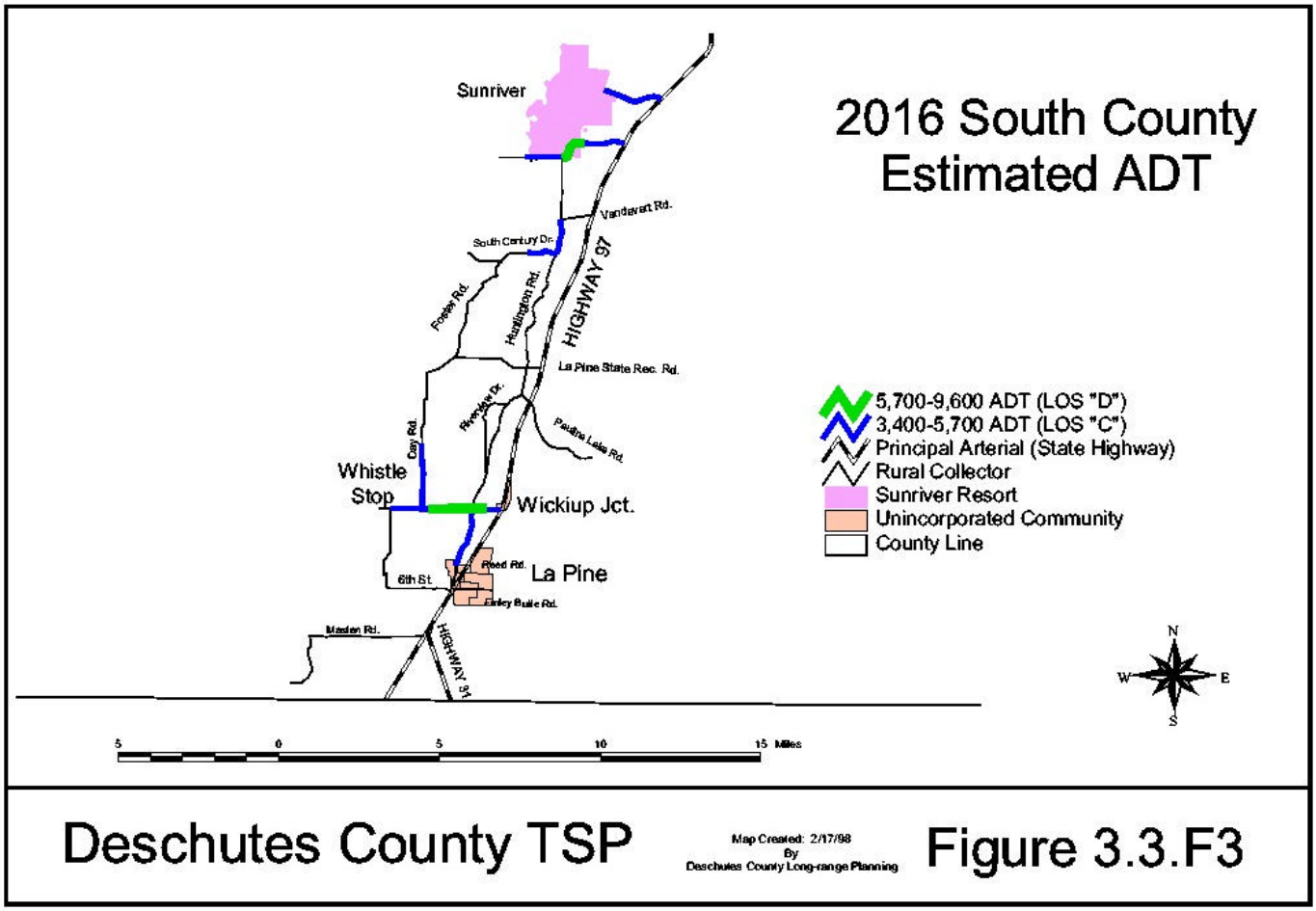
Figure 3.3.F2



Deschutes County TSP

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Figure 3.3.F3

Table 3.3.T2
ODOT 2016 Highway Volume Estimates and LOS Ranking

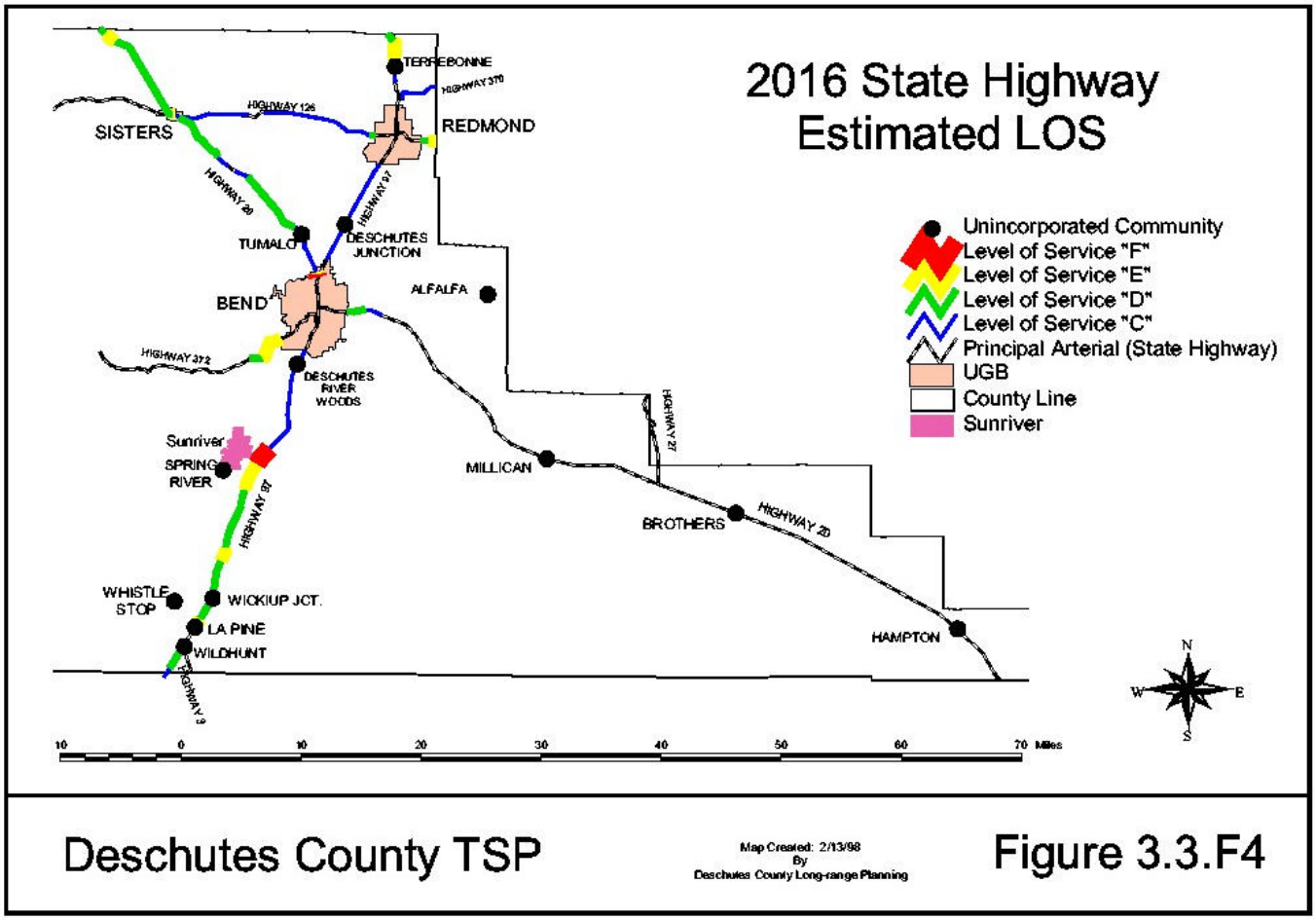
Rank	Hwy #	Highway Name	Route #	Location	Mile Point	2016 ADT	2016 PM Peak	Est. LOS
1	4	DALLES-CALIF. HWY.	US 97	COTTONWOOD DR.	151.10	19,140	1,914	F
2	4	DALLES-CALIF. HWY.	US 97	"A" AVENUE (TERREBONNE)	115.87	16,350	1,635	E
3	15	MCKENZIE HWY	OR 126	LOCUST ST.	92.95	14,860	1,486	E
4	4	DALLES-CALIF. HWY.	US 97	SOUTH CENTURY DR.	153.09	14,420	1,442	E
5	17	MCKENZIE-BEND	US 20	CLINE FALLS HWY.	14.77	13,760	1,376	E
6	16	SANTIAM HWY.	US 20/126	MCKENZIE HWY	100.03	13,710	1,371	E
7	4	DALLES-CALIF. HWY.	US 97	LAPINE STATE REC. RD.	160.60	13,170	1,317	E
8	4	DALLES-CALIF. HWY.	US 97	PAULINA LAKE RD.	161.76	12,990	1,299	E
9	4	DALLES-CALIF. HWY.	US 97	1 ST STREET (LAPINE)	167.49	12,990	1,299	E
10	41	OCHOCO HWY	OR 126	REDMOND CITY LIMITS	2.32	10,830	1,083	E
11	16	SANTIAM HWY.	**US 20/126**	**BLACK BUTTE RANCH (09-014)**	**93.19**	**9,660**	**966**	E
12	16	SANTIAM HWY.	US 20/126	CAMP SHERMAN RD.	90.91	9,360	936	E
13	372	CENTURY DR.	OR 372	DILLON FALLS RD.	7.60	5,330	533	E
14	15	MCKENZIE HWY	OR 126	HWY 20	92.32	16,360	1,636	D
15	15	MCKENZIE HWY	OR 126	ELM ST.	92.51	15,880	1,588	D
16	4	DALLES-CALIF. HWY.	US 97	VANDERVERT RD.	155.51	13,350	1,335	D
17	4	DALLES-CALIF. HWY.	US 97	BURGESS RD.	165.20	12,990	1,299	D
18	4	DALLES-CALIF. HWY.	US 97	JEFFERSON COUNTY LINE	112.86	12,900	1,290	D
19	17	MCKENZIE-BEND	US 20	COUCH MARKET RD.	12.28	12,270	1,227	D
20	17	MCKENZIE-BEND	US 20	TWEED RD.	10.07	11,960	1,196	D
21	16	SANTIAM HWY.	US 20/126	SANTIAM PASS RD.	99.53	11,890	1,189	D
22	17	MCKENZIE-BEND	US 20	INNES MARKET RD.	9.71	11,660	1,166	D
23	16	SANTIAM HWY.	US 20/126	TOLLGATE RD.	98.33	11,150	1,115	D
24	7	MILLICAN-BURNS	US 20	ERICKSON RD.	4.55	11,060	1,106	D
25	16	SANTIAM HWY.	US 20/126	INDIAN FORD RD.	94.91	10,400	1,040	D
26	17	MCKENZIE-BEND	US 20	FRYREAR RD.	7.87	10,300	1,030	D
27	4	DALLES-CALIF. HWY.	US 97	OR 31 (FREMONT HWY.)	169.67	10,180	1,018	D
28	17	MCKENZIE-BEND	US 20	CLOVERDALE RD.	4.77	9,980	998	D
29	17	MCKENZIE-BEND	US 20	HARRINGTON LOOP	3.21	9,830	983	D
30	17	MCKENZIE-BEND	US 20	OR 126	0.11	9,670	967	D
31	41	OCHOCO HWY	OR 126	CROOK COUNTY LINE	3.58	8,930	893	D
32	15	MCKENZIE HWY	OR 126	HELMHOLTZ WAY	109.64	8,880	888	D
33	16	SANTIAM HWY.	US 20/126	JEFFERSON COUNTY LINE	80.77	8,530	853	D
34	372	CENTURY DR.	OR 372	KIWA BUTTE RD.	11.96	3,480	348	D
35	15	MCKENZIE HWY	OR 126	HWY 20	93.08	5,810	581	C-D
36	4	DALLES-CALIF. HWY.	**US 97**	**SOUTH OF YEW AVE. (09-020)**	**125.00**	**36,950**	**3,695**	C
37	4	DALLES-CALIF. HWY.	US 97	KLAMATH COUNTY LINE	172.19	7,590	759	C

Code:

Generalized ADT:	LOS:
> 22,900	F
13,500 - 22,900	E
7,900 - 13,500	D
4,800 - 7,900	C
2,400 - 4,800	B
< 2,400	A

Multilane highways:

Note: Locations in BOLD denote permanent recorder stations. Numbers reflect ODOT estimates as of 7/97.



Deschutes County TSP

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Figure 3.3.F4

4. TRANSPORTATION NEEDS ANALYSIS

4.1 TRANSPORTATION FACILITY DEFICIENCIES

Chapter 2.2 identified the range of existing transportation needs for Deschutes County including the following issues:

- High accident locations
- Pavement condition problem locations
- Roadway width deficiencies
- Transit deficiencies
- County road capacity problems
- State highway capacity problems

The findings from Chapter 2.2, combined with the results of the transportation estimates in Chapter 3, form the basis for establishing the needs of the County transportation system over the next 20 years. These identified needs taken together with the results of the public participation process direct what policies and projects ultimately comprise the draft system plan covered in Chapter 5.

4.2 PUBLIC INVOLVEMENT AND INTERAGENCY COORDINATION

Citizen involvement and interagency coordination is an important component of the Transportation Planning Rule (TPR). A vital step in developing a transportation system plan (TSP) is to identify a public and interagency involvement process that brings citizens, special transportation interest groups, transportation providers, community economic interests, federal, state and local agencies and other jurisdictions into the planning process. Early involvement in the TSP process is important in identifying issues, establishing community understanding and confidence in the process, setting community goals and objectives and developing an appropriate work program.

Deschutes County recognizes the importance of public outreach in the TSP process by creating a public involvement plan to maximize the opportunities the public would have to comment on the TSP and be an integral part of the planning process. Community involvement was achieved through the holding of public meetings and open houses in the community and at the regular meetings of the County Planning Commission. In addition, several project newsletters were produced and mailed to a community mailing list and placed at public buildings throughout the County. The second project newsletter contained a mail-back survey regarding road development standards and maintenance. Several news articles appeared in the Bulletin and other community-based newspapers. The outreach process is identified in Table 4.2.T1

Interagency coordination was achieved by the formation of a County Transportation Technical Advisory Committee (CTAC), which held scheduled monthly meetings for the duration of the project. Representatives on the CTAC included staff from ODOT, the County, and the cities of Bend, Sisters and Redmond. The following is a chronology of the public outreach effort for the Deschutes County TSP:

- County Transportation Technical Advisory Committee (TTAC) established to review products and guide the project. Comprised of staff from the County, and the cities' of Bend, Redmond and Sisters, the committee meets on a monthly basis for the duration of the project.

- The County Planning Commission is designated as the project's citizen advisory committee, and is kept informed through periodic staff presentations for the duration of the project. This committee plays an important role in guiding the direction of the project and approving the products generated by the TSP process.

- County staff regularly attends meetings of the Bend Urban Area Transportation Committee, the Bend Transportation Technical Advisory Committee, and the County Bicycle Advisory Committee to coordinate the County TSP with the preparation of the Bend TSP.

The following specific activities occurred during the course of the project:

- Project Newsletters were created and distributed to provide updates to the community on the status of the TSP project.

- Community meetings were held to solicit input and present concepts to the general public. Meetings were held in the unincorporated communities of La Pine, Tumalo and Terrebonne.

- The local print media and radio and television stations carried feature stories on the County TSP.

- The second project newsletter contained a mail-back transportation survey that was filled-out and returned by 74 people. The survey questions and the voting results are included in Table 4.2.T.2. Most of the responses were clear cut as to a yes or no answer. If no answer received at least a 50 percent majority of votes, the result was considered even. While the sampling was statistically too small to provide direction, the results provide a sense of what road standards County residents want, and where improvements should be made.

Table 4.2.T1
Deschutes County TSP Public Outreach Chronology

Project	Activity	Date(s)
County Board of Commissioners	Worksession	1. April 14, 1998
	Worksession/Public Hearing	2. April 29, 1998
County Planning Commission *(Citizen Advisory Committee)*	TSP Status Report	1. January 12, 1995 2. April 13, 1995 3. January 25, 1996 1. June 13, 1996 2. November 6, 1997 3. December 3, 1997
	TSP Public Hearing	4. January 22, 1998 5. February 26, 1998 6. March 26, 1998
Central Oregon Board of Realtors	TSP Status Report	1. December 15, 1994
Bend Chamber of Commerce Transportation Subcommittee	TSP Status Report	1. March 22, 1995
County Transportation Technical Advisory Committee *(TTAC)*	Regular Meeting: 1. December 8, 1994 2. January 12, 1995 3. March 30, 1995 4. June 8, 1995 5. August 10, 1995 6. October 26, 1995 7. December 14, 1995 8. February 8, 1996 9. March 14, 1996 10. April 11, 1996 11. May 9, 1996 12. June 13, 1996 13. July 11, 1996	14. September 12, 1996 15. October 10, 1996 16. February 13, 1997 17. April 10, 1997 18. May 8, 1997 19. June 12, 1997 20. July 24, 1997 21. September 11, 1997 22. October 30, 1997 23. December 11, 1997 24. January 29, 1998 25. March 12, 1998
Local Television News Coverage *(Z21)* and Local Radio Coverage *(KBND), (KICE)*	Interview with Project Manager	1. April 13, 1995 2. December 16, 1996 3. December 4, 1997 4. January 15, 1998
South County Transportation Advisory Committee	TSP Status Report	1. November 14, 1995 2. December 12, 1995 3. July 26, 1996 4. January 15, 1997 5. April 16, 1997
Project Newsletter distributed to: City of Bend County Admin. Bldg. Central Oregon Board of Realtors Central Oregon Builders Association County Libraries	Spring Edition Fall Edition	1. May 5, 1995 2. December 9, 1996
Community Meeting	La Pine Terrebonne Terrebonne Bend North County South County Tumalo	1. June 29, 1995 2. May 20, 1996 3. August 22, 1996 4. December 16, 1996 5. December 17, 1996 6. December 18, 1996 7. March 5, 1997
Transportation Survey	Countywide	1. December 9, 1996

Table 4.2.T2
TRANSPORTATION SURVEY RESULTS

Deschutes County should:	Overall Results	Yes	%	No	%	No Opinion	%
1. Just maintain current roads, not pave existing unimproved roads.	**No**	**28**	*38%*	**42**	*57%*	**4**	*5%*
2. Work towards paving local roads to full local road width standards (28'-36').	**Even**	**35**	*47%*	**26**	*35%*	**13**	*18%*
3. Pave local roads to a lesser width, as long as they're paved.	**Even**	**33**	*45%*	**34**	*46%*	**7**	*9%*
4. Consider a range of revised (reduced) residential street widths that are sized for anticipated traffic, rather than using a single standard.	**Yes**	**56**	*76%*	**12**	*16%*	**6**	*8%*
5. Complete a system of striped bike lanes on all collectors and arterials.	**Yes**	**37**	*50%*	**31**	*42%*	**6**	*8%*
6. Install sidewalks along at least one side of all rural collectors and arterials in rural communities.	**No**	**26**	*35%*	**38**	*51%*	**10**	*14%*
7. Just work towards getting sidewalks along the highways in rural communities.	**No**	**26**	*35%*	**38**	*51%*	**10**	*14%*
8. Not build (or require) sidewalks in any rural area as long as there's enough shoulder area to walk on.	**Yes**	**41**	*55%*	**27**	*36%*	**6**	*8%*
9. Give the roads with the highest traffic volumes, the highest maintenance priority.	**Yes**	**57**	*77%*	**14**	*19%*	**3**	*4%*
10. Change road requirements in rural areas to allow narrower paved streets without curbs or sidewalks, with just enough width to satisfy emergency vehicles.	**Yes**	**37**	*50%*	**30**	*41%*	**7**	*9%*
11. Focus on extending or creating a grid street layout for new subdivisions.	**Yes**	**44**	*59%*	**21**	*28%*	**9**	*12%*
12. Not promote a grid street pattern, unlimited cul-de-sacs are ok.	**No**	**24**	*32%*	**40**	*54%*	**10**	*14%*
13. Allow partial width street improvements for new developments.	**Even**	**26**	*35%*	**25**	*34%*	**23**	*31%*
14. Not allow new developments unless the adjacent streets are improved to full County standard.	**Yes**	**50**	*68%*	**16**	*22%*	**8**	*11%*

The survey respondents agreed with the following statements, listed in order of highest to lowest majority:

- Give the roads with the highest traffic volumes, the highest maintenance priority. (77%)
- Consider a range of revised (reduced) residential street widths that are sized for anticipated traffic, rather than using a single standard. (76%)

- Not allow new developments unless the adjacent streets are improved to full County standard. (68%)

- Focus on extending or creating a grid street layout for new subdivisions. (59%)

- Not build (or require) sidewalks in any rural area as long as there is enough shoulder area to walk on. (55%)

- Change road requirements in rural areas to allow narrower paved streets without curbs or sidewalks, with just enough width to satisfy emergency vehicles. (50%)

- Complete a system of striped bike lanes on all collectors and arterials. (50%)

TRAFFIC CONGESTION ISSUES

Outside of the urban areas, traffic congestion at intersections may be more of a perceived problem rather than a capacity issue. Over the course of the public involvement process, the following locations were identified as having a congestion problem usually during a peak hour on most days of the year.

- Deschutes Junction (Tumalo Road) at Highway 97 (overpass under construction);
- South Century Drive at Highway 97 (main access to Sunriver);
- Venture Lane at South Century Drive (Sunriver Business Park);
- Cook Avenue / OB Riley Road at Highway 20 (Tumalo);

SAFETY ISSUES

During the course of the public involvement process for this project, as well as other concurrent outreach efforts for the La Pine, Terrebonne and Tumalo projects, several areas were identified that have design, and/or access, or other problems that contribute to an unsafe situation. Several of these areas, identified with "()" have already been addressed with a corrective project or have projects in design or the land use review process.

- Deschutes Junction crossing at Highway 97 (approved project);
- Intersection of Highway 242 and Highway 20/126 in Sisters (approved project);
- Intersection of Highway 20 and Highway 126 at ODOT truck scale in Sisters;
- Intersection of Burgess Road and Highway 97 (completed project);
- Intersection of Cook Avenue/OB Riley Road and Highway 20;
- Intersection of Rosland Road and Wickiup Junction frontage road (under design);
- Excessive speeds on Highway 97 through Wickiup Jct., and lack of a center left turn lane;
- Excessive speeds on Deschutes Market Road;
- Lack of a southbound deceleration lane on Highway 97 at South Century Drive;
- Winter icing on Highway 97 between Bend and La Pine;
- Deer migration corridor across Highway 97 south of Bend;
- Unsafe pedestrian crossing of Highway 97 in Terrebonne and La Pine;
- Insufficient shoulder width for bikes on Baker Road;

- Insufficient shoulder width on OB Riley Road between Tumalo State Park and the top of the grade;
- Need for "escape" routes from rural subdivisions;
- Intersection of Coyner Avenue and Northwest Way;
- Intersection of Smith Rock Way and 11th Street in Terrebonne;
- Intersection of Highway 126 and Helmholtz Way;
- Intersection of Burgess Road and Huntington Road (light added);
- Intersection of Burgess Road and Day Road;
- Intersection of Highway 20 and Old Redmond-Bend Highway;
- Excessive speeds on NW 43rd/Chinook Avenue between Lower Bridge Way and Crooked River Ranch;
- Need for additional east-west connection to Huntington Road between La Pine State Recreation Road and Burgess Road.
- Secondary access from Highway 97 to Deschutes River Woods;

REGIONAL LONG-RANGE NEEDS

The community also identified the following long-range needs to be considered:

- Wickiup Junction realignment of Highway 97 and construction of a railroad overcrossing;
- Secondary access to Crooked River Ranch;
- Northerly connection to Highway 20/126 from residential developments north of Sisters;
- Additional east-west access to residential areas between Spring River and La Pine;
- East side and west side bypasses around Bend;
- Commuter fixed-route transit (bus or rail) between Bend, Redmond, Prineville and La Pine;
- New medium size general aviation airport south of Sunriver.
- Enforcement

BEND "EAST SIDE BYPASS"

The discussion for an "east side bypass" around the City of Bend can be traced as far back as the 1950's. This idea was also incorporated into the original Bend General Plan. In that plan, an expressway facility was described that would skirt the southern and eastern edge of the UGB, as a possible facility that would meet the future transportation needs of the community. Although the document acknowledged that the need for the facility might not be achieved within the time frame of the Plan, it did urge that the corridor be preserved for some type of future facility. In subsequent updates of the General Plan, the east side bypass was eliminated from the circulation element of the Plan and hence, no right-of-way was ever preserved.

In the study of the Bend Parkway, one of several alternatives considered was another version of the east side bypass. This one deviated from the original plan by connecting to Highway 97 on the north near Cooley Road. One key issue that led to the rejection of the east side Bypass alternative was the traffic data forecasts. The bypass was projected to capture only 10,200 of the 75,000+ vehicles expected to travel through Bend's central corridor by the year 2015. Other traffic impact and land use issues were

also identified. Many of the landowners on the east side objected to the intrusion of a major roadway into a rural area. This applied not only to the bypass itself, but also to the east-west arterials that would have to be upgraded to connect to the bypass. Another concern was the potential of the bypass to foster development pressures outside of the UGB. This would have been inconsistent with the road planning requirements recently defined by the state Transportation Planning Rule (TPR).

Some public sentiment for the idea of an east side bypass has remained even though the decision was made to build the Parkway. In light of this interest, the County and the City of Bend have pledged to continue to evaluate the need for the bypass as the community grows. Unfortunately, lost opportunities for right-of-way acquisition for a bypass have been lost In recent transportation modeling conducted as part of the latest Bend General Plan update, the north-south travel needs of the community remain satisfied by the present proposed system of arterials and collectors. Therefore, the need for a new major transportation facility, such as an expressway or bypass, has yet to be demonstrated.

In all likelihood, any single new major facility east of Bend will be both costly and disruptive. Since the new road would need to have limited access to function correctly, a host of questions over access points, grade separations and right-of-way requirements remain. A reasonable, cost-effective alternative to a single, high cost major facility may involve the upgrading and linking of the existing County arterials and collectors located just east of the Bend UGB. With the addition of possible lower cost road links and some roadway upgrades, the distribution of future north-south traffic throughout a grid system of existing arterials and collectors could have the following benefits:

- Less capital and ongoing maintenance costs,
- Less disruption to existing residents,
- Opportunity to retain the rural character of the area,
- Less pressure to create and develop commercial areas east of 27th Street,
- Maximization of access to individual properties,
- Maintain lower overall speeds,
- Maintain emphasis on use of the Parkway by autos and through trucks, and
- Preserve the major taxpayer investment in the Parkway.

TRANSIT NEEDS

Intercity Transit

Since 1997, ODOT has been evaluating intercity transit service throughout the state. The main focus has been the level of service for transit operations that link major intermodal centers (Portland), with outlying cities and urban areas. Desired levels of service are based for the most part on residential population. The other area of concern is the public transit connection between residential areas and the nearest regional airport with commercial passenger air service. For Deschutes County, this means that the Redmond Airport should be accessible via public transit to most of the residents in the County, but especially to the residents of Bend. Currently, only taxi service and several hotel/resort shuttles serve the airport. Therefore, state goals are not currently met.

The other area of transit concern is the lack of a single transit station/facility that is open to multiple users, both public and private service providers. Although the logical placement of this facility is within the Bend urban area (and therefore outside of this TSP's jurisdiction), any such facility would have countywide implications. The facility should provide adequate overnight and long-term parking areas, bicycle parking and rest-room facilities. The current Greyhound Station on Highway 20 is privately controlled and is neither convenient for all users, nor does it provide adequate space for parking.

Bend-Redmond Commuter Shuttle

In 1997, ODOT funded a study to address the issue of a fixed-route commuter transit system between Bend and Redmond. The study was initiated by Commute Options for Central Oregon to comply with the terms of their grant-funding agreement with ODOT. The complete Study is included in Appendix H. The Study includes a commuter survey, and information regarding potential ridership, and costs. The summarized results of the Study are:

- There is community interest in such a shuttle system
- Daily ridership could average 100 with fares $3.00 or less
- Operation would be limited to weekdays only
- Direct routing with few stops
- 12-15 passenger vans
- One-half hour average travel time
- Capital cost for a 3-van system would be approximately $150,000
- Annual operating costs of $165,000 for vans and $30,000 for marketing, etc.
- 3-5 van fleet might be able to recover 45% of operating costs through fares (a.k.a. farebox recovery ratio)
- Further study would be required prior to implementation.

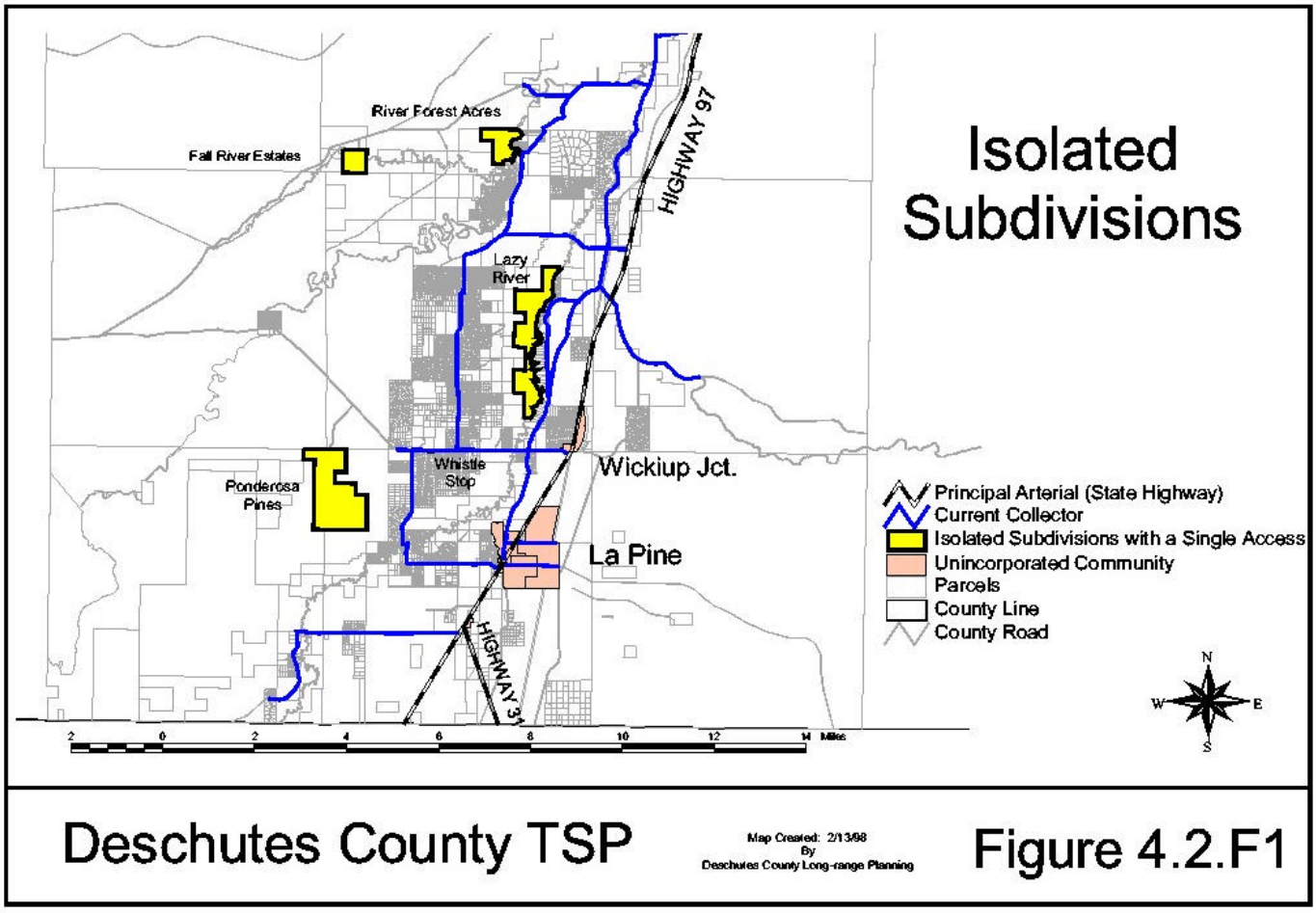
The results of the Bend-Redmond commuter shuttle study could also be loosely applied to a shuttle system between La Pine and Bend.

REGIONAL PROBLEM SOLVING PROJECT

In 1996, using a grant from the Department of Land Use and Conservation (DLCD), Deschutes County initiated work on regional problem solving for southern Deschutes County. One main problem addressed was the fire protection hazard related to the many rural, isolated subdivisions which were created prior to land use planning regulations. The subdivisions are located mostly in heavily forested areas subject to major lightning storms during periods of extreme fire danger. Several of these subdivisions have only one paved ingress/egress that could easily overloaded during a mass evacuation.

A fire management study was completed, which included recommendations for the general location of new local roads from the isolated subdivisions to be used as fire escape routes, emergency equipment access roads and fuel breaks. The subdivisions were recommended to have at least two alternative routes of access, usable by emergency fire equipment and residents, and be oriented 140 degrees apart to assure

that at least one travel route is available during a major wild fire incident. The isolated subdivisions with only one currently available route are shown in Figure 4.2.F1.



Deschutes County TSP

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Deschutes County Long-range Planning

Figure 4.2.F1

5.1 COORDINATION AND IMPLEMENTATION OF THE TRANSPORTATION SYSTEM PLAN

Based on the requirements of the Transportation Planning Rule (TPR), Deschutes County intends to have the Transportation System Plan be the beginning of an ongoing procedure to periodically analyze, prepare and plan for the transportation needs of Deschutes County residents and visitors. Toward this end, the following goals and policies are intended to assist in the implementation of the Deschutes County Transportation System Plan, and thereby meet the requirements of the TPR.

Goals

1. Achieve an efficient, safe, convenient and economically viable transportation and communication system. This system includes roads, rail lines, public transit, air, pipeline, pedestrian and bicycle facilities. The Deschutes County transportation system shall be designed to serve the existing and projected needs of the unincorporated communities and rural areas within the County. The system shall provide connections between different modes of transportation to reduce reliance on the single- occupancy vehicle.

2. Have an ongoing transportation planning process and maintain a transportation plan that meets the needs of the County and its residents. The transportation plan and facilities of Deschutes County shall be coordinated with the plans and facilities of incorporated cities within Deschutes County, adjacent counties and the State of Oregon.

Policies

1. Deschutes County shall:

a. Identify local, regional and state transportation needs;

b. Develop a transportation plan that shall address those needs;

c. Review and update the plan every three to five years;

d. Continue to coordinate transportation planning with local, regional and state plans by reviewing any changes to Deschutes County local transportation plans, regional transportation plans, the Oregon Transportation Plan and ODOT's State Transportation Improvement Plan (STIP); and

e. Continue public and interagency involvement in the transportation planning process.

2. Deschutes County shall notify ODOT concerning:

a. All land use proposals or actions that would create access onto a state highway or add >100 ADT to any County road intersection with a state highway;

b. Any proposed land use or development within 500 feet of a state highway or public use airport within the County; and

c. Required ODOT road approach permits.

3. Deschutes County shall protect approved or proposed transportation project sites through:

a. Access control measures;

b. Review of future large development and transportation projects that significantly affect the County's transportation system; and

c. The imposition of conditions of approval on developments and transportation projects that have a significant effect on the County's transportation system.

4. Deschutes County shall coordinate local plans and land use decisions with state transportation plans, including the Oregon Transportation Plan, modal plans and corridor plans. These plans provide ODOT policies and performance standards for statewide highways within Deschutes County. The statewide plans also provide the framework for access management on state facilities to protect the capacity and function of the highways.

5. The lead agency for transportation project review in Deschutes County shall be:

a. Deschutes County for projects outside UGB's;

b. The affected city for projects within the UGB's; and

c. The State of Oregon, Deschutes County and affected cities on projects involving state-owned facilities.

6. Transportation Projects

a. The County shall have a list of transportation projects, adopted by the Board of County Commissioners in accordance with the policies set forth below.

b. The initial Transportation Project List shall be set forth in Table 5.11.T1 of the Transportation System Plan adopted as part of the Resource Element of the Comprehensive Plan. The Board shall update the Transportation Project List periodically by resolution adopted by the Board, without need of a formal amendment to the TSP.

c. New transportation projects shall be included on the County's Transportation Project List. A transportation project proposed for addition to the list shall be subject to an individual land use review only if applicable administrative rules or land use regulations require such review.

d. Transportation or development projects that require a plan text amendment or a conditional use permit may be required to fulfill conditions or implement mitigation measures before approval is granted. Mitigation and conditions

may include, but are not limited to:

- **Improvement of surrounding roads;**
- **Limits on level of development;**
- **Revision of development placement;**
- **Addition or redesign of access;**
- **Addition of traffic management devices such as traffic signals, medians, turn lanes or signage; and/or**
- **Improvements that reduce transportation impacts.**

Deschutes County acknowledges that land use designations have a significant impact on the overall transportation system and any alterations shall be completed with consideration to traffic impacts on the County road system.

e. The findings of compliance with applicable statewide planning goals, acknowledged comprehensive plan policies and land use regulations, shall be coordinated with the preparation of any Environmental Impact Statement (EIS) required for a proposed transportation facility that is identified on the Deschutes County Transportation System Plan.

5.2 ARTERIAL & COLLECTOR ROAD PLAN (Section 5.2a)

Oregon State Historical Society Photo

COUNTY ROAD NETWORK

The findings in this Plan conclude that the County road network currently in place, except for several specific road segments, should be adequate to serve the County needs over the next twenty years. Given the rural nature of Deschutes County and the fact that the majority of new development will take place on existing lots with existing access, few additional roads are anticipated. New road corridors to isolated subdivisions and new roads linking urban and rural areas are the main exceptions. Any new roads that will be created most likely will be the result of new developments and would therefore be part of land use development review or would be for secondary access or emergency ingress/egress to isolated subdivisions. Unforeseen large developments such as destination resorts normally have a private road system but their impacts to the County road network would be assessed at the time of land use approval.

The majority of road-related projects will consist of safety-related or other upgrades, maintenance and repair. Upgrades, maintenance and repair should be actively pursued to maintain the integrity of the system and not jeopardize the current conditions. Pedestrian, bicycle and transit modes of transportation require wider, smoother roadways. These improvements also benefit automobile and truck traffic by making the roads safer and more efficient. The County's position is that the main purpose of the County-owned road network is to move people and goods as efficiently as possible between and to the incorporated cities in the County, not as a means of increasing urban scale developments in the unincorporated communities of the County. The County recognizes the importance of having a natural and seamless transition of jurisdiction for County roads within urban growth boundaries to their respective city jurisdictions as the cities continue to grow.

Goal

3. Establish a transportation system, supportive of a geographically distributed and diversified industrial base, while also providing a safe, efficient network for residential mobility and tourism.

Policies

7. Deschutes County shall:

a. Consider the road network to be the most important and valuable component of the transportation system; and

b. Consider the preservation and maintenance and repair of the County road network to be vital to the continued and future utility of the County's transportation system.

8. Deschutes County shall not add any miles of new road to the system unless the following issues are satisfied:

a. The need for the road can be clearly demonstrated;

b. The County can financially absorb the additional maintenance requirements;

c. The condition of the road proposed for acceptance into the County system must meet County road standards;

d. An accrued benefit can be shown to the County's economic growth; and

e. An overall increase in efficiency in the County road network can be demonstrated.

9. Deschutes County shall make transportation decisions with consideration of land use impacts, including but not limited to, adjacent land use patterns, both existing and planned, and their designated uses and densities.

10. Deschutes County shall consider roadway function, classification and capacity as criteria for plan map amendments and zone changes. This shall assure that proposed land uses do not exceed the planned capacity of the transportation system.

11. Roads in Deschutes County shall be located, designed and constructed to meet their planned function and provide space for motor vehicle travel and bike and pedestrian facilities where required.

12. Deschutes County shall manage the development process to obtain adequate street right-of-way and improvements commensurate with the level and impact of development. New development shall provide traffic impact analysis to assess these impacts and to help determine transportation system needs. The guidelines for traffic impact analysis shall be located within the Deschutes County Road Standards and Specifications document upon its adoption.

13. Transportation system improvements in Deschutes County shall comply with the Americans with Disabilities Act.

14. Transportation safety in Deschutes County shall improve for all modes through approved design practice and sound engineering principles.

15. Deschutes County shall acquire the necessary right-of-way through the development process to correct street intersections, substandard road geometry or other problems in order to improve the safety of a road alignment, consistent with constitutional limitations.

16. Deschutes County shall support efforts to educate the public regarding hazards related to travel on the transportation system.

17. Deschutes County shall support public and private efforts to acquire right-of-way for new secondary access roads to isolated subdivisions.

STATE HIGHWAYS

Each of the Access Oregon Highways (AOH) in Deschutes County has a specific role in the statewide transportation network, as well as the County system. The 1991 Oregon Highway Plan specifies the design, access management and level of service requirements that need to be applied to these highways. Deschutes County supports ODOT policy to develop highways through a "four-phased" approach. The four phases of development take place incrementally as the traffic volumes increase and the level of service decreases. Beginning with a standard two-lane rural highway, the improvement phases are as follows:

1. Addition of passing or climbing lanes
2. Widening to a four-lane section
3. Adding grade-separated interchanges and raised medians
4. Develop full grade-separated interchanges and frontage roads

Through a coordinated analysis effort between ODOT and County staff, the probable locations of future passing and climbing lanes on the state highways in Deschutes County were identified. Also identified were the four-lane extension to Highway 97 from La Pine south to Highway 31, along with the probable locations of future grade-separated interchanges. The projected highway lane additions and interchanges, shown on Figures 5.2.F1 and 5.2.F2, are in conceptual form. Actual locations and design would be the result of detailed engineering work occurring during project development. No signals are appropriate on state highways outside of UGBs, Terrebonne or La Pine. Instead, as intersections develop safety or operational problems, they shall be grade-separated, restricted or closed (where there is alternative access).

The following descriptions identify the roles the state highways are expected to play in Deschutes County over the next twenty years.

US Highway 97

Highway 97 is the principal north-south route through central Oregon, extending from California to the Columbia River. It serves as the main thoroughfare through the cities of Redmond and Bend, and the unincorporated communities of La Pine and Terrebonne. Congestion on Highway 97 has been mostly a problem within the communities of Bend and Redmond, due to the increasing volumes of truck traffic combined with local traffic generated by the rapid growth experienced in recent years. The Highway 97 Strategy (Appendix D) contains the goals and policies that govern the future development of the Highway 97 corridor. Outside of urban areas, the highway is characterized by two, three, and four-lane sections. The ultimate plan is for a continuous four-lane section to be built throughout the corridor, except for the sections through unincorporated communities such as Terrebonne. In those communities, traffic calming and pedestrian safety are more important than through traffic movement. In most cases, the time delay to drivers passing through the small rural communities is insignificant compared to the overall travel time along the corridor.

Highway 97 is considered a Category 2 access management facility outside of urban areas, except for the specific sections through the communities of Terrebonne, Wickiup Junction and La Pine which are Category 4 (definitions can be found on page 17). The Category 4 section in Terrebonne extends from Lower Bridge Way south to 11th Street. The section in Wickiup Junction extends from Drafter Road south to Burgess Road. The La Pine section extends south from 1st Street to 6th Street. The Terrebonne section has already been redesigned to be pedestrian-friendly by the eventual inclusion of sidewalks, landscaped strips, bulbed intersection corners and a center median. The La Pine section will be studied in 1998 as part of an approved state Transportation and Growth Management (TGM) grant. The La Pine section will be challenging due to the existing four-lane section through the community. Significant issues regarding Highway 97 in Deschutes County that must be addressed with project design and/or land use ordinances include:

- The increasing traffic volumes north of Terrebonne, especially at Lower Bridge Way;
- Traffic calming through Terrebonne, Wickiup Junction and La Pine;
- Local road and direct driveway access onto the highway;
- North and south connections to the Redmond "bypass";
- The needed grade-separated interchange at South Century Drive (Sunriver);
- The realignment of the highway on existing ODOT right-of-way east of Wickiup Junction and the grade separation over the railroad;
- The excessive speeds through the rural communities; and
- The possible grade separation between Yew Avenue and Deschutes Junction.
- The opportunity to enhance the parallel local road network to redistribute local trips that would otherwise need to use the highway (such as paving FS Rd. #41 between Sunriver and Bend).

US Highway 20

Highway 20 is the principal east-west route through Central Oregon. As the principal route for trucks and autos from the Willamette Valley over the Cascades to central Oregon, all traffic passes through downtown Sisters, then splits east of Sisters to either Redmond (on OR 126) or Bend. The ODOT Highway 20 corridor planning process is currently underway, and not expected to be completed before this TSP is adopted. However, policy direction and identified projects resulting from the corridor work can be added to the County's adopted TSP when completed.

The Tumalo section was studied (with Terrebonne) in 1997 as part of an approved state Transportation and Growth Management (TGM) grant. The community focused on the need to reduce accidents and ease the burden of crossing three lanes of high-speed traffic on Highway 20. The high volume of truck trips in the Tumalo area is seen as a contributor to the overall problem, and is not anticipated to diminish during the next twenty years.

Highway 20 is considered a Category 3 access management facility west of the Sister's UGB, Category 4 within Sisters (similar to Terrebonne), Category 2 between Sisters and the Bend UGB, and Category 4 east of the Bend UGB (definitions can be found on page 17).
The critical areas of the corridor are:

- The increasing traffic volumes west of Sisters that may necessitate additional passing lanes

- The intersection of Cook Avenue in Tumalo which will require an eventual grade separation
- Safety problems at the intersection of the Old Redmond-Bend Highway, which will also require an eventual grade separation
- Local road and direct driveway access onto the highway between Sisters and Bend
- Improvements to the Powell Butte Highway intersection if land uses intensify at the Bend Airport and/or accelerated growth occurs in Crook County.

Oregon Highway 126 (OR 126)

OR 126 passes west to east through Sisters and Redmond and on to Prineville, before connecting to US Highway 26 and on to eastern Oregon. OR 126 is the principal route for trips passing through Deschutes County heading to Eastern Oregon and Idaho.

With the completion of the Cline Falls interchange in 1997, there are few transportation issues remaining or anticipated on this facility. No new interchanges or medians are proposed. The primary issues are related to the highway as it passes through the City of Redmond. Areas outside of the Redmond UGB that could develop problems include:

- The intersection of Helmholtz Way if rapid development in and around Redmond continues;
- Access to a possible new state park expansion at Cline Falls;
- Local road and direct driveway access onto the highway between Sisters and Redmond; and
- The substandard section east of Redmond.

Other Oregon Highways (OR 27, OR 31, OR 370 & OR 372)

The remaining highways in the County are not considered AOH facilities, and as such, do not warrant the same priority for projects nor are they anticipated to carry significant traffic volumes. Each of these highways, except for OR 27, is currently considered a Category 4 facility. None has identified high accident rates or safety problems. With the exception of OR 370 (O'Neil Highway), none has much direct private access or potential for intensified land use. OR 27 is considered a Category 6 facility, with no plans to be paved.

ACCESS MANAGEMENT PLAN

Roads accommodate two types of travel: local travel and through traffic. Arterial streets are intended for through movement of traffic while local roads are designed to give direct access to the abutting properties. Collector roads provide a link between the local and arterial roads, balancing accessibility and function. Historically, the state and local governments corrected many congestion problems by constructing new bypasses, grade separations or major street improvements. However, such solutions are expensive and are fast becoming infeasible under current funding levels.

Arterial roads without access management can over time become overused for short distance trips and local access to property. Land use changes along these overburdened arterials results in increased trip generation and traffic conflicts, as businesses normally desire to locate on high traffic arterials. The lack of adequate access management and insufficient coordination of land use development, property division and access review can contribute to the deterioration

of both the arterial and collector road network. Traffic signals, new road approaches and driveways can decrease speed and capacity, and increase both congestion and hazards. Access management includes the control of vehicular access to major roadways. Partial access control, which is often found on major arterials and highways, is provided by limiting or prohibiting driveway access, left turn movements and cross traffic at intersections. These limitations increase the capacity of an arterial to carry through traffic at the desired speeds without requiring the addition of more travel lanes. Coordination, planning and proper policies can help avoid these problems and costly solutions.

Goal

4. Establish an access management system adequate to protect the quality and function of the arterial and collector street system.

Policies

18. Deschutes County shall designate access and land uses appropriate to the function of a given road.

19. Deschutes County shall require new development to minimize direct access points onto arterials and collectors by encouraging the utilization of common driveways.

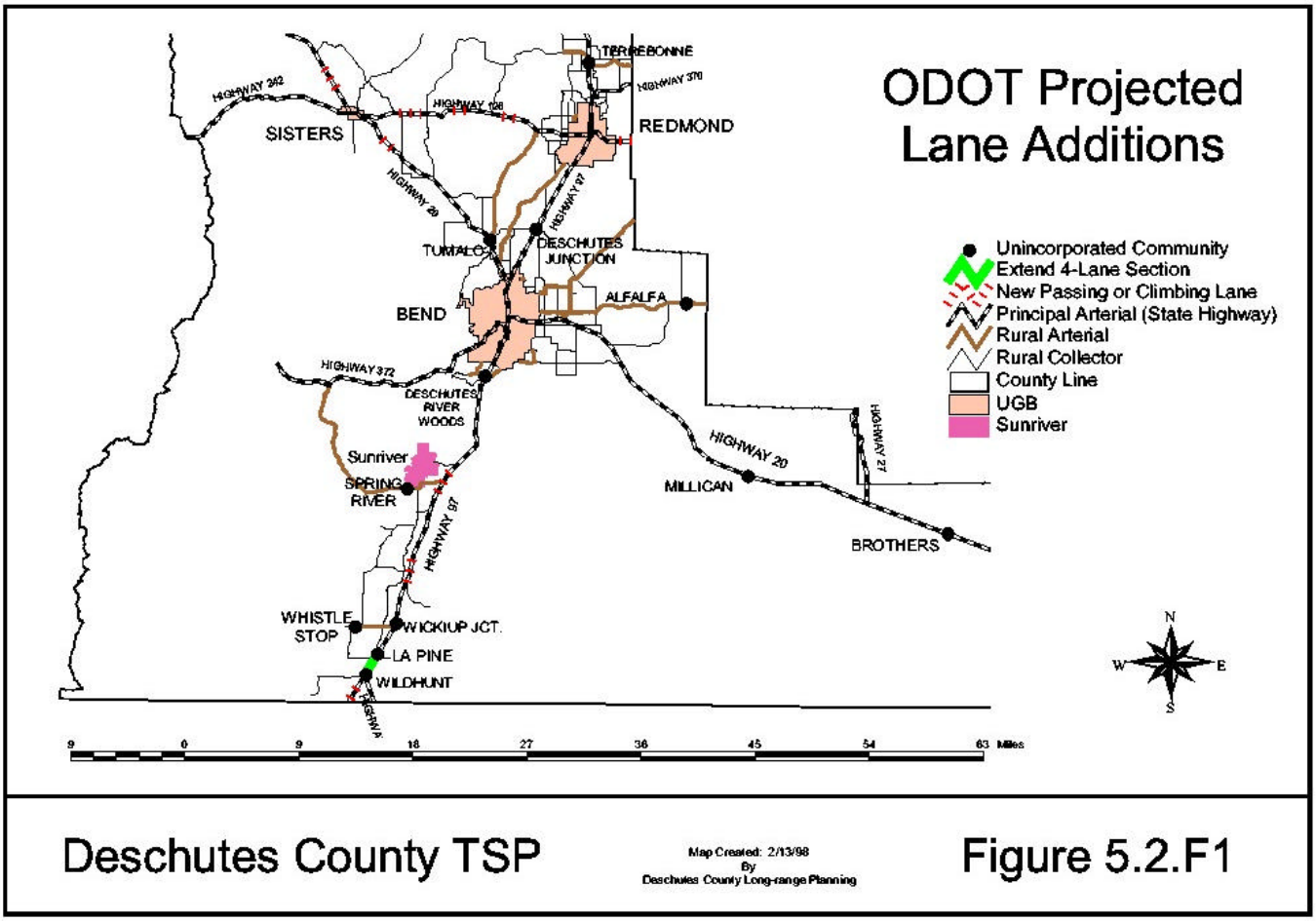
20. Wherever practical, access to state highways shall be provided via frontage roads, alternative local roads or other means, rather than direct access to the highway.

21. A non-traversible median on state highways shall be installed by ODOT when operational or safety issues warrant installation. Directional breaks in the median shall be provided as needed to allow safe traffic operation.

22. Access requests onto Deschutes County arterials and collectors for new partitions, subdivisions and commercial and industrial development, shall be processed with the following access management classification system in mind:

a. Public road access spaced at no less than every 500 feet on arterials and 300 feet on collectors.

b. If either safety or environmental factors, or the unavailability of adequate distance between access points requires placing access points at lesser intervals, then access shall be denied or the best alternative placement shall be chosen. On road segments that are already severely impacted by numerous access points or on road segments which abut exception areas, adherence to the above standards may be either unreasonable or counterproductive to infill of exception areas. In such cases, these standards may be relaxed by the County Road Department Director to accommodate the aforementioned special conditions.



Deschutes County TSP

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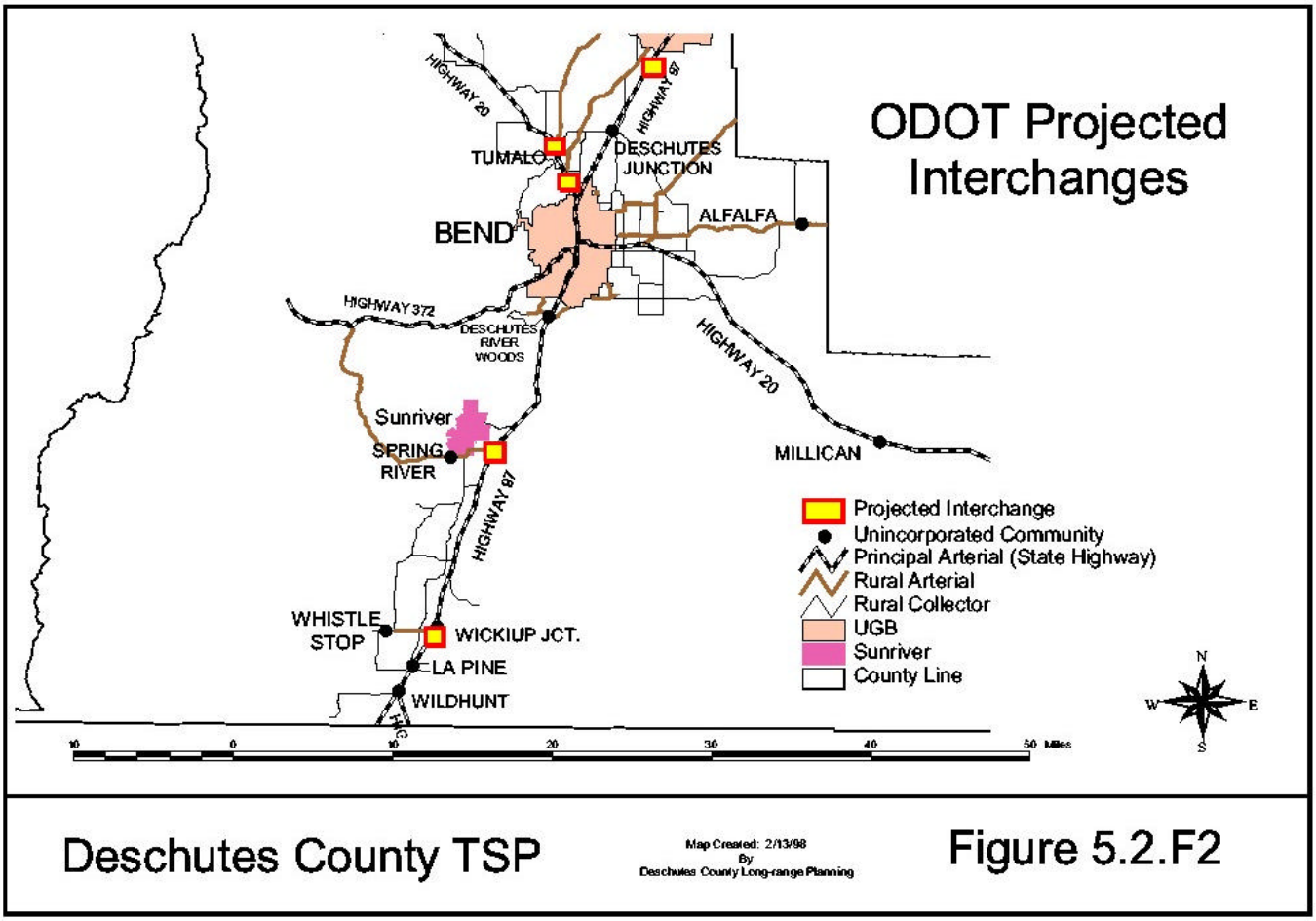
By
Deschutes County Long-range Planning

Figure 5.2.F1



Deschutes County TSP

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Deschutes County Long-range Planning

Figure 5.2.F2

FUNCTIONAL CLASSIFICATION

Functional classification describes how the public road system should operate. Roads are grouped by their similar characteristics in providing mobility and/or land access. Within the County, there are six rural road classifications and nine urban classifications. Further coordination is needed between the County and cities in Deschutes County regarding the functional classification of County roads within city limits and urban growth boundaries. Currently, the County maintains approximately 123 miles of roadway within city limits and urban growth boundaries. The County lacks funds to upgrade these roads to city urban standards. Strengthening and revising Urban Growth Management agreements with cities may be an effective way to pursue tight coordination on this important issue and reduce the long-term financial burden to the County. As an example, the County and the City of Bend have agreed that as of July 1, 1998, all roads within the Bend UGB will become the responsibility of the City of Bend. This shift reduces the County's urban road mileage by approximately 70%.

The following changes to functional classification are identified on the Deschutes County Transportation Plan Map, designated as Exhibit "A" to Ordinance No. 98-044.

Bend TSP

The draft Bend Transportation System Plan is proposing only one change in functional classification to a County road within the UGB. However, with the recent management agreement, this road will become the jurisdiction of the City of Bend. The functional classification of all other roads that cross the Bend UGB between the City and the County have been coordinated.

- Yeoman Road from 18th street east to the outer (ultimate) urban growth boundary is currently classified as either a future or current arterial depending on segment. It proposed to change to a corresponding future and current collector.

Redmond TSP

The draft Redmond Transportation System Plan proposes several classification changes to County roads within and around the UGB. The Redmond TSP also splits the existing arterial classification into two new categories, "major arterial" replaces "principal arterial" and "minor arterial" replaces "arterial". The collector category is also changed by creating a "Major" and "Minor" classification. The difference is that bike lanes are not required on "Minor" collectors. The designation of County roads outside of UGBs shall remain consistent with the County functional classes of Rural Arterial and Rural Collector. The County shall require at least a four-foot shoulder bikeway along those sections of road within the County that are extensions of designated Minor Arterials and Major Collectors on the Redmond Plan.

Rural Arterial to Rural Collector:

- Hemholtz Way (43rd) between Maple Avenue and Obsidian Avenue.
- Northwest Way north of Maple Avenue.
- Maple Avenue between Hemholtz Way (43rd) and Northwest Way (27th) Street

Rural Collector to Rural Arterial:

- 27th Street between Maple Avenue and Hemlock Avenue.

Other Changes:

- 9th Street classification as future arterial north of Maple Avenue / Negus Way is eliminated.

County Roads

Several roads within the rural areas of the County road network are in need of reclassification. The reclassification of these roads is warranted based on either their current and projected average daily traffic (ADT), or planned functional role in the transportation network. In most cases, a projected level of service "D" or worse triggered the change from collector to arterial. One exception to this is the reclassification of Forest Service Road #45. This road is expected to have high peak seasonal use between Sunriver and Mt. Bachelor, and should therefore be reconstructed to a rural arterial standard.

Several roads currently classified as arterial are recommended to revert to collector status because they don't have a projected level of service of "D" or worse, and serve as a parallel route to a state highway. The original Transportation Element of the County Comprehensive Plan made several recommendations as to reclassifications at that time. As time has passed, some of these roads have not experienced the anticipated traffic while others are playing larger roles than originally planned due to accelerated development pressure. The County emphasis is for County roads to remain rural, have lower traffic speeds, and reduced cost to upgrade, repair and maintain.

New local roads for secondary access to rural isolated subdivisions have been identified as part of the Regional Problem Solving Project. In some cases, there is an existing dirt road across private or government land, but no dedicated right-of-way. Figures 5.2.F3a and 5.2.F3b identify proposed new roads as "corridors", subject to future engineering and design, rather than specific alignments.

The Sunriver Business Park is also in need of a future secondary access or intersection treatment such as a roundabout. With increasing development of commercial uses in the Park along with the increasing traffic volumes on South Century Drive, the single entrance/exit onto South Century Drive will become inadequate. Any solution may be problematic due to the established development pattern, the electric substation location, the forest-zoned land, and the Harper town site to the south. Figure 5.2.F3c identifies possible solutions to the problem by establishing a new access to Huntington Road. In the interim, an upgrade project to South Century Drive is identified in the Project List. The project would add a continuous two-way center turn lane from the entrance at Sunriver to the intersection at Spring River Road.

Roads classified as "future" in Figures 5.2.F4a-5.2.F4d are currently in need of either dedicated right-of-way, paving to County standard or both. The Figures identify the complete County Road System Plan. The County recommends the following changes in functional classification based on the current and projected traffic volumes, as well as the need for coordination between jurisdictions:

Upgrade Functional Class

Rural Collector to Rural Arterial

- Baker Road from US 97 to Brookswood Blvd.
- Burgess Road from US 97 to Day Road.
- South Century Drive from US 97 to Spring River Road.
- Cline Falls Highway from OR126 to Second St. (Tumalo).
- Spring River Road from South Century Drive to FS Road #45.
- Forest Service Road #45 from Spring River Road to Century Drive.

Rural Local to Rural Collector

- Stevens Road from Bend UGB to Ward Road
- Nelson Road from Waugh Rd. to Powell Butte Highway
- Billadeau Road from Ward Rd. to Arnold Market Rd.
- Reed Road from US 97 to Darlene Way (edge of La Pine Community)
- Hunnell Rd. from Tumalo Rd. to Bend UGB.
- Rogers Rd. from Old Redmond-Bend Hwy. to Hunnell Rd.

Rural Local to Future Rural Collector

- Lazy River Drive to Tamarack Dr.
- Tamarack Drive from Lazy River Dr. to 4th Street
- 4th Street to Whittier Drive
- Whittier Drive to La Pine State Recreation Road
- Solar Drive to Milky Way
- Upland Road from Milky Way to Savage Drive
- Savage Drive from Upland Road to Winchester Drive
- Winchester Drive From Savage Drive to Browning Drive
- Browning Drive from Winchester Drive to Stagestop Drive
- Stagestop Drive from Browning Drive to Bonanza Lane
- Bonanza Lane from Browning Drive to South Century Drive
- Sunrise Blvd. from Day Rd. to Burgess Rd.

Downgrade Functional Class

Rural Arterial to Rural Collector

- Holmes Road from OR126 to Lower Bridge Way
- OB Riley Road from Bend UGB to Johnson Market Road
- Lower Bridge Way from Holmes Road to 43rd Street
- Deschutes Market Road from US 97 to Bend UGB

Rural Collector to Rural Local

- Horse Butte Road from Knott Road to end.
- Arnold Market Road from Rickard Rd. to Billadeau Rd.

Deschutes County functional classification goals and policies are as follows:

Goal

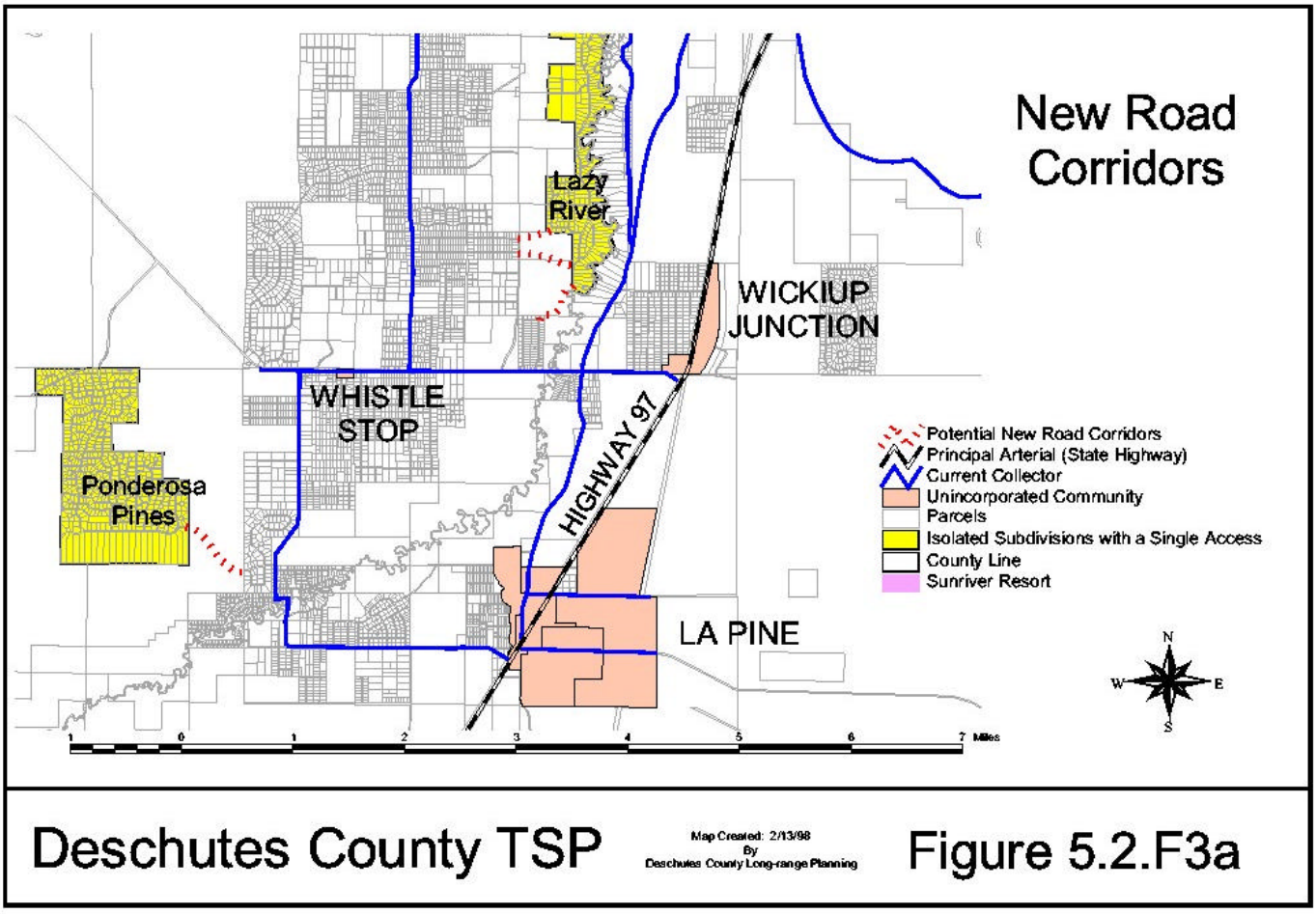
5. Designate access and land uses appropriate to the function of a given road.

Policies

23. Deschutes County shall:

a. Coordinate the County Transportation System Plan with the transportation system plans of the cities of Bend, Redmond and Sisters. The County shall emphasize continuity in the classification of roads and appropriate design standards for roads that link urban areas with rural areas outside the urban growth boundaries. The County and affected city shall agree on the functional classification and design standards of County roads within the proposed UGB area.

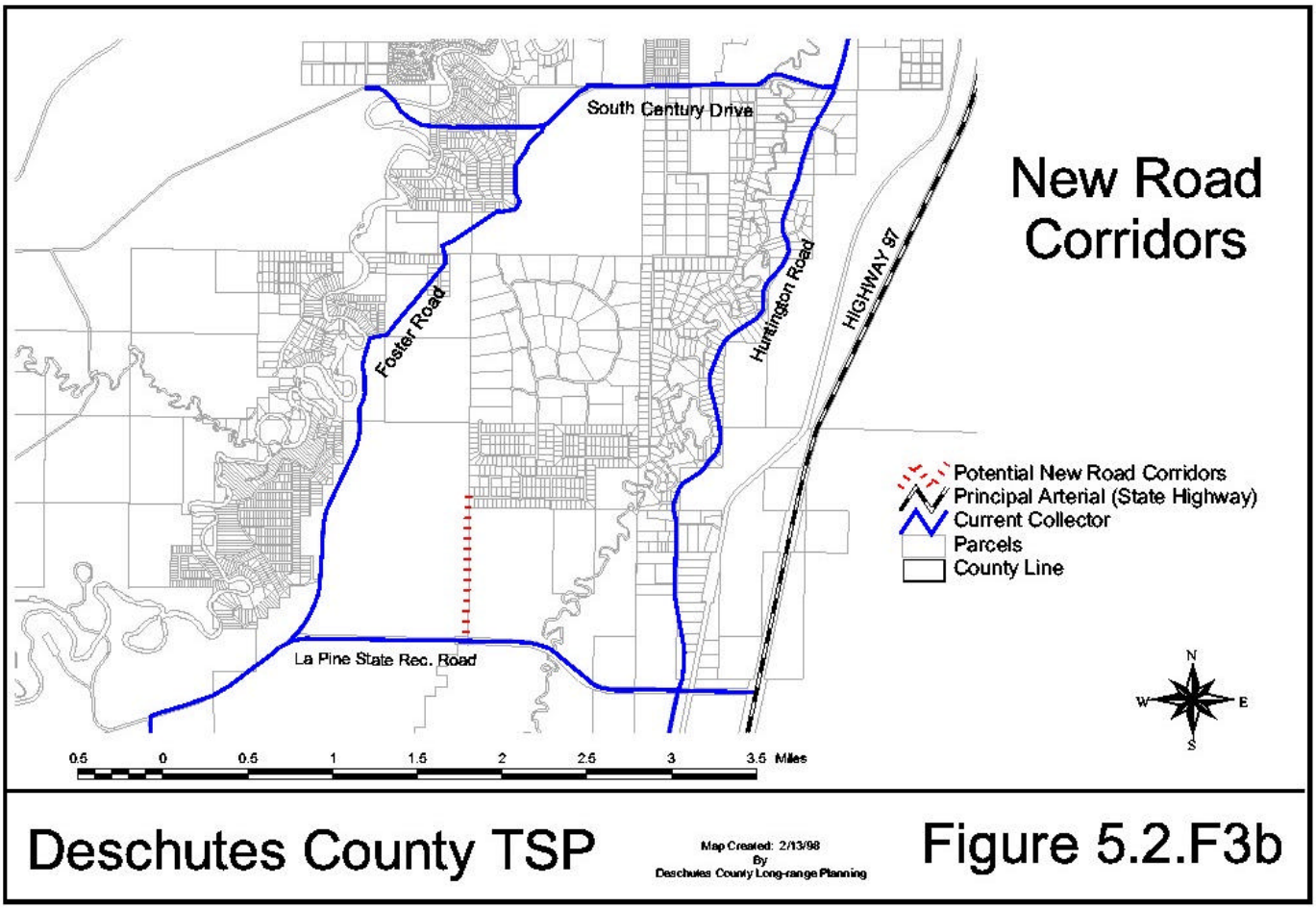
b. Request the transfer, or an agreement to transfer with specific timelines and milestones, jurisdiction of County roadways within the urban growth boundaries to their respective cities at the time of annexation. County policy also directs that any developer of property who proposes annexation and who has frontage on a road that does not meet city standards shall have the primary responsibility for upgrading the road to applicable city specifications. Roads shall be upgraded prior to or at the time of annexation, or the developer shall sign an agreement with the city to upgrade the road, at the time of development. Transfer of road jurisdiction shall require the approval of both the County and affected city in accordance with the provisions in ORS 373.270.



