TRANSPORTATION SYSTEM PLAN
FINAL REPORT

City of Wallowa

March 2001

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DAVID EVANS AND ASSOCIATES, INC.

CITY OF WALLOWA

Transportation System Plan
Final Report

March 2001

Prepared for:
The City of Wallowa

Prepared by:
David Evans and Associates, Inc.

Adopted: June 12, 2001

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ORDINANCE NO. 330-01, WALLOWA ZONING ORDINANCE

AND

ORDINANCE NO. 331-01, WALLOWA LAND DIVISION ORDINANCE

At the close of the public hearing on July 12, 2001, the Wallowa City Council moved unanimously to adopt the Ordinances stated above.

CITY OF WALLOWA, OREGON

Ena May Dempsey

Terri Skillings

Ron Philbrook

Star Longley

ATTEST:

Acting City Recorder

CHAPTER 1: INTRODUCTION

The Wallowa Transportation System Plan (TSP) guides the management of existing transportation facilities and the design and implementation of future facilities for the next 20 years. This TSP constitutes the transportation element of the city's Comprehensive Plan and satisfies the requirements of the Oregon Transportation Planning Rule established by the Department of Land Conservation and Development. It identifies and prioritizes transportation projects for inclusion in the Oregon Department of Transportation's (ODOT's) Statewide Transportation Improvement Program (STIP). This TSP is an update of the TSP completed in June 1997 that was not adopted by the Wallowa City Council. This revised TSP incorporates applicable requirements of the 1999 Oregon Highway Plan and addresses comments on the 1997 TSP that were provided by the Wallowa City Council.

PLANNING AREA

The Wallowa Transportation System Plan planning area includes the City of Wallowa and the area within the city's Urban Growth Boundary (UGB). The planning area is shown on Figure 1-1. Roadways included in the TSP fall under several jurisdictions: the City of Wallowa, Wallowa County, and the State of Oregon.

The City of Wallowa has a population of 830 and is located in northeastern Oregon about 20 miles northwest of Enterprise. It is a self-contained community. The city provides a variety of residential, shopping, employment, and recreational opportunities within its UGB and the surrounding countryside.

The City of Wallowa, like many other smaller communities in Oregon, developed along the state highways serving the region. State Highway 82 (Wallowa Lake Highway) runs through town from the northwest to southeast along Madison and 1st Streets. A street grid pattern has been maintained in Wallowa as it has developed over the years. The Idaho Northern Pacific Rail Road runs through the northern edge of town.

The Comprehensive Plan land use map of the Wallowa TSP planning area is shown in Figure 1-2.

Commercial zoning along the four-block stretch of 1st Street (Highway 82) marks the center of town. North of this area and south of the railroad is zoned residential and residential-commercial. South of 1st Street is primarily residential. A large tract of land north of the railroad and south of the Wallowa River is zoned commercial-industrial. This area lies entirely in the UGB; however, only half of the area is within current city limits. A large tract of land west of the city limits, but within the UGB, is zoned residential.

PLANNING PROCESS

The Wallowa TSP was prepared as part of an overall effort in Wallowa County to prepare TSPs for Wallowa County and the four municipalities: Enterprise, Joseph, Lostine, and Wallowa. Each plan was developed through a series of technical analyses combined with systematic input and review by the city, the combined management team, the Transportation Advisory Committee (TAC), ODOT, and the public. The TAC consisted of staff, elected and appointed officials, residents, and business people from Wallowa County, and the cities of Enterprise, Joseph, Lostine, and Wallowa. Key elements of the process include:

- Involving the Wallowa community (Chapter 1)
- Defining goals and objectives (Chapter 2)
- Reviewing existing plans and transportation conditions (Chapters 3 and 4; Appendices A and B)
- Developing population, employment and travel forecasts (Chapter 5; Appendix C)

- Developing and evaluating potential transportation system improvements (Chapter 6; Appendix D)
- Developing the Transportation System Plan (Chapter 7)
- Developing a capital improvement program (Chapter 8)
- Developing recommended policies and ordinances (Chapter 9)

Community Involvement

Community involvement is an integral component in the development of a TSP for the City of Wallowa, the other cities, and Wallowa County. Since each of the communities needed to address similar transportation and land use issues, a public involvement program involving all the jurisdictions was used. Several different techniques were utilized to involve each local jurisdiction, ODOT, and the general public.

A combined management team and transportation advisory committee (TAC) provided guidance on technical issues and direction regarding policy issues to the consultant team. Staff members from each local jurisdiction and ODOT and a local resident from each community served on this committee. This group met three times during the course of the project.

The second part of the community involvement effort involved the consultant team meeting individually with representatives of each jurisdiction. The purpose of these meetings was to collect information specific to each jurisdiction and to discuss the development of the individual cities and county TSPs. The consultant team met two times with representatives from each jurisdiction during the project.

The third part consisted of community meetings within Wallowa County. The first set of public meetings was held in early January 1997 in Joseph, Enterprise, and Wallowa. The general public was invited to learn about the TSP planning process and provide input on transportation issues and concerns. A second set of public meetings was held in Wallowa County in late April 1997. The final set of public meetings, which consisted of presentations to the management team and TAC, was held during the month of June 1997. The public was notified of the public meetings through public announcements in the local newspapers and on the local radio station.

Goals and Objectives

Based on input from the city, the management team/TAC, and the community, a set of goals and objectives were defined for the TSP. These goals and objectives were used to make decisions about various potential improvement projects. They are described in Chapter 2.

Review and Inventory of Existing Plans, Policies, and Public Facilities

To begin the planning process, all applicable Wallowa and Wallowa County transportation and land use plans and policies were reviewed and an inventory of public facilities was conducted. The purpose of these efforts was to understand the history of transportation planning in the Wallowa area, including the street system improvements planned and implemented in the past, and how the city is currently managing its ongoing development. Existing plans and policies are described in Appendix A of this report. The inventory of existing facilities catalogs the current transportation system. The results of the inventory are described in Chapter 3, while Chapter 4 describes how the system operates.

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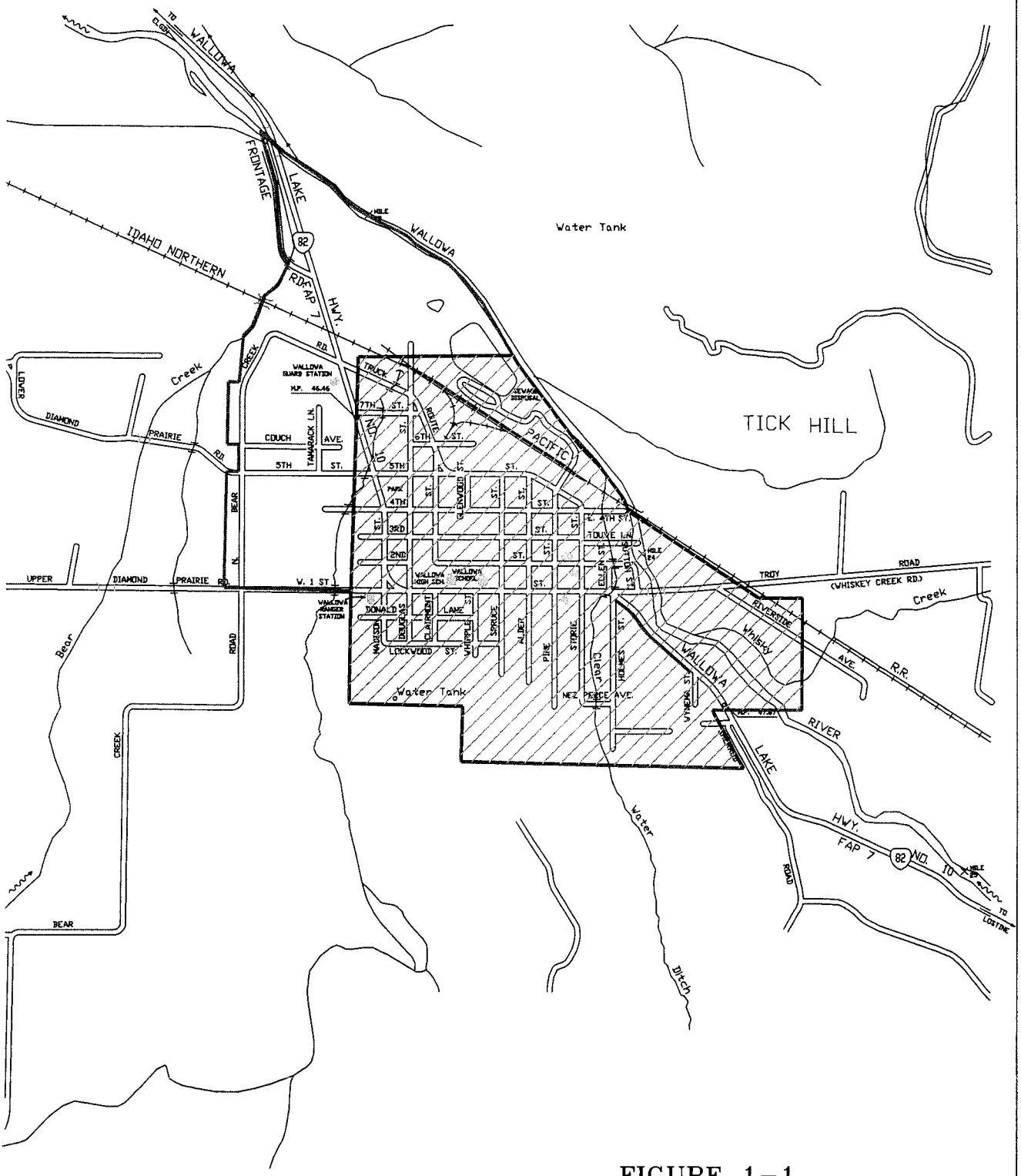


FIGURE 1-1
WALLOWA PLANNING AREA

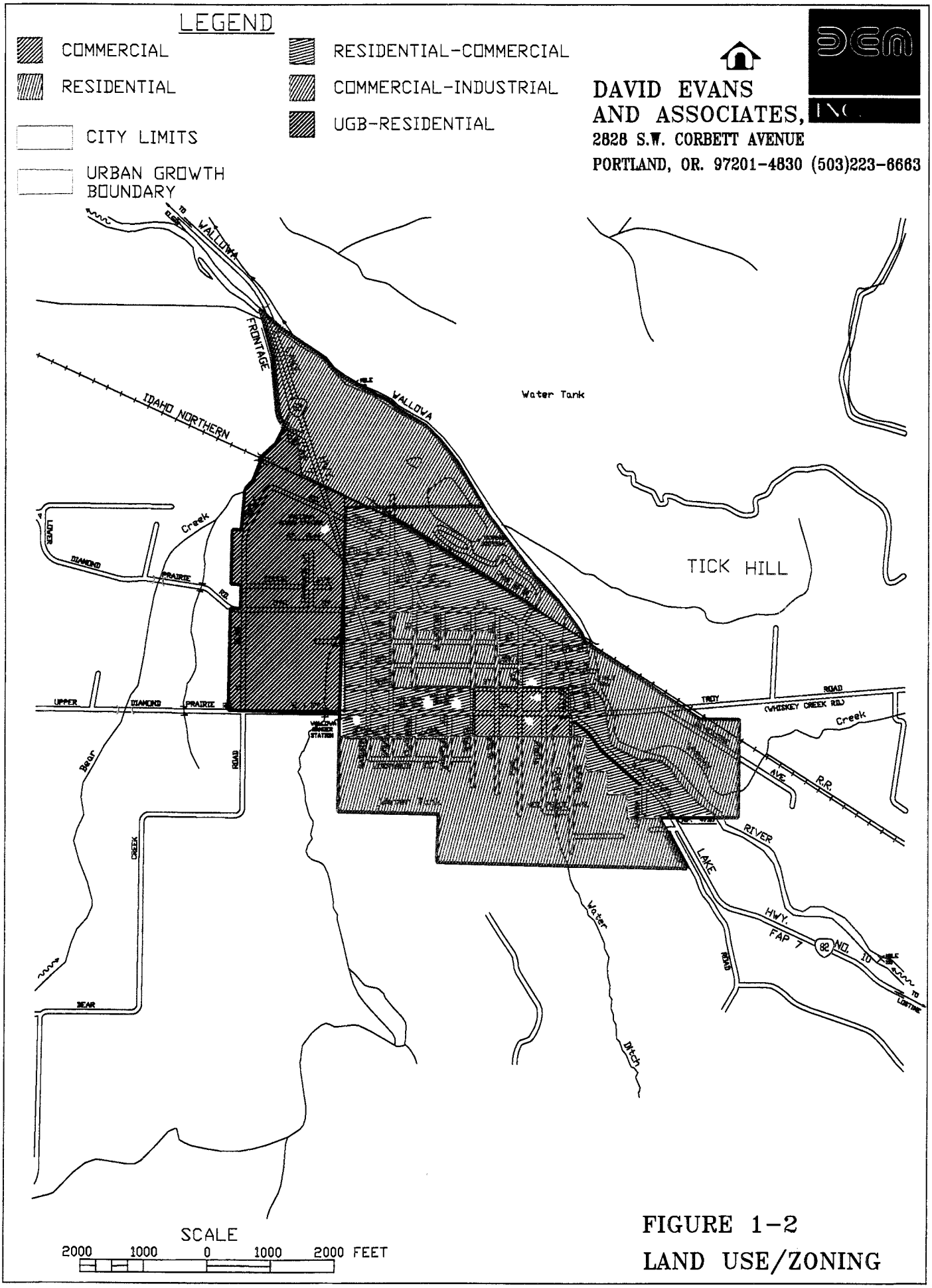


FIGURE 1-2
LAND USE/ZONING

Future Transportation System Demands

The Transportation Planning Rule requires the TSP to address a 20-year forecasting period. Future traffic volumes for the existing plus committed transportation systems were projected using ODOT's *Level 1 -- Trending Analysis* methodology. The overall travel demand forecasting process is described in Chapter 5.

Transportation System Potential Improvements

Once the travel forecasts were developed, it was possible to evaluate a series of potential transportation system improvements. The evaluation of the potential transportation improvements was based on a qualitative review of safety, environmental, socioeconomic, and land use impacts, as well as estimated cost. These improvements were developed with the help of the local working group, and they attempt to address the concerns specified in the goals and objectives (Chapter 2). After evaluating the results of the potential improvements analysis, a series of transportation system improvements were selected. These recommended improvements are described in Chapter 6.

Transportation System Plan

The TSP addresses each mode of transportation and provides an overall implementation program. The street system plan was developed from the forecasting and potential improvements evaluation described above. The bicycle and pedestrian plans were developed based on current usage, land use patterns, and the requirements set forth by the Transportation Planning Rule. The public transportation, air, water, rail, and pipeline plans were developed based on discussions with the owners and operators of those facilities. Chapter 7 details the plan elements for each mode.

Funding Options

The City of Wallowa will need to work with Wallowa County and ODOT to finance new transportation projects over the 20-year planning period. An overview of funding and financing options that might be available to the community are described in Chapter 8.

Recommended Policies and Ordinances

Comprehensive Plan policies and implementing zoning and subdivision ordinance amendments have been completed in concurrence with the TSP update. These policies and ordinances are intended to support the TSP and satisfy the requirements of the TPR as described in Chapter 9.

CHAPTER 2: GOALS AND OBJECTIVES

The purpose of the TSP is to provide a guide for the City of Wallowa to meet its transportation goals and objectives. The following goals and objectives were developed from information contained in the city's Comprehensive Plan and public concerns as expressed during public meetings. An overall goal was drawn from the plan, along with more specific goals and objectives. Throughout the planning process, each element of the plan was evaluated against these parameters.

OVERALL TRANSPORTATION GOAL

To provide and encourage a safe, convenient and economic transportation system.

Goal 1

Preserve the function, capacity, level of service, and safety of the state highways.

Objectives

A. Develop access management standards.

B. Develop alternative, parallel routes.

C. Promote alternative modes of transportation.

D. Promote transportation demand management programs.

E. Promote transportation system management.

F. Develop procedures to minimize impacts to and protect transportation facilities, corridors, or sites during the development review process.

Goal 2

Ensure that the road system within the city and urban area is adequate to meet public needs, including the needs of the transportation disadvantaged.

Objectives

A. Develop a city transportation plan.

B. Meet identified maintenance level of service standards on the county and state highway systems.

C. Review and revise, if necessary, street cross-section standards for local, collector, and arterial streets to enhance safety and mobility.

D. Develop access management strategies for Highway 82.

E. Evaluate the need for traffic control devices, particularly along Highway 82.

F. Analyze the safety of traveling speeds and consider modifying posted speeds as necessary.

G. Evaluate the operation and safety of the Highway 82 and the Whiskey Creek Road intersections.

Goal 3

Improve coordination among Wallowa County, ODOT, the US Forest Service (USFS), the Federal Highway Administration (FHWA), and the city.

Objectives

A. Cooperate with ODOT in the implementation of the Statewide Transportation Improvement Program (STIP).

B. Work with the county in establishing cooperative road improvement programs and schedules.

C. Work with the county in establishing the right-of-way needed for new roads identified in the transportation system plan.

D. Take advantage of federal and state highway funding programs.

Goal 4

Increase the use of alternative modes of transportation (walking, bicycling, and public transportation) through improved access, safety, and service.

Objectives

A. Continue and improve existing service and seek new public transportation including that targeted for seniors.

B. Explore options for providing sidewalks or shoulders and safe crossings on collectors and arterials. (City Comment? TPR requires sidewalks on collectors and arterials.This could be an unpaved path.

C. Explore options for a city bicycle plan.

D. Seek Transportation and Growth Management (TGM) and other funding for projects evaluating and improving the environment for alternative modes of transportation.

Goal 5

Support efforts to maintain the airport facilities for small aircraft and charter services within Wallowa County.

Objectives

A. Encourage the state to improve and maintain airport facilities.

B. Cooperate with airport master planning efforts.

C. Incorporate airport master plans into local Comprehensive Plan.

Goal 6

Encourage the continued and improved rail transportation of goods.

A. Maintain operational status of the Idaho Northern Pacific rail line.

CHAPTER 3: TRANSPORTATION SYSTEM INVENTORY

As part of the planning process, David Evans and Associates, Inc., conducted an inventory of the existing transportation system in Wallowa. This inventory covered the street system as well as the pedestrian, bikeway, public transportation, rail, air, water, and pipeline systems.

STREET SYSTEM

The most common understanding of transportation is of roadways carrying cars and trucks. Most transportation dollars are devoted to building, maintaining, or planning roads to carry automobiles and trucks. The mobility provided by the personal automobile has resulted in a great reliance on this form of transportation. Likewise, the ability of trucks to carry freight to nearly any destination has greatly increased their use.

Encouraging the use of cars and trucks must be balanced against costs, livability factors, the ability to accommodate other modes of transportation, and negative impacts on adjacent land uses; however, the basis of transportation in nearly all American cities is the roadway system. This trend is clearly seen in the existing Wallowa transportation system, which consists almost entirely of roadway facilities for cars and trucks. Because of the rural nature of the area, the street system will most likely continue to be the basis of the transportation system for at least the 20-year planning period; therefore, the emphasis of this plan is on improving the existing street system for all users.

The existing street system inventory was conducted for all highways, arterial roadways, and collector roadways within Wallowa, as well as those in Wallowa County that are included in the TSP planning area. Inventory elements include:

- street classification and jurisdiction;
- street width and right-of-way;
- number of travel lanes;
- presence of on-street parking, sidewalks, or bikeways;
- speed limits; and
- general pavement conditions.

Figure 3-1 shows the roadway functional classification and jurisdiction. Appendix B lists the complete inventory.

State Highways

Discussion of the Wallowa street system must include the state highway, Highway 82, that traverse the planning area. Although Wallowa has no direct control over the state highway, adjacent development and local traffic patterns are heavily influenced by the highway. Highway 82 serves as the major route through town with commercial and industrial development focused along its corridor.

The 1999 *Oregon Highway Plan* (OHP) classifies the state highway system into five categories: Interstate, Statewide, Regional, District, and Local Interest. ODOT has established primary and secondary functions for each type of highway and objectives for managing the operations for each one.

Highway 82 through Wallowa is classified as a highway of statewide significance. According to the OHP, statewide highways "provide connections to larger urban areas, ports, and major recreation areas that are not

directly served by interstate highways." The management objective for statewide highways is to provide for safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal.".

Highway 82

Highway 82 (Wallowa Lake Highway) is a highway of statewide significance, which connects Wallowa with the cities of Lostine, Enterprise, and Joseph, to the southeast. West of Wallowa, Highway 82 connects with Interstate 84 in the City of La Grande.

Highway 82 extends through town from the northwest to southeast along Madison and 1st Streets. Madison and 1st Streets are two-lane roadways and are part of the city's grid system. Outside of the urbanized area, Highway 82 is a two-lane roadway with a speed limit of 55 mph.

In 1995, ODOT, in cooperation with the City of Wallowa and other local jurisdictions along Highway 82 initiated the development of a long-range plan for managing, operating and improving transportation between La Grande and Wallowa Lake over the next 20 years. An interim Corridor Strategy endorsed by the Oregon Transportation Commission and each jurisdiction along the corridor guided the development of the plan. The Interim Corridor Strategy set forth an overall corridor strategy and objectives that emphasizes managing the highway facilities that currently exist without substantial increases in capacity or construction of new facilities. In 1999, the Oregon Transportation Commission adopted the La Grande to Wallowa Lake (Oregon Highway 82) Corridor Plan. The Corridor Plan identifies and prioritizes improvements of transportation facilities and services that will serve as the basis for updating the Statewide Transportation Improvement Program (STIP). The plan also has been closely coordinated with the development of this Transportation System Plan and policies and standards established in the Oregon Transportation Plan, as well as, other modal plans, such as the 1999 Oregon Highway Plan. Relative transportation improvements identified in La Grande to Wallowa Lake (Oregon Highway 82) Corridor Plan are described in Chapters 6 and 7 of this TSP.

Street Classification

The City of Wallowa adopted street classification standards as part of a 1993 study prepared by Anderson and Perry Associates, Inc. This study classified all city streets using rural area street classifications and recommended rural street design standards. The street functional classifications recommended and adopted at that time include minor arterial, major collector, minor collector, and residential.

Minor Arterials

Minor arterials link cities, towns and other traffic generators (such as major resort areas) that are capable of attracting travel over long distances. They are intended to provide for relatively high travel speeds and minimum interference to through movements. The City of Wallowa classified Highway 82 (Madison Street and 1st Street) as a minor arterial.

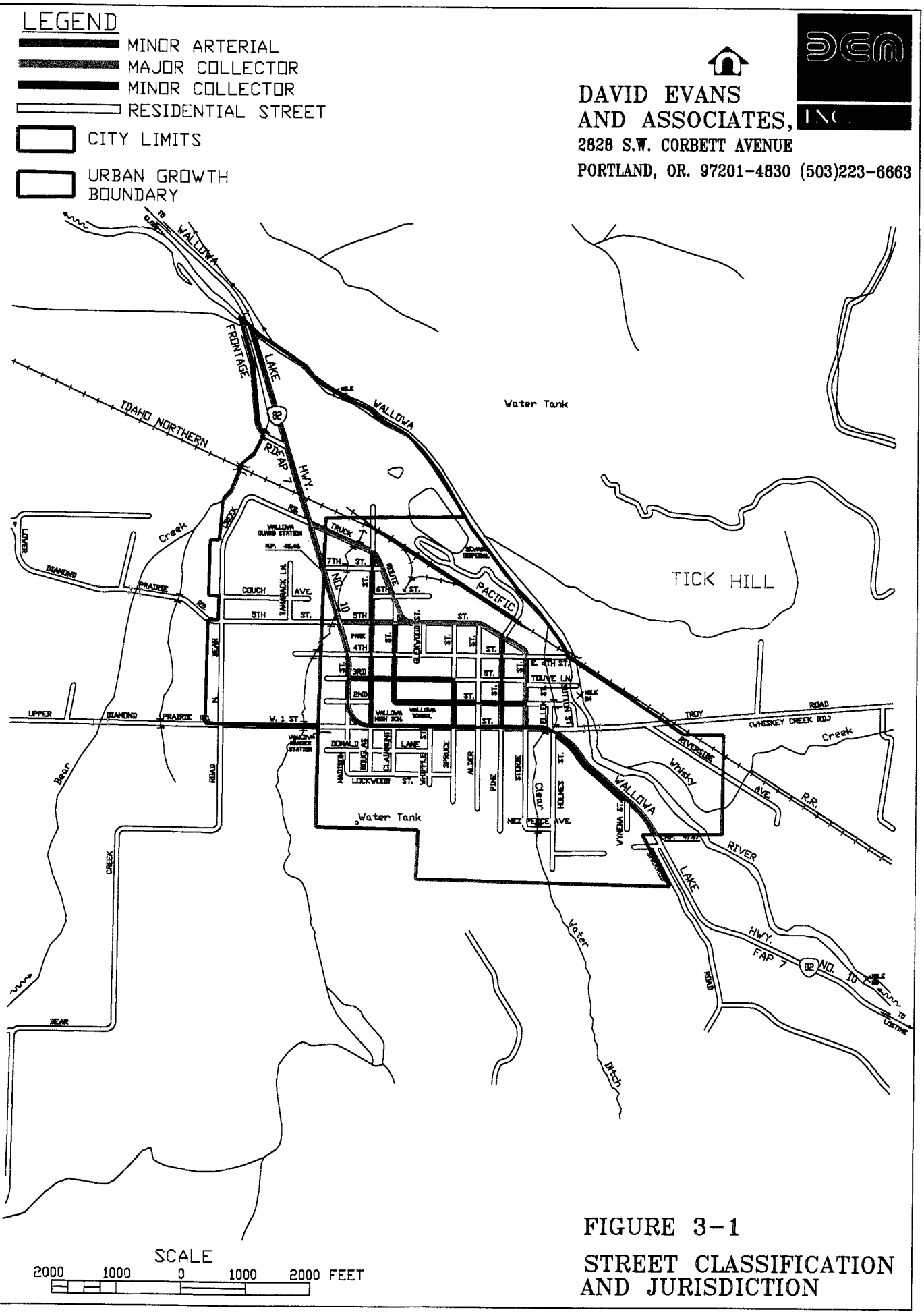


FIGURE 3-1

STREET CLASSIFICATION AND JURISDICTION

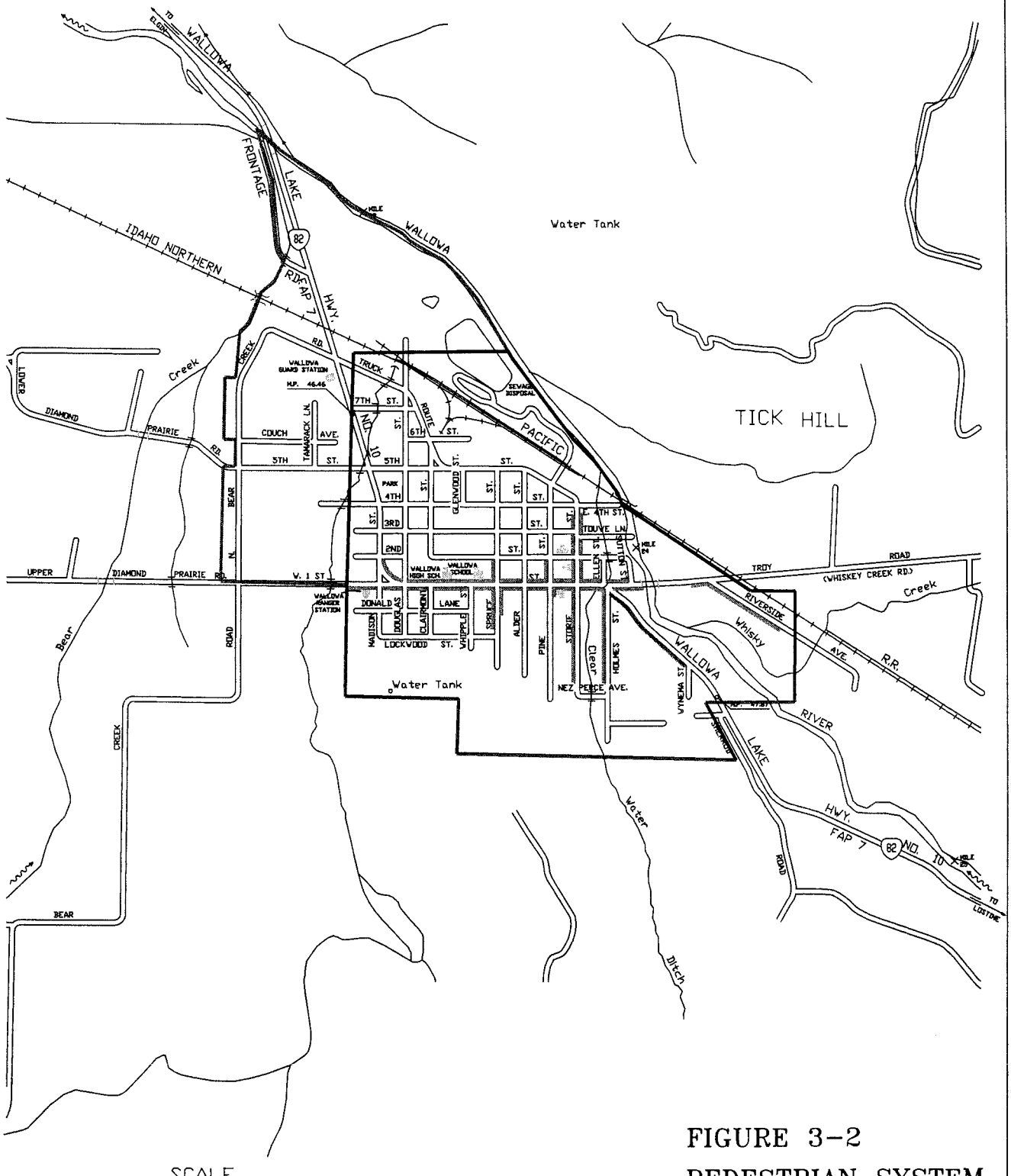


FIGURE 3-2

PEDESTRIAN SYSTEM INVENTORY

Major Collectors

Major collectors serve travel of primarily intracounty, rather than statewide, importance and constitute those routes on which predominant travel distances are shorter than on arterial routes. Consequently, more moderate speeds may be typical. These routes serve traffic generators such as schools, shipping points, county parks, and important mining and agricultural areas and link these places with nearby larger towns or cities or with routes of higher classifications and serve the more important intracounty travel corridors. The City of Wallowa classified 5th Street, Storie Street, and Bear Creek Road as major collectors.

Minor Collectors

Minor arterials also serve travel of primarily intracounty, rather than statewide, importance and provide service to smaller communities and link the locally important traffic generators with rural areas. The City of Wallowa classified 2nd Street, 3rd Street, Douglas Street, Clairmont Street, and Pine Street as minor collectors.

Residential Streets

Residential streets provide access to land adjacent to the collector network and serve travel over relatively short distances. They are designed to carry the very low traffic volumes associated with the local uses which abut them. They constitute all streets not classified as either arterials or collectors. In Wallowa, the local streets help form part of the grid system.

Street Layout

The majority of the Wallowa streets are positioned in a grid pattern. Block sizes vary but are typically 400 feet square. The grid system loses its rigidity on the fringes of the urbanized area, particularly in the northwest part of town.

PEDESTRIAN SYSTEM

The most basic transportation option is walking. Walking is the most popular form of exercise in the United States and can be performed by people of all ages and all income levels. However, it is not often considered as a means of travel. Because pedestrian facilities are generally an afterthought, they are not planned as an essential component of the transportation system.

The relatively small size of Wallowa indicates that walking could be employed regularly, weather permitting, to reach a variety of destinations. Encouraging pedestrian activities may not only decrease the use of the personal automobile but may also provide benefits for retail businesses. Where people find it safe, convenient, and pleasant to walk, they may linger and take notice of shops overlooked before. They may also feel inclined to return to renew the pleasant experience time and again.

In Wallowa, sidewalks exist along both sides of 1st Street from Madison Street to Sutton Street and sidewalk segments of at least one block in length also extend north and/or south of 1st Street along several local roadways, as shown in Figure 3-2. Sidewalks and other pedestrian facilities, including curb cuts for wheelchair access are notably lacking throughout the rest of the city.

CHAPTER 4: CURRENT TRANSPORTATION CONDITIONS

As part of the planning process, the current operating conditions for the transportation system were evaluated. This evaluation focused primarily on street system operating conditions since the automobile is by far the dominant mode of transportation in Wallowa. Census data were examined to determine travel mode distributions.

1998 TRAFFIC VOLUMES

ODOT maintains historic average annual daily traffic volume counts for Highway 82 in Wallowa. No hourly traffic data or turning movement data are available for Highway 82 or any other local roadway in Wallowa.

Average Daily Traffic

The Average Daily Traffic (ADT) on Highway 82 in Wallowa is shown in Figure 4-1. The traffic volume on Highway 82 in the center of town ranged from 2,500 to 2,700 vehicles per day (vpd) in 1998 and there has been no growth in traffic volumes in the past five years. North and south of town traffic volumes ranged from 1,700 to 2,200 vpd and have also remained flat.

The traffic volumes shown on Figure 4-1 and other volume figures are average volumes for the year. Summer is the season when volumes are highest. ODOT data on Highway 82 west of Wallowa County indicate that during the summer season, volumes are about 20 to 30 percent higher than average volumes. Urban sections of the highway (i.e., in Wallowa) are expected to see smaller increases in summer.

Street Capacity

Transportation engineers have established various standards for measuring traffic capacity of roadways or intersections. Each standard is associated with a particular level of service (LOS). The LOS concept requires consideration of factors that include travel speed, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort and convenience, and operating cost. In the 1991 OHP, levels of service were defined by a letter grade from A-F, with each grade representing a range of volume to capacity (v/c) ratios. A volume to capacity ratio (v/c) is the peak hour traffic volume on a highway divided by the maximum volume that a highway can handle. If traffic volume entering a highway section exceeds the section's capacity then disruptions in traffic flow will occur, reducing the level of service. LOS A represents relatively free-flowing traffic and LOS F represents conditions where the street system is totally saturated with traffic and movement is very difficult. The 1999 OHP maintains a similar concept for measuring highway performance, but represents LOS by specific v/c to improve clarity and ease of implementation. Table 4-1 presents the level of service criteria and associated range of v/c ratio for arterial roadways.

The OHP establishes operating level of service standards for the state highway system. Highways of statewide importance, such as Highway 82, should operate at LOS C or better (i.e., average speeds between 20 and 25 mph) in urban and urbanizing areas. For highways of district importance, such as Highway 3, the roadways should operate at LOS D (i.e., average speeds between 15 and 20 mph) in both urban and urbanizing areas.

TABLE 4-1
LEVEL OF SERVICE CRITERIA FOR ARTERIAL AND COLLECTOR STREETS

Service Level[1] (v/c Ratio)[2]	Typical Traffic Flow Conditions
A (0.00-0.48)	Relatively free flow of traffic with some stops at signalized or stop sign controlled intersections. Average speeds would be at least 30 miles per hour.
B (0.49-0.59)	Stable traffic flow with slight delays at signalized or stop sign controlled intersections. Average speed would vary between 25 and 30 miles per hour.
C (0.60-0.69) C-D (0.70-0.73)	Stable traffic flow with delays at signalized or stop sign controlled intersections. Delays are greater than at level B but still acceptable to the motorist. The average speeds would vary between 20 and 25 miles per hour.
D (0.74-0.83) D-E (0.84-0.87)	Traffic flow would approach unstable operating conditions. Delays at signalized or stop sign controlled intersections would be tolerable and could include waiting through several signal cycles for some motorists. The average speed would vary between 15 and 20 miles per hour.
E (0.84-0.97) E-F (0.98-0.99)	Traffic flow would be unstable with congestion and intolerable delays to motorists. The average speed would be approximately 10 to 15 miles per hour.
F (>1.00)	Traffic flow would be forced and jammed with stop and go operating conditions and intolerable delays. The average speed would be less than 10 miles per hour.

Source: (1) Transportation Research Board, *Highway Capacity Manual*, Special Report 209. National Research Council, 1985.
(2) ODOT, *SIGCAP Users Manual.* ODOT, 1994.

The traffic operation was determined at a representative intersection along Highway 82 using the 1994 Highway Capacity Software for unsignalized intersections. This software is based on the 1994 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. Since all intersecting streets and driveways are controlled by STOP signs in the city, the analysis was performed for an unsignalized intersection. The peak hour traffic was assumed to be 10 percent of the 24-hour ADT volume and the directional split was assumed to be 60/40. Because side street traffic volumes were unavailable, an assumed volume of 30 vph was used and unsignalized intersection level-of-service calculations were made for a representative intersection. The results of the level of service analysis are shown in Table 4-2.

TABLE 4-2
SUMMARY OF OPERATIONS AT A REPRESENTATIVE INTERSECTION

Location	Movement	1995 LOS (v/c)
Highway 82	Eastbound; Left, Through, Right	A (<0.48)
	Westbound; Left, Through, Right	B (0.49-0.59)
	Northbound; Left	A (<0.48)
	Southbound; Left	A (<0.48)

Note: The level of service is shown for all movements of the unsignalized intersections.

In general, traffic volumes in Wallowa are very light and traffic flows smoothly. Traffic on the state highway and a representative cross street operates at LOS B or better, which correlates to maximum volume to capacity ratio of 0.59.

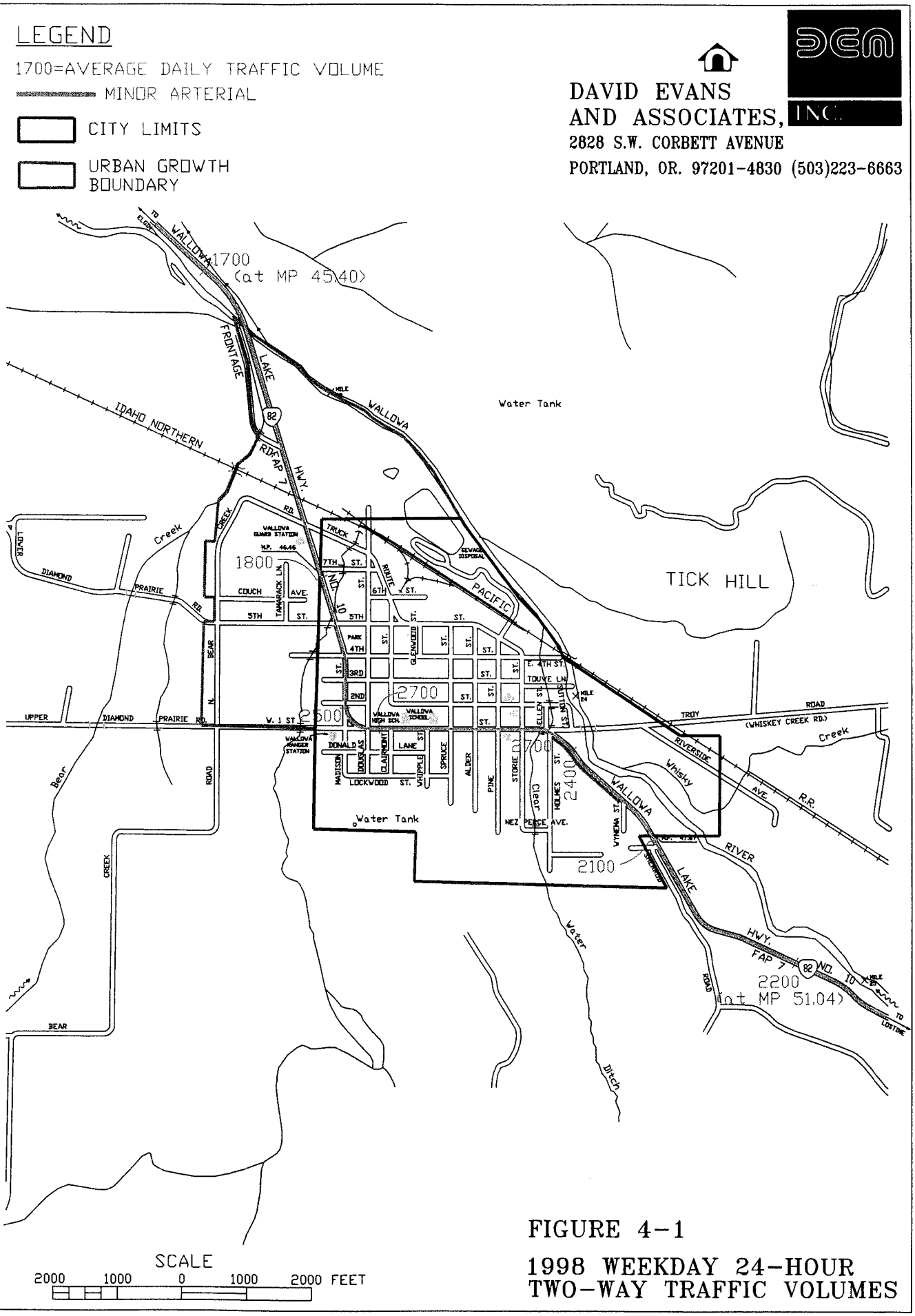


FIGURE 4-1

1998 WEEKDAY 24-HOUR TWO-WAY TRAFFIC VOLUMES

TRANSPORTATION DEMAND MANAGEMENT MEASURES

In addition to inventorying the transportation facilities in Wallowa, transportation demand management measures that are currently in place were also reviewed.