Deschutes County TSP

Map Created: 2/13/98
By
Deschutes County Long-range Planning

Figure 5.2.F3a

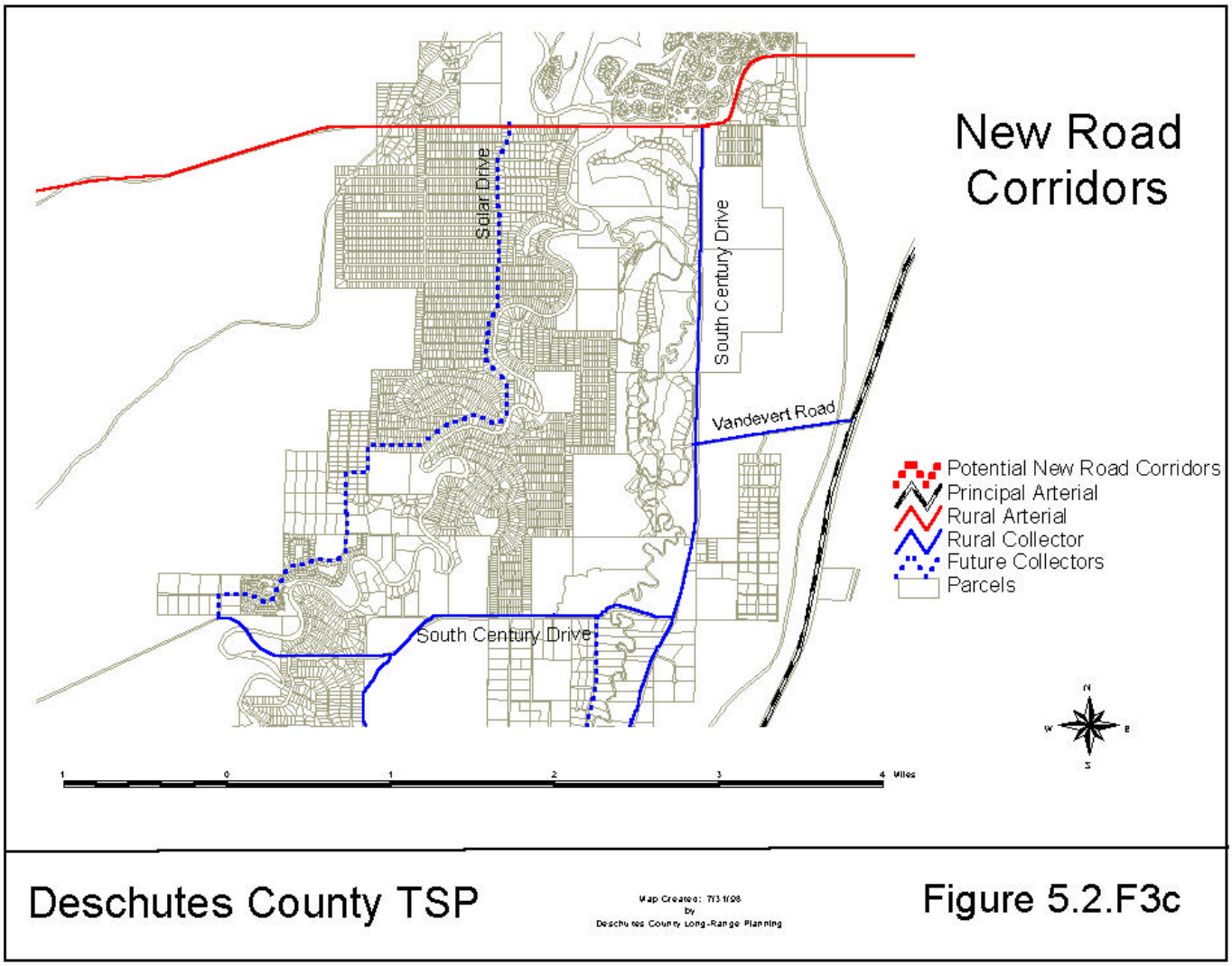


Deschutes County TSP

Map Created: 2/13/98
By
Deschutes County Long-range Planning

Figure 5.2.F3b

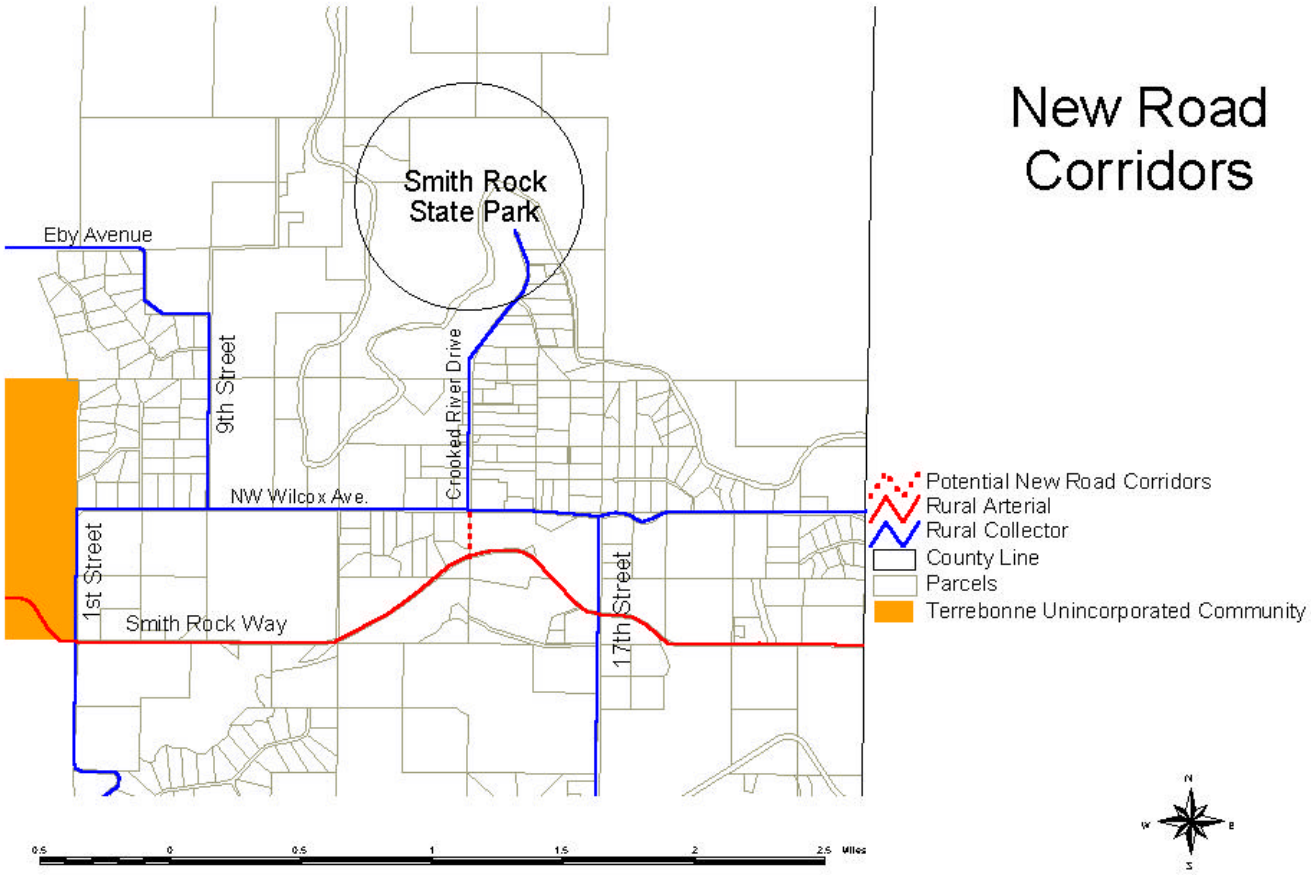
(Section 5.2b)



Deschutes County TSP

Map Created: 7/31/08
by
Deschutes County Long-Range Planning

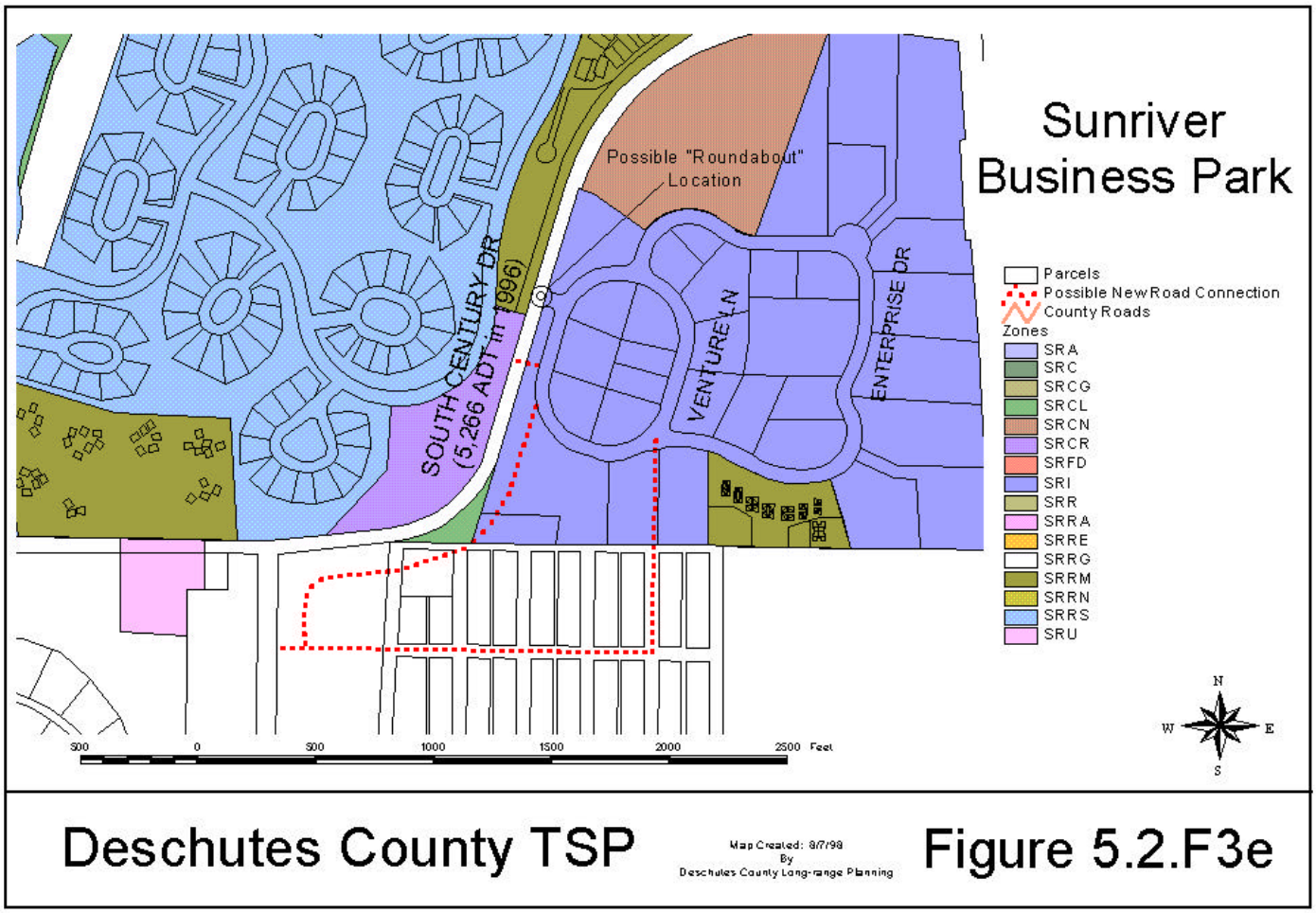
Figure 5.2.F3c



Deschutes County TSP

Map Created: 7/31/98
by
Deschutes County Long-Range Planning

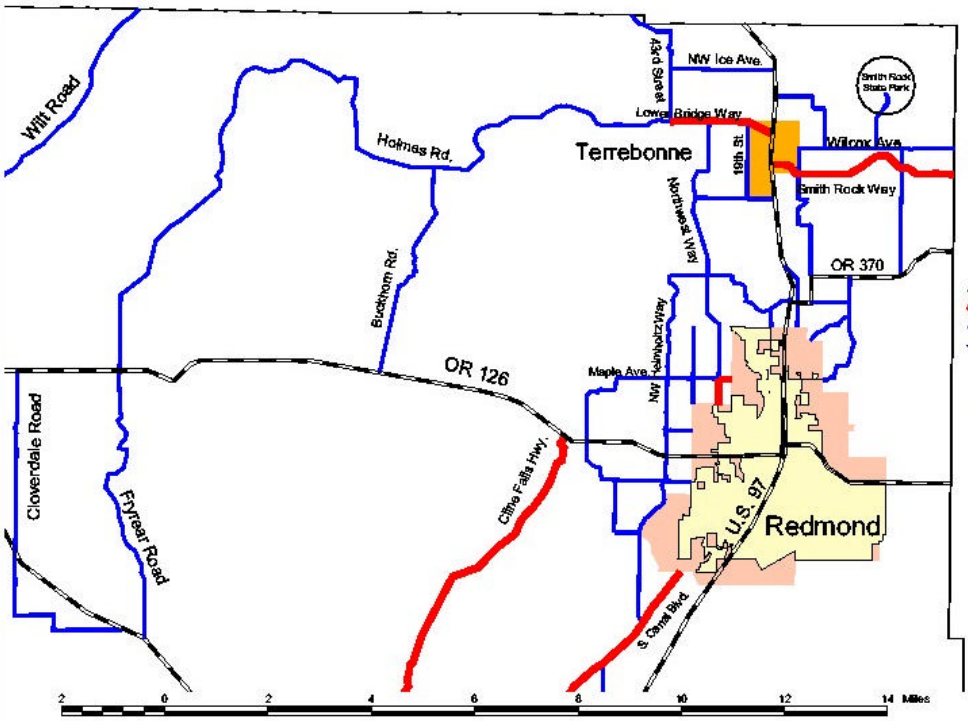
Figure 5.2.F3d



Deschutes County TSP

Map Created: 8/7/98
By
Deschutes County Long-range Planning

Figure 5.2.F3e



Redmond Area Road Plan

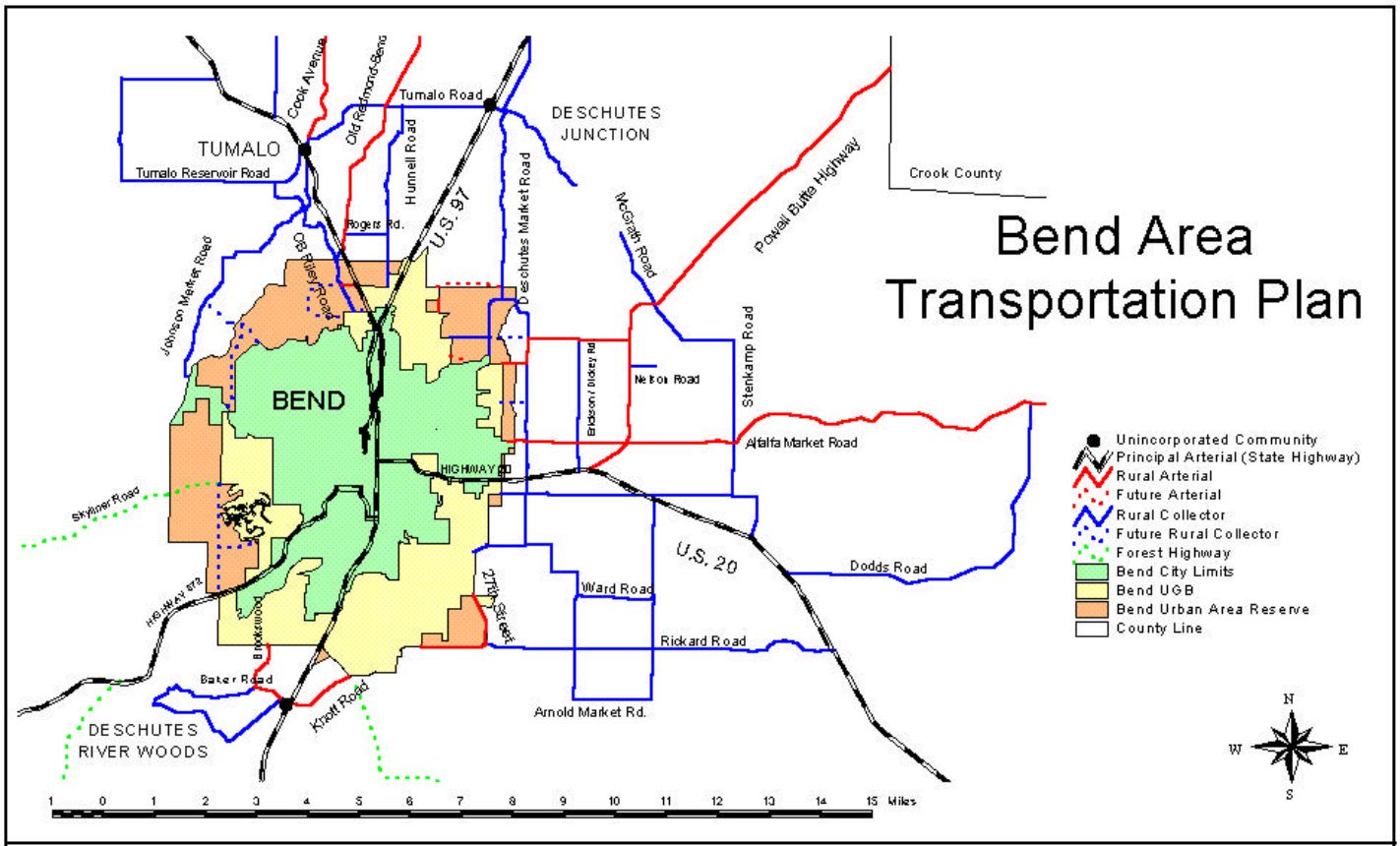
- Principal Arterial (highway)
- Rural Arterial
- Rural Collector
- Future Rural Collector
- Redmond City Limits
- Redmond UGB
- Terrebonne Unincorporated Community
- County Line

N W E S

Map Created: 2/17/98
By
Deschutes County Long-range Planning

Deschutes County TSP

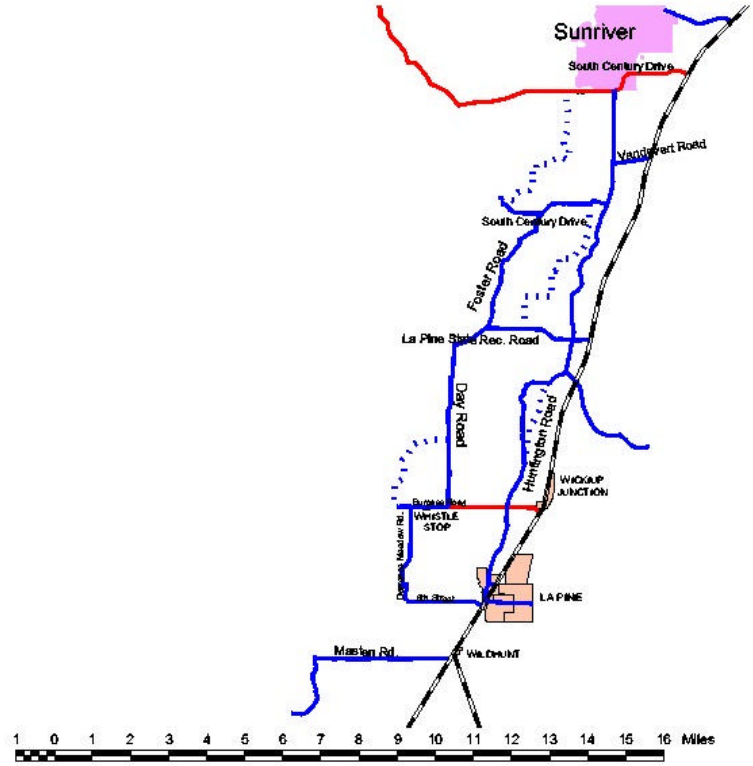
Figure 5.2.F4a



Deschutes County TSP

Map Created: 8/10/98
By
Deschutes County Long-range Planning

Figure 5.2.F4b



South County Road Plan

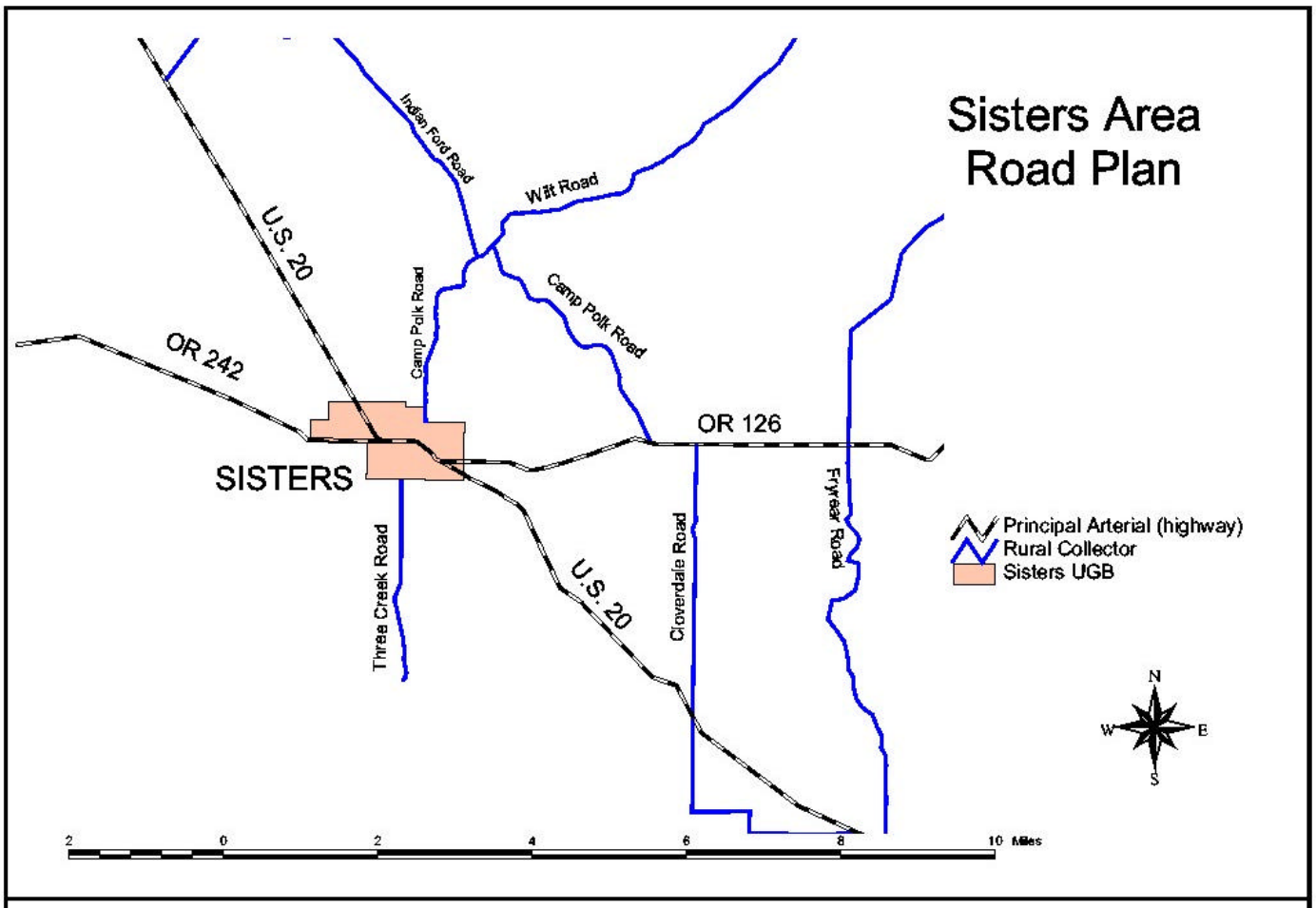
- Principal Arterial (State Highway)
- Rural Collector
- Rural Arterial
- Future Rural Collector
- Unincorporated Community
- Sunriver Resort
- County Line

N
W E
S

Map Created: 3/2/98
By
Deschutes County Long-range Planning

Deschutes County TSP

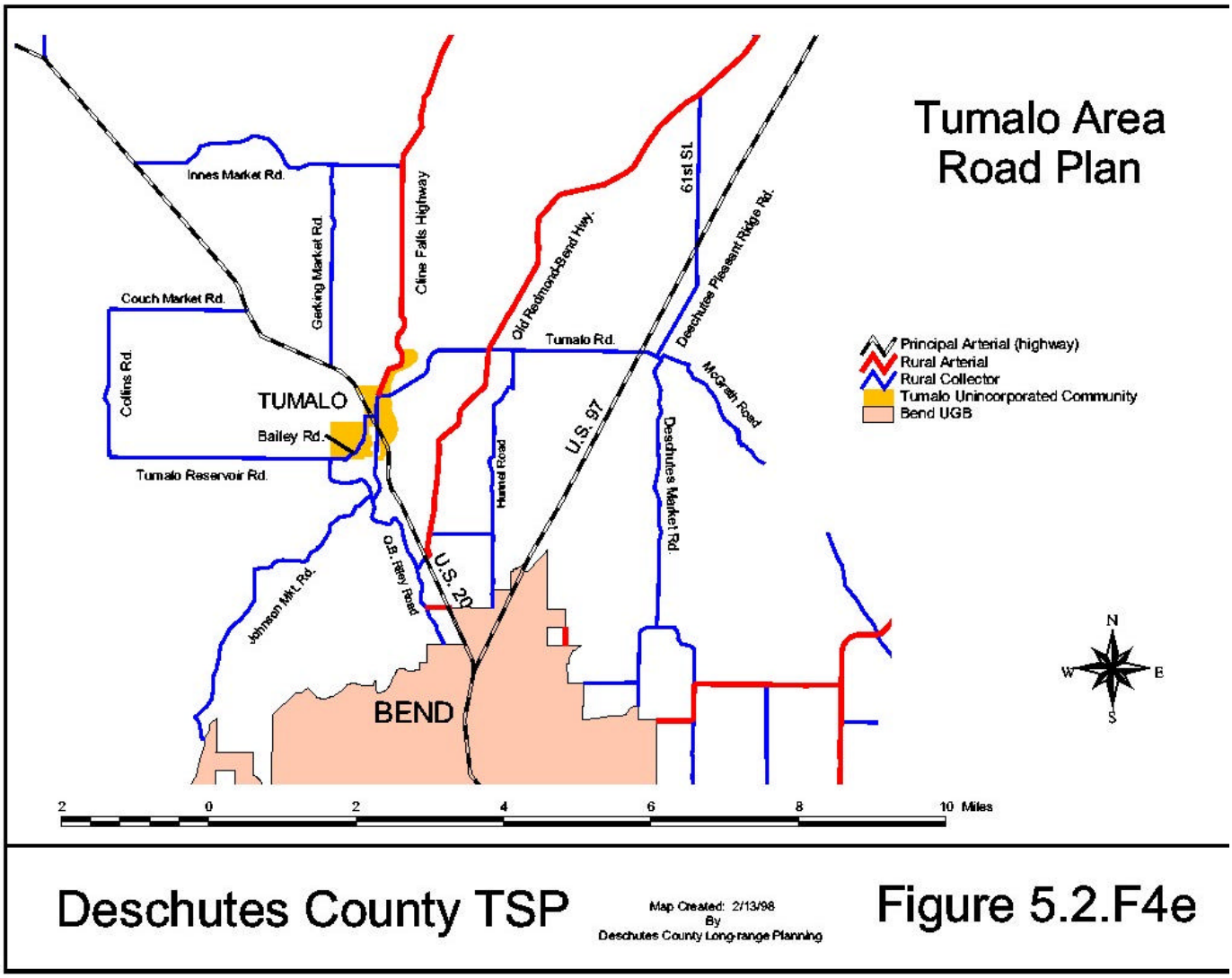
Figure 5.2.F4c



Deschutes County TSP

Map Created: 2/13/98
By
Deschutes County Long-range Planning

Figure 5.2.F4d



Deschutes County TSP

Map Created: 2/13/98
By
Deschutes County Long-range Planning

Figure 5.2.F4e

ROAD AND STREET STANDARDS

Historically, County road and street standards and specifications have been located in various places throughout the County Zoning and Subdivision Ordinances, making it a difficult task to implement standards uniformly and update them as needed. Through this TSP, the County pledges to create a separate standards and specifications document, which shall enable the County to periodically update or change specifications or road project procedures without a Comprehensive Plan amendment. The likely location for the new document or chapter shall be in Title 12 (Road Department) of the Deschutes County Code. The new document shall reflect the County's desire to no longer have urban road standards, only rural road standards, including specific standards for the unincorporated communities of La Pine, Terrebonne and Tumalo.

Goals

6. Develop and adopt a document or chapter of Road Standards and Specifications that shall control all aspects of construction related to roads, pedestrian walkways and bicycle facilities occurring outside designated urban growth boundaries in Deschutes County.

7. Develop and adopt criteria for the requirement of various levels of traffic analysis for each new rural development. The traffic analysis requirements shall be located in the Road Standards document.

Policies

24. After County adoption of the Deschutes County Road Standards and Specifications document, all new and reconstructed Deschutes County rural roads shall be built to those identified standards. In the interim, rural road dimensions outside of the unincorporated communities of Terrebonne and Tumalo shall match the requirements set forth in Table 5.2.T1, which replaces current Table "A" located in Title 17 of the Deschutes County Code. The City of Sisters Road Development Standards shall apply within the Sisters Urban Area. The Road requirements for the unincorporated communities of Tumalo and Terrebonne are governed by the previously adopted tables located in Appendix G.

25. Road, pedestrian and bicycle projects occurring in unincorporated areas within urban growth boundaries shall be governed by the respective city's road and street standards. Those requirements shall be coordinated between the city, the County and the applicant during the land use process according to procedures to be identified in the Deschutes County Road Standards and Specifications document.

Table 5.2.T1

Table "A" Minimum Design Standards (1)

Road Type	Functional Class	Right-of-Way Width	Surface Width (5&7)	Turn Lane Width	Surface Type	Base Depth (6)	Maximum Grade (8)	Design Speed	Minimum Tangent	Minimum Curve	Curb Type
La Pine Urban Unincorporated Community (2)											
Arterial	Principal	80'-100'	60'-80'(3)	14'	(see note #3)		6%	(see note #3)			16"
	Minor	80'	36'-52'	14'	3" AC	10"	6%	(see note #4)			16"
Collector		60'-80'	36'-48'	14'	3" AC	8"	8%	(see note #4)			16"
Local	Commercial	60'	36' (9)	---	2" AC	6"	10%	(see note #4)			12"
Local	Residential	60'	30' (9)	---	2" AC	6"	10%	(see note #4)			12"
Alley		20'	15'-20' (12)	---	2" AC	4"	10%	(see note #4)			---
Rural Areas											
Arterial	Principal	80'-100'	36'-70' (3)	14'	(see note #3)		6%	(see note #3)			---
	Minor	80'	28'-32'(12)	---	3" AC	10"	6%	(see note #4)			---
Collector		60'	28'-30'(12)	---	3" AC	8"	8%	(see note #4)			---
Local		60'	20',24' (13)	---	0-9 or 2" AC	6"	10%	(see note #4)			---
Partition	< 10 acres	60'	20'	---	0-9 or 2" AC	6"	10%	(see note#4)			---
	≥ 10 acres	60'	20'	---	Aggregate	5"	10%	(see note#4)			---
Special Roads											
Industrial		60'	32'	---	3" AC	10"	6%	(see note #4)			---
Private		---	20',28' (11)	---	0-9 or 2" AC	6"	12%	(see note #4)			---
Frontage		40'-60'	28'	---	3" AC	8"	10%	(see note #4)			(10)

(1) City of Sisters road and street design standards shall apply within the Sisters Urban Area. Standards for the Terrebonne and Tumalo Rural Unincorporated Communities are contained in Title 18.
(2) Design standards in this title for the La Pine Urban Unincorporated Community are considered interim until new standards are developed as part of the La Pine Bicycle, Pedestrian and Local Street Plan.
(3) Design shall be in accordance with Oregon Department of Transportation Design Standards.
(4) Design shall be in accordance with AASHTO standards.
(5) Pavement widths are variable, depending on such factors as anticipated traffic volumes, and whether the road section involves turn lanes, bike lanes, and whether frontage roads border an arterial or collector, etc.
(6) The required base depth may be increased when a C.B.R., or R-valve is required by the Road Department.
(7) Cul-de-sac bulb to be constructed with a 45-foot minimum radius.
(8) Increase in grade of 2 percent may be allowed in unusually steep areas.
(9) 30' minimum street width allowed in single-family zoned residential areas or 36' minimum street width in multi-family zones. A lessor street width may be approved through the variance procedure.
(10) 12" standard for urban frontage roads, and no curb for rural frontage roads.
(11) 20' allowed for cul-de-sac's and roads with low anticipated traffic volumes as long as separate multiple use paths are provided. 28' road required (including the required 4' striped shoulder bikeway in each direction) for circulator and primary subdivision access roads and other roads when separate multiple use paths are not provided.
(12) The larger of the two widths is necessary if a shoulder bikeway is required (4' for collector and 5' for arterial).
(13) 20' allowed for cul-de-sac's and roads with low anticipated traffic volumes. 24' width required for circulator and primary subdivision access roads.

ROAD MANAGEMENT SYSTEM

Road management is an orderly scheduling of pavement preservation, maintenance, repairs and improvements to meet serviceability goals and provide safe, comfortable and economical transportation while striving to achieve the best possible value from available funds. Routine maintenance activities are carried out on a daily basis. Road sections requiring more extensive work are prioritized and then selected for improvements based on an evaluation of pavement condition.

Local road standards need to evolve over time as a given road experiences more traffic. A dirt or aggregate surfaced road may be adequate for access to individual properties. However, as additional properties begin to use that road for access, it may no longer be adequate. At a certain point, the owners of property using the road for access will need to join together and participate in the improvement of the road through the formation of a special road district or local improvement district.

Goal

8. Maintain the County road network pavement in good to excellent condition.

Policies

26. Deschutes County shall continue to maintain and preserve the County road network through its pavement management system which guides a program of paving, repairing, reconstruction, drainage clearance and vegetation control.

27. After safety-related issues, the highest volume road segments shall be the next priority for County road maintenance and repair.

28. If and when gravel or dirt roads are paved by the County, the main controlling criteria shall be: density of surrounding development, traffic volumes, road classification, gap filling, potential school bus routing efficiency and emergency evacuation potential.

LEVEL OF SERVICE

Levels of service (LOS) describe the service quality on two lane roads or highways as determined by average travel speed, percent of time delay due to the inability to pass, roadway capacity utilization, or intersection delay. LOS ratings generally apply to collector and arterial streets only.

LOS is defined by a range of designations from “A” to “F”. LOS “A” is completely unimpeded traffic flow while “F” is highly congested. Table 5.2.T2 identifies the relationship between two-way average daily traffic volumes, level of service and the percentage of daily traffic that occurs during the peak travel hours of the day (K factor). While several road segments are expected to reach LOS “E” over the next 20 years, most County roads will be at LOS “D” or better as long as population growth does not exceed the projections. ODOT highway policies dictate that anything over LOS “C” outside of urban areas is unacceptable. For rural highway segments in Deschutes County, ODOT projects several to exceed LOS “D” over the next 20 years.

Table 5.2.T2

Maximum Average Daily Traffic Allowed for Various Levels of Service

K Factor	Level of Service				
	A	B	C	D	E
	Average Daily Traffic Volume (ideal conditions, i.e., level terrain, etc.)				
10%	2,400	4,800	7,900	13,500	22,900

Goal

9. Maintain a level of service of "D" or better during the peak hour throughout the County arterial and collector road system over the next 20 years.

Policy

29. Deschutes County shall continue to monitor road volumes on the County arterial and collector network. The County Road Department shall continue to be the department responsible for monitoring volumes and shall strive to count each arterial and collector at least once every four years. The Road Department shall periodically examine the traffic volumes to identify level of service deterioration.

CAPACITY

County Roads

Traffic volumes on County roads were estimated using a combination of trending analyses and the Potential Development Impact Analysis work done by ODOT for Deschutes County. It was assumed that any road segment with fewer than 9,600 projected ADT in 2016 would operate at an LOS of "D" or better, and that LOS "D" is acceptable for County arterial and collector roads. Of all the County roads, only Baker Road (LOS "E") leading into Deschutes River Woods is projected to operate at worse than LOS "D" in 2016. Additional roads *approaching* LOS "E" are located in the South County and include:

- Burgess Road west of Huntington Road in La Pine.
- South Century Drive near Sunriver.

These two road segments shall be monitored by the County Road Department and counted at least every two years instead of the usual 4-year cycle.

ODOT State Highways

ODOT provides yearly traffic counts on all the state highways running through Deschutes County. ODOT used historical growth rates based on the last twenty years of traffic volume data. The yearly growth ranged from 0.0 to 11.4 percent. It was also assumed that the number of access points remained constant. Whereas the County road analysis related LOS directly to ADT levels, several highway segments may have high ADT levels but a correspondingly low LOS because of the presence of multilane and passing lane sections. Therefore, the most important analysis tool for highway sections becomes the LOS value rather than ADT. For multilane sections in the County, the forecasted traffic volumes are well within the capacity limits through the year 2016. However, several sections of the state

highways will be reaching capacity thresholds for two-lane sections. The sections projected to approach capacity and operate at level of service (LOS) "D" or worse are:

- Highway 126 through downtown Sisters and on either side of the City of Redmond.
- Most of Highway 20/126 between the Jefferson County line, through Sisters and Bend to Powell Butte Highway.
- Highway 97 from the Jefferson County line through Terrebonne and Cottonwood Drive south to La Pine.
- Highway 372 from Bend to Dillon Falls Road on the way to Mt Bachelor.

Goal

10. Maintain the current arterial and collector system in the County and prevent degradation of the capacity of the system.

Policies

30. Deschutes County shall monitor County arterials and collectors to help in the determination of when road improvement projects are necessary.

31. Deschutes County shall continue to work with the ODOT and the Cities of Bend, Redmond and Sisters to coordinate solutions to highway and non-highway road issues that cross over jurisdictional boundaries.

32. The County shall establish requirements and adopt standards for secondary access roads to isolated rural subdivisions.

BRIDGES

Deschutes County owns and manages approximately 120 bridges throughout the County. The County Road Department performs routine maintenance and repairs as necessary. Several of the bridges are signed for weight limitations in the five to fifteen-ton range because they are structurally deficient. Five bridges on higher volume roads are signed with 25-ton weight limits. Since the recent replacement of the Fall River Bridge in 1995, no significant bridge problems have been identified for correction or reconstruction.

Goal

11. Maintain a safe and efficient network of bridges on County roadways.

Policy

33. Deschutes County shall monitor the condition of County bridges on a regular basis, and perform routine maintenance and repair when necessary. The County shall also explore additional funding sources when major reconstruction or replacement of bridges is necessary.

TRUCK ROUTES

Currently Deschutes County has no designated truck routes or hazardous materials routes on County roads. However, several roads are signed to *not* allow trucks over a certain weight due

to bridge limitations. Oregon is one of the few states that currently allow oversized tractor-trailer vehicles referred to as Longer Combination Vehicles (LCVs) on certain highways. Two types of LCVs, triple trailers and heavier double trailers (105,000-lb weight limit) are allowed to operate in Oregon without a special permit. Truck traffic is generally confined to industrial, commercial and surface mining areas. State highways serve the majority of truck traffic and are most suitable for truck use. The County shall continue to designate state highways as the desired through truck routes in the County. The draft 1998 Oregon Highway Plan proposes to designate U.S. 97 as a State Trucking Route. This designation could mean that additional funds would be available for improvements to U.S. 97. Outside of the state highway system, trucks should be limited to travel only on arterial roads.

Goal

12. Develop a plan of designated truck routes.

Policy

34. Deschutes County shall designate that long-haul, through trucks, be limited to operating on Principal Arterial and Rural Minor Arterial roads as designated in the County transportation network, except in emergency situations and when no reasonable alternative arterial road is available for access to commercial or industrial uses.

HAZARDOUS MATERIAL ROUTES

The transport of non-radioactive hazardous materials (NRHM) is guided by Part 397 of the Federal Motor Carrier Safety Regulations. The Federal Department of Transportation defines hazardous materials (HAZMAT) and regulates their packaging and shipping. ODOT designates the NRHM routes in Oregon. Currently, there are no designated NRHM routes in Central Oregon, which means HAZMAT can be transported through Deschutes County without any restrictions. In order to establish a new NHRM route, the County would need to work with ODOT to make findings on various federal criteria such as population density and proximity to hospitals and schools. The creation of NRHM routes requires a deeper understanding of the movement of these shipments than is currently available, therefore no routes will be designated in this Plan. However, the County shall work with ODOT to determine if any Deschutes County highways should be candidates for designation as NRHM routes.

Goal

13. Develop a plan of designated hazardous materials (NRHM) routes.

Policy

35. Deschutes County shall work with ODOT to determine the feasibility of designating NHRM route(s) through Deschutes County.

FACILITY / SAFETY IMPROVEMENTS

In 1996, the grant-funded Deschutes County Safe Communities program was initiated in an effort to reduce transportation-related injuries of all types. Program staff used the state accident database, from the Accident Data Unit at ODOT, to evaluate accident data for the period 1991- April 1995.

During this time period there were a total of 2,518 crashes reported on County roads and highways outside of urban areas. Of the total number of accidents, 70 were fatal, 1,073 involved injury (170 serious), and 1,375 were property damage only accidents. Safe Communities staff has also identified the difference in accident rates between the County in general and the rural areas. Countywide, fatal accidents accounted for 1.2 percent of the total number of accidents, while fatal accidents just in the rural area accounted for 2.8 percent of the total. Injury accidents made up 4.4 percent of the County total, while in just the rural areas; they accounted for 6.8 percent of the total. The Safe Communities Group identified the process of reengineering high incident areas, where the greatest number of accidents occur, as the most important issue that should be addressed within the first year of the program. However, it could also be argued that the number of accidents alone is not the only indicator of need for corrective measures. A location with very high traffic volumes and a high accident rate may be safer than a location with low volumes but a high accident per average daily trip (ADT) rate. The "high priority" projects in the Project List subsection of this Plan includes improvement projects recommended to improve safety.

Goal

14. Maintain a safe and efficient network of roadways.

Policy

36. Deschutes County shall develop and maintain a prioritized inventory of safety-deficient facilities on the County road network and give highest priority to correcting safety issues.

5.3 PUBLIC TRANSPORTATION PLAN

SPECIAL TRANSIT SERVICES

Fixed-Route Transit

There is currently no traditional fixed-route local transit service in Deschutes County. However, the Mt. Bachelor Ski Resort Super Shuttle does operate during the winter months on a fixed-route and schedule. The County will continue to work with service providers such as Mt. Bachelor to secure additional funding as well as increase promotion of their services.

Prineville to Silver Lake Stage

Future Fixed-Route Transportation Options

In 1997, ODOT funded a study to address the issue of a fixed-route, commuter shuttle transit system between Bend and Redmond. The Study includes a commuter survey, information regarding potential ridership and costs. The results indicated that the most feasible operation would be a 3-van system with reasonably direct routing and few stops. The travel time between Bend and Redmond would average 30 minutes. The capital costs would be approximately $150,000, with annual operating costs of $200,000. Average daily ridership could average 100 if fares were $3.00 or less. Further study would be required prior to implementation.

If the County were to establish a rural transit "district" to include a Bend-Redmond shuttle, another potential transit route could be from La Pine to Bend. Although no formal study has been done on this, similar results as the Bend-Redmond Study would be expected. A major difference in a La Pine-Bend shuttle would be the limited number of stops in La Pine and Wickiup Junction, and a probable diversion to serve Deschutes River Woods.

To achieve its potential, a commuter shuttle service needs good connections to sidewalks, bikeways, fixed-route transit systems and rideshare lots. Currently, there is no fixed-route transit in Bend or Redmond, the sidewalk and bicycle networks are generally fragmented and there are few rideshare lots. Because of these limitations, a shuttle service should attempt point to point travel as much as possible, which means working with larger employers to encourage the service. Figure 5.3.F1 identifies the potential routes and stops for a County rural transit system.

The need for a public transit center has been identified and shall be supported by Deschutes County. The center would include adequate parking and restroom facilities, and provide the opportunity to transfer between multiple intercity and local service providers. The most likely transit center location is in Bend, but additional locations in Redmond and possibly La

Pine/Wickiup Junction may also be established. The County shall cooperate with ODOT and local jurisdictions in establishing future transit facilities as needed.

Local Demand-Responsive Transportation

Deschutes County has a network of special transportation providers who serve the elderly and disabled population. In most cases, the general public does not have access to these special transportation services. There are several providers of special transportation services in the County, ranging from public to private, both profit and non-profit. The following are the existing service providers in the County:

- *City of Bend Dial-A-Ride*
- *Central Oregon Council On Aging (COCOA) Dial-A-Ride*
- *Opportunity Foundation of Central Oregon*
- *Residential Assistance Program (RAP)*
- *Disabled American Veterans*
- *Volunteer Services*
- *Central Oregon Resources for Independent Living*
- *Access Express*

With limited funding options, no significant expansions in these demand responsive programs are planned. Short-term capital needs have been identified for several dial-a-ride service providers and are included in the Project List.

INTERCITY BUS AND PASSENGER RAIL

The following intercity bus services are planned to continue as the primary (and only) public transit options in the County. The focus shall be to maximize the efficiency of these services as land use changes occur. The County realizes it has no control over the market driven forces that allow private transit providers to thrive or just survive. Increased emphasis shall be placed on the transit/rideshare connections possible in the South County as the population increases. The County shall continue to work with the cities of Bend and Redmond as they investigate the possibility of fixed-route local transit systems. Without a local transit system to distribute trips, a commuter system linking the rural and urban areas of the County is less likely to succeed.

- *Greyhound*
- *CAC Transportation*
- *The People Mover*
- *Porter Stage Lines*
- *Valley Retriever*

The Oregon Transportation Commission in November 1992 adopted the Oregon Rail Passenger Policy and Plan. It provides a comprehensive long-range plan for railroad passenger service in Oregon in coordination with the Oregon Transportation Plan. Unfortunately, passenger rail service for Central Oregon was ruled out as not being cost-effective. However, as conditions change and the population of Deschutes County continues to increase, the County shall monitor the feasibility for future passenger rail service and work with ODOT and the community on future transit/rail options.

Goals

15. Enhance the opportunity for intermodal connections throughout the County transportation system.

16. Increase the existing level of special services provided.

17. Establish rural transit service for Deschutes County residents.

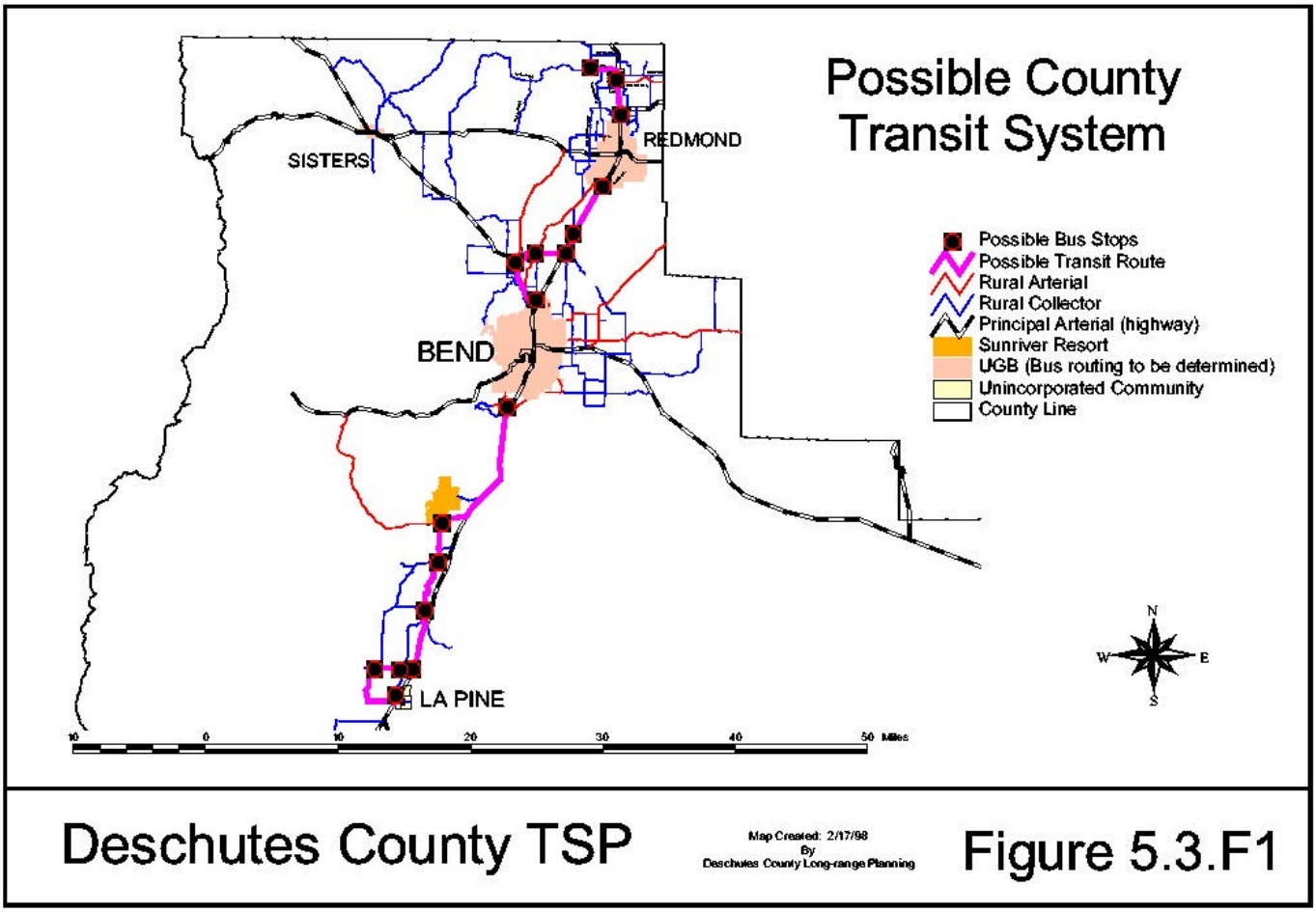
18. Decrease barriers to the use of existing services.

Policies

37. Deschutes County shall work with ODOT, the cities of Bend, Redmond and Sisters, and transit service providers to study countywide rideshare facility needs, and investigate public transit possibilities including potential transit stops for a regional or commuter-based transit system. Those possibilities shall include bus and rail, and if economically feasible, the County shall seek such services as are found to be safe, efficient, and convenient in serving the transportation needs of the residents of Deschutes County.

38. Deschutes County shall continue to work with special service providers, ODOT, and the cities of Bend, Redmond and Sisters to secure additional funding as well as increase promotion of those special transit services that may be underutilized.

39. Deschutes County shall identify and monitor the needs of the transportation disadvantaged and attempt to fill those needs.

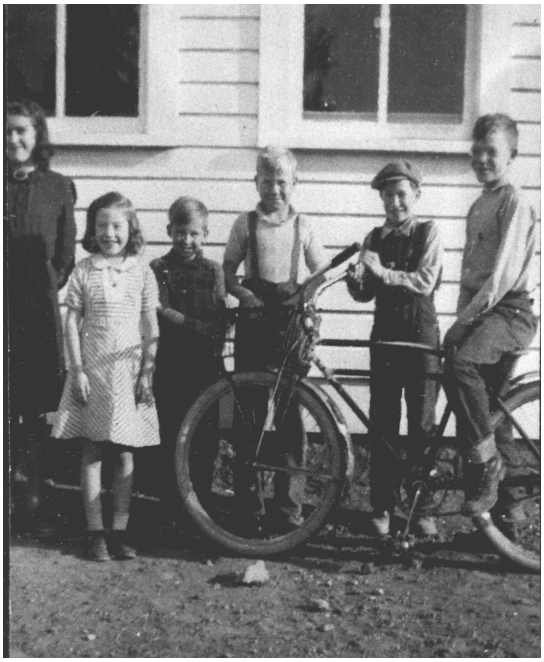


Deschutes County TSP

Map Created: 2/17/98
By
Deschutes County Long-range Planning

Figure 5.3.F1

5.4 BIKEWAY AND PEDESTRIAN PLAN



In March 1992, the County adopted a Bicycle Master Plan as a resource element of the Deschutes County Year 2000 Comprehensive Plan. The Bicycle Master Plan provides recommendations for policies, classifications of bike facilities, location of bike facilities, bicycle parking and other transportation issues related to bike facilities. Many of the goals and objectives of that Plan have been implemented and/or are still valid. With the adoption of the latest version of the Oregon Bicycle and Pedestrian Plan by the Oregon Transportation Commission on June 14, 1995, the 1992 County Bicycle Master Plan is no longer relevant. The new state Plan contains several changes from earlier versions, which will have an effect on the Deschutes County Bicycle Master Plan. The most significant change is the new emphasis on pedestrian facilities, which were not addressed in the previous Plan.

Based on need and road characteristics, all roads open for public use should be considered for the potential to improve bicycling and walking. Facilities should safely accommodate the majority of users. Roads designed to accommodate cyclists with moderate skills will meet the needs of most riders; special consideration should be given close to school areas, where facilities designed specifically for children should be provided. Roads designed to accommodate young, elderly and disabled pedestrians serve all users well.

Rural Bikeways

On most rural roadways, shoulder bikeways are appropriate, accommodating cyclists with few conflicts with motor vehicles. In general, the minimum shoulder widths recommended by Oregon Bicycle and Pedestrian Plan for rural highways are adequate for bicycle travel. These standards take into account traffic volumes and other considerations.

Shared roadways are adequate on low-volume rural roads, where motor vehicle drivers can safely pass bicyclists due to the low likelihood of encountering on-coming traffic. Shoulder bikeways can be added to roads with high bicycle use, such as in semi-rural residential areas or close to urban areas. It may be appropriate to stripe and mark shoulders as bike lanes near schools or other areas of high use. Even adding minimal-width shoulders can improve conditions for bicyclists on roads with moderate traffic volumes. On roads with high use, it may be necessary to add full-width shoulders in areas of poor visibility due to topography.

Rural Walkways

In sparsely populated areas, the shoulders of rural roads usually accommodate pedestrians. There are, however, roadways outside urban areas where the developing urban character

creates a need for sidewalks, such as on highly developed commercial strips or in residential clusters along county roads or state highways.

How and where pedestrians cross arterial roads is potentially more important that pedestrian travel along roads. Road volumes will dictate at what locations special pedestrian treatments may be warranted. It is anticipated that much of the focus will be on the state highways as they travel through rural communities. These locations have the highest concentrations of pedestrians and activity centers. Pedestrian treatments will be analyzed in concert with traffic calming strategies on the highways. Where sidewalks are not provided, paved shoulders should be wide enough to accommodate both pedestrians and bicyclists. Paved multi-use paths provided on one or both sides of a roadway in a rural community may be appropriate for providing access to schools. These paths will also serve the needs of young bicycle riders.

Through the site plan review process, the County shall continue to monitor pedestrian facility design, and require appropriate facility designs to comply with provisions of the Americans with Disabilities Act (ADA).

This Plan identifies policies, bike and pedestrian facility classifications, design standards and construction and maintenance guidelines. Many of the design standards apply to urban rather than rural areas. However, they are in this plan because they may apply to specific projects, new neighborhoods, or urban unincorporated communities. This TSP contains a list of suggested improvements on the Deschutes County Road System to accommodate bike and pedestrian facilities. Completion of these projects will considerably enhance the network of bike and pedestrian facilities throughout the County.

The TSP recommends standards and design guidelines for bicycle and pedestrian facilities set by the 1995 Oregon Bicycle and Pedestrian Plan. All traffic devices used in conjunction with bikeways are required to meet the standards set forth in the national Manual on Uniform Traffic Control Devices (MUTCD).

Design Standards

Shared Roadways

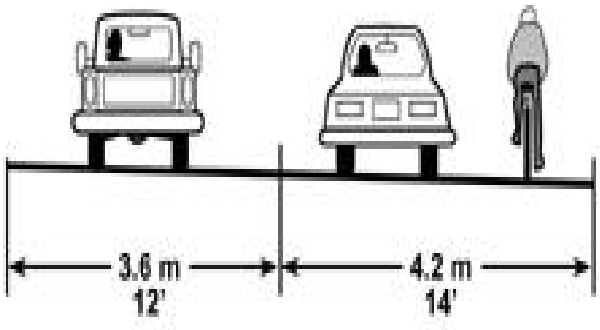
There are no specific bicycle standards for most shared roadways; they are simply the roads as constructed. Shared roadways function well on local streets and minor collectors, and on low-volume rural roads and highways. The majority of rural roads in Deschutes County are shared roadways. Mile for mile, shared roadways are the most common bikeway type.
Shared roadways are suitable in urban areas on streets with low speeds - 40 km/h (25 MPH) or less - or low traffic volumes (3,000 ADT or less, depending on speed and land use).

In rural areas, the suitability of a shared roadway decreases as traffic speeds and volumes increase, especially on roads with poor sight distance. Where bicycle use or demand is potentially high, roads should be widened to include shoulder bikeways where the travel speeds and volumes are high. Many urban local streets carry excessive traffic volumes at speeds higher than they were designed to carry. These can function as shared roadways if

traffic speeds and volumes are reduced. There are many "traffic calming" techniques that can make these streets more amenable to bicycling on the road.

Wide Curb Lanes

A wide curb lane may be provided where there is inadequate width to provide the required bike lanes or shoulder bikeways. This may occur on retrofit projects where there are severe physical constraints, and all other options have been pursued, such as removing parking or narrowing travel lanes. Wide curb lanes are not particularly attractive to most cyclists; they simply allow a motor vehicle to pass cyclists within a travel lane.



To be effective, a wide lane must be at least 4.2m (14ft) wide, but less than 4.8m (16ft). Usable width is normally measured from curb face to the center of the lane stripe, but adjustments need to be made for drainage grates, parking and the ridge between the pavement and gutter. Widths greater than 4.8m (16ft) encourage the undesirable operation of two motor vehicles in one lane. In this situation, a bike lane or shoulder bikeway should be striped.

Shoulder Bikeways

Paved shoulders are provided on rural highways for a variety of safety, operational and maintenance reasons:

- Space is provided for motorists to stop out of traffic in case of mechanical difficulty, a flat tire or other emergency;
- Space is provided to escape potential crashes;
- Sight distance is improved in cut sections;
- Highway capacity is improved;
- Space is provided for maintenance operations such as snow removal and storage;
- Lateral clearance is provided for signs and guardrail;
- Storm water can be discharged farther from the pavement; and
- Structural support is given to the pavement.

Recommended Shoulder Bikeway Design Standards

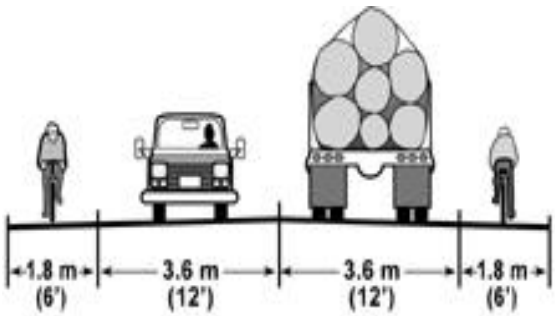
Road Class	**ADT under 250**	**ADT 250-400**	**ADT 400-DHV* 100**	**DHV 100-200**	**DHV 200-400**	**DHV over 400**
Rural Arterials	1.2m (4ft)	1.2m (4ft)	1.8m (6ft)	1.8m (6ft)	2.4m (8ft)	2.4m (8ft)
Rural Collectors	0.6m (2ft)	0.6m (2ft)	1.2m (4ft)	1.8m (6ft)	2.4m (8ft)	2.4m (8ft)
Rural Local Route	0.6m (2ft)	0.6m (2ft)	1.2m (4ft)	1.8m (6ft)	1.8m (6ft)	2.4m (8ft)

*ADT is the *average* daily traffic, which is expressed as a 24-hour volume. DHV (Design Hour Volume) is the expected traffic volume in the peak design hour (usually at commuter times); usually about 10% of ADT in urban areas, higher on rural highways with high recreational use (camping areas, beach access, ski resorts, etc.)

Width Standards

In general, the shoulder widths recommended for rural highways in the ODOT Highway Design Manual serve bicyclists well. The above table should be used when determining roadway shoulder widths.

When providing shoulders for bicycle use, a width of 1.8m (6ft) is recommended. This allows a cyclist to ride far enough from the edge of pavement to avoid debris, yet far enough from passing vehicles to avoid conflicts. If there are physical width limitations, a minimum 1.2m (4ft) shoulder may be used. Shoulders against a curb face, guardrail or other roadside barriers must have a 1.5m (5ft) minimum width or 1.2m (4ft) from the longitudinal joint between a monolithic curb and gutter and the edge of travel lane.



Min: 3.6 m (5') against curb, parking or guardrail, 1.2 m (4') open shoulder

On steep grades, it is desirable to maintain a 1.8m (6ft), (min. 1.5m [5ft]) shoulder, as cyclists need more space for maneuvering.

Note: many rural roads are 8.4m (28ft) wide, with fog lines striped at 3.3m (11ft) from centerline. The remaining 0.9m (3ft) should not be considered a shoulder bikeway (min. width 1.2m {4ft}); these are still considered shared roadways, as most cyclists will ride on or near the fog line.

Pavement Design

Many existing gravel shoulders have sufficient width and base to support shoulder bikeways. Minor excavation and the addition of 75-100mm (3-4") of asphaltic concrete is often enough to provide shoulder bikeways. It is best to widen shoulders in conjunction with pavement overlays for several reasons:

- The top lift of asphalt adds structural strength;
- The final lift provides a smooth, seamless joint;
- The cost is less, as greater quantities of materials will be purchased; and
- Traffic is disrupted only once for both operations.

When shoulders are provided as part of new road construction, the pavement structural design should be the same as that of the roadway. On shoulder widening projects, there may be some opportunities to reduce costs by building to a lesser thickness. 50-100mm (2-

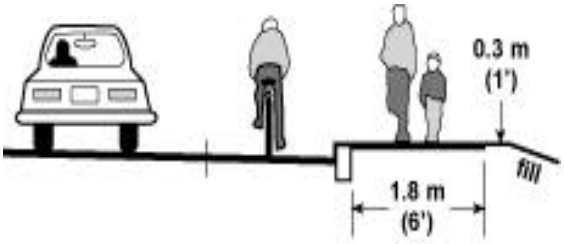
4") of asphalt and 50-75mm (2-3") of aggregate over existing roadway shoulders may be adequate if the following conditions are met:

- There are no planned widening projects for the road section in the foreseeable future;
- The existing shoulder area and roadbed are stable and there is adequate drainage or adequate drainage can be provided without major excavation and grading work;
- The existing travel lanes have adequate width and are in stable condition;
- The horizontal curvature is not excessive, so that the wheels of large vehicles do not track onto the shoulder area (on roads that have generally good horizontal alignment, it may be feasible to build only the inside of curves to full depth); and
- The existing and projected ADT and heavy truck traffic is not considered excessive (e.g. under 10%).

The thickness of pavement and base material will depend upon local conditions, and engineering judgment should be used. If there are short sections where the travel lanes must be reconstructed or widened, these areas should be constructed to normal full-depth standards.

Sidewalks

The standard urban sidewalk width is 1.8m (6ft), exclusive of curb and obstructions. This width allows two pedestrians (including wheelchair users) to walk side by side, or to pass each other comfortably. It also allows two pedestrians to pass a third pedestrian without leaving the sidewalk.

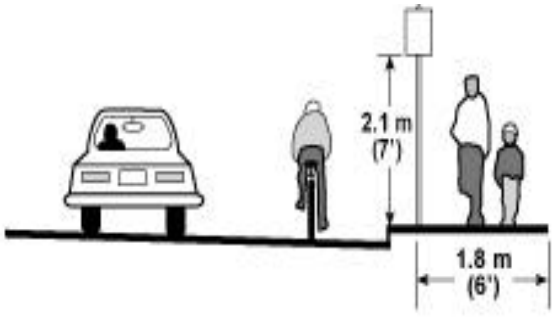


Where it can be justified and deemed appropriate, as in most rural areas, the minimum width may be 1.5m (5ft); on local streets, circumstances may include a combination of width constraints or low potential usage.

The minimum width for sidewalks directly adjacent to a motor vehicle lane is generally 1.8m (6ft). Greater sidewalk widths are needed in high pedestrian use areas, such as urban central business districts.

Obstructions

The standard sidewalk width is clear of obstructions such as sign posts, utility and signal poles, mailboxes, parking meters, fire hydrants, trees and other street furniture. Obstructions should be placed between the sidewalk and the roadway, to create a "buffer" for increased pedestrian comfort. Movable obstructions such as sign boards, tables and chairs must allow for a 1.8m (6ft) clear passage. Obstructions should not be placed in such a manner that they impair motorist visibility. Clearance to vertical obstructions (signs, trees, etc.) must be at least 2.1m (7ft):

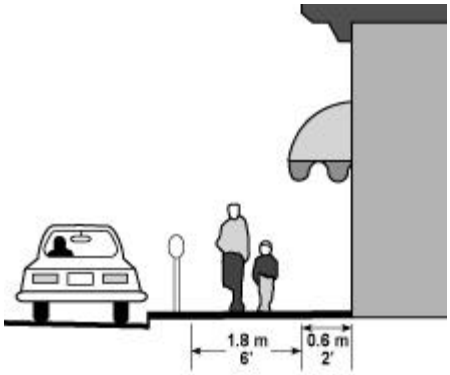


Cars parked perpendicular or diagonally to sidewalks can be obstructions if there is excessive overhang. Wheel stops or blocks can be used to prevent narrowing the usable sidewalk width:

Reducing overhang from parked cars

Shy Distance

An additional 0.6m (2ft) shy distance is needed from shoulder-high vertical barriers such as buildings, sound walls, retaining walls and fences:



Note: ADA requires that "objects protruding from walls (e.g. signs, fixtures, telephones, canopies) with their leading edge between 27" and 80" (685 and 2030mm) above the finished sidewalk shall protrude no more than 4" (100mm) into any portion of the public sidewalk." (ADAAG 14.2.2)

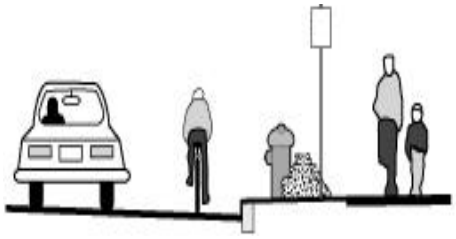
Sidewalk against wall

Planting Strips

Well-designed urban streets include planting strips. A planting strip should be 1.5m (5ft) wide or greater (min. 0.9m [3ft]), and landscaped with low-maintenance plantings.

The extra separation from motor vehicle traffic decreases road noise, prevents water in puddles from splashing onto sidewalk users and generally increases a walker's sense of security. Planting strips offer many other benefits to pedestrians:

- Room for street trees;
- Room for sign posts, utility and signal poles, mailboxes, parking meters, fire hydrants, etc.;
- When wide enough, a place for a motor vehicle to wait out of the stream of traffic while yielding to a pedestrian in a driveway.
- The opportunity to line up sidewalks, curb cuts and crosswalks at intersections:



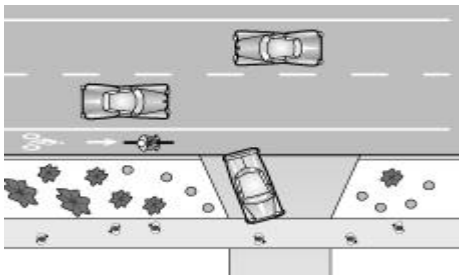
Sidewalk with planting strip

- An enhanced environment for wheelchair users, as the sidewalk can be kept at a constant side slope, with the slope for driveways built into the planting strip section:

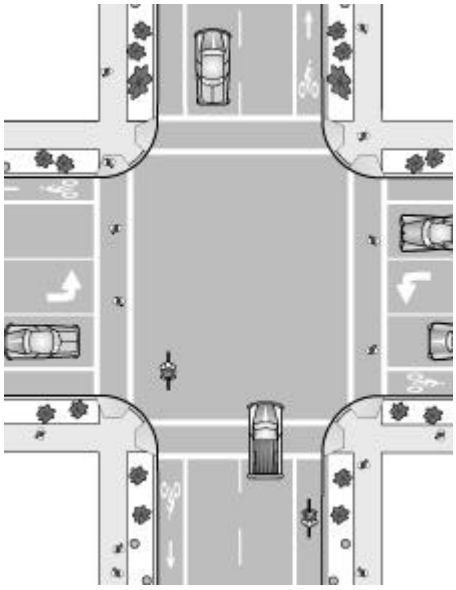
- An opportunity for aesthetic enhancements such as landscaping (plants should be selected that require little maintenance and watering, and whose roots will not buckle sidewalks);

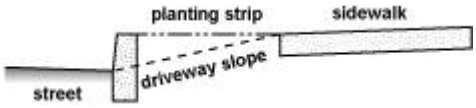
- Less runoff water, decreasing overall drainage requirements.

- Wide planting strip adds room for turn movements



- A place to store snow removal during the winter.





Planting strip at driveway
(and effect on cross-slope)

Where constraints preclude the use of the same width throughout a project, the planting strip can be interrupted and resume where the constraint ends:

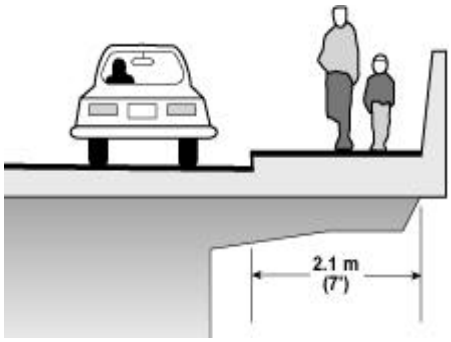
Trees, street furniture and other objects should not reduce visibility of pedestrians, bicyclists and signs.

Planting strip constraints

High-Speed Corridors

Sidewalks must not be placed directly adjacent to a high-speed travel lane (design speed 70 km/h [45 MPH] and above). Acceptable buffers include a planting strip, a shoulder barrier, a parking lane or a bike lane. Buffers are also beneficial on lower speed facilities.

Bridges



The standard width for sidewalks on bridges is 2.1m (7ft) (min. 1.8m [6ft]), to account for a shy distance from the bridge rail - some pedestrians feel uncomfortable walking close to a high vertical drop. The bridge sidewalk must not be narrower than the approach sidewalk; in instances where the approach sidewalks are of differing widths, the lesser of the two widths may be used on the bridge. Sidewalks on bridges with design speeds greater than 65 km/h (40 MPH) require a vehicle barrier at curb line.

Surfacing

The preferred material for sidewalks is Portland Cement Concrete (PCC), which provides a smooth, durable finish that is easy to grade and repair.

Asphaltic Concrete (A/C) may be used if it can be finished to the same surface smoothness as PCC. A/C is susceptible to break up by vegetation, requires more frequent maintenance and generally has a shorter life expectancy (15-20 years versus 40 years or more for PCC).

Brick pavers can provide an aesthetically pleasing effect if the following concerns are addressed:

- They should be laid to a great degree of smoothness;
- The surface must be slip-resistant when wet; and
- Long-term maintenance costs should be considered.

Unpaved Paths

In general, the standard width of an unpaved path is the same as for sidewalks. An unpaved path should not be constructed where a sidewalk is more appropriate.

The surface material should be packed hard enough to be usable by wheelchairs and children on bicycles (the roadway should be designed to accommodate more experienced bicyclists). Recycled pavement grindings provide a suitable material: they are usually inexpensive and easy to grade (this should be done in the summer, when the heat helps pack and bind the grindings).

Though originally conceived to provide a facility for bicyclists separated from motor-vehicle traffic, paths often see greater use by pedestrians, joggers and skaters, and sometimes equestrians. The planning and design of multi-use paths must therefore take into account the various skills, experience and characteristics of these different users.

Well-planned and designed multi-use paths can provide good pedestrian and bicycle mobility. They can have their own alignment along streams and greenways, or may be components of a community trail system.

Paths can serve both commuter and recreational cyclists. Many inexperienced cyclists fear motor vehicle traffic and will not ride on streets until they gain experience and confidence. A separated path provides a learning ground for potential bicycle commuters and can attract experienced cyclists who prefer an aesthetic ride. The key components to successful paths include:

- Continuous separation from traffic, by locating paths along a river or a greenbelt such as a rail-to-trail conversion, with few street or driveway crossings (paths directly adjacent to roadways are not recommended, as they tend to have many conflict points);
- Scenic qualities, offering an aesthetic experience that attracts cyclists and pedestrians;
- Connection to land-uses, such as shopping malls, downtown, schools and other community destinations;
- Well-designed street crossings, with measures such as bike and pedestrian activated signals, median refuges and warning signs for both motor vehicles and path users;
- Shorter trip lengths than the road network, with connections between dead-end streets or cul-de-sacs, or as short-cuts through open spaces;
- Visibility: proximity to housing and businesses increases safety. Despite fears of some property owners, paths have not attracted crime into adjacent neighborhoods;
- Good design, by providing adequate width and sight distance, and avoiding problems such as poor drainage, blind corners and steep slopes; and
- Proper maintenance, with regular sweeping and repairs. The separation from motor vehicle traffic can reduce some maintenance requirements, such as sweeping the debris that accumulates on roads.

Crossings

The number of at-grade crossings with streets or driveways should be limited. Poorly designed crossings put pedestrians and cyclists in a position where motor vehicle drivers do not expect them at street crossings.

Access

Limiting crossings must be balanced with providing access. If a path is to serve bicyclists and pedestrians well, there should be frequent and convenient access to the local road network. Access points that are spaced too far apart will require users to travel out of direction to enter or exit the path. The path should terminate where it is easily accessible to and from the street system, e.g. at a controlled intersection or at the end of a dead-end street. Directional signs direct users to and from the path.

Security

Multi-use paths in secluded areas should be designed with personal security in mind. Illumination and clear sight distances improve visibility. Location markers, mileage posts and directional signing help users know where they are. Frequent accesses improve response time by emergency vehicles.

Maintenance

Multi-use paths require special trips for inspection, sweeping and repairs. They must be built to a standard high enough that allows heavy maintenance equipment to use the path.

On-Street Facilities

As bicyclists gain experience and realize some of the advantages of riding on the road, many stop riding on paths placed adjacent to roadways. This can be confusing to motorists, who may expect bicyclists to use the path. The presence of a nearby path should not be used as a reason to not provide adequate shoulders, bike lanes or sidewalks on the roadway.

Paths Next To Roadways

Multi-use paths should not be placed next to roadways; half of the bicycle traffic will ride against the normal flow of motor vehicle traffic, which is contrary to the rules of the road, with the following consequences for bicyclists:

- When the path ends, bicyclists riding against traffic tend to continue to travel on the wrong side of the street, as do bicyclists getting to a path. Wrong-way travel by bicyclists is a major cause of bicycle/automobile crashes and should be discouraged.
- At intersections, motorists crossing the path often do not notice bicyclists coming from certain directions, especially where sight distances are poor.
- Bicyclists on the path are required to stop or yield at cross-streets and driveways.
- Stopped motor vehicle traffic on a cross street or driveway may block the path.
- Because of the closeness of motor vehicle traffic to opposing bicycle traffic, barriers are often necessary to separate motor vehicles and bicyclists. These barriers are obstructions, complicate maintenance of the facility and waste available right-of-way.

Separated paths along roadways should be evaluated using the following guidelines:

- Bicycle and pedestrian use is anticipated to be high;
- The adjacent roadway is a heavily-traveled, high-speed thoroughfare where on-road bikeways and sidewalks may be unsafe;
- The path will generally be separated from motor vehicle traffic, with few roadway or driveway crossings:
- There are no reasonable alternatives for bikeways and sidewalks on nearby parallel streets;
- There is a commitment to provide path continuity throughout the corridor;
- The path can be terminated at each end onto streets with good bicycle and pedestrian facilities, or onto another safe, well-designed path;
- There is adequate access to local cross-streets and other facilities along the route.
- Any needed grade-separation structures do not add substantial out-of-direction travel; and
- The total cost of providing the proposed path is proportionate to the need. This evaluation should consider the costs of:

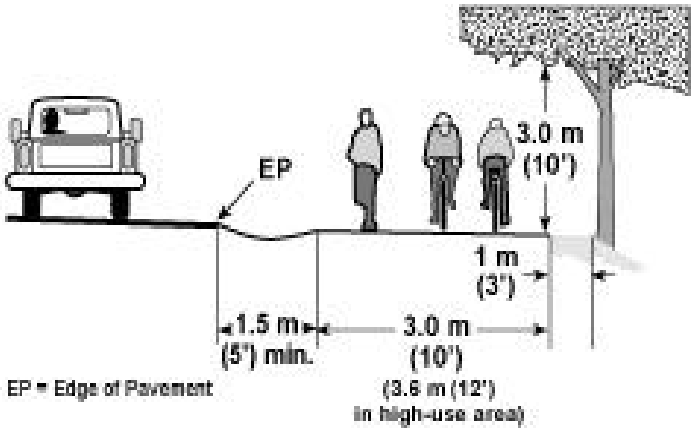
1. Grading, paving, drainage, fences, retaining walls, sound walls, signs and other necessary design features;
2. Structures needed to eliminate at-grade crossings; and

3. Additional maintenance, including the need for specialized maintenance equipment.

Notes: In many cases, the best choice is to improve the roadway system to accommodate cyclists and pedestrians, which may require connecting up local streets or improving nearby, parallel streets.