Alternative Work Schedules

One way to maximize the use of the existing transportation system is to spread peak traffic demand over several hours instead of a single hour. Statistics from the 1990 Census show the spread of departure to work times over a 24-hour period (see Table 4-3). Almost one third of the total employees depart for work between 7:00 and 8:00 a.m. Another third depart in either the hour before or the hour after the peak.

TABLE 4-3
DEPARTURE TO WORK DISTRIBUTION

	1990 Census	
Departure Time	**Trips**	**Percent**
12:00 a.m. to 4:59 a.m.	27	12.2
5:00 a.m. to 5:59 a.m.	25	11.3
6:00 a.m. to 6:59 a.m.	36	16.2
7:00 a.m. to 7:59 a.m.	60	27.0
8:00 a.m. to 8:59 a.m.	25	11.3
9:00 a.m. to 9:59 a.m.	15	6.7
10:00 a.m. to 10:59 a.m.	2	0.9
11:00 a.m. to 11:59 a.m.	2	0.9
12:00 p.m. to 3:59 p.m.	21	9.5
4:00 p.m. to 11:59 p.m.	9	4.0
Total	222	100.0

Source: US Bureau of Census.

Assuming an average nine-hour work day, the corresponding afternoon peak can be determined for work trips. Using this methodology, the peak work travel hour would occur between 4:00 and 5:00 p.m.

TRAVEL MODE DISTRIBUTION

Although the automobile is the primary mode of travel for most residents in the Wallowa area, some other modes are used as well. Modal split data is not available for all types of trips; however, the 1990 Census data do include statistics for journey to work trips as shown in Table 4-4.

Most Wallowa residents travel to work via a private vehicle. In 1990, 84.6 percent of all trips to work were in an auto, van, or truck. Trips in single-occupancy vehicles made up 69.5 percent of all trips, and carpooling accounted for 15.0 percent.

In no case was a bicycle reported as a means of transportation to work in 1990. Since the census data do not include trips to school or other non-work activities, bicycle usage may actually exist. There are no roadways with dedicated bicycle lanes. In addition to bicycle lanes, bicycle parking, showers, and locker facilities can help to encourage bicycle commuting.

Pedestrian activity was high (9.4 percent of trips to work) due to the fact that in a small city the size of Wallowa (less than one square mile) most of the city is within a few minutes walk of the city center. Again, census data do not include trips to school or other non-work activities.

The census data reflect the predominant use of the automobile, a growing population, relatively short travel distances, level terrain, low traffic flows and compact nature of the community, and clear weather conditions during the warmer seasons are favorable for developing adequate pedestrian and bicycle transportation facilities. The statewide emphasis on providing pedestrian and bicycle facilities along with roadways encourages the use of these modes, although these additions may be impractical to implement in some areas.

TABLE 4-4
JOURNEY TO WORK TRIPS

	1990 Census	
Trip Type	**Trips**	**Percent**
Private Vehicle	197	84.6
Drove Alone	*162*	82.2
Carpooled	*35*	17.8
Public Transportation	0	0
Motorcycle	3	1.3
Bicycle	0	0
Walk	22	9.4
Other	0	0
Work at Home	11	4.7
Total	233	100.0

Source: US Bureau of Census.

ACCIDENT ANALYSIS

ODOT collects detailed accident information on an annual basis along Highway 82 in Wallowa. The accident information data show overall accident rate for the route and accident locations. The accident rate for a stretch of roadway is typically calculated as the number of accidents per million vehicle miles traveled along that segment of roadway.

Historic

Table 4-5 shows the accident rates for Highway 82 in Wallowa as well as the Oregon statewide average for urban non-freeway primary state highways from January 1, 1996 to December 31, 1998. The accident rates for Highway 82 during those three years are consistently lower than the statewide average for similar highways.

TABLE 4-5
HISTORIC ACCIDENT RATES FOR STATE HIGHWAYS
(Accidents per Million Vehicle Miles Traveled)

Highway	1998	1997	1996
Highway 82 in Wallowa	1.88	N/A	0.93
Average for all Urban Non-freeway Primary State Highways	3.83	3.67	3.63

Source: Oregon Department of Transportation Accident Rate Tables.

Table 4-6 contains detailed accident information on Highway 82 in Wallowa from January 1, 1996 to December 31, 1998. It shows the number of fatalities and injuries, property damage only accidents, the total number of accidents, and the overall accident frequencies and rates for the segments of these roadways in Wallowa. During the three-year period there was a total of three accidents which were reported as resulting in property damage only. There were no fatalities and no injuries on this roadway segment during the period. All three of the accidents occurred at intersections and two occurred on icy pavement. The accidents were scattered along the roadway segments and there were no particular locations which showed a consistent accident pattern. The accident rate on Highway 82 is significantly below the statewide average, indicating that this roadway segment does not have any safety problems.

TABLE 4-6
ACCIDENT SUMMARIES FOR HIGHWAY 82
(January 1, 1996 to December 31, 1998)

Location	Fatalities	Injuries	Property Damage Only	Total Accidents	Accident Frequency (acc/mi/yr)	Accident Rate (acc/mvm)
Highway 82 (MP 46.46 to 47.67)	0	0	3	3	0.8	.94

Source: Oregon Department of Transportation Accident Summary Database Investigative Report.

CHAPTER 5: TRAVEL FORECASTS

The traffic volume forecasts for Wallowa County and its municipalities are based on historic growth on the state highway system, historic population growth, and projected population growth. Forecasts were only prepared for the state highway system in the county, since the volumes on these roadways are much higher than on any of the roads in the county.

LAND USE

Land use and population growth play an important part in projecting future traffic volumes. Historic trends and their relationship to historic traffic demand are the basis of those projections. These population and employment forecasts were developed to determine future transportation needs. The amount of growth, and where it occurs, will affect traffic and transportation facilities in the study area. This report is not intended to provide a complete economic forecast or housing analysis, and it should not be used for any purpose other than that for which it is designed.

A more detailed description of existing and future land use projections is contained in the Population and Employment Analysis located in Appendix C. Both historic and projected population for Wallowa County and its incorporated cities are summarized in Table 5-1.

TABLE 5-1
WALLOWA COUNTY POPULATION TRENDS

	1970[1]	1980[1]	1990[1]	2000[2]	2020 Projected
Wallowa County	6,247	7,273	6,911	7,200	8,248[3]
Incorporated Cities:					
Enterprise	1,680	2,003	1,905	2,050	2,261
Joseph	839	999	1,073	1,280	1,511
Lostine	196	250	231	230	252
City of Wallowa	811	847	748	865	994

Source:
1) US Bureau of the Census.
2) Portland State University Center for Population Research and Census.
3) State of Oregon Office of Economic Analysis.

Historic

Population levels in most of Eastern Oregon are close to, or actually lower than, those experienced earlier in the century. Counties included in this phenomenon include Baker, Harney, Union, Grant, and Wallowa Counties. The population of Wallowa County actually declined in the 1960s and 1980s, reflecting the general slowdown in the state's economy during these time periods. As a result of this activity, the population of Wallowa County declined by 3 percent between the 1960 and 1990 Censuses (from 7,102 in 1960 to 6,911 in 1990). The population in the City of Wallowa fell from 811 in 1970 to 748 in the 1990 Census (a loss of nearly eight percent in 20 years). However, population levels have again begun climbing. Since 1990, the City of Wallowa's population has increased by 120 (a 16 percent increase) people to 865 for the year 2000, which is slightly higher than its 1980 population

Projected

Population projections in Wallowa County are based on historic growth rates and forecasts by the State of Oregon Office of Economic Analysis. Factors that will affect the future growth rate of Wallowa County include employment opportunities, available land area for development, and community efforts to manage growth.

Wallowa County is expected to experience small population gains for the next 20 years. Like much of Eastern Oregon, the economy of Wallowa County remains largely seasonal, with more than one-quarter of all employment agriculture-based. Therefore, population increases are difficult to predict, and are not likely to be as stable as the forecasts appear to imply.

The population of Wallowa County is expected to increase by15 percent over the next 20 years, from the 2000 estimate of 7,200 to an estimated 8,248 in year 2020. Wallowa and Joseph are expected to grow fasterthan the county, with forecasted increases of nearly 16 and 19 percent respectively over the next 20 years.The City of Wallowa's population is expected to climb from it current level of 865 to 994 by 2020 . Despite Wallowa's historical population losses, other factors suggest future population growth. These factors include its strong schools, relative affordability, and the planning development of the Wallowa Band Nez Perce Interpretive Center.

TRAFFIC VOLUMES

Traffic volume projections are based on historic growth trends for highway volumes and land use and on the future land use projections.

Historic

Before projecting future traffic growth, it is important to examine past growth trends on the Wallowa roadway system. Historic data is only available for State Highway 82 in Wallowa; however, this roadway carries far more traffic than any other streets in the city. ODOT collects traffic count data on the state highways (rural and urban sections) every year at the same locations. These counts have been conducted at six locations on Highway 82 in Wallowa.

Historical growth trends on the state highways in and around Wallowa were established using the average annual daily traffic (AADT) volume information presented in the ODOT Traffic Volume Tables for the years 1975 through 1995. The AADT volumes were obtained for each of these years at several locations along each highway. Using a linear regression analysis of the average AADT volumes between 1975 and 1995, an average annual growth rate was determined. Table 5-2 summarizes the historic average growth rate on each of these sections.

TABLE 5-2
HISTORIC TRAFFIC GROWTH RATES ON STATE HIGHWAYS

Highway Section	Average Annual Growth Rate 1975-1995	Total Growth 1975-1995
Highway 82 north of Wallowa	2.2%	53%
Highway 82 in Wallowa	1.9%	44%
Highway 82 south of Wallowa	1.8%	43%

Over the past 20 years, growth on Highway 82 in Wallowa has averaged 1.9 percent per year. On the rural section of Highway 82 north of Wallowa, traffic has been growing at a rate of 2.2 percent per year. South of Wallowa, traffic has been growing at a rate of 1.8 percent per year.

In all cases, growth on the highways far exceeded the population growth in Wallowa itself. This relationship reflects the modern trend toward an increase in per capita vehicle miles traveled and an increase in tourist traffic.

Forecasting Methodology

It was decided that the most appropriate growth rates to project future traffic are those calculated from the historic traffic growth and not those calculated from the historic and future population and employment forecasts. Using the same linear regression analysis used to calculate the historic growth rate of traffic, forecasts were made for the years 1997 through 2017. Traffic volumes on Highway 82 are expected to grow at a rate of 1.3 percent per year (30 percent over the next 20 years) to 3,240 vpd. This annual growth rate is higher than both the estimated population and employment growth rates as described earlier in this chapter, and provide a more conservative estimate. Also, much of the traffic on this highway in Wallowa is tourist traffic, whose growth is not directly determined by the population and employment growth in the study area.

It is important to note that using the historical growth trends assumes that future traffic patterns will remain consistent with historical patterns, without consideration of future planned developments.

HIGHWAY SYSTEM CAPACITY

For the year 2017, unsignalized intersection analysis was performed using the overall growth (30 percent) expected on Highway 82 at the same representative intersection in Wallowa for which the existing conditions were analyzed. The analyses indicated that this intersection is expected to meet ODOT level of service standards over the 20-year forecast period. The results of the unsignalized intersection analyses are shown in Table 5-3.

Analysis Results

At a representative intersection on Highway 82, traffic volumes are expected to be 30 percent higher than traffic volumes today. This increase in traffic volumes over the 20 year projection period will not impact the level-of-service (LOS) or meet the maximum volume to capacity ratio of 0.80 at this intersection. The

northbound and southbound left turns at this intersection will continue to operate at LOS A (<0.48 v/c), and the eastbound and westbound left, through and right turns will continue to operate at LOS B (0.49-0.59 v/c). The level of service for the eastbound left, through and right turns will drop to LOS B; however, this is still in the range of acceptable delay for drivers.

TABLE 5-3
SUMMARY OF OPERATIONS AT A REPRESENTATIVE INTERSECTION

Location	Movement	1995 LOS (v/c)	2017 LOS (v/c)
Highway 82	Eastbound; Left, Through, Right	A (<0.48)	B (0.49-0.59)
	Westbound; Left, Through, Right	B (0.49-0.59)	B (0.49-0.59)
	Northbound; Left	A (<0.48)	A (<0.48)
	Southbound; Left	A (<0.48)	A (<0.48)

Note: The level of service is shown for all movements of the unsignalized intersections.

CHAPTER 6: IMPROVEMENT OPTIONS ANALYSIS

As required by the Oregon Transportation Planning Rule (TPR), transportation alternatives were formulated and evaluated for the City of Wallowa TSP. These potential improvements were developed with the help of the TAC and the individual communities, and attempt to address the concerns specified in the goals and objectives section (Chapter 2).

Each of the transportation system improvement options was developed to address specific deficiencies or access concerns. The following list includes all of the potential transportation system improvements considered. Improvement Options 3, 4, and 5 are illustrated in Figure 6-1.

The proposed transportation system improvements recommended for the City of Wallowa TSP include both state highway and local road projects. This section of the TSP describes the individual improvements and their associated costs. Improvement options include:

1. Revise zoning code to allow and encourage mixed-use development and redevelopment.
2. Control speeds on Highway 82.
3. Improve the alignment at the intersection of Highway 82 and Whiskey Creek Road.
4. Protect the Idaho Northern Pacific Railroad right-of-way.
5. Provide a bikeway on Highway 82.
6. Implement Transportation Demand Management Strategies.

As discussed in the remaining sections of this chapter, not all of these on-going or considered improvements were recommended. The recommendations were based on their costs and benefits relative to traffic operation, and their impact on the transportation system and community livability.

EVALUATION CRITERIA

The evaluation of the potential transportation improvements was based on a qualitative review of safety, environmental, socioeconomic, and land use impacts, as well as estimated cost. The effect of each potential project on traffic patterns was not evaluated since existing and future traffic projections for the city indicate there will be no deficiencies in the capacity of the street system over the next 20 years.

Safety was the first qualitative factor to be evaluated. Although driver safety is considered in these projects, pedestrian and bicycle safety are critical concerns for the city. Environmental factors were also evaluated, such as air quality, noise, and water quality. In evaluating socioeconomic and land use impacts, right-of-way requirements, impacts to adjacent lands, and community livability were considered. The final factor in the evaluation of each potential transportation improvement was cost. Costs were estimated in 2000 dollars based on preliminary alignments for each potential transportation system improvement.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM PROJECTS

The Oregon Department of Transportation has a comprehensive transportation improvement and maintenance program that covers the entire state highway system. The STIP identifies all the highway improvement projects in Oregon. The STIP lists specific projects, the counties in which they are located, and their construction year.

There were no highway improvement projects for the City of Wallowa listed in the 2000-2003 STIP, published in 2000.

IMPROVEMENT OPTIONS EVALUATION

Through the transportation analysis and input provided from the public involvement program, multiple improvement projects were identified. These options included reconstructing existing intersections and providing improved pedestrian and bicycle facilities.

Option 1. Revise Zoning and Development Codes

One of the goals of the Oregon Transportation Planning Rule (TPR) is to reduce the reliance on the automobile. One way city jurisdictions can do this is through amendments in zoning and development codes to permit mixed-use developments and increases in density in certain areas. Specific amendments include allowing neighborhood commercial uses within residential zones and allowing residential uses within commercial zones. Such code amendments can encourage residents to walk and bicycle throughout the community by providing shorter travel distances between land uses.

These code revisions are more effective in medium to large sized cities with populations of 25,000 and over, but in cities such as Wallowa, they are not appropriate. Because of Wallowa's size, the decision about what mode of transportation to use when making a trip inside the city is not influenced by distance. The longest distance between city limit boundaries in Wallowa is around one mile, a distance short enough to walk, ride a bike, or drive. Distances between different land uses, such as residential and commercial, is even shorter.

Revisions to zoning and development codes to allow for increased density are not applicable to the City of Wallowa. Because of the small size of Wallowa, the relationship between land uses is already similar to the mixed-use zoning patterns that are recommended in larger urban areas. Increasing density is also likely to have little effect on development in a community which is expecting a population increase of nearly ten percent (79 additional residents) in the next 20 years.

The City of Wallowa Comprehensive Land Use Plan, Zoning Ordinance and Land Division Ordinance have been amended in concurrence with the TSP revisions to address applicable TPR requirements (see Chapter 9), including the addition of provisions to implement the TSP.

Option 2. Control Speeds on Highway 82

The residents of the City of Wallowa are concerned about traffic exceeding the posted speed limit along Highway 82 through the city. Excessive speeds along the highway segment adjacent to Wallowa School and Wallowa High School where children frequently walk and ride bicycles are of particular concern. Residents

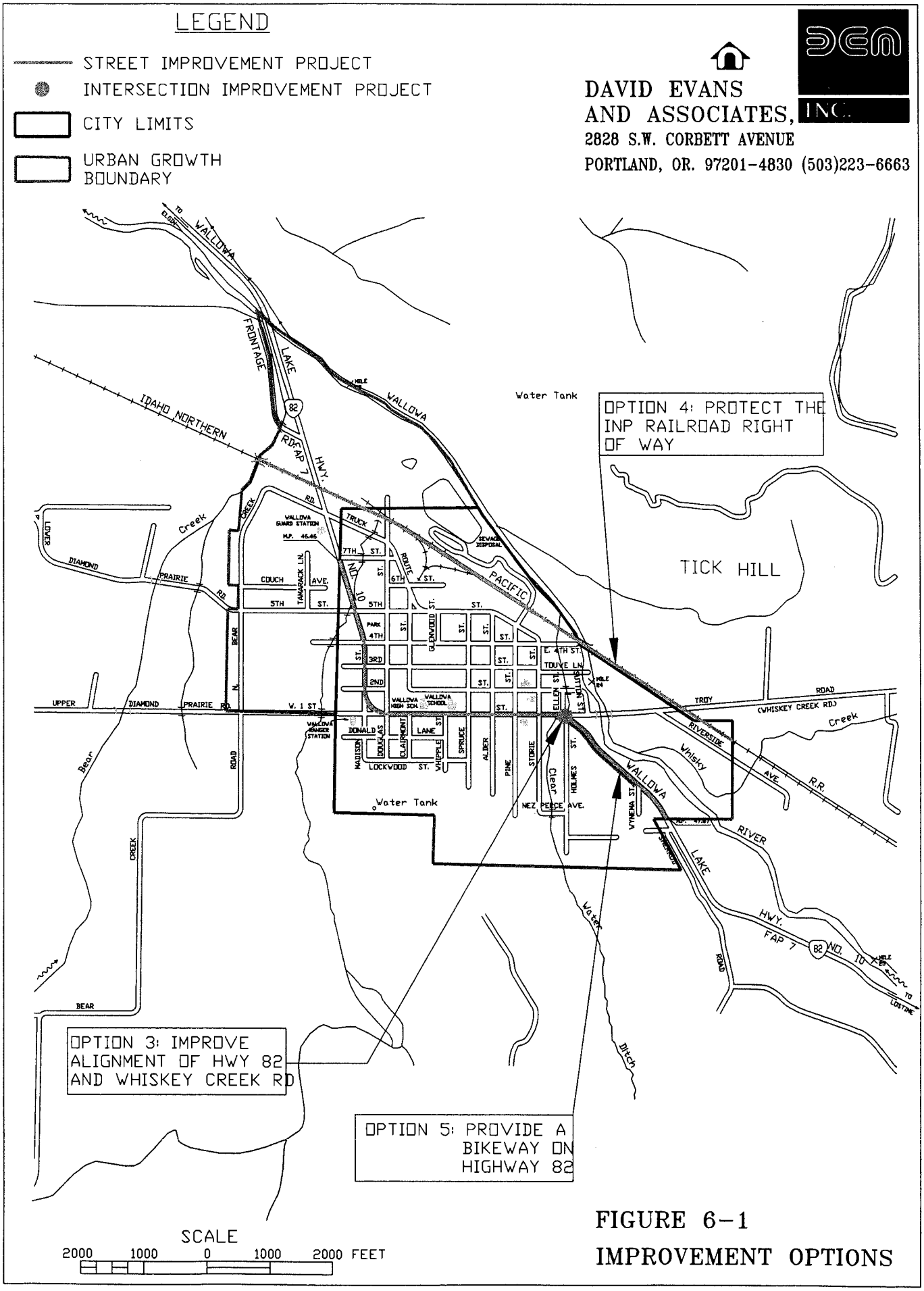


FIGURE 6-1
IMPROVEMENT OPTIONS

would like to see a system developed that would encourage traffic to slow down to a more appropriate speed.

It is recommended that a system be developed to discourage motorists from exceeding the speed limit along Highway 82 within Wallowa. There are a variety of different speed control measures used on the roadways of many cities in the state ranging from narrowing lane widths to more stringent enforcement. A technical memorandum describing the different types of speed control measures available can be found in Appendix D. A specific cost cannot be identified until a speed control program is developed.

Option 3. Improve the Alignment at the Intersection of Highway 82 and Whiskey Creek Road

The intersection of Highway 82 and Whiskey Creek Road is an awkwardly aligned five-legged intersection. Turns from northbound Highway 82 to eastbound Whiskey Creek Road are particularly difficult because of the tight angle of the turn. Whiskey Creek Road is expected to have higher traffic volumes in the near future due to the newly constructed RV park and the planned Native American Interpretive Center along its alignment. Residents feel that the increase in traffic through this intersection will increase the likelihood of an accident.

Improved alignment of this intersection and private access restriction should be included in the TSP for safety reasons. Because it lies on a state highway, ODOT has the jurisdiction over whether this improvement is made. Additional study of this intersection is recommended to determine potential alignment options, turn-lane storage requirements, right-of-way acquisition, and impacts of potential closure of private driveways.

This improvement is estimated to be a relatively high cost roadway improvement. Assuming reconstruction of this intersection requires addition of an eastbound left-turn refuge lane, the purchase of private property, and the realignment and reconstruction of approximately 600 feet of Highway 82, the cost of this improvement is estimated at $380,000.

Option 4. Protect the Idaho Northern Pacific Railroad Right-of-Way

The Idaho Northern Pacific Railroad (INP) owns an abandoned railroad right-of-way between Elgin and Joseph. Oregon State Parks has obtained funding through the Transportation Efficiency Act of the 21st Century (TEA-21) to purchase the railroad right-of-way and preserve the rail corridor for public use.

There is strong community interest in Wallowa County to protect the railroad right-of-way for future uses of the abandoned rail line. Options that have been discussed include using the right-of-way for utility systems and as a recreational trail. It may be possible that the right-of-way could serve as both a linear utility corridor and as a non-motorized path.

Wallowa County has identified the need to extend natural gas and fiber optic telecommunication lines into the county to encourage the diversification of the local economy. Business recruiters have informed the Wallowa County Court that both natural gas service and an improved telecommunication system are essential for new businesses selecting development sites within the county. Presently, the natural gas line stops at Elgin and fiber optics have not been extended beyond La Grande. The INP rail right-of-way has the potential to serve as a corridor for these two utility systems.

Conversion to a horse, hiking, and/or bike trail may be an option because it would provide both recreational opportunities and a transportation system for non-motorized vehicles.

However, public use of the right-of-way has not been embraced county-wide. Some residents expressed concerns about a hiking or riding trail along the abandoned rail lines because of increased risk of fire, compromises in safety and security, the possibility of more trash along the right-of-way, and a general dislike of public access through private property.

It is estimated that a "Rails to Trails" improvement option would have moderate to high construction costs. The Wallowa section of this trail would be a small part of a much larger county-wide project. The cost of the right-of-way between Elgin and Joseph (approximately 50 miles) was estimated at $2.5 million (1995 dollars) in the *Oregon Highway 82 Corridor Plan*. The cost to clear, prepare, and construct a 10-foot-wide asphalt path is around $16 per linear foot. This assumes the pathway is composed of two inches of asphalt and four inches of aggregate. The section of this project within the City of Wallowa is approximately 1.4 miles. Excluding the cost of the right-of-way, the cost to construct this path in the City of Wallowa would be $128,000. A less costly option would be to not pave the path.

Efforts should be made to retain the right-of-way for utilities and as a possible recreational trail. Such a situation could preserve the integrity of the right-of-way and the possibility of future rail service. The Transportation Planning Rule requires that jurisdictions protect right-of-ways for future operation of transportation corridors.

There is community interest in pursuing this project because of its benefits to the community and the region. In spite of some opposition by the property owners along the alignment of the proposed multi-use path, it is recommended for inclusion in the plan. Efforts to implement this project will need to be coordinated with the county, the state, and INP.

Option 5. Provide a Bikeway on Highway 82

Goals and objectives of the city's bicycle plan include reducing conflicts between bicyclists and motorized vehicle traffic, developing a system dedicated to bicycles, and providing opportunities for recreational bicycle use. One option for meeting these goals is adding a bikeway on Highway 82.

Shared roadways, where bicyclists share normal vehicle lanes with motorists, are generally acceptable if speeds and traffic volumes are relatively low. On the local streets in Wallowa, shared roadways are not an issue; however, on arterial roadways bike lanes are recommended.

Highway 82 functions as an arterial street through Wallowa, which means that it should have bike lanes on both sides of the street as specified in the recommended street standards listed in Chapter 7 and as required by the TPR.

On Highway 82, volumes are approximately 2,700 vehicles per day. Accident statistics on the highway do not indicate that there are frequent conflicts between bicyclists and motorized vehicles. However, the highway segment adjacent to Wallowa School and Wallowa High School where children frequently walk and ride bicycles and within the City's Central Business District are of particular concern. Bicycle lanes in an urban area can help define travel lanes and help calm traffic. In other areas along Highway 82, shoulders would need widening on sections where no on-street parking exists. Depending on existing pavement width, bike lanes can be provided at a low construction cost simply by restriping the existing road (approximately $0.40 per linear foot). If a roadway has to be widened to provide a bike lane or paved shoulder, it can be

done at a relatively high construction cost (approximately $45 per linear foot for a facility five foot wide on both sides of the road, built to highway standards, with curbs and striping.

The narrowest segment of Highway 82 in Wallowa, between Douglas and Holmes Streets, consists of a 70-foot right-of-way with a paved width of 50 feet. As noted in the 1995 Oregon Pedestrian and Bicycle Plan, five feet is the minimum width of a bicycle lane adjacent to parked cars. The State's Plan also notes that shared roadways (used by both motorized vehicles and bicyclists) without striped bike lanes is suitable in urban areas on streets with low speeds (25 miles per hour or less) including the segment of Highway 82 between Spruce and Holmes Streets.

Although the right-of-way is narrower between Douglas and Holmes Streets, bike-lanes can still be provided in the existing space, which is illustrated in. Figure 7-1A. This will require restriping to accommodate the new bike lanes. At approximately $0.40 per linear foot, restriping Highway 82 between Holmes and Douglas Streets will cost approximately $2320.00. This option is reccomended because it implements the 1995 Oregon Bicycle and Pedestrian Plan and is a relatively low-cost alternative to widening the right-of-way.

Option 6. Implement Transportation Demand Management Strategies

Transportation demand management (TDM) strategies change the demand on the transportation system by providing facilities for modes of transportation other than single occupant passenger vehicles, such as implementing carpooling programs, altering work shift schedules, and applying other transportation measures within the community. The State Transportation Planning Rule recommends that cities should evaluate TDM measures as part of their Transportation System Plans.

TDM strategies are most effective in large, urban cities; however, some strategies can still be useful in small cities such as Wallowa. For example, staggering work shift schedules at local businesses may not be appropriate in Wallowa since there are no large employers in the area; however, provisions for alternative modes of transportation, such as sidewalks and bike lanes, and implementing a county-wide carpooling program can be beneficial for residents of the city. In rural communities, TDM strategies include providing mobility options.

Wallowa can implement TDM strategies by requiring all future street improvement projects to include the addition of some sort of pedestrian facility, such as new sidewalks or walkways, which will effectively separate pedestrians from motorized traffic. All new street improvement projects should also consider bicycle lanes as well.

Implementing a local carpool program in Wallowa alone is not necessary because of Wallowa's geographical size; however, a county-wide carpool program is possible. Residents who live in Wallowa and residents who live in other cities and rural areas should be encouraged to carpool with a fellow coworker or someone who works in the same area.

Although the primary goal of these measures is to reduce the number of vehicle trips made within the city, especially during peak periods, street capacity for automobiles and trucks is not generally an issue in Wallowa. However, providing adequate facilities for pedestrians and bicyclists increases the livability of a city, and improves traffic and pedestrian safety. With more emphasis on walking or biking in the city, conditions such as air quality and noise levels would be improved as well, therefore, this option is recommended.

Costs associated with implementing TDM strategies were not determined.

SUMMARY

Table 6-1 summarizes the recommendations of the street system modal plan based on the evaluation process described in this chapter. Chapter 7 discusses how these improvement options fit into the modal plans for the Wallowa area.

TABLE 6-1
TRANSPORTATION IMPROVEMENT OPTIONS: RECOMMENDATION SUMMARY

Option	Recommendation
1. Revise Zoning and Development Codes	• Do not implement; not applicable[1]
2. Control Speeds on Highway 82	• Desirable to implement; ODOT has jurisdiction
3. Improve the alignment at the intersection of Highway 82 and Whiskey Creek Rd.	• Implement
4. Protect the Idaho Northern Pacific Railroad Right-of-Way	• Implement
5. Provide a Bikeway on Highway 82	• Implement. Restripe Highway 82 between Holmes and Douglas Streets
6. Implement Transportation Demand Management Strategies	• Implement

1 The City Comprehensive Plan, and Zoning and Land Division Ordinances have been amended to incorporate provisions oriented to pedestrians and bicyclists in compliance with the Transportation Planning Rule. However, these revisions do not promote higher development densities.

CHAPTER 7: TRANSPORTATION SYSTEM PLAN

The purpose of this chapter is to provide detailed operational plans for each of the transportation systems within the community. The City of Wallowa TSP covers all the transportation modes that exist and are interconnected throughout the urban area. Components of the street system plan include street classification standards, access management recommendations, transportation demand management measures, modal plans, and a system plan implementation program.

STREET DESIGN STANDARDS

Street classification standards relate the design of a roadway to its function. The function is determined by operational characteristics such as traffic volume, operating speed, safety, and capacity. Street standards are necessary to provide a community with roadways which are relatively safe, aesthetic, and easy to administer when new roadways are planned or constructed. They are based on experience, and policies and publications of the profession.

Existing Street Classification Standards

The City of Wallowa adopted street classification standards as part of a 1993 study prepared by Anderson and Perry Associates, Inc. This study classified all city streets using rural area street classifications and recommended rural street design standards. The street functional classifications recommended and adopted at that time include minor arterial, major collector, minor collector, and residential. The rural street standards, which do not require bike lanes, curbs, or sidewalks, are described below. The City Council felt that, although bike lanes, sidewalks, curbs, and gutters are desirable, unless substantial financial assistance can be obtained and/or special safety considerations dictate, they will not be installed under future street projects in the city.

Residential Streets -- Current standards are for two 11-foot traffic lanes and four-foot shoulders. Where conditions require parking, 10-foot shoulders will be provided.

Collector Streets -- Current standards are for two 11-foot traffic lanes. Parking would be provided in commercial or public use areas and traffic lanes and four-foot shoulders will be provided at other locations.

No standards were adopted for arterial streets; however, the only arterial street in the city is Highway 82, under state jurisdiction.

Recommended Street Standards

The development of the City of Wallowa TSP provides the city with an opportunity to review and revise street design standards to more closely fit with the functional street classification, and the goals and objectives of the TSP. The recommended street standards are shown graphically in Figure 7-1 through Figure 7-3 and summarized in Table 7-1. Since the City of Wallowa TSP includes land within the UGB, urban street standards should be applied in these outlying areas as well. Although portions of the city, especially outside the city boundary, may presently have a rural appearance, these lands will ultimately be part of the urban area. Retrofitting rural streets to urban standards in the future is expensive and controversial and may not be practical when considering the low population and compact nature of the city. It is better to initially build them to an acceptable urban standard.

TABLE 7-1
RECOMMENDED STREET DESIGN STANDARDS

Classification	Pavement Width	Right-of-Way Width	Min. Posted Speed
Residential – Option 1	20 ft.	42 to 48ft.	15-25 mph
Residential – Option 2	23 to 24 ft.	47 to 52 ft.	15-25 mph
Residential – Option 3	28 ft.	52 to 56 ft.	15-25 mph
Alley	10 to 12 ft.	16 to 20 ft.	15 mph
Collector	30 to 34 ft.	57 to 63 ft.	25-35 mph
Arterial	50 to 52 ft.	80 ft.	25-45 mph

A good, well-connected grid system of relatively short blocks can minimize excessive volumes of motor vehicles by providing a series of equally attractive or restrictive travel options. This street pattern is also beneficial to pedestrians and bicyclists.

Sidewalks must be included on all urban streets as an important component of the pedestrian system unless the City determines they are unnecessary. When sidewalks are located directly adjacent to the curb, they can include such impediments as mailboxes, street light standards, and sign poles, which reduce the effective width of the walk. Sidewalks buffered from the street by a planting strip eliminate obstructions in the walkway, provide a more pleasing design as well as a buffer from traffic, and make the sidewalk more useable by disabled persons. To maintain a safe and convenient walkway for at least two adults, a five-foot sidewalk should be used in residential areas.

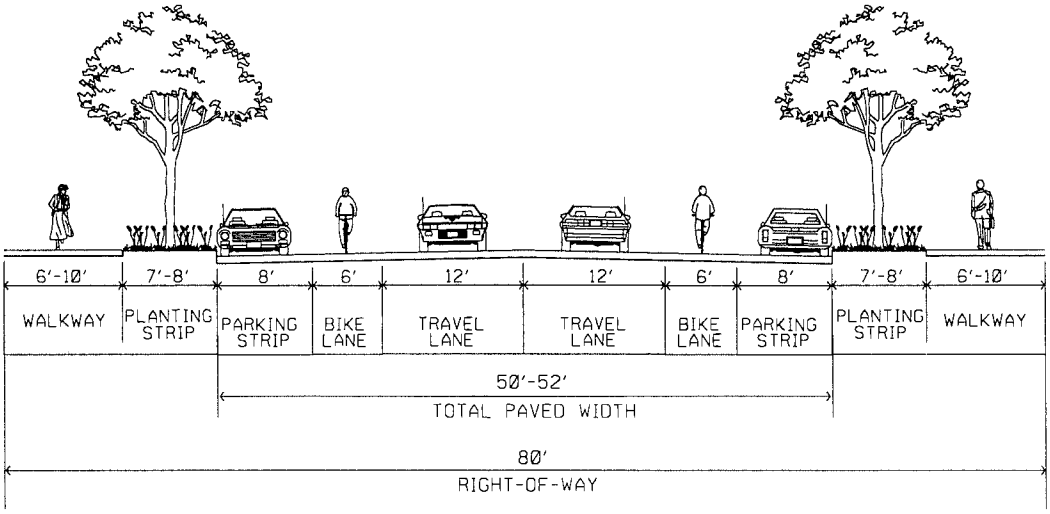
Residential Streets

The design of a residential street affects its traffic operation, safety, and livability. The residential street should be designed to enhance the livability of the neighborhood as well as to accommodate less than 1,200 vehicles per day. Design speeds should be 15 to 25 mph. When traffic volumes exceed approximately 1,000 to 1,200 vehicles per day, the residents on that street will begin to notice the traffic as a noise and safety problem. To maintain neighborhoods, local residential streets should be designed to encourage low speed travel and to discourage through traffic.

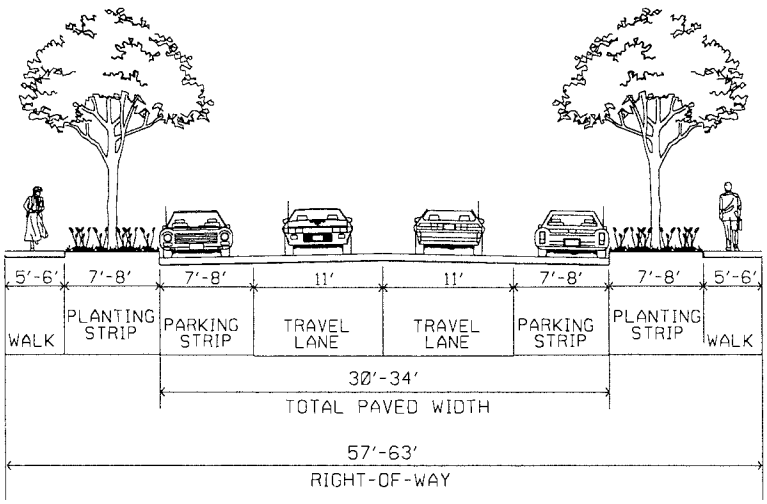
Cul-de-sac, or "dead-end" residential streets are intended to serve only the adjacent land in residential neighborhoods. These streets should be short (less than 300 feet long) and serve a maximum of 20 single-family houses. Because the streets are short and the traffic volumes relatively low, the street width can be narrower than a standard residential street, allowing for the passage of two lanes of traffic when no vehicles are parked at the curb at one lane of traffic when vehicles are parked at the curb.

Because cul-de-sac streets limit street and neighborhood connectivity, they should only be used where topographical or other environmental constraints prevent street connections. Where cul-de-sacs must be used, pedestrian and bicycle connections to adjacent cul-de-sacs or through streets should be included.

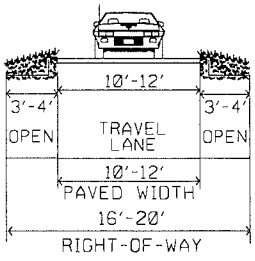
Three recommended street standard options are provided for residential streets, as shown in Figure 7-1. Each option provides a minimum of 20 feet of pavement and provide varying degrees of on-street parking.