Width & Clearances

3m (10ft) is the standard width for a two-way multi-use path; they should be 3.6m (12ft) wide in areas with high mixed-use. Faster-moving bicyclists require greater width than pedestrians do; optimum width should be based on the relative use by these two modes. High use by skaters may also require greater width.



The minimum width is 2.4m (8ft). However, 2.4m wide multi-use paths are not recommended in most situations because they may become over-crowded. They should only be constructed as short connectors, or where long-term usage is expected to be low, and with proper horizontal and vertical alignment to assure good sight distances.

Multi-use path standards

Although one-way paths may be intended for one direction of bicycle travel, pedestrians will often use them as two-way facilities. Caution must be used in selecting this type of facility. If needed, they should be 1.8m (6ft) wide (min. 1.5m [5ft]) and designed and signed to assure one-way operation by bicyclists.

A 1m (3ft) or greater (min. 0.6m [2ft]) "shy" or clear distance on both sides of a multi-use path is necessary for safe operation. This area should be graded to the same slope as the path to allow recovery by errant bicyclists. The standard clearance to overhead obstructions is 3m (10ft), min. 2.4m (8ft).

Where a path is parallel and adjacent to a roadway, there should be a 1.5m (5ft) or greater width separating the path from the edge of roadway, or a physical barrier of sufficient height should be installed.

Typical Pavement Sections

The use of concrete surfacing for paths is best for long-term use. Concrete provides a smooth ride when placed with a slip-form paver. The surface must be cross-broomed. The crack-control joints should be saw-cut, not troweled. Concrete paths cost more to build than asphalt paths, but long-term maintenance costs are lower, since they do not become as brittle, cracked and rough with age, or deformed by roots and weeds as does asphalt.

Multi-use paths should be designed with sufficient surfacing structural depth for the subgrade soil type to support maintenance and emergency vehicles. If the path must be constructed over a very poor subgrade (wet and/or poor material), treatment of the subgrade with lime, cement or geotextile fabric should be considered.

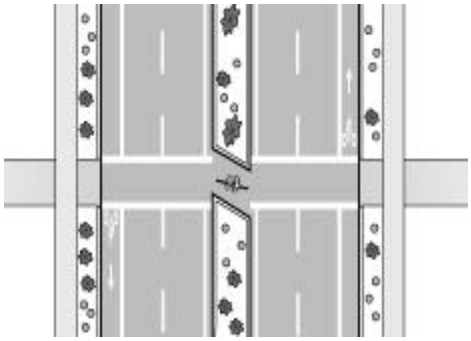
Grades & Cross-Slope

AASHTO recommends a maximum grade of 5% for bicycle use, with steeper grades allowable for up to 150m (500ft.), provided there is good horizontal alignment and sight distance. Extra width is also recommended. Engineering judgment and analysis of the controlling factors should be used to determine what distance is acceptable for steep grades.

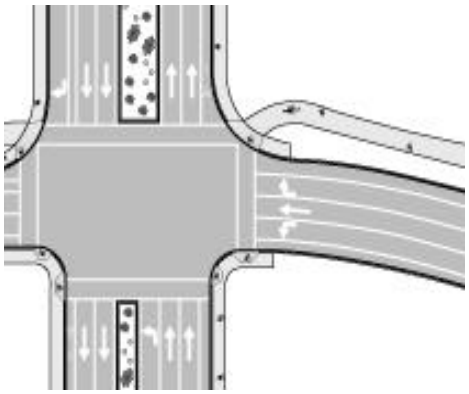
If use by pedestrians is expected, ADA requirements must be met: the grade of separated pathways should not exceed 5%, to accommodate wheelchair users.

Based on AASHTO recommendations and ADA requirements, 5% should be considered the maximum grade allowable for multi-use paths. The standard cross-slope grade is 2%, to meet ADA requirements and to provide drainage. Curves should be banked with the low side on the inside of the curve to help bicyclists maintain their balance.

At-grade Crossings of Thoroughfares



At-grade crossings introduce conflict points, and grade separation should be sought, as most path users expect continued separation from traffic. The greatest conflicts occur where paths cross freeway entrance and exit ramps. Motorists using these ramps are seeking opportunities to merge with fast moving traffic; they are not expecting bicyclists and pedestrians at these locations.

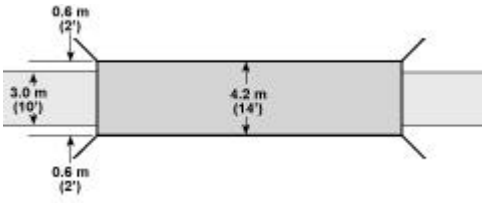


When grade separation structures cannot be justified, signalization or other measures should be considered to reduce conflicts. Good sight distance must be provided so vehicle drivers can see approaching path users. One method is to provide a median island on multi-lane roadways as a refuge:

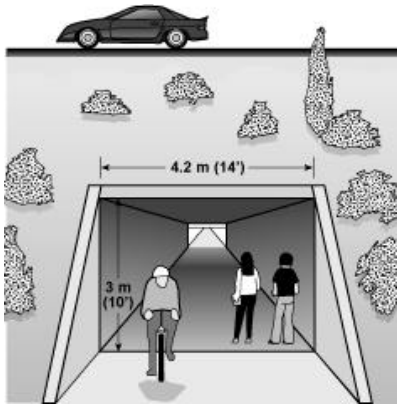
Where a path must cross a roadway at an intersection, improvements to the alignment should be made to increase the visibility of approaching path users. One method is to curve the path slightly, so that it is not parallel to the adjacent roadway:

Multi-use path bridge

The width of multi-use path structures is the same as the approach paved path, plus a 0.6m (2ft) shy



distance on both sides. For example, a 3m (10ft) wide path requires a 4.2m (14ft) wide structure.



Undercrossing Dimensions

The standard overhead clearance of under-crossings is 3m (10ft); a 2.4m (8ft) min. may be allowable with good horizontal and vertical clearance, so users approaching the structure can see through to the other end. Undercrossings should be visually open for the personal security of users. Illumination is needed in areas of poor visibility.

There are advantages and disadvantages to both overcrossings and undercrossings:

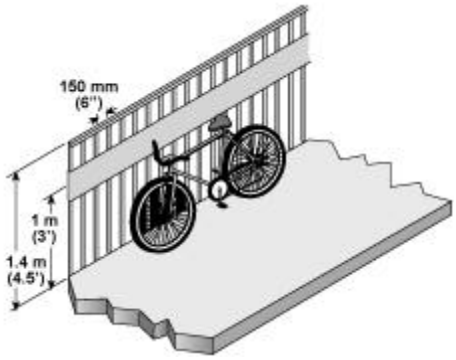
Under-crossings

Advantages: They provide an opportunity to reduce approach grades, as the required 3m (10ft) clearance is less than the clearance required for crossing over a roadway. If the roadway is elevated, an undercrossing can be constructed with little or no grade. They are often less expensive to build.

Disadvantages: They may present security problems, due to reduced visibility. An open, well-lighted structure may end up costing as much as an over-crossing. They may require drainage if the sag point is lower than the surrounding terrain.

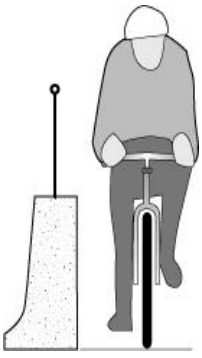
Over-crossings

Advantages: They are more open and present fewer security problems.



Disadvantages: They require longer approaches to achieve the standard 5m (17ft) of clearance over most roadways. With an additional structural depth of 1m (3ft), the total rise will be 6m (20ft). At 5%, this requires a 120m (400ft) approach ramp at each end, for a total of 240m (800ft). This can be lessened if the road is built in a cut section.

Railings, Fences & Barriers

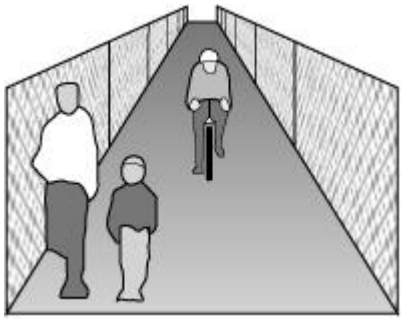


Fences or railings along paths may be needed to prevent access to high-speed highways, or to provide protection along steep side slopes and waterways. A height of 1m (4.5ft) keeps a cyclist from falling over the railing or fence.

Openings in the railing must not exceed 150mm (6") in width. Where a cyclist's handlebar may come into contact with a fence or barrier, a smooth, wide rub-rail may be installed at a height of 1m (3ft).

Where concrete barriers are used, adding tube railing or chain link fencing may be necessary to achieve the required height.

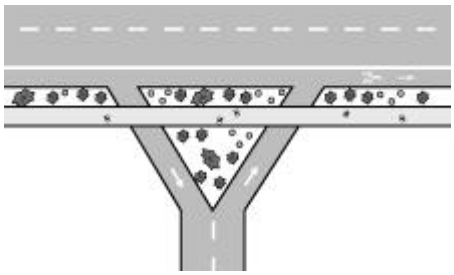
"Cattle-chute" effect



Fences should only be used where they are needed for safety reasons. They should be placed as far away from the path as possible. Duplication of fences should be avoided, such as fences on the right-of-way and fences to keep pedestrians off highways.

Care must be taken to avoid a "cattle chute" effect by placing a high chain-link fence on each side of a path.

Geometric Design



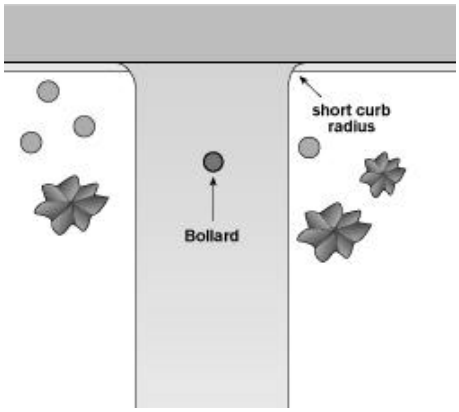
Split path discourages motor-vehicle access.

One method branches the path into two narrower one-way paths just before it reaches the roadway, making it difficult for a motor vehicle to gain access to the path:

Short Curb Radii

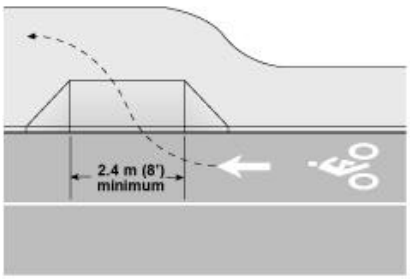
Short curb radii (1.5m [5ft]) make it difficult for motorists to enter a path from the roadway.

Bollards



Barrier posts ("bollards") may be used to limit vehicle traffic on paths. However, they are often hard to see and cyclists may not expect them. When used, they must be spaced wide enough (min. 1.5m [5ft]) for easy passage by cyclists and bicycle trailers as well as wheelchair users. A single bollard is preferred, as two may channelize bicyclists to the middle opening, creating conflicts. They should not be placed right at the intersection. They should be painted with bright, light colors for visibility.

Curb Cuts

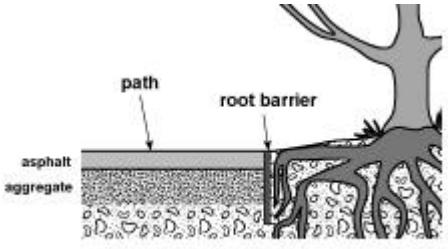


Curb cuts for bicycle access to multi-use paths should be built so they match the road grade without a lip. The width of the curb cut is the full width of the path when the approaching path is perpendicular to the curb and a minimum of 2.4m (8ft) wide when the approaching path is parallel and adjacent to the curb. Greater widths may be needed on downhill grades.

Drainage

Multi-use paths must be constructed with adequate drainage to avoid washouts and flooding, and to prevent silt from intruding onto the path.

Vegetation



All vegetation, including roots, must be removed in the preparation of the subgrade. Special care is needed to control new growth, such as the use of soil sterilant or lime treatment of the subgrade. Plants that can cause other problems should be controlled, such as plants with thorns that can puncture bicycle tires.

Paths built in wooded areas present special problems. The roots of shrubs and trees can pierce through the surface and cause it to bubble up and break apart. Preventive methods include removal of vegetation, realignment of the path away from trees, and placement of root barriers along the edge of the path. An effective barrier is created with a 300mm (12") deep metal shield; greater depth is required for some trees such as cottonwoods.

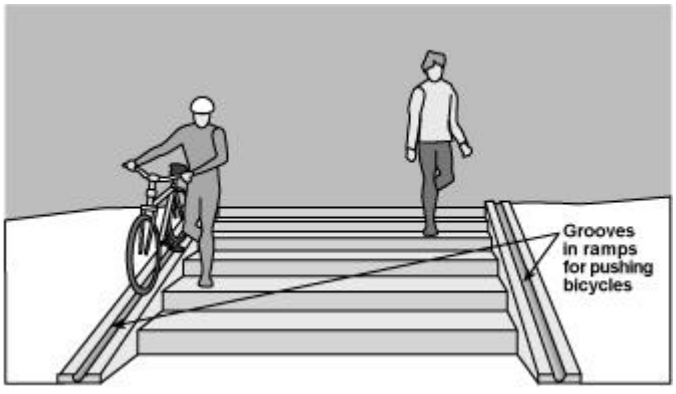
Paths with Heavy Use

If a path must handle a high number of users, it should be wider than standard (3.6m or more). A separate soft-surface jogger or equestrian path may be constructed with bark mulch alongside the paved path.

Multi-use path with additional jogger/equestrian way

Stairways

Where a connection is needed to a destination or another path at a different elevation, a stairway can be used where the terrain is too steep for a path. A grooved concrete trough should be provided so bicyclists can easily push their bicycles up or down.



Stairway provides easy access for bicycles and pedestrians

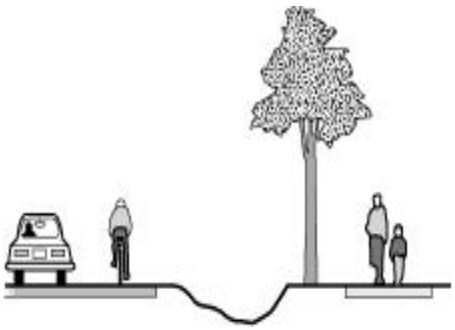
Note: Stairways are usually provided as a shortcut and do not meet ADA requirements; the destination should also be accessible along a flatter route, even if this route is longer and more circuitous.

Sidewalks Without Curb & Gutter

Most sidewalks are separated from the roadway with a curb. The main functions of a curb are for drainage and as a positive separation for motor vehicles. Curb and gutter add substantially to the cost of sidewalks in areas where no storm drain system is in place.

In situations where sidewalks are needed, but the high cost of curb and drainage cannot be justified, or where curbs don't fit the character of the street, two designs enable sidewalks to be constructed without curb and drainage: sidewalks behind the ditch and soft sidewalks.

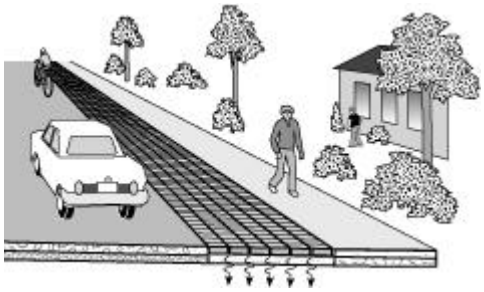
Sidewalks Behind the Ditch



On roads with a rural character, where drainage is provided with an open ditch, and where there is sufficient right-of-way, sidewalks may be placed behind the ditch.

The sidewalk should be built to the same standard as curbed sidewalks: 1.8m (6ft) wide (1.5m [5ft] min.). If the traffic on the road is high, bicyclists should be accommodated with on-road bike lanes or shoulders. Gravel driveways should be paved back 5 m (15 ft) to avoid debris accumulation on the sidewalks.

"Soft Sidewalks"



A "soft sidewalk" has no curb separating the roadway from the walkway. This treatment may be appropriate in areas of moderate precipitation and low traffic volumes and speeds. A brick paver strip, gravel or other permeable material separates sidewalks, so runoff water can percolate. A change in surface texture is needed for vision-impaired pedestrians to detect the edge of walkway with a cane.

Practices To Be Avoided

- *Obstructions in sidewalk*

  The full sidewalk pavement width should be maintained to the extent possible. Permanent fixtures such as mailboxes, poles and sign posts should be placed outside of the sidewalk, or the sidewalk should be enlarged or wrapped around to avoid these obstructions.

- *Narrow Sidewalks*

  Though ADA does specify a 1m (3') minimum clear passage, this is inadequate for pedestrian use. The 1.5m (5') ODOT minimum standard should be applied wherever possible.

- *Discontinuous Sidewalks*

Sidewalks must link up to each other, or to a defined origin or destination point.

- *Steep Cross-Slope*

Severe cross-slopes hinder movements of wheelchair users. Where the ADA 2% minimum cannot be achieved, attempts should be made to reduce cross-slope as much as possible.

- *Broken Pavement*

Sidewalks in poor repair are difficult for wheelchair users to negotiate. Even able-bodied pedestrians have difficulty walking through badly broken pavement.

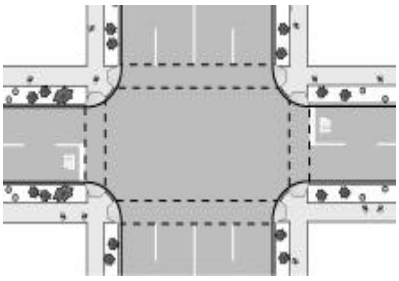
- *Encroaching Vegetation*

Bushes, shrubs and trees can reduce sidewalk width and obscure visibility. Maintenance should be scheduled to ensure that plants are trimmed on a regular basis.

- *Inaccessible Crosswalks*

Any open leg of an intersection should lead to a sidewalk.

- *Unmarked Crosswalks*



Walkways along a road provide mobility in one direction, but a successful pedestrian network also requires safe and convenient crossing opportunities. Wide roads carrying large traffic volumes can be obstacles to pedestrians, making facilities on the other side difficult to access.

Safe street crossings also benefit motorists: an automobile driver parking on one side of the road may desire access to points across the street. A pedestrian system with sidewalks and crossing opportunities allows a driver to park once and walk to several destinations.

Most pedestrian crashes occur when a pedestrian crosses a road, often at locations other than intersections. Mid-block crossings are a fact that planners and designers need to consider: people will take the shortest route to their destination. Prohibiting such movements is counter-productive if pedestrians dash across the road with no protection. It is better to design roadways that enable pedestrians to cross safely.

Crosswalks Defined

Oregon law defines a crosswalk as the prolongation of a curb, sidewalk or shoulder across an intersection, whether it is marked or not. Outside an intersection, a crosswalk is created with markings on the road. If a pedestrian is in a crosswalk, all drivers on that half of the

street are required to yield the right of way to the pedestrians. See ORS 801.220 in Appendix I for the complete legal definition of a crosswalk.

Improving Crossing Opportunities

To increase pedestrian crossing opportunities and safety, two approaches can be considered:

- Designing roads that allow crossings to occur safely by incorporating design features such as raised medians or signal timing that creates gaps in traffic; or
- Constructing actual pedestrian crossings with pedestrian activated signals, mid-block curb extensions, marked crosswalks, etc.

Issues

Safe and convenient pedestrian crossings must be considered when planning and designing urban roadways. The following issues should be addressed when seeking solutions to specific problems:

Level of Service (LOS) & Design Standards

Appropriate design standards take into account the needs of all users. Pedestrian access and mobility should be considered when determining the desirable LOS for a roadway. In some areas, pedestrian needs should be elevated above the needs of motorized traffic (e.g. downtown, near schools or parks). Pedestrians are less visible and less protected than motorists; well-designed roads take this into account.

In general, there is an inverse relationship between traffic volumes or speeds and the ease of pedestrian crossing, which can lead to conflicting goals when determining priorities for a roadway:

- Some motor vehicle designs may reduce pedestrian crossing safety (e.g. a high number of wide travel lanes increases the distance a pedestrian must cross);
- Some designs that facilitate pedestrian crossings may reduce capacity (e.g. pedestrian signals);
- Other design features benefit all users (e.g. improved sight distance at intersections and raised medians).

In some cases, actual travel speeds may be higher than is appropriate for the adjacent land use, and improvements that facilitate crossing may be useful in reducing traffic speeds to desirable and legal limits. Minor collectors and residential streets often carry more fast-moving traffic than the street is designed to carry. The design of a road should not encourage excessive speeds; even a major arterial can be treated for pedestrian safety without degrading capacity.

Land Use

As the number and density of pedestrian-accessible origin and destination points increase, so does the demand for pedestrian crossings. On corridors with scattered development and residences, it is difficult to predict where crossings may occur. On corridors with

concentrated nodes of activity, special crossing treatments are easier to justify at locations where crossings will likely occur (apartment complexes, senior citizen centers, schools, parks, shopping areas, libraries, hospitals and other public or institutional uses).

Planners and elected officials must work together to ensure that land use is compatible with the roadway design, and vice versa.

Transit Stops

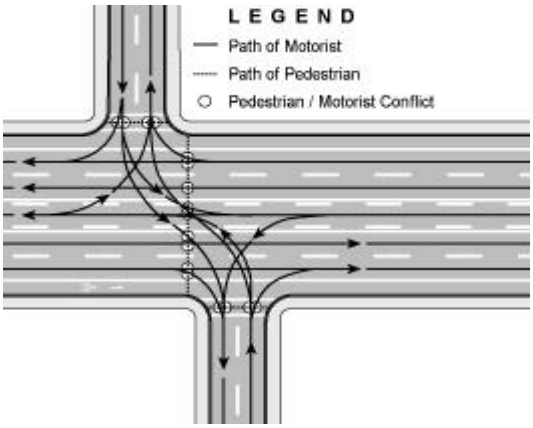
To access a transit stop, most transit users will have to cross a road on one leg of their trip. Cooperation between public transit agencies and transportation designers is essential to ensure safe pedestrian crossings. By coordinating land use, roadway design and transit stops, passengers will be more secure when boarding or leaving a bus, and walking to or from their destination at either end of the transit trip.

Signal Spacing

Signalized intersections may be the preferred pedestrian crossing points at peak traffic hours; other crossing opportunities close to signalized intersections benefit from a "platooning" effect, as traffic signals create gaps in traffic. The effect decreases:

- As the distance from the signalized intersections increases;
- As traffic volumes increase at peak hours; or
- If poor access management allows vehicles to continually enter the roadway.

Access Management



Many uncontrolled accesses to a busy road decrease pedestrian crossing opportunities: when a gap is created in the traffic stream, motorists entering the road fill the gap. Pedestrians seeking refuge in a center turn lane are unprotected. One access management tool benefits pedestrian crossing: well-designed raised center medians provide a refuge for pedestrians, so they can cross one direction of traffic at a time.
However, eliminating road connections and signals also eliminates potential pedestrian crossing opportunities. Creating an urban freeway can increase traffic speeds and volumes. Concrete barriers placed down the middle of the road (rather than a raised median) effectively prohibit pedestrian crossings.

Perception of Safety at Crosswalks

Some studies have indicated that pedestrians may develop a "false sense of security" when crossing a road in marked crosswalks. Other studies have indicated that motorists are more likely to stop for pedestrians in marked crosswalks, especially where the right-of-way laws are enforced. Proper design makes it clear who has the right-of-way.

Grade-Separation & Out-of-Direction Travel

Though grade-separation may seem to offer greater safety, excessive added travel distance will discourage pedestrians who want to take a more direct route. Grade-separation must offer obvious advantages over an at-grade crossing. A structure that is unused because of inconvenience creates a situation whereby pedestrians are at risk when they attempt to cross the road with no protection.

Maintenance

The effectiveness of a design will be lost if maintenance is excessively difficult or expensive. Forethought must be given to the practicality of future maintenance. Facilities will be effective over time only if they are in good condition. Examples of design features to be avoided include:

- Blind corners that can accumulate debris;
- Restricted areas that cannot accommodate sweepers or other power equipment; and
- Remote areas requiring hand maintenance, such as sweeping.

Solutions

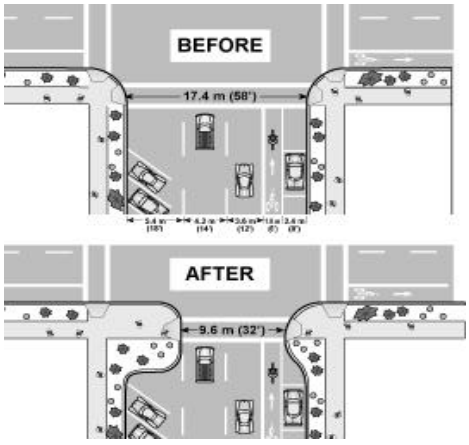
No one solution is applicable in all situations as the issues will usually overlap on any given section of road. In most cases, a combination of measures will be needed to improve pedestrian crossing opportunities and safety.

Raised Medians

These benefit pedestrians on two-way, multi-lane streets, as they allow pedestrians to cross only one direction of traffic at a time: it takes much longer to cross four lanes of traffic than two. Where raised medians are used for access management, they should be constructed so they provide a pedestrian refuge. Where it is not possible to provide a continuous raised median, island refuges can be created between intersections and other accesses. These should be located across from high pedestrian generators such as schools, park entrances, libraries, parking lots, etc.

In most instances, the width of the raised median is the width of the center turn-lane, minus the necessary shy distance on each side. Ideally, raised medians should be constructed with a smooth, traversable surface, such as brick pavers. If a median is landscaped, the plants should be low enough so they do not obstruct visibility, and spaced far enough apart to allow passage by pedestrians.

Curb Extensions



Also known as "bulbs, neckdowns, flares or chokers," curb extensions reduce the pedestrian crossing distance and improve the visibility of pedestrians by motorists. Curb extensions should be considered at all intersections where on-street parking is allowed. The crossing distance savings are greatest when used on streets with diagonal parking. On arterials and

collectors, space should be provided for existing or planned bike lanes.

Reducing pedestrian crossing distance improves signal timing if the pedestrian phase controls the signal. The speed normally used for calculating pedestrian crossing time is 1.2m (4ft)/sec., or less where many older pedestrians are expected. The time saved is substantial when two corners can be treated with curb extensions.

Non-signalized intersections also benefit from curb extensions: reducing the time pedestrians are in a crosswalk improves pedestrian safety and vehicle movement.

Mid-block crossing curb extensions may be considered where there are pedestrian generators on both sides of the road. However, entrances to buildings should be placed close to intersections, existing signals or crosswalks, where possible. The appropriate road authority establishes mid-block crossings.

Illumination

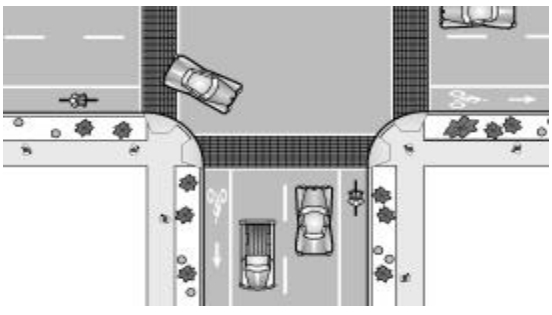
Many crossing sites are not well lit. Providing illumination or improving existing lighting can increase nighttime safety at many locations, especially at mid-block crossings, which are often not expected by motorists.

Crosswalks

Marked crosswalks are generally located at all open legs of signalized intersections. They may also be considered at other locations. Combined with curb extensions, illumination and signage, marked crosswalks can improve the visibility of pedestrian crossings. Crosswalks send the message to motorists that they are encroaching on a pedestrian area, rather than the reverse, which is often the common assumption.
There is considerable debate concerning the usefulness and safety of crosswalks. If a crosswalk is not working, some possible problems include:

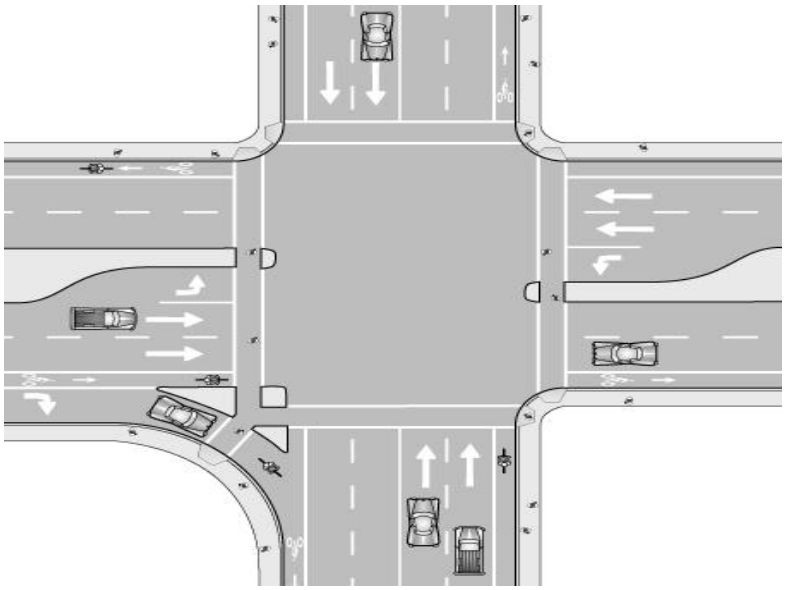
- Enforcement — more rigorous enforcement of traffic laws is needed for motorists to understand that it is their duty to yield to pedestrians in a crosswalk, marked or unmarked;
- Location — marked crosswalks must be placed in locations where they are visible and where obstructions such as parked cars and signs do not affect sight lines;
- Traffic movement — many turning vehicles at nearby intersections or driveways can compromise the crosswalk;
- Users — Some people need extra help crossing a street and crosswalks alone may not be sufficient; for example, young children lack judgement and may need the positive control given by signals.

A traffic study will determine if a marked crosswalk will enhance pedestrian safety. This is usually in locations that are likely to receive high use, based on adjacent land use. Crosswalks



should be 3m (10ft) wide, or the width of the approaching sidewalk if it is greater. Two techniques to increase the visibility and effectiveness of crosswalks are:

- Striped (or "zebra") markings, which are more visible than double lines;
- Textured crossings, using non-slip bricks or pavers, which raise a driver's awareness through increased noise and vibration. Colored pavers increase the visibility of the crosswalk.



Islands & Refuges

At wide intersections, there is often a triangular area between a through lane and a turn lane unused by motor vehicle traffic. Placing a raised island in this area benefits pedestrians by:

Raised islands at intersections

- Allowing pedestrians to cross fewer lanes at a time, and to judge conflicts separately;
- Providing a refuge so that slower pedestrians can wait for a break in the traffic stream;
- Reducing the total crossing distance (which provides signal timing benefits); and
- Providing an opportunity to place easily accessible pedestrian push buttons.

An island can also be provided in the middle of an intersection. An island must be a minimum of 1.2m (4ft) wide, preferably 2.4m (8ft) or more.

Islands must be large enough to provide refuge for several pedestrians waiting at once. For wheelchair accessibility, it is preferable to provide at-grade cuts rather than ramps. Poles must be mounted away from curb cuts and out of the pedestrian path.

Pedestrian Signals

A pedestrian activated signal may be warranted where the expected number of people needing to cross a roadway at a particular location is significant. Anticipated use must be high enough for motorists to get used to stopping frequently for a red light (a light that is rarely activated may be ignored when in use). Refer to the MUTCD for pedestrian signal warrants.

Sight-distance must be adequate to ensure that motorists will see the light in time to stop. Warning signs should be installed on the approaching roadway.

Pedestrian signals may be combined with curb extensions, raised medians and refuges.

Signing

Recommended signs include both advance warning signs and pedestrian crossing signs at the crossing itself, and regulatory signs at intersections to reinforce the message that motorists must yield to pedestrians. These signs should only be placed at warranted locations, because excessive signage leads to signs being missed or ignored.

Intersections

For Both Bicyclists & Pedestrians

- Unusual conflicts should be avoided.
- Access management practices should be used to remove additional conflict points.
- Signals should be timed so they do not impede bicycle or foot traffic with excessively long waits or insufficient crossing times.
- Good intersection designs are compact and avoid free-flowing movements.
- Simple right angle intersections are usually the simplest to treat for bicycle and pedestrian movement. The problems are more complex at skewed and multiple intersections.

For Bicyclists

- Good design creates a path for bicyclists that is direct, logical and close to the path of motor vehicle traffic; only in rare cases should they proceed through intersections as pedestrians.
- Bicyclists should be visible and their movements should be predictable.
- Bike lanes should be striped to a marked crosswalk or a point where turning vehicles would normally cross them. The lanes should resume at the other side of the intersection.

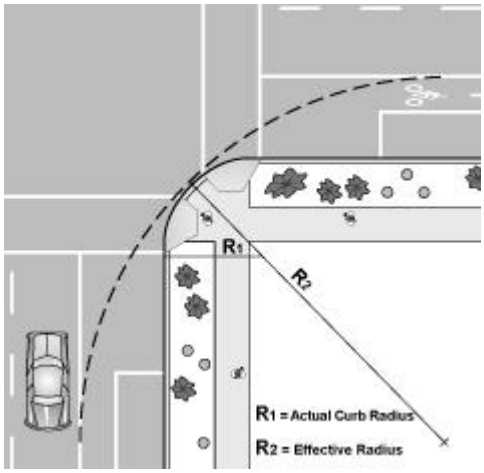
For Pedestrians

- All legs of an intersection should be open to pedestrians.
- The pedestrian's path of travel should be direct with minimal out-of-direction travel.
- Pedestrians should not have to travel over an excessive expanse of uninterrupted pavement.
- At signalized intersections, pedestrian signal heads should be clearly visible - this requires that they not be placed too far from the nearest safe refuge.
- Additional pedestrian refuges should be used to decrease crossing distances.

Pedestrian Crossing

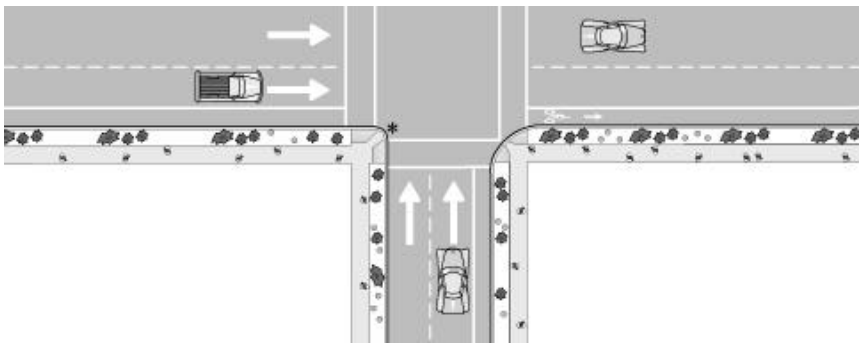
Marked or unmarked, crosswalks are the continuation of the sidewalk. They should be kept as short as possible. This can be achieved by:

- Making the radius of a corner as short as needed to accommodate design vehicles. The effective radius takes into account parking and bike lanes:



Effective radius with bike lanes and parking

- Using a short radius (1.5m [5ft]) on one-way streets, where no turn movements are allowed at a corner, the radius can be very short:



Corner with no possible turn movement on a one-way street

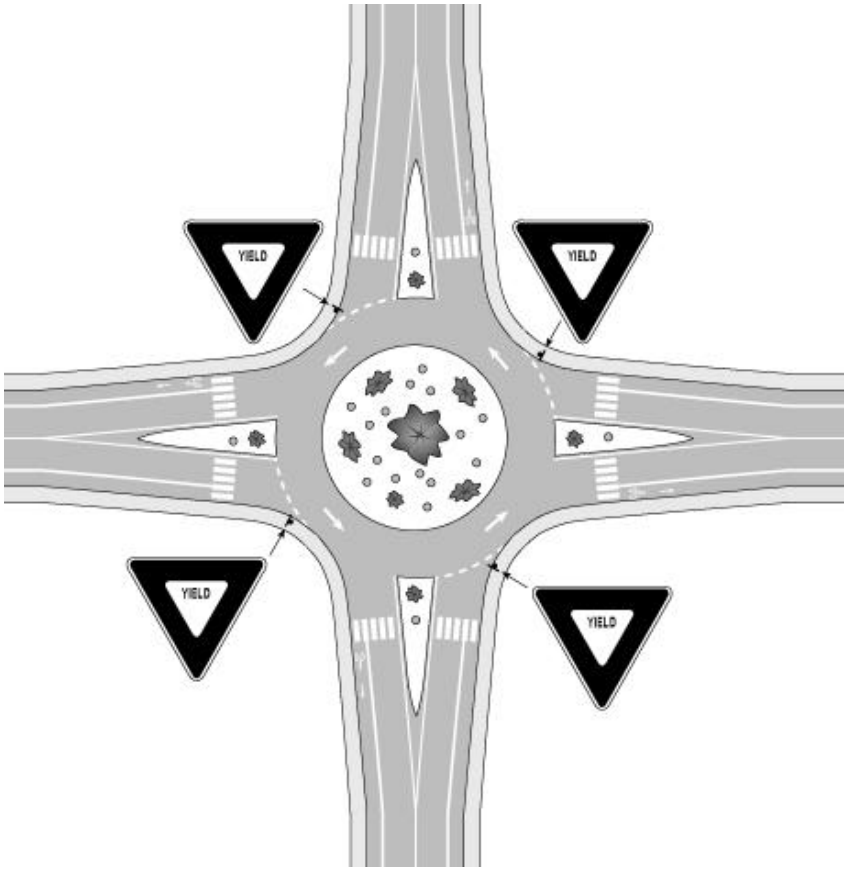
- Using curb extensions, as they make pedestrians more visible to motorists. At signalized intersections, they improve signal timing by reducing the time needed for the pedestrian phase.
- Using islands to interrupt extremely long crosswalks. See Figure 74, page 111 for an illustration of islands; and
- Lining up curb cuts with the crosswalk.

Other Innovative Designs

This concept is presented as information, to help come up with new solutions to common intersection problems.

Modern Roundabouts

A roundabout is a method of handling traffic at intersections commonly used in Europe, Australia and Japan. Roundabouts are now gaining acceptance in this country. Early attempts at roundabouts were often not successful for several reasons, mainly:



- The radius was too small (creating difficulties for trucks);
- The radius was too large (encouraging high speeds);
- The right of way was not clearly defined (causing confusion and collisions); or
- Pedestrians were allowed access to the middle of the roundabout.

Modern roundabout design has several distinctive features:

- A radius large enough to allow movement by trucks, but small enough to slow traffic speeds;
- A visual obstruction, through landscaping, that obscures the driver's view of the road ahead, to discourage users from entering the roundabout and proceeding at high speeds;
- The right of way clearly established: drivers entering the roundabout yield to drivers already in the roundabout; and
- No bicycle or pedestrian access to the center of the roundabout, which should not contain attractions such as fountains or statues.

One of the major advantages of roundabouts is the reduced need for travel lanes, as traffic is constantly moving (signals create stop-and-go conditions for motor vehicles - extra travel lanes are needed to handle capacity at intersections).

Other advantages include:

- Reduced crash rates;
- Reduced severity of injuries (due to slower speeds);
- Reduced costs (compared to traffic signals, which require electrical power); and
- Reduced liability by transportation agencies (there are no signals to fail).

Most of the advantages and disadvantages of roundabouts affect motor vehicle flow, but there are advantages and disadvantages for bicyclists and pedestrians:

Advantages for pedestrians and bicyclists

- The reduced cost frees funds for other purposes, including bicycle and pedestrian facilities;
- The reduced need for travel lanes frees right-of-way for other purposes, including bicycle and pedestrian facilities;
- Traffic flows at a more even pace, making it easier for bicyclists and pedestrians to judge crossing movements;
- Pedestrians have to cross only one or two lanes of travel at a time, in clearly marked crosswalks;
- Bicyclists negotiate intersections at speeds closer to that of motor vehicles; and
- Mid-block crossing opportunities may be improved if the number of travel lanes can be reduced.

Disadvantages for pedestrians and bicyclists

- Traffic flowing more evenly may reduce pedestrian crossing opportunities as fewer gaps are created;
- Pedestrians are responsible for judging their crossing opportunities; there is no signal protection provided, though pedestrian signals can be added at special sites; and
- Bicyclists must share the road and occupy a travel lane; by riding too far to the right, they risk being cut off by vehicles leaving the roundabout in front of them.

Goals

19. Adopt a Countywide system plan for bike and pedestrian facilities which provide access to various destinations within unincorporated communities and between urban areas and unincorporated communities.

20. Provide and maintain a safe, convenient and pleasing countywide bicycle and pedestrian system that is integrated with other transportation systems.

21. Establish bicycle safety, education and enforcement programs for all ages, improve riding skills, achieve observances of traffic laws, increased awareness of cyclist's and pedestrian rights, and monitor and analyze bicycle accident data to determine safety problem areas.

Policies

40. Deschutes County shall coordinate local plans for pedestrian and bicycle facilities with the 1995 Oregon Bicycle and Pedestrian Plan. The statewide plan provides a framework for a local bicycle and pedestrian system and design standards.

41. Deschutes County shall require bike facilities at locations that provide access within and between residential subdivisions, schools, shopping centers, industrial parks, and other activity centers when financially feasible.

42. Deschutes County shall:

a. Balance the plan with a variety of facilities to meet the needs of different cyclists;

b. Plan for bicycle access between the County's urban and rural areas;

c. Develop a bikeway system, to be updated yearly and including a map for the public that describes the opportunities for bicycling in Deschutes County;

d. Establish priorities for facility construction and maintenance based on need and resource availability;

e. Evaluate the plan regularly to monitor how well the facilities meet the goals of the Plan;

f. Upgrade rural road shoulder widths to County standards during road modernization or maintenance projects involving overlays as funding allows;

g. Require bicycle and pedestrian facilities to satisfy the recreational and utilitarian needs of the citizens of Deschutes County;

h. Make potential use, safety and the cost of bikeway construction, the primary considerations when designing specific bikeways;

i. Emphasize the designation of on-road bikeways, where conditions warrant due to safety reasons and the cost of construction and maintenance of separate bike paths;

j. Expend resources for the maintenance of existing bikeways and to keep pace with the development of new bikeways;

k. Designate that the Deschutes County Bicycle and Pedestrian Advisory Committee facilitate the coordination of all bicycle and pedestrian planning in the County to assure compatibility;

l. Designate that the Deschutes County Bicycle and Pedestrian Advisory Committee assure that the Plan remains up-to-date and that implementation proceeds according to the Plan;

m. Work with affected jurisdictions to acquire, develop and maintain a series of trails along the Deschutes River, Tumalo Creek, and the major irrigation canals so that these features can be retained as a community asset; and

n. Adopt standards for trail system right-of-ways and trail improvements that are based on the type of planned trail use and reflect the standards of the 1995 Oregon Bicycle and Pedestrian Plan.

ON-ROAD ROUTE SELECTION

The integrity and usefulness of the bicycle system mandates that future development is designed with bicycling in mind.

Goal

22. Coordinate on-road County bikeways with known existing and proposed state and city bikeways.

Policies

43. New public and private land developments in Deschutes County shall accommodate and tie into the bicycle system, and shall provide their residents and employees with appropriate bicycle facilities.

44. County arterials and collectors may use shoulder bikeways or shared roadways. These bikeways shall be upgraded to bike lanes when highway reconstruction occurs and the traffic volumes warrant lanes.

45. Deschutes County shall facilitate safe and direct bicycle and pedestrian crossings of arterial roads.

46. On-road bikeways shall be constructed in accordance with the specifications set forth in the 1995 Oregon Bicycle and Pedestrian Plan.

OFF-ROAD ROUTE SELECTION

On-road bike facilities are generally preferred due to their lower cost and easier maintenance. However, paved and unpaved off-road bike paths could cater more to the recreational and fitness riders, and also offer an automobile-free route for inexperienced and younger cyclists. Well-placed paths could also serve commuting traffic. A paved multi-use path should be of sufficient width to accommodate multiple user groups such as jogging strollers and rollerbladers. The opportunity exists in Deschutes County to create off-road, separate multiple-use paths in some circumstances:

- Along maintenance “ditchrider” roads adjacent to main irrigation canals.
- Major utility easements.
- Short connector routes between adjoining subdivisions, and between subdivisions and adjoining schools and parks.
- Abandoned roadways.

- Additional bicycle paths within destination resorts and new recreational communities now in the planning stage.
- Heavily impacted forest trails.

Goal

23. Identify a system of off-road paved multiple use paths to be included in the County transportation system.

Policies

47. Developers in Deschutes County shall be encouraged to design paths that connect to the countywide bikeway system and that provide a direct route for commuters. In some cases, it may be appropriate to relax a requirement, such as for a sidewalk on one side of a residential street, in favor of a comparable bike path in the development. However, the use of a bike path shall not change the on-road bikeway requirement for arterials and collectors.

48. Deschutes County shall facilitate mountain bike routes and the creation of paved off-road multiple-use paths. The County shall identify routes and incorporate them into its transportation system where appropriate. Particular attention shall be given to obtaining and keeping rights-of-way for uninterrupted routes linking areas within the County. Natural corridors such as rivers, irrigation canals, ridges and abandoned roadway and rail lines shall receive special attention. Proposed developments may be required to provide such identified rights-of-way as part of their transportation scheme in order to maintain the integrity and continuity of the countywide system.

49. The County shall work with local agencies and jurisdictions to acquire, develop and maintain those sections of trail that are located outside of UGB's, but are part of a trail plan or map that has been adopted by the local jurisdiction and the County.

50. Off-road paved multiple use paths shall be constructed in accordance with the specifications set forth in the 1995 Oregon Bicycle and Pedestrian Plan.

FACILITY REQUIREMENTS

The TPR has various requirements relating to bicycle facilities such as bike parking amounts and areas, and employee considerations such as shower and changing facilities. Most of these requirements have already been implemented through Deschutes County ordinances, but are reinforced here with goals and policies.

Goal

24. Maintain the existing development requirements for bicycle facilities in Deschutes County.

Policy

51. Deschutes County shall maintain and update as necessary, the existing ordinance requirements for bicycle facilities found in Title 18.116.031, or such other location that it may be moved to within the Deschutes County Development Code.

5.5 AIRPORT PLAN

Redmond Airport 1946, United Air Lines inaugural service

AIRPORTS

The continued operation and vitality of airports registered, licensed or otherwise recognized by the Department of Transportation is a matter of State and County concern. There are currently 18 registered airports in Deschutes County. Four of these are public use airports; two of which, Bend Municipal and Redmond Municipal-Roberts Field are publicly owned while Sisters Eagle Air and Sunriver airports are privately owned. These airports have improved (paved) runways, and offer a range of services, from the availability of commercial passenger flights arriving and departing daily at Redmond Municipal Airport, to the Sisters (Eagle Air) Airport which offers no services or runway navigational aids. Cline Falls Airport, Juniper Airpark and Pilot Butte Airport are privately owned private use airports with more than three based aircraft. There are three heliports: St. Charles Medical Center, La Pine and Cinder Butte, all with fewer than three based aircraft. The eight remaining airfields; Don Stevenson Ranch, Fall River Fish Hatchery, Gopher Gulch, Pine Ridge Ranch, The Citadel, Whippet Field, Freight Wagon and Sage Ranch Airports are all privately owned, private use airfields with 2 or fewer based aircraft.

The Redmond Airport Master Plan, adopted in 1988, is currently in the process of being updated, and when completed, will guide the future use of the airport. The Master Plan will include an inventory of existing facilities, land use, aviation forecasts, a demand/capacity analysis, airport plans and a development program. The Bend Airport Master Plan is also planned for an update in the near future. No changes or expansions to the Sisters and Sunriver airports are envisioned at this time. However, the possibility of a new public general aviation airport located in the South County has been discussed. The airport would be funded by private interests and will continue to be monitored by Deschutes County.

Currently, LCDC has administrative regulations (OAR 660-13) which were adopted in 1996. These regulations apply to airports that, in 1994, were the base for three or more aircraft. However, with the passage of HB 2605, the regulations were revised by the 1997 Oregon Legislature, which will require DLCD to update the rules to incorporate the changes made by the Legislature. For purposes of this TSP, the County will not alter current land use regulations in response to the current regulations (OAR 660-13) which have been revised by the Oregon Legislature. While the content of the new regulations is not yet known, the County policy shall be to develop ordinances to comply with the new regulations once they are adopted by DLCD.

Goal

25. Protect the function and economic viability of the existing public-use airports, while ensuring public safety and compatibility between the airport uses and surrounding land uses for public use airports and for private airports with three or more based aircraft.

Policies

52. Deschutes County shall protect public-use airports through the development of airport land use regulations. Efforts shall be made to regulate the land uses in designated areas surrounding the Redmond, Bend, Sunriver and Sisters (Eagle Air) airports based upon adopted airport master plans or evidence of each airports specific level of risk and usage. The purpose of these regulations shall be to prevent the installation of airspace obstructions, additional airport hazards, and ensure the safety of the public and guide compatible land use. For the safety of those on the ground, only limited uses shall be allowed in specific noise impacted and crash hazard areas that have been identified for each specific airport.

Protecting the privately owned, private-use airports, with three or more based aircraft, shall be accomplished by development of specific land use regulations for these types of airports. The function and economic vitality of privately owned, private-use airports with two or fewer based aircraft shall also be accomplished through land use planning. Each airport's specific level of risk and usage shall be used to guide the continued safe aeronautical access to and from these airports considering the type of aircraft approved to use the airfield.

53. Deschutes County shall:

a. Continue to recognize the Redmond (Roberts Field) Airport as the major commercial/passenger aviation facility in Deschutes County and an airport of regional significance. Its operation, free from conflicting land uses, is in the best interests of the citizens of Deschutes County. Incompatible land uses shall be prohibited on the County lands adjacent to the airport;

b. Cooperate with the cities of Bend, Redmond and Sisters in establishing uniform zoning standards, which shall prevent the development of hazardous structures and incompatible land uses around airports;

c. Take steps to ensure that any proposed uses shall not impact airborne aircraft because of height of structures, smoke, glare, lights which shine upward, radio interference from transmissions or any water impoundments or sanitary landfills which would create potential hazards from waterfowl to airborne aircraft;

d. Allow land uses around public-use airports that shall not be adversely affected by noise and safety problems and shall be compatible with the airports and their operations;

e. Work with, and encourage airport sponsors to work with the Federal Aviation Administration (FAA) to enforce FAA-registered flight patterns and FAA flight behavior regulations to protect the interests of County residents living near airports.

f. Adopt regulations to ensure that developments in the airport approach areas shall not be visually distracting, create electrical interference or cause other safety problems for aircraft or persons on the ground. In addition, efforts shall

be made to minimize population densities and prohibit places of public assembly in the approach areas;

g. Continue efforts to prevent additional residential encroachment within critical noise contours or safety areas without informed consent;

h. Specifically designate any proposed airport facility relocations or expansions within County jurisdiction on an airport master plan or airport layout plan map, as amended, and establish the appropriate airport zoning designation to assure a compatible association of airport growth with surrounding urban or rural development;

i. Maintain geographic information system (GIS) mapping of the Airport Overlay Zones and provide timely updates;

j. For those airports in Deschutes County without adopted master plans, the County shall, as a minimum, base any land use decisions involving airports on LCDC airport regulations, upon adoption of those regulations by LCDC, which implement HB 2605;

k. Participate in and encourage the County-adoption of airport master plans for all public use airports and at least an airport layout plan for the remaining ODOT-recognized airfields in Deschutes County;

l. Encourage appropriate federal, state and local funding for airport improvements at public-owned airports; and

m. Discourage future development of private landing fields when they are in proximity to one another, near other public airports and potential airspace conflicts have been determined to exist by the Federal Aviation administration (FAA) or ODOT Aeronautics.

5.6 RAIL PLAN

Bend Railroad Depot

FREIGHT RAIL PLAN

Goals

26. Maintain the existing levels of freight rail activity throughout the County while also encouraging expanded usage by commercial and industrial companies.

27. Increase the safety of existing at-grade crossings and work towards the eventual replacement of all at-grade crossings with gate-protected or grade-separated crossings.

Policies

54. Deschutes County shall:

a. Work cooperatively with affected local jurisdictions and railroad operators to reduce land use conflicts and increase safety at all at-grade crossings;

b. Encourage efforts to improve the condition of rail lines throughout the County in order to retain the effectiveness and competitiveness of freight rail;

c. Not endorse the abandonment of any rail lines unless they are to be converted to trail use through the federal "Rails to Trails" program. Once converted, the trails shall be incorporated into the County Bikeway/Trail System;

d. Not endorse any activities that would diminish existing rail service; and

e. **Work cooperatively with affected local jurisdictions, businesses and railroad operators to protect all rail spurs that currently serve businesses or have the potential to serve freight rail uses from abandonment or incompatible zoning.**

5.7 WATER PLAN

A water-borne transportation plan is not applicable in Deschutes County.

5.8 PIPELINE PLAN

Many miles of pipeline in Deschutes County currently carry power transmission lines, cable television, telephone, natural gas, water and sewage. The County encourages the continued use of pipelines to carry goods across County boundaries and for distribution within the County.

5.9 TRANSPORTATION SYSTEM MANAGEMENT (TSM) AND TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

Although not urban, Deschutes County still has the potential to use several TSM and TDM strategies in order to help preserve the function of major County roads and state highways.

Transportation System Management (TSM)

TSM improvements focus on optimizing the carrying capacity of roads by alleviating congestion and reducing accidents. Examples of TSM strategies include:

- Minimizing the number of access points
- Channelization of turning movements
- Creation of continuous turning and merging lanes
- Raised medians
- Signalization

An important aspect of TSM is that public agencies work closely with affected businesses to fully evaluate impacts from changes to access. In addition, TSM must account equally for the needs of all modes of travel, particularly that bike, pedestrian and transit movements and safety are not compromised in exchange for improving roadway capacity.

Goal

28. In order to optimize the carrying capacity of the County road system, provide cost effective transportation improvements and implement strategies that shall improve the efficiency and function of existing roads.

Policies

55. Deschutes County shall adopt land use regulations to limit the location and number of driveways and access points on all collector and arterial roads;

56. Deschutes County shall ensure that land use actions support the access management policies of the Oregon Department of Transportation (ODOT) along state highways; and

57. Deschutes County shall implement transportation system management measures to increase safety and reduce traffic congestion on arterial and collector streets, and protect the function of all travel modes.

58. Deschutes County shall promote safety and uninterrupted traffic flow along arterials via the following planning considerations:

a. Clustering of all types of development and provisions for an internal traffic circulation pattern with limited arterial access shall be encouraged;

b. A minimum setback of 50 feet from arterial rights-of-way shall be required;

c. Recommendations on speed limits shall be forwarded to the State Speed Control Board.

Transportation Demand Management (TDM)

Unlike TSM strategies, which focus on physical changes, TDM targets driver behavior, mode choice and employers to lower the traffic demands on the roads, especially during the peak travel times of the day. Examples of TDM strategies include:

- Alternative or flexible work schedules
- Ridesharing/carpooling
- Transit use
- Bicycling/walking
- Parking management
- Working at home/telecommuting (teleworking)

TDM strategies often involve and education and promotion effort to encourage changes in single occupant driving behavior. Therefore, TDM strategies require a concerted community and/or employer effort and commitment to realize the greatest results. A "tool box" of TDM strategies suitable for Central Oregon is included in Appendix M. Also significant is that, of all the different strategies used to relieve congestion, TDM efforts in Bend, Redmond, Sisters, Prineville, and Madras can all affect the County and each city because of the employee commute patterns throughout the tri-county area.

Goal

29. Reduce peak hour traffic volumes on County roads and diminish the exclusive use of single-occupant vehicles.

Policies

59. Deschutes County shall:

a. Encourage businesses to participate in transportation demand management efforts through the development of incentives and/or disincentives. These programs shall be designed to reduce peak hour traffic volumes by encouraging ridesharing, cycling, walking, telecommuting, alternative/flexible work schedules and transit use when it becomes available;

b. Work with business groups, large employers and school districts to develop and implement transportation demand management programs;

c. Continue to support the work of non-profit agencies working towards the same TDM goals as Deschutes County;

d. Encourage programs such as van or carpooling (rideshare) to increase vehicle occupancy and reduce unnecessary single-occupant vehicle travel;

e. Continue to pursue the development of park and ride facilities and consider the siting of a rideshare facility, based on identified needs, when realigning

County roadways, considering the sale of surplus property, or reviewing land use applications for developments that could benefit from such a facility;

f. Pursue the development and utilization of telecommunication technologies that facilitate the movement of information and data;

g. Support efforts to educate the public regarding the actual costs related to travel on the transportation system and encourage transportation demand management alternatives; and

h. Establish and make available a transportation demand management program to County employees, to serve as a role model for the community.

5.11 SHORT-TERM IMPROVEMENT PROJECTS

The proposed short-term projects identified below, consist of the previously committed projects and the remaining prioritized projects that ranked "high". ODOT highway projects that ranked "high" are included due to their relative importance, although the status of future state funding is questionable.

PREVIOUSLY COMMITTED PROJECTS

Road Improvements	***Estimated Cost***
None	$0

Transportation System Development	***Estimated Cost***
PINEBROOK SOUND WALL (County obligation through Parkway agreement)	$40,000

Area	Bend UGB
Action	Construct sound wall between Parkway and Pinebrook Subdivision
Schedule	2000-2001

Bike & Pedestrian Improvements	***Estimated Cost***
None	$0

Transportation System Management (TSM) & Transportation Demand Management (TDM) Improvements	***Estimated Cost***
None	$0

Traffic Safety Improvements	***Estimated Cost***
DESCHUTES JUNCTION OVERCROSSING (Phase 2)	$900,000

Area	Deschutes Junction / Rural
Action	Phase 2 construction of east side overcrossing connections
Schedule	1998-1999

Bridge Improvements	***Estimated Cost***
None	$0

Right-of-Way Acquisition	***Estimated Cost***
None	$0

TOTAL Previously Committed Costs:	**$ 940,000**

PRIORITY PROJECT LIST

Table 5.11.T1 identifies the high priority and other priority projects that form the basis for future road improvement work in Deschutes County over the next twenty years. This project listing shall be reviewed annually by the County Road Department and the Board of Commissioners for additions, deletions and re-prioritization. Figure 5.11.F1 identifies the high priority projects.

Subtotal Projects Rated "High":	**$ 11,051,080**
Subtotal Other "Priority" Projects:	**$ 43,957,740**
Subtotal Bridge Projects:	**$ 647,900**
SUBTOTAL FOR ALL PRIORTIZED IMPROVEMENT PROJECTS:	**$ 55,656,720**
SUBTOTAL PROJECTS RATED LOW (SEE APPENDIX J):	**$ 57,139,174**
TOTAL 20-YEAR LIST OF PROJECTS:	**$112,147,994**

Table 5.11.T1
Transportation Project List

Road Name	From	To	Proposed Treatment	Current Functional Class	Proposed Functional Class	Existing Road Section	Estimated Cost (28'-36' road)	Revised Cost (28'-32' road)	Project Priority
Improvement Projects (intersection only)									
Intersection		*Location*							
NEFF RD AT HAMBY RD		Rural / Bend Area	Add turn lanes and flashing light	*Arterial*	*Same*		$100,000	$100,000	High
SMITH ROCK WAY AT 17TH		Rural / North County	Add turn lane to Smith Rock Way	*Art./Local*	*Same*		$100,000	$100,000	High
HUNTINGTON RD AT BURGESS RD		Rural / South County Area	Add turn lanes to Burgess Rd. & Huntington Rd.	*Collector*	*Art./Collector*		$100,000	$100,000	High
DESCHUTES MKT. RD AT HAMEHOOK RD		Rural / Bend Area	Create "T" intersection and add left-turn lane	*Arterial*	*Collector*		$100,000	$100,000	High
BURGESS RD AT DAY RD		Rural / South County Area	Add turn lanes to Burgess Road	*Collector*	*Art./Collector*		$150,000	$150,000	High
COYNER RD AT NORTHWEST WAY		Rural / North County Area	Add turn lanes to Northwest Way	*Collector*	*Same*		$150,000	$150,000	High
OLD REDMOND-BEND HWY AT TUMALO RD		Rural / Tumalo Area	Add turn lanes to Old Redmond-Bend Hwy	*Art./Collector*	*Same*		$150,000	$150,000	High
COOK AVE / O.B. RILEY RD AT HWY. 20		Rural / Tumalo Area	Interim realignment	*Art./Collector*	*Same*		$400,000	$400,000	High
						Subtotal	**$1,250,000**	**$1,250,000**	
Improvement Projects (may include intersections)									
Project									
COOK AVE	TUMALO RD	HIGHWAY 20	Reconstruction	*Collector*	*Same*	*24*	$400,000	$400,000	High
ALFALFA MARKET RD	POWELL BUTTE HWY	MILEPOST 8	Widen & Overlay	*Arterial*	*Arterial*	*26*	$1,900,000	$1,500,000	High
HUNTINGTON RD	BURGESS RD	UGB - LAPINE	Widen & Overlay	*Collector*	*Same*	*31*	$877,000	$877,000	High
TUMALO RD	OLD REDMOND-BEND HWY	HWY 97	Widen & Overlay	*Collector*	*Same*	*26-28*	$540,000	$453,600	High
SMITH ROCK WAY	HIGHWAY 97	COMMUNITY BOUNDARY	Widen & Overlay	*Arterial*	*Same*	*27*	$200,000	$138,000	High
SPRING RIVER RD	HARBER BRIDGE	FS ROAD #40	Widen & Overlay	*Collector*	*Same*	*28*	$633,000	$531,720	High
CAMP POLK RD	WILT RD	UGB - SISTERS	Widen & Overlay	*Collector*	*Same*	*25-26*	$1,024,000	$706,560	High
DESCHUTES MARKET RD	HIGHWAY 97	BUTLER MARKET RD	Widen & Overlay	*Arterial*	*Collector*	*26*	$1,808,000	$1,808,000	High
WARD RD	STEVENS RD	LARSON RD	Reconstruction	*Collector*	*Same*	*23*	$480,000	$331,200	High
						Subtotal	**$7,862,000**	**$6,746,080**	
Transportation System Management (TSM) and Transportation Demand Management (TDM) Projects									
Project									

Regional TDM Program		Countywide	County share to continue funding of Commute Options (per year)				$10,000	$10,000	High
Rideshare Lots		Countywide	Install regional rideshare lots at various future locations				$45,000	$45,000	High
						Subtotal	**$55,000**	**$55,000**	
State Highway Improvement Projects (ODOT Projects with County participation)									
Highway									
U.S. 97	@	SOUTH CENTURY DRIVE	Grade Separation	*Principal Arterial*	*Same*		$3,000,000	$3,000,000	High
						Subtotal	**$3,000,000**	**$3,000,000**	
				SUBTOTAL RATED "HIGH"			**$12,167,000**	**$11,051,080**	
Federal Forest Highway Projects (primarily federal funding)									
Project									
BURGESS RD	PRINGLE FALLS	SOUTH CENTURY DR	Reconstruction	*Collector*	*Same*	*24*	$1,400,000	$966,000	Priority
SOUTH CENTURY DR	VANDEVERT RD.	GENERAL PATCH BRIDGE	Widen & Overlay	*Collector*	*Same*	*26*	$1,411,000	$1,185,240	Priority
FS ROAD #45	SPRING RIVER ROAD	CENTURY DRIVE	Reconstruction	*FS Collector*	*Same*	*?*	$6,400,000	$5,376,000	Priority
						Subtotal	**$9,211,000**	**$7,527,240**	
Other Prioritized Projects (for roads with more than 1,000 ADT in 1996)									
Project									
TUMALO RD	COOK AVE	UGB - TUMALO	Widen & Overlay	*Collector*	*Same*	*25*	$42,000	$28,980	Priority
SOUTH CENTURY DR	SPRING RIVER RD.	VANDEVERT RD	Widen & Overlay	*Collector*	*Same*	*23*	$515,000	$432,600	Priority
POWELL BUTTE HWY	BUTLER MARKET	HWY 20	Reconstruction	*Arterial*	*Same*	*28-29*	$903,000	$ 758,520	Priority
SHEVLIN PARK RD	BRIDGE-TUMALO CREEK	END-BEGIN JOHNSON MARKET RD	Widen & Overlay	*Arterial*	*Collector*	*32*	$11,000	$11,000	Priority
BAKER RD	HIGHWAY 97	SHOSHONE RD W	Widen & Overlay	*Collector*	*Arterial*	*24-25*	$938,000	$787,920	Priority
AMBER LN	DEEP WOODS RD	5TH ST	Widen & Overlay	*Collector*	*Same*	*25*	$24,000	$16,560	Priority
NW COYNER AVE	PERSHALL	NW HELMHOLTZ WAY	Widen & Overlay	*Collector*	*Same*	*24-27*	$420,000	$289,800	Priority
O B RILEY RD	JOHNSON MARKET RD	UGB - TUMALO	Widen & Overlay	*Arterial*	*Collector*	*22*	$357,000	$ 246,330	Priority
OLD REDMOND-BEND HWY	TUMALO RD	HWY 20	Widen & Overlay	*Arterial*	*Same*	*24-25*	$966,000	$ 811,440	Priority
BAILEY RD	US 20	UGB - TUMALO	Modernize	*Collector*	*Same*	*23*	$260,000	$ 179,400	Priority
POWELL BUTTE HWY	COUNTY LINE	BUTLER MARKET RD	Widen & Overlay	*Arterial*	*Same*	*24-28*	$1,800,000	$1,512,000	Priority
BAILEY RD	UGB - TUMALO	TUMALO RESERVOIR RD	Widen & Overlay	*Collector*	*Same*	*23*	$275,000	$189,750	Priority
NW 10TH ST	UGB - REDMOND	NW PERSHALL WAY	Widen & Overlay	*Collector*	*Same*	*21*	$183,000	$126,270	Priority

DAY RD	BURGESS ROAD	AMBER LN	Widen & Overlay	*Collector*	*Same*	*24-26*	$1,354,000	$1,137,360	Priority
BUTLER MARKET RD	DESCHUTES MKT. RD	POWELL BUTTE HWY	Reconstruction	*Arterial*	*Same*	*30*	$842,000	$707,280	Priority
NE NEFF RD	UGB - BEND	POWELL BUTTE HWY	Widen & Overlay	*Arterial*	*Same*	*26-30*	$885,000	$743,400	Priority
O B RILEY RD	OLD REDMOND-BEND HWY	SUNSET DR	Modernize	*Arterial*	*Collector*	*26*	$342,000	$235,980	Priority
NW 19TH ST	NW ODEM WAY	NW LOWER BRIDGE WAY	Widen & Overlay	*Collector*	*Same*	*21*	$728,000	$502,320	Priority
SMITH ROCK WAY	UGB – TERREBONNE	CROOK COUNTY LINE	Widen & Overlay	*Arterial*	*Same*	*27*	$1,181,000	$814,890	Priority
JOHNSON MARKET RD	SHEVLIN PARK	TUMALO RESERVOIR RD	Widen & Overlay	*Collector*	*Same*	*30-32*	$957,000	$803,880	Priority
TUMALO RESERVOIR RD	OB RILEY	COLLINS RD	Widen & Overlay	*Collector*	*Same*	*21-23*	$1,973,000	$1,361,370	Priority
SKYLINERS RD	UGB - BEND	END COUNTY MAINT.	Widen & Overlay	*FS Collector*	*Same*	*24*	$3,000,000	$2,070,000	Priority
						Subtotal	**$17,956,000**	**$13,767,050**	

Prioritized Other Bike and Pedestrian Projects

Road	*Bike Projects*		*Proposed Treatment*						
Neff Road	Bend UGB	Big Sky Park	Add shoulder bikeway	*Arterial*	*Same*	*28*	$180,000	$151,200	Priority
Baker Road	River Woods Store	Brookswood Blvd.	Add shoulder bikeway	*Collector*	*Arterial*	*25*	$67,500	$ 67,500	Priority
Baker Road	Brookswood Blvd	Shoshone Road	Add shoulder bikeway	*Collector*	*Arterial*	*24*	$67,500	$67,500	Priority
Cottonwood Road	Sunriver	Highway 97	Add shoulder bikeway	*Collector*	*Same*	*28*	$180,000	$151,200	Priority
	Sidewalk Projects					**Subtotal**	**$495,000**	**$437,400**	
5th Street	B Avenue	C Avenue	5' sidewalk on east side only	*Local*	*Same*		$12,500	$12,500	Priority
Highway 242	Highway 20	Sisters High School	Add 5' sidewalk, north side	*Arterial*	*Same*		$20,000	$20,000	Priority
8th Street	Wharton Road	Riverside Avenue	5' sidewalk on south side only	*Local*	*Same*		$3,000	$3,000	Priority
7th Street	U.S. 20	Cook Avenue	5' sidewalk north side only	*Local*	*Same*		$7,500	$7,500	Priority
B Avenue	5th Street	U.S. 97	5' sidewalk on north side only	*Local*	*Same*		$37,500	$37,500	Priority
8th Street	Cook Avenue	Wharton Road	5' sidewalks both sides	*Local*	*Same*		$12,500	$12,500	Priority
C Avenue	19th Street	U.S. 97	5' sidewalk on south side only	*Local*	*Same*		$40,000	$40,000	Priority
4th Street	Wood Avenue	Cook Avenue	5' sidewalks on both sides	*Local*	*Same*		$25,000	$25,000	Priority
5th Street	Wood Avenue	Cook Avenue	5' sidewalks on both sides	*Local*	*Same*		$26,000	$26,000	Priority
A Avenue	11th Street	15th Street	future 5' sidewalks both sides	*Local*	*Same*		$50,000	$50,000	Priority
13th Street	C Avenue	400' south of A Avenue	future 5' sidewalks both sides	*Local*	*Same*		$60,000	$60,000	Priority
Smith Rock Way	U.S. 97	15th Street	5' sidewalks on both sides	*Arterial*	*Same*		$62,500	$62,500	Priority
15th Street	C Avenue	400' south of A Avenue	future 5' sidewalks both sides	*Local*	*Same*		$62,500	$62,500	Priority
C Avenue	U.S. 97	16th Street	5' sidewalk on south side only	*Local*	*Same*		$65,000	$65,000	Priority
Cook Avenue	Cline Falls Highway	U.S. 20	5' sidewalks both sides to 8th St.	*Collector*	*Same*		$90,000	$90,000	Priority
11th Street	Central Ave	U.S. 97	5' sidewalks on both sides	*Local*	*Same*		$92,500	$92,500	Priority
	Trails/Other Projects					**Subtotal**	**$666,500**	**$666,500**	
Canal "H"	13th Street	12th Street	10' sandseal trail	*Local*	*Same*		$1,500	$1,500	Priority
Canal "H"	12th Street	400' south of A Avenue	10' sandseal trail	*Local*	*Same*		$5,500	$5,500	Priority
Riverside Ave. Trail	Riverside Avenue	South Community Boundary	10' sandseal trail	*Local*	*Same*		$10,000	$10,000	Priority
E Avenue	West of Canal "H"	East of Canal "H"	10' sandseal trail and bridge	*Local*	*Same*		$20,000	$20,000	Priority

B Avenue	East end of west segment	West end of east segment	300' stairway	*Local*	*Same*		$21,000	$21,000	Priority
E Avenue	East end of west segment	West end of east segment	300' stairway	*Local*	*Same*		$21,000	$21,000	Priority
4th Street	North	Forster Drive	300' stairway	*Local*	*Same*		$21,000	$21,000	Priority
						Subtotal	**$100,000**	**$100,000**	
						Bike and Pedestrian Subtotal	**$1,261,500**	**$1,203,900**	
Other Prioritized Projects (for urban roads with more than 1,000 ADT in 1996.)									
KNOTT RD	15TH ST	RICKARD RD	Widen & Overlay	*Arterial*	*Same*	*28*	$250,000	$250,000	Priority
						Subtotal	**$250,000**	**$250,000**	
Prioritized Non Safety-based Projects (for roads with more than 1,000 ADT in 1996.)									
Project									
NW CHINOOK DR	NW 43RD ST	JEFFERSON COUNTY LINE	Widen & Overlay	*Collector*	*Same*	*28*	$256,000	$215,040	Priority
SW HELMHOLTZ WAY	ANTLER AVE	SW OBSIDIAN AVE	Widen & Overlay	*Arterial*	*Collector*	*21-24*	$488,000	$ 409,920	Priority
VANDEVERT RD	HWY 97	SOUTH CENTURY DR	Widen & Overlay	*Collector*	*Same*	*27*	$316,000	$218,040	Priority
CLINE FALLS HWY	HWY 126	UGB – TUMALO	Widen & Overlay	*Collector*	*Arterial*	*22-24*	$3,534,000	$2,968,560	Priority
HAMBY RD	HWY 20	BUTLER MARKET RD	Widen & Overlay	*Collector*	*Same*	*26*	$1,646,000	$1,135,740	Priority
SW HELMHOLTZ WAY	CANAL BRIDGE	S CANAL BLVD	Widen & Overlay	*Collector*	*Same*	*24*	$725,000	$500,250	Priority
NW PERSHALL WAY	HWY 97	NW COYNER AVE	Widen & Overlay	*Collector*	*Same*	*28*	$671,000	$462,990	Priority
NW 43RD ST	LOWER BRIDGE	NW CHINOOK DR	Widen & Overlay	*Collector*	*Same*	*22-26*	$250,000	$172,500	Priority
SW HELMHOLTZ WAY	CANAL BRIDGE	OBSIDIAN AVE.	Widen & Overlay	*Collector*	*Same*	*24*	$510,000	$351,900	Priority
NORTHWEST WAY	MAPLE	NW ODEM WY.-NW ALMETER WY.	Widen & Overlay	*Arterial*	*Collector*	*23-33*	$710,000	$489,900	Priority
HAMEHOOK RD	BUTLER MKT. ROAD	DESCHUTES MARKET RD	Widen & Overlay	*Collector*	*Same*	*26*	$419,000	$289,110	Priority
S CANAL BLVD	39TH ST	TUMALO RD	Widen & Overlay	*Arterial*	*Same*	*24-25*	$2,740,000	$1,890,600	Priority
						Subtotal	**$12,265,000**	**$9,104,550**	
New Road Segments (urban and rural)									
CROOKED RIVER DR	WILCOX DR	SMITH ROCK WAY	New Road	*Collector*	*Same*	*28*	$80,000	$80,000	Priority
74TH ST	HWY. 126 INTERCNGE	EAGLE DR	New Road	*Local*	*Same*	*28*	$150,000	$150,000	Priority
27TH ST	HEMLOCK AVE	MAPLE AVE	New Road	*Arterial*	*Same*	*28*	$240,000	$240,000	Priority
EMPIRE AVE	COOLEY RD	Canal	New Road	*Arterial*	*Same*	*36*	$275,000	$275,000	Priority
MAPLE AVE	27TH ST (widen to 35th)	HELMHOLTZ	New Road	*Collector*	*Same*	*28*	$360,000	$360,000	Priority

						Subtotal	**$1,105,000**	**$1,105,000**

State Highway Improvement Projects (Projects with County participation)

Highway		*Intersection*	*Treatment*			(Total Project Cost)		
U.S. 20	@	Cook Avenue/ Bailey Road/ O.B. Riley Road	grade separation, realignment	*Principal Arterial*	*Same*	$2,000,000	$2,000,000	Priority
U.S. 20	@	Old Redmond-Bend Highway	grade separation	*Principal Arterial*	*Same*	$2,000,000	$2,000,000	Priority
U.S. 97	@	Wickiup Junction realignment and railroad overcrossing	grade separation, realignment	*Principal Arterial*	*Same*	$5,000,000	$5,000,000	Priority
U.S. 97	@	Quarry (or other similar location based on future engineering)	grade separation	*Principal Arterial*	*Same*	$2,000,000	$2,000,000	Priority
						Subtotal	**$11,000,000**	**$11,000,000**
				SUBTOTAL RATED "PRIORITY"			**$53,048,500**	**$43,957,740**

Bridge Projects

Location	*Sufficiency Rating*	*Treatment*	*Posted Limit*	(Total Project Cost)		
GRIBBLING RD	16.8	Upgrade	*5 tons*	$86,000	same	Low
TETHEROW RD	34.1	New Bridge	*none*	$152,700	same	Low
NE 17TH ST	36.2	Upgrade	*none*	$42,100	same	Low
NE 41ST ST	37.1	Upgrade	*none*	$38,900	same	Low
HOLMES RD	49.9	Upgrade	*none*	$31,250	same	Low
WILCOX AVE	50.1	Upgrade	*none*	$27,300	same	Low
SW 27TH ST	52.2	Upgrade	*none*	$36,000	same	Low
WOODSIDE RD	53.9	New bridge	*none*	$55,600	same	Low
JOHNSON MARKET RD	61.7	Upgrade	*15 tons*	$49,200	same	Low
NE KING WAY	62.2	Upgrade	*none*	$32,100	same	Low
CASCADES LAKES (Fall River)	66.2	Upgrade	*5 tons*	$65,500	same	Low
SW GLACIER AVE	72.3	Upgrade	*none*	$31,250	same	Low
				Subtotal	**$647,900**	**$647,900**

Total for Projects Rated "High"	$11,051,080
Total for Projects Rated "Priority"	$43,957,740
Total for Bridge Projects	$647,900
Total for all prioritized projects:	**$55,656,720**

	20-Year Per Year Total	**$2,782,836**

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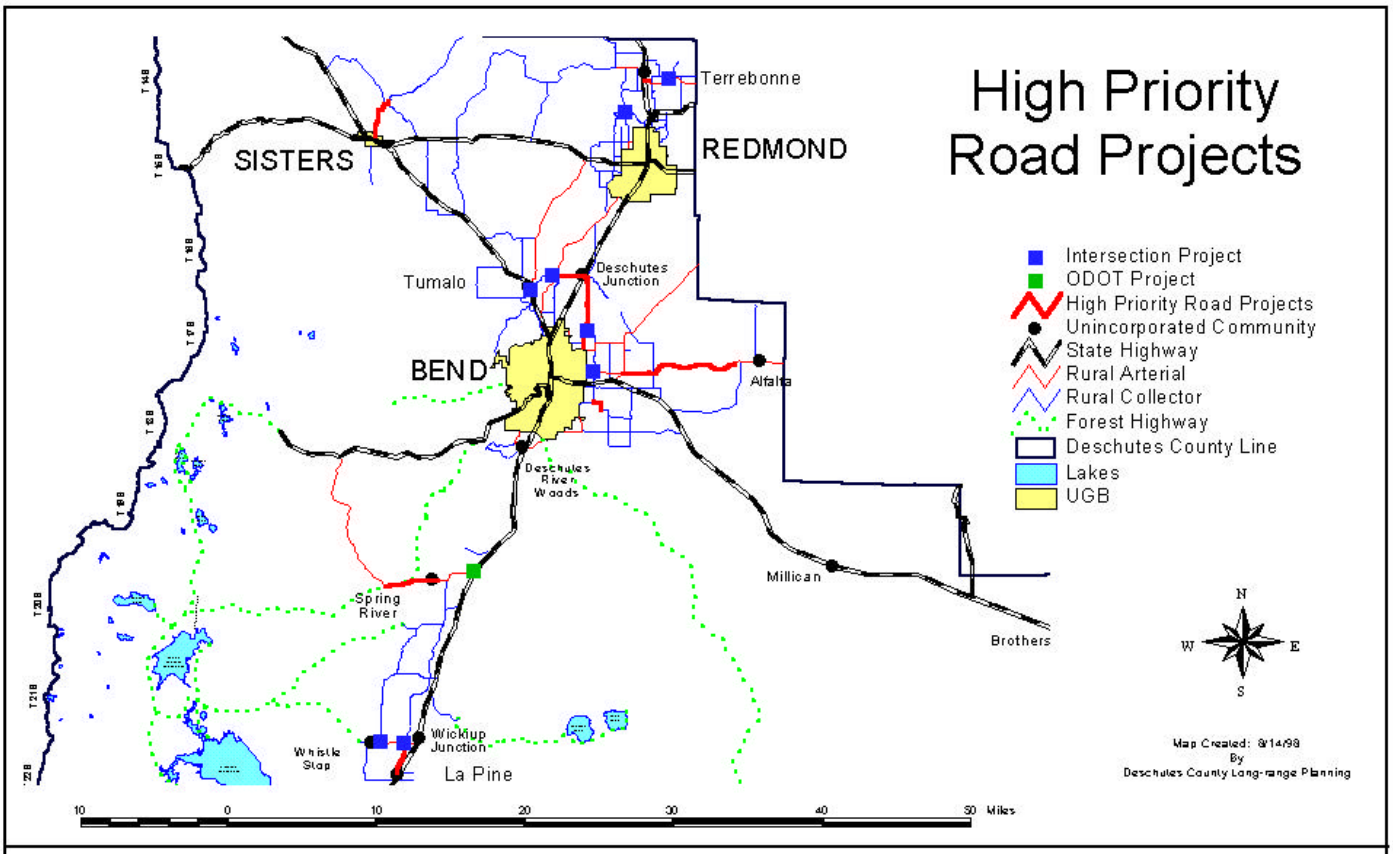
Table 5.11.T1



Deschutes County TSP

Figure 5.11.F1

6. TRANSPORTATION FINANCE PLAN

6.1 CURRENT FUNDING SOURCES

Historically, the County Road Department has had the responsibility to propose projects, acquire funding, schedule improvements and construct or contract for the construction of transportation projects in the County. Each year, the Road Department has submitted a list of prioritized projects called the Major Roads Capital Improvement Program (MRCIP) to the County Board of Commissioners for approval. The TSP now augments the existing MRCIP process by providing a long-term project listing along with the short-term plan in the MRCIP. In the past, the MRCIP has contained five-year's worth of projects. The MRCIP shall continue to be updated and adopted by the County Board of Commissioners each year but it will now only contain three-year's worth of projects. The MRCIP could also form the basis for a special bond measure discussed below. Traditionally, funding for local and state roadway improvements has come from the variety of sources including:

Federal Sources:
- Revenue from timber sales on federal lands within Deschutes County
- Grants

State Sources:
- Vehicle registration fees
- State gas tax
- Weight mile fees
- Grants

County Sources:
- System Development Charge (SDC) funds (Bend UGB only, and ended as of March 1, 1998)

6.2 IMPROVEMENT COSTS

When looking at the County road budget, an important consideration is the allocation of funds for maintenance projects within the cities, UGBs and the rural area. Current funds have been flexible as to how they are spent. The mix of maintenance operations versus capital projects is largely a policy issue, which could vary from year to year. Historically, the County has been responsible for maintaining (asphalt overlays, plowing, etc.) approximately 123 miles of roads within city limits and UGBs. The cities of Redmond and Sisters have taken over responsibility as annexation has occurred. The recent agreement with the City of Bend will transfer 70% of these road miles to the City. A similar agreement with the City of Redmond is in the works and will transfer a majority of the remaining road miles out of County jurisdiction.