Arterial Roads



Collector Roads



Alley

DAVID EVANS AND ASSOCIATES, INC.
2828 S.W. CORBETT AVENUE
PORTLAND, OR. 97201-4830 (503) 223-6663

(Not to Scale)

FIGURE 7-1

Rural Street Standards Local, Minor Collector and Major Collector Roadways

CITY OF WALLOWA TSP

(not to scale)

DAVID EVANS
AND ASSOCIATES, INC.
2828 S.W. CORBETT AVENUE
PORTLAND, OR. 97201-4830 (503) 223-6663

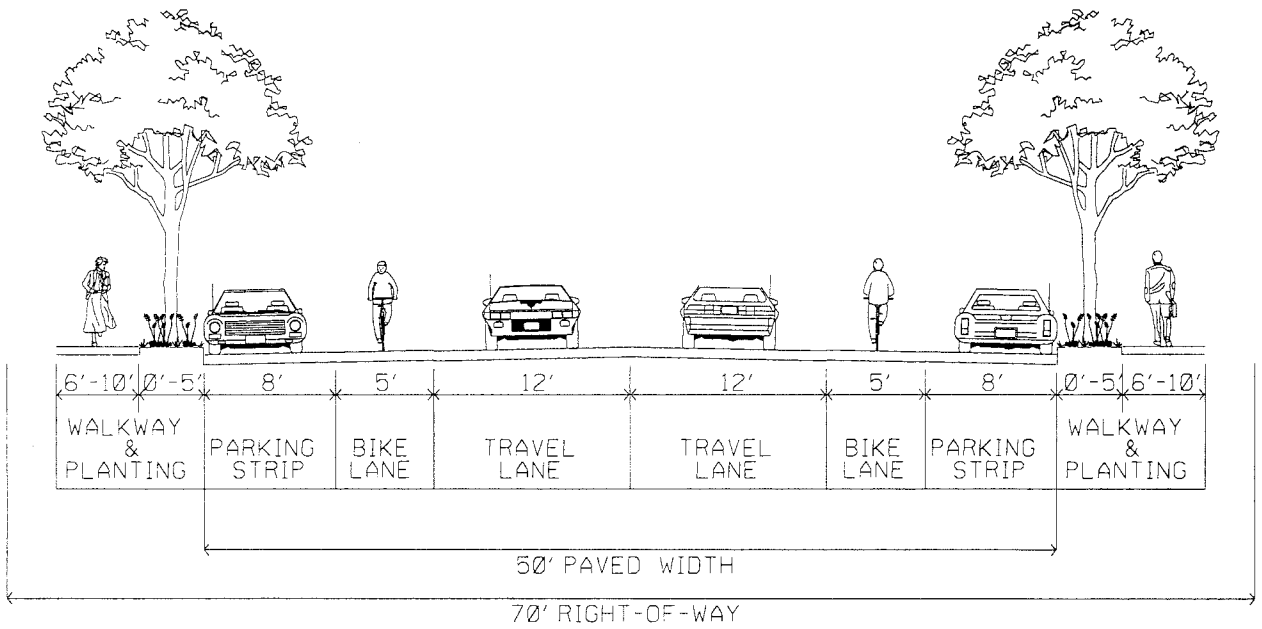
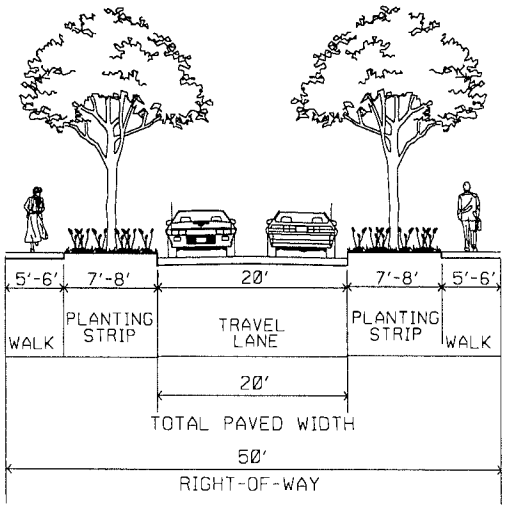
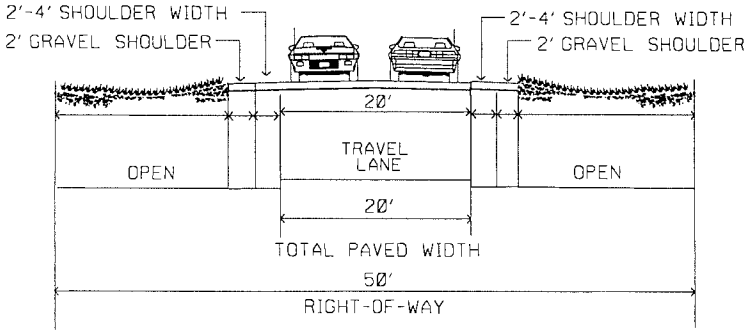


FIGURE 7-1A
URBAN ARTERIAL
STREET STANDARDS
WALLOWA LAKE HIGHWAY (HIGHWAY 82):
DOUGLAS ST. TO HOLMES ST.



Local Option 1



Local Option 1 (without planting strip and walk)

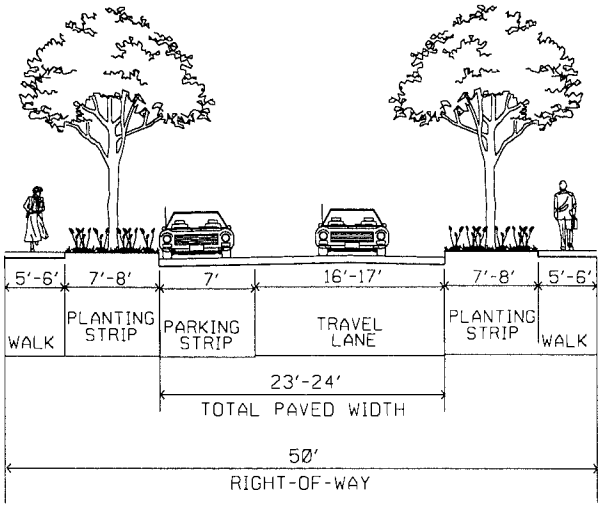
DAVID EVANS AND ASSOCIATES, INC.
2828 S.W. CORBETT AVENUE
PORTLAND, OR. 97201-4830 (503) 223-6663

(Not to Scale)

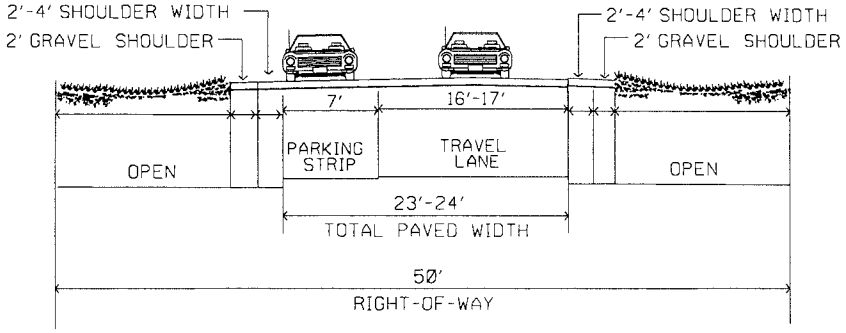
FIGURE 7-2

Rural Street Standards Local, Minor Collector and Major Collector Roadways

Umatilla County TSP



Local Option 2



Local Option 2 (without planting strip and walk)

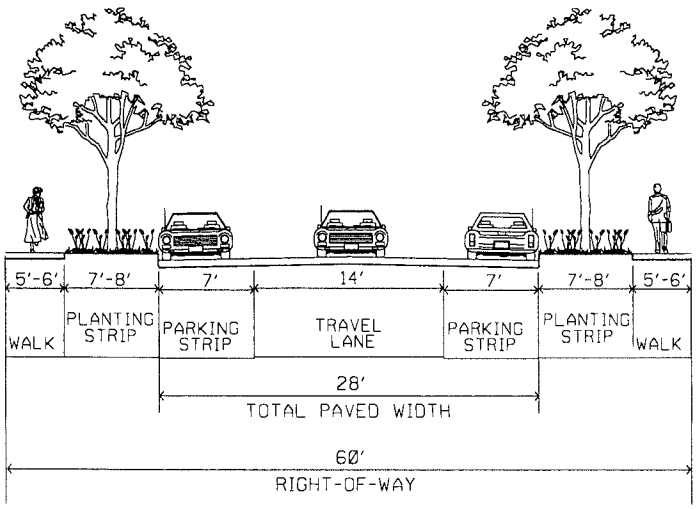
DAVID EVANS AND ASSOCIATES, INC.
2828 S.W. CORBETT AVENUE
PORTLAND, OR. 97201-4830 (503) 223-6663

(Not to Scale)

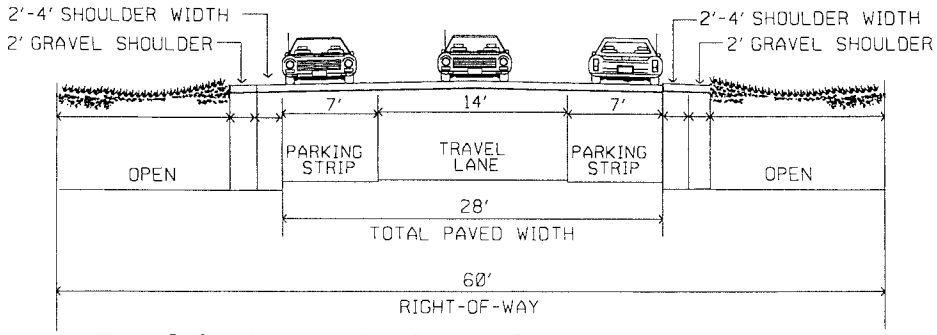
FIGURE 7-3

Rural Street Standards Local, Minor Collector and Major Collector Roadways

CITY OF WALLOWA TSP



Local Option 3



Local Option 3 (without planting strip and walk)

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PORTLAND, OR. 97201-4830 (503) 223-6663

(Not to Scale)

FIGURE 7-4

Rural Street Standards Local, Minor Collector and Major Collector Roadways

The city should choose one of these options for each residential street based on the existing right-of-way and neighborhood character.

Option 1

This first option for a local residential street is a 20 foot paved roadway surface within a 42 to 48 foot right-of-way. This standard will accommodate passage of one lane of moving traffic in each direction. Five to six foot sidewalks and seven to eight foot planting strips should be provided on each side of the roadway. The planting strips may be graded to accommodate parking in appropriate locations.

Narrower streets improve neighborhood aesthetics and discourage speeding and through traffic. They also reduce right-of-way needs, construction costs, storm water run-off, and the need to clear vegetation.

Option 2

This option provides a 23 to 24 foot paved roadway surface within a 47 to 52 foot right-of-way. This standard will accommodate passage of one lane of moving traffic in each direction, with an eight foot paved parking strip on one side. Five to six foot sidewalks and seven to eight foot planting strips should be provided on each side of the roadway.

Option 3

A third option for a residential street provides a 28 foot paved roadway within a 52 to 56 foot right-of-way. This standard will accommodate passage of one lane of moving traffic in each direction, with paved parking present along both sides of the road. Five to six foot sidewalks should be provided on both sides of the roadway in addition to seven to eight foot planting strips.

Alleys

Alleys can be a useful way to diminish street width by providing rear access and parking to residential areas. Including alleys in a subdivision design allows homes to be placed closer to the street and eliminates the need for garages to be the dominant architectural feature. This pattern, once common, has been recently revived as a way to build better neighborhoods. In addition, alleys can be useful in commercial and industrial areas, allowing access by delivery trucks that is off of the main streets. Alleys should be encouraged in the urban area of the City of Wallowa. Alleys should be 10 to 12 feet wide, with a 16 to 20-foot right-of-way. (See Figure 7-1.)

Collector Streets

Collectors are intended to carry between 1,200 and 10,000 vehicles per day, including limited through traffic, at a design speed of 25 to 35 mph. A collector can serve residential, commercial, industrial, or mixed land uses. Collectors are primarily intended to serve local access needs of residential neighborhoods through connecting local streets to arterials. Bike lanes are typically not needed due to slower traffic speeds.

The recommended street standard provided for collectors, is shown in Figure 7.2. This recommended standard provides one lane of moving traffic in each direction plus parking on both sides and can also be striped to provide two travel lanes plus left-turn lanes at intersections or driveways by removing parking for short distances. Five to six-foot sidewalks should be provided on each side of the roadway. A planting strip has been included with a width of seven to eight feet, which may be used as parking.

Arterial Streets

Arterial streets form the primary roadway network within and through a region. They provide a continuous roadway system that distributes traffic between different neighborhoods and districts. Generally, arterial streets are high capacity roadways that carry high traffic volumes with minimal localized activity. Design speeds should be between 25 and 45 mph. The recommended design standard for arterial streets provides a 50-52-foot paved surface within an 80-foot right-of-way to allow for two 11 to 12-foot travel lanes, two six-foot bike lanes, and two eight-foot parking lanes. The bike lanes should be striped between the parking lane and the travel lane. (See Figure 7-3.)

Highway 82 narrows between Douglas St. and Holmes Street to a 70-foot right of way. For this section of arterial, the standard is two 12-foot travel lanes with a 5-foot bike lane, an 8-foot parking strip, and a six-10 foot walkway on each side of the road. A planting strip of zero-five feet is also a possibility depending on the width of the walkway (see Figure 7.1A).

Bike Lanes

In cases where a bikeway is proposed within the street right-of-way, 12 feet of roadway pavement (between curbs) should be provided for a six-foot bikeway on each side of the street, as shown on the cross sections in Figure 7-3. Except in rare circumstances, bike lanes on one-way streets should be located on the right side of the roadway, be one-way, and flow in the same direction as vehicular traffic. The striping should be done in conformance with the State Bicycle and Pedestrian Plan (1995). In cases where curb parking will exist with a bike lane, the bike lane will be located between the parking and travel lanes. In some situations, curb parking may have to be removed to permit a bike lane.

The bikeways on new streets or streets to be improved as part of the street system plan should be added when the improvements are made. The implementation program identifies an approximate schedule for these improvements.

On arterial and collector streets that are not scheduled to be improved as part of the street system plan, bike lanes may be added to the existing roadway at any time to encourage cycling, or when forecast traffic volumes exceed 2,500 to 3,000 vehicles per day. The striping of bike lanes on streets which lead directly to schools should be high priority.

Sidewalks

A complete pedestrian system should be implemented in the urban portion of the City of Wallowa. Every urban street should have sidewalks on both sides of the roadway as shown on the cross sections in Figure 7-1 through Figure 7-3. Sidewalks on residential streets should have a five-foot wide paved width. Collector and arterial streets should have six-foot wide sidewalks. In addition, pedestrian and bicycle connections

should be provided from any cul-de-sac or other dead-end streets to each other, to other streets, or to local activity centers except when such a connection is impracticable.

Another essential component of the urban sidewalk system is street crossings. Intersections must be designed to provide safe and comfortable crossing opportunities. Long-term improvements include crosswalks, but also enhancements such as curb extensions to calm traffic and decrease pedestrian crossing distance.

Curb Parking Restrictions

Curb parking should be prohibited at least 25 feet from the end of an intersection curb return to provide sight distance at street crossings.

Street Connectivity

Street connectivity is important because a well-connected street system provides more capacity than a disconnected one, provides alternate routes for local traffic, and is more pedestrian and bicycle-friendly. It is likely that the City of Wallowa's relative lack of congestion is in part due to its grid system. Ensuring that this grid is extended as development occurs is critical to City of Wallowa's continued livability. To this end, a maximum block perimeter of 1,200 feet is recommended.

ACCESS MANAGEMENT

Access management is an important tool for maintaining a transportation system. Too many access points can diminish the function of an arterial, mainly due to delays and safety hazards created by turning movements. Traditionally, the response to this situation is to add lanes to the street. However, this can lead to increases in traffic and, in a cyclical fashion, require increasingly expensive capital investments to continue to expand the roadway.

Reducing capital expenditures is not the only argument for access management. Additional driveways along arterial streets lead to an increased number of potential conflict points between vehicles entering and exiting the driveway, and through vehicles on the arterial streets. This not only leads to increased vehicle delay and a deterioration in the level of service on the arterial, but also leads to a reduction in safety.

Research has shown a direct correlation between the number of access points and collision rates. In addition, the wider arterial streets that can ultimately result from poor access management can diminish the livability of a community. Therefore, it is essential that all levels of government maintain the efficiency of existing arterial streets through better access management.

Access Management Techniques

The number of access points to an arterial can be restricted through the following techniques:

- Restricting the space between access points (driveways) based on the type of development and the speed along the arterial.

- Sharing of access points between adjacent properties.
- Providing access via collector or local streets where possible.
- Constructing frontage roads to separate local traffic from through traffic.
- Providing service drives to prevent spill-over of vehicle queues onto the adjoining roadways.
- Providing acceleration, deceleration, and right turn only lanes.
- Offsetting driveways to produce T-intersections to minimize the number of conflict points between traffic using the driveways and through traffic.
- Installing median barriers to control conflicts associated with left turn movements.
- Installing side barriers to the property along the arterial to restrict access width to a minimum.

Recommended Access Management Standards

Access management is hierarchical, ranging from complete access control on freeways to increasing use of streets for access purposes, parking and loading at the local and minor collector level. Table 7-2 describes recommended general access management guidelines by roadway functional classification.

TABLE 7-2
RECOMMENDED ACCESS MANAGEMENT STANDARDS

	Intersections			
Functional	**Public Road**		**Private Drive**	
Classification	**Type**	**Spacing**	**Type**	**Spacing**
State Highways	See Access Mangement Spacing Standards, Appendix C from 1999 Oregon Highway Plan			
Other Arterials within UGB	at-grade	250 ft.	L/R Turns	100 ft.
Collector	at-grade	250 ft.	L/R Turns	100 ft.
Residential Street	at-grade	250 ft.	L/R Turns	Access to Each Lot
Alley (Urban)	at-grade	100 ft.	L/R Turns	Access to Each Lot

Application

These access management standards are generally not intended to eliminate existing intersections or driveways. Rather, they should be applied as new development occurs. Over time, as land is developed and redeveloped, the access to roadways will meet these guidelines. However, where there is a recognized problem, such as an unusual number of collisions, these techniques and standards can be applied to retrofit existing roadways.

To summarize, access management strategies consist of managing the number of access points and providing traffic and facility improvements. The solution is a balanced, comprehensive system that provides reasonable access while maintaining the safety and efficiency of traffic movement.

State Highways

Access management is important to promoting safe and efficient travel for both local and long distance users along State Highway 82 in the City of Wallowa. The 1999 *Oregon Highway Plan* specifies an access management spacing standards and policies for state facilities. Although the City of Wallowa may designate state highways as arterial roadways within their transportation system access management for these facilities follow the Access Management Spacing Standards of the 1999 Oregon Highway Plan. These spacing standards are based on highway classification, type of area and speed limits, which are shown in the appendix to this document. This section of the TSP describes the state highway access management objectives and specific highway segment where special access spacing standards apply.

GeneralHighway 82 through the City of Wallowa is categorized in the 1999 Oregon Highway Plan as a Statewide Highway. The primary function of these highways is to provide connections to larger urban areas, ports, and major recreation areas of the state not served by freeways. Access Management to statewide urban highways is to provide high to moderate speed operations with limited interruptions in traffic flow.

To assist in implementing state access management standards and policies, the 1999 Oregon Highway Plan also recognizes that state highways serve as main streets of many communities, such as downtown Wallowa. Shorter block lengths and a well-developed grid system are important to a downtown area, along with convenient and safe pedestrian facilities. In general, downtown commercial arterial streets typically have blocks 200 to 400 feet long, driveway access sometimes as close as 100-foot intervals and occasionally, crosswalks, along with on street parking. The need to maintain these typical downtown characteristics must be carefully considered along with the need to maintain the safe and efficient movement of through traffic. The Oregon Highway Plan recognizes the main street function through the designation of Special Transportation Areas (STAs).

Special Transportation Area

A Special Transportation Area (STA) is a designation that may be applied to a state highway, when a downtown, business district or community center straddles the state highway within a community's urban growth boundary. STAs can include business districts but they do not apply to whole cities or strip development areas along individual highway corridors.

The primary objective of aSTA is to provide access to community activities, businesses and residences, and to accommodate pedestrian, and bicycle movements along and across the highway in a compact central business district. A STA designation will allow reduced mobility standards, accommodate existing public street spacing and compact-development patterns, and enhance opportunities to provide improvements for pedestrians and bicyclists in the downtown area. Inclusion in a STA allows for redevelopment with exception to the proposed access management standards.

Access management in STAs corresponds to the existing city block for public road connections and discourages private driveways. However, where driveways are allowed and land use patterns permit, the minimum spacing for driveways is 175 feet or mid-block if the current city block spacing is less than 350 feet. In addition, the need for local access outweighs the consideration of maintaining highway mobility within a STA. The maximum volume to capacity ratio for state highways may increase in a STA .

In Wallowa, the area along Highway 82 between Spruce Street and Storie Street exemplifies the design features of a historic downtown. Within this three-block segment, buildings are spaced close together,

parking is on street, sidewalks bind the streets to the buildings and the posted speed limit is 25 m.p.h.,. The compact development pattern qualifies this area for a STA highway segment designation.