Depending on the combination of projects chosen for short-term implementation and long-term programming, the following are the costs for the County Transportation System Plan projects over the next 20 years.

Previously Committed Projects	
Total	$ 940,000
Short-term, High Priority Projects	
Total	$11,051,080
Long-term, Priority Projects	
Total	$43,957,740
Bridge Projects	
Total	$647,900
Long-term, Non-Prioritized Projects	
Total	$57,139,174

Total 20-Year Combined Project Costs: $112,147,994

The ability of the County to fund needed projects is in doubt. With the limited future funding opportunities available, the project outlook is questionable. Under current funding levels there are no resources available for capital projects outside of the County's previously committed projects. In addition, if road preservation takes precedence over new projects, the projected funding available for road operations, maintenance and preservation (OM&P) alone over the next three years is already $8.1 million below the Road Department's estimated minimum desired level of OM&P.

Projected Shortfalls:

1998-1999	$2.4 million
1998-2000	$2.8 million
1998-2001	$2.9 million
	$8.1 million

The minimum desired level of OM&P is based on the Road Department's 1992-93 Operations Plan, which defined levels of service. The dollar figures from this study have been adjusted to reflect 1998 costs. Also, the mileage figures used to calculate the total OM&P costs have been adjusted to reflect the transfer of Bend UGB roads to the City of Bend as of July 1, 1998.

If all the projects (excluding the non-prioritized projects) are combined into a twenty-year plan amount, the resulting $55,656,720 would amount to an expenditure of approximately $2.8 million per year.

6.3 POSSIBLE FUNDING SOURCES

There are several potential funding sources for needed County transportation system improvements. Included are: System Development Charges, gas taxes, exactions, local improvement districts, special assessments fees and vehicle fees. These are sources that have been used in the past by agencies in Oregon. Due to diminishing current funding for today's transportation projects, it is necessary to seek several avenues for

funding projects, and many of the funding sources may need to be adjusted to meet current and future transportation needs. Unique or hybrid funding of projects is becoming necessary to assure implementation. In many cases, this means private/public cooperation rather than depending on user fees to fix every need. Examples of funding sources that generally cannot provide funds for roadways include: Property Tax General Funds, Car Rental Tax, Transient Lodging Tax, Business Income Tax, Business License Tax and Communication Services Tax.

Although motor vehicle revenues fund many of the state highway, County and city projects within Deschutes County, major transportation projects may need to be brought to a public vote for approval. This would be necessary to supplement existing funding sources, which cannot keep up with growing needs. Specific projects would be defined in a ballot measure, such as the Major Streets Transportation Improvement Program (MSTIP) passed by voters in Washington County. Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community supporting needed transportation improvements. That is the value of the Transportation System Plan.

Based upon current sources of funding, the cost of the needs far exceeds the projected funding over 20 years. Some of the difference can be made up by land use development exactions, where unimproved frontage is built to the TSP standards as projects are implemented. The state Transportation Planning Rule requires that any proposed TSP financing plan contain credible financial options. The Deschutes County calculations for possible funding sources are located in Appendix K. To overcome the projected funding shortfalls in existing revenue sources, and build identified projects from the Transportation Project List, the County may wish to consider the following funding options:

State Highway Trust Fund

The state currently collects gas taxes, vehicle registration fees, fines and weight/mile taxes. These funds are pooled together, then a portion is returned to individual cities and counties through an allocation formula. As of January 1990:

- The state keeps 60 percent.
- Cities receive 16 percent, which is apportioned to individual cities based on their population.
- Counties receive 24 percent, which is apportioned to individual counties based on the number of vehicles registered in that county.

Countywide Gas Tax / Registration Fee

The State, cities and counties can provide their basic roadway funding through a tax placed on gasoline. State gas tax is approved legislatively while local gas taxes are voter-approved. Vehicle registration fees can be enacted by ordinance. State Highway Trust funds are dedicated to roadway construction and maintenance, with one percent allocated to pedestrian and bicycle needs. This tax does not fall under the Measure 5 limits because it is a pay-as-you-go user tax.

Several counties throughout the state currently have a local gas tax in place. Notably, Multnomah and Washington Counties use such a tax for funding road projects.

Multnomah receives about $6 million per year, whereas Washington receives roughly $1.2 million. These counties contract with the State Fuel Tax Branch to collect and administer the tax. Gasoline distributors who deliver in those counties submit separate distribution reports along with their state report identifying how many gallons were delivered to each county. The state processes the county forms, calculates the tax revenue, subtracts the administration fee portion, and sends the county its revenue. As an example, Multnomah County retains 53% of its fuel tax revenue for road improvements in the unincorporated areas of the County, then distributes the rest to the cities on a per capita basis.

If the fuel sales for Deschutes County were used in a similar gas tax formula, the County could expect the following revenues based on a 55% share. The fee calculations are located in Appendix K.

Countywide gas tax: range per year = **$ 151,884** @ ½ cent to **$ 1,518,844** @ 5 cents

Vehicle Registration Fee: increase of $15 autos, $9 motorcycles, and $30 trucks = **$ 434,835**/yr.

(Note: ORS 801.041 requires 40% of vehicle registration fees go to cities.)

Street Utility/Road User Fee

Already used in Ashland and La Grande, road user fees are a monthly or yearly assessment charged to residences and non-residential users of County roads. This fee is similar to sewer and water fees charged to users on a monthly basis. In Ashland, the fee is $1 per month per residence and business. In LaGrande, they charge $2.50 per water meter per month. These fees are not for capacity improvements, but for supporting local road maintenance based upon land use type and trip generation. The exclusive use of the fees for maintenance allows a more uniform distribution of spending and frees up other revenue sources for capacity needs. If a $1 per month fee per dwelling were used in the unincorporated areas of Deschutes County, approximately $185,000 could be generated per year. Utility fees could be vulnerable to Measure 5 limitations, unless they include provisions for property owners to reduce or eliminate charges based on actual use.

Exactions

Development exactions and contributions often pay for portions of many roads in and through new developments. The road, or improvements to a road, are many times paid for or built by a developer to County standard, then deeded to the County as a development condition of approval. This practice has been modified by Oregon case law over the years, but will continue to be used throughout the state. Developers of sites adjacent to improvements identified as SDC projects can be credited the value of their frontage work, which is included in the SDC project-list cost estimate.

Rural System Development Charge (SDC)

System development charges are authorized by state law, and have been used in Oregon and throughout the United States. They can be levied by local jurisdictions on new developments. The fees can be used for a variety of public services such as parks, roads, sewer and water. The basic principles in development of SDCs are that:

1. There must be a reasonable connection between growth generated by development and the facilities constructed to serve that growth (generally determined by level of service or connectivity); and

2. There must be a general system-wide connection between the fees collected from the development and the benefits development receives. Charges are typically developed based on a measurement of the demand that new development places on the street system and the capital costs required to meet that demand. SDCs do not require a vote of the public.

The SDC amount is assessed at the time of development approval or building permit issuance and based on the anticipated number of trips generated by the proposed land use. The charge is a means of requiring new developments to pay an equitable portion of the capital costs of improvements needed to accommodate growth. Charges to recently developed properties can be used to recover past and/or future growth-related improvements. However, they may not be used to recover costs for improvements to serve existing users and residents. By law, the funds must be used for capital improvements only and are not eligible to be used for operations or routine road maintenance. Currently, road SDCs are charged to new developments within the Bend and Redmond UGBs.

Like all road SDCs, a countywide road SDC will not be adequate for complete project funding, but could form an important financing component for new capacity-enhancing projects. If a countywide SDC is implemented, it should be limited to arterial and collector road projects in the overall transportation network.

A district-level SDC may be used, with the fees possibly varying from district to district. An example would be for SDCs to be applied to areas where the growth is expected to occur. These could be the existing County road maintenance districts. This method allows the benefits to apply directly to the residents of the SDC district. Different areas could have different charges that reflect the growth projected for that area. However, the administration of multiple districts, funds and creation of subjective boundaries may be problematic for a process that is by law, designed to be simple to understand and implement. Due to the variables of growth rates, state land use changes, and siting of destination resorts, SDC revenues can fluctuate over time and be difficult to program into a capital project list.

General Obligation Bonds

Bonding has been historically used as a funding alternative to spread the project debt over a voting district or districts. The residents vote to levy a special property tax, to be distributed equally according to assessed value of the voting district. These bonds are generally used to make improvements benefiting the entire district population. General obligation bonds are often the least expensive borrowing mechanism available to jurisdictions. When the bond issue is paid off completely, the levy is finished.

Grants

From time to time, grant funding becomes available. Grants are most often funding

matches, whereby the local jurisdiction must contribute a percentage of the funds to complete the project. Often, the local contribution is an "in-kind" pledge of resources for planning, engineering and design services or materials from the local jurisdiction. However, some grants are 100% awards. Most grants are only to be used for capital improvements or planning studies, not maintenance. An example is the next (1997) version of the federal Intermodal Surface Transportation Enhancement Act (ISTEA) nearing adoption, there will be funds available for such things fixed-route transit and off-street bicycle and pedestrian paths. Grant availability and possible awards are difficult to gauge from year to year. At best, the County should be prepared with eligible transportation projects that can be plugged into a grant category on short notice. Often these projects will not have alternate funding sources, and therefore must rely on grants, to be completed.

Special Road Districts

Special road districts provide a means for funding specific improvements that benefit a specific group of property owners. These districts require owner approval and a specific project definition. The residents forming the district agree to pay property taxes to support the special district. Road District Commissioners are appointed by the Deschutes County Board of Commissioners to operate the district.

Local Improvement District (LID)

Local residents can petition the County Board of Commissioners to form an LID to get their road improved. Usually a public dirt or gravel road, once improved under the LID process, the road may be accepted by the County as a "county" road to be maintained by the County. Property owners agree to pay for road improvements made under an LID. The trade off is that as LIDs form, the County becomes responsible for more miles of road maintenance, which spreads limited funds even thinner over the long term.

Funding Summary

The following are the estimated funds, which could be available to fund maintenance and/or capital road projects. Note: (SDCs assume 750 new houses per year @ $250 – $800 per unit)

Source	Per Year Amount	20-Year Total
Countywide Gas Tax	$151,884 - $1,518,844	$3,037,680 - $30,376,880
Vehicle Registration Fee	$434,835	$8,696,700
Road User Fee	$185,000	$3,700,000
Public/Private Partnership	variable	variable
System Development Charge	$187,500 - $600,000	$3,750,000 - $12,000,000
Total Alternative Sources	$960,000 - $2,740,000	$19,200,000 - $54,800,000

Appendix A

OREGON STATE TRANSPORTATION PLAN REQUIREMENTS

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The Oregon Transportation Plan was developed to meet the requirements of the Department of Land Conservation and Development's Goal 12: Transportation Planning Rule requirements for a statewide transportation system plan. It also carries out the federal Intermodal Surface Transportation Efficiency Act (ISTEA) requirements for a state transportation plan.

The purpose of the plan ***"... is to guide the development of a safe, convenient and efficient transportation system which promotes economic prosperity and livability for all Oregonians."*** With the population increases that are forecasted by the Oregon Department of Transportation (ODOT) over the next 40 years, the state will require a strong and efficient transportation system to serve the needs of commerce and personal mobility. While most of the population growth will occur in the Willamette Valley, Deschutes County will continue to be one of the fastest growing regions in Oregon. As such, rural areas like the unincorporated areas of Deschutes County will increasingly need access to services and markets in urban areas. These linkages must be maintained and enhanced in order to serve both areas.

The goals and policies identified in the Plan refer to specific actions needed to attain those goals. The actions that apply to **Deschutes County** are listed below.

Goal 1 - Provide for a balanced, efficient, accessible and environmentally responsible transportation system that connects places, modes and carriers, while maintaining safety and financial responsibility.

Action 1.a, Employ economic, social, energy, and environmental impacts as a part of the transportation planning and project design process. To be done on a total system basis rather than optimizing the cost effectiveness of one mode at the expense of another.

Action 1.b, Develop pricing programs that charge road users commensurately with the total costs of operations and improvements. Programs could include:

- Automobile emissions charges based on vehicle miles travelled (VMT) and relative vehicle emissions.
- Road access charges for major trip generators.
- User charges such as a gas tax.

Action 1.c, Encourage multi-modal accessibility to employment, shopping and other commerce, medical care, housing and recreation, including adequate public transit access for the transportation disadvantaged.

Action 1.d, Develop public transit, bicycle and pedestrian systems in urban and rural areas.

Action 1.e, Positively affect both the natural and built environments in the design, construction and operation of the transportation system. However, where adverse impacts cannot be avoided, minimize or mitigate their effects on the environment.

Action 1.f, Require that the regional and local transportation systems plans provide for the safe routing of hazardous materials consistent with federal guidelines.

Action 1.g, Require local and regional transportation plans to identify (a) major transportation terminals and facilities and (b) routes and modes connecting passenger and freight facilities with major highways and intermodal facilities.

Goal 2 - To develop a multi-modal transportation system that provides access to the entire state, supports acknowledged comprehensive land use plans, is sensitive to regional differences, and supports livability in urban and rural areas.

Action 2.a, Require that the transportation system plans adopted by state, regional or local jurisdiction be sufficient to accommodate planned development within the respective jurisdiction.

Action 2.b, Restrict access from state facilities for incompatible activities and development where land use plans call for rural or resource development.

Action 2.c, Promote alternative modes and preservation and improvement of parallel arterials so that local trips have alternatives to the use of intercity routes.

Action 2.d, Encourage regional and local transportation system plans and land use plans to avoid dependence on the state highway system for direct access to commercial, residential or industrial development adjacent to the state highway.

Action 2.e, Promote the development of interurban bus and rail passenger service to improve urban accessibility and achieve land use goals.

Action 2.f, Define appropriate minimum levels of service for all modes and for all potential users.

Action 2.g, Improve rural highways, minimizing the interaction of passenger vehicles, bicycles, recreational vehicles and freight vehicles by providing passing lanes and paved shoulders, wherever practical.

Action 2.h, Implement a statewide system of bikeways using current rights-of-way and creating new paths along rail beds, open spaces, and other public and private lands held by cooperating land owners.

Action 2.i, Encourage modal alternatives to the automobile and truck where feasible in rural areas.

Action 2.j, Revise regulatory systems in order to stimulate the provision of transportation services by private companies in rural areas.

Action 2.k, Consider acquiring and upgrading low density rail lines where current owners are seeking to sell or abandon them.

Action 2.l, Encourage stronger aesthetic land use controls outside of the rights-of-way involving features such as utilities, billboards, urban design and rural development, directional signs for tourists and unique resources.

Goal 3 - To promote the expansion and diversity of Oregon's economy through the efficient and effective movement of goods, services and passengers in a safe, energy

efficient and environmentally sound manner.

Action 3.a, Identify the present level of local, state and federal support for each of the various modes of freight transportation, including taxation, regulation, capital investment, and operating subsidy.

Action 3.b, Provide more efficient railroad service through the reduction of conflicts at busy railroad crossings and rail yard areas by means of grade separations and development of alternative motor vehicle circulation routes.

Action 3.c, Promote the growth of intercity bus, rail passenger and commuter air services to link all areas of the state with national and international transportation facilities and services.

Action 3.d, Maintain, preserve and improve the highway system in order to provide infrastructure for the efficient movement of goods by truck and bus.

Action 3.e, Promote the retention of desirable rail service and rights-of-way through existing railroad ownership or alternative private or public ownership.

Action 3.f, Facilitate development and operation of transportation hubs with statewide, interstate and international functions, as identified in the state transportation system plan.

Action 3.g, Develop a tourism transportation action plan to identify facilities and services to serve tourism and incorporate in state and local transportation plans.

Action 3.h, Identify certain transportation corridors as scenic routes and consider scenic values in corridor planning, improvements and maintenance.

Goal 4 - To implement the Transportation Plan by creating a stable but flexible financing system, by using good management practices, by supporting transportation research and technology, and by working cooperatively with federal, regional and local governments, Indian tribal governments, the private sector and citizens.

Action 4.a, Place priority on preserving, maintaining and improving the transportation infrastructure and services that are of statewide significance.

Action 4.b, Manage such factors as the number, spacing, type and location of accesses, intersections and signals in order to operate the transportation system at reasonable levels of service and in a cost-effective manner.

Action 4.c, Protect the integrity of statewide transportation corridors and facilities from encroachment by such means as controlling access to state highways, minimizing rail crossings and controlling incompatible land use around airports.

Action 4.d, Establish criteria in the Oregon Transportation Plan and modal plans to guide the development of MPO and other regional transportation plans.

Action 4.e, Adopt MPO and other regional plans when they meet established criteria.

Action 4.f, MPOs and counties shall carry out their responsibilities for transportation planning and development as described in the LCDC Transportation Rule (OAR 660-12).

Action 4.g, Establish private sector participation in the transportation policy and systems plans at all levels of government in Oregon.

Action 4.h, Provide stable, consistent funding for the implementation of this plan to encourage the private sector to commit similarly long-term investments.

Action 4.i, When preparing and adopting a transportation plan, transportation plan element, modal plan, facility plan or transportation improvement program, conduct and publicize a program for citizen, business, local government and state agency involvement that clearly defines the procedures by which these groups will be involved.

Action 4.j, Make information about proposed transportation policies, plans, and programs available to the public in an understandable form.

Preferred Alternative

The Plan identifies a "Preferred Alternative" that meets all policy goals by:

- Identifying a multi-modal system including air, rail, auto, truck, bus, bicycle, pedestrian, waterway transportation and pipelines to be implemented over by the Year 2012.
- Establishing minimum levels of service to be achieved by each mode of transportation.
- Identifying other major improvements beyond minimum levels of service.
- Identifying the transportation corridors and facilities which serve statewide and interstate functions.
- Identifying transportation system and facility management processes that must be put into place, including local transportation demand management and financing principles.
- Identifying land use patterns that must be put into effect to achieve the goals of the transportation plan.
- Identifying local, state and federal roles in implementing the plan and setting planning and performance criteria for modal implementation plans and local and regional transportation plans.
- Estimating the financial requirements to implement the plan.

The preferred plan makes several fundamental assumptions about the future of Oregon. Without these assumptions, the effectiveness of the plan would be limited.

1. Regional and local governments will continue to contain development within established urban growth boundaries.

2. Urban areas will use compact and mixed-use development patterns to enhance livability and preserve open space. These patterns will also support transit and other alternatives to the automobile.

3. The transportation system will achieve the transportation-related economic and livability standards of the Oregon Benchmarks.

4. State, regional and local governments will cooperate to achieve the vehicle miles travelled reduction standard in the LCDC Transportation Rule.

5. In rural areas, automobiles will continue to be the dominant transportation alternative available for most purposes, although transit, intercity bus and rail options will grow.

6. Telecommunications will develop substantially because of costs to motor vehicles. It will provide a significant alternative to making transportation trips.

7. The price for transportation services can reflect full costs and lead to expanded use of alternatives to the single occupant vehicle.

8. Most transportation services, other than public transit, will be provided by the private sector.

9. If the preferred plan cannot be implemented in its entirety, land use and system management strategies will still be implemented to the fullest extent possible.

The Preferred Alternative includes the following specific recommendations, which apply to **Deschutes County**, to be in place by the Year 2012:

- Walking and bicycle trips at double the present rate;
- Intercity bus or commuter bus service available to cities of over 2,500 population;
- Urban transit service available in communities over 25,000 population;
- Intermodal passenger terminals established in Portland, ...and Bend/Redmond;
- Expanded air freight handling capability at all commercial airports;
- Truck/rail freight reload hubs established in Medford, ...Bend;
- Full implementation of the LCDC Transportation Rule.

The preliminary cost estimate for the preferred alternative to be implemented statewide is approximately $12 billion over the next 17 years. This amount includes all local, state and federal commitments. Fifty-seven percent (57%) of the funding is earmarked for roads, streets, and highways, with the remainder pledged for new investments in railroads, ports, aviation, intercity bus, and transit.

An important aspect of the Plan is the Oregon Benchmarks, adopted in 1991 by the legislature as state objectives. The benchmarks are identified in Table 2c.

Table 2c
Oregon Benchmarks

Percentage of Oregonians living in areas that meet governmental ambient clean air standards	**100%**
Percentage of Oregonians with less than 30-minute (one-way) home-to-work commutes	**88%**
Percentage of Oregonians living within 50 miles of an airport with daily scheduled passenger air service	**75%**
Backlog of city, county, and state roads and bridges in need of repair and preservation	**5%**

The Plan considers land use policies as the primary tool to guide development of the state while protecting its resources, livability, and developing its economy. For rural areas, land use planning is expected to promote development through the logical planning and extension of public infrastructure and the services necessary to support new industry and development.

The transportation implications include the development of more compact, mixed use, pedestrian-friendly developments and that facilities are designed to support locally-adopted comprehensive plans. In rural areas, communities need to enhance levels of transportation and connections between modes to improve access and economic development.

Appendix B

OREGON STATE HIGHWAY PLAN REQUIREMENTS

OREGON STATE HIGHWAY PLAN

Level of Importance (LOI)

This strategy classifies the state highway system into four levels of importance. Each LOI is defined in terms of primary and secondary function, highway features, and desired operating character. The following are the LOI for state highways in Deschutes County:

LEVEL OF IMPORTANCE	HIGHWAY
Interstate	**None**
Statewide	**US 20** **US 97** **OR 126**
Regional	**OR 31 (US 97 to Lakeview)**
District	**OR 27 (Crooked River Hwy.)** **OR 46 (Century Drive Hwy.)** **OR 242 (McKenzie Hwy.)** **Powell Butte Hwy.** **O'Neil Highway**

Level of Service (LOS)

For each LOI category, there is a corresponding Level of Service (LOS) standard. These are meant to be minimum standards that guide operational and access management decisions regarding state highways. A total of six LOS standards attempt to quantify the level of comfort experienced by drivers depending on varying traffic conditions. Conditions range from free flow driving with little or no delays (LOS "A"), to extreme congestion at generally unacceptable levels (LOS "F"). In general, an LOS "E" is considered the limit of acceptable traffic congestion. The statewide LOS standards are as follows:

LEVEL OF IMPORTANCE	URBAN AREAS (Within City)	URBANIZING AREAS (Within UGB)	RURAL AREAS (Outside UGB)
Interstate	**None in Deschutes County**		
Statewide	**C**	**C**	**B**
Regional	**D**	**C**	**C**
District	**D**	**D**	**C**

Access Management Policy

The Access Management policy focuses on statewide access control measures and targets those areas of emerging development rather than retrofitting already built-up areas. The Highway 97 corridor between Redmond and Bend is an example of an emerging development area.

The Plan identifies six access management categories into which specific highway segments will be placed. The segments will be assigned a category in conjunction with the development of highway corridor plans. At this time, the corridor plan for Highway 97 is being developed by ODOT, and category assignments have not yet been made. Therefore, it is assumed that the corridors for US 20, US 97, and OR 126 will fall into either category 3, 4, or 5.

Congestion Management Tools

Consider the following right-of-way and design techniques during project planning and development to reduce congestion and protect the AOH facility. Agreements with local government shall include an understanding in advance that certain of these methods may be used at some future time if area development threatens the facility. This is a listing of only those strategies that may be applicable to rural areas.

- Use of access restrictions to control traffic volumes.
- Use of landscaped areas or physical barriers as medians.
- Grade-separated structures for cross streets, that are unconnected to the AOH facility.
- Interchanges.
- Frontage or other parallel roads.
- Purchase of complete access control.
- Right-turn (in/out) only access.

Truck Load Restrictions

The State Transportation Commission has set a goal of 96 percent of all Oregon highways be modernized to the point of being approved for continuous heavy truck (<80,000 lbs.) usage by the year 2010. It will be up to the ODOT Region Engineer to program reconstruction or resurfacing projects in the Six-Year Transportation Improvement process (TIP) to meet the Commission's goals. The remaining 4 percent of highways do not have the potential to carry significant truck traffic, therefore, they are to be left "as is". The following two "as is" segments are in Deschutes County:

REGION	HIGHWAY NUMBER	DESCRIPTION	COMMENTS
3	OR 242	Belknap Springs Jct. to Snowgate (McKenzie Hwy.)	Scenic Route
4	OR 27	US 20 to Prineville (Crooked River Hwy.)	Few Trucks, Gravel Surface

Six-Year Transportation Improvement Program (TIP)

ODOT's Six-Year Transportation Improvement Program provides a schedule of state funding for the highest priority projects identified during the statewide planning process. Projects identified in the TIP comply with

statewide planning goals and are assumed to be in compliance with local comprehensive plans.

Appendix C

Access Oregon Highways (AOH) System

Access Oregon Highways (AOH) System

The AOH system was developed to focus limited state resources on significant highway segments that provide access through and between major cities, regional centers and interstate cities. The primary goal is to maintain the efficient flow of traffic along these highways, protect right-of-way for future development, guide land uses by coordination with local comprehensive plans, and promote alternative modes and congestion management tools in areas that highway improvements are not cost-effective. Congestion management tools appropriate for rural areas include:

- Use of access restrictions to control traffic volumes.
- Use of landscaped or physical barriers as medians.
- Grade-separated structures for cross streets.
- Interchanges.
- Frontage or other parallel roads.
- Purchase of complete access control.
- Right-turn only (in and out) access.

In Deschutes County, Highways 20, 97, and 126 are all considered Access Oregon Highways.

Goal: The goal of the AOH system is to provide for the economic growth of Oregon by moving through traffic safely and efficiently through and between geographic and major economic areas within Oregon, between Oregon and adjacent states, and to and through major metropolitan areas.

Objective 1:

Achieve a network of high speed facilities which will provide maximum levels of service at the highest safe operating safe speeds possible with minimum amounts of delay in transporting goods and people between major economic centers and the interstate system,

Implementation Strategy:

1.1 Design AOH facilities to achieve the highest safe operating speed when considering the cost effectiveness of design options, the characteristics, and growth potential of the areas the facility passes through. The operating speeds will in general be at least 55 mph in rural areas and lower density urban fringe areas.

1.2 Develop long-range plans to preserve and in some cases improve facilities so they can meet future traffic demand. In cases where improving an AOH facility to the full standard would either be very costly or produce significant adverse impacts to the surrounding community, a phased plan to achieve acceptable final standards should be developed.

1.4 In cases where the desired operating speeds cannot be met, consider a bypass or congestion management techniques. Congestion management techniques may include access controls, traffic metering techniques, land use controls and complimentary street and road improvements or increased transit usage to assure that design year through travel can be accommodated at acceptable operating speeds.

1.5 Where AOH highways traverse rural geographical barriers that prevent 55 mph

operating speeds, establish the highest design standard compatible with the environment but consistent with economic efficiency.

Objective 2:

Protect the integrity of the AOH routes, which, along with the Interstate, are the most vital links in the state system.

Implementation Strategy:

2.1 Consider the intrinsic statewide service value of the AOH facility to the state highway system when evaluating the impacts of adjacent land use.

2.2 In areas of potential development or redevelopment, discourage strip commercial development (direct access to the facility).

2.3 Where prudent, use AOH funds for access control purchase and protective right-of-way purchase.

2.4 Where applicable, include reference to access control in right-of-way documents and correspondence with private parties.

2.5 During project development on an AOH facility, establish two formal “check points” to confirm that a project still meets the goals and objectives of the AOH program: 1) during project scoping, and 2) prior to design approval.

2.6 Where applicable, consider multimodal options and design features for the movement of people and goods to reduce highway improvement needs.

2.7 If during the environmental and design processes it is found that a proposed AOH route cannot be justified, allow AOH funds to be used on other state highways that would serve the same function as the original AOH route. This applies only if the goals and objectives of the AOH system can still be met and the alternate route is approved by the commission for inclusion into the AOH system.

Objective 3:

Strengthen the partnership between Oregon State Highway Division (OSHD) and local government to achieve mutual highway and community goals.

Implementation Strategy:

3.1 Develop projects as required under the Oregon Action Plan for Transportation 1989. The OSHD will work closely with local governments to provide highway improvements that will benefit all jurisdictions.

3.2 Encourage local jurisdictions to amend comprehensive plans during periodic review to recognize AOH corridors within their boundaries, adopt policies, which recognize the statewide transportation functions that those highways serve, and plan for adjacent land uses accordingly.

3.3 Do not proceed with work beyond a reconnaissance level on significant AOH projects that are not recognized in local comprehensive plans and protected by plan policies, which acknowledge the function that the project is to serve.

3.4 Listing of a project in the six-year Transportation Improvement Program does not automatically mean it will be constructed. Before environmental work proceeds on a project where local government is involved, review the purpose and scope of the project with the local government agency to reinforce the importance of maintaining the integrity of the AOH system. The project will not receive design approval, nor will it be constructed until a formal agreement between OSHD and the appropriate local government is signed. This agreement will contain local government and state commitments to insure that measures will be taken to protect the integrity of the AOH system. The formal agreement will specify, where applicable:

a) The purpose and functional role of an AOH facility.

b) The approximate description and scope of the proposed project.

c) Understandings on protective measures (median closings, street disconnections, local traffic circulation plans, land use controls, etc.) necessary to preserve the operation of the facility.

d) Commitment that the local government accepts the major responsibility for future land access as local streets are developed and as properties are redeveloped if OSHD cannot maintain control over access. This will relieve the AOH facility of the land access function.

e) Access management plans. Level of detail of plans and requirements can vary according to future chance of conflicting development.

f) Responsibility of local government to assume irrevocable jurisdiction of the old road or other state highways that may be replaced by a new facility.

g) A shared responsibility for congestion management, which would include some or all of the items listed below and may require local agency financial assistance and participation.

Appendix D

Highway 97 Corridor Study

Highway 97 Corridor Study

Overall Corridor Goal: to promote commerce by efficiently distributing goods and services, while enhancing travel safety, maintaining environmental integrity, and preserving regional quality of life***.***

Key themes for the corridor include:

- Enhancing Safety
- Facilities Management and Improvement
- Intermodal Connections
- Interpretive Opportunities and Preservation of Environmental Quality
- Economic Development
- Partnering

State policies, corridor goals and strategy objectives for the US 97 corridor within Deschutes County are as follows:

A. Transportation Balance/Intermodal Connectivity

Policy: It is the policy of the State of Oregon to provide a balanced transportation system. A balanced transportation system is one that provides transportation options a appropriate minimum service standards, reduces reliance on the single-occupant automobile ***where other modes or choices can be made available, particularly in urban areas***, and takes advantage of inherent efficiencies of each mode.

Goal: The goal for the US 97 corridor includes maintaining and improving Highway 97 to serve the auto and truck travel needs as the primary modes in the this corridor, while maintaining and encouraging the use and connection of alternate modes, including rail, air and intercity bus service through the Corridor, ***especially in urban or urbanizing areas***. The objectives described for each travel mode are intended to create a more balanced transportation system over time.

Objective A1 - Automobiles and Trucks

Specific performance objectives for the highway are described in Section C, Highway Congestion, Facility Management and Roadway Conditions

Objective A2 - Freight Rail Service

The OTP calls for rail lines, including the Burlington Northern Bend Branch and the Southern Pacific Cascade line to be operated at not less than a minimum speed of 25 mph.

- Partner with Burlington Northern (and Santa Fe) to maintain average operating speeds of 40-60 mph with the exception of 25 mph maximum speeds in the Deschutes River Canyon of the Bend Branch Line.

Objective A3 - Highway / Rail Freight Connectivity

- Not applicable to the rural areas of Deschutes County.

Objective A4 - Public Transportation Service

The policy of the OTP is to provide intercity passenger transit service to/from cities or groups of cities with a population of more than 2,500 and located 20 miles or more from the nearest Oregon city with a larger population. The targeted minimum of one trip per day is currently provided by Greyhound Bus Lines.

- Develop a coordinated public transportation system over time with multimodal alternatives and proper facilities.

- Begin to establish a public transportation system in Bend that coordinates the role of special needs transportation providers and their services. Initially work with local jurisdictions within Deschutes County to establish a local bus service for the elderly and transit-dependent population with “dial-a-ride” service between the Redmond Municipal Airport, Bend, Sunriver and La Pine. Eventually expand to hourly service to selected destinations.

- Explore rideshare, park and ride and other pilot programs for providing amenities and unique services that may benefit or supplement public transportation service expansion.

Objective A5 - Intercity Bus / Passenger Rail Service and Connectivity

A 1992 passenger rail study by ODOT concluded that any new Amtrak service through Central Oregon would be cost prohibitive for the potential benefit derived.

- In cooperation with local jurisdictions, railroads, and others, explore development of enhanced intercity bus service as a first step to determining the feasibility of intercity passenger rail service from Redmond to Bend and possibly connecting to Chemult.

- Partner with local jurisdictions and private transportation providers to ensure that intercity bus service and passenger rail service includes efficient and reliable intermodal connections (bus, taxi, rental car) to destinations and activity centers.

Objective A6 - Air Service and Connectivity

The Redmond Municipal airport currently exceeds the minimum level of three daily round-trip flights identified in the OTP.

- In accordance with the Oregon Aviation Plan, provide continued support for airport facilities improvements and highway access management, including the Bend and Redmond Municipal Airport and Chiloquin Airport runway expansion plans.

- Improve modal connections between Redmond, Bend and Madras airports with surrounding major destinations and activity centers. Work with the private sector to provide transit express bus, taxi and car rental service, as the market demands.

Objective A7 - Bicycle / Pedestrian Facilities

Develop safe and convenient walkways, bikeways and highway crossings are the goals of the OTP. In addition, the Transportation Planning Rule advocates the provision of pedestrian and

bicycle facilities that allow direct, hazard-free travel, such as sidewalks and bike lanes ***in urban areas.***

- Through ***all urban areas***, as well as ***La Pine***, Chemult, Crescent and ***Terrebonne***, provide sidewalks and bike lanes on both sides of Highway 97 and safe and convenient pedestrian crossings. Improvements should occur primarily in conjunction with new highway projects or major reconstruction. Retrofit projects will be programmed based on need.

- In cases where it is anticipated that there will be little use of a sidewalk or a bike lane on the highway and it would be of greater value to pedestrians and/or bicyclists to construct a parallel facility, then the parallel facility may be improved in lieu of the highway improvement.

- All pedestrian facilities and crossings should be accessible to people with disabilities, including hearing, visual, mobility and cognitive disabilities.

- Sidewalks should be buffered from the highway with adequate landscaping, shoulders and/or parking in areas with design speeds of 45 mph or above.

- ODOT will work with the USFS, the public, and local jurisdictions to develop, where practical, bicycle facilities between Redmond and La Pine that are parallel to Highway 97 using dedicated easements and right-of-way along gas pipelines, old roads, railroads and irrigation canals. Also, work with local jurisdictions to improve local bike/pedestrian networks in Madras, Redmond, Bend and Klamath Falls urban areas.

- Cooperate with local jurisdictions to expand the modal share of bicycling and walking trips to work ***within urban areas*** in the Corridor to at least double the state average.

Objective A8 - Pipelines

In order to make alternative fuel widely available and to support regional economic development opportunities, the OTP calls for adequate natural gas to be available every 100 to 150 miles on major transportation corridors, when economically feasible.

- Encourage the Public Utilities Commission (PUC) and Pacific Gas Transmission Company (PGTC) to maintain or improve the natural gas transmission line and service provided to communities within the Corridor.

B. Regional Connectivity

Policy: It is the policy of the State of Oregon to identify and develop statewide transportation system of corridors and facilities that ensures appropriate access to all areas of the state, nation and the world.

Goal: The stated overall goal for the Corridor includes promoting commerce through the efficient distribution of goods and services. This will involve coordinating interstate transportation linkages and intrastate services, particularly for the transportation disadvantaged.

Objective B1 - Interstate Transportation Connections

Highway 97 provides direct access to Washington and California. In addition, the Burlington Northern, Southern Pacific and Union Pacific railroads and Amtrak Coast Starlight lines all provide freight and passenger service within the Corridor for goods and people moving throughout Oregon and the nation.

- Partner with Burlington Northern, Southern Pacific, and Union Pacific railroads to identify rail freight transportation issues and to facilitate transfer of freight to rail.

Objective B2 - Transportation Disadvantaged Services

Transportation disadvantaged populations in the Corridor have their transportation needs met by a variety of service agencies. Coordination of these services could save money and allow for more efficient levels of transit service and reduced reliance on the automobile.

- Work with local jurisdictions, public transportation providers, and community-based social service agencies to identify and respond to the needs of the transportation disadvantaged population. Coordinate the services of existing providers to serve all population segments more efficiently.

C. Highway Congestion, Facility Management and Roadway Conditions

Policy: It is the policy of the State of Oregon to define minimum levels of service and assure balanced, multimodal accessibility to existing and new development ***within urban areas*** to achieve the state goal of compact, highly livable ***urban*** areas. It is also the policy of the State of Oregon to provide interurban mobility through and near ***urban*** areas in such a manner that minimizes adverse effects on land use and ***urban*** travel patterns.

Goal: The management goal for the Corridor is to provide for safe and efficient high-speed continuous flow operation in rural areas and moderate to high-speed operations of flow in urban and urbanizing areas, and rural development centers. The Corridor goal is to address overall congestion by working with local governments to accommodate local mobility needs while maintaining through travel needs, using Transportation Demand Management (TDM) programs, multimodal facilities and other strategies, in addition to highway capital improvements. The tendency of Highway 97 to act as a linear barrier to east-west movement of people, goods, and wildlife needs to be reduced, or at least should be minimized by careful design and improved facilities management.

Objective C1 - Highway Level of Service and Travel Time

- Maintain existing average overall travel times within highway corridors.

- Provide highway design-hour LOS “B” in rural areas and “C” or better in urban areas, urbanizing areas and rural development centers. Lower levels of service in selected urbanized segments may be acceptable, as determined during the systems planning process.

Objective C2 - Transportation Demand Management / Rideshare Measures

- Continue to expand and support TDM and pedestrian-oriented “mixed-use” development measures in Bend, Redmond, Madras and Klamath Falls **urban areas**. Build upon the existing Rideshare Program in Deschutes County with other TDM measures such as parking management provisions, traffic impact fees, and support for employer-based commute options such as vanpools, compressed work weeks/staggered work hours, walking, bicycling and telecommuting.

- Step up outreach programs to help facilitate TDM objectives. Programs should focus on informing and educating local residents, employees and employers about available TDM measures, efforts and transportation options.

Objective C3 - Transportation System Planning and General Planning Coordination

- In cooperation with the cities of Madras, Prineville, Redmond, Bend and Klamath Falls and counties of Deschutes, Jefferson and Klamath, develop integrated transportation plans for urban areas and counties that are consistent with the statewide role of the Highway 97 Corridor as set forth by this Corridor Strategy and other state planning policies and goals.

Objective C4 - Capacity Improvements

- Alternatives such as access management, development of a good local road system and improved land use planning will be essential for effectively managing congestion and where practical, should be implemented prior to, or at least in concert with any capacity improvements.

- Partner with local jurisdictions to plan, design and construct highway improvements along Highway 97 in accordance with volume/capacity, safety, environmental and needs analysis.

- Within rural highway segments (between communities), focus capital improvements on providing high-speed, safe and continuous flow operation. Rural capacity improvements, particularly those near urban areas, should be designed to limit unplanned development and changes in rural land use.

- As funding becomes available, proceed with developing construction projects identified in the Statewide Transportation Improvement Program (STIP).

- Provide spot safety and capacity improvements, which have favorable cost/benefit ratios, to enhance safe access for all modes to and from major destinations.

- For sections of the Corridor south of La Pine that demonstrate substandard levels of congestion and safety performance, provide passing lanes at 3-5 mile spacing, with adequate shoulders to accommodate bicycles and emergency vehicles.

- In high growth areas of the Corridor between Madras and La Pine that demonstrate substandard levels of safety and performance, provide roadway widening in accordance with a four-phased approach.

Objective C5 - Truck Routes

- Work with local jurisdictions to evaluate the need, feasibility, cost and desirability of truck route modifications (such as the North Canal Blvd. Option in Redmond). Support implementation where practical.

Objective C6 - Facilities Management

- Work with local jurisdictions to adopt and implement access management policies along the entire corridor that are consistent with the Oregon Highway Plan. Specific access management classifications should be adopted along Highway 97 during the Transportation System Planning and Comprehensive Planning process.

- ODOT and local jurisdictions should adopt and implement consistent standards regarding left turn lanes, raised medians, driveway spacing, acceleration/decelleration lanes, turn refuges and means to enhance the local street network (e.g., better use of parallel local streetsand service roads) to safely handle local traffic, improve pedestrian access and crossings, and relieve congestion in urban and urbanizing areas, and rural development centers along Highway 97.

Objective C7 - Interchanges and Grade Separations

- Increased through and cross traffic volumes will generate high levels of congestion and poor safety performance at some intersections. ODOT policy does not allow signalization of rural intersections in 55mph highway segments. Consequently in rural highway segments, when intersections are projected to meet signal warrants, are on the Safety Priority Index System (SPIS), or are needed to address a strategic element of a more detailed system plan for a high growth area, plan for interchanges or simple grade separations. Other alternatives, such as median treatments, or local road closure will be considered prior to planing for the grade separation, and if practical, will be implemented. As appropriate, seek cost participation by private developer(s) and/or the **County.**

Objective C8 - Right-of-Way Preservation

- Where cost-effective, sufficient right-of-way should be preserved for planned transportation improvements. Wherever practical, this step should occur through the local land-use process.

Objective C9 - Roadway Conditions

- Focus improvements on segments with above average accident rates, high congestion and a favorable cost/benefit ratio.

- Consider new regional partnerships between ODOT and counties to share roadway maintenance and funding for capital improvements, particularly in areas experiencing economic downturns from reduced timber revenues.

- Provide minimum paved shoulder of six to eight feet, in accordance with design standards, as roadway segments are modernized.

- Develop an aggressive surface preservation program that achieves 88 percent fair or

better conditions and reduces winter breakup pavement problems.

D. Safety

Policy: It is the policy of the state of Oregon to continually improve the safety of all facets of statewide transportation for system users, including operators, passengers, pedestrians, recipients of goods and services and property owners. According to the Safety Priority Index System (SPIS), in 1992 there were 27 high accident locations along Highway 97 and the accident rate in the section from Madras to La Pine far exceeded the statewide average.

Goal: The Corridor goal is to identify and give priority to improving safety conditions along the Highway 97 Corridor through necessary improvements, while addressing problems associated with game crossing areas, speeding through rural centers and congestion in urban areas.

Objective D1 - Traffic Calming

- In selected small communities (e.g., Terrebonne, La Pine) consider traffic calming measures (e.g., curb extensions, signage, raised medians), Intelligent Transportation Systems (i.e., electronic monitoring), and facilities management measures to help slow traffic to posted speed limits and to improve safety. These measures will be planned and developed in cooperation with the local community.

Objective D2 - Vehicle Recovery Zones

- From Sunriver south to the peak of Spring Creek Hill, plan for separating the northbound and southbound lanes with a wide natural vegetation median wherever possible. Median vegetation will emphasize plant species that maximize motorist safety while minimizing ecological impacts including wildlife/vehicle collisions, non-invasive species and aesthetics.

- Provide tree thinning in segments of Corridor to reduce sun glare/strobe effect, improve driver visibility, help melt snow/ice and possibly reduce wildlife-vehicle collisions, particularly between Bend and Modoc Point. Preserve selected trees and shrubs to improve aesthetics and ecological conditions.

Objective D3 - High Accident Locations

- In cooperation with local officials, identify and develop strategiues wherer warranted to provide proper signage and necessary mitigation measures at high-accident locations such as sharp curves, areas prone to icing, rock falls, significant wildlife crossings and areas of high pedestrian activity.

- During the Corridor planning process, consider and plan for facilities management improvements such as acceleration/decelleration lanes, left turn lanes, and enhanced local street network and signalization (i.e., blinking yellow lights) to improve safety performance at high accident intersections.

Objective D4 - Vehicle/Wildlife Collisions

- Work with the Oregon Department of Fish and Wildlife during the County Transportation Planning Process to identify and implement measures to reduce vehicle-wildlife collisions. Consider fencing and passage, seasonally concentrated enforcement, driver education and signage as a means to improve safety to motorists and wildlife.

- Medians in high collision areas should be designed to allow wildlife movement across the highway.

Objective D5 - Enhanced Traffic Enforcement and Safety Education

- Consider additional traffic enforcement measures such as electronic measuring in selected small communities (e.g., Terrebonne and La Pine).

- Provide Intelligent Transportation System (ITS) techniques, such as automated signage, and advisory radio service to inform motorists about travel conditions (e.g., delays from congestion/accidents, seasonal wildlife migration, inclement weather, forest fires and rock falls).

- Work with local jurisdictions to consider safety improvements related to cros-traffic movements on adjacent roads that are impacted by Highway 97.

Objective D6 - Rest Stops and Driving Experience

- Ensure some type of a “rest area”, with access to public or private commercial restroom facilities, is provided, and meets federal ADA standards for motorists, at spacing consistent with state standards. Consider the placement of seasonal “wildlife migration” signs at the rest area exit lane.

- As sections of Highway 97 are improved or upgraded, attempt to enhance the visual experience of the drive to reduce boredom and mitigate accidents, especially between Spring Creek Hill and Sunriver. Consider a variety of means to enhance corridor landscape using vegetation management, scenic vistas, interpretive signage and vehicle pull-outs.

- Given the importance of tourism to the regional economy, as well as the scenic and recreational potential of the Corridor, highway improvement design should reflect a high level of aesthetic sensitivity. This includes design of transportation facilities that improves facility appearance, as well as views from the facilities. This will require balancing addiitonal design costs with the functional nature of the improvement, and may require cost participation by local developers and/or jurisdictions.

E. Environmental Impacts

Policy: It is the policy of the State of Oregon to provide a transportation system that is environmentally responsible and encourages conservation of natural resources.

Goal: To promote the efficient and effective movement of goods, services and passengers and to avoid, whenever possible, impacts to areas/locations of environmental and cultural significance, and create opportunities for scenic and interpretive signage, viewpoints, and

turnouts, and to assure consistency with local and state agency plans and policies.

Objective E1 - Scenic and Cultural Resources

- Develop scenic and interpretive opportunities throughout the Corridor.

- Utilize programs of educational signage for scenic resources, wild and scenic rivers, state scenic waterways, and other natural features consistent with Scenic Byways Program.

- Encourage land use controls to protect corridor view sheds, (i.e., along mile 145.6-147.6 and 150.5-159.0).

- Support the development of viewing and educational opportunities for the public, focusing on sensitive, threatened and charismatic wildlife (i.e., Swainson's hawks, bald eagles, antelope), and display the scenic, geologic, and recreational resources.

Objective E2 - Emergency Response, Hazardous Materials Accident and Spill Management

- Provide minimum shoulder width for emergency response vehicles, such as fire trucks.

- Manage shoulder vegetation to reduce wildfire hazard.
- In cooperation with local governments, Native American Tribes, federal/state agencies, Southern Pacific and Burlington Northern Railroads, and Pacific Gas Transmission Company, participate in regional emergency response and hazardous materials accident spill management programs for the Corridor.

Objective E3 - Maintenance Plans for Environmentally and Culturally Sensitive Areas

- In cooperation with state and federal agencies, develop maintenance plans, including special signing and crew training to avoid, minimize or mitigate adverse effects of highway maintenance operations on environmentally sensitive portions of the Corridor (e.g., scenic resources, federal wild and scenic waterways, state scenic waterways, wetland and riparian habitats). Encourage Burlington Northern and Southern Pacific Railroads and Pacific Gas Transmission Company to develop and abide by similar plans.

Objective E4 - Wildlife Crossing Areas

- In cooperation with federal and state resource agencies, local governments, Native American Tribes, and the public at large, develop strategies to allow the safe movement of wildlife across highways and the maintenance of their forage base and habitats, thus insuring healthy fish and wildlife communities.

- In cooperation with local officials, Oregon Department of Fish and Wildlife (ODFW) and Oregon State Police (OSP) identify and implement strategies to address high wildlife crossing and accident locations.

- In cooperation with ODFW, identify and reduce "attractive nusiance" aspects of highway developments that might attract and hold wildlife near roadways.

Objective E5 - Wildlife Mitigation

- In cooperation with ODFW, identify acceptable mitigation for engineering designs that increase wildlife impacts such as population loss or habitat loss. Mitigation measures could include wildlife water developments or habitat improvements (i.e., forage or cover).

Objective E6 - Air Quality

- Other than Klamath Falls, work with jurisdictions to maintain their attainment status.

F. Social and Land Use

Policy: It is the policy of the State of Oregon to develop transportation plans and policies that implement Oregon's Statewide Planning Goals, as adopted by the Land Conservation and Development Commission.

It is also the policy of the State of Oregon to provide a transportation system consistent with, yet recognizing differences in, local and regional land use and an economic development plan.

Objective F1 - Transportation-Land Use Integration

- Work with local jurisdictions to optimize the local street network, utilize access management, and manage land use development patterns.

- Work closely with small communities such as La Pine to consider refocusing their local comprehensive plans in accordance with an available land and existing/planned transportation infrastructure. Assist communities, as appropriate, in planning for the development of commercial centers on parallel or adjoining local roadways.

- Support patterns of development that avoid or eliminate significant at-grade railroad crossings, whenever possible. Assist local jurisdictions in amending local comprehensive plans to avoid, consolidate and/or eliminate at-grade crossings.
- Work with local jurisdictions to minimize landuse conflicts near airports.

- Rural capacity improvements, particularly those near urban areas, should be designed to limit unplanned development and changes in rural land use.

Objective F2 - Accommodate Elderly Users

The growth rate for population over the age of 55 is projected to outpace the average overall populaton growth in the County

- Evaluate the needs of elderly transportation users, especially in urban areas where elderly population is rapidly increasing. Work with local jurisdictions to provide: better lighting and signage, paratransit service, transit connections to airports and medical facilities, and enhance emergency response systems.

Objective F3 - Social, Cultural and Recreational Resources

- Avoid impacts to cemetaries, parks and historic resources, including: Peter Ogden Wayside Park; Robert W. Sawyer State Park; Terrebonne Ladies Pioneer Club; Harper

School; La Pine Commercial Club Building; and the Vandervert Homestead.

- Develop strategy to accommodate livestock crossing, with consideration for wildlife crossing needs.

G. Energy

Policy: It is the policy of the State of Oregon to assure provision of an efficient transportation system. The Highway 97 Corridor policy is to minimuze transportation-related energy consumption through the use of fuel-efficient modes of travel, enhance vehicle efficieincies, and improved design, construction and operation of transportation facilities.

H. Economic Development

Policy: It is the policy of the State of Oregon to promote the expansion and diversity of Oregon's economy through the efficient and effective management of goods, services and passengers in a safe, energy efficient and environmentally sound manner.

Objective H1 - Strengthen Business and Industrial Base

- Continue to work with existing business and industry to identify issues and concerns regarding Highway 97, while promoting Travel Demand Management (TDM) programs, including telecommunications.

- Expand tourism by combining traffic calming measures with signs marking amenities and attractions in small communities; providing rest stops/scenic waysides; and developing interpretive sites within the Corridor.

Objective H2 - Interpretive Corridor

- Work with federal and state resource agencies, local governments, Native American Tribes, local businesses, and the public to identify scenic, environmental and cultural resources along the Corridor that can be protected, enhanced, and/or restored, while being developed as interpretive sites.

- Consider partnerships with the above-mentioned groups in the development of funding and management agreements to develop and enhance interpretive centers and waysides.

Objective H3 - Intermodal Reload Facility

Only applies to ***urban areas*** within the Corridor.

Objective H4 - International Air Freight Facility

Only applies to Klamath Falls International Airport.

Implementation

The Corridor Strategy objective for the U.S. 97 Corridor are intended by ODOT to embody the overall goal for the Corridor and establish direction and provide guidance for corridor-wide transportation plans and enhancements over the next 20 years. The Corridor Stategy was endorsed by the Deschutes County Board of Commissioners in October 1995. Once endorsed, the Strategy became the guiding document for detailed transportation system planning and comprehensive planning, which will establish corridor improvement priorities for state funding; thereby ensuring that future transportaiton facilities and services optimise the needs of Oregon's Corridor stakeholders.

Appendix E

OREGON TRAVEL BEHAVIOR SURVEY

Oregon Travel Behavior Survey

Summary of Findings for Deschutes County

Submitted to:
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Salem, Oregon 97310

Submitted by:
NuStats International
3006 Bee Cave Road, Ste. A-300
Austin, Texas 78746

May 1997

Table of Contents

DESCHUTES COUNTY
SUMMARY OF FINDINGS

I Executive Summary

Introduction

The purpose of the 1996 Oregon Travel Behavior Survey is to provide information suitable for gaining an in-depth understanding of the activity and travel behavior of both households in non-metropolitan areas and the individuals within those households. The sampling approach used was designed to ensure that representative statewide data were obtained.

The 1996 Oregon Travel Behavior Survey was conducted under the auspices of the Oregon Department of Transportation. This survey relied on the willingness of area residents to complete diary records of their daily travel. Recruitment of households was conducted through a "recruitment interview" in which respondents were informed of the survey, its purpose and the respondent's obligation to complete diaries. Data on households and household members were also collected during the recruitment interview.

Participating households were assigned a "2-day travel period", which typically occurred 10 days after recruitment. Household members were asked to record travel information in their diaries for the specified 48-hour period. Immediately after the assigned date, households were contacted to retrieve the diary information.

The survey consisted of a scientifically formulated sample design, appropriate instruments for data collection, a package of written materials to communicate with survey respondents, a toll-free survey hotline, and data collection, processing and reporting procedures that comported to standards of the Council of American Survey Research Organizations (CASRO).

Data collection for Deschutes County was conducted from April to December 1996. Data collection resulted in 1,208 recruited households. Of these, 775 provided the necessary information to result in completed surveys. The total number of activities reported was 50,439, and the total number of trips was 11,445. These totals translate into an average of about 65 activities and about 15 trips per household for the two-day period.

Average Person Trips Per Day

- One-person households averaged 3.40 trips per day,
- Two-person households averaged 5.84 trips per day,
- Three-person households averaged 8.80 trips per day,
- Four-person households averaged 13.11 trips per day,
- Five-person households averaged 17.23 trips per day.

The average rate for all households was roughly eight (8) trips per day.

Summary of Methods

The accompanying "Technical Memorandum" describes the sampling methodology in detail.

II Sampling and Response

Sample Design

The universe consists of households in the cities of Bend, Redmond, Sisters and Terrebonne in Deschutes County. The household count for the study area was 29,400 households. It was determined using projections of annual growth rates from 1994 and/or 1995 commercial estimates. For purposes of the survey, a household was defined as "all persons currently living in the same dwelling who typically share meals together as well as share at least a part of their income."

The Oregon Travel Behavior Survey used a random sample of telephone numbers in the study area. A random sample is one in which the probability, or relative chance, that any given household will be included in the sample is the same for all households in the universe. The sampling frame for the Oregon Travel Behavior Survey consisted of listed and unlisted telephone numbers for Deschutes County drawn in proportion to their distribution within the county. Due to the nature of the sampling frame requested in the survey proposal, households without telephones were excluded from the sample.

The Deschutes County sample included the cities of Bend (zip codes 97701, 97702, 97707), Redmond (zip code 97756), Sisters (zip code 97759), and Terrebonne (zip code 97760). These zip codes account for 94% of the total households in the county.

Response Rate

The Oregon Travel Behavior Survey used a two-stage sampling process (household recruitment and household retrieval). In such a case, response rates for recruitment and retrieval stages are reported independently, and then an overall response rate is reported by multiplying the two rates.

The **recruitment rate** is calculated using the following formula:

$$\textit{Recruitment rate} = \frac{\textit{Number of Recruited Households}}{\textit{Number of Eligible Households in Sample}}$$

The number of recruited households is known - 1,208 households. The number of eligible households in the sample is calculated from the dispositions recorded for each sample piece. Contact attempts yielded three types of sample dispositions: (1) Eligible Sample, (2) Ineligible Sample, and (3) Eligibility Unknown Sample (see Table II-1). In estimating the eligible households, the number of eligible sample units is combined with a pro-rated number of eligibility unknown sample units. The pro-rated number is determined by totaling the number of eligible and ineligible sample, and then identifying the portion of the total comprised by eligible or ineligible sample. The number of eligible households is then calculated by adding the proportion of unknown sample (61%) to the total number of recruited households. The recruitment rate for households in Deschutes County was 50% of all eligible households.

Recruitment Rate Calculation

	Calculation	Total/ Percent
Number of Recruited Households	1,208	
Total Number of Eligible and Ineligible Sample	1,684 + 1,097	2,781
Proportion of Eligible Sample	1,684 / 2,781	61%
Proportion of Ineligible Sample	1,097 / 2,781	39%
Number of Eligible Households	1,684 + 729	2,416
Recruitment Rate	1,208 / 2,416	50%

Table II-1
Final Sample Dispositions (n=3,976)

Dispositions	Frequency	Percent	Total Number and Percent
Eligible Sample			42.4%
Recruited	1,208	30.1%	
Second Refusal	396	10.0%	
Terminated in middle of interview	22	0.6%	
Over Quota	58	1.5%	
			1,684
Ineligible Sample			27.6%
Disconnected Number	589	14.8%	
Deaf/Language	15	0.4%	
Business/Government	344	8.7%	
Computer/Fax	116	2.9%	
Non-Qualified	25	0.6%	
Non-Resident	8	0.2%	
			1,097
Eligibility Unknown Sample			30.0%
First Refusal	419	10.5%	
No Answer	278	7.0%	
Busy	44	1.1%	
Answering Machines	354	9.0%	
Call Back Appointments/Requests	100	2.5%	
			1,195
Total Sample Pieces	3,976	100.0%	

The **completion rate** is the rate at which recruited households complete the survey process. It is a measure of sample attrition, which is one determinant of sample bias. This rate is calculated by dividing the total number of completed surveys (775) by the total number of recruited households (1,208). A completion rate of 64% was obtained. The **Overall Response Rate** is calculated by multiplying the recruitment rate (50%) by the completion rate (64%) for a rate of 32%.

The final day-of-week distribution is displayed in Table II-2. It shows a greater number of interviews completed for the beginning of the week, which should be taken into consideration during analysis.

Table II-2
Travel Day of Week Distribution
(n=775)

Travel Day Pairs	Percent
Monday/Tuesday	36.4%
Tuesday/Wednesday	21.2%
Wednesday/Thursday	20.3%
Thursday/Friday	22.2%
Friday/Saturday	0.0%
Sunday/Monday	0.0%

Survey Validation

The objective of validation was to estimate the precision of the survey results and evaluate the reasonableness of the survey results. The survey validation involved comparing regional population and housing characteristics with the 1990 STF-3A Census data for Deschutes County for reasonableness. In 1990 Deschutes County had 74,958 residents in 29,400 households; the total number of housing units was 35,928 while the number of occupied housing units was 29,217. During the study, 1,208 households were recruited, and 775 actually completed the survey. A completed household is one in which all members of the household completed a travel and activity diary. The following three tables (II-3, II-4, and II-5) compare survey data to Census parameters to identify potential biased estimates.

Low-income households (under $10,000) are under-represented in the survey sample as compared to Census data (Table II-3). Several factors account for this discrepancy. First, it is likely that many of the households that refused to answer the income question fell into this category. Second, the survey contacted only telephone households, while the Census reached every household. Non-telephone households tend to have lower incomes than telephone households, and this bias is reflected in the data. Third, many low income households are hourly workers who are also multiple job holders. These people are difficult to reach via telephone because they are not home during regular calling hours. Fourth, many low income households also report low educational levels. Persons with low education are often intimidated by the survey diary package.

When compared to Census data, two-person households are over-represented in the sample (Table II-4). The factors underlying this discrepancy include the following. Two person households typically do not have a large number of activities and travel to report. Therefore, the burden in terms of participation is relatively light. Large households, on the other hand, usually must report a greater number of trips. Therefore, the perceived burden of the survey is greater. In addition, to be "complete" all members of the household must have provided data. It is more difficult to retrieve activity and travel data from all members of large households. The sample distribution in terms of number of vehicles owned also diverges from the Census data (Table II-5). The sample contains disproportionately fewer zero, one, and two-vehicle households than the population.

Table II-3
Household Income

Income	Recruited Households (n=1208)	Completed Households (n=775)	Census Data (n=29,400)
$0-$4,999	1.3%	1.5%	4.5%
$5,000-$9,999	2.9%	3.4%	8.0%
$10,000-$14,999	5.5%	5.0%	10.7%
$15,000-$19,999	7.4%	7.0%	11.0%
$20,000-$24,999	9.2%	9.3%	10.4%
$25,000-$29,999	8.2%	9.2%	10.4%
$30,000-$34,999	5.5%	5.3%	9.2%
$35,000-$39,999	6.9%	8.3%	7.1%
$40,000-$44,999	8.4%	9.5%	6.2%
$45,000-$49,999	7.8%	8.3%	4.7%
$50,000-$54,999	5.7%	5.7%	4.2%
$55,000-$59,999	4.1%	5.2%	3.0%
$60,000-$100,000	10.5%	11.0%	7.3%
$100,000 or more	3.8%	3.9%	3.2%
Refused	12.8%	7.6%	–

Table II-4
Household Size

Persons per Household	Recruited Households (n=1208)	Completed Households (n=775)	Census Data (n=29,400)
1 Person	20.1%	22.1%	21.0%
2 Persons	42.9%	44.4%	39.5%
3 Persons	14.6%	14.3%	16.0%
4 Persons	14.7%	12.9%	14.9%
5 Persons	6.0%	5.4%	5.9%
6 Persons	1.2%	0.5%	1.8%
7 or More Persons	0.5%	0.4%	0.9%
Refused	0.0%	0.0%	–

Table II-5
Vehicles available per Occupied Housing Unit

Vehicles Available	Recruited Households (n=1208)	Completed Households (n=775)	Census Data (n=29,217)
None	2.6%	2.7%	3.9%
One	20.9%	23.1%	26.6%
Two	40.6%	39.9%	43.3%
Three	20.4%	20.3%	18.1%
Four	9.4%	8.8%	5.4%
Five or More	6.0%	5.2%	2.7%
Refused	0.0%	0.0%	–

III Household Characteristics

The following tables provide information about respondents' households. Where available, collected data is compared to Census Data.

Table III-1
Household Size by Income (Completed Households=775)

Income		HH Size 1	2	3	4	5	6+	Row Total
less	Count	8	3	1	0	0	0	12
than	Row %	66.7%	25.0%	8.3%	0.0%	0.0%	0.0%	
$4,999	Column %	4.7%	0.9%	0.9%	0.0%	0.0%	0.0%	1.5%
$5,000	Count	16	7	2	1	0	0	26
to	Row %	61.5%	26.9%	7.7%	3.8%	0.0%	0.0%	
$9,999	Column %	9.4%	2.0%	1.8%	1.0%	0.0%	0.0%	3.4%
$10,000	Count	24	14	0	1	0	0	39
to	Row %	61.5%	35.9%	0.0%	2.6%	0.0%	0.0%	
$14,999	Column %	14.0%	4.1%	0.0%	1.0%	0.0%	0.0%	5.0%
$15,000	Count	16	27	6	2	2	1	54
to	Row %	22.5%	47.9%	11.1%	3.7%	3.7%	1.9%	
$19,999	Column %	9.4%	7.8%	5.4%	2.0%	4.8%	14.3%	7.0%
$20,000	Count	24	27	9	8	3	1	72
to	Row %	33.3%	37.5%	12.5%	11.1%	4.2%	1.4%	
$24,999	Column %	14.0%	7.8%	8.1%	8.0%	7.1%	14.3%	9.3%
$25,000	Count	16	34	11	7	3	0	71
to	Row %	22.5%	47.9%	15.5%	9.9%	4.2%	0.0%	
$29,999	Column %	9.4%	9.9%	9.9%	7.0%	7.1%	0.0%	9.2%
$30,000	Count	13	13	5	8	2	0	41
to	Row %	31.7%	31.7%	12.2%	19.5%	4.9%	0.0%	
$34,999	Column %	7.6%	3.8%	4.5%	8.0%	4.8%	0.0%	5.3%
$35,000	Count	14	31	5	11	3	0	64
to	Row %	21.9%	48.4%	7.8%	17.2%	4.7%	0.0%	
$39,999	Column %	8.2%	9.0%	4.5%	11.0%	7.1%	0.0%	8.3%

(Table continues on next page)

Table III-1 (Continued)
Household Size by Income (Completed Households=775)

Income		HH Size 1	2	3	4	5	6+	Total
$40,000	Count	9	32	15	10	8	0	74
to	Row %	12.2%	43.2%	20.3%	13.5%	10.8%	0.0%	
$44,999	Column %	5.3%	9.3%	13.5%	10.0%	19.0%	0.0%	9.5%
$45,000	Count	6	30	12	12	1	3	64
to	Row %	9.4%	46.9%	18.8%	18.8%	1.6%	4.7%	
$49,999	Column %	3.5%	8.7%	10.8%	12.0%	2.4%	42.9%	8.3%
$50,000	Count	7	12	4	14	7	0	44
to	Row %	15.9%	27.3%	9.1%	31.8%	15.9%	0.0%	
$54,999	Column %	4.1%	3.5%	3.6%	14.0%	16.7%	0.0%	5.7%
$55,000	Count	4	16	10	4	5	1	40
to	Row %	10.0%	40.0%	25.0%	10.0%	12.5%	2.5%	
$59,999	Column %	2.3%	4.7%	9.0%	4.0%	11.9%	14.3%	5.2%
$60,000	Count	2	46	20	12	5	0	85
to	Row %	2.4%	54.1%	23.5%	14.1%	5.9%	0.0%	
$100,000	Column %	1.2%	13.4%	18.0%	12.0%	11.9%	0.0%	11.0%
more	Count	0	20	8	2	0	1	30
than	Row %	0.0%	66.7%	23.3%	6.7%	0.0%	3.3%	
$100,000	Column %	0.0%	5.8%	6.3%	2.0%	0.0%	14.3%	3.9%
	Count	12	32	4	8	3	0	59
Refused	Row %	20.3%	54.2%	6.8%	13.6%	5.1%	0.0%	
	Column %	7.0%	9.3%	3.6%	8.0%	7.1%	0.0%	7.6%
Column	Count	171	344	111	100	42	7	775
Total	%	22.1%	44.4%	14.3%	12.9%	5.4%	0.9%	100.0%

Table III-2
Household Size by Number of Vehicles Available
(Completed Households=775)

Vehicles		HH Size 1	2	3	4	5	6+	Row Total
None	Count	19	2	0	0	0	0	21
	Row %	90.5%	9.5%	0.0%	0.0%	0.0%	0.0%	
	Column %	11.1%	0.6%	0.0%	0.0%	0.0%	0.0%	2.7%
1	Count	102	55	14	4	3	1	179
	Row %	57.0%	30.7%	7.8%	2.2%	1.7%	0.6%	
	Column %	59.6%	16.0%	12.6%	4.0%	7.1%	14.3%	23.1%
2	Count	34	169	44	42	18	2	309
	Row %	11.0%	54.7%	14.2%	13.6%	5.8%	0.6%	
	Column %	19.9%	49.1%	39.6%	42.0%	42.9%	28.6%	39.9%
3	Count	11	70	30	30	17	2	157
	Row %	7.0%	44.6%	19.1%	19.1%	8.9%	1.3%	
	Column %	6.4%	20.3%	27.0%	30.0%	33.3%	28.6%	20.3%
4	Count	2	30	16	14	5	1	68
	Row %	2.9%	44.1%	23.5%	20.6%	7.4%	1.5%	
	Column %	1.2%	8.7%	14.4%	14.0%	11.9%	14.3%	8.8
5 or more	Count	3	18	7	10	2	1	41
	Row %	7.3%	43.9%	17.1%	24.4%	4.9%	2.4%	
	Column %	1.8%	5.2%	6.3%	10.0%	7.2%	14.3%	5.3%
Refused	Count	0	0	0	0	0	0	0
	Row %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
	Column %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Column Total	Count	171	344	111	100	42	7	775
	%	22.1%	44.4%	14.3%	12.9%	5.4%	0.9%	100.0%

Table III-3
Dwelling Type (All Housing Units)

Type of Dwelling	Recruited Households (n=1208)	Completed Households (n=775)	Census Data (n=35,928)
Single, Detached	78.1%	78.1%	66.0%
Multi Unit	8.0%	8.1%	12.9%
Mobile Home or Trailer	11.8%	11.6%	20.6%
Other	2.0%	2.1%	0.5%
Refused	0.1%	0.1%	–

Table III-4
Owner/Renter Status (Occupied Housing Units)

Ownership Status	Recruited Households (n=1208)	Completed Households (n=775)	Census Data (n=29,217)
Own	76.7%	77.7%	71.0%
Rent	22.9%	22.1%	29.0%
Other	0.1%	0.1%	–
Refused	0.3%	0.1%	–

IV Person Characteristics

The following tables provide information about the respondents themselves. Where available, collected data is compared to Census Data.

Table IV-1
Gender

Gender	Recruited Percentage (n=3,013)	Completed Percentage (n=1,848)	Census Data (n=74,958)
Male	50.6%	50.6%	50.0%
Female	49.3%	49.4%	50.0%
Refused	0.1%	0.0%	–

Table IV-2
Age of Household Members

Age	Recruited Percentage (n=3,013)	Completed Percentage (n=1,848)	Census Data (n=74,958)
0-4	6.1%	6.4%	6.9%
5-9	7.5%	7.2%	7.5%
10-14	7.4%	6.3%	7.3%
15-19	6.0%	5.1%	6.3%
20-24	5.3%	5.0%	5.0%
25-34	13.5%	14.3%	15.1%
35-44	16.4%	15.1%	17.7%
45-54	14.8%	16.0%	11.1%
55-64	10.2%	11.1%	9.0%
65-74	8.2%	8.9%	8.8%
75+	4.0%	4.4%	5.1%
Refused	0.6%	0.2%	–

Table IV-3
Licensed Drivers by Persons

License Status	Recruited Percentage (n=3,013)	Completed Percentage (n=1,848)	Census Data
Licensed	74.0%	75.9%	–
Non-Licensed	4.9%	4.1%	–
Not Applicable (under 15 years of age)	21.1%	20.0%	–
Refused	0.0%	0.0%	–

Table IV-4
Employment Status by Persons 16 and older

Employment Status	Recruited Percentage (n=2,334)	Completed Percentage (n=1,455)	Census Data (n=57,230)
Employed	67.0%	66.9%	62.7%
Unemployed	6.8%	5.5%	3.2%
Not in Labor Force	26.1%	27.5%	34.1%
Refused	0.1%	0.1%	–

Table IV-5
Telecommute Status by Employed Persons

Telecommute to Work?	Recruited Percentage (n=1,563)	Completed Percentage (n=972)	Census Data
Yes	7.9%	8.0%	–
No	91.9%	91.9%	–
Refused	0.2%	0.1%	–

Table IV-6
Shift or Flexible Work Schedule by Employed Persons

Shift or Flexible Work Schedule	Recruited Percentage (n=1,563)	Completed Percentage (n=972)	Census Data
Yes	32.0%	31.9%	–
No	28.9%	28.0%	–
Refused	39.1%	40.1%	–

Table IV-7
Length of Employment by Employed Persons

Length of Employment	Recruited Percentage (n=1,563)	Completed Percentage (n=972)	Census Data
Less than 1 year	17.3%	17.5%	–
1 - 1.9 years	12.2%	10.7%	–
2 - 2.9 years	11.2%	10.8%	–
3 - 3.9 years	6.5%	6.5%	–
4 - 4.9 years	5.6%	6.2%	–
5 or more years	42.7%	41.9%	–
Refused	4.4%	6.5%	–

Table IV-8
Student Status by Full- or Part-Time Schedule
Persons 3 years and older

Student Status	Recruited Percentage (n=2,902)	Completed Percentage (n=1,778)	Census Data (n=71,764)
Not Enrolled	74.0%	75.8%	74.7%
Part-Time Student	5.8%	6.1%	
Full-Time Student	20.1%	17.9%	25.3%
Refused	0.1%	0.2%	–

Table IV-9
Educational Attainment by Persons 25 years and older

Educational Attainment	Recruited Percentage (n=2,020)	Completed Percentage (n=1,291)	Census Data
None through 4th Grade	0.0%	0.0%	
5th through 7th Grade	0.3%	0.3%	
8th Grade	0.8%	0.7%	-
9th through 11th Grade	4.4%	3.8%	-
12th Grade	29.5%	27.8%	-
College Freshman to Junior	29.4%	29.9%	-
College Senior	19.8%	20.9%	-
Post Graduate Work	13.9%	14.7%	-
Refused	1.9%	1.9%	–

Table IV-10
Ethnicity by Person

Ethnicity	Recruited Percentage (n=3,013)	Completed Percentage (n=1,848)	Census Data (n=74,958)
White, Not Hispanic	95.6%	94.7%	96.1%
Black, Not Hispanic	0.1%	0.2%	0.2%
American Indian, Eskimo or Aleutian, Not Hispanic	1.1%	1.3%	1.1%
Asian or Pacific Islander, Not Hispanic	0.5%	0.7%	0.6%
Other Race, Not Hispanic	0.8%	1.0%	0.0%
Hispanic (Any Race)	1.2%	1.2%	2.0%
Refused	0.7%	0.9%	–

Table IV-11
Disability Status of Persons 16 years and Older

Disability Status	Recruited Percentage (n=2,334)	Completed Percentage (n=57,584)	Census Data (n=57,230)
With a mobility or self-care limitation	4.0%	3.8%	4.1%
Without a mobility or self-care limitation	95.8%	96.0%	95.9%
Refused	0.2%	0.2%	–

V Travel Characteristics

Respondents were asked to record all activities over a two-day period. In this report, activity data is reported for the 775 households in the Deschutes County study. An average of 65.08 activities were reported by these households for the two-day period. As shown in Table V-1, the most frequently named activities are trips, meals, sleep, amusements (at home), personal hygiene, and work.

The mean number of activities per household for Day 1 is 32.68 and for Day 2 is 32.42. The relatively small difference between the number of activities reported for each day indicates that the two-day diary worked as planned.

While the diaries focused on respondent activities, information on person trips made in conjunction with those activities was also gathered. The mean number of person trips per household was 14.77 for the two-day period. The mean number of trips for Day 1 was 7.41, and similarly an average of 7.37 trips were made per household on Day 2. The average daily trip rate by household size is shown in Table V-2.

The majority of zero-trip households and households with only one to nine trips had an average income of less than $40,000. Households with incomes over $40,000 had higher trip rates. These data are shown in Table V-3.

Table V-4 compares household size and trip rates. Smaller households generated fewer trips than larger households. For example, the majority of zero-trip households are households with less than three members, and there are no households with fewer than four members that had 50 or more trips. This data is shown in Table V-4.

Respondents were asked to record mode usage for each trip taken. Of the 50,439 activities reported by respondents (shown in Table V-1), 38,994 took place at home or had no travel associated with them. For the remaining activities, the travel modes used in accessing the activities are shown in Table V-5.

Table V-6 shows average reported trip times by mode. Private vehicle trips were, on average, the shortest. Walking trips and bicycle trips were similar in length, averaging about 18 minutes each. Trips recorded as "other", often out of the area, took the longest and were approximately 156 minutes in length. School bus trips were approximately 26 minutes long. Public bus trips lasted approximately 33 minutes.

Table V-1
Activities by Type (n=50,439)

Activity	Frequency	Percent
Trip	11,445	22.69%
Meals	8,418	16.69%
Sleep	7,221	14.32%
Personal Hygiene	4,074	8.08%
Work/Work-related activities	2,994	5.94%
Rest and Relaxation	1,240	2.46%
School	1,519	3.01%
Shopping	1,065	2.11%
Visiting	649	1.29%
Pick-up/Drop-off Passengers	927	1.84%
Household Obligations/Childrearing	639	1.27%
Exercise/Athletics	374	0.74%
Hobbies	268	0.53%
Tag-along	101	0.20%
Pet Care	122	0.24%
Amusements (at home)	5,254	10.42%
Amusements (out of home)	312	0.62%
Religion/Civil Services	87	0.17%
Out of area	127	0.25%
Civic	106	0.21%

Table V-1 (Continued)
Activities by Type (n=50,439)

Activity	Frequency	Percent
Medical Care	133	0.26%
Personal Services	31	0.06%
Casual Entertaining	16	0.03%
Culture	4	0.01%
Household/Personal Business	1,176	2.33%
Professional Services	4	0.01%
Household Maintenance	1,938	3.84%
Spectator at Athletic Events	15	0.03%
Incidental	51	0.10%
Wait on Plane	10	0.02%
Wait on Bus	113	0.22%
Formal Entertaining	6	0.01%

Table V-2
Average 1-Day Household Trip Rate
by Household Size

Household Size	Average Daily Trips
One	3.40
Two	5.84
Three	8.80
Four	13.11
Five	17.23
Six or more	17.72

Table V-3
2-Day Household Trips by Household Income (n=775)

Number of Trips		Income Under $40,000	Income Over $40,000	Refused	Total
none	Count	30	15	5	50
	Row %	60.0%	30.0%	10.0%	
	Column %	7.9%	4.5%	8.5%	6.5%
1 to 9	Count	146	80	18	244
	Row %	59.8%	32.8%	7.4%	
	Column %	38.5%	23.7%	30.5%	31.5%
10 to 19	Count	133	123	25	281
	Row %	47.3%	43.8%	8.9%	
	Column %	35.1%	36.5%	42.4%	36.3%
20 to 29	Count	49	64	6	119
	Row %	41.2%	53.8%	5.0%	
	Column %	12.9%	19.0%	10.2%	15.4%
30 to 39	Count	13	29	5	47
	Row %	27.7%	61.7%	10.6%	
	Column %	3.4%	8.6%	8.5%	6.1%
40 to 49	Count	6	16	0	22
	Row %	27.3%	72.7%	0.0%	
	Column %	1.6%	4.7%	0.0%	2.8%
50 to 59	Count	1	7	0	8
	Row %	12.5%	87.5%	0.0%	
	Column %	0.3%	2.1%	0.0%	1.0%
60 to 69	Count	0	1	0	1
	Row %	0.0%	100.0%	0.0%	
	Column %	0.0%	0.3%	0.0%	0.1%
more than 70	Count	1	2	0	3
	Row %	33.3%	66.7%	0.0%	
	Column %	0.3%	0.6%	0.0%	0.4%
Total	Count	379	337	59	775
	Row %	48.9%	43.5%	7.6%	100.0%

Table V-4
2-Day Household Trips by Household Size (n=775)

Number of Trips		HH Size 1	2	3	4	5	6+	Total
none	Count	19	25	5	0	1	0	50
	Row %	38.0%	50.0%	10.0%	0.0%	2.0%	0.0%	
	Column %	11.1%	7.3%	4.5%	0.0%	2.4%	0.0%	6.5%
1 to 9	Count	110	112	12	8	2	0	244
	Row %	45.1%	45.9%	4.9%	3.3%	0.8%	0.0%	
	Column %	64.3%	32.6%	10.8%	8.0%	4.8%	0.0%	31.5 %
10 to 19	Count	39	161	52	23	6	0	281
	Row %	13.9%	57.3%	18.5%	8.2%	2.1%	0.0%	
	Column %	22.8%	46.8%	46.8%	23.0%	14.3%	0.0%	36.3%
20 to 29	Count	3	42	31	30	11	2	119
	Row %	2.5%	35.3%	26.1%	25.2%	9.2%	1.6%	
	Column %	1.8%	12.2%	27.9%	30.0%	26.2%	28.6%	15.4%
30 to 39	Count	0	3	9	24	8	3	47
	Row %	0.0%	6.4%	19.1%	51.1%	17.0%	6.3%	
	Column %	0.0%	0.9%	8.1%	24.0%	19.0%	42.9%	6.1%
40 to 49	Count	0	1	2	12	6	1	22
	Row %	0.0%	4.5%	9.1%	54.5%	27.3%	4.5%	
	Column %	0.0%	0.3%	1.8%	12.0%	14.3%	14.3%	2.8%
50 to 59	Count	0	0	0	3	4	1	8
	Row %	0.0%	0.0%	0.0%	37.5%	50.0%	12.5%	
	Column %	0.0%	0.0%	0.0%	3.0%	9.5%	14.3%	1.0%
60 to 69	Count	0	0	0	0	1	0	1
	Row %	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
	Column %	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.1%
more than 70	Count	0	0	0	0	3	0	3
	Row %	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
	Column %	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	0.4%
Total	Count	171	344	111	100	42	7	775
	Row %	22.1%	44.4%	14.3%	12.9%	5.4%	0.9%	100.0%

Table V-5
Trip Mode (n=11,445)

Mode	Percent
Private Vehicle	88.3%
Walk	6.5%
Bicycle	0.8%
School Bus	4.0%
Public Bus	0.2%
Other	0.2%

Table V-6
Average "Reported" Household Trip Times by Mode (n=11,445)

Mode	Mean Trip Length (min.)
Private Vehicle	16.50
Walk	17.78
Bicycle	17.90
School Bus	26.35
Public Bus	32.80
Other (Airplane, etc.)	155.96

VI Item Non-Response

The following tables show the item non-response for questions contained on the recruitment instrument. The non-response rate is the percentage of respondents who did not provide an answer to the item. As indicated in the tables below, all efforts were to minimize non-response.

Table VI-1
Percent Item Non-Response - Household Questions (n=1,208)

Household Variables	Percent Non-Response
Household Size	0.0%
Household Vehicles	0.0%
Home Ownership	0.3%
Dwelling Type	0.1%
Household Income	12.8%

Table VI-2
Percent Item Non-Response - Person Questions (n=3,013)

Household Variables	Percent Non-Response
Relation to Head of House	0.0%
Age	0.6%
Race	0.7%
Drivers License Status	0.0%
Employment Status	0.1%
Occupation	3.4%
Industry	1.8%
Shiftwork	39.1%
Years at Work Site	4.4%
Student Status	0.1%
Student Level - Head of House	1.2%
Student Level - Others	0.3%
Disability	0.1%

TECHNICAL REPORT OF METHODS

I Sample Design

Eight (8) independent samples were drawn to represent the non-MPO areas of Oregon. The universe for the household activity survey consists of households in the Counties of Clatsop, Coos, Deschutes, Josephine, Klamath, Lincoln, Malheur, and Umatilla. The geographic distribution of the survey sites is shown on the map (Figure 1).

A household was defined as "all persons currently living in the same dwelling who typically share meals together as well as share at least a part of their income." This definition therefore defines roommates, who only share expenses, or children away at college, as separate households. The size of the total universe was defined by the total number of households in the study area. There were 163,280 households in the study area; the household counts are projected by annual growth rates from 1994 and/or 1995 commercial estimates. Due to the nature of the sampling frame requested in the survey proposal, non-telephone households were excluded from the sample.

The following sections summarize the distribution of households in the counties targeted for inclusion in the non-MPO study.

Clatsop County

Includes the city of Astoria and the adjacent (less than 7 miles from city center) communities of Seaside, Warrenton, and Hammond. These communities together are defined by zip codes 97103, 97138, 97146, and 97121. Together, this will include 96% of the county's households and be a small contiguous geographic area.

Coos County

Includes the cities of Coos Bay and North Bend as defined by zip codes 97420 and 97459. The Coos Bay zip also includes adjacent areas of Sumner, Millington, Charleston, and Coaledo. This includes 65% of the county's households and is restricted to the Coos Bay urban area.

Josephine County

Includes the Grants Pass zip codes (97526 and 97527). This covers 76% of the county's households.

Klamath County

Includes only Klamath Falls (two zip codes; 97603 and 97601). This covers 76% of the county's households.

Deschutes County

Includes the Bend, Redmond, Sisters, Terrebonne area. Entire area is very high growth. The six zip codes of 97701, 97702, 97707, 97756, 97759, and 97760 will cover 94% of the county's households.

Umatilla County

Includes Pendleton-Hermiston Corridor (97801,97838) and covers 60% of the county's households.

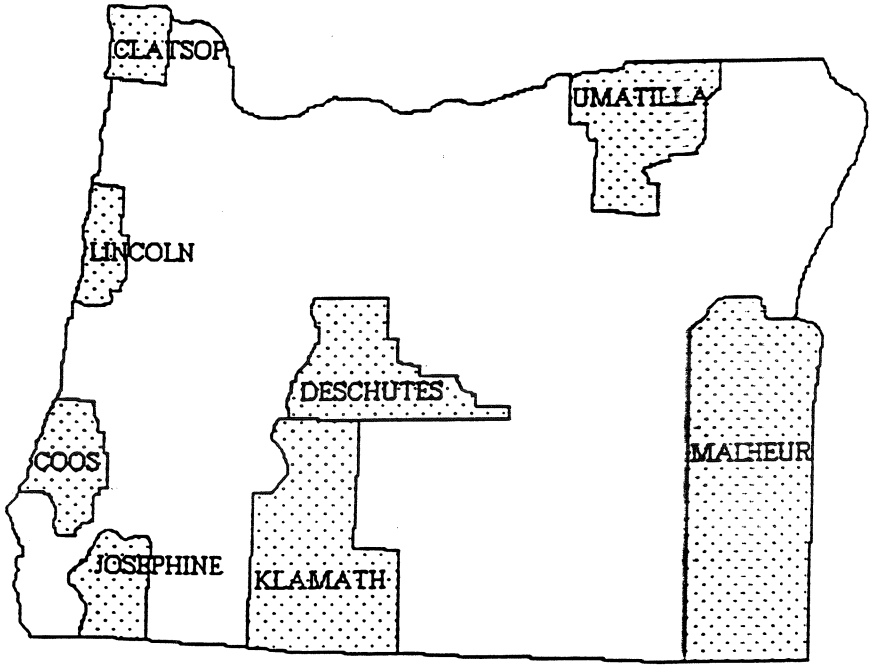
Malheur County

Only includes Ontario (97914) but covers 69% of the county's households.

Lincoln County

Includes the cities of Newport (97365, 97366), Lincoln City (97367), and Depoe Bay (97341). These zip codes cover 58% of the households in the county.

Figure 1
Map of Survey Sites



Sample Size

The proposed sample size for the 1996 Oregon Travel Behavior Survey was 3,400 households with complete activity and travel information. The sample was stratified by county and within counties by zip code, with a disproportionate distribution of completes across the counties. The goals by county are shown in Table 1.

The estimated sample requirements for each county are listed in Table 2. The sample requirements took into account the unlisted phone rate, the rate of working phone numbers (both listed and random), the geographic hit rate (the rate at which phone numbers will be located in the desired county), and the response rate anticipated. Additionally, some degree of attrition was expected in terms of households that move in mid-survey process, deaths, and uncooperative response to the second part of the survey (approximately 30 percent). To account for these factors, NuStats determined that the number of desired recruited households was 5,030 and that approximately 16,000 sample pieces would be generated.

Table 1
Areas to be Sampled

Sample	Size	County	City	Zip
1	400	Clatsop	Astoria	97103
			Seaside	97138
			Warrenton	97146
			Hammond	97121
2	400	Lincoln	Lincoln City	97368, 97367
			Depoe Bay	97341
			Newport	97365,97366, 97391
3	400	Coos	Coos Bay	97420
			North Bend	97459
4	400	Josephine	Grants Pass	97526, 97527
5	400	Klamath	Klamath Falls	97603, 97601
6	800	Deschutes	Bend	97701, 97702, 97707
			Redmond	97756
			Sisters	97759
			Terrebonne	97760
7	300	Umatilla	Pendleton	97801
			Hermiston	97838
8	300	Malheur	Ontario	97914

Table 2
Estimated Sample Requirements

County	Total	Recruitment Needs	Unlisted Phone Rate	Working Listed Rate	Working Random Rate	Geo-Hit Rate Listed	Geo-Hit Rate Random	Response Rate	Required Total	Required Listed	Required Random
Clatsop	400	592	14.9%	85%	65%	90%	60%	55%	1,922	1,625	285
Lincoln	400	592	11.6%	85%	65%	90%	60%	55%	1,914	1,680	221
Coos	400	592	38.0%	85%	65%	90%	60%	55%	1,914	1,179	722
Josephine	400	592	32.3%	85%	65%	90%	60%	55%	1,914	1,287	614
Klamath	400	592	29.7%	85%	65%	90%	60%	55%	1,914	1,336	565
Deschutes	800	1,182	23.8%	85%	65%	90%	60%	55%	3,821	2,898	905
Umatilla	300	444	25.8%	85%	65%	90%	60%	55%	1,435	1,058	368
Malheur	300	444	17.5%	85%	65%	90%	60%	55%	1,435	1,176	250
Total	3,400	5,030	24.2%	85%	65%	90%	60%	55%	16,267	12,239	3,930

II Instrument and Materials Design

The design of data collection instruments and related materials was a critical stage of the data collection process. As a result, careful consideration was given during the design phase to establishing the relevancy of the project in the mind of the respondents and to ensuring that all materials were clear and easy to use. The following sections describe the instrument and materials design.

Press Release

In coordination with ODOT's communication staff, a press release was prepared that provided general information about the household survey to the public, media, and local officials in each of the study areas. A contact telephone number for the project principal and project manager was made available to answer questions from the public, media, and local officials, as necessary.

Advance Letter

In coordination with ODOT, NuStats prepared an advance letter printed on ODOT letterhead and signed by an ODOT official and the NuStats project manager. The purpose of the advance letter was to establish the relevancy of the project in the mind of prospective participants. The letter was mailed to all listed sample households, (i.e., those telephone numbers for which an address was known prior to contact), at least seven days prior to the initial recruitment contact. Letters were mailed from the offices of NuStats' Oregon-based mailing subcontractor to ensure an in-state postmark.

Recruitment Instrument

The interview script was designed to provide the respondent with the name of the sponsoring agency, the purpose and anticipated benefits of the study, and an indication of the tasks that the household would be expected to perform. Computer-assisted telephone interviewing (CATI) was used during the recruitment phase to facilitate data collection. The data elements collected include the following:

- Number of vehicles owned
- Vehicle make
- Vehicle model
- Vehicle fuel type
- Is vehicle replacement or addition
- Household size
- Household member (HHM) relation
- HHM Gender
- HHM Age
- HHM Licensed to drive
- HHM Employment status
- HHM Occupation
- HHM Industry
- HHM Telecommuting status
- HHM uses shift or flexible work schedule
- HHM Length of employment
- HHM Work address
- HHM student status
- HHM School name, location
- HHM School type
- HHM Educational attainment
- HHM Race, Ethnicity
- HHM Disability
- Type of dwelling
- Own/buying or rent home
- Household income (or income range)
- Address verification
- Phone number verification

Diary Log

The travel diaries used for the study were specially designed to aid in the recording and retrieval of activity data. In order to facilitate carrying of the diary on the respondent's travel days, the diary was produced as a 4★ x 8★ pamphlet. Respondents were asked to record all activities during a 48-hour period. Space was available on the personal travel dairy for recording up to 18 activities per day. Additional space was available in the back of the diary for notes. The following information was collected on each activity:

- Description of the activity
- Location of the activity (exact address and/or cross streets)
- Start and end times
- Whether or not the activity included or required a trip
- Mode of travel

Retrieval Instrument

NuStats prepared a paper-and-pencil instrument to retrieve the activity and travel information from respondents. The retrieval instrument was designed to follow the same format as the activity diary to facilitate the recording of travel data. Household, person and vehicle information collected during the recruitment interview was reprinted on the retrieval instrument for reference by the interviewer.

The retrieval instrument consisted of two forms: a household information sheet and an activity data sheet. The household information sheet contained four main sections. The first section included a label containing the household information, including the respondent name that the package was addressed to, the household address, telephone number, income level, and scheduled travel date. The second section contained a label including information about each person in the household. This label included items such as each household member's name, age, and gender. The third section contained a label including information about the vehicles available to the household. The label included the year, make, model, and fuel type usage of each vehicle. The fourth section included result codes for calling attempts and a household contact record section. This section included space for the date, time, interviewer initial, result code, and special contact notes for each call attempt.

III Data Collection Procedures

Before interviewers were placed on the phone, they went through a general training and orientation to the survey profession that was presented by NuStats field services manager who has nearly 10 years of experience. Subsequent to this training, they were placed on the phones in a probationary status. With probation, their work was strictly monitored both in real-time during their interviews and subsequently, with a detailed and thorough edit of their work. They received re-training as necessary during this probationary period.

Prior to the start of this project, all surveyors received a project specific briefing prepared and given by the project manager. For this project, the briefing lasted from 4 to 8 hours. The briefings included several activities that are aimed at familiarizing interviewers with the geographical areas they are calling. They had access to maps of each of the survey geographies. These maps were strategically placed on walls in the field room. Local place name lists (organized for quick reference) were produced and made available to all surveyors and editors.

Recruitment

Attempts were made to recruit households approximately ten days prior to their assigned travel days. Recruitment calls were timed to be placed after the receipt of the advance letter and sufficiently in advance of the desired travel days to allow for the mailing of the travel diary and related materials. Up to six attempts were made to contact each household before a final disposition was made. The CATI system technology delivered sample and recorded the disposition of each call attempt, which assisted with managing the sample. Once contact was made, recruiters asked to speak to a head of the household. Following the initial recruitment script, interviewers invited the household to participate. Once the household spokesperson

agreed, recruiters collected demographic information about the persons in the household and informed the respondent of the specified days for survey participation. They were also informed that they would receive a packet of materials including travel diaries before their specified travel dates.

Mail Survey Materials

Within three days following recruitment, each household that agreed to participate in the survey was mailed a packet of survey materials. The home address information for each household that agreed to participate in the study was reviewed the morning after data collection to check for incomplete information and obvious misspellings. Each mailing label contained the following information: Household Informant Name, Street Address, City, State, Zip, Sample Number, Household Size, and Cohort Number. The sample number was a unique number assigned to each telephone number (i.e., household) in the sampling frame. The household size indicated the number of persons in the household. The number was referenced when packaging to assure that there were enough activity diaries included for each household member. The cohort number referred to a household's assignment to specific travel days. Any problems spotted by the technical clerk were corrected directly in the recruitment data file, and address labels for each recruited household were produced.

NuStats Oregon-based mailing subcontractor prepared the packets for each recruited household. Each package contained the following materials:

- Cover letter (on top)
- A brief brochure containing answers to commonly asked questions
- "How to Complete the Diaries" instruction sheet
- Trip Diaries (one for each household member)
- Reminder Flyer
- A pre-addressed, pre-paid envelope to mail back the diaries.

Quality control steps on the packaging included a review of the package contents by the mailing subcontractor and tracking of returned packages. Any returned packages were tracked by sample number. A list of returned sample numbers (along with associated names, phone numbers, and cohort numbers) was produced daily. This list was provided to the interviewing shift supervisor who ensured that the information was corrected, each household's travel day rescheduled, and a new package sent.

Reminder Call

In order to maximize the number of completed households, each recruited household received a reminder call the night before their scheduled travel date. This phone call was also used to ensure that the packet of survey materials had been received, to answer any additional questions regarding the study and to again remind the household members to record their activities/trips on their travel days.

Retrieval of Travel Information

Immediately following each household's designated travel day, a NuStats interviewer contacted the household to collect the travel information. Efforts were made to collect the data as soon as possible after the travel day as to ensure that the data was "fresh." In the event that a household could not be reached within a recall time period (usually one week), the household was rescheduled for another travel day. Collection of activity and travel data consisted of a structured interview with the original respondent who was recruited and/or other adults in the household as needed. The interview was recorded with paper and pencil on a specially designed instrument that guided the interviewer to probe for the specific data elements.

The interview began by verifying household demographic data. Thereafter, the interviewer guided the respondent to provide his/her activities for the 48-hour period, using the diaries as a guide. Where possible and appropriate, the interviewer attempted to speak with other persons in the household and collect each individual's activity information. In the event such reporting was not possible, the adult head of household spokesperson who had initially been recruited read from diaries or obtained information directly from the other household member.

Individuals who had not received their materials were rescheduled for a new travel day. In certain instances individuals who had misplaced or discarded their diaries were guided through an exercise of recalling specific activities for a 48-hour period that had occurred within the previous 3 days.

At the end of the retrieval interview, respondents are informed to return their diaries in the pre-paid business reply envelope. They are informed to hang on to them for a few days before dropping them into the mail in case any clarification of correction follow-up calls are made in the next few days.

IV Data Production Procedures

Editing and Coding of Data

In the process of editing, a review of respondents' answers in the travel information retrieval was made to reduce errors, inconsistencies, and incomplete responses in each questionnaire. The goal in the editing process was to do this while at the same time preserving the meaning and integrity of the collected data. To achieve the above goals, each retrieval questionnaire was checked for the following:

- Omissions
- Logical consistency
- Legibility and/or clarity.

Omissions. The initial step in the editing process was to check each form to ensure that no data were omitted because of interviewer error or data unavailability. First, the data retrieval form was checked to see that interviewers completely filled out each section. All activities were checked for location information, including exact address, cross-streets, or a nearby landmark. Because of geo-coding requirements, postal route or PO Box numbers were not accepted in lieu of a street address. Address fields with postal route information were verified to ensure that an address could not be gamered (i.e., partial addresses).

Correction calls were made to retrieve "missing" information unless the information was deduced from elsewhere on the questionnaire. (e.g., if two household members went on the same trip, information for both was reviewed.)

Logical Consistency. It was possible that respondents may have reported conflicting information during the course of an interview. Since the interviewers were not always able to catch these inconsistencies while on the phone, the editors performed quick logic checks. Logic checks relevant to the project were:

- Cross-checking the information about vehicles against the trip information provided.
- Checking that trip information seemed to correspond with the age level of the household member.
- Checking the logical flow of the travel patterns for the day.
- Ensuring that complete trip information was reported for each trip.
- Checking travel patterns and mode choice across all household members for consistency (*e.g.* if the mother reported taking a trip with her daughter, did the daughter's trip record reflect that trip?).

If the questionnaire failed these logic checks, the respondents were called back for corrections.

Checks for Legibility or Clarity. All entries (written or circled responses) were sufficiently legible and unambiguous to allow easy coding and keying. If anything was unclear, it was corrected by the editors.

Data Entry and Tabulations

Data entry involved the transfer of information from retrieval questionnaires into data processing form. Data entry was done within a computer-assisted environment. A customized data entry program was designed that conducted verifications, logical, and consistency checks at the point of entry. Elements of the "programmed" checks included:

- Inputting the sample number only once and person number, day number, and activity numbers automatically increment to decrease data entry errors;

- Only accepting values within the prescribed or pre-assigned range of response categories;
- Only allowing work related activities for employed household members;
- Only allowing licensed household members to be drivers on trips;
- Automated time checks (trip start time could not begin before last trip end).

When the program did not "accept" an entry, the data entry clerk verified and/or corrected information. In addition, a sample of each data entry clerk's work was verified by the data production staff manager. Data tabulations or data checks of recruitment and retrieval data were done on a weekly basis to ensure that the data were consistent and accurate, and to monitor non-response.

V Geographic Coding Procedures

Home Addresses

NuStats performed the geographic coding of home addresses using ESRI's (Environmental Systems Research Institute's) ArcView 2.1 for Windows software product.

Home address geocoding of listed sample (for those records containing addresses prior to recruitment calls) was completed prior to loading the sample into the CATI system for calling attempts. For the listed cases that were not geocodable, they were replaced with new listed sample pieces for which a geocodes could be provided. Geocoding of unlisted sample was done following the recruitment call. If a geocode could not be provided for an address from unlisted sample, it was also replaced with a new record.

Trip Ends

NuStats coordinated the geocoding of trip-ends (activity/trip ending address points) with ODOT staff. Trip-end files were periodically posted on NuStats' BBS as data was collected and entered. ODOT staff would dial in and retrieve the files and perform a first iteration of geocoding efforts. This was done primarily because ODOT staff members are more familiar with the area and could assist in more quickly identifying correct street name spellings, exact addresses using place names, correct intersecting streets for locations, or identifying cross-streets or exact address points for cases where only landmark information was provided.

For cases where a geocode was not obtained during ODOT's initial geocoding efforts, a data file was provided back to NuStats so that more in-depth address research and data cleaning efforts could be done. NuStats' geocoding group would geocode as many of the remaining unmatched address points as possible using the address research tools that were available.

Appendix F

STATE HIGHWAY AND COUNTY ROAD LISTING

Principal Arterials

	Road Name	Location	Mile Point	Total Paved Width	No. of Travel Lanes	Lane Width (feet)	Width of Paved Lanes	Shoulder Width (feet)	Center Median	Median Width
Level of Importance										
Statewide										
#15	OR 126 (MCKENZIE HWY)	HWY 20	92.32	40	2	20.0	40	0.0	NO	
	OR 126	ELM ST.	92.51	48	2	24.0	48	0.0	NO	
	OR 126	LOCUST ST.	92.95	36	2	13.0	26	5.0	NO	
	OR 126	HWY 20	93.08	54	2	13.0	38	3.0	YES	10
	OR 126	GOODRICH RD.	97.47	40	2	12.0	24	8.0	NO	
	OR 126	BUCKHORN RD.	103.72	36	2	12.0	24	6.0	NO	
	OR 126	CLINE FALLS HWY	107.56	36	2	12.0	24	6.0	NO	
	OR 126	HELMHOLTZ WAY	109.64	36	2	12.0	24	6.0	NO	
#41	OR 126 (OCHOCO HWY)	REDMOND CITY LIMITS	2.32	36	2	12.0	24	6.0	NO	
	OR 126	CROOK COUNTY LINE	3.58	36	2	12.0	24	6.0	NO	
#17	US 20 (MCKENZIE-BEND)	OR 126	0.11	32	2	24.0	12	4.0	NO	
	US 20	HARRINGTON LOOP	3.21	32	2	24.0	12	4.0	NO	
	US 20	CLOVERDALE RD.	4.77	32	2	24.0	12	4.0	NO	
	US 20	ROCK ISLAND LANE	6.32	56	4	12.0	48	4.0	NO	
	US 20	FRYREAR RD.	7.87	34	2	12.0	24	5.0	NO	
	US 20	INNES MARKET RD.	9.71	34	2	12.0	24	5.0	NO	
	US 20	TWEED RD.	10.07	34	2	12.0	24	5.0	NO	
	US 20	COUCH MARKET RD.	12.28	54	2	14.0	28	13.0	NO	
	US 20	GERKING MARKET RD.	13.72	44	3	12.0	36	4.0	NO	
	US 20	CLINE FALLS HWY.	14.77	48	2	12.0	24	4.0	YES	16
	US 20	TUMALO STATE PARK	15.75	48	3	12.0	36	6.0	NO	
	US 20	OLD BEND-REDMOND HWY.	16.70	88	4	12.0	48	20.0	NO	
UGB	US 20	COOLEY RD.	17.49	76	3	12.0	36	20.0	NO	
UGB	US 20	ENT. MT. VIEW MALL	18.10	64	2	14.0	28	10.0	YES	16
UGB	US 20	HWY. 97	18.21	24	1	16.0	16	2.0	YES	4
#7	US 20 (MILLICAN-BURNS)	27TH STREET	2.56	46	2	12.0	24	9.0	YES	4
	US 20	ERICKSON RD.	4.55	40	2	12.0	24	8.0	NO	
	US 20	POWELL BUTTE HIGHWAY	4.83	54	2	12.0	24	8.0	YES	14
*	**US 20**	**BEAR CREEK RD. (09-005)**	6.27	40	2	12.0	24	8.0	NO	
	US 20	TEN BARR RD.	8.17	40	2	12.0	24	8.0	NO	
	US 20	DODDS RD.	9.16	40	2	12.0	24	8.0	NO	
	US 20	RICKARD RD.	10.94	40	2	12.0	24	8.0	NO	
	US 20	MILLICAN	25.80	40	2	12.0	24	8.0	NO	
	US 20	OR 27 (CROOKED RIVER HWY)	35.80	40	2	12.0	24	8.0	NO	
	US 20	BROTHERS	43.18	40	2	12.0	24	8.0	NO	
	US 20	LAKE COUNTY LINE	69.25	40	2	12.0	24	8.0	NO	
#16	US 20/126 (SANTIAM HWY.)	JEFFERSON COUNTY LINE	80.77	44	2	12.0	24	4.0	YES	12
	US 20/126	CAMP SHERMAN RD.	90.91	62	2	13.0	26	18.0	NO	
*	**US 20/126**	**BLACK BUTTE RANCH (09-014)**	93.19	50	2	14.0	28	11.0	NO	
	US 20/126	INDIAN FORD RD.	94.91	50	2	14.0	28	5.0	YES	12
	US 20/126	TOLLGATE RD.	98.33	52	2	14.0	28	12.0	NO	
	US 20/126	SANTIAM PASS RD.	99.53	54	2	15.0	30	5.0	YES	14
	US 20/126	MCKENZIE HWY	100.03	64	2	14.0	28	11.0	YES	14
#4	US 97 (DALLES-CALIF. HWY.)	JEFFERSON COUNTY LINE	112.86	52	2	16.0	32	4.0	YES	12
	US 97	"A" AVENUE (TERREBONNE)	115.87	56	2	12.0	24	9.0	YES	14
	US 97	O'NEIL HIGHWAY	118.51	86	4	12.0	48	19.0	NO	
UGB	US 97	KINGWOOD AVE.	120.28	74	4	12.0	48	13.0	NO	
UGB	US 97	S. CANAL BLVD.	121.72	60	4	12.0	48	6.0	NO	

Principal Arterials

	Road Name	Location	Mile Point	Total Paved Width	No. of Travel Lanes	Lane Width (feet)	Width of Paved Lanes	Shoulder Width (feet)	Center Median	Min Width
UGB	US 97	YEW AVE. INTERCHANGE	123.30	78	4	12.0	48	8.0	YES	14
*	**US 97**	**SOUTH OF YEW AVE. (09-020)**	125.00	78	4	12.0	48	8.0	YES	14
	US 97	S.W QUARRY RD.	126.22	78	4	12.0	48	8.0	YES	14
	US 97	DESCHUTES MARKET RD.	130.19	86	4	12.0	48	19.0	NO	
	US 97	NELS ANDERSON PLACE	134.70	74	4	12.0	48	6.0	YES	14
UGB	US 97	NORTH OF HWY. 20 (MERGE)	134.84	44	2	12.0	24	3.0	YES	14
UGB	US 97	SOUTH OF HWY. 20 (MERGE)	135.44	74	4	12.0	48	13.0	NO	
UGB	US 97	SOUTH OF WILSON RD.	138.74	66	4	13.0	52	7.0	NO	
UGB	US 97	SOUTH OF MURPHY RD.	141.52	74	4	12.0	48	6.0	YES	14
*	**US 97**	**LAVA BUTTE (09-003)**	142.27	86	4	12.0	48	12.0	YES	14
	US 97	BAKER RD.	143.47	76	4	12.0	48	12.0	YES	14
	US 97	COTTONWOOD DR.	151.10	40	2	12.0	24	8.0	NO	
	US 97	SOUTH CENTURY DR.	153.09	44	2	12.0	24	8.0	YES	4
	US 97	VANDERVERT RD.	155.51	40	2	12.0	24	8.0	NO	
	US 97	LAPINE STATE REC. RD.	160.60	61	2	12.0	24	18.5	NO	
	US 97	PAULINA LAKE RD.	161.76	54	2	12.0	24	8.0	YES	14
	US 97	BURGESS RD.	165.20	40	2	12.0	24	8.0	NO	
	US 97	1 ST STREET (LAPINE)	167.49	40	2	12.0	24	1.0	YES	14
	US 97	HUNTINGTON RD. (LAPINE)	167.98	66	4	13.0	52	0.0	YES	14
	US 97	SIXTH ST	168.20	66	4	13.0	52	0.0	YES	14
	US 97	OR 31 (FREMONT HWY.)	169.67	48	2	12.0	24	6.0	YES	12
	US 97	KLAMATH COUNTY LINE	172.19	40	2	12.0	24	8.0	NO	
Regional										
#19	OR 31 (FREMONT HWY)	US 97	0.15	32	2	12.0	24	4.0	NO	
	OR 31 (FREMONT HWY)	KLAMATH COUNTY LINE	2.31	32	2	12.0	24	4.0	NO	
District										
#14	OR27 (CROOKED RIVER HWY)	US 20	42.41	gravel	2	10.5	21	0.0	NO	
#15	OR 242 (MCKENZIE HWY)	LINN COUNTY LINE	77.14	34	2	12.0	24	5.0	NO	
	OR 242	BAILEY DITCH RD.	91.28	34	2	12.0	24	5.0	NO	
	OR 242	SISTERS CITY LIMITS	92.20	34	2	12.0	24	5.0	NO	
#370	OR 370 (O'NEIL HWY)	HWY. 97	0.01	22	2	11.0	22	0.0	NO	
	OR 370	N. CANAL BLVD.	0.19	21	2	10.5	21	0.0	NO	
	OR 370	NE 5TH ST.	0.87	22	2	11.0	22	0.0	NO	
	OR 370	NE 17TH ST.	1.62	22	2	11.0	22	0.0	NO	
	OR 370	NE 33RD ST.	2.57	22	2	11.0	22	0.0	NO	
	OR 370	CROOK COUNTY LINE	3.84	22	2	11.0	22	0.0	NO	
#372	OR 372 (CENTURY DR.)	INN OF THE 7TH MTN.	7.14	38	2	13.0	26	6.0	NO	
	OR 372	DILLON FALLS RD.	7.60	36	2	13.0	26	5.0	NO	
	OR 372	KIWA BUTTE RD.	11.96	36	2	12.0	24	6.0	NO	
*	**OR 372**	**ROAD TO SUNRIVER (09-011)**	19.25	60	4	12.0	48	6.0	NO	
	OR 372	MT. BACHELOR	21.96	60	4	12.0	48	6.0	NO	
		Multilane								
		Within UGB								

FOREST HIGHWAYS

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Pavement Condition
Forest Service Arterial												
4107-12		CASCADE LAKES HWY	BEGIN COUNTY MAINT	MILE POST 23	1	60	27	2	11.0	2.5	shoulder	Good
4107-14		CASCADE LAKES HWY	MILE POST 23	TODD LAKE RD 4600-370	0.69	60	27	2	11.0	2.5	shoulder	Good
4107-16		CASCADE LAKES HWY	TODD LAKE RD 4600-370	MILE POST 25	1.31	60	27	2	11.0	2.5	shoulder	Good
4107-18		CASCADE LAKES HWY	MILE POST 25	SPARKS LAKE CG RD 400	0.85	60	27	2	11.0	2.5	shoulder	Good
4107-20		CASCADE LAKES HWY	SPARKS LAKE CG RD 400	GOOSE CREEK XING (CULVERT)	1	60	27	2	11.0	2.5	shoulder	Good
4107-22		CASCADE LAKES HWY	GOOSE CREEK XING (CULVERT)	MILE POST	0.15	60	27	2	11.0	2.5	shoulder	Good
4107-24		CASCADE LAKES HWY	MILE POST	WICKIUP PLAIN TRLHD RD 430	1.46	60	27	2	11.0	2.5	shoulder	Good
4107-26		CASCADE LAKES HWY	WICKIUP PLAIN TRLHD RD 430	MIRROR LAKES TRLHD RD	1.38	60	27	2	11.0	2.5	shoulder	Good
4107-28		CASCADE LAKES HWY	MIRROR LAKES TRLHD RD	QUINN MDW HORSE CAMP RD 450	1.07	60	27	2	11.0	2.5	shoulder	Good
4107-30		CASCADE LAKES HWY	QUINN MDW HORSE CAMP RD 450	MILE POST	0.09	60	27	2	11.0	2.5	shoulder	Good
4107-32		CASCADE LAKES HWY	MILE POST	SUNSET VIEW RD 4625 N	1.32	60	27	2	11.0	2.5	shoulder	Good
4107-34		CASCADE LAKES HWY	SUNSET VIEW RD 4625 N	END RED CINDER OIL MAT	0.36	60	27	2	11.0	2.5	shoulder	Good
4107-36		CASCADE LAKES HWY	END RED CINDER OIL MAT	POINT CG RD	1.04	60	27	2	11.0	2.5	shoulder	Good
4107-38		CASCADE LAKES HWY	POINT CG RD	SIX LAKES TRLHD RD 490	1.05	60	26	2	11.5	1.5	shoulder	Fair
4107-40		CASCADE LAKES HWY	SIX LAKES TRLHD RD 490	MILE POST 36	1.24	60	25	2	11.0	1.5	shoulder	Fair
4107-42		CASCADE LAKES HWY	MILE POST 36	MILE POST 37	1	60	25	2	11.0	1.5	shoulder	Fair
4107-44		CASCADE LAKES HWY	MILE POST 37	LAVA LAKES RD 500	1.07	60	25	2	11.0	1.5	shoulder	Fair
4107-46		CASCADE LAKES HWY	LAVA LAKES RD 500	LUCKY LAKE TRLHD RD 495	0.45	60	25	2	11.0	1.5	shoulder	Fair
4107-54		CASCADE LAKES HWY	MILE POST 43	MILE POST 44	1	60	24	2	11.0	1.0	shoulder	Good
4107-56		CASCADE LAKES HWY	MILE POST 44	FS RD 40	1.39	60	24	2	11.0	1.0	shoulder	Good
4107-58		CASCADE LAKES HWY	FS RD 40	COW MEADOW RD 4600-620	0.62	60	24	2	10.5	1.5	shoulder	Good
4107-60		CASCADE LAKES HWY	COW MEADOW RD 4600-620	CULTUS LK CG & RESORT RD 4635	0.61	60	24	2	10.5	1.5	shoulder	Good
4107-62		CASCADE LAKES HWY	CULTUS LK CG & RESORT RD 4635	QUARRY SITE RD 4630-750	1.67	60	24	2	10.5	1.5	shoulder	Good
4107-64		CASCADE LAKES HWY	QUARRY SITE RD 4630-750	OSPREY PT OBSERVATION SITE	1.03	60	24	2	10.5	1.5	shoulder	Good
4107-66		CASCADE LAKES HWY	OSPREY PT OBSERVATION SITE	ROCK CR CG RD 4600-695	1.1	60	24	2	10.5	1.5	shoulder	Good
4107-68		CASCADE LAKES HWY	ROCK CR CG RD 4600-695	FS RD 4285	1.29	60	24	2	11.0	1.0	shoulder	Good
4107-70		CASCADE LAKES HWY	FS RD 4285	S CENTURY DR (FS RD 42)	1.25	60	24	2	11.0	1.0	shoulder	Good
4107-48		CASCADE LAKES HWY	LUCKY LAKE TRLHD RD 495	FS RD 4600-155	1.02	60	23	2	10.5	1.0	shoulder	Fair
4107-50		CASCADE LAKES HWY	FS RD 4600-155	SNOW GATE	1.24	60	23	2	10.5	1.0	shoulder	Fair
4107-52		CASCADE LAKES HWY	SNOW GATE	MILE POST	1.22	60	23	2	10.5	1.0	shoulder	Fair
4107-74		CASCADE LAKES HWY	MILE POST	QUARRY SITE 1057 W BROWNS CR	0.9	60	30	2	12.0	3.0	shoulder	Good
4107-76		CASCADE LAKES HWY	QUARRY SITE 1057 W BROWNS CR	BROWNS CREEK RD 4280	1.02	60	30	2	12.0	3.0	shoulder	Good
4107-78		CASCADE LAKES HWY	BROWNS CREEK RD 4280	NORTH DAVIS CR CG RD 798	0.98	60	30	2	12.0	3.0	shoulder	Good
4107-80		CASCADE LAKES HWY	NORTH DAVIS CR CG RD 798	FS RD 4600-810	1.35	60	30	2	12.0	3.0	shoulder	Good
4107-82		CASCADE LAKES HWY	FS RD 4600-810	MILE POST	1.75	60	30	2	12.0	3.0	shoulder	Good
4107-84		CASCADE LAKES HWY	MILE POST	END CHIP SEAL	0.74	60	30	2	12.0	3.0	shoulder	Good
4107-86		CASCADE LAKES HWY	END CHIP SEAL	KLAMATH COUNTY LINE	1.13	60	30	2	12.0	3.0	shoulder	Good
4107-72		CASCADE LAKES HWY	S CENTURY DR (FS RD 42)	MILE POST 53	1.04	60	24	2	11.0	1.0	shoulder	Good
Forest Service Collector												
4106-80		BURGESS RD	SUNRISE BLVD	PONDEROSA WAY	1.2	60	28	2	12.0	2.0	shoulder	Good
4106-90		BURGESS RD	PONDEROSA WAY	FS RD (UNKNOWN)	1.13	60	28	2	12.0	2.0	shoulder	Good
4106-92		BURGESS RD	FS RD (UNKNOWN)	FS RD 44	1.13	60	28	2	12.0	2.0	shoulder	Good
4106-94		BURGESS RD	FS RD 44	FS RD 4370	0.64	60	23	2	10.0	1.5	shoulder	Good

FOREST HIGHWAYS

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Pavement Condition
4106-96		BURGESS RD	FS RD 4370	FS RD 4300-722	1.09	60	23	2	10.0	1.5	shoulder	Good
4106-97		BURGESS RD	FS RD 4300-722	FS RD 4380	1.27	60	24	2	10.5	1.5	shoulder	Good
4106-98		BURGESS RD	FS RD 4380	SOUTH CENTURY DR	0.63	60	24	2	10.5	1.5	shoulder	Fair
3388-20		CHINA HAT RD	UGB - BEND	CATTLE GUARD	1	73	25	2	10.0	2.5	none	Good
3388-30		CHINA HAT RD	CATTLE GUARD	END COUNTY MAINT	0.79	66	25	2	10.0	2.5	none	Good
4182-25		PAULINA LAKE RD	PAULINA CREEK BRIDGE	PAULINA PRAIRIE CG	0.21	60	30	2	11.0	4.0	none	Good
4182-30		PAULINA LAKE RD	PAULINA PRAIRIE CG	FS RD 2100-100	1.01	60	27	2	11.0	2.5	none	Good
4182-35		PAULINA LAKE RD	FS RD 2100-100	SIX MILE SNO-PARK	1.35	60	27	2	11.0	2.5	none	Good
4182-40		PAULINA LAKE RD	SIX MILE SNO-PARK	FS RD 9736	0.96	60	28	2	11.0	3.0	none	Good
4182-45		PAULINA LAKE RD	FS RD 9736	FS RD 2100-680	0.81	60	28	2	11.0	3.0	none	Good
4182-50		PAULINA LAKE RD	FS RD 2100-680	FS RD 9736-645	0.56	60	28	2	11.0	3.0	none	Good
4182-53		PAULINA LAKE RD	FS RD 9736-645	EXIT TEN MILE SNO-PARK	1.88	60	28	2	11.0	3.0	none	Good
4182-56		PAULINA LAKE RD	EXIT TEN MILE SNO-PARK	FS RD 9736-580	1.92	60	28	2	11.0	3.0	none	Good
4182-60		PAULINA LAKE RD	FS RD 9736-580	PAULINA CR FALLS PARKING LOT	1.01	60	28	2	11.0	3.0	none	Good
4182-63		PAULINA LAKE RD	PAULINA CR FALLS PARKING LOT	PAULINA LAKE CG	0.4	60	28	2	11.0	3.0	none	Good
4182-66		PAULINA LAKE RD	PAULINA LAKE CG	FS RD 2100-550	1.22	60	28	2	11.0	3.0	none	Good
4182-70		PAULINA LAKE RD	FS RD 2100-550	LITTLE CRATER CG	0.58	60	28	2	11.0	3.0	none	Good
4182-73		PAULINA LAKE RD	LITTLE CRATER CG	FS RD 2100-630	0.88	60	28	2	11.0	3.0	none	Good
4182-76		PAULINA LAKE RD	FS RD 2100-630	FS RD 2100-650	0.46	60	28	2	11.0	3.0	none	Good
4182-80		PAULINA LAKE RD	FS RD 2100-650	EAST LAKE CG	0.78	60	28	2	11.0	3.0	none	Good
4182-83		PAULINA LAKE RD	EAST LAKE CG	FS RD 21	0.99	60	28	2	11.0	3.0	none	Good
4182-86		PAULINA LAKE RD	FS RD 21	END-FS RD 2100-730 (RET OF LP)	1.52	60	28	2	11.0	3.0	none	Good
3535-20		SKYLINERS RD	UGB-BEND	BROOKS-SCANLON LOG OVERPASS	0.75	60	24	2	10.0	1.0	shared	Good
3535-30		SKYLINERS RD	BROOKS-SCANLON LOG OVERPASS	FS RD 4610	1.18	60	24	2	10.0	2.5	shared	Good
3535-40		SKYLINERS RD	FS RD 4610	FS RD 4601-300(CIND SITE 1037)	1.91	60	24	2	10.0	2.0	shared	Good
4112-45		SOUTH CENTURY DR	BRIDGE - DESCHUTES RIVER	FS RD 4220	0.47	60	34	2	12.0	5.0	shared	Good
4112-50		SOUTH CENTURY DR	FS RD 4220	FS RD 4360	1.67	60	21	2	9.5	1.0	shared	Good
4112-55		SOUTH CENTURY DR	FS RD 4360	FS RD 4230	1.29	60	21	2	9.5	1.0	shared	Good
4112-60		SOUTH CENTURY DR	FS RD 4230	FISH HATCHERY RD	0.75	60	21	2	10.0	0.5	shared	Good
4112-65		SOUTH CENTURY DR	FISH HATCHERY RD	FS BOUNDARY	0.8	60	24	2	10.0	2.0	shared	Good
4112-70		SOUTH CENTURY DR	FS BOUNDARY	MILE POINT	0.98	60	24	2	10.0	2.0	shared	Good
4112-75		SOUTH CENTURY DR	MILE POINT	FALL RIVER CAMPGROUND	1.24	60	24	2	10.0	2.0	shared	Good
4112-80		SOUTH CENTURY DR	FALL RIVER CAMPGROUND	FS RD 4240	0.8	60	24	2	10.0	2.0	shared	Good
4112-85		SOUTH CENTURY DR	FS RD 4240	MILE POST 17	0.97	60	24	2	10.0	2.0	shared	Good
4112-90		SOUTH CENTURY DR	MILE POST 17	BURGESS RD (END COUNTY MAINT)	1.89	60	24	2	10.0	2.0	shared	Fair
4192-30		SPRING RIVER RD	FS BOUNDARY	FS RD 41	0.21	60	26	2	11.0	2.0	shoulder	Good

Note: ADT number key is as follows - **BOLD** numbers are actual 1995 counts, non-bold numbers are trending estimates, and *italics* are interpolated or "best guess" estimates.

BOLD text are street segment additions based on review of the current Deschutes County Public Works Road Segment Report dated 12/15/95.

LOS = Estimates based on Highway Capacity Manual calculations assuming 10% of the ADT occur in the peak hour.

Bike Facility Types:	Shared = Shared Roadway (*28' minimum pavement width*)
(*standards*)	Shoulder = Shoulder Bikeway (*4'-6' shoulder if no curb, 5' minmum if curb present*)
	Lane = Bike Lane (*4'-6' lane with 8" stripe*)

Deschutes County

Rural Arterial Roads

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	% No Passing Lanes	Terrain (L,R,M)	Pavement Condition
3154-10		ALFALFA MARKET RD	POWELL BUTTE HWY	BYRAM RD	0.56	60	26	2	9.0	4.0	none	16	80%	R	Good
3154-20		ALFALFA MARKET RD	BYRAM RD	WAUGH RD	1.00	60	26	2	9.0	4.0	none	18	80%	R	Good
3154-30		ALFALFA MARKET RD	WAUGH RD	STENKAMP RD	0.52	60	26	2	11.0	2.0	none		80%	R	Good
3154-40		ALFALFA MARKET RD	STENKAMP RD	DIXON LOOP	0.52	60	26	2	11.0	2.0	none		80%	R	Good
3154-45		ALFALFA MARKET RD	DIXON LOOP	MILE POST	0.41	60	26	2	11.0	2.0	none		80%	R	Good
3154-50		ALFALFA MARKET RD	MILE POST	MILE POST	1.00	60	28	2	11.0	3.0	none		80%	R	Good
3154-60		ALFALFA MARKET RD	MILE POST	MILE POST	1.00	60	26	2	11.0	2.0	none		80%	R	Good
3154-70		ALFALFA MARKET RD	MILE POST	PAVEMENT NARROWS	1.14	60	25	2	10.0	2.5	none		80%	R	Good
3154-80		ALFALFA MARKET RD	PAVEMENT NARROWS	TODD RD	1.48	60	29	2	11.0	3.5	none		80%	L	Good
3154-90		ALFALFA MARKET RD	TODD RD	DODDS RD	0.83	60	22	2	10.0	1.0	none		80%	L	Good
3154-95		ALFALFA MARKET RD	DODDS RD	JOHNSON RANCH RD	1.00	60	21	2	10.0	0.5	none		80%	L	Good
3093-40		BROOKSWOOD BLVD	BUCK CANYON DR	BAKER RD	0.80	60	34	2	11.0	6.0	lane		100%	L	Good
3182-60		BUTLER MARKET RD	UGB - BEND	HAMBY RD	0.26	60	30	2	11.0	4.0	shoulder	19	100%	L	Good
3182-70		BUTLER MARKET RD	HAMBY RD	HAMEHOOK RD	0.48	60	30	2	13.0	2.0	shoulder	21	100%	L	Good
3182-80		BUTLER MARKET RD	HAMEHOOK RD	SILVIS RD	1.00	60	30	2	13.0	2.0	shoulder	21	100%	L	Good
3182-90		BUTLER MARKET RD	SILVIS RD	POWELL BUTTE HWY	1.00	60	30	2	13.0	2.0	shoulder	16	20%	L	Good
2130-35	S	CANAL BLVD	SW 39TH ST	SW HELMHOLTZ WAY	1.18	60	25	2	10.5	2.0	none	8	60%	L	Good
2130-40	S	CANAL BLVD	SW HELMHOLTZ WAY	SW 61ST ST	1.10	60	25	2	10.5	2.0	none		60%	L	Good
2130-45	S	CANAL BLVD	SW 61ST ST	SW YOUNG AVE	1.35	60	24	2	10.0	2.0	none	4	60%	L	Good
2130-50	S	CANAL BLVD	SW YOUNG AVE	SW 93RD ST	1.19	60	24	2	10.0	2.0	none		60%	L	Good
2130-55	S	CANAL BLVD	SW 93RD ST	SW HEREFORD AVE	0.67	60	24	2	10.0	2.0	none		60%	L	Good
2130-60	S	CANAL BLVD	SW HEREFORD AVE	HUNNELL RD	0.91	60	24	2	10.0	2.0	none		60%	L	Good
2130-65	S	CANAL BLVD	HUNNELL RD	TUMALO RD	0.68	60	25	2	10.0	2.5	none		60%	L	Good
3181-10		DESCHUTES MARKET RD	HWY 97	DALE RD	1.00	60	26	2	11.0	2.0	shared	11	60%	R	Fair
3181-20		DESCHUTES MARKET RD	DALE RD	PIONEER LOOP	1.40	60	26	2	11.0	2.0	shared	13	60%	R	Good
3181-30		DESCHUTES MARKET RD	PIONEER LOOP	UGB - BEND	1.39	60	26	2	11.0	2.0	shared	19	60%	R	Good
3181-40		DESCHUTES MARKET RD	UGB - BEND	HAMEHOOK RD	0.25	60	26	2	12.0	1.0	shared	12	100%	L	Good
3181-50		DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	0.27	60	26	2	11.0	2.0	shoulder	19	40%	L	Good
3181-60		DESCHUTES MARKET RD	J D ESTATES DR	YEOMAN RD	0.65	60	26	2	11.0	2.0	shoulder	48	40%	L	Good
3181-70		DESCHUTES MARKET RD	YEOMAN RD	BUTLER MARKET RD	0.61	60	26	2	11.0	2.0	shoulder	22	40%	L	Good
2116-10	SW	HELMHOLTZ WAY	W ANTLER AVE	HWY 126	0.50	60	21	2	10.0	0.5	none		40%	L	Fair
2116-20	SW	HELMHOLTZ WAY	HWY 126	SW OBSIDIAN AVE	0.51	60	24	2	10.0	2.0	none		40%	L	Good
2176-10	NW	HELMHOLTZ WAY	W ANTLER AVE	NW MAPLE AVE	1.02	60	22	2	10.0	1.0	none		80%	R	Fair
3101-10		JOHNSON MARKET RD	BEGIN-END SHEVLIN PARK MKT RD	SADDLEBACK DR S	1.29	60	32	2	12.0	4.0	shared	5	100%	R	Good
3101-30		JOHNSON MARKET RD	SADDLEBACK DR S	TYLER RD	1.20	60	30	2	11.0	4.0	shared	7.5	100%	R	Good
2177-10		LOWER BRIDGE WAY	HWY 97	NW 27TH ST	1.07	60	26	2	11.0	2.0	none	15	40%	L	Fair
2177-20		LOWER BRIDGE WAY	NW 27TH ST	NW 43RD ST	1.11	60	26	2	11.0	2.0	none	15	20%	L	Fair
2177-30		LOWER BRIDGE WAY	NW 43RD ST	NORTHWEST WAY	1.00	60	26	2	11.0	2.0	none	8	20%	L	Fair
2162-50	NW	MAPLE AVE	UGB - REDMOND	NORTHWEST WAY	0.19	60	21	2	10.0	0.5	none		40%	L	
3173-30	NE	NEFF RD	UGB - BEND	HAMBY RD	0.22	60	28	2	12.0	2.0	none	27	100%	R	Good
3173-40	NE	NEFF RD	HAMBY RD	ERICKSON RD	1.00	60	26	2	11.0	2.0	none	8	100%	L	Good
3173-50	NE	NEFF RD	ERICKSON RD	POWELL BUTTE HWY	0.93	60	30	2	13.0	2.0	none	15	20%	R	Good
2178-10		NORTHWEST WAY	NW MAPLE AVE	NW UPAS AVE	1.04	60	33	2	12.5	4	none	15	0%	L	Good
2178-20		NORTHWEST WAY	NW UPAS AVE	NW COYNER AVE	1.09	60	32	2	11.0	5	none		20%	L	Good
2178-30		NORTHWEST WAY	NW COYNER AVE	NW MONTGOMERY DR	1.15	60	22	2	10.0	1	none		60%	L	Fair

Deschutes County

Rural Arterial Roads

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	% No Passing Lanes	Terrain (L,R,M)	Pavement Condition
2178-40		NORTHWEST WAY	NW MONTGOMERY DR	NW ODEM WY.-NW ALMETER WY.	0.40	60	23	2	10.0	2	none		60%	L	Good
3102-40		O B RILEY RD	GLEN VISTA RD	COOLEY RD	0.66	60	36	2	13.0	5.0	lane	29	100%	L	Fair
3102-50		O B RILEY RD	COOLEY RD	OLD REDMOND-BEND HWY	0.59	60	36	2	13.0	5.0	lane	22	100%	L	Good
3102-60		O B RILEY RD	OLD REDMOND-BEND HWY	SUNSET DR	0.46	60	26	2	11.5	1.5	shared	20	100%	L	Good
3102-70		O B RILEY RD	SUNSET DR	TUMALO ST PARK DAY USE RD	0.81	60	20	2	10.0	0.0	shared	10	100%	M	Poor
3102-80		O B RILEY RD	TUMALO ST PARK DAY USE RD	UGB - TUMALO	0.70	60	22	2	11.0	0.0	shared	9	80%	L	Good
2156-10		OLD REDMOND-BEND HWY	TUMALO RD	POHAKU RD	0.50	60	24	2	8.0	4.0	none	12	80%	R	Good
2156-20		OLD REDMOND-BEND HWY	POHAKU RD	ROGERS RD	2.28	60	25	2	8.5	4.0	none	18	80%	R	Good
2156-30		OLD REDMOND-BEND HWY	ROGERS RD	HWY 20	0.30	60	25	2	8.5	4.0	none	17	80%	R	Good
3518-10		POWELL BUTTE HWY	CROOK COUNTY LINE	MILE POINT	1.00	200	25	2	10.0	2.5	shoulder		20%	L	New
3518-20		POWELL BUTTE HWY	MILE POINT	MILE POINT	1.00	200	26	2	11.0	2.0	shoulder		20%	L	New
3518-25		POWELL BUTTE HWY	MILE POINT	MILE POINT	1.00	200	26	2	11.0	2.0	shoulder		20%	L	New
3518-30		POWELL BUTTE HWY	MILE POINT	MILE POINT	1.00	200	26	2	11.0	2.0	shoulder		20%	L	New
3518-35		POWELL BUTTE HWY	MILE POINT	MILE POINT	1.00	200	26	2	11.0	2.0	shoulder		20%	L	New
3518-40		POWELL BUTTE HWY	MILE POINT	MCGRATH RD	1.05	150	24	2	11.0	1.0	shoulder		20%	L	New
3518-45		POWELL BUTTE HWY	MCGRATH RD	BUTLER MARKET RD	1.05	95	28	2	11.5	2.5	shoulder	1	80%	L	Good
3518-50		POWELL BUTTE HWY	BUTLER MARKET RD	ERICKSON RD	1.00	60	28	2	12.0	2.0	shoulder	11	50%	L	Good
3518-55		POWELL BUTTE HWY	ERICKSON RD	ALFALFA MARKET RD-NEFF RD	1.02	60	29	2	11.5	3.0	shoulder	10	80%	L	Good
3518-60		POWELL BUTTE HWY	ALFALFA MARKET RD-NEFF RD	HWY 20	0.91	80	28	2	11.0	3.0	shoulder	18	40%	L	Good
3103-40		SHEVLIN PARK RD	BRIDGE-TUMALO CREEK	END-BEGIN JOHNSON MARKET RD	0.10	60	32	2	12.0	4.0	lane	0	100%	L	Good
2184-20		SMITH ROCK WAY	RR XING/UGB - TERREBONNE	NE 17TH ST	1.27	60	27	2	11.0	2.5	none		100%	L	Fair
				Total Miles of Rural Arterials:	**56.97**										

Note: ADT number key is as follows - **BOLD** numbers are actual 1996 counts, others are estimates.