Upon adoption of the TSP by the Wallowa City Council and a finding of compliance with the Oregon Highway Plan, the City of Wallowa and ODOT Region 5 may jointly designate this segment of Highway 82 as an STA through a Memorandum of Understanding (MOU). The MOU will incorporate by reference the TSP and the following STA Management Plan provisions.

Special Transportation Area Management Plan

The Wallowa STA will be located on the portion of Highway 82 routed on 1st Street between the intersections of Spruce Street (milepost no. 47.08) and Storie Street (milepost no. 47.26), which is located completely within the urban growth boundary and city limits of the City of Wallowa.

The primary objective of the Wallowa STA is to provide access to community activities, businesses and residences, and to accommodate pedestrian, and bicycle movements along and across the highway in the city's central business district.

The designation of a STA in Wallowa is intended to accommodate the existing public street spacing and compact development pattern. Specific access management conditions for the Wallowa STA on Highway 82 include:

a) Minimum spacing for public road connections at the current city block spacing of 250 feet.

b) Public road connections are preferred over private driveways, which are discouraged in an STA.

c) Where land use patterns permit, ODOT will work with the City and property owners to identify appropriate access within the STA.

d) Where a right to access exists, access will be allowed to property at less than the designated spacing standard only if the property does not have reasonable alternative. If possible, other options should be considered, such as joint access.

e) Where a right to access exists, the number of driveways to a single property shall be limited to one. ODOT will work with the City and property owners if additional driveways are necessary to accommodate and service the traffic to the property, and will not interfere with driver expectancy and the safety of through traffic on the highway.

f) Driveways shall be located where they do not create undue interference or hazard to the free movement of normal highway or pedestrian traffic. Locations in areas of restricted sight distance or at points that interfere with the placement and proper functioning of traffic control signs, lighting or other devices that affect traffic operation will not be permitted.

g) If a property is landlocked (no reasonable alternative exists) because a driveway cannot be safely constructed and operated and all other alternatives have been explored and rejected, ODOT might be required to purchase the property. However, if a hardship is self-inflicted, such as by partitioning or subdividing a property, ODOT has no responsibility for purchasing the property.

The designation of a STA in Wallowa also recognizes that the need for local access outweighs the consideration of maintaining highway mobility. Today, traffic on the state highway operates at LOS B or better, which correlates to maximum volume to capacity ratio of 0.59. Increase in traffic volumes over the 20 year projection period will not impact the level-of-service (LOS) or meet the maximum volume to capacity ratio of 0.80 for Highway 82 within the city's urban growth boundary.

To maintain highway mobility through a STA in Wallowa, land use development decisions shall not cause traffic flow to exceed a volume to capacity ratio of 0.80. The posted speed limit in the STA is currently and will remain at 25 miles per hour as allowed by state statute in a business district. Curb parking is permitted in the STA, provided minimum sight distance requirements are met for all public road connections and private driveways.

The designation of a STA in Wallowa further identifies the need to accommodate pedestrian, and bicycle movements along and across the highway in the compact central business district. At this time, no specific bikeway or pedestrian improvements are recommended for Highway 82 through Wallowa; however, the recommended City arterial standard identified in the TSP includes 6-ft. bike lanes. Another essential component to accommodate pedestrians in a STA is street crossings. There are no specific crosswalk enhancements recommended for Highway 82 at this time. Future improvements and modifications to the highway within the STA and within the curb line will be made in accordance with the Oregon Highway Design Manual and with ODOT approval.

Existing maintenance and operational strategies along Highway 82 will be employed within the STA. Future improvements and modifications to the highway within the STA will also include maintenance and operational strategies.

MODAL PLANS

The City of Wallowa modal plans have been formulated using information collected and analyzed through a physical inventory, forecasts, goals and objectives, and input from area residents. The plans consider transportation system needs for the City of Wallowa during the next 20 years assuming the growth projections discussed in Chapter 5. The timing for individual improvements will be guided by the changes in land use patterns and growth of the population in future years. Adjustment to specific projects and improvement schedules will likely need to be adjusted depending on where growth occurs within the City of Wallowa.

Street System Plan

The street system plan recommends changes to the current street classification system and outlines a series of improvements that are recommended for construction within the City of Wallowa during the next 20 years. These options have been discussed in Chapter 6 (Improvement Options Analysis). The proposed street system plan is summarized and shown in Figure 7-4.

Street System Functional Classification

Street system functional classifications relate the design of a roadway to its function. The function is determined by operational characteristics such as traffic volume, operation speed, safety and capacity.

The City of Wallowa adopted street classification standards as part of a 1993 study prepared by Anderson and Perry Associates, Inc. This study classified all city streets using rural area street classifications and recommended rural street design standards. The design standards for rural streets in the City of Wallowa do not meet the needs of the Oregon Transportation Planning Rule which requires urban street standards for incorporated cities, including sidewalks on both sides of the street and bike lanes on streets classified as major collectors or higher (includes major and minor arterials). The street functional classifications recommended and adopted at that time include minor arterial, major collector, minor collector, and residential.

An analysis of the existing street system indicated that several of the streets within the community function differently than their classification. For example, some roadways are classified as minor collectors when they actually function as local streets. Others, classified as major collectors, do not meet the design standards of major collectors which include multiple travel lanes, on-street parking, curbs and sidewalks, bike lanes, and access limitations.

The City of Wallowa should reclassify its street system so that each street's classification more closely matches its actual design and function. This could be accomplished by classifying all streets as either arterial, collector, residential, or alley. The following roadway classifications are recommended:

- Highway 82 (Madison Street north of 1st Street and 1st Street east of Madison Street) -- change classification from rural minor arterial to arterial, as it is a state highway of statewide level of importance, it carries the highest traffic volumes in the city, and it is the primary route to City of Wallowa from the rest of the state.

- Storie Street (north of 1st Street) -- change classification from rural major collector to residential, as it does not meet the design standards of a major collector, which require multiple travel lanes and bike lanes.

- Truck Route -- change classification from rural major collector to collector, as it does not meet the design standards of a major collector, which require multiple travel lanes and bike lanes.

- 5th Street -- change classification from rural major collector to residential, as it does not meet the design standards of a major collector, which require multiple travel lanes and bike lanes.

- 1st Street (west of Douglas Street) -- change classification from rural major collector to residential , as it does not meet the design standards of a major collector, which require multiple travel lanes and bike lanes.

- Whiskey Creek Road -- change classification from rural major collector to collector, as it does not meet the design standards of a major collector, which require multiple travel lanes and bike lanes.

- Douglas Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.

- Clairmont Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.

- Spruce Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.
- Pine Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.
- 2nd Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.
- 3rd Street -- change classification from rural minor collector to residential, as it functions as a local street rather than as a collector.
- All other roadways -- change classification from rural residential to residential.

No direct costs are associated with making the classification changes.

Street Improvement Projects

In 1993, the city adopted the long-range goal that all streets within the city limits should have some type of all-weather surface treatment. Collector roads should have an asphalt concrete pavement section and residential streets shall have as a minimum a bituminous surface treatment (BST).

There is one recommended improvement to the roadway system included in the roadway system plan:

- Highway 82 -- Improve the alignment at the intersection of Whiskey Creek Road. This is a high priority project (construction expected in the next 0 to 5 years) with an estimated cost of $350,000.

Speed Control Measures

The City of Wallowa should develop a system of speed control measures that will discourage motorists from exceeding the speed limit along Highway 82 within Wallowa. Appendix D contains a variety of different speed control measures which can be implemented, ranging from narrowing lane widths to more stringent enforcement.

The small size of the City of Wallowa might make it difficult to raise funding to pay for these measures. However, if the costs are shared with several other cities, Wallowa County, and even the state, it may be possible for Wallowa to implement a speed control program. Discussions with other jurisdictions should be a high priority for city officials to determine what kind of county-wide enforcement program may be possible and how the city could participate in and contribute to it. The total estimated cost of these speed control measures cannot be easily calculated because exact programs are unknown at this time.

Pedestrian System Plan

A pedestrian system should be implemented in the city. Every paved street should have sidewalks, unless the cost of establishing such paths and trails would be excessively disproportionate to the need or probable use, meeting the requirements set forth in the recommended street standards. Pedestrian access on walkways

should be provided between all buildings including shopping centers and abutting streets and adjacent neighborhoods. (Ordinances specifying these requirements are included in Chapter 9.)

A sidewalk inventory revealed that the City of Wallowa has sidewalks on both sides of 1st Street (Highway 82)and along several local streets that intersect 1st Street.

The city's sidewalk system should be expanded to include, at a minimum, sidewalks along both sides of the segment of Highway 82 north of 2nd Street to the City limit. Other blocks within the city's grid system which have a significant amount of pedestrian activity, such as in front of stores or schools, etc., should also have sidewalks.

The primary goal of this improvement option is to improve pedestrian safety; however, an effective sidewalk system has several qualitative benefits as well. Providing adequate pedestrian facilities increases the livability of a city. When pedestrians can walk on a sidewalk, separated from vehicular street traffic, it makes the walking experience more enjoyable and may encourage walking, rather than driving, for short trips. Sidewalks enliven a downtown and encourage leisurely strolling and window shopping in commercial areas. This "Main Street" effect improves business for downtown merchants and provides opportunities for friendly interaction among residents. It may also have an appeal to tourists as an inviting place to stop and walk around.

The cost to construct a concrete sidewalk facility is around $35 per linear foot for a 6-foot wide sidewalk or $65 per linear foot for a 12-foot wide sidewalk including curbs. The cost estimate also assumes the sidewalks are composed of four inches of concrete and six inches of aggregate.

New sidewalks should be constructed with curb cuts for wheelchairs at every crosswalk to comply with the Americans with Disabilities Act (ADA).

As street improvements are made to the existing street system, projects involving the construction of new sidewalks may require on-street parking to be implemented in place of parking on grass or gravel shoulders.

The following is a list of specific pedestrian improvements that may be needed over the next 20 years. Sidewalks should be added as new streets are constructed and existing streets reconstructed. The implementation program identifies an approximate schedule for these improvements. (See Figure 7-5)

- Madison Street (Highway 82) -- Provide a sidewalk between 1st Street and 7th Street. This is a high priority project (for the next 0 to 5 years) and, at a length of 2,000 feet, is expected to cost $140,000.

- INP right-of-way -- Provide a separate recreational path. This is a low priority project (for the next 5 to 20 years) and, at a length of 1.4 miles, is expected to cost $118,000 (excluding the cost of the right-of-way).

Pedestrian projects include sidewalks on both sides of the street, unless otherwise noted.

The on-street pedestrian improvements only include sidewalk projects. Although shoulder additions serve pedestrians, they are not ideal because they are not separated from the roadway. Generally, shoulders are more of a benefit to cyclists than to pedestrians; therefore, proposed shoulder-widening or additions are discussed in the Bicycle System Plan section of this chapter.

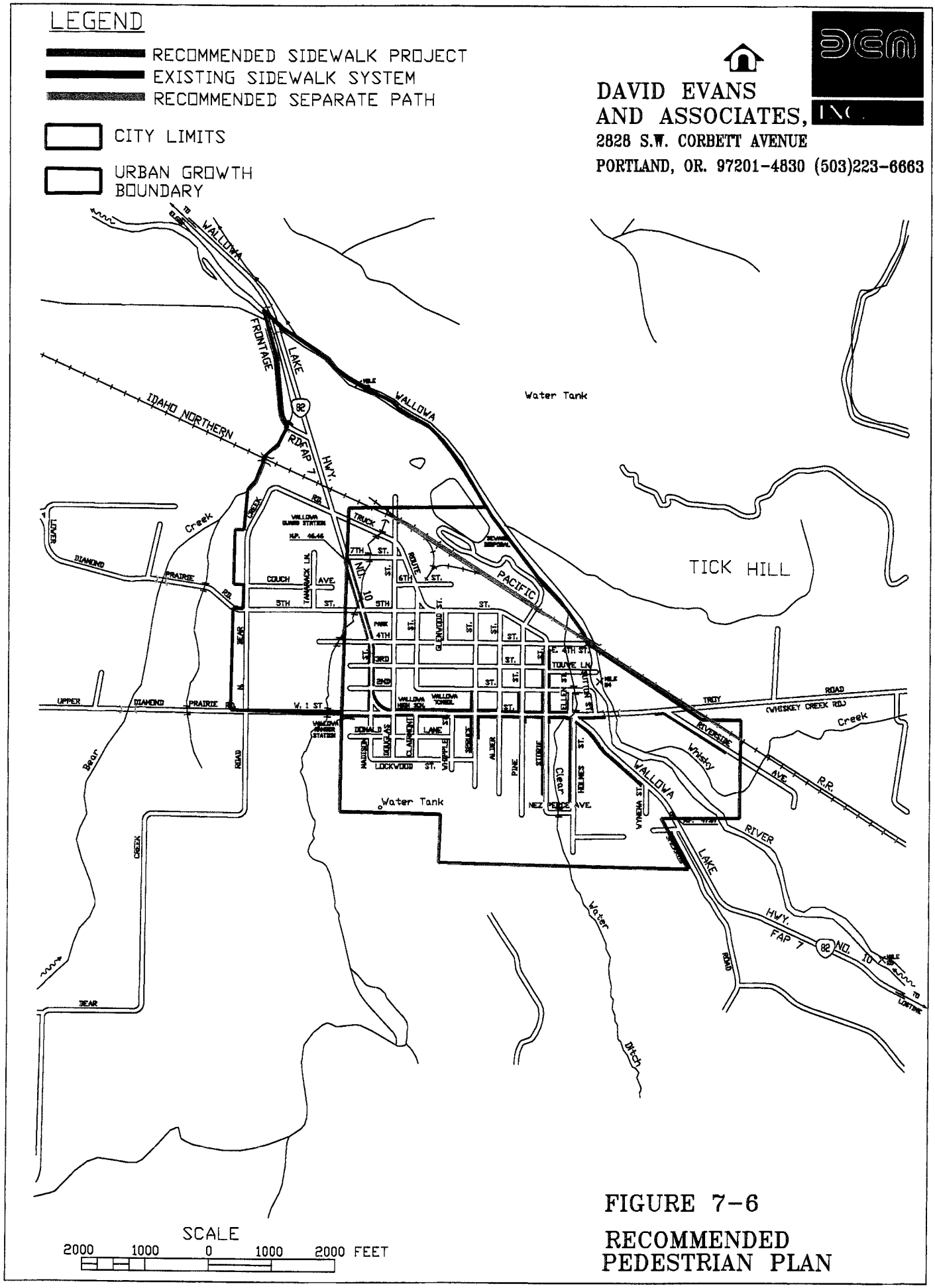


FIGURE 7-6

RECOMMENDED PEDESTRIAN PLAN

A six-foot-wide sidewalk with curbs already in place costs about $30 per linear foot. Adding a curb as well as a six-foot-wide sidewalk costs about $35 per linear foot. In commercial areas, a 12-foot-wide sidewalk with a curb would cost about $65 per linear foot. Applying these costs to a typical block in Wallowa would require about 600 linear feet of sidewalk (2 x 300 feet). For a six-foot-wide sidewalk including curbs, the cost would be approximately $23,000. With curbs already in place, the cost would be approximately $20,000.

Asphalt pathways could be provided instead of a concrete sidewalk. In general, asphalt pathways are a lower cost alternative to concrete sidewalks. Construction costs for asphalt pathways are about 40 percent of the costs for concrete sidewalks; however, the life expectancy of asphalt is less than that of concrete and maintenance, such as sealing and resurfacing the asphalt, must occur more frequently. Furthermore, sidewalks should be uniform throughout the downtown area, and asphalt pathways would not have the same visual character as concrete sidewalks.

Missing sidewalk segments should be infilled whenever the opportunity presents itself (such as infill development, special grants, etc.), concentrating on arterial streets, collectors, and school routes.

Bicycle System Plan

Goals and objectives of the city's bicycle plan include reducing conflicts between bicyclists and motorized vehicle traffic, developing a system dedicated to bicycles, and providing opportunities for recreational bicycle use. One option for meeting these goals is adding a bikeway on Highway 82.

Shared roadways, where bicyclists share normal vehicle lanes with motorists, are generally acceptable if speeds and traffic volumes are relatively low. On the local streets in Wallowa, shared roadways are not an issue; however, on arterial roadways bike lanes are recommended.

Highway 82 functions as an arterial street through Wallowa, which means that it should have bike lanes on both sides of the street as specified in the recommended street standards described earlier and as required by the TPR. Accident statistics on the highway do not indicate that there are frequent conflicts between bicyclists and motorized vehicles. As noted in the 1995 Oregon Pedestrian and Bicycle Plan, five feet is the minimum width of a bicycle lane adjacent to parked cars. Shoulders would need widening on sections where no on-street parking exists. The City should work with ODOT to restripe the section of Highway 82 between Holmes and Douglas Streets. It is a relatively lost cost project and will fit within the existing 70-foot right-of-way.

Bicycle parking is generally lacking in the City of Wallowa. Bike racks could be installed in front of downtown businesses and all public facilities (schools, post office, library, city hall, and parks). Typical rack designs cost about $50 per bike plus installation. The City of Wallowa should begin to place racks where needs are identified and to respond to requests for racks at specific locations. Bicycle parking requirements are further addressed in Chapter 9 (Policies and Ordinances).

Oregon Highway 82 Corridor Plan

The *Oregon Highway 82 Corridor Plan* recommends collaboration among ODOT, Wallowa County, local jurisdictions, and other appropriate agencies to develop a Highway 82 corridor bicycle refinement plan. The plan will integrate municipal and county bike plans with the existing statewide plan and could be used to

determine where to prioritize investment in Highway 82. A promotional strategy for the corridor bicycle system will be developed including mapping, signage and marketing.

Transportation Demand Management Plan

Through transportation demand management (TDM), peak travel demands can be reduced or spread to more efficiently use the transportation system, rather than building new or wider roadways. Techniques which have been successful and could be initiated to help alleviate some traffic congestion include carpooling and vanpooling, alternative work schedules, bicycle and pedestrian facilities, and programs focused on high density employment areas.

In the City of Wallowa, where traffic volumes are low and the population and employment is small, implementing TDM strategies is not practical in most cases. However, the sidewalks improvements recommended earlier in this chapter are also considered TDM strategies. By providing these facilities, the City of Wallowa is encouraging people to travel by other modes than the automobile. In rural communities, TDM strategies include providing mobility options.

Because intercity commuting is factor in Wallowa County, residents who live in the City of Wallowa and work in other cities should be encouraged to carpool with a fellow coworker or someone who works in the same area. Implementing a local carpool program in the City of Wallowa alone is not practical because of the city's small size; however, a county-wide carpool program is possible. The City of Wallowa should support state and county carpooling and vanpooling programs which could further boost carpooling ridership.

No costs have been estimated for the TDM plan. Grants may be available to set up programs; other aspects of transportation demand management can be encouraged through ordinance and policy.

Public Transportation Plan

Public transportation in the City of Wallowa consists of the Wallowa Valley Stage Line and Community Connection.

The Wallowa Valley Stage Line is operated by the Moffit Brothers and is based in Lostine. It provides van service which transports passengers to Enterprise, Joseph, Lostine, and several cities in Union County, including La Grande. In La Grande, passengers can connect to Greyhound bus service. In addition to transporting passengers, the line also transports packages.

The senior citizens and disabled Dial-A-Ride service is provided by Community Connection. It operates two 12-passenger, lift-equipped buses, one based in Enterprise and one based in Wallowa. The buses make one trip per day between Enterprise and Joseph and between Wallowa and Lostine. On Mondays, Wednesdays, and Fridays, the buses transport senior citizens and the disabled to meal sites in Enterprise and Wallowa. On Tuesdays and Thursdays, the general public can use the service as well. On Tuesdays, the bus based in Wallowa goes to Enterprise. The operator estimates that the service is currently underutilized.

Another type of public transportation service available in the county is client transportation, which is provided by a social service or health care agency to individuals participating in the agency's service program. This type of public transportation is offered by the Wallowa County Health Care District and the Wallowa County Nursing Home. A volunteer driver program is also administered in Wallowa County by each of these social

service and health care agencies as well as the Department of Human Resources Volunteer Program. A volunteer driver program is a community based program to provide drivers to transport specific client groups.

No specific expansions of these services are currently planned; however, intercity connections and senior citizen and disabled public transportation should be maintained and increased usage of these services should be encouraged.