Bike Facility Types:
(*standards*)

Shared = Shared Roadway (*28' minimum pavement width*)
Shoulder = Shoulder Bikeway (*4'-6' shoulder if no curb, 5' minimum if curb present*)
Lane = Bike Lane (*4'-6' lane with 8" stripe*)

Deschutes County

Rural Collector Roads

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	% No Passing Lanes	Terrain (L,R,M)	Pavement Cond.
3006-10		BAKER RD	HWY 97	LAKEVIEW DR	0.93	60	25	2	10.0	2	none	44	100%	L	Good
3006-20		BAKER RD	LAKEVIEW DR	SHOSHONE RD E	0.65	60	24	2	10.0	2	none	38	100%	L	Good
3006-30		BAKER RD	SHOSHONE RD E	SHOSHONE RD W	0.85	60	24	2	10.0	2	none	64	100%	L	Good
4106-10		BURGESS RD	HWY 97	PINE DR	0.46	60	32	2	13.0	3	shoulder	17	20%	L	Good
4106-20		BURGESS RD	PINE DR	GLENWOOD DR	0.51	60	32	2	13.0	3	shoulder	14	0%	L	Good
4106-30		BURGESS RD	GLENWOOD DR	LOST PONDEROSA RD	0.47	60	32	2	13.0	3	shoulder	6	0%	L	Fair
4106-40		BURGESS RD	LOST PONDEROSA RD	DEER FIELD DR	0.84	60	32	2	13.0	3	shoulder	23	0%	L	Good
4106-50		BURGESS RD	DEER FIELD DR	STEARNS RD	0.62	60	33	2	13.5	3	shoulder	55	0%	L	Good
4106-60		BURGESS RD	STEARNS RD	DORRANCE MEADOW RD	0.55	60	32	2	13.0	3	shoulder	44	0%	L	Good
4106-70		BURGESS RD	DORRANCE MEADOW RD	SUNSET CT	0.45	60	32	2	13.0	3	shoulder	18	0%	L	Good
1161-10		CAMP POLK RD	HWY 126	SQUAW CREEK DR	1.12	60	26	2	11.0	2	none		20%	R	Good
1161-20		CAMP POLK RD	SQUAW CREEK DR	SQUAW CREEK BRIDGE	1.50	60	26	2	11.0	2	none		20%	R	Good
1161-30		CAMP POLK RD	SQUAW CREEK BRIDGE	WILT RD	1.00	60	26	2	11.0	2	none		20%	R	Good
1161-40		CAMP POLK RD	WILT RD	LUNDY RD	0.95	60	25	2	11.0	2	none		100%	L	Good
1161-50		CAMP POLK RD	LUNDY RD	TRAPPER POINT RD	1.09	60	26	2	11.0	2	none	1	80%	L	Good
1161-60		CAMP POLK RD	TRAPPER POINT RD	UGB - SISTERS	0.67	60	26	2	11.0	2	none	12	20%	L	Good
2303-10	NW	CHINOOK DR	NW 43RD ST	JEFFERSON COUNTY LINE	0.89	60	28	2	11.0	3	none	15	100%	L	Good
3022-10		CINDER BUTTE RD	BAKER RD	LAKEVIEW RD	0.67	50	24	2	10.0	2	none	75	60%	L	Good
3022-20		CINDER BUTTE RD	LAKEVIEW RD	MINNETONKA LN NE	0.68	50	24	2	10.0	2	none	97	0%	L	Good
1148-10		CLINE FALLS HWY	HWY 126	EAGLE CREST ENTRANCE	0.95	60-230	22	2	10.0	1.0	none	2	100%	R	Good
1148-20		CLINE FALLS HWY	EAGLE CREST ENTRANCE	SW 83RD ST	0.63	60	24	2	10.0	2.0	none	5	60%	L	Fair
1148-30		CLINE FALLS HWY	SW 83RD ST	MILE POST 2	0.41	60	24	2	10.0	2.0	none	2	60%	R	Fair
1148-32		CLINE FALLS HWY	MILE POST 2	MILE POST 3	1.00	60	24	2	10.0	2.0	none	3	20%	L	Fair
1148-34		CLINE FALLS HWY	MILE POST 3	MILE POST 4	1.00	60	24	2	10.0	2.0	none	1	20%	L	Fair
1148-36		CLINE FALLS HWY	MILE POST 4	MILE POST 5	1.00	60	24	2	10.0	2.0	none	0	20%	L	Fair
1148-38		CLINE FALLS HWY	MILE POST 5	NEWCOMB RD	0.52	60	24	2	10.0	2.0	none	2	20%	L	Good
1148-40		CLINE FALLS HWY	NEWCOMB RD	MARSH RD	1.07	60	24	2	10.0	2.0	none	5	20%	L	Good
1148-50		CLINE FALLS HWY	MARSH RD	CONNARN RD	0.99	60	22	2	10.0	1.0	none	18	0%	L	Good
1148-60		CLINE FALLS HWY	CONNARN RD	EDGE HILL DR	1.20	60	22	2	10.0	1.0	none	10.5	20%	L	Good
1148-70		CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	0.93	60	22	2	10.0	1.0	none	10.5	100%	R	Good
1148-80		CLINE FALLS HWY	UGB - TUMALO	TUMALO RD	0.30	60	22	2	10.0	1.0	none	10.5	100%	L	Good
1171-10		COOK AVE	TUMALO RD	HWY 20	0.40	60	24	2	11.0	1.0	none		100%	L	Good
4143-10		COTTONWOOD RD	HWY 97 (OVERPASS)	EXIT SOUTH 97 RAMP	0.18	60	28	2	12.0	2	shoulder	0	80%	L	Good
4143-20		COTTONWOOD RD	EXIT SOUTH 97 RAMP	MILE POINT	0.82	60	28	2	12.0	2	shoulder	0	80%	L	Good
4143-30		COTTONWOOD RD	MILE POINT	RR OVERPASS	0.84	60	28	2	12.0	2	shoulder	7	80%	L	Good
2264-20	NW	COYNER AVE	PERSHALL WAY	NORTHWEST WAY	0.50	60	27	2	11.0	2.5	none		100%	R	Good
2264-30	NW	COYNER AVE	NORTHWEST WAY	NW HELMHOLTZ WAY	0.74	60	24	2	10.0	2.0	none		40%	L	Good
4111-10		DAY RD	BURGESS RD	NORTHWOOD DR	0.45	60	26	2	11.0	2	none	33	0%	L	Good
4111-20		DAY RD	NORTHWOOD DR	DEEDON RD	0.55	60	26	2	11.0	2	none	36	0%	L	Good
4111-30		DAY RD	DEEDON RD	FRANCES LN	0.44	60	25	2	10.5	2	none	57	20%	L	Good
4111-40		DAY RD	FRANCES LN	OLD MILL RD	0.57	60	25	2	10.5	2	none	25	20%	L	Good
4111-50		DAY RD	OLD MILL RD	DAWN RD	0.50	60	24	2	10.0	2	none	20	20%	L	Good
4111-60		DAY RD	DAWN RD	AMBER LN	0.98	60	25	2	10.0	3	none		20%	L	Good
3176-10		DESCHUTES PLEASANT RID	HWY 97	DESCHUTES MARKET RD	1.65	60	29	2	11.0	4	none		60%	L	Good
3195-10		HAMBY RD	HWY 20	NEFF RD	0.72	60	26	2	12.0	1.0	none	15	60%	L	Good
3195-20		HAMBY RD	NEFF RD	FLETCHER LN	0.88	60	26	2	11.5	1.5	none	15	80%	L	Good

Deschutes County

Rural Collector Roads

Rd-Sg	Dir	Road Name	From	To	Length (miles)	ROW Width (feet)	Paved Width (feet)	No. of Travel Lanes	Lane Width (feet)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	% No Passing Lanes	Terrain (L,R,M)	Pavement Cond.
3195-30		HAMBY RD	FLETCHER LN	BUTLER MARKET RD	0.63	60	26	2	11.5	1.5	none	15	60%	L	Good
3203-10		HAMEHOOK RD	BUTLER MARKET RD	CANAL BRIDGE	0.85	60	26	2	11.0	2.0	none		60%	L	Good
3203-20		HAMEHOOK RD	CANAL BRIDGE	DESCHUTES MARKET RD	0.31	60	26	2	11.0	2.0	none		100%	L	Good
2116-40	SW	HELMHOLTZ WAY	CANAL BRIDGE	SW ELKHORN AVE	0.97	60	24	2	10.0	2.0	none		20%	L	Good
2116-50	SW	HELMHOLTZ WAY	SW ELKHORN AVE	S CANAL BLVD	0.79	60	24	2	10.0	2.0	none		60%	L	Good
4101-10		HUNTINGTON RD	SOUTH CENTURY DR	LAPINE STATE REC RD	3.93	60	24	2	9.0	3	none	18	80%	L	Good
4101-20		HUNTINGTON RD	LAPINE STATE REC RD		1.34	60	24	2	9.0	3	none	16	60%	L	Good
4101-30		HUNTINGTON RD		BURGESS RD	1.34	60	24	2	9.0	3	none	16	60%	L	Good
4101-40		HUNTINGTON RD	BURGESS RD	UGB - LAPINE	1.79	60	31	2	11.5	4	none	16	40%	L	Fair
4151-10		LAPINE STATE REC. RD	HWY 97	HUNTINGTON RD	0.42	200	28	2	11.0	3	none		40%	L	Good
4151-20		LAPINE STATE REC. RD	HUNTINGTON RD	WHITTIER DR	1.35	200	28	2	11.0	3	none		40%	L	Good
4151-30		LAPINE STATE REC. RD	WHITTIER DR	FOSTER RD (FS RD 4205)	1.13	60	29	2	11.0	4	none		0%	L	Good
3171-60		MCGRATH RD	POWELL BUTTE HWY	PEACOCK LN	0.90	60	22	2	10.0	1	none		60%	L	Good
2167-10	NW	PERSHALL WAY	HWY 97	NW YUCCA WAY	1.02	60	28	2	11.0	3.0	none		100%	L	Good
3175-10		RICKARD RD	KNOTT RD-SE 27TH ST	ARNOLD MARKET RD	0.81	60	32	2	11.0	4.5	none	9	100%	L	Good
3175-20		RICKARD RD	ARNOLD MARKET RD	BILLADEAU RD	0.98	60	24	2	10.5	1.5	none	14	60%	L	Good
4112-05		SOUTH CENTURY DR	HWY 97	SEWAGE TREATMENT RD	1.15	60	36	2	12.0	6	shoulder	1	100%	L	Good
4112-10		SOUTH CENTURY DR	SEWAGE TREATMENT RD (CRAWFOR	SPRING RIVER RD	1.01	60	27	2	11.5	2	shoulder	2	100%	L	Fair
4112-15		SOUTH CENTURY DR	SPRING RIVER RD	MILE POINT	0.85	60	23	2	10.5	1	shoulder	1	0%	L	Fair
4112-20		SOUTH CENTURY DR	MILE POINT	VANDEVERT RD	1.12	60	23	2	10.5	1	shoulder	1	0%	L	Fair
4112-25		SOUTH CENTURY DR	VANDEVERT RD	HUNTINGTON RD	1.07	60	26	2	11.0	2	shoulder	3	80%	L	Good
4112-30		SOUTH CENTURY DR	HUNTINGTON RD	SNOW GOOSE RD	0.94	60	28	2	10.0	4	shoulder	12	60%	L	Good
4112-35		SOUTH CENTURY DR	SNOW GOOSE RD	OLD SOUTH CENTURY DR W	1.03	60	28	2	12.0	2	shoulder	14	60%	L	Good
4112-40		SOUTH CENTURY DR	OLD SOUTH CENTURY DR W	BRIDGE - DESCHUTES RIVER	0.88	60	28	2	12.0	2	shoulder	14	40%	L	Good
4192-10		SPRING RIVER RD	SOUTH CENTURY DR	SOLAR DR	1.20	60	28	2	11.0	3	shoulder	12	0%	L	Fair
4192-20		SPRING RIVER RD	SOLAR DR	FS BOUNDARY	0.90	60	28	2	11.0	3	shoulder		20%	L	Fair
3148-10		TUMALO RD	HWY 97	92ND ST	1.08	60	28	2	10.5	4	none	28	20%	L	Good
3148-20		TUMALO RD	92ND ST	OLD REDMOND-BEND HWY	0.97	60	26	2	11.0	2	none	22	20%	L	Good
3148-30		TUMALO RD	OLD REDMOND-BEND HWY	SWALLEY RD	0.67	60	24	2	10.0	2	none	9	10%	L	Good
3148-40		TUMALO RD	SWALLEY RD	UGB - TUMALO	1.01	60	25	2	10.5	2	none	11	60%	R	Good
4108-10		VANDEVERT RD	HWY 97	SOUTH CENTURY DR	1.02	60	27	2	11.0	3	none		100%	I	Good
3202-10		WARD RD	HWY 20	OBSIDIAN AVE	1.04	60	28	2	12.0	2	none	19	40%	L	Good
3202-15		WARD RD	OBSIDIAN AVE	STEVENS RD	0.24	60	28	2	11.0	3	none		80%	L	Good
3202-20		WARD RD	STEVENS RD	LARSEN RD	1.00	60	23	2	10.0	2	none		100%	L	New
3202-30		WARD RD	LARSEN RD	BILLADEAU RD	0.92	60	26	2	11.0	2	none		100%	L	New
3202-40		WARD RD	BILLADEAU RD	ROPP LN	0.24	60	26	2	11.0	2	none		100%	L	New
3202-50		WARD RD	ROPP LN	GOSNEY LN	1.28	60	27	2	11.0	3	none		100%	L	Fair
				Total Miles of Rural Collectors:	***73.36***										

Note: ADT number key is as follows - **BOLD** numbers are actual 1996 counts, others are estimates.

Bike Facility Types: (*standards*)

Shared = Shared Roadway (*28' minimum pavement width*)

Shoulder = Shoulder Bikeway (*4'-6' shoulder if no curb, 5' minmum if curb present*)

Lane = Bike Lane (*4'-6' lane with 8" stripe*)

Deschu County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
4140-30		6TH ST	DORRANCE MEADOW RD	END PAVEMENT-BEGIN CINDERS	0.05	60	24	2	9	3	none	n/a	100	Good
2175-30	NE	9TH ST	NE WILCOX AVE	PAVEMENT ENDS	0.75	60	20	2	7	3	none	n/a	200	Good
2280-60	NE	11TH ST	BEGIN	NE JUNIPER RIDGE RD	0.60	60	24	2	10	2	none	n/a	50	Fair-Poor
2287-40	NE	17TH ST	SMITH ROCK WAY	NE WILCOX AVE	0.50	60	20	2	6	4	none	n/a	200	Good
2232-20	NW	21ST ST	NW 25TH ST	NW RIMROCK LOOP	0.32	60	26	2	9	4	none	n/a	50	Fair-Poor
2325-10	NW	25TH LN	NW LYNCH LN	END/CUL-DE-SAC	0.18	60	24	2	9	3	none	n/a	20	Good
2230-20	NW	25TH ST	NW 21ST ST	NW RIMROCK LOOP	0.54	60	25	2	7.5	5	none	n/a	50	Good
2165-20	NW	27TH ST	NW LOWER BRIDGE WAY	NW ICE AVE	0.99	60	21	2	7.5	3	none	n/a	100	Good
2250-10	NE	28TH CT	NE MONTGOMERY AVE	END BUBBLE	0.11	60	24	2	9	3	none	n/a	50	Good
2249-10	NW	29TH CT	NW POVEY AVE	END BUBBLE	0.13	60	24	2	7	5	none	n/a	50	Good
2324-10	NW	30TH ST	NW MONTGOMERY DR	NW LYNCH WAY	0.25	60	24	2	9	3	none	n/a	50	Fair-Poor
2169-30	NE	33RD ST	NE O'NEIL WAY	RR XING	1.16	60	20	2	7	3	none	n/a	200	Good
2169-35	NE	33RD ST	RR XING	SMITH ROCK WAY	0.93	60	20	2	7	3	none	n/a	200	Good
2169-40	NE	33RD ST	SMITH ROCK WAY	NE WILCOX AVE	0.37	60	20	2	7	3	none	n/a	200	Fair-Poor
2220-20	NW	36TH ST	NW POPLAR AVE	NW QUINCE AVE	0.12	60	24	2	7	5	none	n/a	100	Good
2221-20	NW	37TH ST	NW OAK AVE	NW QUINCE AVE	0.21	60	24	2	7	5	none	n/a	50	Good
2222-20	NW	38TH ST	NW OAK AVE	NW NORSE AVE	0.20	60	24	2	7	5	none	n/a	50	Good
2222-60	NW	38TH ST	NW ORCHARD CT	NW POVEY AVE	0.15	60	25	2	8.5	4	none	n/a	50	Fair-Poor
2223-20	NW	39TH ST	NW SPRUCE AVE	END	0.20	60	24	2	8	4	none	n/a	50	Good
2154-40	SW	39TH ST	S CANAL BLVD	SW ELKHORN AVE	0.19	60	20	2	7	3	none	n/a	100	Good
2122-40	SW	43RD ST	SW ELKHORN AVE	SW MCVEY AVE	0.98	60	22	2	8	3	none	n/a	50	Good
2153-20	SW	46TH ST	SW MCVEY AVE	SW QUARRY AVE	0.57	60	24	2	8	4	none	n/a	300	Good
2111-20	SW	58TH ST	SW OBSIDIAN AVE	SW WICKIUP AVE	1.00	60	24	2	9	3	none	n/a	300	Excellent
2111-30	SW	58TH ST	SW WICKIUP AVE	SW ZENITH AVE	0.37	60	24	2	10	2	none	n/a	300	Excellent
2111-40	SW	58TH ST	SW ZENITH AVE	SW COYOTE AVE	0.38	60	23	2	9.5	2	none	n/a	300	Excellent
2111-60	SW	58TH ST	SW HARVEST AVE	SW MCVEY AVE	0.65	60	25	2	8.5	4	none	n/a	100	Excellent
2107-20	SW	61ST ST	SW MCVEY AVE	BEGIN PAVEMENT	0.55	60	23	2	9.5	2	none	n/a	100	Good
2107-30	SW	61ST ST	BEGIN PAVEMENT	S CANAL BLVD	n/a	60	23	2	9.5	2	none	n/a	900	Good
2251-10	NW	74TH ST	HWY 126	NW EAGLE DR	0.40	60	25	2	10.5	2	none	n/a	200	Good
2251-20	NW	74TH ST	NW EAGLE DR	NW LARCH AVE	0.72	60	25	2	9.5	3	none	n/a	200	Good
2251-30	NW	74TH ST	NW LARCH AVE	END PAVEMENT-BEGIN TETHEROW RD	0.45	60	25	2	8.5	4	none	n/a	200	Good
2121-20	SW	77TH ST	SW MCVEY AVE	SW QUARRY AVE	0.33	60	21	2	6.5	4	none	n/a	100	Fair-Poor
2121-30	SW	77TH ST	SW QUARRY AVE	SW YOUNG AVE	1.00	60	20	2	7	3	none	n/a	100	Good
2252-20	NW	77TH ST	NW LARCH AVE	NW POPLAR AVE	0.28	60	24	2	8	4	none	n/a	50	Fair-Poor

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
2253-10	NW	83RD PL	NW TEATER AVE	END BUBBLE	0.99	60	25	2	12.5	0	none	n/a	50	Good
2254-10	NW	84TH CT	NW VAUGHN AVE	END BUBBLE	0.27	60	25	2	12.5	0	none	n/a	50	Good
2295-10	NW	89TH CT	NW TEATER AVE	END BUBBLE	0.27	60	25	2	12.5	0	none	n/a	50	Good
2296-10	NW	89TH CT	NW VAUGHN AVE	END BUBBLE	0.14	60	25	2	12.5	0	none	n/a	50	Good
2255-10	NW	89TH PL	NW TEATER AVE	NW VAUGHN AVE	0.30	60	25	2	12.5	0	none	n/a	50	Good
2256-40	NW	91ST ST	NW SPRUCE AVE	NW COYNER AVE	1.23	60	25	2	8.5	4	none	n/a	50	Fair-Poor
2119-20	SW	93RD ST	SW YOUNG AVE	S CANAL BLVD	0.48	60	19	2	6.5	3	none	n/a	100	Fair-Poor
2257-20	NW	93RD ST	END BUBBLE	NW TEATER AVE	0.87	60	25	2	12.5	0	none	n/a	50	Fair-Poor
2258-10	NW	96TH CT	NW TEATER AVE	END BUBBLE	0.71	60	24	2	10	2	none	n/a	50	Fair-Poor
2262-10	NW	98TH LN	OAK AVE	END BUBBLE	0.31	60	24	2	9	3	none	n/a	50	Good
2265-10	NW	101ST LN	101ST ST	END BUBBLE	0.26	60	24	2	8	4	none	n/a	100	Good
2270-10	NW	101ST ST	HWY 126	NW MAPLE LN	0.36	60	24	2	8	4	none	n/a	100	Fair-Poor
2270-20	NW	101ST ST	NW MAPLE LN	95TH ST	0.85	60	24	2	8	4	none	n/a	100	Good
2259-40	NW	103RD ST	BEGIN	NW COYNER AVE	0.25	60	24	2	9	3	none	n/a	50	Fair-Poor
2261-10	NW	105TH CT	QUINCE AVE	END BUBBLE	0.11	60	24	2	8	4	none	n/a	20	Good
2188-70	NW	10TH ST	NW GALLOWAY AVE	NW DAVIDSON AVE	0.76	60	20	2	8	2	none	n/a	200	Good
2188-90	NW	10TH ST	HWY 97 S	HWY 97 N	0.19	60	30	2	12	3	none	n/a	300	Excellent
2163-70	NW	19TH ST	NW DAVIDSON WAY	NW ODEM WAY	0.25	60	21	2	6.5	4	none	n/a	400	Good
3236-10		ABILENE CT	CIMARRON DR	END BUBBLE	0.19	60	21	2	5.5	5	none	n/a	50	Fair-Poor
4146-10		ALLEN DR	GLENWOOD DR N	GLENWOOD DR S	0.18	60	25	2	10.5	2	none	n/a	100	Fair-Poor
3473-10		ANN MARGARET D	OLD DESCHUTES RD.	ANN MARGARET DR.	0.32	60	28	2	10	3	none	n/a	20	Excellent
2173-50	W	ANTLER AVE	NW 35TH ST	NW HELMHOLTZ WAY	0.62	60	21	2	6.5	4	none	n/a	700	Fair Poor
3284-10		ARROW AVE	OBSIDIAN AVE	END	0.13	60	20	2	6	4	none	n/a	50	Fair-Poor
2238-10	NW	ARROWHEAD LN	NW 21ST ST	END BUBBLE	0.14	60	25	2	8.5	4	none	n/a	50	Good
3143-10		BACHELOR WAY	JEFFERSON CT	END BUBBLE	0.06	60	24	2	10	2	none	n/a	50	Fair-Poor
3006-40		BAKER RD	SHOSHONE RD W	END PAVEMENT	0.15	60	22	2	9	2	none	n/a	50	Good
3391-10		BANFF DR	QUEBEC DR	END BUBBLE	0.12	60	24	2	8	4	none	n/a	50	Good
3493-10		BARLOW TRAIL	CHISHOLM TRAIL	BUTTERFIELD TRAIL	0.35	60	24	2	8	4	none	n/a	50	Good
1128-10		BARR RD	CLINE FALLS HWY	END PAVEMENT	0.23	60	22	2	7	4	none	n/a	100	Excellent
1146-10		BECKER RD	CLINE FALLS HWY	BARR RD	0.45	60	20	2	6	4	none	n/a	50	Fair-Poor
3490-10		BECKY CT	JOE NEIL RD	END BUBBLE	0.07	60	24	2	9	3	none	n/a	20	Excellent
3272-10		BEE TREE LN	OVERTREE RD	END BUBBLE	0.07	60	21	2	6.5	4	none	n/a	100	Good
3561-10		BELKNAP DR	END BLUB	END	0.17	60	24	2	9	3	none	n/a	10	Excellent
4501-10		BIG RIVER DR	S CENTURY DR (NEW ALIGN E)	SEEVERS RD	0.39	60	22	2	8	3	none	n/a	500	Good

Deschu County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3156-10		BILLADEAU RD	WARD RD	RICKARD RD	1.07	60	24	2	9	3	none	n/a	235	Good
3156-20		BILLADEAU RD	RICKARD RD	ARNOLD MARKET LOOP	1.00	60	26	2	10	3	none	n/a	100	Good
4119-10		BITTER BRUSH RD	LOST PONDEROSA RD	RIVER PINE DR	0.15	60	20	2	9	1	none	n/a	50	Fair-Poor
3507-10		BLACKFOOT TRAIL	CHISHOLM TRAIL	END BUBBLE	0.12	60	24	2	8	4	none	n/a	50	Fair-Poor
4142-10		BLUE EAGLE RD	VANDEVERT RD	END PAVEMENT	0.13	60	24	2	9	3	none	n/a	100	Good
3505-10		BOBCAT RD	RICKARD RD	END	0.09	60	24	2	8	4	none	n/a	50	Fair-Poor
3344-10		BOONES BOROUG	DALE RD	END BUBBLE	0.16	60	21	2	7.5	3	none	n/a	20	Good
3345-10		BOONES BOROUG	DALE RD	JOE NEIL RD	0.79	60	25	2	8.5	4	none	n/a	200	Good
3345-20		BOONES BOROUG	JOE NEIL RD	MCGRATH RD	0.53	60	25	2	9.5	3	none	n/a	100	Good
3564-10		BOULDER CT	MCGRATH RD	END/CUL-DE-SAC	0.14	60	22	2	8	3	none	n/a	20	Good
3365-10		BOZEMAN TRAIL	BUTTERFIELD TRAIL	END	0.60	60	24	2	9	3	none	n/a	50	Fair-Poor
3563-10		BRADETICH LP	EAGLE RD	EAGLE RD	0.42	60	24	2	8	4	none	n/a	50	Excellent
3494-10		BRASADA WAY	BARLOW TRAIL	END BUBBLE	0.30	60	24	2	7	5	none	n/a	20	Good
4176-10		BRIDGE CT	BRIDGE DR	END BUBBLE	0.06	60	24	2	10	2	none	n/a	20	Excellent
4175-10		BRIDGE DR	OTTER DR	FERNDALE PL	0.94	60	24	2	9	3	none	n/a	300	Good
4175-20		BRIDGE DR	FERNDALE PL	SERPENTINE DR	0.43	60	26	2	10	3	none	n/a	300	Good
4175-30		BRIDGE DR	SERPENTINE DR	PRAIRIE VIEW DR	1.15	60	26	2	12	1	none	n/a	200	Good
4175-40		BRIDGE DR	PRAIRIE VIEW DR	END BUBBLE	0.77	60	25	2	11.5	1	none	n/a	100	Good
3118-10		BRIDLE LN	SADDLEBACK DR	GOLD SPUR WAY	0.57	60	24	2	9	3	none	n/a	20	Excellent
3503-10		BRONCO CT	CHAPARREL DR	END BUBBLE	0.07	60	24	2	10	2	none	n/a	50	Fair-Poor
3310-10		BRONCO LN	NE BEAR CREEK RD	END BUBBLE	0.14	60	20	2	8	4	none	n/a	50	Good
3094-10		BUCK CANYON RD	SHOSHONE RD	END PAVEMENT	0.18	60	25	2	10	2	none	n/a	50	Good
3132-10		BUCK DR	JOHNSON MARKET RD	END	0.71	60	25	2	9.5	3	none	n/a	50	Good
3245-10		BUCKSKIN CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	9	3	none	n/a	50	Good
3559-10		BUNCHGRASS CT	BUNCHGRASS PL	END BULB	0.03	60	24	2	9	3	none	n/a	10	Excellent
3560-10		BUNCHGRASS PL	BRADETICH LP	END	0.08	60	24	2	9	3	none	n/a	10	Excellent
3495-10		BUTTERFIELD TRAI	GROFF RD	END	0.88	60	24	2	7	5	none	n/a	20	Fair-Poor
3270-10		BYRAM CT	BYRAM RD	END BUBBLE	0.03	60	23	2	8.5	3	none	n/a	20	Good
3159-10		BYRAM RD	HWY 20	ALFALFA MARKET RD	1.07	60	22	2	8	3	none	n/a	200	Good
3389-10		CALGARY DR	SWEETGRASS DR	STIRLING DR	0.97	60	24	2	8	4	none	n/a	300	Good
3389-20		CALGARY DR	STIRLING DR	OKANAGAN LN	1.00	60	24	2	8	4	none	n/a	300	Good
3389-30		CALGARY DR	OKANAGAN LN	CALGARY DR	0.88	60	24	2	9	3	none	n/a	200	Good
3390-10		CALGARY LN	CALGARY DR	END BUBBLE	0.10	60	24	2	8	4	none	n/a	100	Good
5114-10		CAMP CREEK RD	HWY 20	COFFEY RD	0.09	60	20	2	4	6	none	n/a	Unknown	Good

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
5114-20		CAMP CREEK RD	COFFEY RD	POWERLINE XING	1.36	60	20	2	6	4	none	n/a	Unknown	Excellent
5114-30		CAMP CREEK RD	POWERLINE XING	CATTLE GUARD G	n/a	60	n/a	2	n/a	n/a	none	n/a	Unknown	Excellent
5114-40		CAMP CREEK RD	CATTLE GUARD	MILE POST	1.24	60	22	2	7	4	none	n/a	Unknown	Excellent
5114-50		CAMP CREEK RD	MILE POST	MILE POST	1.00	60	22	2	11	0	none	n/a	Unknown	Bad
5114-60		CAMP CREEK RD	MILE POST	MILE POST	1.00	60	22	2	7	4	none	n/a	Unknown	Excellent
5114-70		CAMP CREEK RD	MILE POST	END PAVEMENT	1.04	60	21	2	6.5	4	none	n/a	Unknown	Excellent
3268-10		CAROLYN CT	WALLACE RD	END BUBBLE	0.08	60	23	2	6.5	5	none	n/a	20	Excellent
4136-10		CASCADE LN	DAY RD	DEER FIELD DR	0.19	60	20	2	9	1	none	n/a	20	Fair-Poor
1177-10		CASCADE WAY	VARCO RD	PONDEROSA CASCADE DR	0.18	60	24	2	8	4	none	n/a	200	Excellent
3453-10		CATHY CT	TUMBLEWEED DR	END BUBBLE	0.07	60	24	2	10	2	none	n/a	20	Fair-Poor
4117-10		CENTER DR	NORTH DR	WEST DR	0.59	60	21	2	8.5	2	none	n/a	50	Good
4159-10		CENTRAL WAY	SPRAGUE LOOP	END BUBBLE	0.25	60	24	2	11	1	none	n/a	20	Good
3235-10		CHAPARREL DR	MCGRATH RD	LARIAT LN	0.94	60	24	2	9	3	none	n/a	200	Good
3021-10		CHEROKEE RD	CHEYENNE RD	MINNETONKA LN	0.50	60	25	2	8.5	4	none	n/a	500	Good
3098-10		CHEYENNE RD	CINDER BUTTE RD	CHEROKEE RD	1.04	60	24	2	9	3	none	n/a	520	Fair-Poor
3098-20		CHEYENNE RD	CHEROKEE RD	NAVAJO CIR	1.08	60	24	2	9	3	none	n/a	500	Good
3516-10		CHICKASAW WAY	BUTTERFIELD TRAIL	END	0.12	60	24	2	9	3	none	n/a	20	Fair-Poor
3370-10		CHISHOLM TRAIL	GROFF RD	END BUBBLE	1.13	60	24	2	8	4	none	n/a	50	Good
3026-10		CHOCTAW RD	RIVER WOODS DR W	PIMA RD	0.53	60	24	2	9	3	none	n/a	200	Fair-Poor
3233-10		CIMARRON DR	MCGRATH RD	LATIGO CT	0.94	60	24	2	8	4	none	n/a	570	Good
3022-30		CINDER BUTTE RD	MINNETONKA LN NE	END PAVEMENT	0.20	60	24	2	9	3	none	n/a	500	Good
4168-10		CLOVER CT	BRIDGE DR	END BUBBLE	0.04	60	24	2	10	2	none	n/a	20	Good
3302-10		CLYDE LN	BUTLER MARKET RD	END BUBBLE	0.24	60	25	2	8.5	4	none	n/a	200	Fair-Poor
3257-10		CODY JR RD	CODY RD	END	0.25	60	22	2	6	5	none	n/a	100	Fair-Poor
3256-10		CODY RD	NE BEAR CREEK RD	END	0.60	60	21	2	5.5	5	none	n/a	300	Good
3545-10		COMANCHE LN	NAVAJO RD	CHEYENNE RD	0.16	60	25	2	9.5	3	none	n/a	10	Good
1132-10		CONNARN RD	CLINE FALLS HWY	GERKING MARKET RD	0.97	60	20	2	6	4	none	n/a	100	Excellent
1102-40		COUCH MARKET R	COLLINS RD	END PAVEMENT	0.71	60	21	2	7.5	3	none	n/a	200	Good
3273-10		COUNTRY SQUIRE	OVERTREE RD	OLD DESCHUTES RD	0.23	60	24	2	9	3	none	n/a	100	Good
3295-10		COUNTRY VIEW LN	OLD DESCHUTES RD	END BUBBLE	0.18	60	20	2	8	2	none	n/a	20	Fair-Poor
3247-10		COVENTRY CIR	RIDGEVIEW DR	END BUBBLE	0.16	60	23	2	8.5	3	none	n/a	50	Good
2264-40	NW	COYNER AVE	NW HELMHOLTZ WAY	END PAVEMENT	0.12	60	25	2	10.5	2	none	n/a	600	Good
2264-70	NW	COYNER AVE	NW 91ST ST	END	0.75	60	24	2	10	2	none	n/a	50	Bad
2114-20	SW	COYOTE AVE	SW HELMHOLTZ WAY	SW 58TH ST	0.50	60	21	2	6.5	4	none	n/a	200	Excellent

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3366-10		CROCKETT WAY	CHISHOLM TRAIL	END BUBBLE	0.04	60	24	2	9	3	none	n/a	20	Good
2174-10		CROOKED RIVER D	NE WILCOX AVE	END	1.04	60	21	2	7.5	3	none	n/a	460	Good
3150-10		CROSSWINDS RD	TANGLEWOOD RD	END	0.59	60	25	2	8.5	4	none	n/a	50	Fair-Poor
3347-10		DALE RD	DESCHUTES MARKET RD	MCGRATH RD	0.80	60	26	2	9	4	none	n/a	500	Good
3491-10		DANIEL CT	JOE NEIL RD	END BUBBLE	0.12	60	24	2	9	3	none	n/a	50	Good
2157-10	NW	DAVIDSON WAY	HWY 97	NW 19TH ST	0.55	60	20	2	7	3	none	n/a	440	Good
4195-20		DAWN RD	DAY RD	END PAVEMENT	0.75	60	22	2	10	1	none	n/a	200	Good
1133-10		DAYTON RD	HWY 20	GERKING MARKET RD	1.41	60	21	2	6.5	4	none	n/a	100	Fair-Poor
3492-10		DEE DR	MCGRATH RD	SYLVAN LOOP	0.34	60	24	2	9	3	none	n/a	100	Good
4135-10		DEER FIELD DR	BURGESS RD	NORTHWOOD DR	0.47	60	24	2	11	1	none	n/a	50	Fair-Poor
3320-10		DEER TRAIL RD	ALFALFA MARKET RD	END	0.50	60	24	2	7	5	none	n/a	50	Fair-Poor
3349-10		DICKENS CT	J D ESTATES DR	END BUBBLE	0.14	60	24	2	8	4	none	n/a	50	Excellent
3309-10		DOBBIN CT	DOBBIN RD	END BUBBLE	0.12	60	20	2	7	3	none	n/a	50	Good
3307-10		DOBBIN RD	NE BEAR CREEK RD	WARD RD	0.73	60	21	2	5.5	5	none	n/a	200	Good
3133-10		DOE LN	STAG DR	END	0.13	60	24	2	10	2	none	n/a	50	Fair-Poor
2168-10		DONEY RD	HWY 97	END PAVEMENT	0.65	60	21	2	6.5	4	none	n/a	100	Fair-Poor
3258-10		DONNA LN	CODY RD	END BUBBLE	0.54	60	23	2	7.5	4	none	n/a	50	Good
3368-10		DROVER WAY	CHISHOLM TRAIL	END BUBBLE	0.10	60	24	2	9	3	none	n/a	50	Good
3515-10		DULIN DR	OVERTREE RD	END	0.08	60	25	2	9.5	3	none	n/a	10	Good
4177-10		EAGLE CT	OTTER DR	END BUBBLE	0.07	60	24	2	11	1	none	n/a	50	Excellent
2187-10	NW	EAGLE DR	NW 74TH ST	HWY 126	1.27	60	20	2	6	4	none	n/a	300	Good
3162-30		EAGLE RD	BUTLER MARKET RD	END	0.51	60	20	2	7	3	none	n/a	500	Fair-Poor
1174-10		EAST CASCADE	PONDEROSA CASCADE DR	END/CUL-DE-SAC	0.09	60	24	2	8	4	none	n/a	20	Excellent
3303-10		EAST STEM PL	HAMBY RD	END BUBBLE	0.06	60	21	2	8.5	2	none	n/a	50	Good
3513-10		EASTMONT DR	WEST END	EAST END	0.28	60	24	2	8	4	none	n/a	100	Excellent
3392-10		EDMONTON DR	CALGARY DR	STIRLING DR	0.84	60	24	2	9	3	none	n/a	100	Good
1168-10		EDMUNDSON RD	GOODRICH RD	HOLMES RD	1.01	60	25	2	9.5	3	none	n/a	100	Excellent
2123-20	SW	ELKHORN AVE	SW 39TH ST	SW HELMHOLTZ WAY	0.76	60	21	2	7.5	3	none	n/a	250	Good
4154-10		ELSINOR RD	LUNAR DR	STELLAR DR	0.98	60	24	2	8	4	none	n/a	100	Good
4200-10		ENTERPRISE DR	VENTURE LN	VENTURE LN	0.54	60	24	2	9	3	none	n/a	200	Good
3163-30		ERICKSON RD	DICKEY RD	POWELL BUTTE HWY	0.99	60	20	2	8	2	none	n/a	160	Good
1173-10		FADJUR LN	HOLMES RD	END	1.01	60	23	2	9.5	2	none	n/a	Unknown	Fair-Poor
4141-10		FALL RIVER DR	SOUTH CENTURY DR	RIVER LOOP DR EAST	0.51	60	23	2	7.5	4	none	n/a	100	Good
4163-10		FAWN CT	LOOP DR	END BUBBLE	0.05	60	24	2	10	2	none	n/a	50	Fair-Poor

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3134-10		FAWN LN	BUCK DR	END BUBBLE	0.15	60	25	2	9.5	3	none	n/a	50	Good
4170-10		FERNDALE PL	BRIDGE DR	END BUBBLE	0.08	60	24	2	11	1	none	n/a	50	Good
3312-10		FILLY CT	STUD CT	END BUBBLE	0.06	60	21	2	7.5	3	none	n/a	50	Good
3266-10		FLORENCE DR	BUTLER MARKET RD	END	0.25	60	25	2	8.5	4	none	n/a	100	Fair-Poor
4164-10		FOREST CT	FOREST RD	END BUBBLE	0.07	60	24	2	10	2	none	n/a	50	Good
4167-10		FOREST RD	BRIDGE DR	PRAIRIE VIEW DR	0.35	60	24	2	10	2	none	n/a	50	Good
4139-10		FRONTAGE RD	BURGESS RD	DEER FIELD DR	0.16	60	20	2	9	1	none	n/a	50	Fair-Poor
3369-10		FRONTIER WAY	CHISHOLM TRAIL	END BUBBLE	0.09	60	24	2	9	3	none	n/a	50	Good
2288-20	NW	GALLOWAY AVE	HWY 97	NW 10TH ST	0.16	60	20	2	8	2	none	n/a	100	Good
3558-20		GARCIA RD	END CINDERS - START PVMT	OVERTREE RD	0.06	60	25	2	7.5	5	none	n/a	20	Excellent
1147-10		GEORGE CYRUS R	HWY 126	JORDAN RD	1.45	60	21	2	7.5	3	none	n/a	200	Fair-Poor
1137-40		GERKING MARKET	INNES MARKET RD	END PAVEMENT	0.80	60	21	2	8.5	2	none	n/a	100	Good
2105-20	SW	GIFT RD	SW 61ST ST	END COUNTY MAINT	0.57	60	23	2	9.5	2	none	n/a	325	Excellent
3140-10		GLACIER VIEW DR	OLD REDMOND-BEND HWY N	OLD REDMOND-BEND HWY S	0.79	60	24	2	9	3	none	n/a	50	Excellent
4147-10		GLENWOOD DR	BURGESS RD	HUNTINGTON RD	0.52	60	25	2	10.5	2	none	n/a	50	Good
3116-10		GOLD SPUR WAY	SADDLEBACK DR	END BUBBLE	0.60	60	23	2	7.5	4	none	n/a	50	Excellent
1163-10		GOODRICH RD	HWY 126	EDMUNDSON RD	1.51	60	24	2	8	4	none	n/a	200	Good
3452-10		GREG CT	TUMBLEWEED DR	END BUBBLE	0.07	60	24	2	9	3	none	n/a	50	Fair-Poor
3185-10		GROFF RD	SUPREME CT	RICKARD RD	0.76	60	24	2	8	4	none	n/a	Unknown	Fair-Poor
3185-20		GROFF RD	RICKARD RD	END	0.78	60	21	2	7.5	3	none	n/a	200	Good
3119-10		HACKAMORE DR	BRIDLE LN	END	0.16	60	23	2	9.5	2	none	n/a	10	Excellent
1117-10		HARRINGTON LOO	HWY 20 N (CINDERS)	BEGIN PAVEMENT	1.37	60	24	2	9	3	none	n/a	200	Good
1117-20		HARRINGTON LOO	BEGIN PAVEMENT	GIST RD	1.18	60	24	2	10	2	none	n/a	295	Fair-Poor
2132-20	SW	HARVEST AVE	SW HELMHOLTZ WAY	SW LOMA LINDA DR	0.83	60	24	2	7	5	none	n/a	100	Excellent
3322-10		HERITAGE AVE	TALL PINE AVE	WOODSIDE LOOP	0.19	60	24	2	8	4	none	n/a	50	Fair-Poor
4158-10		HERRELL LN	SPRAGUE LOOP	END	0.06	60	24	2	10	2	none	n/a	50	Good
3485-10		HIDAWAY HILLS CT	JAN DR	END BUBBLE	0.15	60	24	2	9	3	none	n/a	50	Good
4171-10		HIDDEN GLEN CT	BRIDGE DR	END BUBBLE	0.06	60	24	2	10	2	none	n/a	50	Good
1149-10		HIGHLAND AVE	CLINE FALLS HWY	END BUBBLE	0.64	60	25	2	7.5	5	none	n/a	50	Fair-Poor
1150-10		HIGHLAND RD	HIGHLAND AVE	END	0.31	60	25	2	7.5	5	none	n/a	50	Fair-Poor
4137-10		HOLIDAY LN	DAY RD	END BUBBLE	0.09	60	20	2	8	2	none	n/a	50	Good
3212-10		HORSE BUTTE RD	ARNOLD MARKET LOOP	CATTLE GUARD	1.01	60	25	2	10.5	2	none	n/a	610	Fair-Poor
3224-10		HORSELL RD	JOHNSON RANCH RD	CANAL PIPE	0.25	60	21	2	8.5	2	none	n/a	100	Good
3224-20		HORSELL RD	CANAL PIPE	SCHMIDT RD	1.00	60	21	2	8.5	2	none	n/a	100	Good

Deschu County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3224-30		HORSELL RD	SCHMIDT RD	WILLARD RD	1.24	60	21	2	7.5	3	none	n/a	100	Fair-Poor
3137-20		HUNNELL RD	TUMALO RD-BEGIN PAVEMENT	END PAVEMENT	0.22	60	23	2	9.5	2	none	n/a	500	Good
3137-40		HUNNELL RD	BEGIN PAVEMENT	END PAVEMENT-END CO. MAINT	0.58	60	24	2	9	3	none	n/a	500	Fair-Poor
3137-60		HUNNELL RD	BEGIN PAVEMENT	END PAVEMENT-END CO. MAINT	0.07	60	24	2	9	3	none	n/a	300	Fair-Poor
4101-60		HUNTINGTON RD	FINLEY BUTTE RD	END PAVEMENT	1.92	60	24	2	10	2	none	n/a	450	Fair-Poor
4101-70		HUNTINGTON RD	END PAVEMENT	HWY 31	1.28	60	0	2	0	0	none	n/a	Unknown	Excellent
3300-10		HYDE LN	EAGLES RD	END	0.25	60	23	2	8.5	3	none	n/a	50	Good
4156-20		INDIO RD	METEOR DR	SOLAR DR	0.10	60	25	2	10.5	2	none	n/a	100	Excellent
3348-10		J D ESTATES DR	DESCHUTES MARKET RD	END	0.49	60	24	2	8	4	none	n/a	200	Excellent
1129-10		J W BROWN RD	CLINE FALLS HWY	GERKING MARKET RD	0.97	60	20	2	7	3	none	n/a	65	Excellent
2134-20	SW	JAGUAR AVE	SW 58TH ST	END	0.55	60	24	2	8	4	none	n/a	100	Good
3486-10		JAN DR	KATIE DR	SYLVAN LOOP	0.42	60	24	2	9	3	none	n/a	50	Good
3393-10		JASPER PL	CALGARY DR	END BUBBLE	0.05	60	24	2	9	3	none	n/a	50	Good
3350-10		JEFFERS CT	J D ESTATES DR	END BUBBLE	0.04	60	24	2	8	4	none	n/a	50	Excellent
3142-10		JEFFERSON CT	GLACIER VIEW DR	END BUBBLE	0.16	60	25	2	10.5	2	none	n/a	50	Excellent
3534-10		JENNINGS RD	RICKARD RD	END BUBBLE	0.76	60	24	2	8	4	none	n/a	50	Good
1179-10		JERICHO RD	PLAINVIEW RD	END PAVEMENT	0.30	60	25	2	10.5	2	none	n/a	50	Good
1179-20		JERICHO RD	END PAVEMENT	END ROCK ROAD	0.37	60	18	2	9	0	none	n/a	10	Excellent
3489-10		JOE NEIL RD	BOONES BOROUGH DR	MCGRATH RD	0.50	60	24	2	9	3	none	n/a	50	Good
1143-20		JORDAN RD	CLOVERDALE RD	GEORGE CYRUS RD	1.04	60	21	2	6.5	4	none	n/a	50	Good
2245-10		JUNIPER RIDGE RD	NE KNICKERBOCKER AVE	END	1.16	60	24	2	9	3	none	n/a	10	Good
3514-10		KATIE DR	MCGRATH RD	END	0.04	60	24	2	9	3	none	n/a	50	Good
1124-10		KEITH CT	TUMALO RESERVOIR RD	END BUBBLE	0.03	60	27	2	9.5	4	none	n/a	50	Good
3487-10		KELLY CT	SYLVAN LOOP	END BUBBLE	0.06	60	24	2	8	4	none	n/a	50	Good
3254-10		KEYTE LN	EAGLES RD	PEARL LN	0.19	60	23	2	7.5	4	none	n/a	100	Good
3394-10		KIMBERLY CT	CALGARY DR	END BUBBLE	0.31	60	24	2	9	3	none	n/a	50	Good
2326-10	NW	KINGWOOD DR	NW 101ST ST	END	0.95	60	20	2	9	1	none	n/a	10	Bad
3024-10		KIOWA RD	RIVER WOODS DR	MINNETONKA LN	0.55	60	24	2	9	3	none	n/a	100	Good
3031-10		LAKEVIEW DR	BAKER RD	LAKEVIEW RD	0.09	60	24	2	7	5	none	n/a	200	Good
3032-10		LAKEVIEW RD	LAKEVIEW DR	RIVER WOODS DR W	0.10	60	24	2	8	4	none	n/a	100	Good
4151-40		LAPINE STATE REC	FOSTER RD (FS RD 4205)	5TH ST (DAY RD)	0.88	60	29	2	13.5	1	none	n/a	300	Fair-Poor
2266-10	NW	LARCH CT	NW LARCH AVE	END BUBBLE	0.16	60	24	2	8	4	none	n/a	10	Good
2310-10		LARCH DR	POPLAR CT	NW 77TH ST	1.11	60	24	2	8	4	none	n/a	100	Good
3244-10		LARIAT LN	CIMARRON DR	END PAVEMENT	0.63	60	24	2	9	3	none	n/a	50	Good

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3222-10		LARSEN RD	WARD RD	MILE POINT	1.00	60	25	2	9.5	3	none	n/a	100	Good
3222-20		LARSEN RD	MILE POINT	RICKARD RD	0.51	60	25	2	9.5	3	none	n/a	100	Good
3246-10		LATIGO CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	9	3	none	n/a	50	Good
2131-10	SW	LOMA LINDA DR	SW JAGUAR AVE	END	0.49	60	24	2	7	5	none	n/a	50	Fair-Poor
3241-10		LOMA VISTA DR	LOS SERRANOS DR	END BUBBLE	0.28	60	24	2	9	3	none	n/a	50	Excellent
3238-10		LONGHORN CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	7	5	none	n/a	50	Good
4166-10		LOOP DR	PRAIRIE VIEW DR-WALKER WAY	PRAIRIE VIEW DR	0.60	60	24	2	11	1	none	n/a	100	Good
3240-10		LOS SERRANOS DR	HAMBY RD	END	0.65	60	24	2	9	3	none	n/a	100	Excellent
4118-10		LOST PONDEROSA	BURGESS RD	BITTER BRUSH RD	0.46	60	20	2	9	1	none	n/a	200	Good
4121-10		LUNAR DR	SPRING RIVER RD	ELSINOR RD	0.63	60	24	2	9	3	none	n/a	300	Good
3562-10		LYDIA DR	BRADETICH LP	END	0.04	60	24	2	7	5	none	n/a	10	Excellent
2281-20	NE	LYNCH AVE	NE 11TH ST	END	0.11	60	22	2	9	2	none	n/a	50	Good
2322-10	NW	LYNCH CT	N.W. LYNCH LN.	END	0.14	60	24	2	11	1	none	n/a	Unknown	Good
2321-10	NW	LYNCH LN	N.W. 30TH ST	END	0.47	60	28	2	12	2	none	n/a	Unknown	Good
2323-10	NW	LYNCH WAY	NW 30TH ST.	END PAVEMENT	0.03	60	24	2	12	0	none	n/a	20	Fair-Poor
2323-20	NW	LYNCH WAY	END PAVEMENT	END/CUL-DE-SAC	0.14	60	20	2	10	0	none	n/a	20	Excellent
3234-10		MANZANITA CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	8	4	none	n/a	50	Fair-Poor
3308-10		MARE CT	DOBBIN RD	END	0.05	60	23	2	10.5	1	none	n/a	50	Good
1139-10		MARSH RD	CLINE FALLS HWY	WHITE ROCK LOOP	1.00	60	21	2	6.5	4	none	n/a	100	Excellent
3269-10		MARTEE LN	BYRAM RD	WALLACE RD	0.21	60	23	2	7.5	4	none	n/a	50	Good
3117-10		MARTINGALE CIR	BRIDLE LN	END BUBBLE	0.18	60	23	2	8.5	3	none	n/a	50	Excellent
3136-10		MATHERS RD	O B RILEY RD	END BUBBLE	0.32	60	25	2	10.5	2	none	n/a	50	Good
3455-10		MAVERICK CT	MUSTANG RD	END BUBBLE	0.07	60	24	2	8	4	none	n/a	50	Fair-Poor
3454-10		MAVERICK LN	CHAPARREL DR	MUSTANG RD	0.26	60	24	2	9	3	none	n/a	50	Fair-Poor
1121-10		MCALLISTER RD	HWY 20	END PAVEMENT	1.57	60	24	2	8	4	none	n/a	100	Fair-Poor
2120-20	SW	MCVEY AVE	SW 43RD ST	END PAVEMENT	0.13	60	24	2	9	3	none	n/a	300	Good
2120-40	SW	MCVEY AVE	S CANAL BLVD	SW 61ST ST	0.61	60	21	2	7.5	3	none	n/a	700	Fair-Poor
2120-50	SW	MCVEY AVE	SW 61ST ST	SW 77TH ST	1.06	60	21	2	7.5	3	none	n/a	500	Fair-Poor
3146-10		MEADOW LN	SCENIC DR	END BUBBLE	0.11	60	24	2	11	1	none	n/a	50	Fair-Poor
4110-10		MEADOW LN	BURGESS RD	PAULINA VIEW RD	0.63	60	24	2	8	4	none	n/a	50	Good
4110-20		MEADOW LN	PAULINA VIEW RD	END PAVEMENT	0.58	60	24	2	9	3	none	n/a	50	Good
3395-10		MEDICINE HAT LN	CALGARY DR	END BUBBLE	0.09	60	24	2	9	3	none	n/a	50	Good
3488-10		MELINDA CT	SYLVAN LOOP	END BUBBLE	0.11	60	24	2	8	4	none	n/a	50	Good
4155-10		METEOR DR	ELSINOR RD	INDIO RD	0.40	60	24	2	9	3	none	n/a	100	Excellent

Desch County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3122-10		MIDAY WAY	SUNSET DR	END BUBBLE	0.03	60	23	2	8.5	3	none	n/a	50	Fair-Poor
4153-10		MILKY WAY	MAPLE DR	ISLAND LOOP WAY	0.64	60	24	2	9	3	none	n/a	100	Good
3478-10		MISTY LN	RAINTREE DR	END BUBBLE	0.05	60	24	2	11	1	none	n/a	50	Excellent
3242-10		MONTARA DR	LOS SERRANOS DR	END	0.87	60	24	2	7	5	none	n/a	50	Excellent
2276-20	NE	MONTGOMERY AV	BEGIN	NE 33RD ST	0.24	60	24	2	9	3	none	n/a	50	Fair-Poor
2224-10	NW	MONTGOMERY DR	NORTHWEST WAY	NW 30TH ST	0.34	60	25	2	9.5	3	none	n/a	100	Fair-Poor
3169-10		MORRILL RD	DESCHUTES MARKET RD	GATE - END COUNTY MAINT	0.54	60	25	2	10.5	2	none	n/a	100	Good
3145-10		MOUNTAIN DR	HWY 20	SCENIC DR	0.26	60	26	2	8	5	none	n/a	50	Good
3457-10		MUSTANG CT	MUSTANG RD	END BUBBLE	0.07	60	24	2	9	3	none	n/a	50	Good
3456-10		MUSTANG RD	LARIAT LN	MAVERICK CT	0.38	60	24	2	9	3	none	n/a	100	Fair-Poor
3030-10		NAVAJO CIR	CHEYENNE RD	END BUBBLE	0.08	60	25	2	9.5	3	none	n/a	100	Good
3020-10		NAVAJO RD	CINDER BUTTE RD	CHEROKEE RD	0.82	60	24	2	8	4	none	n/a	200	Good
3020-20		NAVAJO RD	CHEROKEE RD	CHEYENNE RD	0.93	60	24	2	9	3	none	n/a	100	Good
3213-10		NELSON RD	DICKEY RD	POWELL BUTTE HWY	1.00	60	20	2	7	3	none	n/a	160	Fair-Poor
3213-20		NELSON RD	POWELL BUTTE HWY	MILE POINT	1.00	60	21	2	8.5	2	none	n/a	330	Good
3213-30		NELSON RD	MILE POINT	WAUGH RD	0.49	60	21	2	7.5	3	none	n/a	300	Good
4190-10		NEWBERRY RD	PAULINA LAKE RD	GOLDEN ASTOR RD	1.26	60	24	2	11	1	none	n/a	100	Good
2214-10	NW	NORSE DR	NW QUINCE AVE	NW SPRUCE AVE	0.25	60	24	2	8	4	none	n/a	50	Good
4114-10		NORTH DR	MEADOW LN	CENTER DR	0.19	60	21	2	7.5	3	none	n/a	50	Good
4172-10		NORTHRIDGE DR	PINE GROVE RD	END	0.06	60	24	2	10	2	none	n/a	50	Good
4134-10		NORTHWOOD DR	DAY RD	DEER FIELD DR	0.19	60	24	2	11	1	none	n/a	50	Fair-Poor
2215-20	NW	OAK AVE	NW 35TH ST	NW 38TH ST	0.21	60	24	2	7	5	none	n/a	100	Good
2215-40	NW	OAK AVE	BEGIN	101ST ST	0.65	60	24	2	7	5	none	n/a	50	Fair-Poor
2268-10	NW	OAK LN	101ST ST	END BUBBLE	0.20	60	24	2	8	4	none	n/a	50	Fair-Poor
3290-10		OBSIDIAN AVE	WARD RD	END	0.84	60	24	2	8	4	none	n/a	100	Good
3396-10		OKANAGAN LN	CALGARY DR	END BUBBLE	0.07	60	24	2	8	4	none	n/a	50	Good
3294-05		OLD DESCHUTES R	YEOMAN RD	COUNTRY SQUIRE RD	0.28	60	25	2	10.5	2	none	n/a	Unknown	Good
3294-10		OLD DESCHUTES R	COUNTRY SQUIRE RD	CANAL BRIDGE	0.31	60	24	2	9	3	none	n/a	310	Excellent
3294-20		OLD DESCHUTES R	CANAL BRIDGE	END CINDERS	0.46	60	18	2	9	0	none	n/a	100	Excellent
3306-10		OLD RED RD	WARD RD	DOBBINS RD	0.46	60	23	2	7.5	4	none	n/a	200	Good
2156-40		OLD REDMOND-BE	HWY 20	O B RILEY RD	0.21	60	30	2	11	4	none	n/a	900	Good
3292-10		OLIVIA CT	CHAPARREL DR	END BUBBLE	0.06	60	24	2	8	4	none	n/a	50	Good
2247-10	NW	ORCHARD CT	NW 38TH ST	END BUBBLE	0.26	60	24	2	9	3	none	n/a	50	Good
2248-10	NW	ORCHARD DR	NW 38TH ST	END	0.44	60	24	2	8	4	none	n/a	50	Good

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
4178-10		OTTER DR	LAZY RIVER SOUTH	EAGLE CT	0.52	60	24	2	11	1	none	n/a	400	Good
3271-10		OVER TREE RD	YEOMAN RD	END	0.60	60	21	2	7.5	3	none	n/a	100	Good
3291-10		OXBOW LN	CIMARRON DR	CHAPARREL DR	0.37	60	24	2	8	4	none	n/a	100	Good
3466-10		PALOMA DR	HAMBY RD	END	0.55	60	29	2	9.5	5	none	n/a	50	Excellent
3265-10		PARK WAY	FLORENCE DR	END BUBBLE	0.10	60	20	2	8	2	none	n/a	50	Good
3415-10		PARKER LN	PETERMAN LN	END BUBBLE	0.12	60	24	2	7	5	none	n/a	Unknown	Good
3537-10		PEACOCK LN	MCGRATH RD	END	0.51	60	19	2	9.5	0	none	n/a	20	Excellent
3255-10		PEARL LN	HYDE LN	KEYTE LN	0.12	60	23	2	8.5	3	none	n/a	50	Good
4150-10		PENGRA ST	6TH ST	END	0.10	60	23	2	7.5	4	none	n/a	100	Excellent
3416-10		PETERMAN LN	BUTLER MARKET RD	END PAVEMENT	0.32	60	24	2	8	4	none	n/a	50	Good
3027-10		PIMA RD	ZUNI RD	CHOCTAW RD	0.13	60	24	2	9	3	none	n/a	300	Fair-Poor
4125-10		PINE FOREST RD	BURGESS RD	END	0.99	60	23	2	9.5	2	none	n/a	50	Good
4174-10		PINE GROVE RD	BRIDGE DR	END BUBBLE	0.55	60	24	2	10	2	none	n/a	50	Good
3114-10		PINE KNOLL CIR	SADDLEBACK DR	END BUBBLE	0.22	60	21	2	6.5	4	none	n/a	50	Excellent
3248-10		PINE VISTA DR	KNOTT RD	RIDGEVIEW DR	0.99	60	24	2	7	5	none	n/a	255	Good
1105-10		PINEHURST RD	GERKING MARKET RD	HWY 20	0.58	60	21	2	7.5	3	none	n/a	100	Good
1105-20		PINEHURST RD	HWY 20	MOCK RD	0.73	60	20	2	8	2	none	n/a	300	Good
1105-30		PINEHURST RD	MOCK RD	ALLEN RD	1.01	60	20	2	9	1	none	n/a	200	Good
1105-40		PINEHURST RD	ALLEN RD	WALTON RD	0.48	60	20	2	8	2	none	n/a	200	Good
1105-50		PINEHURST RD	WALTON RD	TUMALO RESERVOIR RD	1.02	60	20	2	8	2	none	n/a	100	Good
3149-10		POHAKU RD	OLD REDMOND-BEND HWY	HUNNELL RD	0.30	60	24	2	8	4	none	n/a	500	Fair-Poor
1175-10		PONDEROSA CASC	BEGIN-WEST END	END	0.07	60	24	2	8	4	none	n/a	50	Excellent
1176-10		PONDEROSA LP	PONDEROSA CASCADE DR-WEST END	PONDEROSA CASCADE DR-EAST END	0.49	60	24	2	8	4	none	n/a	50	Excellent
4133-10		PONDEROSA WAY	BURGESS RD	FS RD 4320-040	0.68	60	24	2	9	3	none	n/a	500	Good
4133-20		PONDEROSA WAY	FS RD 4320-040	WHITE PINE RD	0.44	60	24	2	9	3	none	n/a	500	Fair-Poor
2213-40	NW	POPLAR AVE	NW 35TH ST	NW 38TH ST	0.25	60	24	2	7	5	none	n/a	50	Fair-Poor
2263-10	NW	POPLAR CT	98TH LN	END	0.14	60	24	2	9	3	none	n/a	20	Good
2267-10	NW	POPLAR CT	NW POPLAR AVE	END BUBBLE	0.10	60	24	2	9	3	none	n/a	50	Good
2312-10		POPLAR DR	LARCH DR	NW 77TH ST	1.07	60	24	2	8	4	none	n/a	50	Fair-Poor
2246-20	NW	POVEY AVE	BEGIN	NW 43RD ST	1.12	60	25	2	8.5	4	none	n/a	50	Good
3460-10		POWDERHORN DR	QUAIL RIDGE RD	END BUBBLE	0.08	60	25	2	9.5	3	none	n/a	50	Excellent
4161-10		PRAIRIE VIEW DR	BRIDGE DR	WALKER WAY - LOOP DR	0.34	60	24	2	11	1	none	n/a	50	Good
2216-10	NW	PROGRESS LN	NW NORSE DR	END BUBBLE	0.04	60	20	2	7	3	none	n/a	50	Good
3147-10		QUAIL HAVEN DR	ROGERS RD W	ROGERS RD E	1.06	60	24	2	9	3	none	n/a	50	Good

Desch County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3458-10		QUAIL RIDGE RD	HAMBY RD N	HAMBY RD S	0.49	60	25	2	9.5	3	none	n/a	100	Fair-Poor
2113-20	SW	QUARRY AVE	HWY 97	SW 51ST ST	0.38	60	21	2	8.5	2	none	n/a	300	Excellent
2113-30	SW	QUARRY AVE	SW 51ST ST	S CANAL BLVD	0.74	60	21	2	7.5	3	none	n/a	220	Excellent
2113-40	SW	QUARRY AVE	S CANAL BLVD	SW 77TH ST	1.00	60	22	2	7	4	none	n/a	100	Excellent
3397-10		QUEBEC CT	QUEBEC DR	END BUBBLE	0.09	60	24	2	10	2	none	n/a	50	Excellent
3398-10		QUEBEC DR	SWEETGRASS DR	EDMONTON DR	0.65	60	24	2	8	4	none	n/a	300	Fair-Poor
2217-40	NW	QUINCE AVE	NW 35TH ST	NW 38TH ST	0.21	60	25	2	7.5	5	none	n/a	50	Good
2217-60	NW	QUINCE AVE	101ST LN	105TH CT	0.25	60	24	2	8	4	none	n/a	50	Excellent
3409-10		RADCLIFF CIR	WOODSIDE RD	END BUBBLE	0.08	60	24	2	8	4	none	n/a	50	Excellent
3479-10		RAINTREE DR	KNOTT RD	END	0.28	60	24	2	7	5	none	n/a	50	Fair-Poor
3367-10		RANGER WAY	CHISHOLM TRAIL	END BUBBLE	0.05	60	24	2	9	3	none	n/a	50	Fair-Poor
3196-10		RASTOVICH RD	WARD RD	END	0.24	60	22	2	7	4	none	n/a	200	Good
2218-10	NW	REDWOOD LN	NW NORSE DR	END BUBBLE	0.05	60	20	2	5	5	none	n/a	50	Good
3263-10		RIDGEVIEW CT	RIDGEVIEW DR	END BUBBLE	0.05	60	23	2	8.5	3	none	n/a	50	Fair-Poor
3249-10		RIDGEVIEW DR	WOODSIDE RD	WINDY RIDGE RD	1.00	60	24	2	8	4	none	n/a	100	Good
3249-20		RIDGEVIEW DR	WINDY RIDGE RD	END	0.65	60	24	2	8	4	none	n/a	100	Excellent
3264-10		RIDGEVIEW PL	RIDGEVIEW DR	END BUBBLE	0.07	60	20	2	7	3	none	n/a	50	Bad
1123-10		RIDGEWOOD DR	TUMALO RESERVOIR RD	END	0.21	60	25	2	7.5	5	none	n/a	50	Excellent
2234-10	NW	RIMROCK #1	NW RIMROCK LOOP	END BUBBLE	0.08	60	24	2	9	3	none	n/a	50	Good
2235-10	NW	RIMROCK #2	NW 25TH ST	END BUBBLE	0.08	60	24	2	9	3	none	n/a	50	Fair-Poor
2236-10	NW	RIMROCK #3	NW 25TH ST	END BUBBLE	0.08	60	24	2	8	4	none	n/a	50	Good
2237-10	NW	RIMROCK #4	NW 25TH ST	END BUBBLE	0.19	60	25	2	7.5	5	none	n/a	50	Good
2231-10	NW	RIMROCK LOOP	NW 25TH ST	NW 21ST ST	0.27	60	24	2	9	3	none	n/a	100	Good
3325-10		RINCON AVE	SOMERSET DR	END BUBBLE	0.14	60	23	2	7.5	4	none	n/a	50	Fair-Poor
3095-10		RIVER BEND DR	END BUBBLE WEST	END BUBBLE EAST	0.66	60	25	2	9.5	3	none	n/a	50	Good
4120-10		RIVER PINE RD	BITTER BRUSH RD	BURGESS RD	0.46	60	20	2	8	2	none	n/a	100	Fair-Poor
3025-20		RIVER WOODS DR	LAKEVIEW RD	KIOWA RD	0.99	60	24	2	8	4	none	n/a	500	Good
3025-30		RIVER WOODS DR	KIOWA RD	CHOCTAW RD W	1.03	60	24	2	8	4	none	n/a	500	Good
3025-40		RIVER WOODS DR	CHOCTAW RD W	END/CUL-DE-SAC	0.40	60	25	2	7.5	5	none	n/a	200	Good
2271-10	NW	ROBERTS CT	NW 83RD PL	END BUBBLE	0.17	60	25	2	12.5	0	none	n/a	50	Good
3243-10		RODEO CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	8	4	none	n/a	50	Good
3139-10		ROGERS RD	OLD REDMOND-BEND HWY	HUNNELL RD	0.86	60	24	2	8	4	none	n/a	310	Good
4188-10		ROSLAND RD	HWY 97	PGT GAS PIPELINE XING	0.91	60	24	2	10	2	none	n/a	865	Good
4188-20		ROSLAND RD	PGT GAS PIPELINE XING	END PAVEMENT	1.30	60	24	2	10	2	none	n/a	700	Excellent

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3096-10		RUSTIC CANYON R	BUCK CANYON RD	RIVER BEND DR	0.17	60	25	2	8.5	4	none	n/a	100	Good
3304-10		RUSTICATE RD	WOODSIDE RD	END BUBBLE	0.21	60	24	2	9	3	none	n/a	50	Good
3111-10		SADDLEBACK DR	WEST DEAD END	JOHNSON MARKET RD	0.30	60	24	2	8	4	none	n/a	100	Good
3111-20		SADDLEBACK DR	JOHNSON MARKET RD	END BUBBLE	0.37	60	24	2	8	4	none	n/a	100	Fair-Poor
3113-10		SADDLEBACK LN	SADDLEBACK DR	END BUBBLE	0.26	60	21	2	7.5	3	none	n/a	50	Excellent
3112-10		SADDLEBACK PL	SADDLEBACK DR	END BUBBLE	0.16	60	21	2	7.5	3	none	n/a	50	Excellent
3239-10		SAGE CT	CIMARRON DR	END BUBBLE	0.20	60	24	2	9	3	none	n/a	50	Good
3399-10		SASKATOON LN	KIMBERLY CT	END BUBBLE	0.10	60	24	2	9	3	none	n/a	50	Excellent
3144-10		SCENIC DR	ROGERS RD	END COUNTY MAINT	0.62	60	25	2	9.5	3	none	n/a	100	Good
2201-20	NW	SEDGEWICK AVE	NW 19TH ST	NW ALMETER WAY	0.98	60	21	2	7.5	3	none	n/a	200	Fair-Poor
4157-10		SERPENTINE DR	BRIDGE DR	HAFDAHL LN	0.27	60	24	2	10	2	none	n/a	50	Good
4173-10		SHADOW CT	PINE GROVE RD	END BUBBLE	0.04	60	24	2	10	2	none	n/a	50	Good
4160-10		SHANKS LN	SPRAGUE LOOP	END PAVEMENT	0.05	60	24	2	9	3	none	n/a	50	Good
3336-10		SHOLES RD	TEKAMPE RD	END PAVEMENT	0.26	60	20	2	6	4	none	n/a	100	Good
3029-10		SHOSHONE RD	BAKER RD E	BUCK CANYON RD	0.61	60	25	2	8.5	4	none	n/a	300	Good
3029-20		SHOSHONE RD	BUCK CANYON RD	END PAVEMENT	0.74	60	24	2	9	3	none	n/a	200	Fair-Poor
3115-10		SILVERADO DR	SADDLEBACK DR	END	0.24	60	24	2	9	3	none	n/a	50	Excellent
3225-10		SILVIS RD	BUTLER MARKET RD	END PAVEMENT	0.29	60	19	2	7.5	2	none	n/a	50	Good
3535-50		SKYLINERS RD	FS RD 4601-300(CIND SITE 1037)	FS RD 4601-400	1.50	60	26	2	10	3	none	n/a	400	Good
3535-60		SKYLINERS RD	FS RD 4601-400	FS BOUNDARY	1.57	60	24	2	8	4	none	n/a	400	Good
3535-70		SKYLINERS RD	FS BOUNDARY	FS RD 4601-END COUNTY MAINT	0.37	60	22	2	6	5	none	n/a	100	Good
3141-10		SNOW CAP PL	GLACIER VIEW DR	END BUBBLE	0.06	60	22	2	9	2	none	n/a	50	Good
4123-10		SOLAR DR	SPRING RIVER RD	KINGSBURG RD	1.07	60	24	2	7	5	none	n/a	300	Good
4123-20		SOLAR DR	KINGSBURG RD	ISLAND LOOP RD	0.85	60	24	2	8	4	none	n/a	100	Good
3324-10		SOMERSET DR	RASTOVICH RD	END	0.83	60	24	2	7	5	none	n/a	100	Excellent
4115-10		SOUTH DR	MEADOW LN	CENTER DR	0.19	60	21	2	8.5	2	none	n/a	100	Excellent
5104-10		SPENCER WELLS R	HWY 20	MILE POST	1.00	60	22	2	9	2	none	n/a	100	Excellent
5104-20		SPENCER WELLS R	MILE POST	MILE POST	1.00	60	22	2	9	2	none	n/a	100	Excellent
5104-30		SPENCER WELLS R	MILE POST	MILE POST	1.00	60	22	2	9	2	none	n/a	100	Excellent
5104-40		SPENCER WELLS R	MILE POST	MILE POST	1.00	60	22	2	9	2	none	n/a	100	Excellent
5104-50		SPENCER WELLS R	MILE POST	MILE POST	1.00	60	20	2	7	3	none	n/a	100	Excellent
5104-60		SPENCER WELLS R	MILE POST	MILE POST	1.00	60	21	2	7.5	3	none	n/a	100	Good
5104-70		SPENCER WELLS R	MILE POST	END PAVEMENT	0.59	60	21	2	7.5	3	none	n/a	100	Fair-Poor
4162-10		SPRAGUE LOOP	BRIDGE DR N	BRIDGE DR S	1.20	60	24	2	10	2	none	n/a	50	Excellent

Desch County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
2219-20	NW	SPRUCE	NW 35TH ST	END BUBBLE	0.30	60	23	2	6.5	5	none	n/a	50	Good
2219-50	NW	SPRUCE	NW 91ST ST	NW 95TH ST	0.28	60	25	2	9.5	3	none	n/a	Unknown	Good
1166-20		SQUAW BACK RD	UGB - SISTERS	END PAVEMENT	0.17	60	20	2	6	4	none	n/a	195	Fair-Poor
3135-10		STAG DR	JOHNSON MKT RD	MILE POST	1.00	60	25	2	8.5	4	none	n/a	50	Good
3135-20		STAG DR	MILE POST	BUCK DR	0.11	60	24	2	10	2	none	n/a	50	Good
4506-10		STAGE STOP DR	SOUTH CENTURY DR	OLD GENERAL PATCH BRIDGE	0.37	60	22	2	9	2	none	n/a	300	Good
4194-10		STELLAR DR	SPRING RIVER RD	KINGSBURG RD	1.05	60	24	2	8	4	none	n/a	400	Excellent
4194-20		STELLAR DR	KINGSBURG RD	MAPLE DR	0.84	60	24	2	8	4	none	n/a	200	Good
3200-10		STEVENS RD	SE 27TH ST	WARD RD	1.04	60	21	2	6.5	4	none	n/a	500	Fair-Poor
3400-10		STIRLING DR	CALGARY DR	END PAVEMENT	0.78	60	24	2	8	4	none	n/a	100	Good
3459-10		STONY RIDGE RD	QUAIL RIDGE RD	END BUBBLE	0.08	60	25	2	8.5	4	none	n/a	50	Good
3446-10		STORMY LN	TORKELSON RD	END	0.26	60	29	2	9.5	5	none	n/a	50	Excellent
3301-10		STUB PL	HAMBY RD	END BUBBLE	0.06	60	21	2	8.5	2	none	n/a	50	Good
3311-10		STUD CT	NE BEAR CREEK RD	END BUBBLE	0.13	60	20	2	7	3	none	n/a	50	Good
3124-10		SUNGLOW CT	SUNSET DR	END BUBBLE	0.05	60	21	2	6.5	4	none	n/a	50	Good
4180-10		SUNRISE BLVD	DAY RD	END PAVEMENT-BEGIN CINDERS	0.96	60	24	2	10	2	none	n/a	655	Fair-Poor
3121-10		SUNRISE CIR	SUNSET DR NW	SUNSET DR SE	0.19	60	25	2	10.5	2	none	n/a	50	Fair-Poor
3120-10		SUNSET DR	OLD REDMOND-BEND HWY	O B RILEY RD	0.52	60	25	2	9.5	3	none	n/a	50	Fair-Poor
4138-10		SUNSET LN	DAY RD	END BUBBLE	0.10	60	20	2	8	2	none	n/a	50	Fair-Poor
3123-10		SUNSET PL	SUNSET DR	END BUBBLE	0.04	60	21	2	6.5	4	none	n/a	50	Good
2109-10		SWALLEY RD	S CANAL BLVD	CANAL BRIDGE	0.68	60	21	2	6.5	4	none	n/a	400	Good
2109-20		SWALLEY RD	CANAL BRIDGE	TWIN BRIDGES RD	0.78	60	21	2	6.5	4	none	n/a	400	Good
2109-30		SWALLEY RD	TWIN BRIDGES RD	STURGEON RD	0.76	60	21	2	6.5	4	none	n/a	300	Good
2109-40		SWALLEY RD	STURGEON RD	TUMALO RD	0.50	60	21	2	6.5	4	none	n/a	300	Good
3401-10		SWEETGRASS DR	HORSE BUTTE RD	EDMONTON DR	0.61	60	24	2	9	3	none	n/a	100	Good
3401-20		SWEETGRASS DR	EDMONTON DR	STIRLING DR	0.42	60	24	2	9	3	none	n/a	50	Good
3402-10		SWEETGRASS LN	SWEETGRASS DR	QUEBEC DR	0.24	60	24	2	9	3	none	n/a	50	Good
3346-10		SYLVAN LOOP	MCGRATH RD N	KATIE DR	0.97	60	25	2	9.5	3	none	n/a	300	Good
3346-20		SYLVAN LOOP	KATIE DR	MCGRATH RD S	0.49	60	25	2	8.5	4	none	n/a	200	Good
3321-10		TALL PINE AVE	KNOTT RD	WOODSIDE LOOP	1.02	60	24	2	8	4	none	n/a	300	Fair-Poor
3151-10		TANGLEWOOD RD	ROGERS RD	END	0.60	60	25	2	9.5	3	none	n/a	50	Fair-Poor
2272-20	NW	TEATER AVE	BEGIN BUBBLE	NW 93RD ST	0.88	60	25	2	10.5	2	none	n/a	50	Good
2272-30	NW	TEATER AVE	NW 93RD ST	NW LOWER BRIDGE WAY	0.60	60	25	2	9.5	3	none	n/a	50	Excellent
3208-10		TEKAMPE RD	KNOTT RD	END COUNTY MAINT	1.00	60	24	2	8	4	none	n/a	500	Good

Deschutes County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
3201-10		TEN BARR RD	HWY 20	NE BEAR CREEK RD-MCNAUGHT RD	0.82	60	23	2	8.5	3	none	n/a	100	Good
1110-50		THREE CREEK RD	FS RD 1600-210	FS RD 1600-370	1.19	60	26	2	11	2	none	n/a	200	Fair-Poor
4169-10		TIMBER LANE LOO	BRIDGE DR N	BRIDGE DR S	0.42	60	24	2	10	2	none	n/a	50	Good
3285-10		TOMAHAWK ST	OBSIDIAN AVE	END	0.11	60	19	2	7.5	2	none	n/a	50	Fair-Poor
3221-10		TORKELSON RD	HWY 20	NE BEAR CREEK RD	0.46	60	26	2	10	3	none	n/a	100	Good
1107-70		TUMALO RESERVO	COLLINS RD	SISEMORE RD	0.56	60	20	2	8	2	none	n/a	100	Good
1125-10		TUMALO RIM CT	TUMALO RIM DR	END BUBBLE	0.06	60	25	2	9.5	3	none	n/a	50	Good
1122-10		TUMALO RIM DR	TUMALO RESERVOIR RD	JOHNSON MARKET RD	0.69	60	24	2	7	5	none	n/a	100	Excellent
3237-10		TUMBLEWEED CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	8	4	none	n/a	50	Good
3451-10		TUMBLEWEED DR	CHAPARREL DR	END BUBBLE	0.33	60	24	2	8	4	none	n/a	50	Good
1114-10		TWEED RD	HWY 20	MILE POINT	1.00	60	22	2	8	3	none	n/a	100	Good
1114-20		TWEED RD	MILE POINT	COUCH MARKET RD	0.95	60	22	2	7	4	none	n/a	200	Good
1140-10		TWIN BRIDGES RD	WHITE ROCK LOOP	SWALLEY RD	1.06	60	25	2	9.5	3	none	n/a	100	Excellent
1111-10		TYLER RD	TUMALO RESERVOIR RD	KUHLMAN RD	1.32	60	25	2	11.5	1	none	n/a	200	Excellent
1111-20		TYLER RD	KUHLMAN RD	JOHNSON MARKET RD	0.79	60	25	2	11.5	1	none	n/a	200	Excellent
3403-10		VANCOUVER LN	QUEBEC DR	END BUBBLE	0.07	60	24	2	8	4	none	n/a	50	Good
1108-10		VARCO RD	CASCADE WAY	END COUNTY MAINT	0.33	60	23	2	9.5	2	none	n/a	500	Excellent
2273-20	NW	VAUGHN AVE	NW TEATER AVE	NW 89TH PL	0.52	60	25	2	12.5	0	none	n/a	50	Excellent
4199-10		VENTURE LN	S CENTURY DR	S CENTURY DR	0.44	60	24	2	9	3	none	n/a	500	Good
3404-10		VICTORIA LN	CALGARY DR	END BUBBLE	0.06	60	24	2	8	4	none	n/a	50	Good
3293-10		VINTAGE LN	CIMARRON DR	END BUBBLE	0.19	60	20	2	6	4	none	n/a	50	Excellent
3177-10		WALKER RD	WILLARD RD	LANDFILL RD	0.97	60	22	2	9	2	none	n/a	100	Good
3177-20		WALKER RD	LANDFILL RD	DODDS RD (END PAVEMENT)	1.00	60	22	2	9	2	none	n/a	200	Good
4148-10		WALKER ST	5TH ST	END	0.20	60	23	2	9.5	2	none	n/a	600	Good
4165-10		WALKER WAY	FOREST RD	PRAIRIE VIEW DR-LOOP DR	0.31	60	24	2	10	2	none	n/a	50	Fair-Poor
3267-10		WALLACE RD	ALFALFA MARKET RD	END BUBBLE	0.50	60	23	2	7.5	4	none	n/a	50	Good
1113-10		WALTON RD	PINEHURST RD	COLLINS RD	0.50	60	19	2	7.5	2	none	n/a	100	Good
3447-10		WARBOW PL	STORMY LN	END	0.07	60	29	2	10.5	4	none	n/a	50	Excellent
3178-10		WAUGH RD	MCGRATH RD	NELSON RD	0.50	60	25	2	8.5	4	none	n/a	200	Fair-Poor
3178-20		WAUGH RD	NELSON RD	ALFALFA MARKET RD	1.49	60	21	2	7.5	3	none	n/a	300	Fair-Poor
1178-10		WEST CASCADE	PONDEROSA CASCADE DR	END/CUL-DE-SAC	0.09	60	24	2	8	4	none	n/a	10	Excellent
4116-10		WEST DR	MEADOW LN	CENTER DR	0.19	60	21	2	8.5	2	none	n/a	50	Good
1141-10		WHITE ROCK LOOP	CLINE FALLS HWY N	HARPER RD	0.78	60	21	2	7.5	3	none	n/a	100	Good
1141-20		WHITE ROCK LOOP	HARPER RD	90 DEGREE CURVE	0.99	60	20	2	8	2	none	n/a	100	Good

Deschu County

Rural Local Roads

Rd-Sg	Dir	Road Name	From	To	Length	ROW Width	Pavement Width	No. of Travel Lanes	Lane Width	Shoulder Width	Bike Lanes	Accesses per Mile	Average Daily Traffic	Pavement Condition
1141-30		WHITE ROCK LOOP	90 DEGREE CURVE	CLINE FALLS HWY S	1.00	60	21	2	7.5	3	none	n/a	200	Fair-Poor
3286-10		WICKIUP RD	OBSIDIAN AVE	END BUBBLE	0.19	60	20	2	6	4	none	n/a	100	Fair-Poor
2274-10	NW	WILLIAMS LOOP	NW WILLIAMS WAY	NW WILLIAMS WAY	0.94	60	25	2	9.5	3	none	n/a	50	Good
2275-10	NW	WILLIAMS WAY	NORTHWEST WAY	NW WILLIAMS LOOP	0.18	60	25	2	10.5	2	none	n/a	50	Good
2189-10	NW	WIMP WAY	HWY 97	NW ICE AVE	0.34	60	20	2	8	2	none	n/a	300	Good
2189-20	NW	WIMP WAY	NW ICE AVE	END	1.30	60	22	2	8	3	none	n/a	300	Good
3262-10		WINDY RIDGE RD	RIDGEVIEW DR	END BUBBLE	0.13	60	21	2	6.5	4	none	n/a	50	Fair-Poor
3376-10		WOODSIDE DR NO	WOODSIDE RD	END	0.44	60	24	2	8	4	none	n/a	50	Good
3323-10		WOODSIDE LOOP	RIDGEVIEW DR	PINE VISTA DR	0.84	60	24	2	8	4	none	n/a	300	Good
3499-10		WOODSIDE PL	WOODSIDE RD	END BUBBLE	0.08	60	22	2	8	3	none	n/a	50	Good
3250-20		WOODSIDE RD	UGB - BEND	PINE VISTA DR	0.91	60	25	2	7.5	5	none	n/a	800	Good
3250-30		WOODSIDE RD	PINE VISTA DR	RIDGEVIEW DR	0.69	60	24	2	8	4	none	n/a	400	Good
2106-20	SW	YOUNG AVE	SW 61ST ST	CANAL BRIDGE	0.50	60	20	2	6	4	none	n/a	200	Good
2106-30	SW	YOUNG AVE	CANAL BRIDGE	S CANAL BLVD	0.37	60	20	2	7	3	none	n/a	200	Good
2106-40	SW	YOUNG AVE	S CANAL BLVD	SW 77TH ST	0.10	60	21	2	7.5	3	none	n/a	100	Fair-Poor
2106-50	SW	YOUNG AVE	SW 77TH ST	SW 93RD ST	1.00	60	20	2	7	3	none	n/a	100	Fair-Poor
2170-10	NE	YUCCA AVE	NE O'NEIL WAY	NE 17TH ST	0.76	60	20	2	7	3	none	n/a	50	Fair-Poor
3232-10		YUCCA CT	CIMARRON DR	END BUBBLE	0.19	60	24	2	8	4	none	n/a	50	Fair-Poor
2233-10	NW	YUCCA WAY	NW PERSHALL WAY	NW 21ST ST	0.13	60	24	2	9	3	none	n/a	100	Good
3405-10		YUKON LN	CALGARY DR	END BUBBLE	0.08	60	24	2	9	3	none	n/a	50	Good
3028-10		ZUNI RD	SHOSHONE RD	END PAVEMENT	0.11	60	24	2	7	5	none	n/a	100	Fair-Poor

Total Miles of Rural Local Roads:

		Percentage:
Excellent = 70-100	45.77	19.0%
Good = 50-70	138.06	57.3%
Fair-Poor = 25-50	54.45	22.6%
Bad = <25	2.77	1.1%
Total:	241.05	100.0%

signirds.xls (rural local)

Appendix G

TERREBONNE AND TUMALO STREET STANDARDS

TABLE 18-66-A

TERREBONNE ROAD DEVELOPMENT STANDARDS (1)

Road Class/ Zone District		Right-of-Way Width	Pavement Width (5)	Travel Lane Width	On-Street Parking (15)	Shoulder	Drainage Swale (7,8)	Sidewalk	Pavement Type	Base Depth (4)	Maximum Grade (6)	Design Speed
Arterial												
US 97		80'-100'	60'	12'	Not Allowed	6' paved	Not Required	Not Required (9)	(see note #3)		6%	(see note #3)
Smith Rock Way	*TeC*	60'	34'	12'	Not Allowed	5' paved	Required	Required (10)	3" AC	10"	6%	(see note #2)
	TeR	60'	34'	12'	Not Allowed	5' paved	Not Required	Not Required	3" AC	10"	6%	(see note #2)
Lower Bridge Way		60'	34'	12'	Not Allowed	5' paved	Not Required	Not Required	3" AC	10"	6%	(see note #2)
Collector												
Commercial	*TeC*	60'	24'	12'	Allowed	Part of Swale	Required	Required (10)	3" AC	8"	8%	(see note #2)
	TeCR	60'	24'	12'	Allowed	4' gravel	Not Required	Not Required	3" AC	8"	8%	(see note #2)
Residential *TeR*		60'	24'	12'	Allowed	Part of Swale	Not Required (11)	Not Required (11)	3" AC	8"	8%	(see note #2)
Local												
Commercial	*TeC*	60'	24'	12'	Allowed	Part of Swale	Required	Required (9)	3" AC	8"	8%	(see note #2)
	TeCR	60'	24'	12'	Allowed	4' gravel	Not Required	Not Required	3" AC	8"	8%	(see note #2)
Residential *TeR*		60'	20'	10'	Allowed	4' gravel	Not Required (12)	Not Required (12)	0-9 or 2" AC	6"	10%	(see note #2)
Other												
Alley (Commercial)		20'	20'	10'	Allowed	Allowed	Not Required	Not Required	3" AC	6"	10%	(see note #2)
Path/Trail		15'	6' unpaved 8'-10'paved	---	---	graded 2' min. if paved	---	---	2" AC	4"	5%	---

(1) These design specifications are intended to guide new construction and any required improvements to existing facilities.
(2) Design shall be in accordance with AASHTO standards.
(3) Design shall be in accordance with Oregon Department of Transportation Design Standards.
(4) Required base depth may be increased when C.B.R. or R-valve is required by the Department of Public Works.
(5) Cul-de-sac bulb to be paved with a 45-foot minimum radius.
(6) Increase in grade of 2 percent may be allowed in unusually steep areas.
(7) Widths are variable, but in no case shall a swale be less than 8 feet in width.

Revised: November 10, 1997

(8) Where drainage swales are not required, the standards for drainage in Title 17, Chapter 17.48 shall still apply.
(9) 6-foot sidewalks required on both sides of Highway 97 between South 11th Avenue and Central Avenue intersections. Includes pedestrian crossing improvement a "B" Avenue and "C" Avenue intersection (see Terrebonne Comprehensive Plan Map D-3).
(10) 5-foot curbless sidewalks with a drainage swale required on both sides of the road.
(11) 5-foot curbless sidewalks with drainage swales required from West 19th Street to 15th Street on the south side of "C" Avenue (see Terrebonne Comprehensive Plan Map D-3).
(12) 5-foot curbless sidewalks with drainage swales required along school frontage on "B" Avenue and 5th Street (see Terrebonne Comprehensive Plan Map D-3).
(13) Frontage roads shall be in accordance with Table A contained in Title 17, Chapter 17.48 of the Deschutes County Code.
(14) Private roads shall be constructed in accordance with Table 18-66-A standards for local roads.
(15) Where allowed, parking must be off pavement.

TABLE 18-67-A

TUMALO ROAD DEVELOPMENT STANDARDS (1)

Road Class/ Zone District	Right-of-Way Width	Pavement Width (5)	Travel Lane Width	On-Street Parking (13)	Shoulder	DrainageSwale (7,10)	Sidewalk	Pavement Type	Base Depth (4)	Maximum Grade (6)	Design Speed
Arterial											
US 20	80'-100'	60'	12'	Not Allowed	6' paved	Not Required	Not Required	(see note #3)		6%	(see note #3)
Collector											
Rural	60'	36'	12'	Not Allowed	6' paved	Not Required	Not Required	3" AC	8"	8%	(see note #2)
Commercial.	60'	30'	10'	Allowed	5' paved	Required	Required (8)	3" AC	8"	8%	(see note #2)
Local											
Commercial	60'	20'	10'	Allowed	Part of swale	Not Required (9)	Not Required (8,9)	3" AC	8"	8%	(see note #2)
Residential	60'	20'	10'	Allowed	4' gravel	Not Required	Not Required	0-9 or 2" AC	6"	10%	(see note #2)
Other											
Alley (Commercial)	60'	20'	10'	Allowed	Allowed	Not Required	Not Required	3" AC	8"	10%	(see note #2)
Path/Trail	15'	6' unpaved 8'-10'paved	---	---	graded 2' min. if paved	---	---	2" AC	4"	5%	---

(1) These design specifications are intended to guide new construction and any required improvements to existing facilities.
(2) Design shall be in accordance with AASHTO standards.
(3) Design shall be in accordance with Oregon Department of Transportation Design Standards.
(4) Required base depth may be increased when C.B.R. or R-valve is required by the Department of Public Works.
(5) Cul-de-sac bulb to be paved with a 45-foot minimum radius.
(6) Increase in grade of 2 percent may be allowed in unusually steep areas.
(7) Widths are variable, but in no case shall a swale be less than 8 feet in width.
(8) 5-foot curbless sidewalks with a drainage swale required on both sides of the road.

(9) 5-foot curbless sidewalks with drainage swales only required on those road segments designated for sidewalks (see Tumalo Comprehensive Plan Map D2).
(10) Where drainage swales are not required, the standards for drainage in Title 17, Chapter 17.48 shall still apply.
(11) Frontage roads shall be in accordance with Table A contained in Title 17, Chapter 17.48 of the Deschutes County Code.
(12) Private roads shall be constructed in accordance with Table 18-67-A standards for local roads.
(13) Where allowed, parking must be off pavement.

Revised: November 10, 1997

Appendix H

BEND-REDMOND COMMUTER SHUTTLE SERVICE FEASIBILITY STUDY

Bend–Redmond Commuter Shuttle Service Feasibility Study

August 1997

Prepared for the

Oregon Department of Transportation

by

Commute Options for Central Oregon

A project of the Central Oregon Environmental Center
16 NW Kansas, Bend, Oregon 97701

Bend–Redmond Commuter Shuttle Service Feasibility Study

Contents

Summary

There are thousands of commuters traveling between Bend and Redmond, about two-thirds of which travel into Bend to work. Preliminary surveys indicate interest in a commuter-oriented, intercity shuttle. Daily ridership could probably average about 100 with a fare not exceeding $3.00. Operation would normally be restricted to weekdays.

To provide timely service, a shuttle would need to travel a fairly direct route with few stops. This would most easily be achieved with half-hour service from specific pickup locations to large employers or concentrated employment areas. Maximum flexibility with minimum investment would be offered by 12 to 15-passenger vans.

Start-up costs for a 3-van system would be at least $150,000. Annual operational costs would be about $165,000 for the vehicles and $30,000 miscellaneous (marketing, management, etc.). With careful planning, a fleet of 3 to 5 vans could probably cover a substantial portion (perhaps 45%) of its operating and administration costs through fares. The remainder would need to be subsidized.

Although a schedule and some likely shuttle stops have been identified, further study is needed to determine operational details.

1. Purpose

This study examines the feasibility of a commuter shuttle service between Bend and Redmond through existing data and a simple survey.

2. Factors

Many factors influence an individual's choice of travel mode. Various studies have identified over a hundred critical factors. Among those that may be most important to potential shuttle riders are distance to the pickup point, timely service, cost, and comfort. Addressing these needs will be a challenge: riders tend to live and work in widely dispersed areas, they need to be picked up at different times, they are willing to pay only a fraction of transport costs, and there is poor infrastructure (such as bus stops and sidewalks) to support transit. The success of a shuttle service will depend on how these factors are addressed.

3. Potential Riders

Commute trips make up only one in five trips, although they typically represent 30% to 40% of transit trips (reference *Bend Urban Area Transit Feasibility Study*, Nelson\Nygaard Consulting Associates, 1996). A commuter shuttle between Bend and Redmond (about 16 miles between city centers) focuses on a subset of commuters who currently have no other option than private automobile. Commuting patterns and the location of employment centers will give an indication of how many people might use a commuter shuttle at least some of the time.

Central Oregon Commuting Patterns

The 1990 Census journey-to-work data provide the most complete look at commuting patterns. Although Central Oregon has grown significantly since 1990, the overall relationships should be similar, with Bend attracting the majority of intercity commuters because it contains by far the most jobs. Some of the commuting data are listed below, with the estimated number of workers in 1994 (extrapolated from Bureau of Labor Statistics data which showed that Deschutes County had a civilian labor force of 49,508):

Deschutes County		**1994 Est.**
Workers living in a census place	45%	22,300
Workers with 20+ minute commute	30%	14,850

Bend		**1994 Est.**
Workers living in Bend	30%	14,850
Workers commuting outside Bend	23%	3,415
Workers with 20+ minute commute	17%	2,500

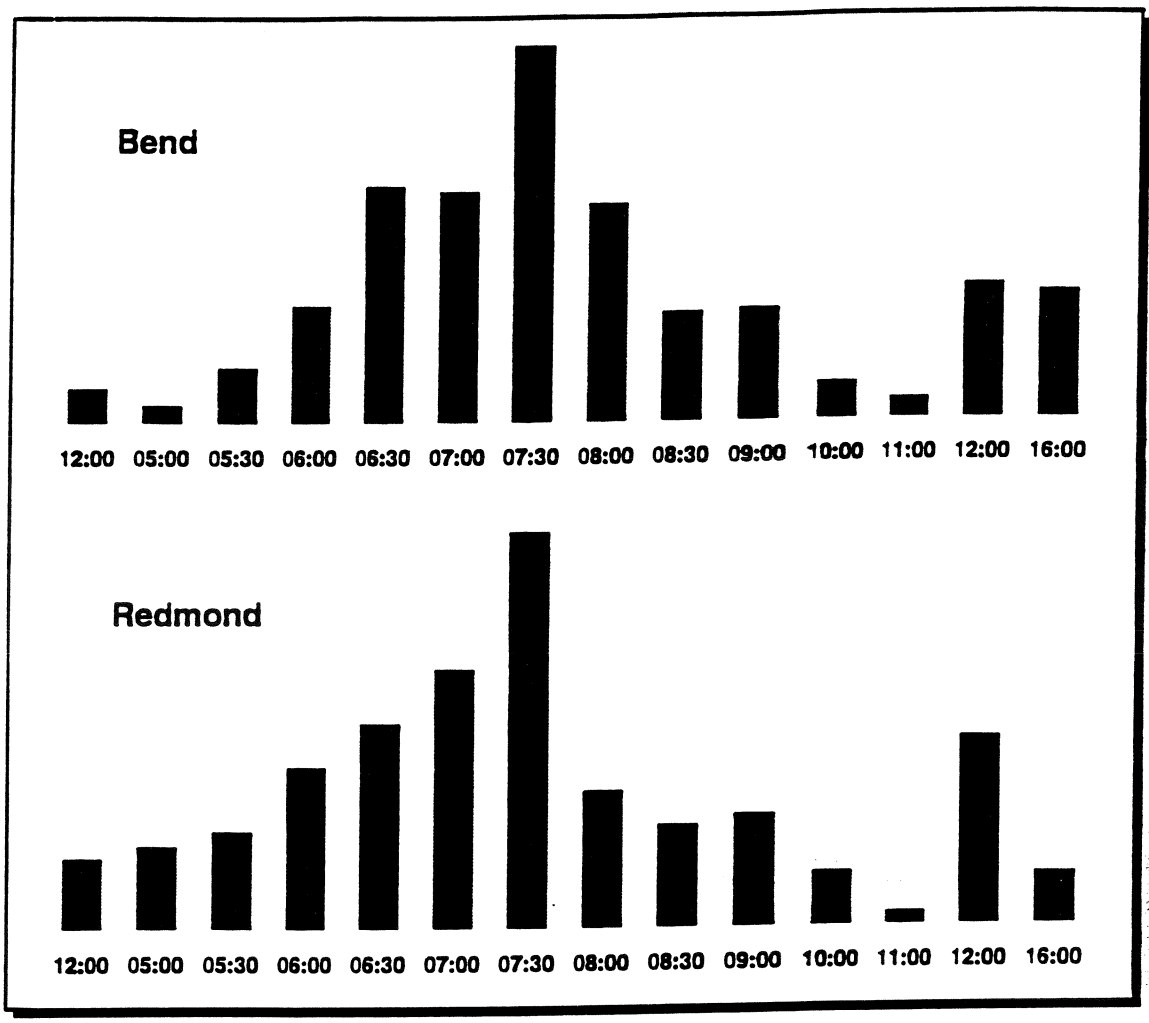
Redmond		**1994 Est.**
Workers living in Redmond	9%	4,455
Workers commuting outside Redmond	40%	1,780
Workers with 20+ minute commute	35%	1,550

About twice as many workers who lived in Redmond commuted to jobs outside the city than did workers who lived in Bend. So, even though Bend had 3.3 times the total workers of Redmond, Redmond had half as many who commuted outside their city and even a higher proportion who traveled 20 or more minutes to their job.

Also, nearly 20% of Redmond and Bend commuters left for work between 7:30 and 8:00 a.m. (see Figure 1). In Redmond, about half left between 6:00 and 8:00 a.m. In Bend, over half left between 6:30 and 8:30 a.m., reflecting the shorter overall commuting time in Bend, presumably because jobs are closer.

The number of workers with a 20 or more minute commute, especially those who live in Bend or Redmond (4,050), give a rough idea of the total number of potential shuttle users between these cities. Of course, some of these workers travel to other cities or county areas, but they might be willing to take the shuttle for part of their trip, as may some commuters who live in county areas (for example, a resident of Terrebonne could drive to Redmond and take the shuttle to Bend).

Figure 1. Time Workers Leave for Job (1990 Census)



In Oregon, transit captured 3.4% of commute trips in 1990. Applying this percentage to the potential users between Bend and Redmond yields a ridership of 138. If this group used transit an average of 3.5 out of 5 weekdays, that would be a daily ridership of nearly 100.

Major Employers

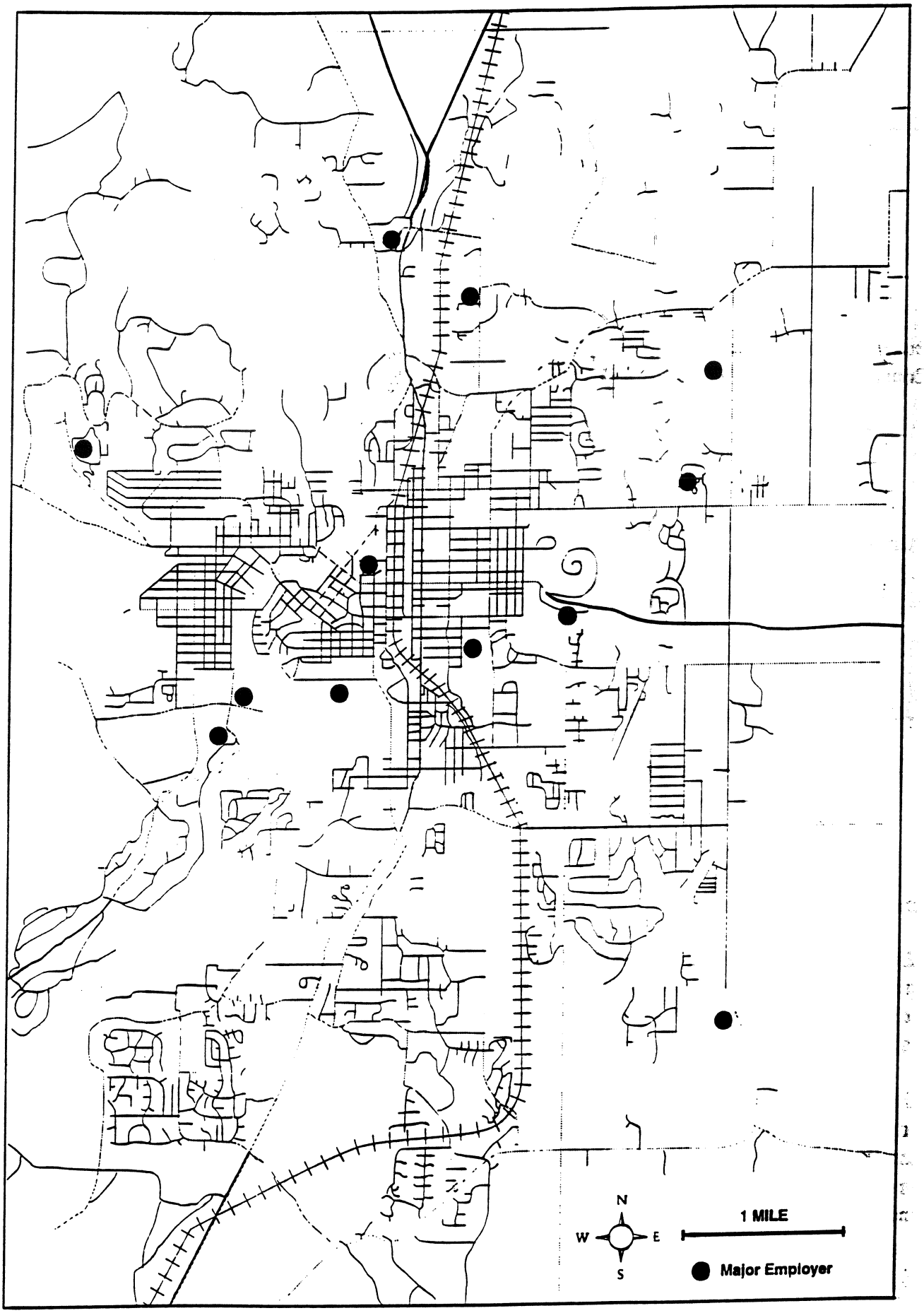
Concentrated employment areas and large employers provide the best opportunity for convenient shuttle bus service. Although some of the employers are seasonal (such as Mt. Bachelor) or decentralized (school districts), there are still opportunities to serve a substantial number of employees.

In Redmond, most of the employment in on the east side of the city, with several large employers near Highway 97. In Bend, the major employers are widely scattered (see also Map 1):

Bend

St. Charles Medical Center	1,200
Bend-LaPine School District	1,200
State of Oregon	1,000
Deschutes National Forest	900

Map 1. Bend Major Employers



Mt. Bachelor Inc. 800
Deschutes County 680
Central Oregon Community College 400
Pozzi Window Co. 370

Redmond

Redmond School District 546
Central Oregon District Hospital 230
Wal-Mart 180
Opportunity Foundation 170
Safeway 125
Tektronix 120

Beyond Bend and Redmond, there are major employers in Deschutes, Crook and Jefferson Counties that attract some workers from Bend and Redmond:

Deschutes County

Sunriver Resort 600
Eagle Crest Resort 350

Crook County

Les Schwab Tire Center 675
Clear Pine Moulding 600
American Pine Products 425
Crook County School District 385

Jefferson County

Bright Wood Corp. 1,200
Warm Springs 790
Jefferson County School District 337
Ka-Nee-Ta Resort 270

Community Support

Transit is a frequently requested service in Central Oregon and appears to have widespread support. The *Bend Urban Area Transit Feasibility Study* conducted a survey in which over 75% of the respondents supported a fixed-route transit system. 69% said they would use it, and 74% of the potential users said they would ride at least twice a week.

Similar results were obtained in a 1993 Gallup Poll in which 68% of those in ODOT's Region 4 (including Bend and Redmond) said they would be willing to use transit instead of a car for an average of 18 trips per month (49% of reported trips), public transit investments were the top priority for 45%, and intercity bus service rated 3.7 on a scale of 1 (not important) to 5 (extremely important).

4. Commuter Survey

A brief questionnaire (see Appendix) was distributed to area employers before Commute Options Week (an annual event centered in Bend). The questions were directed at people commuting between Bend and Redmond. Thirty-two responses were received: half of these were from St. Charles Medical Center and nearby medical offices.

Origin/Destination

Table 1 summarizes where people travel from and to; "county" refers to unincorporated areas in Deschutes County including Terrebonne and Tumalo. About 9 out of 10 respondents travel from (or through) Redmond with Bend as their destination. Requested pickup locations in Redmond are shown in Map 2. Destinations in Bend are widely scattered, although half the respondents worked at St. Charles Medical Center.

Table 1.
Survey Results—Origins and Destinations

Area	Origin	Destination
Bend	3	29
Redmond	24	3
Prineville	1	0
North County	4	0

For comparison, Table 2 summarizes origin/destination data from the Rideshare program for Central Oregon which covers a larger area than the survey. A search of the database for Rideshare participants who might travel through Bend or Redmond yielded 78 commuters. About 7 out of 10 rideshare participants travel from (or through) Redmond with Bend as their destination. Many of the factors that motivate people to rideshare (reduced cost, limited car availability, environmental concerns) also apply to potential shuttle customers.

Table 2.
Rideshare Data—Origins and Destinations

Area	Origin	Destination
Bend	20	57
Redmond	34	13
Madras	4	3
Prineville	18	5
Terrebonne	1	0
LaPine	1	0

Time of Travel

Over half of the respondents wanted to be picked up between 6:30 and 7:30 a.m., with 85% between 5:00 and 8:15 a.m. (see Figure 2). After work, about half wanted to be picked up between 5:00 and 5:30 p.m., with the remainder scattered from 2:00 p.m. on into the evening.

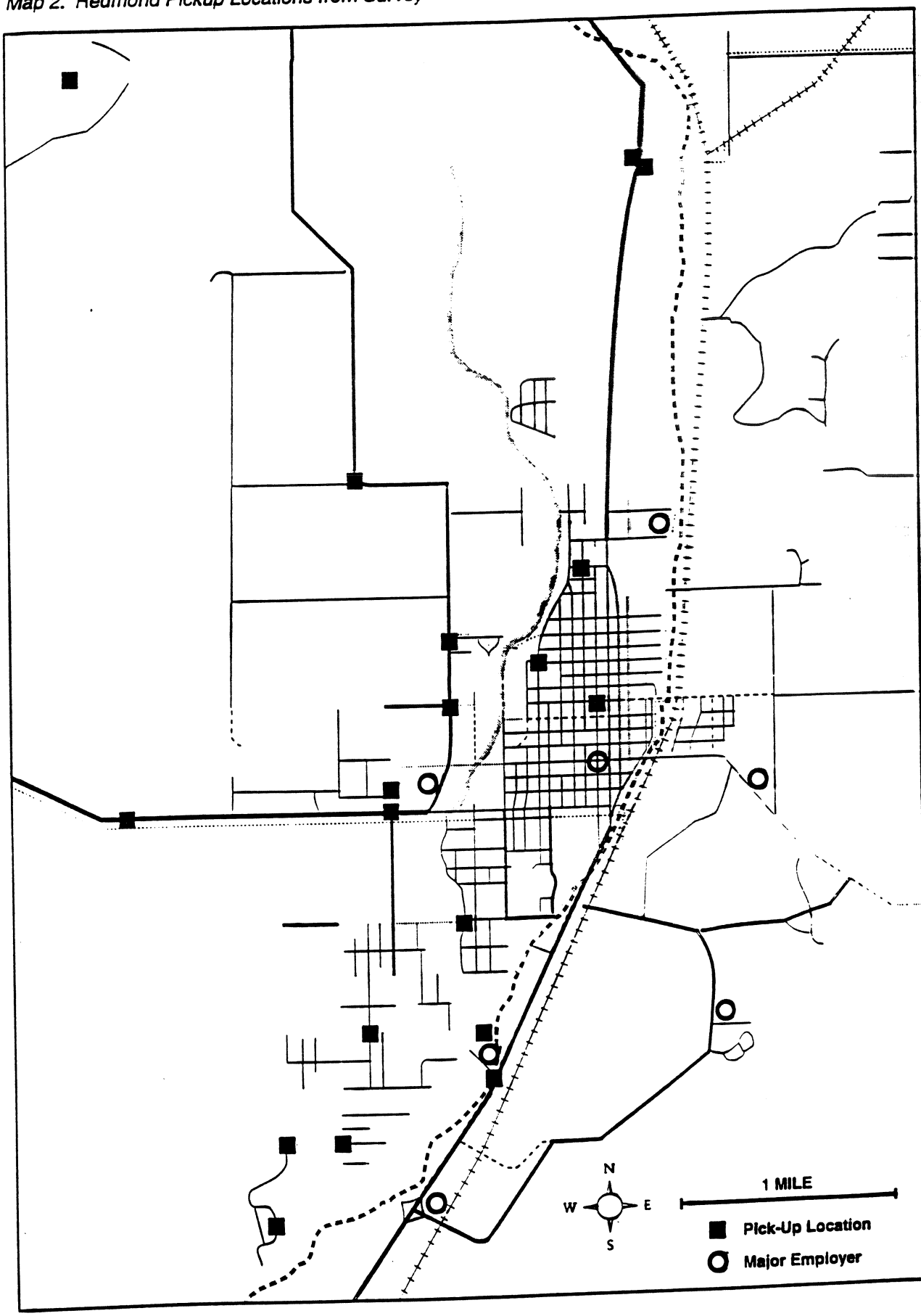
Participation

The respondents to the survey indicated that they would be willing to use a shuttle van an average of 3.6 days in a 5-day work week.

Price

The respondents to the survey indicated that they would be willing to pay an average of $2.85 for a round trip between Redmond and Bend. That is less than $0.09 per mile for the roughly 32-mile round trip from city center to city center.

Map 2. Redmond Pickup Locations from Survey

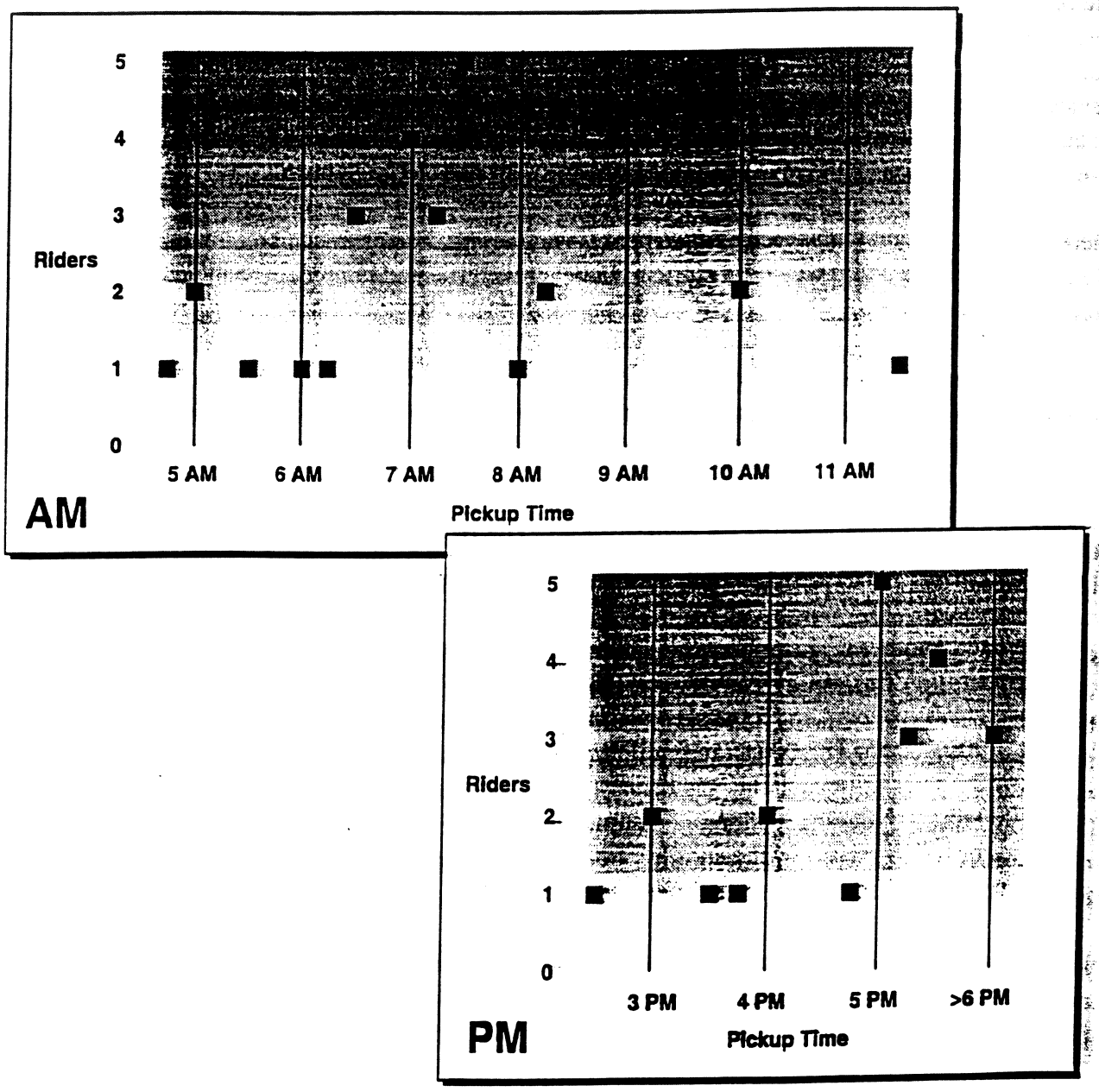


5. Costs

It is difficult to compare a potential intercity commuter shuttle service with urban transit and specialized transit (van pools, dial-a-ride, airport shuttles, etc.) operations in Oregon because each has its own unique attributes and funding sources. Costs vary widely, and systems are often part of larger fixed-route systems or are subsidized by large employers.

A simple commuter shuttle service between Bend and Redmond will probably require two or more vehicles, a driver for each vehicle, a storage area, and a program for seeking customers and coordinating operations.

Figure 2. Pickup Times from Survey



Start-Up Costs

The primary start-up cost is that of the vehicles. A gasoline powered van that carries 12 or 15 passengers would cost about $30,000 to $35,000 (at least $10,000 more if a wheelchair lift is needed). Leasing is also possible at rates that typically run about $400 per month with a $4,000 lease fee if mileage is not excessive. A 30-passenger diesel bus would cost over $200,000 but it would last longer and fewer would be needed compared to a smaller, light-duty van.

Whatever vehicle is chosen, a backup would be necessary in case of a breakdown. Some type of communications system and office would also be needed. Depending on the size of vehicle, an investment of about $150,000 to $600,000 could be expected. It is assumed that no special transit facilities (benches, shelters, signs, etc.) would be needed.

Costs for minimum 3-van system:

Start-Up Costs $150,000
Operating Costs $165,000/year
Marketing, etc. $30,000/year

Operating Costs

The operating costs include fuel, maintenance, insurance, registration, driver compensation, and depreciation. Cost may be expressed in terms of dollars per service hour or by dollars per vehicle-mile. The examples below are not directly comparable because they involve different vehicle types carrying different numbers of passengers, but they give an indication of the range of options from small vans to large buses.

There would also be miscellaneous expenses (marketing, management, etc., totaling perhaps $30,000 per year) that would be similar whatever the type and number of vehicles. At a $3.00 fare, nearly 40 passengers per day would be needed to cover miscellaneous expenses.

Hourly costs for primarily fixed-route systems in cities comparable to Bend is about $37 excluding administration for 30-passenger buses (reference *Bend Urban Area Transit Feasibility Study*). Assuming that the commuter system would operate during weekdays with 22 round trips (most occurring during a.m. and p.m. peak hours), at one hour per round trip, there would be 5,720 annual service hours (22 hours × 5 days × 52 weeks). At $37 per hour, the annual operating cost would be about $210,000. At 32 miles per round-trip, the annual mileage would be 185,000 miles (22 trips × 5 days × 52 weeks × 32 miles) which would result in a cost per mile of $1.14.

Calculated another way using average dollars per vehicle mile in North America (reference *Transportation Cost Analyzer*, Victoria Transport Policy Institute, March 1996), 40-foot diesel buses (capable of carrying 53 passengers) would have an operating cost of $4.89 per mile or about $900,000 for 185,000 annual miles. A 12-passenger van would cost $0.54 per mile or about $0.90 per mile including the driver's wages for an annual total of about $165,000 for 185,000 miles. Note that parking is assumed to be free (probably provided by a local government or by a business served by the shuttle). For comparison, the Opportunity Foundation in Redmond reports an operating cost of $0.74 per mile for their van.

By comparison, an average automobile would cost about $0.33 per mile to operate but would normally carry only 1.2 people (about 15% of automobile commuters carpooled in 1990), making the cost per passenger-mile much higher than a van or bus.

Other costs associated with vehicle use not analyzed here but relevant to owners, users and the general public who help subsidize travel are travel time, accidents, parking, congestion, roadway provision, municipal services, land use impacts, pollution, resource consumption, waste disposal, travel equity, and the barrier effect.

6. Analysis

Schedule

A shuttle system that appeals to commuters will need to have frequent service during weekday a.m. and p.m. peak hours (6:30 to 8:00 a.m. and 4:30 to 6:00 p.m.). A headway of 30-minutes is probably the minimum. This can be extended to much longer periods (perhaps 120 minutes) midday. A possible schedule would have 13 round trips between Bend and Redmond at (in 24-hour time) 6:00, 6:30, 7:00, 7:30, 8:00, 10:00, 12:00, 14:00, 16:00, 16:30, 17:00, 17:30, and 18:00. The midday trips would probably attract some shoppers to the commercial centers. Weekend service would not be provided unless a particular employer could support it.

Because the one-way distance is about 16 miles, 10 on rural highway, each round-trip could be made in an hour even with a couple of stops in each city. Two vehicles could cover the peak-hour times, while one vehicle could cover the midday period. For flexibility and route choices (perhaps one to west Bend and one to east Bend), four vehicles and a spare would be preferred, although the cost might be prohibitive.

Locations

The choice of pickup and drop-off locations involves trade-offs. Ideally, shuttle stops should be kept to a minimum to reduce delay and simplify the user's understanding of the service. On the other hand, limited locations will discourage potential customers who do not want to travel far to the shuttle stop. The best locations will be areas near dense residential or business uses. Because of the low-density, segregated zoning in Bend and Redmond, few locations are ideal.

The most promising shuttle stop locations in Redmond are probably the downtown and the Safeway on U.S. 97; other potential stops are Airport Way, the hospital, the high school, and O'Neil Highway. Promising stops in Bend are the downtown, St. Charles Medical Center, Shevlin Industrial Park, COCC, and any employers who have substantial ridership; the Greyhound station on Highway 20 is also a possibility.

Modal Connections

To achieve anywhere near its potential, a commuter shuttle service needs to connect well to sidewalks, bikeways, fixed-route transit systems, and park-and-ride lots. There is no fixed-route transit in Bend or Redmond, the pedestrian and bicycle networks are generally fragmented, and there are few park-and-ride lots. Because of these limitations, shuttle service should attempt point-to-point travel as much as possible which means working with large employers to encourage the service.

Transit fares average $1.00 per 8-mile trip nationally ($4.00 for 32 miles) and provide about 10% to 25% of the operating costs (*Transit Fact Book*, American Public Transit Association). Grants, city general funds, special taxes, and employer contributions are other typical funding sources. The survey showed that potential users may be willing to pay close to $3.00 for a 32-mile round trip which, if the service operated 12-passenger vans at an average capacity of 6 (not counting the driver), would generate $0.56 per mile which would just cover the operating expense of the vehicle but not wages.

Larger, more expensive diesel buses would need proportionally greater ridership to cover operating costs, although wages and administrative costs would remain fairly constant. Shuttle services usually offer discounted monthly rates to encourage long-term use.

The feasibility of achieving the ridership necessary to cover a reasonable portion of the operating costs cannot be stated with any certainty. Under present conditions, realistic ridership may be around 100 which, if spread out over 22 round trips (2 vehicles during peak hours only), would provide an average occupancy of 4.5 and peak occupancy of around 10. This points to 12 or 15-passenger vans as the logical vehicle choice. A daily average of 100 riders at $3.00 per fare would raise about $75,000 annually or 45% of a $165,000 operating budget.

7. Conclusions and Recommendations

Feasibility is a function of priorities. If an intercity commuter shuttle service is a priority to the state, cities, employers, and public, then it can be provided. Certainly, there is a good argument for making this a priority: there are thousands of intercity commuters, the Highway 97 corridor is under increasing traffic pressure, the public has a high interest in transit, and a limited survey attracted scores of potential riders.

The most promising scenario might be a 3-van fleet to 2 or 3 locations in each city, later expanded to 5 vans or mid-sized buses when the concept is proven. Further contact with government agencies, employers and potential riders is needed to identify exact locations and funding sources.

Special survey on potential Bend–Redmond shuttle service

We are studying the feasibility of a shuttle service between Bend and Redmond. If you or others in your company commute between these cities, please fill out this questionnaire. Fill out one questionnaire for each person responding.

Company _____

How many days a week would you be willing to take a shuttle van from a pickup point near your home to a point near your place of work (circle your choice)?

1 2 3 4 5

How much would you be willing to pay for a round-trip between Bend and Redmond by shuttle (circle your choice)?

$1 $2 $3 $4 $5 $6 $7 $8 $9 $10 $_

What is your point of origin (city and nearest cross streets)? _____

_____

What is your destination (city and nearest cross streets)? _____

_____

What would be the best pickup times for you? _____ A.M. _____ P.M.

Thanks for your help! If you have any comments, write them below.

16 NW Kansas Ave. • Bend, OR 97701 • (541) 330-2647 • FAX: (541) 385-3370 • E-mail: commuteop@empnet.com

Commute Options is a project of the Central Oregon Environmental Center

Appendix I

1996 AND 2016 TRAFFIC VOLUMES AND LEVEL OF SERVICE ESTIMATES FOR DESCHUTES COUNTY AND STATE HIGHWAYS

Top County 1996 Rural Road Volumes and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	1996 ADT	1996 PM Peak	Est. LOS	Functional Class
1	3006-10		BAKER RD	HWY 97	LAKEVIEW DR	9,090	909	D	Collector
2	3161-50	SE	27TH ST	FERGUSON RD	RICKARD RD	7,900	790	D	Arterial
3	4106-20		BURGESS RD	PINE DR	GLENWOOD DR	7,240	620	D	Collector
4	4106-30		BURGESS RD	GLENWOOD DR	LOST PONDEROSA RD	6,290	629	D	Collector
5	4106-40		BURGESS RD	LOST PONDEROSA RD	DEER FIELD DR	5,340	534	C	Collector
6	4112-10		SOUTH CENTURY DR	SEWAGE TREATMENT RD (CRAWFORD)	SPRING RIVER RD	5,266	474	C	Collector
7	4101-30		HUNTINGTON RD	BURGESS RD	EVERGREEN LN	5,220	522	C	Collector
8	3006-20		BAKER RD	LAKEVIEW DR	SHOSHONE RD E	4,870	487	C	Collector
9	1171-10		COOK AVE	TUMALO RD	HWY 20	4,774	401	C	Collector
10	4106-50		BURGESS RD	DEER FIELD DR	STEARNS RD	4,400	440	C	Collector
11	3181-70		DESCHUTES MARKET RD	YEOMAN RD	BUTLER MARKET RD	4,285	383	C	Arterial
12	3181-60		DESCHUTES MARKET RD	J D ESTATES DR	YEOMAN RD	4,270	427	C	Arterial
13	3181-50		DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	4,260	426	C	Arterial
14	3181-40		DESCHUTES MARKET RD	UGB - BEND	HAMEHOOK RD	4,241	275	C	Arterial
15	3181-30		DESCHUTES MARKET RD	PIONEER LOOP	UGB - BEND	4,210	421	C	Arterial
16	3181-20		DESCHUTES MARKET RD	DALE RD	PIONEER LOOP	4,180	418	C	Arterial
17	3181-10		DESCHUTES MARKET RD	HWY 97	DALE RD	4,142	376	C	Arterial
18	1148-80		CLINE FALLS HWY	UGB - TUMALO	TUMALO RD	3,930	393	C	Collector
19	4112-25		SOUTH CENTURY DR	VANDEVERT RD	HUNTINGTON RD	3,760	376	C	Collector
20	4106-10		BURGESS RD	HWY 97	PINE DR	3,640	364	C	Collector
21	2177-10		LOWER BRIDGE WAY	HWY 97	NW 27TH ST	3,601	326	C	Arterial
22	4112-30		SOUTH CENTURY DR	HUNTINGTON RD	SNOW GOOSE RD	3,590	359	C	Collector
23	4106-60		BURGESS RD	STEARNS RD	DORRANCE MEADOW RD	3,450	345	C	Collector
24	1148-70		CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	3,450	345	C	Collector
25	3518-45		POWELL BUTTE HWY	MCGRATH RD	BUTLER MARKET RD	3,440	344	C	Arterial
26	4111-10		DAY RD	BURGESS RD	NORTHWOOD DR	3,434	294	C	Collector
27	3518-60		POWELL BUTTE HWY	ALFALFA MARKET RD-NEFF RD	HWY 20	3,390	339	B	Arterial
28	4112-05		SOUTH CENTURY DR	HWY 97	SEWAGE TREATMENT RD	3,384	294	B	Collector
29	3182-60		BUTLER MARKET RD	UGB - BEND	HAMBY RD	3,260	326	B	Arterial
30	3518-40		POWELL BUTTE HWY	MILE POINT	MCGRATH RD	3,220	322	B	Arterial
31	2130-40	S	CANAL BLVD	SW HELMHOLTZ WAY	SW 61ST ST	3,210	330	B	Arterial
32	4111-20		DAY RD	NORTHWOOD DR	DEEDON RD	3,180	318	B	Collector
33	1148-60		CLINE FALLS HWY	CONNARN RD	EDGE HILL DR	3,160	316	B	Collector
34	4101-40		HUNTINGTON RD	BURGESS RD	UGB - LAPINE	3,140	314	B	Collector
35	3022-10		CINDER BUTTE RD	BAKER RD	LAKEVIEW RD	3,050	305	B	Collector
36	3518-35		POWELL BUTTE HWY	MILE POINT	MILE POINT	3,020	302	B	Arterial
37	4192-10		SPRING RIVER RD	SOUTH CENTURY DR	SOLAR DR	2,990	299	B	Collector
38	3518-50		POWELL BUTTE HWY	BUTLER MARKET RD	ERICKSON RD	2,970	297	B	Arterial
39	1148-10		CLINE FALLS HWY	HWY 126	EAGLE CREST ENTRANCE	2,920	292	B	Collector
40	4111-30		DAY RD	DEEDON RD	FRANCES LN	2,910	291	B	Collector

Revised: 11/12/97

Top County 1996 Rural Road Volumes and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	1996 ADT	1996 PM Peak	Est. LOS	Functional Class
41	3518-30		POWELL BUTTE HWY	MILE POINT	MILE POINT	2,860	286	B	Arterial
42	3182-70		BUTLER MARKET RD	HAMBY RD	HAMEHOOK RD	2,850	285	B	Arterial
43	1148-20		CLINE FALLS HWY	EAGLE CREST ENTRANCE	SW 83RD ST	2,780	278	B	Collector
44	4143-10		COTTONWOOD RD	HWY 97 (OVERPASS)	EXIT SOUTH 97 RAMP	2,730	273	B	Collector
45	4143-20		COTTONWOOD RD	EXIT SOUTH 97 RAMP	MILE POINT	2,730	273	B	Collector
46	4143-30		COTTONWOOD RD	MILE POINT	RR OVERPASS	2,730	273	B	Collector
47	1161-60		CAMP POLK RD	TRAPPER POINT RD	UGB - SISTERS	2,710	271	B	Collector
48	3518-25		POWELL BUTTE HWY	MILE POINT	MILE POINT	2,700	270	B	Arterial
49	3195-20		HAMBY RD	NEFF RD	FLETCHER LN	2,665	267	B	Collector
50	2303-10	NW	CHINOOK DR	NW 43RD ST	JEFFERSON COUNTY LINE	2,660	266	B	Collector
51	3148-10		TUMALO RD	HWY 97	92ND ST	2,660	266	B	Collector
52	1148-30		CLINE FALLS HWY	SW 83RD ST	MILE POST 2	2,640	264	B	Collector
53	4111-40		DAY RD	FRANCES LN	OLD MILL RD	2,630	263	B	Collector
54	3006-30		BAKER RD	SHOSHONE RD E	SHOSHONE RD W	2,620	262	B	Collector
55	3175-10		RICKARD RD	KNOTT RD-SE 27TH ST	ARNOLD MARKET RD	2,620	262	B	Collector
56	3518-55		POWELL BUTTE HWY	ERICKSON RD	ALFALFA MARKET RD-NEFF RD	2,585	259	B	Arterial
57	3101-10		JOHNSON MARKET RD	BEGIN-END SHEVLIN PARK MKT RD	SADDLEBACK DR S	2,560	256	B	Arterial
58	1161-70		CAMP POLK RD	UGB - SISTERS	HWY 20	2,545	255	B	Collector
59	3518-20		POWELL BUTTE HWY	MILE POINT	MILE POINT	2,520	252	B	Arterial
60	4106-70		BURGESS RD	DORRANCE MEADOW RD	SUNSET CT	2,500	250	B	Collector
61	1148-32		CLINE FALLS HWY	MILE POST 2	MILE POST 3	2,500	250	B	Collector
62	3182-80		BUTLER MARKET RD	HAMEHOOK RD	SILVIS RD	**2,425**	**226**	B	Arterial
63	2178-10		NORTHWEST WAY	NW MAPLE AVE	NW UPAS AVE	2,400	240	B	Arterial
64	2184-10		SMITH ROCK WAY	HWY 97	RR XING/UGB - TERREBONNE	**2,391**	**185**	B	Arterial
65	4112-20		SOUTH CENTURY DR	MILE POINT	VANDEVERT RD	2,390	239	B	Collector
66	2130-35	S	CANAL BLVD	SW 39TH ST	SW HELMHOLTZ WAY	2,360	236	B	Arterial
67	1148-34		CLINE FALLS HWY	MILE POST 3	MILE POST 4	2,360	236	B	Collector
68	4111-50		DAY RD	OLD MILL RD	DAWN RD	2,360	236	B	Collector
69	3518-10		POWELL BUTTE HWY	CROOK COUNTY LINE	MILE POINT	2,360	236	B	Arterial
70	2156-30		OLD REDMOND-BEND HWY	ROGERS RD	HWY 20	2,340	234	B	Arterial
71	3148-50		TUMALO RD	TUMALO UGB	CLINE FALLS HWY	2,330	233	B	Collector
72	3195-10		HAMBY RD	HWY 20	NEFF RD	2,255	226	B	Collector
73	1148-36		CLINE FALLS HWY	MILE POST 4	MILE POST 5	2,220	222	B	Collector
74	3154-10		ALFALFA MARKET RD	POWELL BUTTE HWY	BYRAM RD	2,140	214	B	Arterial
75	2116-20	SW	HELMHOLTZ WAY	HWY 126	SW OBSIDIAN AVE	2,110	211	B	Arterial
76	1148-38		CLINE FALLS HWY	MILE POST 5	NEWCOMB RD	2,080	208	B	Collector
77	4111-60		DAY RD	DAWN RD	AMBER LN	2,060	206	B	Collector
78	4112-15		SOUTH CENTURY DR	SPRING RIVER RD	MILE POINT	2,010	201	B	Collector
79	3148-30		TUMALO RD	OLD REDMOND-BEND HWY	SWALLEY RD	2,010	201	B	Collector
80	3173-30	NE	NEFF RD	UGB - BEND	HAMBY RD	**2,005**	**185**	B	Arterial

Revised: 11/12/97

Top County 1996 Rural Road Volumes and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	1996 ADT	1996 PM Peak	Est. LOS	Functional Class
81	3175-20		RICKARD RD	ARNOLD MARKET RD	BILLADEAU RD	1,960	196	B	Collector
82	1148-40		CLINE FALLS HWY	NEWCOMB RD	MARSH RD	1,940	194	B	Collector
83	2178-20		NORTHWEST WAY	NW UPAS AVE	NW COYNER AVE	1,920	192	B	Arterial
84	3148-20		TUMALO RD	92ND ST	OLD REDMOND-BEND HWY	1,900	190	B	Collector
85	1161-50		CAMP POLK RD	LUNDY RD	TRAPPER POINT RD	1,868	165	B	Collector
86	2156-20		OLD REDMOND-BEND HWY	POHAKU RD	ROGERS RD	1,860	186	B	Arterial
87	2264-30	NW	COYNER AVE	NORTHWEST WAY	NW HELMHOLTZ WAY	1,850	185	B	Collector
88	3182-90		BUTLER MARKET RD	SILVIS RD	POWELL BUTTE HWY	1,814	194	B	Arterial
89	3202-10		WARD RD	HWY 20	OBSIDIAN AVE	1,810	181	B	Collector
90	2178-30		NORTHWEST WAY	NW COYNER AVE	NW MONTGOMERY DR	1,801	153	B	Arterial
91	4151-10		LAPINE STATE REC. RD	HWY 97	HUNTINGTON RD	1,780	178	B	Collector
92	3154-20		ALFALFA MARKET RD	BYRAM RD	WAUGH RD	1,770	177	B	Arterial
93	1148-50		CLINE FALLS HWY	MARSH RD	CONNARN RD	1,753	152	B	Collector
94	3195-30		HAMBY RD	FLETCHER LN	BUTLER MARKET RD	1,750	175	B	Collector
95	4184-10		FINLEY BUTTE RD	HWY 97	LA PINE UGB	1,690	169	A	Collector
96	2130-45	S	CANAL BLVD	SW 61ST ST	SW YOUNG AVE	1,655	166	A	Arterial
97	2176-10	NW	HELMHOLTZ WAY	W ANTLER AVE	NW MAPLE AVE	1,650	165	A	Arterial
98	4108-10		VANDEVERT RD	HWY 97	SOUTH CENTURY DR	1,650	165	A	Collector
99	3102-90		O B RILEY RD	TUMALO ST PARK DAY USE RD	UGB - TUMALO	1,620	162	A	Arterial
100	2116-10	SW	HELMHOLTZ WAY	W ANTLER AVE	HWY 126	1,610	161	A	Arterial
101	3176-10		DESCHUTES PLEASANT RIDG	HWY 97	DESCHUTES MARKET RD	1,570	157	A	Collector
102	2130-50	S	CANAL BLVD	SW YOUNG AVE	SW 93RD ST	1,563	156	A	Arterial
103	3093-40		BROOKSWOOD BLVD	BUCK CANYON DR	BAKER RD	1,560	156	A	Arterial
104	4106-80		BURGESS RD	SUNSET CT	PONDEROSA WAY	1,555	156	A	Collector
105	3173-40	NE	NEFF RD	HAMBY RD	ERICKSON RD	1,545	137	A	Arterial
106	2116-50	SW	HELMHOLTZ WAY	SW ELKHORN AVE	S CANAL BLVD	1,520	152	A	Collector
107	1161-40		CAMP POLK RD	WILT RD	LUNDY RD	1,490	149	A	Collector
108	4101-10		HUNTINGTON RD	SOUTH CENTURY DR	LAPINE STATE REC RD	1,475	148	A	Collector
109	2130-55	S	CANAL BLVD	SW 93RD ST	SW HEREFORD AVE	1,471	147	A	Arterial
110	2167-10	NW	PERSHALL WAY	HWY 97	NW YUCCA WAY	1,440	144	A	Collector
111	2184-20		SMITH ROCK WAY	RR XING/UGB - TERREBONNE	NE 17TH ST	1,434	118	A	Arterial
112	3022-20		CINDER BUTTE RD	LAKEVIEW RD	MINNETONKA LN NE	1,430	143	A	Collector
113	3148-40		TUMALO RD	SWALLEY RD	UGB - TUMALO	1,430	143	A	Collector
114	3202-15		WARD RD	OBSIDIAN AVE	STEVENS RD	1,410	141	A	Collector
115	3154-30		ALFALFA MARKET RD	WAUGH RD	STENKAMP RD	1,400	140	A	Arterial
116	2156-10		OLD REDMOND-BEND HWY	TUMALO RD	POHAKU RD	1,395	140	A	Arterial
117	4112-35		SOUTH CENTURY DR	SNOW GOOSE RD	OLD SOUTH CENTURY DR W	1,386	132	A	Collector
118	2130-60	S	CANAL BLVD	SW HEREFORD AVE	HUNNELL RD	1,340	134	A	Arterial
119	3171-60		MCGRATH RD	POWELL BUTTE HWY	PEACOCK LN	1,330	133	A	Collector
120	2178-40		NORTHWEST WAY	NW MONTGOMERY DR	NW ODEM WY.-NW ALMETER WY.	1,310	126	A	Arterial

Revised: 11/12/97

Top County 1996 Rural Road Volumes and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	1996 ADT	1996 PM Peak	Est. LOS	Functional Class
121	3202-20		WARD RD	STEVENS RD	LARSEN RD	*1,300*	*130*	*A*	Collector
122	3102-40		O B RILEY RD	GLEN VISTA RD	COOLEY RD	*1,290*	*129*	*A*	Arterial
123	3102-50		O B RILEY RD	COOLEY RD	OLD REDMOND-BEND HWY	*1,270*	*127*	*A*	Arterial
124	3203-10		HAMEHOOK RD	BUTLER MARKET RD	CANAL BRIDGE	*1,260*	*126*	*A*	Collector
125	2130-65	S	CANAL BLVD	HUNNELL RD	TUMALO RD	*1,250*	*125*	*A*	Arterial
126	2116-40	SW	HELMHOLTZ WAY	CANAL BRIDGE	SW ELKHORN AVE	*1,150*	*115*	*A*	Collector
127	2264-20	NW	COYNER AVE	PERSHALL WAY	NORTHWEST WAY	*1,130*	*113*	*A*	Collector
128	3173-50	NE	NEFF RD	ERICKSON RD	POWELL BUTTE HWY	**1,120**	**98**	*A*	Arterial
129	4112-40		SOUTH CENTURY DR	OLD SOUTH CENTURY DR W	BRIDGE - DESCHUTES RIVER	*1,110*	*111*	*A*	Collector
130	3203-20		HAMEHOOK RD	CANAL BRIDGE	DESCHUTES MARKET RD	*1,060*	*106*	*A*	Collector
131	3154-40		ALFALFA MARKET RD	STENKAMP RD	DIXON LOOP	*1,035*	*104*	*A*	Arterial
132	3103-40		SHEVLIN PARK RD	BRIDGE-TUMALO CREEK	END-BEGIN JOHNSON MARKET RD	*1,000*	*100*	*A*	Arterial

Code:	ADT:	LOS:
	> 16,300	F
	9,600 - 16,300	E
	5,700 - 9,600	D
	3,400 - 5,700	C
	1,700 - 3,400	B
	< 1,700	A

Note: Numbers in **BOLD** are actual 1996 counts, others are Deschutes County estimates.
LOS estimates are based on a 10% peak hour traffic flow being modified to arrive at a desirable flow, and the Highway Capacity Manual.

Top County 2016 Rural Road Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
1	3006-10		BAKER RD	HWY 97	LAKEVIEW DR	12,530	1,253	Collector	E
2	3161-50	SE	27TH ST	FERGUSON RD	RICKARD RD	10,630	1,063	Arterial	E
3	4106-20		BURGESS RD	PINE DR	GLENWOOD DR	9,140	914	Collector	D
4	4106-30		BURGESS RD	GLENWOOD DR	LOST PONDEROSA RD	7,940	794	Collector	D
5	4101-30		HUNTINGTON RD	BURGESS RD	EVERGREEN LN	7,020	702	Collector	D
6	4112-10		SOUTH CENTURY DR	SEWAGE TREATMENT RD (CRAWFORD)	SPRING RIVER RD	6,800	680	Collector	D
7	4106-40		BURGESS RD	LOST PONDEROSA RD	DEER FIELD DR	6,740	674	Collector	D
8	3006-20		BAKER RD	LAKEVIEW DR	SHOSHONE RD E	6,710	671	Collector	D
9	1171-10		COOK AVE	TUMALO RD	HWY 20	5,650	565	Collector	C
10	4106-50		BURGESS RD	DEER FIELD DR	STEARNS RD	5,545	555	Collector	C
11	2177-10		LOWER BRIDGE WAY	HWY 97	NW 27TH ST	5,345	535	Arterial	C
12	1148-80		CLINE FALLS HWY	UGB - TUMALO	TUMALO RD	5,280	528	Collector	C
13	3181-70		DESCHUTES MARKET RD	YEOMAN RD	BUTLER MARKET RD	5,100	510	Arterial	C
14	3181-50		DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	5,075	508	Arterial	C
15	3181-60		DESCHUTES MARKET RD	J D ESTATES DR	YEOMAN RD	5,075	508	Arterial	C
16	3181-40		DESCHUTES MARKET RD	UGB - BEND	HAMEHOOK RD	5,050	505	Arterial	C
17	3181-20		DESCHUTES MARKET RD	DALE RD	PIONEER LOOP	5,000	500	Arterial	C
18	3181-30		DESCHUTES MARKET RD	PIONEER LOOP	UGB - BEND	5,000	500	Arterial	C
19	4192-10		SPRING RIVER RD	SOUTH CENTURY DR	SOLAR DR	4,950	495	Collector	C
20	3181-10		DESCHUTES MARKET RD	HWY 97	DALE RD	4,930	493	Arterial	C
21	4112-25		SOUTH CENTURY DR	VANDEVERT RD	HUNTINGTON RD	4,860	486	Collector	C
22	1148-70		CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	4,640	464	Collector	C
23	4112-30		SOUTH CENTURY DR	HUNTINGTON RD	SNOW GOOSE RD	4,640	464	Collector	C
24	4111-10		DAY RD	BURGESS RD	NORTHWOOD DR	4,625	463	Collector	C
25	3518-45		POWELL BUTTE HWY	MCGRATH RD	BUTLER MARKET RD	4,620	462	Arterial	C
26	4106-10		BURGESS RD	HWY 97	PINE DR	4,590	459	Collector	C
27	3518-60		POWELL BUTTE HWY	ALFALFA MARKET RD-NEFF RD	HWY 20	4,560	456	Arterial	C
28	3182-60		BUTLER MARKET RD	UGB - BEND	HAMBY RD	4,380	438	Arterial	C
29	4112-05		SOUTH CENTURY DR	HWY 97	SEWAGE TREATMENT RD	4,370	437	Collector	C
30	4106-60		BURGESS RD	STEARNS RD	DORRANCE MEADOW RD	4,350	435	Collector	C
31	2130-40	S	CANAL BLVD	SW HELMHOLTZ WAY	SW 61ST ST	4,310	431	Arterial	C

Revised: 11/12/97

Top County 2016 Rural Road Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
32	4111-20		DAY RD	NORTHWOOD DR	DEEDON RD	4,280	428	Collector	C
33	1148-60		CLINE FALLS HWY	CONNARN RD	EDGE HILL DR	4,250	425	Collector	C
34	4101-40		HUNTINGTON RD	BURGESS RD	UGB - LAPINE	4,220	422	Collector	C
35	3022-10		CINDER BUTTE RD	BAKER RD	LAKEVIEW RD	4,105	411	Collector	C
36	3518-35		POWELL BUTTE HWY	MILE POINT	MILE POINT	4,000	400	Arterial	C
37	3518-40		POWELL BUTTE HWY	MILE POINT	MCGRATH RD	4,000	400	Arterial	C
38	3518-50		POWELL BUTTE HWY	BUTLER MARKET RD	ERICKSON RD	4,000	400	Arterial	C
39	1148-10		CLINE FALLS HWY	HWY 126	EAGLE CREST ENTRANCE	3,930	393	Collector	C
40	4111-30		DAY RD	DEEDON RD	FRANCES LN	3,910	391	Collector	C
41	1148-20		CLINE FALLS HWY	EAGLE CREST ENTRANCE	SW 83RD ST	3,740	374	Collector	C
42	2303-10	NW	CHINOOK DR	NW 43RD ST	JEFFERSON COUNTY LINE	3,670	367	Collector	C
43	4143-10		COTTONWOOD RD	HWY 97 (OVERPASS)	EXIT SOUTH 97 RAMP	3,670	367	Collector	C
44	4143-20		COTTONWOOD RD	EXIT SOUTH 97 RAMP	MILE POINT	3,670	367	Collector	C
45	4143-30		COTTONWOOD RD	MILE POINT	RR OVERPASS	3,670	367	Collector	C
46	3103-40		SHEVLIN PARK RD	BRIDGE-TUMALO CREEK	END-BEGIN JOHNSON MARKET RD	3,670	367	Arterial	C
47	1161-60		CAMP POLK RD	TRAPPER POINT RD	UGB - SISTERS	3,640	364	Collector	C
48	3006-30		BAKER RD	SHOSHONE RD E	SHOSHONE RD W	3,610	361	Collector	C
49	3195-20		HAMBY RD	NEFF RD	FLETCHER LN	3,580	358	Collector	C
50	3148-10		TUMALO RD	HWY 97	92ND ST	3,570	357	Collector	C
51	1148-30		CLINE FALLS HWY	SW 83RD ST	MILE POST 2	3,550	355	Collector	C
52	4111-40		DAY RD	FRANCES LN	OLD MILL RD	3,550	355	Collector	C
53	3175-10		RICKARD RD	KNOTT RD-SE 27TH ST	ARNOLD MARKET RD	3,520	352	Collector	C
54	3182-70		BUTLER MARKET RD	HAMBY RD	HAMEHOOK RD	3,500	350	Arterial	C
55	3518-20		POWELL BUTTE HWY	MILE POINT	MILE POINT	3,500	350	Arterial	C
56	3518-25		POWELL BUTTE HWY	MILE POINT	MILE POINT	3,500	350	Arterial	C
57	3518-30		POWELL BUTTE HWY	MILE POINT	MILE POINT	3,500	350	Arterial	C
58	3518-55		POWELL BUTTE HWY	ERICKSON RD	ALFALFA MARKET RD-NEFF RD	3,470	347	Arterial	C
59	3101-10		JOHNSON MARKET RD	BEGIN-END SHEVLIN PARK MKT RD	EBACK DR S	3,440	344	Arterial	C
60	1161-70		CAMP POLK RD	UGB - SISTERS	HWY 20	3,420	342	Collector	C
61	1148-32		CLINE FALLS HWY	MILE POST 2	MILE POST 3	3,360	336	Collector	B
62	3182-80		BUTLER MARKET RD	HAMEHOOK RD	SILVIS RD	3,260	326	Arterial	B

Revised: 11/12/97

3%proj.xls/2016 ranking

Top County 2016 Rural Road Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
63	2184-10		SMITH ROCK WAY	HWY 97	RR XING/UGB - TERREBONNE	3,210	321	Arterial	B
64	2130-35	S	CANAL BLVD	SW 39TH ST	SW HELMHOLTZ WAY	3,180	318	Arterial	B
65	4111-50		DAY RD	OLD MILL RD	DAWN RD	3,180	318	Collector	B
66	3518-10		POWELL BUTTE HWY	CROOK COUNTY LINE	MILE POINT	3,180	318	Arterial	B
67	1148-34		CLINE FALLS HWY	MILE POST 3	MILE POST 4	3,170	317	Collector	B
68	4106-70		BURGESS RD	DORRANCE MEADOW RD	SUNSET CT	3,150	315	Collector	B
69	2156-30		OLD REDMOND-BEND HWY	ROGERS RD	HWY 20	3,150	315	Arterial	B
70	3148-50		TUMALO RD	TUMALO UGB	CLINE FALLS HWY	3,130	313	Collector	B
71	4112-20		SOUTH CENTURY DR	MILE POINT	VANDEVERT RD	3,090	309	Collector	B
72	3195-10		HAMBY RD	HWY 20	NEFF RD	3,030	303	Collector	B
73	1148-36		CLINE FALLS HWY	MILE POST 4	MILE POST 5	2,980	298	Collector	B
74	3154-10		ALFALFA MARKET RD	POWELL BUTTE HWY	BYRAM RD	2,870	287	Arterial	B
75	2116-20	SW	HELMHOLTZ WAY	HWY 126	SW OBSIDIAN AVE	2,830	283	Arterial	B
76	1148-38		CLINE FALLS HWY	MILE POST 5	NEWCOMB RD	2,790	279	Collector	B
77	4111-60		DAY RD	DAWN RD	AMBER LN	2,780	278	Collector	B
78	3148-30		TUMALO RD	OLD REDMOND-BEND HWY	SWALLEY RD	2,700	270	Collector	B
79	3173-30	NE	NEFF RD	UGB - BEND	HAMBY RD	2,695	270	Arterial	B
80	3175-20		RICKARD RD	ARNOLD MARKET RD	BILLADEAU RD	2,640	264	Collector	B
81	1148-40		CLINE FALLS HWY	NEWCOMB RD	MARSH RD	2,600	260	Collector	B
82	4112-15		SOUTH CENTURY DR	SPRING RIVER RD	MILE POINT	2,600	260	Collector	B
83	4151-10		LAPINE STATE REC. RD	HWY 97	HUNTINGTON RD	2,560	256	Collector	B
84	3148-20		TUMALO RD	92ND ST	OLD REDMOND-BEND HWY	2,550	255	Collector	B
85	1161-50		CAMP POLK RD	LUNDY RD	TRAPPER POINT RD	2,510	251	Collector	B
86	2156-20		OLD REDMOND-BEND HWY	POHAKU RD	ROGERS RD	2,495	250	Arterial	B
87	2264-30	NW	COYNER AVE	NORTHWEST WAY	NW HELMHOLTZ WAY	2,490	249	Collector	B
88	3093-40		BROOKSWOOD BLVD	BUCK CANYON DR	BAKER RD	2,450	245	Arterial	B
89	3182-90		BUTLER MARKET RD	SILVIS RD	POWELL BUTTE HWY	2,440	244	Arterial	B
90	3202-10		WARD RD	HWY 20	OBSIDIAN AVE	2,430	243	Collector	B
91	2178-30		NORTHWEST WAY	NW COYNER AVE	NW MONTGOMERY DR	2,420	242	Arterial	B
92	1148-50		CLINE FALLS HWY	MARSH RD	CONNARN RD	2,360	236	Collector	B
93	3195-30		HAMBY RD	FLETCHER LN	BUTLER MARKET RD	2,360	236	Collector	B

Revised: 11/12/97

3%proj.xls/2016 ranking

Top County 2016 Rural Road Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
94	4184-10		FINLEY BUTTE RD	HWY 97	BONNIE WAY	2,270	227	Collector	B
95	2130-45	S	CANAL BLVD	SW 61ST ST	SW 93RD ST	2,220	222	Arterial	B
96	2176-10	NW	HELMHOLTZ WAY	W ANTLER AVE	NW MAPLE AVE	2,220	222	Arterial	B
97	4108-10		VANDEVERT RD	HWY 97	SOUTH CENTURY DR	2,220	222	Collector	B
98	3102-90		OB RILEY RD	OLD REDMOND-BEND HWY	UGB - TUMALO	2,180	218	Arterial	B
99	2116-10	SW	HELMHOLTZ WAY	W ANTLER AVE	HWY 126	2,170	217	Arterial	B
100	3176-10		DESCHUTES PLEASANT RI	HWY 97	DESCHUTES MARKET RD	2,115	212	Collector	B
101	3173-40	NE	NEFF RD	HAMBY RD	ERICKSON RD	2,080	208	Arterial	B
102	2116-50	SW	HELMHOLTZ WAY	SW ELKHORN AVE	S CANAL BLVD	2,040	204	Collector	B
103	1161-40		CAMP POLK RD	WILT RD	LUNDY RD	2,010	201	Collector	B
104	4101-10		HUNTINGTON RD	SOUTH CENTURY DR	LAPINE STATE REC RD	1,980	198	Collector	B
105	4106-80		BURGESS RD	SUNSET CT	PONDEROSA WAY	1,960	196	Collector	B
106	2167-10	NW	PERSHALL WAY	HWY 97	NW YUCCA WAY	1,930	193	Collector	B
107	2184-20		SMITH ROCK WAY	RR XING/UGB - TERREBONNE	NE 17TH ST	1,930	193	Arterial	B
108	3022-20		CINDER BUTTE RD	LAKEVIEW RD	MINNETONKA LN NE	1,925	193	Collector	B
109	3148-40		TUMALO RD	SWALLEY RD	UGB - TUMALO	1,920	192	Collector	B
110	3202-15		WARD RD	OBSIDIAN AVE	STEVENS RD	1,890	189	Collector	B
111	2156-10		OLD REDMOND-BEND HWY	TUMALO RD	POHAKU RD	1,875	188	Arterial	B
112	3171-60		MCGRATH RD	POWELL BUTTE HWY	PEACOCK LN	1,790	179	Arterial	B
113	4112-35		SOUTH CENTURY DR	SNOW GOOSE RD	OLD SOUTH CENTURY DR W	1,790	179	Collector	B
114	2178-40		NORTHWEST WAY	NW MONTGOMERY DR	NW ODEM WY -NW ALMETER WY	1,760	176	Arterial	B
115	3202-20		WARD RD	STEVENS RD	LARSEN RD	1,750	175	Arterial	B
116	3102-50		OB RILEY RD	COOLEY RD	OLD REDMOND-BEND HWY	1,710	171	Arterial	B
117	3203-10		HAMEHOOK RD	BUTLER MARKET RD	CANAL BRIDGE	1,690	169	Collector	A
118	2130-65	S	CANAL BLVD	SW 93RD ST	TUMALO RD	1,680	168	Arterial	A
119	3205-60	SE	BEAR CREEK RD	WARD RD	HWY 20	1,600	160	Collector	A
120	2116-40	SW	HELMHOLTZ WAY	CANAL BRIDGE	SW ELKHORN AVE	1,550	155	Collector	A
121	2195-20	NE	NEGUS WAY	REDMOND UGB	NEGUS LANDFILL	1,540	154	Arterial	A
122	2264-20	NW	COYNER AVE	PERSHALL WAY	NORTHWEST WAY	1,520	152	Collector	A
123	3173-50	NE	NEFF RD	ERICKSON RD	POWELL BUTTE HWY	1,510	151	Collector	A
124	4109-50		DORRANCE MEADOW RD	DEER AVE	6TH STREET	1,500	150	Collector	A

Revised: 11/12/97

3%proj.xls/20[illegible] ranking

Top County 2016 Rura. .oad Volume Estimates and LOS Ranking

Rank	Rd-Sg	Dir	Road Name	From	To	2016 ADT	2016 PM Peak	Functional Class	Est. LOS
125	4109-40		DORRANCE MEADOW RD	PINE LOOP DR	DEER AVE	1,480	148	Collector	A
126	4109-30		DORRANCE MEADOW RD	LACAR LN	PINE LOOP DR	1,470	147	Collector	A
127	4109-20		DORRANCE MEADOW RD	FEDERAL RD	LACAR LN	1,460	146	Collector	A
128	4109-10		DORRANCE MEADOW RD	BURGESS RD	FEDERAL RD	1,450	145	Collector	A
129	4112-40		SOUTH CENTURY DR	OLD SOUTH CENTURY DR W	BRIDGE - DESCHUTES RIVER	1,430	143	Arterial	A
130	3154-20		ALFALFA MARKET RD	BYRAM RD	WAUGH RD	1,390	139	Arterial	A
131	3154-30		ALFALFA MARKET RD	WAUGH RD	STENKAMP RD	1,310	131	Arterial	A
132	4101-20		HUNTINGTON RD	LAPINE STATE REC RD	LAZY RIVER SOUTH RD	1,170	117	Collector	A

Code:

ADT:	LOS:
> 16,300	F
9,600 - 16,300	E
5,700 - 9,600	D
3,400 - 5,700	C
1,700 - 3,400	B
< 1,700	A

Note: Numbers are Deschutes County estimates.
LOS estimates are based on the Highway Capacity Manual and a 10% peak hour traffic flow being modified to establish a desirable flow.