The city has no local fixed-route transit service at this time. The small size and low traffic volumes on city streets indicate that mass transit is not necessary or economically feasible at this time. The Transportation Planning Rule exempts cities with a population of less than 25,000 from including mass transit facilities in their development regulations. However, Wallowa can plan for future transit services with growth patterns that support rather than discourage transit use in the future.

The existing stage line and Dial-A-Ride services already meet the required daily trip to a larger city specified for communities the size of Wallowa in the Oregon Transportation Plan.

No costs have been estimated for this modal plan. Grants may be available to conduct feasibility studies. State and Federal funding may be available to purchase equipment.

Oregon Highway 82 Corridor Plan

The *Oregon Highway 82 Corridor Plan* calls for preparation of a Public Transportation Plan that integrates all appropriate public transit to make the most efficient use of scarce public transit resources. The product will be a comprehensive public/private transit plan for the corridor.

Rail Service Plan

The City of Wallowa has no passenger rail service. The Idaho Northern Pacific Railroad owns an abandoned freight line which runs through the northern part of town. The rails and bridges are in good condition and retaining transportation use of the line is a goal of the local jurisdictions. Discussions among INP, state agencies, local jurisdictions and shippers concerning the future of the rail line and right-of-way are on-going.

Efforts should be made to retain the right-of-way as a utility corridor and as a possible recreational trail. Such a situation would preserve the integrity of the right-of-way and the possibility of future rail service. The Transportation Planning Rule requires that jurisdictions protect right-of-ways for future operation of transportation corridors.

The *Oregon Highway 82 Corridor Plan* describes a service improvement decision to work with Wallowa County and local jurisdictions, the ODOT Rail Section and INP to develop a plan that addresses the ongoing preservation of the Elgin-Joseph rail line for freight transportation. Potential alternatives considered for the line include preserving the line as a freight railroad, modifying it for an excursion train, converting it into a trail system, or as a corridor for fiber optic cables. The cost of the right-of-way between Elgin and Joseph was estimated at $2.5 million (1995 dollars).

Air Service Plan

The City of Wallowa does not have airborne transportation service.

Pipeline Service Plan

There are currently no pipelines serving the City of Wallowa. There has been interest expressed in the communities of Wallowa County to extend natural gas service from Elgin.

Water Transportation Plan

The City of Wallowa has no waterborne transportation services.

TRANSPORTATION SYSTEM PLAN IMPLEMENTATION PROGRAM

Implementation of the Wallowa TSP will require adoption of the amended city comprehensive plan, and zoning and land division ordinances, and preparation of a 20-year Capital Improvement Plan (CIP). These actions will enable Wallowa to address both existing and emerging transportation issues throughout the urban area in a timely and cost effective manner.

One part of the implementation program is the formulation of a CIP. The purpose of the CIP is to detail what transportation system improvements will be needed as Wallowa grows and provide a process to fund and schedule the identified transportation system improvements. It is expected that the Transportation System Plan Capital Improvement Plan can be integrated into the existing city CIP and the ODOT STIP. This integration is important since the TSP proposes that both governmental agencies will fund some of the transportation improvement projects.

Model policy and ordinance language that conforms with the requirements of the Transportation Planning Rule is included in Chapter 9. The proposed ordinance amendments will require approval and adoption by the City Council and those that affect the unincorporated urban area will also require approval by the Board of County Commissioners.

20-Year Capital Improvement Program

The CIP is shown with the following priorities:

- High Priority (next 0 to 5 years)
- Low Priority (next 5 to 20 years)

These priorities are based on current need, the relationship between transportation service needs, and the expected growth of the city. The following schedule indicates priorities and may be modified to reflect the availability of finances or the actual growth in population and employment.

Table 7-3 summarizes the CIP. The cost estimates for all the project listed on the CIP were prepared on the basis of 1997 dollars. These costs include design, construction, and some contingency costs. They are preliminary estimates and generally do not include right-of-way acquisition, water or sewer facilities, adding or relocating public utilities, or detailed intersection design.

Wallowa has identified a total of four projects in its CIP with a cost of about $661,000. Three high priority projects have been identified with a cost of about $530,000. One low priority project has been identified with a cost of about $128,000, however, there are currently no identified funding sources and the City of Wallowa does not have the available funds for the project.

TABLE 7-3
PRIORITIZED CAPITAL IMPROVEMENT PROGRAM (2000) DOLLARS

Project Description	Local Cost	County Cost	State Cost	Total Cost
High Priority				
Reconstruct the intersection of Highway 82 and Whiskey Creek Road.			$380,000	$380,000
Sidewalk on Madison St. (Highway 82) between 1st St. and 7th St.			$150,000	$150,000
Implement speed control measures on Highway 82	unknown		unknown	unknown
Restripe Highway 82 between Holmes and Douglas Streets			$2,320	$2,320
Low Priority				
Separate path in the Idaho Northern Pacific right-of-way[1]	$128,000			$128,000
Subtotal High Priority Projects			$532,320	$532,320
Subtotal Low Priority Projects	$128,000			$128,000
Total	$128,000		$532,320	$662,320

[1] Cost does not include right-of-way acquisition. The City of Wallowa does not the funds available for this project, nor have they identified any potential funding sources.

CHAPTER 8: FUNDING OPTIONS AND FINANCIAL PLAN

The Transportation Planning Rule requires TSPs to evaluate the funding environment for recommended improvements. This evaluation must include a listing of all recommended improvements, estimated costs to implement those improvements, and a review of potential financing mechanisms to fund proposed transportation improvement projects. The City of Wallowa's TSP identifies $661,000 in improvements recommended over the next 20 years. This section of the TSP provides an overview of the City of Wallowa's revenue outlook and a review of some funding and financing options that may be available to the City of Wallowa.

Pressures from increasing growth throughout much of Oregon have created an environment of recommended improvements that remain unfunded. The City of Wallowa will need to work with Wallowa County and ODOT to finance new transportation projects over the 20-year planning horizon. The actual timing of these projects will be determined by the rate of population and employment growth actually experienced by the community. If population growth exceeds the anticipated rate, the improvements may need to be accelerated. Slower than expected growth will relax the improvement schedule. Availability of funding will also play an important role in the implementation program.

HISTORICAL STREET IMPROVEMENT FUNDING SOURCES

In Oregon, state, county, and city jurisdictions work together to coordinate transportation improvements. In addition to this overlapping jurisdiction of the road network, transportation improvements are funded through a combination of federal, state, county, and city sources.

Table 8-1 shows the distribution of road revenues for the different levels of government within the state by jurisdiction level. Although these numbers were collected and tallied in 1991, ODOT estimates that these figures accurately present the current revenue structure for transportation-related needs.

TABLE 8-1
SOURCES OF ROAD REVENUES BY JURISDICTION LEVEL

	Jurisdiction Level			Statewide
Revenue Source	**State**	**County**	**City**	**Total**
State Road Trust	58%	38%	41%	48%
Local	0%	22%	55%	17%
Federal Road	34%	40%	4%	30%
Other	9%	0%	0%	4%

Source: ODOT 1993 Oregon Road Finance Study.

At the state level, nearly half (48 percent in Fiscal Year 1991) of all road-related revenues are attributable to the State Highway Fund, whose sources of revenue include fuel taxes, weight-mile taxes on trucks, and vehicle registration fees. As shown in the table, the state road trust is a considerable source of revenue for all levels of government. Federal sources (generally the federal highway trust account and federal forest revenues) comprise another 30 percent of all road-related revenue. The remaining sources of road-related revenues are generated locally, including property taxes, LIDs, bonds, traffic impact fees, road user taxes, general fund transfers, receipts from other local governments, and other sources.

As a state, Oregon generates 94 percent of its highway revenues from user fees, compared to an average of 78 percent among all states. This fee system, including fuel taxes, weight distance charges, and registration

fees, is regarded as equitable because it places the greatest financial burden upon those who create the greatest need for road maintenance and improvements. Unlike many states that have indexed user fees to inflation, Oregon has static road-revenue sources. For example, rather than assessing fuel taxes as a *percentage* of price per gallon, Oregon's fuel tax is a fixed amount (currently 24 cents) per gallon.

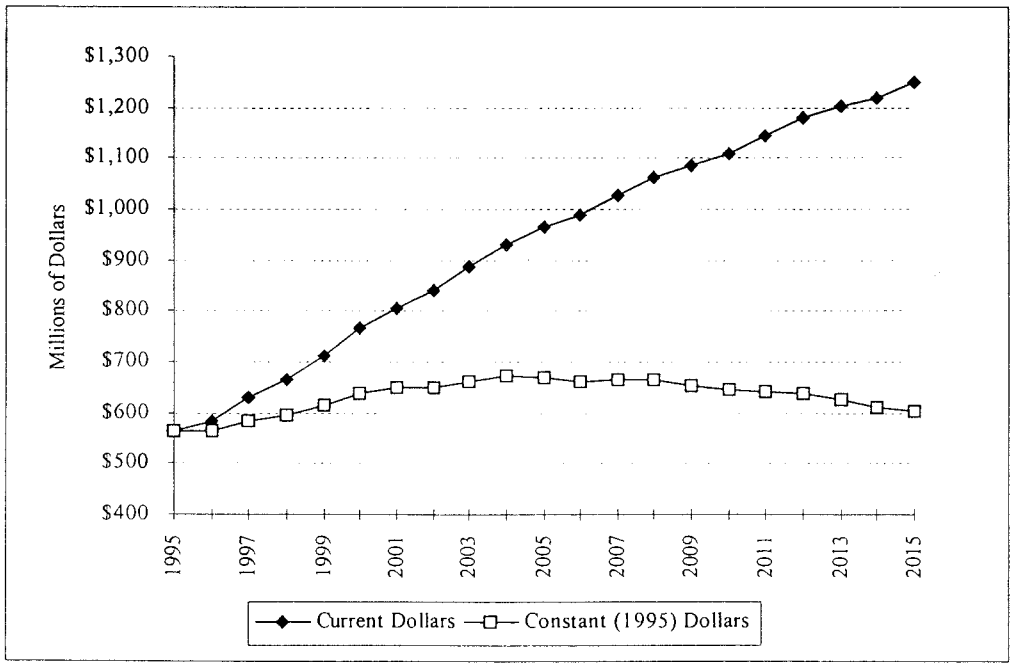
Transportation Revenue Outlook

ODOT's policy section recommends certain assumptions in the preparation of transportation plans. In its *Financial Assumptions* document prepared in March 1995, ODOT projected the revenue of the State Highway Fund through year 2018. The estimates are based on the following assumptions:

- Fuel tax (and weight-mile fee) increases of 1 cent per gallon per year, with an additional 1 cent per gallon every fourth year;
- Transportation Planning Rule goals are met; and
- Inflation occurs at an average annual rate of 3.7 percent (as assumed by ODOT).

Figure 8-1 shows the forecast in both current-dollar and inflation-deflated constant (1995) dollars. As highlighted by the constant-dollar data, the highway fund is expected to grow faster than inflation early in the planning horizon, with growth slowing to a rate somewhat less than inflation around year 2004, continuing a slight decline through the remainder of the planning horizon.

FIGURE 8-1
STATE HIGHWAY FUND



Source: ODOT Financial Assumptions.

The State Highway Fund is expected to remain a significant source of funding for the City of Wallowa during the next 20 years. Although the city has historically received revenue from this fund for

transportation maintenance and improvements, Wallowa should be cautious of relying heavily on this source, since funds are expected to decline after 2005.

REVENUE SOURCES

In order to finance the recommended transportation system improvements in Wallowa, it will be important to consider a range of funding sources. Recent property tax limitations have created the need for local governments to seek revenue sources other than the traditional property tax. The use of alternative revenue funding has been a trend throughout Oregon as the full implementation of Measure 5 has significantly reduced property tax revenues. This trend is expected to continue with the recent passage of Measure 47 and its revised version, Measure 50. The alternative revenue sources described in this section may not all be appropriate in the City of Wallowa; however, this overview is being provided to illustrate the range of options currently available to finance transportation improvements during the next 20 years.

Property Taxes

Property taxes have historically been the primary revenue sources for local governments. However, property tax revenue goes into general fund operations, and is not typically available for street improvements or maintenance. The dependence of local governments on this revenue source is due largely to the fact that property taxes are easy to implement and enforce. Property taxes are based on real property (i.e., land and buildings) which have a predictable value and appreciation, in contrast to income or sales taxes, which can fluctuate with economic trends or unforeseen events.Property taxes can be levied through: 1) tax base levies, 2) serial levies, and 3) bond levies. The most common method uses tax base levies which do not expire and are allowed to increase by 6 percent per annum. Serial levies are limited by amount and time they can be imposed. Bond levies are for specific projects and are limited by time based on the debt load of the local government or the project.

The historic dependence on property taxes changed with the passage of Ballot Measure 5 in 1990. Ballot Measure 5 created an amendment to the Oregon Constitution limiting the property tax rate for purposes other than payment of certain voter-approved general obligation indebtedness. Under full implementation, the tax rate for all local taxing authorities is limited to $15 per $1,000 of assessed valuation. As a group, all non-school taxing authorities are limited to $10 per $1,000 of assessed valuation. All tax base, serial, and special levies are subject to the tax rate limitation. Ballot Measure 5 requires that all non-school taxing districts property tax rate be reduced if together they exceed $10 per $1,000 per assessed valuation by county. If the non-debt tax rate exceeds the constitutional limit of $10 per $1,000 of assessed valuation, then all of the taxing districts' tax rates are reduced on a proportional basis. The proportional reduction in the tax rate is commonly referred to as compression of the tax rate.

Any new funding sources will also need to be reconciled with Measure 47, an initiative petition passed by Oregon voters in November 1996. The measure created a constitutional amendment that reduces and limits property taxes and limits local revenues and replacement fees. The measure limits 1997-98 property taxes to the lesser of 1995-96 tax minus 10 percent, or 1994-95 tax. It limits future annual property tax increase to three percent, with exceptions. Local governments' lost revenue may be replaced only with state income tax, unless voters approve replacement fees or charges. Tax levy approvals in certain elections require 50 percent voter participation.

Measure 47 adds another layer of restrictions to those which govern the adoption of tax bases and levies outside the tax base, as well as Measure 5's tax rate limits for schools and non-schools and tax rate

exceptions for voter-approved debt. Each new levy and the imposition of a property tax must be tested against a longer series of criteria before the collectible tax amount on a parcel of property can be determined.

The state legislature created Measure 50, which retains the tax relief of Measure 47 but clarifies some legal issues. This revised tax measure was approved by voters in May 1997 and it now replaces Measure 47.

The League of Oregon Cities (LOC) estimated that direct revenue losses to local governments, including school districts, totaled $467 million in fiscal year 1998, $553 million in 1999, and increases thereafter. The actual revenue losses to local governments will depend on actions of the Oregon Legislature. LOC also estimates that the state will have revenue gains of $23 million in 1998, $27 million in 1999, and increasing thereafter because of increased personal and corporate tax receipts due to lower property tax deduction.

These measures will impact the ability of cities to pay for transportation improvements out of general funds or other funds created through property taxes. In addition, it may impact cities abilities to create alternative funding sources if those sources are perceived to be in replacement of property tax revenue.

System Development Charges

System Development Charges (SDCs) are becoming increasingly popular in funding public works infrastructure needed for new local development. Generally, the objective of systems development charges is to allocate portions of the costs associated with capital improvements upon the developments which increase demand on transportation, sewer or other infrastructure systems.

Local governments have the legal authority to charge property owners and/or developers fees for improving the local public works infrastructure based on projected demand resulting from their development. The charges are most often targeted towards improving community water, sewer, or transportation systems. Cities and counties must have specific infrastructure plans in place that comply with state guidelines in order to collect SDCs.

The City of Wallowa could implement SDCs for their transportation system. The fee is collected when new building permits are issued. The cities would calculate the fee based on trip generation of the proposed development. Residential calculations would be based on the assumption that a typical household will generate a given number of vehicle trips per day. Nonresidential use calculations are based on the number of trips generated or on employee ratios for the type of business or industrial uses. The SDC fees will help construct and maintain of the transportation network throughout the TSP study area. The implementation SDCs in the City of Wallowa is not considered a practical funding option since the rate of new development has been slow, and is not expected to grow significantly in the future.

Gas Tax, License Fee, and Vehicle Weight/Mile Tax

The State of Oregon collects revenues to fund transportation needs almost exclusively through user fees. These fees are collected through state fuel taxes, vehicle registration fees, overweight/overheight fines, and vehicle weight/mile taxes on heavy vehicles weighing in excess of 26,000 pounds.

Oregon's vehicle registration fee, at $30 every two years, is a relatively minor source of revenue for highways and roads, generating less than 10 percent of total highway user tax and fee revenue. In 1990, vehicle registration fees were increased by 50 percent, the first increase in 40 years. Compared to other

states, Oregon's registration fee is low; registration fees in other states range from a low of $8.00 annually in Arizona to $125 annually in Minnesota. Vehicle registration fees are allocated to the state, counties, and cities for road funding.

In the summer of 1999, the state legislature passed House Bill (HB) 2082 that would substantially change the fees and taxes that are collected by the state of Oregon for transportation needs. Acting in opposition to HB 2082, however, the American Automobile Association (AAA) successfully petitioned the state to refer HB 2082 to the state's voters. Oregon residents voted no on Measure 82 (the HB 2082 referendum) in the May 16, 2000 primary election.

Local Gas Taxes

The Oregon Constitution permits counties and incorporated cities to levy additional local gas taxes with the stipulation that the monies generated from the taxes will be dedicated to street-related improvements and maintenance within the jurisdiction. At present, only a few local governments (including the cities of Woodburn and The Dalles, and Multnomah and Washington Counties) levy a local gas tax. Based on the experiences of other local jurisdictions, the City of Wallowa may have difficulty gaining public support for a local gas tax, even on a county-wide basis.

Local Vehicle Registration Fee

Although cities do not currently have the legislative authority to impose local registration fees, Oregon Revised Statues (ORS) grants counties and special districts the right to establish registration fees for vehicles. Counties and districts, however, are limited to a maximum of $30 for a two-year period on allowed classes of motor vehicles. To establish an ordinance imposing the fee, the county must first obtain the approval of the electors of the county. The ordinance must be filed with the Department of Transportation. The governing body of the county must enter into an intergovernmental agreement with the department outlining the rules for administration of laws authorizing county and district registration fees and for the collection of the fees. The owner of any vehicles subject to multiple fees is allowed a credit or credits with respect to such fees so that the total of such fees does not exceed $30.

Although vehicle registration fees have not yet been imposed by any local jurisdictions in the state, Deschutes County could impose a registration fee for all passenger cars and other specified classes of vehicles licensed within the county. The county must pay at lease 40 percent of the money to cities within the county unless a different distribution is agreed to between the county and the cities within the jurisdiction of the county. The funds may be used for any purpose for which the moneys for registration fees may be used.

Local Improvement Districts

The Oregon Revised Statutes allow local governments to form Local Improvement Districts (LIDs) to construct public improvements. LIDs are most often used by cities to construct localized projects such as streets, sidewalks or bikeways. The statutes allow formation of a district by either the city government or property owners. Cities that use LIDs are required to have a local LID ordinance that provides a process for district formation and payback provisions. Through the LID process, the cost of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation. The types of allocation methods

are only limited by the Local Improvement Ordinance. The cost of LID participation is considered an assessment against the property which is a lien equivalent to a tax lien. Individual property owners typically have the option of paying the assessment in cash or applying for assessment financing through the city. Since the passage of Ballot Measure 5, cities have most often funded local improvement districts through the sale of special assessment bonds.

Urban Renewal Districts

The Oregon Revised Statutes allow a city or county to create an urban renewal agency to improve "blighted areas" within the municipality. These areas must be detrimental to the health, safety, or welfare of the community because of deterioration, faulty planning, inadequate or improper facilities, and/or deleterious land use. The agency must prepare an urban renewal plan that describes the blighted area, how the area will be improved, and specific improvement projects. The agency can acquire funds by issuing bonds, borrowing money, and accepting loans or grants from any sources, public or private. Taxes from the property within the urban renewal district are collected at the normal rate. However, additional tax revenue generated by improvements within the district must be used for additional improvements within the district instead of being evenly distributed throughout the municipality. Typically, urban renewal districts last for 20 years.