Revised: 11/12/97

ODOT 1996 Highway Volumes and LOS Ranking

Rank	Hwy #	Highway Name	Route #	Location	Mile Point	1996 ADT	1996 PM Peak	Est. LOS
1	4	DALLES-CALIF. HWY.	US 97	SOUTH CENTURY DR.	153.09	8,100	*810*	*E*
2	4	DALLES-CALIF. HWY.	US 97	"A" AVENUE (TERREBONNE)	115.87	11,200	*1,120*	*D*
3	4	DALLES-CALIF. HWY.	US 97	COTTONWOOD DR.	151.10	10,750	*1,075*	*D*
4	15	MCKENZIE HWY	OR 126	HWY 20	92.32	10,100	*1,010*	*D*
5	15	MCKENZIE HWY	OR 126	ELM ST.	92.51	9,800	*980*	*D*
6	15	MCKENZIE HWY	OR 126	LOCUST ST.	92.95	8,950	*895*	*D*
7	16	SANTIAM HWY.	US 20/126	MCKENZIE HWY	100.03	8,900	*890*	*D*
8	16	SANTIAM HWY.	US 20/126	SANTIAM PASS RD.	99.53	8,375	*838*	*D*
9	16	SANTIAM HWY.	US 20/126	TOLLGATE RD.	98.33	7,850	*785*	*D*
10	17	MCKENZIE-BEND	US 20	CLINE FALLS HWY.	14.77	7,400	*740*	*D*
11	4	DALLES-CALIF. HWY.	US 97	LAPINE STATE REC. RD.	160.60	7,400	*740*	*D*
12	16	SANTIAM HWY.	US 20/126	INDIAN FORD RD.	94.91	7,325	*733*	*D*
13	4	DALLES-CALIF. HWY.	US 97	PAULINA LAKE RD.	161.76	7,300	*730*	*D*
14	4	DALLES-CALIF. HWY.	US 97	1 ST STREET (LAPINE)	167.49	7,300	*730*	*D*
15	16	SANTIAM HWY.	**US 20/126**	**BLACK BUTTE RANCH (09-014)**	93.19	**6,800**	**1,156**	*D*
16	17	MCKENZIE-BEND	US 20	INNES MARKET RD.	9.71	6,700	*670*	*D*
17	4	DALLES-CALIF. HWY.	US 97	JEFFERSON COUNTY LINE	112.86	8,800	*880*	*C*
18	4	DALLES-CALIF. HWY.	US 97	VANDERVERT RD.	155.51	7,500	*750*	*C*
19	4	DALLES-CALIF. HWY.	US 97	BURGESS RD.	165.20	7,300	*730*	*C*
20	17	MCKENZIE-BEND	US 20	COUCH MARKET RD.	12.28	7,050	*705*	*C*
21	7	MILLICAN-BURNS	US 20	ERICKSON RD.	4.55	7,000	*700*	*C*
22	17	MCKENZIE-BEND	US 20	TWEED RD.	10.07	6,875	*688*	*C*
23	4	DALLES-CALIF. HWY.	US 97	OR 31 (FREMONT HWY.)	169.67	6,700	*670*	*C*
24	17	MCKENZIE-BEND	US 20	FRYREAR RD.	7.87	6,600	*660*	*C*
25	17	MCKENZIE-BEND	US 20	CLOVERDALE RD.	4.77	6,400	*640*	*C*
26	17	MCKENZIE-BEND	US 20	HARRINGTON LOOP	3.21	6,300	*630*	*C*
27	17	MCKENZIE-BEND	US 20	OR 126	0.11	6,200	*620*	*C*
28	15	MCKENZIE HWY	OR 126	HELMHOLTZ WAY	109.64	6,000	*600*	*C*
29	41	OCHOCO HWY	OR 126	REDMOND CITY LIMITS	2.32	5,700	*570*	*C*
30	41	OCHOCO HWY	OR 126	CROOK COUNTY LINE	3.58	4,700	*470*	*C*
31	16	SANTIAM HWY.	US 20/126	CAMP SHERMAN RD.	90.91	4,500	*450*	*C*
32	16	SANTIAM HWY.	US 20/126	JEFFERSON COUNTY LINE	80.77	4,100	*410*	*C*
33	7	MILLICAN-BURNS	US 20	POWELL BUTTE HIGHWAY	4.83	3,700	*370*	*C*
34	372	CENTURY DR.	OR 372	INN OF THE 7TH MTN.	7.14	3,600	*360*	*C*
35	372	CENTURY DR.	OR 372	DILLON FALLS RD.	7.60	3,600	*360*	*C*
36	15	MCKENZIE HWY	OR 126	HWY 20	93.08	3,500	*350*	*C*
37	370	O'NEIL HWY	OR 370	NE 33RD ST.	2.57	1,600	*160*	*C*
38	4	DALLES-CALIF. HWY.	US 97	KLAMATH COUNTY LINE	172.19	5,200	*520*	*B*
39	15	MCKENZIE HWY	OR 126	CLINE FALLS HWY	107.56	3,600	*360*	*B*
40	15	MCKENZIE HWY	OR 126	GOODRICH RD.	97.47	2,900	*290*	*B*
41	15	MCKENZIE HWY	OR 126	BUCKHORN RD.	103.72	2,800	*280*	*B*
42	7	MILLICAN-BURNS	**US 20**	**BEAR CREEK RD. (09-005)**	**6.27**	**2,400**	**281**	*B*
43	370	O'NEIL HWY	OR 370	N. CANAL BLVD.	0.19	2,200	*220*	*B*
44	370	O'NEIL HWY	OR 370	NE 17TH ST.	1.62	1,700	*170*	*B*
45	370	O'NEIL HWY	OR 370	NE 5TH ST.	0.87	1,600	*160*	*B*
46	370	O'NEIL HWY	OR 370	CROOK COUNTY LINE	3.84	1,200	*120*	*B*
47	15	MCKENZIE HWY	OR 242	LINN COUNTY LINE	77.14	310	*31*	*B*

Revised: 11/12/97

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ODOT 1996 Highway Volumes and LOS Ranking

Rank	Hwy #	Highway Name	Route #	Location	Mile Point	1996 ADT	1996 PM Peak	Est. LOS
48	4	DALLES-CALIF. HWY.	US 97	SOUTH OF YEW AVE. (09-028)	125.00	20,300	2,050	A
49	4	DALLES-CALIF. HWY.	US 97	S.W QUARRY RD.	126.22	18,400	1,840	A
50	4	DALLES-CALIF. HWY.	US 97	DESCHUTES MARKET RD.	130.19	17,500	1,760	A
51	4	DALLES-CALIF. HWY.	US 97	LAVA BUTTE (09-003)	142.27	17,100	1,710	A
52	4	DALLES-CALIF. HWY.	US 97	BAKER RD.	143.47	13,400	1,340	A
53	4	DALLES-CALIF. HWY.	US 97	O'NEIL HIGHWAY	118.51	12,700	1,270	A
54	17	MCKENZIE-BEND	US 20	OLD BEND-REDMOND HWY.	15.7	9,100	910	A
55	17	MCKENZIE-BEND	US 20	TUMALO STATE PARK	15.75	8,250	825	A
56	4	DALLES-CALIF. HWY.	US 97	HUNTINGTON RD. (LAPINE)	167.96	7,300	730	A
57	17	MCKENZIE-BEND	US 20	GERKING MARKET RD.	13.72	7,225	723	A
58	4	DALLES-CALIF. HWY.	US 97	SIXTH ST.	168.20	7,000	700	A
59	17	MCKENZIE-BEND	US 20	ROCK ISLAND LANE	6.32	6,500	650	A
60	372	CENTURY DR.	OR 372	MT. BACHELOR	21.96	2,400	*240*	A
61	372	CENTURY DR.	**OR 372**	**ROAD TO SUNRIVER (09-011)**	**19.25**	**2,300**	**943**	A
62	7	MILLICAN-BURNS	US 20	TEN BARR RD.	8.17	2,150	*215*	A
63	15	MCKENZIE HWY	OR 242	SISTERS CITY LIMITS	92.20	2,100	*210*	A
64	370	O'NEIL HWY	OR 370	HWY. 97	0.01	2,000	*200*	A
65	372	CENTURY DR.	OR 372	KIWA BUTTE RD.	11.96	2,000	*200*	A
66	7	MILLICAN-BURNS	US 20	DODDS RD.	9.16	1,900	*190*	A
67	7	MILLICAN-BURNS	US 20	RICKARD RD.	10.94	1,650	*165*	A
68	19	FREMONT HWY	OR 31	US 97	0.15	1,500	*150*	A
69	7	MILLICAN-BURNS	US 20	BROTHERS	43.18	1,500	*150*	A
70	19	FREMONT HWY	OR 31	KLAMATH COUNTY LINE	2.31	1,400	*140*	A
71	7	MILLICAN-BURNS	US 20	MILLICAN	25.80	1,400	*140*	A
72	7	MILLICAN-BURNS	US 20	OR 27 (CROOKED RIVER HWY)	35.80	1,400	*140*	A
73	7	MILLICAN-BURNS	US 20	LAKE COUNTY LINE	69.25	1,200	*120*	A
74	15	MCKENZIE HWY	OR 242	BAILEY DITCH RD.	91.28	1,200	*120*	A
75	14	CROOKED RIVER HWY	OR27	US 20	42.41	30	*3*	A

Code:

Generalized ADT:	LOS:
> 22,900	F
13,500 - 22,900	E
7,900 - 13,500	D
4,800 - 7,900	C
2,400 - 4,800	B
< 2,400	A

Note: Locations in **BOLD** denote permanent recorder stations.
Numbers in **BOLD** are actual 1995 counts, *ITALICS* are County estimates, and others are ODOT estimates.
LOS estimates furnished by ODOT.

Multilane highways:

Revised: 11/12/97

signirds.xls/1996 highways

ODOT 2016 Highway Volume Estimates and LOS Ranking

Rank	Hwy #	Highway Name	Route #	Location	Mile Point	2016 ADT	2016 PM Peak	Est. LOS
1	4	DALLES-CALIF. HWY.	US 97	COTTONWOOD DR.	151.10	19,140	1,914	F
2	4	DALLES-CALIF. HWY.	US 97	"A" AVENUE (TERREBONNE)	115.87	16,350	1,635	E
3	15	MCKENZIE HWY	OR 126	LOCUST ST.	92.95	14,860	1,486	E
4	4	DALLES-CALIF. HWY.	US 97	SOUTH CENTURY DR.	153.09	14,420	1,442	E
5	17	MCKENZIE-BEND	US 20	CLINE FALLS HWY.	14.77	13,760	1,376	E
6	16	SANTIAM HWY.	US 20/126	MCKENZIE HWY	100.03	13,710	1,371	E
7	4	DALLES-CALIF. HWY.	US 97	LAPINE STATE REC. RD.	160.60	13,170	1,317	E
8	4	DALLES-CALIF. HWY.	US 97	PAULINA LAKE RD.	161.76	12,990	1,299	E
9	4	DALLES-CALIF. HWY.	US 97	1 ST STREET (LAPINE)	167.49	12,990	1,299	E
10	41	OCHOCO HWY	OR 126	REDMOND CITY LIMITS	2.32	10,830	1,083	E
11	16	SANTIAM HWY.	**US 20/126**	**BLACK BUTTE RANCH (09-014)**	**93.19**	**9,660**	**966**	E
12	16	SANTIAM HWY.	US 20/126	CAMP SHERMAN RD.	90.91	9,360	936	E
13	372	CENTURY DR.	OR 372	DILLON FALLS RD.	7.60	5,330	533	E
14	15	MCKENZIE HWY	OR 126	HWY 20	92.32	16,360	1,636	D
15	15	MCKENZIE HWY	OR 126	ELM ST.	92.51	15,880	1,588	D
16	4	DALLES-CALIF. HWY.	US 97	VANDERVERT RD.	155.51	13,350	1,335	D
17	4	DALLES-CALIF. HWY.	US 97	BURGESS RD.	165.20	12,990	1,299	D
18	4	DALLES-CALIF. HWY.	US 97	JEFFERSON COUNTY LINE	112.86	12,900	1,290	D
19	17	MCKENZIE-BEND	US 20	COUCH MARKET RD.	12.28	12,270	1,227	D
20	17	MCKENZIE-BEND	US 20	TWEED RD.	10.07	11,960	1,196	D
21	16	SANTIAM HWY.	US 20/126	SANTIAM PASS RD.	99.53	11,890	1,189	D
22	17	MCKENZIE-BEND	US 20	INNES MARKET RD.	9.71	11,660	1,166	D
23	16	SANTIAM HWY.	US 20/126	TOLLGATE RD.	98.33	11,150	1,115	D
24	7	MILLICAN-BURNS	US 20	ERICKSON RD.	4.55	11,060	1,106	D
25	16	SANTIAM HWY.	US 20/126	INDIAN FORD RD.	94.91	10,400	1,040	D
26	17	MCKENZIE-BEND	US 20	FRYREAR RD.	7.87	10,300	1,030	D
27	4	DALLES-CALIF. HWY.	US 97	OR 31 (FREMONT HWY.)	169.67	10,180	1,018	D
28	17	MCKENZIE-BEND	US 20	CLOVERDALE RD.	4.77	9,980	998	D
29	17	MCKENZIE-BEND	US 20	HARRINGTON LOOP	3.21	9,830	983	D
30	17	MCKENZIE-BEND	US 20	OR 126	0.11	9,670	967	D
31	41	OCHOCO HWY	OR 126	CROOK COUNTY LINE	3.58	8,930	893	D
32	15	MCKENZIE HWY	OR 126	HELMHOLTZ WAY	109.64	8,880	888	D
33	16	SANTIAM HWY.	US 20/126	JEFFERSON COUNTY LINE	80.77	8,530	853	D
34	372	CENTURY DR.	OR 372	KIWA BUTTE RD.	11.96	3,480	348	D
35	15	MCKENZIE HWY	OR 126	HWY 20	93.08	5,810	581	C-D
36	4	DALLES-CALIF. HWY.	US 97	SOUTH OF YEW AVE. (09-020)	125.00	36,950	3,695	C
37	4	DALLES-CALIF. HWY.	US 97	KLAMATH COUNTY LINE	172.19	7,590	759	C
38	15	MCKENZIE HWY	OR 126	CLINE FALLS HWY	107.56	6,190	619	C
39	7	MILLICAN-BURNS	US 20	POWELL BUTTE HIGHWAY	4.83	6,070	607	C
40	15	MCKENZIE HWY	OR 126	BUCKHORN RD.	103.72	4,650	465	C
41	370	O'NEIL HWY	OR 370	N. CANAL BLVD.	0.19	3,920	392	C
42	7	MILLICAN-BURNS	**US 20**	**BEAR CREEK RD. (09-005)**	**6.27**	**3,840**	**384**	C
43	370	O'NEIL HWY	OR 370	NE 17TH ST.	1.62	3,030	303	C
44	370	O'NEIL HWY	OR 370	NE 5TH ST.	0.87	2,850	285	C
45	370	O'NEIL HWY	OR 370	NE 33RD ST.	2.57	2,850	285	C

ODOT 2016 Highway Volume Estimates and LOS Ranking

Rank	Hwy #	Highway Name	Route #	Location	Mile Point	2016 ADT	2016 PM Peak	Est. LOS
46	370	O'NEIL HWY	OR 370	CROOK COUNTY LINE	3.84	1,900	190	C
47	4	DALLES-CALIF. HWY.	US 97	LAVA BUTTE (09-003)	142.27	30,440	3,044	B
48	4	DALLES-CALIF. HWY.	US 97	S.W QUARRY RD.	126.22	30,180	3,018	B
49	4	DALLES-CALIF. HWY.	US 97	DESCHUTES MARKET RD.	130.19	29,190	2,919	B
50	4	DALLES-CALIF. HWY.	US 97	BAKER RD.	143.47	23,850	2,385	B
51	4	DALLES-CALIF. HWY.	US 97	O'NEIL HIGHWAY	118.51	19,050	1,905	B
52	4	DALLES-CALIF. HWY.	US 97	HUNTINGTON RD. (LAPINE)	167.98	12,990	1,299	B
53	4	DALLES-CALIF. HWY.	US 97	SIXTH ST	165.20	12,460	1,246	B
54	15	MCKENZIE HWY	OR 126	GOODRICH RD.	97.47	4,810	481	B
55	372	CENTURY DR.	OR 372	ROAD TO SUNRIVER (09-011)	19.25	4,000	400	B
56	7	MILLICAN-BURNS	US 20	TEN BARR RD.	8.17	3,440	344	B
57	15	MCKENZIE HWY	OR 242	SISTERS CITY LIMITS	92.20	3,400	340	B
58	19	FREMONT HWY	OR 31	US 97	0.15	3,210	321	B
59	19	FREMONT HWY	OR 31	KLAMATH COUNTY LINE	2.31	3,110	311	B
60	370	O'NEIL HWY	OR 370	HWY. 97	0.01	2,800	280	B
61	15	MCKENZIE HWY	OR 242	LINN COUNTY LINE	77.14	350	35	B
62	17	MCKENZIE-BEND	US 20	TUMALO STATE PARK	15.75	15,350	1,535	A/E-F
63	17	MCKENZIE-BEND	US 20	GERKING MARKET RD.	13.72	12,570	1,257	A/E
64	17	MCKENZIE-BEND	US 20	OLD BEND-REDMOND HWY.	16.7	16,560	1,656	A
65	17	MCKENZIE-BEND	US 20	ROCK ISLAND LANE	6.32	10,140	1,014	A
66	372	CENTURY DR.	OR 372	INN OF THE 7TH MTN.	7.14	4,400	440	A
67	372	CENTURY DR.	OR 372	MT. BACHELOR	21.96	3,360	336	A
68	7	MILLICAN-BURNS	US 20	DODDS RD.	9.16	3,040	304	A
69	7	MILLICAN-BURNS	US 20	RICKARD RD.	10.94	2,640	264	A
70	7	MILLICAN-BURNS	US 20	BROTHERS	43.18	2,400	240	A
71	7	MILLICAN-BURNS	US 20	MILLICAN	25.80	2,240	224	A
72	7	MILLICAN-BURNS	US 20	OR 27 (CROOKED RIVER HWY)	35.80	2,240	224	A
73	7	MILLICAN-BURNS	US 20	LAKE COUNTY LINE	69.25	1,920	192	A
74	15	MCKENZIE HWY	OR 242	BAILEY DITCH RD.	91.28	1,700	170	A
75	14	CROOKED RIVER HWY	OR27	US 20	42.41	30	3	A

Color Code:	Generalized ADT:	LOS:
	> 22,900	F
	13,500 - 22,900	E
	7,900 - 13,500	D
	4,800 - 7,900	C
	2,400 - 4,800	B
	< 2,400	A

Note: Locations in **BOLD** denote permanent recorder stations.
Numbers reflect ODOT estimates as of 7/97.
LOS estimates furnished by ODOT.

Multilane highways:

Revised: 11/12/97

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Appendix J

TRANSPORTATION SYSTEM PLAN PROJECT SELECTION MATRIX

Deschutes County

Transportation System Plan

Project Selection Matrix

	Road Name	From	To	Length (miles)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	1996 ADT	LOS Est.	2016 ADT Est.	LOS Est.	Functional Class	Proposed Treatment	Cost To Upgrade	Cost per ADT (1996)	Cost Rank	2016 ADT Rank	Subtotal	Category Rank	Enhances Bike Facility	Adds Bike Link	Subtotal	Category Rank	School or Park Location	Fire Station	Subtotal	Category Rank	Rank Total	Overall Category Rank	Project Priority
Improvement Projects (intersections only)																														
Intersection		*Location*	*Proposed Treatment*				(Combined Intersection ADT)																							
NEFF RD AT HAMBY RD		Rural / Bend Area	Add turn lanes and flashing light					4,210		6,275				$ 100,000	$ 23.75	1	4	5	*1*				*0*	5	5	10	*1*	2	1	High
HUNTINGTON RD AT BURGESS RD		Rural / South County Area	Add turn lanes to Burgess Road					11,117		16,160				$ 100,000	$ 9.00	4	2	6	*2*				*0*				*10*	12	2	High
COOK AVE/O.B. RILEY RD AT HWY. 20		Rural / Tumalo Area	Interim realignment					13,794		21,590				$ 600,000	$ 43.50	6	1	7	*3*				*0*				*10*	13	3	High
BURGESS RD AT DAY RD		Rural / South County Area	Add turn lanes to Burgess Road					7,979		8,975				$ 150,000	$ 18.80	5	3	8	*4*				*0*				*10*	14	4	High
COYNER RD AT NORTHWEST WAY		Rural / North County Area	Add turn lanes to Northwest Way					3,651		3,940				$ 10,000	$ 2.74	2	6	8	*4*				*0*				*10*	14	4	High
OLD REDMOND-BEND HWY AT TUMALO RD		Rural / Tumalo Area	Add turn lanes to Old Redmond-Bend Hwy					4,274		4,575				$ 150,000	$ 35.10	6	5	11	*5*				*0*				*10*	15	5	High
													Subtotal	**$ 1,110,000**															
Improvement Projects (may include intersections)																														
	SOUTH CENTURY DR	**HIGHWAY 97**	SPRING RIVER RD	**2.15**	6	shoulder	2	5,266	C	6,800	D	*Collector*	Overlay	$ 455,000	$ 86	1	1	2	*1*	2		2	*2*	5		5	*5*	8	1	High
	HUNTINGTON RD	**BURGESS RD**	UGB - LAPINE	**1.8**	3	none	16	2,962	B	4,220	C	*Collector*	Widen & Overlay	$ 700,000	$ 236	3	2	5	*2*		5	5	*1*	5		5	*5*	8	1	High
	TUMALO RD	OLD REDMOND-BEND H	HWY 97	**2.1**	3	none	9	1,993	B	2,700	B	*Collector*	Widen & Overlay	$ 700,000	$ 351	4	3	7	*4*		5	5	*1*				*10*	15	2	High
NW	COYNER AVE	**PERSHALL**	NW HELMHOLTZ WAY	**1.2**	2	none		1,818	B	2,490	B	*Collector*	Widen & Overlay	$ 420,000	$ 231	2	4	6	*3*				*3*				*10*	16	3	High
													Subtotal	**$ 2,275,000**															
Transportation System Management (TSM) and Transportation Demand Management (TDM) Projects																														
Project		*Location*	*Proposed Treatment*																											
Regional TDM Program		Countywide	County share to continue funding of Commute Options (per year)											$ 10,000														1	High
Rideshare Lots		Countywide	Install regional rideshare lots at various future locations											$ 45,000														1	High
													Subtotal	**$ 55,000**															
Prioritized Non Safety-based Projects (for roads with more than 1,000 ADT in 1996, and that provide new or improved bike facilities.)																														
	COOK AVE	TUMALO RD	HIGHWAY 20	**0.54**	1	none		4,774	C	5,650	C	*Collector*	Widen & Overlay	$ 35,500	$ 7	1	2	3	*1*		5	5	*1*	5	5	10	*1*	3	1	Priority
	CLINE FALLS HWY	EDGE HILL DR	UGB - TUMALO	0.2	1	none	10.5	3,478	C	4,640	C	*Collector*	Modernize	$ 118,000	$ 34	4	4	8	*2*		5	5	*1*				*10*	13	2	Priority
	TUMALO RD	OLD REDMOND-BEND H	UGB - TUMALO	**1.8**	2	none	11	1,415	A	1,920	B	*Collector*	**Widen & Overlay**	$ 42,000	$ 30	3	18	21	*4*		5	5	*1*				*10*	15	3	Priority
	COTTONWOOD RD	**HIGHWAY 97**	RR OVERPASS	**1.84**	2	shoulder	7	2,748	B	3,670	C	*Collector*	Overlay	$ 389,000	$ 142	7	7	14	*3*	2		2	*3*				*10*	16	4	Priority
	DESCHUTES MARKET RD	**HIGHWAY 97**	BUTLER MARKET RD	**5.5**	2	shoulder	22	4,285	C	5,100	C	*Arterial*	Reconstruction	$ 2,604,000	$ 608	18	3	21	*4*	2		2	*3*				*10*	17	5	Priority
	BROOKSWOOD BLVD	BUCK CANYON DR	BAKER RD	0.8	5	lane		1,080	A	2,450	B	*Arterial*	Widen & Overlay	$ 168,000	$ 156	8	14	22	*5*	3		3	*2*				*10*	17	5	Priority
	BAKER RD	**HIGHWAY 97**	SHOSHONE RD W	**2.43**	2	none	64	2,635	B	3,610	C	*Collector*	Widen & Overlay	$ 938,000	$ 356	15	8	23	*6*		5	5	*1*				*10*	17	5	Priority
	SMITH ROCK WAY	**HIGHWAY 98**	**UGB - TERREBONNE**	**0.3**	2	none		1,434	A	1,930	B	*Arterial*	Modernize	$ 225,000	$ 157	9	17	26	*7*		5	5	*1*				*10*	18	6	Priority
	BURGESS RD	**HIGHWAY 99**	SUNSET CT	**3.9**	4	shoulder	18	2,512	B	3,150	B	*Collector*	Overlay	$ 825,000	$ 328	14	9	23	*6*	2		2	*3*				*10*	19	7	Priority
	POWELL BUTTE HWY	**BUTLER MARKET**	HWY 20	**2.9**	3	shoulder	18	3,225	B	4,560	C	*Arterial*	Reconstruction	$ 1,391,000	$ 431	17	6	23	*6*	2		2	*3*				*10*	19	7	Priority
	O B RILEY RD	JOHNSON MARKET RD	UGB - TUMALO	0.46	1	shared		1,568	A	2,180	B	*Arterial*	Widen & Overlay	$ 357,000	$ 228	10	16	26	*7*	1		1	*4*				*10*	21	8	Priority
	SOUTH CENTURY DR	**SPRING RIVER RD.**	VANDEVERT RD	**1.97**	3	shoulder	1	2,376	B	3,090	B	*Collector*	Overlay	$ 936,000	$ 394	16	11	27	*8*	2		2	*3*				*10*	21	8	Priority
	POWELL BUTTE HWY	**COUNTY LINE**	BUTLER MARKET RD	**7.1**	3	shoulder	1	3,385	B	4,620	C	*Arterial*	Widen & Overlay	$ 2,746,000	$ 811	24	5	29	*9*	2		2	*3*				*10*	22	9	Priority
	DAY RD	**BURGESS ROAD**	AMBER LN	**3.5**	3	none		2,060	B	2,780	B	*Collector*	Widen & Overlay	$ 1,354,000	$ 657	20	12	32	*11*		5	5	*1*				*10*	22	9	Priority
	DESCHUTES MARKET RD	HAMEHOOK RD	J D ESTATES DR	0.3	2	shoulder	19	4,256	B			*Arterial*	Reconstruction	$ 300,000	$ 70	5	25	30	*10*	2		2	*3*				*10*	23	10	Priority
NW	10TH ST	UGB - REDMOND	NW PERSHALL WAY	0.38	1	none		600	A		A	*Collector*	Widen & Overlay	$ 183,000	$ 305	13	22	35	*12*		5	5	*1*				*10*	23	10	Priority
	SHEVLIN PARK RD	BRIDGE-TUMALO CREE	END-BEGIN JOHNSON MARKE	0.1	6	lane	0	1,000	A		A	*Arterial*	Widen & Overlay	$ 11,000	$ 11	2	34	36	*13*	3		3	*2*				*10*	25	11	Priority
	BAILEY RD	US 20	UGB - TUMALO	0.352	2	none		1,018	A		A	*Collector*	Modernize	$ 260,000	$ 255	11	26	37	*14*		5	5	*1*				*10*	25	11	Priority
	CAMP POLK RD	**HIGHWAY 126**	UGB - SISTERS	6.329	2	none	12	2,720	B	2,510	B	*Collector*	Widen & Overlay	$ 2,289,000	$ 842	25	13	38	*15*		5	5	*1*				*10*	26	12	Priority
	BAILEY RD	UGB - TUMALO	TUMALO RESERVOIR RD	0.63	2	none		1,018	A		A	*Collector*	Widen & Overlay	$ 275,000	$ 270	12	27	39	*16*		5	5	*1*				*10*	27	13	Priority
	OLD REDMOND-BEND HWY	TUMALO RD	HWY 20	3.1	3	none	17	2,281	B	3,150	B	*Arterial*	Widen & Overlay	$ 3,119,000	$ 1,367	29	10	39	*16*		5	5	*1*				*10*	27	13	Priority
	AMBER LN	DEEP WOODS RD	5TH ST	0.06	3	none		200	A		A	*Collector*	Widen & Overlay	$ 24,000	$ 120	6	35	41	*17*		5	5	*1*				*10*	28	14	Priority
NE	NEFF RD	**UGB - BEND**	POWELL BUTTE HWY	**2.2**	2	none	15	1,120	A	1,510	A	*Arterial*	Widen & Overlay	$ 885,000	$ 790	23	19	42	*18*		5	5	*1*				*10*	29	15	Priority
	BUTLER MARKET RD	**DESCHUTES MKT. RD**	POWELL BUTTE HWY	**3.2**	3	shoulder	16	1,814	B	2,440	B	*Arterial*	Reconstruction	$ 1,532,000	$ 845	26	15	41	*17*	2		2	*3*				*10*	30	16	Priority
NW	19TH ST	C AVE	NW LOWER BRIDGE WAY	0.74	1	none		530	A		A	*Collector*	Widen & Overlay	$ 358,000	$ 675	21	31	52	*19*		5	5	*1*				*10*	30	16	Priority
	BURGESS RD	**FS RD 4370**	SOUTH CENTURY DR	**2.99**	2	shoulder		360	A		A	*FS Collector*	Widen & Overlay	$ 1,080,000	$ 3,000	32	20	52	*19*	2		2	*3*				*10*	32	17	Priority
NW	19TH ST	NW ODEM WAY	C AVE	0.76	1	none		530	A		A	*Collector*	Widen & Overlay	$ 370,000	$ 698	22	32	54	*21*		5	5	*1*				*10*	32	17	Priority
	O B RILEY RD	OLD REDMOND-BEND H	SUNSET DR	0.5	6	shared	20	543	A		A	*Arterial*	Modernize	$ 342,000	$ 630	19	33	52	*19*	1		1	*4*				*10*	33	18	Priority
	SPRING RIVER RD	**SOUTH CENTURY DR**	**FS BOUNDARY**	**2.3**	2	shoulder		405	A		A	*FS Collector*	Widen & Overlay	$ 833,000	$ 2,057	30	23	53	*20*	2		2	*3*				*10*	33	18	Priority
	TUMALO RESERVOIR RD	**OB RILEY**	COLLINS RD	4.051	1	none		287	A		A	*Collector*	Widen & Overlay	$ 1,973,000	$ 6,875	33	24	57	*23*		5	5	*1*				*10*	34	19	Priority
	BURGESS RD	**SUNSET COURT**	FS RD 4370	**4.1**	3	shoulder		1,000	A		A	*FS Collector*	Widen & Overlay	$ 1,174,000	$ 1,174	28	28	56	*22*	2		2	*3*				*10*	35	20	Priority
	JOHNSON MARKET RD	**SHEVLIN PARK**	TUMALO RESERVOIR RD	**4.5**	4	shared	3	977	A		A	*Collector*	Widen & Overlay	$ 957,000	$ 980	27	29	56	*22*	1		1	*4*				*10*	36	21	Priority
	SOUTH CENTURY DR	**VANDEVERT RD.**	BURGESS RD (END COUNTY	**14.77**	2	shared		100	A		A	*FS Collector*	Widen & Overlay	$ 5,341,000	$ 53,410	35	21	56	*22*	1		1	*4*				*10*	36	21	Priority
	SMITH ROCK WAY	**UGB - TERREBONNE**	CROOK COUNTY LINE	**3.5**	3	none		556	A		A	*Arterial*	Widen & Overlay	$ 1,181,000	$ 2,124	31	36	67	*25*		5	5	*1*				*10*	36	21	Priority
	SKYLINERS RD	**UGB - BEND**	**END COUNTY MAINT.**	**7.28**	2	shared		200	A		A	*FS Collector*	Widen & Overlay	**$ 3,000,000**	$ 15,000	34	30	64	*24*	1		1	*4*				*10*	38	22	Priority
													Subtotal	**$ 37,580,000**															

3/19/98

Deschutes County

Transportation System Plan

Project Selection Matrix

Road Name	From	To	Length (miles)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	1996 ADT	LOS Est.	2016 ADT Est.	LOS Est.	Functional Class	Proposed Treatment	Cost To Upgrade	Cost per ADT (1996)	Cost Rank	2016 ADT Rank	2016 ADT Subtotal	Category Rank	Enhances Bike Facility	Adds Bike Link	Category Subtotal	Category Rank	School or Park Location	Fire Station	Category Subtotal	Category Rank	Rank Total	Overall Category Rank	Project Priority
Prioritized Bike and Pedestrian Projects																												
Road	***Bike Projects***	*Location*	*Proposed Treatment*												(1996) ADT Rank													
Huntington Road		Rural	Add shoulder bikeway, La Pine School complex to Burgess Rd.				3,140						$ 157,500	$ 50	3	3	6	*3*					5			5	8	1	Priority
O.B. Riley Road		Rural	Extend shoulder bikeway north to Tumalo State Park				1,500						$ 135,000	$ 90	2	8	10	*5*					5			5	10	2	Priority
Baker Road		Rural	Add shoulder bikeway, River Woods Store to Brookswood Blvd.				9,090						$ 67,500	$ 7	1	1	2	*1*								10	11	3	Priority
Neff Road		Rural	Add shoulder bikeway,Bend UGB to Big Sky Park				2,005						$ 180,000	$ 90	4	7	11	*6*					5			5	11	3	Priority
Baker Road		Rural	Add shoulder bikeway, Brookswood Blvd. to Shoshone Road				4,870						$ 67,500	$ 14	1	2	3	*2*								10	12	4	Priority
Spring River Road		Rural	Add shoulder bikeway, Harper Bridge to Forest Service Rd. #45				3,000						$ 135,000	$ 45	2	4	6	*3*								10	13	5	Priority
Cottonwood Road		Rural	Add shoulder bikeway east from Sunriver to Highway 97				2,730						$ 180,000	$ 66	4	5	9	*4*								10	14	6	Priority
Camp Polk Road		Rural	Add shoulder bikeway from City of Sisters to Indian Ford Road				2,545						$ 180,000	$ 71	4	6	10	*5*								10	15	7	Priority
	Sidewalk Projects											**Subtotal**	**$ 1,102,500**														(Community Identified Priority)	
5th Street		Terrebonne	B Avenue to C Avenue, 5' sidewalk on east side only										$ 12,500		3		3	*3*					5			5	8	1	High
Highway 242		Rural	Add 5' sidewalk, north side, Highway 20 to the high school										$ 20,000		4		4	*4*					5			5	9	2	High
8th Street		Tumalo	Wharton Road to Riverside Avenue, 5' sidewalk on south side only										$ 3,000		1		1	*1*								10	11	3	Priority
7th Street		Tumalo	U.S. 20 to Cook Avenue, 5' sidewalk north side only										$ 7,500		2		2	*2*								10	12	4	Priority
B Avenue		Terrebonne	5th Street to U.S. 97, 5' sidewalk on north side only										$ 37,500		7		7	*7*					5			5	12	4	High
8th Street		Tumalo	Cook Avenue to Wharton Road, 5' sidewalks both sides										$ 12,500		3		3	*3*								10	13	5	High
C Avenue		Terrebonne	19th Street to U.S. 97, 5' sidewalk on south side only										$ 40,000		8		8	*8*					5			5	13	5	High
4th Street		Tumalo	Wood Avenue to Cook Avenue, 5' sidewalks on both sides										$ 25,000		5		5	*5*								10	15	6	Priority
5th Street		Tumalo	Wood Avenue to Cook Avenue, 5' sidewalks on both sides										$ 26,000		6		6	*6*								10	16	7	Priority
A Avenue		Terrebonne	11th Street to 15th Street, future 5' sidewalks both sides										$ 50,000		9		9	*9*								10	19	8	Priority
13th Street		Terrebonne	C Avenue to 400' south of A Avenue, future 5' sidewalks both sides										$ 60,000		10		10	*10*								10	20	9	Priority
Smith Rock Way		Terrebonne	U.S. 97 to 15th Street, 5' sidewalks on both sides										$ 62,500		11		11	*11*								10	21	10	High
15th Street		Terrebonne	C Avenue to 400' south of A Avenue, future 5' sidewalks both sides										$ 62,500		11		11	*11*								10	21	10	Priority
C Avenue		Terrebonne	U.S. 97 to 16th Street, 5' sidewalk on south side only										$ 65,000		12		12	*12*								10	22	11	Priority
Cook Avenue		Tumalo	Cline Falls Highway to U.S. 20, 5' sidewalks both sides to 8th St.										$ 90,000		13		13	*13*								10	23	12	High
11th Street		Terrebonne	Central Ave. to U.S. 97, 5' sidewalks on both sides										$ 92,500		14		14	*14*								10	24	13	High
	Trails/Other Projects											**Subtotal**	**$ 666,500**															
Canal "H"		Terrebonne	13th Street to 12th Street, 10' sandseal trail										$ 1,500		1		1	*1*								1	1	1	Priority
Canal "H"		Terrebonne	12th Street to 400' south of A Avenue, 10' sandseal trail										$ 5,500		2		2	*2*								2	2	2	Priority
Riverside Avenue Trail		Tumalo	Riverside Avenue to South Community Boundary, 10' sandseal trail										$ 10,000		3		3	*3*								3	3	3	Priority
E Avenue		Terrebonne	West of Canal "H" to East of Canal "H", 10' sandseal trail and bridge										$ 20,000		4		4	*4*								4	4	4	Priority
B Avenue		Terrebonne	East end of west segment to West end of east segment, 300' stairway										$ 21,000		5		5	*5*								5	5	5	Priority
E Avenue		Terrebonne	East end of west segment to West end of east segment, 300' stairway										$ 21,000		5		5	*5*								5	5	5	Priority
4th Street		Terrebonne	North to Forster Drive, 300' stairway										$ 21,000		5		5	*5*								5	5	5	Priority
												Subtotal	**$ 100,000**															
Prioritized Non Safety-based Projects (for roads with more than 1,000 ADT in 1996.)																												
NW	CHINOOK DR	NW 43RD ST	JEFFERSON COUNTY LINE	0.89	3	none	15	2,678	B	3,670	C	*Collector*	Widen & Overlay	$ 256,000	$ 96	1	2	3	*1*					5	5	5	6	1	Priority
	VANDEVERT RD	HWY 97	SOUTH CENTURY DR	1.02	4	none		1,663	A	2,220	B	*Collector*	Widen & Overlay	$ 316,000	$ 190	2	5	7	*2*								10	12	2	Priority
SW	HELMHOLTZ WAY	ANTLER AVE	SW OBSIDIAN AVE	1.0	1	none		2,068	B	2,830	B	*Arterial*	Widen & Overlay	$ 488,000	$ 236	4	3	7	*2*								10	12	2	Priority
NW	PERSHALL WAY	HWY 97	NW YUCCA WAY	1.0	3	none		1,388	A	1,930	B	*Collector*	Widen & Overlay	$ 317,000	$ 228	3	8	11	*3*								10	13	3	Priority
	DESCHUTES PLEASANT RIDGE R	HWY 97	DESCHUTES MARKET RD	1.65	4	none		1,565	A	2,115	B	*Collector*	Widen & Overlay	$ 471,000	$ 301	5	6	11	*3*								10	13	3	Priority
	CLINE FALLS HWY	HWY 126	UGB - TUMALO	9.8	1	none	10.5	3,184	B	4,250	C	*Collector*	Widen & Overlay	$ 3,534,000	$ 1,110	11	1	12	*4*								10	14	4	Priority
	HAMBY RD	HWY 20	BUTLER MARKET RD	2.2	2	none	15	1,700	B	2,360	B	*Collector*	Widen & Overlay	$ 1,646,000	$ 968	10	4	14	*5*								10	15	5	Priority
SW	HELMHOLTZ WAY	CANAL BRIDGE	S CANAL BLVD	1.8	2	none		1,426	A	2,040	B	*Collector*	Widen & Overlay	$ 725,000	$ 508	8	7	15	*6*								10	16	6	Priority
	NORTHWEST WAY	MAPLE	NW ODEM WY.-NW ALMETER	3.7	2	none		1,310	A	1,760	B	*Arterial*	Widen & Overlay	$ 710,000	$ 542	9	9	18	*7*								10	17	7	Priority
	HAMEHOOK RD	BUTLER MKT. ROAD	DESCHUTES MARKET RD	1.2	2	none		1,025	A		A	*Collector*	Widen & Overlay	$ 419,000	$ 409	6	12	18	*7*								10	17	7	Priority
SW	HELMHOLTZ WAY	CANAL BRIDGE	OBSIDIAN AVE.	1.2	2	none		1,126	A	1,550	A	*Collector*	Widen & Overlay	$ 510,000	$ 453	7	11	18	*7*								10	17	7	Priority
S	CANAL BLVD	39TH ST	TUMALO RD	7.1	3	none		1,253	A	1,680	A	*Arterial*	Widen & Overlay	$ 2,740,000	$ 2,187	12	10	22	*8*								10	18	8	Priority
													Subtotal	**$ 12,132,000**															
Prioritized Non Safety-based Projects (for roads with less than 1,000 ADT in 1996)																												
	FINLEY BUTTE RD	UGB - LAPINE	DARLENE WAY-END COUNTY	0.07	2	none		814	A		A	*Collector*	Overlay	$ 15,206	$ 19	1		1	1								10	11	1	Low
NE	NEGUS WAY	UGB - REDMOND	NE UPAS AVE	1.5	4	none		906	A		A	*Collector*	Widen & Overlay	$ 454,508	$ 502	7		7	2								10	12	2	Low
NW	ALMETER WAY	NORTHWEST WAY	NW SEDGEWICK AVE	0.53	1	none		819	A		A	*Arterial*	Widen & Overlay	$ 258,639	$ 316	4		4	3								10	13	3	Low
	RICKARD RD	KNOTT RD	BOZEMAN TRAIL	4.8	2	none		661	A		A	*Collector*	Widen & Overlay	$ 774,441	$ 1,172	20		20	4								10	14	4	Low
	RIVERVIEW DR	OTTER	HUNTINGTON RD	2.3	3	none		717	A		A	*Collector*	Widen & Overlay	$ 920,000	$ 1,283	2		2	5								10	15	5	Low
SW	63RD ST	SW CATLOW WAY	SW OBSIDIAN AVE	0.25	1	none		100	A		A	*Collector*	Widen & Overlay	$ 120,309	$ 1,203	22		22	6								10	16	6	Low
	ERICKSON RD	HWY 20	DICKEY RD	1.54	1	none		429	A		A	*Collector*	Widen & Overlay	$ 751,077	$ 1,751	35		35	7								10	17	7	Low
NW	59TH ST	NW KINGWOOD AVE	NW MAPLE AVE	0.25	2	none		200	A		A	*Collector*	Widen & Overlay	$ 102,960	$ 515	8		8	8								10	18	8	Low
NW	35TH ST	HEMLOCK	NW UPAS AVE	1.51	1	none		500	A		A	*Collector*	Widen & Overlay	$ 697,158	$ 1,394	27		27	9								10	19	9	Low
NW	HELMHOLTZ WAY	ANTLER AVE.	NW COYNER AVE	3.7	0	none		694	A		A	*Collector*	Widen & Overlay	$ 1,464,078	$ 2,110	40		40	10								10	20	10	Low
NW	43RD ST	LOWER BRIDGE RD	NW CHINOOK DR	1.83	2	none		800	A		A	*Collector*	Widen & Overlay	$ 708,158	$ 885	14		14	11								10	21	11	Low
NE	KING WAY	UGB - REDMOND	NE 17TH ST	0.94	1	none		300	A		A	*Collector*	Widen & Overlay	$ 457,368	$ 1,525	30		30	12								10	22	12	Low

3/19/98

Deschutes County

Transportation System Plan
Project Selection Matrix

	Road Name	From	To	Length (miles)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	1996 ADT	LOS Est.	2016 ADT Est.	LOS Est.	Functional Class	Proposed Treatment	Cost To Upgrade	Cost per ADT (1996)	Cost Rank	2016 ADT Rank	Subtotal	Category Rank	Enhances Bike Facility	Adds Bike Link	Subtotal	Category Rank	School or Park Location	Fire Station	Subtotal	Category Rank	Rank Total	Overall Category Rank	Project Priority
	PRAIRIE DR	HWY 97	HUNTINGTON RD	0.35	3	none		393	A		A	Collector	Widen & Overlay	$ 135,366	$ 344	5		5	13								10	23	13	Low
SW	61ST ST	SOUTH CANAL BLVD	HWY 97	2.13	1	none		900	A		A	Collector	Widen & Overlay	$ 1,037,480	$ 1,153	19		19	14								10	24	14	Low
	5TH ST	AMBER LN	LAPINE STATE REC RD	0.82	2	none		300	A		A	Collector	Widen & Overlay	$ 297,663	$ 992	15		15	15								10	25	15	Low
NW	PERSHALL WAY	NW YUCCA WAY	NW COYNER AVE	0.6	3	none		630	A		A	Collector	Widen & Overlay	$ 190,962	$ 303	3		3	16								10	26	16	Low
NW	EBY AVE	BEGIN GRID	HWY 97	0.48	1	none		230	A		A	Collector	Widen & Overlay	$ 235,747	$ 1,025	17		17	17								10	27	17	Low
	PLAINVIEW RD	HWY 20	GIST RD	2.292	1	none		535	A		A	Collector	Widen & Overlay	$ 1,116,387	$ 2,087	39		39	18								10	28	18	Low
	DICKEY RD	BUTLER MKT. ROAD	ERICKSON RD	1	0	none		408	A		A	Collector	Widen & Overlay	$ 512,160	$ 1,255	24		24	19								10	29	19	Low
	BENNETT RD	ALFALFA MARKET RD	NE BEAR CREEK RD	0.99	0	none		150	A		A	Collector	Widen & Overlay	$ 504,990	$ 3,367	51		51	21								10	31	20	Low
	6TH ST	HWY 97	DORRANCE MEADOW RD	2.05	3	none		300	A		A	Collector	Widen & Overlay	$ 741,444	$ 2,471	46		46	22								10	32	21	Low
NE	CAYUSE AVE	NE 5TH ST	NE 9TH ST	0.26	0	none		200	A		A	Collector	Widen & Overlay	$ 134,186	$ 671	10		10	23								10	33	22	Low
NW	MAPLE AVE	UGB - REDMOND	NW 59TH ST	2.25	2	none		742	A		A	Collector	Widen & Overlay	$ 926,640	$ 1,249	23		23	24								10	34	23	Low
NW	31ST ST	NW SEDGEWICK AVE	NW LOWER BRIDGE WAY	1	4	none		200	A		A	Arterial	Widen & Overlay	$ 436,920	$ 2,185	42		42	25								10	35	24	Low
NE	EBY AVE	BEGIN GRID	NE 5TH ST	0.25	0	none		233	A		A	Collector	Widen & Overlay	$ 134,310	$ 576	9		9	26								10	36	25	Low
NE	KNICKERBOCKER AVE	NE 1ST ST	NE 5TH ST	0.24	1	none		300	A		A	Collector	Widen & Overlay	$ 109,956	$ 367	6		6	27								10	37	26	Low
	GIST RD	PLAINVIEW RD	VARCO RD	1.541	1	none		447	A		A	Collector	Widen & Overlay	$ 750,590	$ 1,679	34		34	28								10	38	27	Low
	LAPINE STATE REC. RD	HWY 97	5TH ST	2.91	3	none		370	A		A	Collector	Widen & Overlay	$ 905,900	$ 2,448	45		45	29								10	39	28	Low
	THREE CREEK RD	UGB - SISTERS	FS RD 1600-210	2.502	2	none		300	A		A	Collector	Widen & Overlay	$ 904,923	$ 3,016	50		50	30								10	40	29	Low
NW	67TH ST	BEGIN GRID	NW KINGWOOD AVE	0.65	2	none		200	A		A	Collector	Widen & Overlay	$ 283,124	$ 1,416	28		28	31								10	41	30	Low
	LOWER BRIDGE WAY	HWY 97	HOLMES RD	10.7	3	none		250	A		A	Arterial	Widen & Overlay	$ 3,860,211	$ 15,441	65		65	32								10	42	31	Low
	GERKING MARKET RD	HWY 20	INNES MARKET RD	2.767	1	none		261	A		A	Collector	Widen & Overlay	$ 1,278,354	$ 4,898	56		56	33								10	43	32	Low
NE	17TH ST	NE UPAS AVE	O'NEIL HWY	1	0	route		200	A		A	Collector	Widen & Overlay	$ 510,624	$ 2,553	47		47	34								10	44	33	Low
	FRYREAR RD	HWY 20	END PAVEMENT	1.699	4	none		476	A		A	Collector	Widen & Overlay	$ 486,662	$ 1,022	16		16	35								10	45	34	Low
SW	CATLOW WAY	SW 67TH ST	SW 63RD ST	0.35	1	none		200	A		A	Collector	Widen & Overlay	$ 168,043	$ 840	12		12	36								10	46	35	Low
	MCGRATH RD	MORRILL RD	END PAVEMENT	1.83	2	none		491	A		A	Collector	Widen & Overlay	$ 755,315	$ 1,538	31		31	37								10	47	36	Low
	WILLARD RD	ALFALFA MKT. RD.	CROOK COUNTY LINE	2	1	none		75	A		A	Arterial	Widen & Overlay	$ 924,924	$ 12,332	62		62	38								10	48	37	Low
	DORRANCE MEADOW RD	BURGESS RD	6TH ST	2.66	2	none		840	A		A	Collector	Widen & Overlay	$ 1,094,259	$ 1,303	25		25	39								10	49	38	Low
NW	UPAS AVE	NORTHWEST WAY	NW 35TH ST	0.51	0	none		300	A		A	Collector	Widen & Overlay	$ 258,641	$ 862	13		13	40								10	50	39	Low
	JOHNSON RANCH RD	ALFALFA MKT. RD.	CROOK COUNTY LINE	3.99	2	none		250	A		A	Collector	Widen & Overlay	$ 1,641,594	$ 6,566	57		57	41								10	51	40	Low
	ALFALFA MARKET RD	POWELL BUTTE HWY	JOHNSON RANCH RD	9.4	3	none		719	A		A	Arterial	Widen & Overlay	$ 3,414,621	$ 4,749	55		55	42								10	52	41	Low
	DODDS RD	HWY 20	ALFALFA MARKET RD	7.67	1	none		137	A		A	Collector	Widen & Overlay	$ 3,543,078	$ 25,862	71		71	43								10	53	42	Low
	CHINA HAT RD	KNOTT RD	END COUNTY MAINT	1.79	3	none		50	A		A	FS Collector	Widen & Overlay	$ 689,593	$ 13,792	64		64	44								10	54	43	Low
NW	ICE AVE	WIMP WAY	NW 43RD ST	2	1	none		709	A		A	Collector	Widen & Overlay	$ 977,082	$ 1,378	26		26	45								10	55	44	Low
NE	1ST ST	KNICKERBOCKER	NE WILCOX	1.69	1	none		800	A		A	Collector	Widen & Overlay	$ 822,191	$ 1,028	18		18	46								10	56	45	Low
	MINNETONKA LN	KIOWA RD	CHEROKEE RD	0.39	3	none		50	A		A	Collector	Widen & Overlay	$ 149,289	$ 2,986	49		49	47								10	57	46	Low
	MCGRATH RD	BEGIN PVMT.	END-BEGIN STENKAMP RD	3	1	none		607	A		A	Collector	Widen & Overlay	$ 1,384,614	$ 2,281	44		44	48								10	58	47	Low
SW	OBSIDIAN AVE	SW 35ST ST	SW 63RD ST	1.77	0	none		725	A		A	Collector	Widen & Overlay	$ 869,136	$ 1,199	21		21	49								10	59	48	Low
SE	BEAR CREEK RD	UGB - BEND	TEN BARR RD	5.03	4	none		240	A		A	Collector	Widen & Overlay	$ 1,693,435	$ 7,056	59		59	50								10	60	49	Low
NE	5TH ST	O'NEILL HWY	NE EBY AVE	1.2	0	none		500	A		A	Collector	Widen & Overlay	$ 1,765,416	$ 3,531	52		52	51								10	61	50	Low
NW	KINGWOOD AVE	NW 59TH ST	NW 67TH ST	0.51	2	none		100	A		A	Collector	Widen & Overlay	$ 222,829	$ 2,228	43		43	52								10	62	51	Low
	MASTEN RD	HWY 97	END PAVEMENT	5.63	1	none		150	A		A	Collector	Widen & Overlay	$ 2,460,733	$ 16,405	66		66	53								10	63	52	Low
NW	ODEM AVE	NW 10TH ST	NORTHWEST WAY	1.5	1	none		503	A		A	Collector	Widen & Overlay	$ 733,542	$ 1,458	29		29	54								10	64	53	Low
	ARNOLD MARKET RD	RICKARD RD.	GOSNEY	3.44	1	none		230	A		A	Collector	Widen & Overlay	$ 1,589,742	$ 6,912	58		58	55								10	65	54	Low
N	CANAL BLVD	O'NEIL HWY	HWY 97	0.9	1	none		207	A		A	Collector	Widen & Overlay	$ 437,398	$ 2,113	41		41	56								10	66	55	Low
SW	WICKIUP AVE	SW HELMHOLTZ WAY	SW 58TH ST	0.51	0	none		167	A		A	Collector	Widen & Overlay	$ 258,641	$ 1,549	32		32	57								10	67	56	Low
	MCGRATH RD	END PAVEMENT	BEGIN PAVEMENT	1.7	2	none		61	A		A	Collector	Reconstruction	$ 828,749	$ 13,586	63		63	58								10	68	57	Low
	COLLINS RD	WALTON RD	TUMALO RESERVOIR RD	2.041	0	none		222	A		A	Collector	Widen & Overlay	$ 1,045,319	$ 4,709	54		54	59								10	69	58	Low
	INNES MARKET RD	GERKING MARKET RD	CLINE FALLS HWY	4.018	1	none		399	A		A	Collector	Widen & Overlay	$ 1,856,316	$ 4,652	53		53	60								10	70	59	Low
	CLOVERDALE RD	HWY 20	HWY 126	3.569	1	none		895	A		A	Collector	Widen & Overlay	$ 1,648,878	$ 1,842	36		36	61								10	71	60	Low
NE	WILCOX AVE	NE 1ST ST	CROOK COUNTY LINE	2.94	1	none		144	A		A	Collector	Widen & Overlay	$ 1,357,356	$ 9,426	61		61	62								10	72	61	Low
	COUCH MARKET RD	HWY 20	COLLINS RD	1.858	1	none		425	A		A	Collector	Widen & Overlay	$ 858,396	$ 2,020	37		37	63								10	73	62	Low
SW	67TH ST	BEGIN GRID	SW CATLOW WAY	0.6	0	none		150	A		A	Collector	Widen & Overlay	$ 308,832	$ 2,059	38		38	64								10	74	63	Low
	FRYREAR RD	FRYREAR LANDFILL RO	HWY 126	3.867		none		181	A		A	Collector	Reconstruction	$ 299,376	$ 1,654	33		33	65								10	75	64	Low
	GOSNEY RD	HWY 20	ARNOLD MARKET	3.9	3	none		208	A		A	Collector	Widen & Overlay	$ 1,915,686	$ 9,210	60		60	66								10	76	65	Low
	STENKAMP RD	MCGRATH RD	ALFALFA MARKET RD	2	1	none		346	A		A	Collector	Widen & Overlay	$ 971,725	$ 2,808	48		48	67								10	77	66	Low
	INDIAN FORD ROAD	CAMP POLK RD	GREEN RIDGE RD	6.092	0	none		150	A		A	Collector	Widen & Overlay	$ 3,120,079	$ 20,801	69		69	68								10	78	67	Low
	BUCKHORN RD	HWY 126	NW LOWER BRIDGE WAY	4.28	0	none		70	A		A	Collector	Widen & Overlay	$ 2,189,484	$ 31,278	72		72	69								10	79	68	Low
	WARD RD	HWY 20	GOSNEY RD	4.72	3	none		73	A		A	Collector	Widen & Overlay	$ 1,469,128	$ 20,125	68		68	70								10	80	69	Low
	PAULINA LAKE RD	HWY 97	EAST LAKE	19.36	4	none		200	A		A	FS Collector	Widen & Overlay	$ 5,058,884	$ 25,294	70		70	71								10	81	70	Low
	RICKARD RD	BOZEMAN TRAIL	HWY 20	2.2		none		60	A		A	Collector	Reconstruction	$ 1,045,440	$ 17,424	67		67	72								10	82	71	Low
	WILT RD	CAMP POLK RD	END COUNTY MAINT	7	1	none		76	A		A	Collector	Widen & Overlay	$ 2,882,880	$ 37,933	73		73	73								10	83	72	Low
	HOLMES RD	HWY 126	NW LOWER BRIDGE WAY	9.2	1	none		100	A		A	Arterial	Widen & Overlay	$ 4,464,575	$ 44,646	74		74	74								10	84	73	Low
	BUFFALO RD	WILT RD	APPALOOSA DR	1.378	3	none		500	A		A	Collector	Widen & Overlay	$ 533,000	$ 1,066	75		75	75								10	85	74	Low
	YEOMAN RD	DESCHUTES MKT. RD.	OLD DESCHUTES RD	0.8	1	none						Arterial	Widen & Overlay	$ 363,849		76		76	76								10	86	75	Low
														Subtotal	$ 80,290,569														

3/19/98

Deschutes County

Transportation System Plan
Project Selection Matrix

Road Name		From	To	Length (miles)	Shoulder Width (feet)	Bike Facility Type	Accesses per Mile	1996 ADT	LOS Est.	2016 ADT Est.	LOS Est.	Functional Class	Proposed Treatment	Cost To Upgrade	Cost per ADT (1996)	Cost Rank	2016 ADT Rank	Subtotal	Category Rank	Enhances Bike Facility	Adds Bike Link	Subtotal	Category Rank	School or Park Location	Fire Station	Subtotal	Category Rank	Rank Total	Overall Category Rank	Project Priority
State Highway Improvement Projects (Projects with County participation)								1996		2016																			
Highway			*Treatment*		(1996 County Road ADT)			(Combined Intersection ADT)						Total Cost															
U.S. 20	@	Cook Avenue/ Bailey Road/ O.B. Riley Road	grade separation, realignment		4,774			12,174		19,410				$ 2,000,000	$ 103	2	1	3	*1*								*1*		High
U.S. 20	@	Old Redmond-Bend Highway	grade separation		2,340			11,440		19,710				$ 2,000,000	$ 101	1	2	3	*1*								*1*		Priority
U.S. 97	@	South Century Drive	grade separation		5,266			13,366		21,220				$ 3,000,000	$ 141	3	3	6	*2*								*2*		High
U.S. 97	@	Wickiup Junction realignment and railroad overcrossing	grade separation, realignment		3,640			10,940		22,130				$ 5,000,000	$ 226	4	4	8	*3*								*3*		Priority
													Subtotal	**$ 12,000,000**														

Total for Projects Rated "High"	$ 3,737,500
Total for Projects Rated "Medium"	$ 38,803,000
Total for Projects Rated "Low"	$ 12,480,500
Total for Projects Not Rated	$ 80,290,569
Total for ODOT Projects	$ 12,000,000
Total for all projects:	**$ 147,311,569**

Note: Pavement Condition Index (PCI):

Excellent	= 70-100
Good	= 50-70
Fair to Poor	= 25-50
Bad	= 0-25

Bike Facility Ranking Factors:

Adds New Facility	5
Enhances Lane	3
Enhances Shoulder	2
Upgrades or Enhances Shared	1

School/Park Ranking Factors:

school or park located on or adjacent to road	5
No school	0

Fire Station Ranking Factors:

Fire Station on or adjacent to road	5
No fire station	0

Combined Ranking:

School or Park & Fire Station	1
School, Park or Fire Station	5
No School, Park or Fire Station	10

High Accident Intersections (not addressed in the County TSP)

	Rank (out of 11)	Location
27th at Reed Market	5th	Bend UGB
27th at Bear Creek	6th	Bend UGB
Reed Market at Fargo Ln.	7th	Bend UGB
Murphy at Country Club	9th	Bend UGB

96pci.xls
(Road Matrix)

Appendix K

DESCHUTES COUNTY POTENTIAL FUNDING SOURCE CALCULATIONS

Table 6.4.T2
Deschutes County Estimated Gas Tax Revenues

Deschutes County — Current Statewide Gas Tax $ 0.24

	Bend	Redmond	Sisters	Unincorporated Area	County
1995 Population	30,630	10,585	775	**52,110**	94,100
Percentage	33%	11%	1%	**55%**	100%
Potential Revenue @					
0.5 cent	$89,277	$30,852	$2,259	**$151,884**	$274,272
1.0 cent	$178,554	$61,704	$4,518	**$303,769**	$548,544
1.5 cents	$267,831	$92,556	$6,777	**$455,653**	$822,816
2.0 cents	$357,108	$123,408	$9,036	**$607,538**	$1,097,089
3.0 cents	$535,661	$185,112	$13,553	**$911,306**	$1,645,633
4.0 cents	$714,215	$246,816	$18,071	**$1,215,075**	$2,194,177
5.0 cents	$892,769	$308,520	$22,589	**$1,518,844**	$2,742,721

1995 Registered Vehicles		
Statewide	2,662,754	100%
County	94,906	4%

1995 Estimated gallons of fuel sold		
Statewide	1,539,037,004	100%
County	54,854,427	4%

Table 6.4.T3
Deschutes County Estimated Vehicle Registration Fee Revenues

Deschutes County

	Bend	Redmond	Sisters	Unincorporated Area	County
1995 Population	30,630	10,585	775	**52,110**	**94,100**
Percentage	33%	11%	1%	**55%**	**100%**

1996 Deschutes County Registered Vehicles		Renewals per year	*New Fee* @	
Autos	98,126	49,063	$15	**$735,945**
Motorcycles	2,464	1,232	$9	**$11,088**
Non-PUC Trucks	2,546	1,273	$30	**$38,190**
Total	103,136	51,568		**$785,223**

Potential revenue assuming 2-year renewal cycle				
Total per year				
785,223	$255,594	$88,327	$6,467	**$434,835**

Appendix L

GLOSSARY OF TERMS & ABBREVIATIONS USED IN THIS PLAN

AASHTO: American Association of State Highway and Transportation Officials.

ACCESS MANAGEMENT: The principles, laws and techniques used to control access to a highway.

ADA: The Americans with Disabilities Act; civil rights legislation passed in 1990, effective July 1992.

ADT: Average Daily Traffic. The measurement of the average number of vehicles passing a certain point each day on a highway, road or street.

ARTERIAL (STREET): A street designated to carry traffic, mostly uninterrupted, through an urban area, or to different neighborhoods within an urban area.

BICYCLE: A vehicle having two tandem wheels, a minimum of 14" (35 cm) in diameter, propelled solely by human power, upon which any person or persons may ride. A three-wheeled adult tricycle is considered a bicycle.

BICYCLE FACILITY: Any facility provided for the benefit of bicycle travel, including bikeways and parking facilities as well as all other roadways not specifically designated for bicycle use.

BIKE LANE: A portion of a roadway which has been designated by striping and pavement markings for the preferential or exclusive use of bicyclists.

BIKEWAY: A bikeway is created when a road has the appropriate design treatment for bicyclists, based on motor vehicle traffic volumes and speeds: shared roadway, shoulder bikeway, bike lane or bicycle boulevard. Another type of facility is separated from the roadway: multi-use path.

CLEARANCE, LATERAL: The width required for safe passage as measured in a horizontal plane.

CLEARANCE, VERTICAL: The height required for safe passage as measured in a vertical plane.

COG: Council of Governments

COLLECTOR (STREET): A street designated to carry traffic between local streets and arterials, or from local street to local street.

CROSS SECTION, or TYPICAL CROSS-SECTION or TYPICAL: Diagrammatic presentation of a highway profile at right angles to the centerline at a given location.

CROSSWALK: Portion of a roadway designated for pedestrian crossing, marked or unmarked. Unmarked crosswalks are the natural extension of the shoulder, curb line or sidewalk.

DLCD: Department of Land Conservation and Development.

FRONTAGE ROAD: A road designated and designed to serve local traffic parallel and adjacent to a highway or arterial street.

GRADE: A measure of the steepness of a roadway, bikeway or walkway, expressed in a ratio of vertical rise per horizontal distance, usually in percent; e.g. a 5% grade equals 5 m of rise over a 100 m horizontal distance.
GRADE SEPARATION: The vertical separation of conflicting travelways with a structure.

HIGHWAY: A general term denoting a public way for purposes of travel, including the entire area within the right-of-way.

ISTEA: The Intermodal Surface Transportation Efficiency Act.

LCDC: Land Conservation and Development Commission.

LEGEND: Words, phrases or numbers appearing on all or part of a traffic control device; also the symbols that appear on maps.

LOCAL STREET: A street designated to provide access to and from residences or businesses.

MOTOR VEHICLE: A vehicle that is self-propelled or designed for self-propulsion.

MPO - Metropolitan Planning Organization: An agency that combines the governing bodies of neighboring cities whose combined population exceeds 50,000.

MULTI-USE PATH: A path physically separated from motor vehicle traffic by an open space or barrier and either within a highway right-of-way or within an independent right-of-way, used by bicyclists, pedestrians, joggers, skaters and other non-motorized travelers.

MUTCD: The "Manual on Uniform Traffic Control Devices," approved by the Federal Highway Administration as a national standard for placement and selection of all traffic control devices on or adjacent to all highways open to public travel.

OAR: Oregon Administrative Rule - A rule written by an affected government agency, intended to clarify the intent of an ORS.

ODOT: Oregon Department of Transportation.

ORS - Oregon Revised Statute: The laws that govern the state of Oregon, as proposed by the legislature and signed by the Governor.

OTC- Oregon Transportation Commission: a five-member, Governor-appointed commission, whose primary duty is to develop and maintain a state transportation policy and a comprehensive, long-term plan for a multimodal transportation system.

OTP: Oregon Transportation Plan.

PAVEMENT MARKINGS: Painted or applied lines or legends placed on a roadway surface for regulating, guiding or warning traffic.

PEDESTRIAN: A person on foot, in a wheelchair or walking a bicycle.

PEDESTRIAN FACILITY: A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, signs, signals, illumination and benches.

RIGHT-OF-WAY: A general term denoting publicly-owned land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

RIGHT OF WAY: The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

ROADWAY: The paved portion of the highway.

RULES OF THE ROAD: The portion of a motor vehicle law that contains regulations governing the operation of vehicular and pedestrian traffic.

SHARED ROADWAY: A type of bikeway where bicyclists and motor vehicles share a travel lane.

SHOULDER: The portion of a highway that is contiguous to the travel lanes provided for pedestrians, bicyclists, emergency use by vehicles and for lateral support of base and surface courses.

SHOULDER BIKEWAY: A type of bikeway where bicyclists travel on a paved shoulder.

SHY DISTANCE: The distance between the edge of a travelway and a fixed object.

SIDEWALK: A walkway separated from the roadway with a curb, constructed of a durable, hard and smooth surface, designed for preferential or exclusive use by pedestrians.

SIGHT DISTANCE: The distance a person can see along an unobstructed line of sight.

SKEW ANGLE: The angle formed between a roadway, bikeway or walkway and an intersecting roadway, bikeway, walkway or railway, measured away from the perpendicular.

STRUCTURE: A bridge, retaining wall or tunnel.

TPR: Transportation Planning Rule 12 (OAR 660-12).

TRAFFIC CONTROL DEVICES: Signs, signals or other fixtures, whether permanent or temporary, placed on or adjacent to a travelway by authority of a public body having jurisdiction to regulate, warn or guide traffic.

TRAFFIC VOLUME: The given number of vehicles that pass a given point for a given amount of time (hour, day, year). See ADT.

TSP: Transportation System Plan: the overall plan for all transportation modes for a given area (usually city, county or MPO).

UGB: Urban Growth Boundary: the area surrounding an incorporated city in which the city may legally expand its city limits.

URBAN AREA: The area immediately surrounding an incorporated city or rural community that is urban in character, regardless of size.

VEHICLE: Any device in, upon or by which any person or property is or may be transported or drawn upon a highway, including vehicles that are self-propelled or powered by any means.

WALKWAY: A transportation facility built for use by pedestrians, including persons in wheelchairs. Walkways include sidewalks, paths and paved shoulders.

WIDE OUTSIDE LANE: A wider than normal curbside travel lane that is provided for ease of bicycle operation where there is insufficient room for a bike lane or shoulder bikeway.

Appendix M

TOOLBOX OF TDM STRATEGIES FOR CENTRAL OREGON

The Central Oregon Transportation Demand Management (TDM) Tool Box of Strategies

Prepared by Commute Options for Central Oregon

STRATEGY	LOCAL EXAMPLE	COMMENTS
Park and Ride	LaPine, Redmond-Wal Mart, Sisters, Mt. Bachelor	*Dedicated and shared use sites. Reduces Single Occupant Vehicle (SOV) miles traveled. Most successful when linked with transit.*
Vanpool	Future employers; SCMC and Tektronix	*Each vanpool removes 10-12 SOV from peak period travel; Reduces Vehicle Miles Traveled (VMT) and Emissions.*
Carpool	Throughout area	*Informal or through Central Oregon RideShare; most effective where parking is managed with incentives and/or disincentives*
Local bus	In Study phase	*The most common form of public transportation. Flexible and responsive to changing market.*
Group Transit passes	Future	*Provides blanket coverage for employment sites.*
Shuttle bus	Future plans; Bend to Redmond, other intercity routes.	*3 to 5 vans; limited stops at major trip generator sites.*
Transportation Allowances	?	*Private employers provide monthly allowances for transportation; may be used for parking, vanpool, transit, bicycling etc.*
Transportation Incentives	St. Charles Medical Center	*Gift certificate and other Incentives to encourage Bicycling, walking, carpooling*
Bicycle Supportive Policies	Area wide	*Relatively low cost; reduces SOV travel. Bike lanes, trails, parking, education and enforcement*
Walking Supportive Policies	Area wide	*Relatively low cost; reduces SOV; investment in sidewalk construction and maintenance; intersection safety and roadway design.*
Event Promotions	Commute Options Week	*TDM promotions and awareness campaign; Media, employers, individuals.*
Schools	Area wide	*Students, parents, staff encouraged to walk, bicycle, carpool. Add incentives, disincentives*

Parking Management	Limited in Central Oregon	*Can control SOV use more effectively than any other strategy; revenues generated from parking can be used by private employers or public jurisdictions to offer incentives for alternative mode transportation; very effective in Portland*
Trip Reduction Ordinances	Not used in Central Oregon	*May encourage or mandate reductions in trips made to major employer sites; most effective when legally required and linked to financial incentives.*
Compressed Work Week (4-10hr. days, etc.)	Various businesses	*Removes commuters from daily peak traffic periods and from roads altogether 2-4 days per month; minimal cost for some employers.*
Staggered Work Hours	Various businesses	*Removes commuters from daily peaks; minimal cost for some employers.*
Flex-Time	Various businesses	*Removes commuters from daily peaks; minimal cost for some employers.*
Telework (telecommute)	Various businesses	*Removes commuters from road; requires proper work, home and management environment*