Grants and Loans

The majority of the grant and loan programs available today are geared towards economic development and not specifically for construction of new streets. Typically, grant programs target areas that lack the basic public works infrastructure needed to support new or expanded industrial businesses. Because of the popularity of some grant programs such as the Oregon Special Public Works Fund, the emphasis has shifted to more of a loan program. Many programs require a match from the local jurisdiction as a condition of approval. Because grant programs are subject to change, they should not be considered a secure long-term funding source for the City of Wallowa.

These programs include the Immediate Opportunity Grant, the Oregon Special Public Works Fund program, and the Special Small City Allotment program which are described below. Some special programs for public transportation and non-auto modes are also described briefly.

ODOT Immediate Opportunity Grant Program

The Oregon Economic Development Department (OEDD) and ODOT jointly administer a grant program designed to assist local and regional economic development efforts. The program is funded to a level of approximately $7 million per year through state gas tax revenues. The following factors determine which projects are eligible for grants:

- Improvement of public roads;
- Inclusion of an economic development-related project of regional significance;
- Creation or retention of primary employment; and
- Ability to provide local funds (50/50) to match grant.

The maximum amount of any grant under the program is $500,000. Local governments that have received grants under the program include Washington County, Multnomah County, Douglas County, the City of Hermiston, the Port of St. Helens, and the City of Newport.

Oregon Special Public Works Fund

The Special Public Works Fund (SPWF) program was created by the 1985 State Legislature as one of several programs for the distribution of funds from the Oregon Lottery to economic development projects in communities throughout the state. The program provides grant and loan assistance to eligible municipalities primarily for the construction of public infrastructure that supports commercial and industrial development and results in permanent job creation or job retention. To be awarded funds, an infrastructure project must support businesses wishing to locate, expand, or remain in Oregon. SPWF awards can be used for improvement, expansion, and new construction of public sewage treatment plants, water supply works, public roads, or transportation facilities.

While SPWF program assistance is provided in the form of both loans and grants, the program emphasizes loans in order to assure that funds will return to the state over time for reinvestment in local economic development infrastructure projects. Jurisdictions that have received SPWF funding for projects that include some type of transportation-related improvement include Douglas County and the Cities of Baker City, Bend, Cornelius, Forest Grove, Madras, Portland, Redmond, Reedsport, Toledo, Wilsonville, and Woodburn.The contact person for the Oregon Special Public Works Fund is Betty Pongracz, who can be reached at (503) 986-0136.

Transportation Enhancement Program

The federally-funded Transportation Enhancement Program earmarks $8 million annually for projects in Oregon. In order to receive funds, projects must demonstrate a link to the intermodal transportation system, compatibility with approved plans, and local financial support. A 10.27 percent local match is required. Each proposed project is evaluated against all other proposed projects in its region. Within the five Oregon regions, funds are distributed based on population, vehicle miles traveled, number of vehicles registered, and other transportation-related criteria.

The contact person for the Enhancement Program is Pat Rogers, who can be reached at (503) 986-3528.

Special Small City Allotment Program

This program is restricted to cities with populations under 5,000 residents. Unlike the OEDD Immediate Opportunity Grant program and the Oregon Special Public Works Fund, no locally funded match is required for participation. Grant amounts are limited to $25,000 and must be earmarked for surface projects (drainage, curbs, sidewalks, etc.). However, the program does allow jurisdictions to use the grants to leverage local funds on non-surface projects if the grant is used specifically to repair the affected area.

Public Transportation Funds

There are several different grants and loans which are available to fund public transportation, including:

- Special Transportation Fund (STF)
- Section 5311
- Community Transportation Program
- Special Transportation District

These grant and loan programs require a local funding match from the participating local government agencies.

Bicycle and Pedestrian Program Funds

By law (ORS 366.514), all road street or highway construction or reconstruction projects must include facilities for pedestrians and bicyclists, with the following exceptions (ORS 366.514 (2)(a-c)):

(a) Where the establishment of such paths and trails would be contrary to public safety;

(b) If the cost of establishing such paths and trails would be excessively disproportionate to the need or probable use; or

(c) Where the sparsity of population, other available ways or other factors indicate as absence of any need for such paths and trails.

ODOT's Bike and Pedestrian Program administers two programs to assist in the development of walking and bicycling improvements: local grants, and Small-Scale Urban Projects. Cities and counties with projects on local streets are eligible for local grant funds. A 20 percent local match is required. Eligible projects include curb extensions, pedestrian crossings and intersection improvements, shoulder widening, and re-striping for bike lanes. Projects on urban state highways with little or no right-of-way taking and few environmental impacts are eligible for Small-Scale Urban Project Funds. Both programs are limited to projects costing up to $100,000. Projects that cost more than $100,000, require right-of-way acquisition, or have environmental impacts should be submitted to ODOT for inclusion in the STIP.

Many projects in the Redmond TSP would be eligible for partial funding though this program. All of the urban upgrade (road widening) projects would add bike lanes to roadways, and several projects would add sidewalks and/or bike lanes in existing right-of-way.

The contact person for the Bike-Pedestrian Grant Program is Michael Ronkin, who can be reached at (503) 986-3555.

Highway Bridge Rehabilitation or Replacement Program

The Highway Bridge Rehabilitation or Replacement Program (HBRR) provides federal funding for the replacement and rehabilitation of bridges of all functional classifications. A portion of the HBRR funding is allocated for the improvement of bridges under local jurisdiction. A quantitative ranking system is applied to the proposed projects based on sufficiency rating, cost factor, and load capacity. Projects are ranked

against other proposed projects throughout the state, and require state and local matches of 10 percent each. The program includes the Local Bridge Inspection Program and the Bridge Load Rating Program.

The contact person for the Highway Bridge Rehabilitation or Replacement Program is Mark Hirota, who can be reached at (503) 986-3344.

Transportation Safety Grant Program

Managed by ODOT's Transportation Safety Section (TSS), this program's objective is to reduce the number of transportation-related accidents and fatalities by coordinating several statewide programs. These funds are intended for use as seed money, funding a program for three years. Eligible programs include those that address impaired driving, occupant protection, youth, pedestrians, speed enforcement, and bicycle and motorcycle safety. Every year, TSS produces a Highway Safety Plan that identifies the major safety programs, suggests counter measures to existing safety problems, and lists successful projects selected for funding, rather than granting funds through an application process.

The contact person for the Transportation Safety Grant Program is Troy Costales, who can be reached at (503) 986-4192.

Special Transportation Fund

The Special Transportation Fund (STF) awards funds to maintain, develop, and improve transportation services for people with disabilities and those over 60 years of age. Financed by a two-cent tax on each pack of cigarettes sold in the state, the annual distribution is approximately $5 million. Three-quarters of the available funds are distributed on a per-capita basis to mass transit districts, transportation districts, and -- where such districts do not exist -- counties. The remaining funds are distributed on a discretionary basis.

The contact person for the Special Transportation Fund is Jean Palmeteer, who can be reached at (503) 986-3800.

Oregon Transportation Infrastructure Bank

The Oregon Transportation Infrastructure Bank (OTIB) program is a revolving loan fund administered by ODOT to provide loans to local jurisdictions (including cities, counties, special districts, transit districts, tribal governments, ports, and state agencies). Eligible projects include construction of federal-aid highways, bridges, roads, streets, bikeways, pedestrian accessways, and right-of-way costs. Capital projects such as buses, light-rail cars and lines, maintenance yards, and passenger facilities are also eligible.

The contact person for the Oregon Transportation Infrastructure Bank is John Fink, who can be reached at (503) 986-3922.

State Transportation Improvement Program (STIP)

The State of Oregon provides funding for all highway-related transportation projects through the Statewide Transportation Improvement Program (STIP) administered by the Oregon Department of Transportation. The STIP outlines the schedule for ODOT projects throughout the state. The STIP, which identifies

transportation for a three-year funding cycle, is updated on an annual basis. Starting with the 1998 budget year, ODOT will then identify projects for a four-year funding cycle. In developing this funding program, ODOT must verify that the identified projects comply with the Oregon Transportation Plan (OTP), ODOT Modal Plans, Corridor Plans, local comprehensive plans, and ISTEA Planning Requirements. The STIP must fulfill ISTEA planning requirements for a staged, multi-year, statewide, intermodal program of transportation projects. Specific transportation projects are prioritized based on a review of the ISTEA planning requirements and the different state plans. ODOT consults with local jurisdictions before highway related projects are added to the STIP.

The highway-related projects identified in the City of Wallowa's TSP will be considered for future inclusion on the STIP. The timing of including specific projects will be determined by ODOT based on an analysis of all the project needs within Region 5. The TSP will provide ODOT with a prioritized project list for the City of Wallowa for the next 20 years. The City of Wallowa, Wallowa County, and ODOT will need to communicate on an annual basis to review the status of the STIP and the prioritization of individual projects within the project area. Ongoing communication will be important for the city, county, and ODOT to coordinate the construction of both local and state transportation projects.

An ODOT funding technique that will likely have future application to the City of Wallowa's TSP is the use of state and federal transportation dollars for off-system improvements. Until the passage and implementation of ISTEA, state and federal funds were limited to transportation improvements within highway corridors. ODOT now has the authority and ability to fund transportation projects that are located outside the boundaries of the highway corridors. The criteria for determining what off-system improvements can be funded has not yet been clearly established. It is expected that this new funding technique will be used to finance local system improvements that reduce traffic on state highways while preserving the existing function capacity, level of service, and safety of the existing state highway.

On June 9, 1998, the Transportation Equity Act for the 21st Century (TEA-21) was enacted, authorizing highway, highway safety, transit, and other surface transportation programs for the next six years. TEA-212 combines the continuation and improvement of ISTEA programs with new initiatives such as: investing in research and deployment of Intelligent Transportation Systems, strengthening safety programs, and extension of the Disadvantaged Business Enterprises program. TEA-21 assures a guaranteed level of federal funding for surface transportation through FY 2003.

FINANCING TOOLS

In addition to funding options, the recommended improvements listed in this plan may benefit from a variety of financing options. Although often used interchangeably, the words financing and funding are not the same. Funding is the actual generation of revenue by which a jurisdiction pays for improvements, some examples of which include the sources discussed above: property taxes, SDCs, fuel taxes, vehicle registration fees, LIDs, and various grant programs. In contrast, financing refers to the collecting of funds through debt obligations.

There are a number of debt financing options available to the City of Wallowa. The use of debt to finance capital improvements must be balanced with the ability to make future debt service payments and to deal with the impact on its overall debt capacity and underlying credit rating. Again, debt financing should be viewed not as a source of funding, but as a time-shifting of funds. The use of debt to finance these transportation-system improvements is appropriate since the benefits from the transportation improvements will extend over the period of years. If such improvements were to be tax-financed immediately, a large short-term increase in the tax rate would be required. By utilizing debt financing, local governments are

essentially spreading the burden of the costs of these improvements to more of the people who are likely to benefit from the improvements and lowering immediate payments.

General Obligation Bonds

General obligation bonds (GOs) are voter-approved bond issues which represent the least expensive borrowing mechanism available to municipalities. GO bonds are typically supported by a separate property tax levy specifically approved for the purposes of retiring debt. The levy does not terminate until all debt is paid off. The property tax levy is distributed equally throughout the taxing jurisdiction according to assessed value of property. General obligation debts typically used to make public improvement projects that will benefit the entire community.

State statutes require that the general obligation indebtedness of a city not exceed three percent of the real market value of all taxable property in the city. Since general obligation bonds would be issued subsequent to voter approval, they would not be restricted to the limitations set forth in Ballot Measures 5 and 50 (revised Measure 47). Although new bonds must be specifically voter-approved, Measure 50 provisions are not applicable to outstanding bonds, unissued voter-approved bonds, or refunding bonds.

Limited Tax Bonds

Limited tax general obligation bonds (LTGOs) are similar to general obligation bonds in that they represent an obligation of the municipality. However, a municipality's obligation is limited to its current revenue sources and is not secured by the public entity's ability to raise taxes. As a result, LTGOs do not require voter approval. However, since the LTGOs are not secured by the full taxing power of the issuer, the limited tax bond represents a higher borrowing cost than general obligation bonds. The municipality must pledge to levy the maximum amount under constitutional and statutory limits, but not the unlimited taxing authority pledged with GO bonds. Because LTGOs are not voter-approved, they are subject to the limitations of Ballot Measures 5 and 47.

Local Improvement District Bonds

Local improvement districts (LID's) may be formed to construct local improvements including street and sidewalk repairs and improvements. They are formed either through petition by the benefited property owners who seek a set of public improvements or through the legislative process of the city council. After the district is formed, public improvements may be made and the costs of those improvements distributed among the properties within the LID according to their respective benefit. The benefit is set by formula by the city council. Once the benefit and cost have been set, an assessment is levied against the benefiting properties. Assesses may pay in one up-front assessment or apply for assessment financing. In Oregon, this means that the city will issue bonds and allow the property owners to pay their assessment over time. Since the security of special assessment bonds lies solely with the assessment payments, potential investors and rating agencies apply a much more rigorous credit evaluation than they would to a general obligation issue backed by property taxes. As a result, it may be very difficult to sell special assessment bonds at reasonable rates for projects that are of marginal credit quality.

Bancroft Bonds

Under Oregon Statute, municipalities are allowed to issue Bancroft bonds which pledge the city's full faith and credit to assessment bonds. As a result, the bonds become general obligations of the city but are paid with assessments. Historically, these bonds provided a city with the ability to pledge its full faith and credit in order to obtain a lower borrowing cost without requiring voter approval. However, since Bancroft bonds are not voter-approved, taxes levied to pay debt service on them are subject to the limitations of Ballot Measures 5 and 50 (revised Measure 47). As a result, since 1991, Bancroft bonds have not been used by municipalities who were required to compress their tax rates.

Special Tax Revenue Bond

Cities may issue revenue bonds based on the expected receipt of special taxes. Examples of such revenues are gas taxes, hotel-motel taxes, or system development charges. Generally speaking, the more predictable the revenue source, the easier it is to support debt financing with that revenue. These types of bonds are more complicated to issue and usually restrict the other uses of the dedicated revenues so that the bond holders can be assured timely payment.

A few cities in Oregon have secured revenue bond issues with gas taxes or other special transportation revenues. In many cases, local governments have become accustomed to using state gas tax revenues solely for maintenance needs. Using gas tax revenues to pay debt service on bonds instead of funding maintenance would require an issuer to either reduce its maintenance budget or provide some other source of funding for maintenance needs.

CHAPTER 9: RECOMMENDED POLICIES AND ORDINANCES

In 1991, the Oregon Transportation Planning Rule was adopted to implement State Planning Goal 12 -- Transportation (amended in May and September 1995). The Transportation Planning Rule requires counties and cities to complete a TSP that includes policies and ordinances to implement that plan. The City of Wallowa's Comprehensive Land Use Plan was adopted in 1983. Based on content, the Transportation discussion in the Land Use Plan has not been significantly updated since the implementation of the Transportation Planning Rule. The city's zoning and land division ordinances also need updating to meet the requirements of the Transportation Planning Rule and this TSP. Applicable amendments to the City of Wallowa Comprehensive Land Use Plan, and zoning and land division ordinance were made in concurrence with the update to the 1997 TSP.

ELEMENTS REQUIRED BY THE TRANSPORTATION PLANNING RULE

The applicable portion of the Transportation Planning Rule is found in Section 660-12-045--*Implementation of the Transportation System Plan.* In summary, the Transportation Planning Rule requires that local governments revise their land use regulations to implement the Transportation System Plan in the following manner:

- *Amend land use regulations to reflect and implement the Transportation System Plan.*
- *Clearly identify which transportation facilities, services, and improvements are allowed outright, and which will be conditionally permitted or permitted through other procedures.*
- *Adopt land use or subdivision ordinance measures, consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions, to include the following topics:*
  - ⇒ *access management and control;*
  - ⇒ *protection of public use airports;*
  - ⇒ *coordinated review of land use decisions potentially affecting transportation facilities;*
  - ⇒ *conditions to minimize development impacts to transportation facilities;*
  - ⇒ *regulations to provide notice to public agencies providing transportation facilities and services of land use applications that potentially affect transportation facilities;*
  - ⇒ *regulations assuring that amendments to land use applications, densities, and design standards are consistent with the Transportation System Plan.*
- *Adopt land use or subdivision regulations for urban areas and rural communities to provide safe and convenient pedestrian and bicycle circulation and bicycle parking, and to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel.*
- *Establish street standards that minimize pavement width and total right-of-way.*

These elements have been addressed through the aforementioned plan and code amendments . These amended documents are recommended for approval and adoption by the Wallowa City Council.

APPENDIX A

Review of Plans and Policies

REVIEW OF EXISTING PLANS AND POLICIES
CITY OF WALLOWA

The City of Wallowa Comprehensive Land Use Plan was reviewed to establish the history of planning in the City and a comparison was made of the information in the existing Plan with the requirements of the Oregon Transportation Planning Rule (TPR). A description of the information in the Plan is provided followed by comments in italics.

CITY OF WALLOWA COMPREHENSIVE LAND USE PLAN

The City of Wallowa Comprehensive Land Use Plan was adopted by the City Council on April 26, 1983.

The three basic purposes of the Plan are to: (1) encourage desirable growth; (2) accommodate anticipated development, and (3) make provisions for those uses which may be needed by the community, but which may have such undesirable characteristics as noise, smoke, and odor.

Purposes (2) and (3) are the same as purposes (3) and (4) in the Wallowa County Land Use Plan.

The Plan is based upon the following fourteen Statewide Planning Goals:

1. Citizen Involvement
2. Planning Process
3. Agriculture
4. Forestry
5. Natural Resources
6. Air, Land and Water Quality
7. Natural Hazards
8. Recreation
9. Economy
10. Housing
11. Public Facilities and Services
12. Transportation
13. Energy Conservation
14. Urbanization

For each goal, the Plan presents findings and policies. Only Goal 12 specifically relates to transportation.

Transportation Goal

Summary: Low density population and the rural nature of the area has resulted in individual vehicular traffic being the only major source of transportation. Rail connection between Wallowa and La Grande provides transport for significant amounts of logs and wood products. Airfields are located at Joseph and Enterprise and landing strips are in a number of locations throughout the County. The Senior Citizens' Bus Program and the Moffitt Brothers' Stage connect the cities and La Grande and provide the only public transportation within the County.

The freight rail line described above refers to the Union Pacific Railroad. Service no longer exists on this line, and the line has been sold to the Idaho Northern Pacific Railroad, which has begun abandonment proceedings.

As a result of the nature of transportation improvements, primary local planning concerns are with the County, State, and Federal road systems. The County road system is of concern because of the requirements for improvement and maintenance, and the costs involved in both. State roads are significant because of their connections between Wallowa and peripheral areas to which linkages are necessary for the economic success of local industries. Federal roads are important because of the recreation and timber activities which they accommodate. Of equal concern is the upkeep of USFS roads.

The long-range outlook for the City is little change in the emphasis in transportation modes. Other than an ever present need to upgrade and maintain current facilities. There will be little change in transportation facilities as long as the area retains its rural character and there is no radical change either in population or local industrial needs.

Goal: To provide and encourage a safe, convenient and economic transportation system.

Findings: The following findings are the basis for policies related to the transportation needs of the City:

12-1. That the road system within the City is adequate to meet public needs.

12-2. That the City is served by a branch line operated by the Union Pacific Railroad.

Service no longer exists on this line, and the line has been sold to the Idaho Northern Pacific Railroad, which has begun abandonment proceedings.

12-3. That public transportation between incorporated towns in Wallowa County is now being provided by a local bus that operates between Joseph and La Grande on Highway 82, and by the Senior Citizens' Bus Program.

12-4. That few people in the City are transportation disadvantaged.

Policies: The following policies are a part of the City of Wallowa Land Use Plan and will be taken into consideration by both private and public interests in making land use decisions. The policies supplement the Plan Map and have the same regulatory effect. The City Council hereby insures:

12-1. That the Highway Department be encouraged to improve the State Highway between Joseph and La Grande.

12-2. That continued and improved rail service for goods be encouraged.

12-3. That the Oregon Department of Transportation improve on and maintain the safety of the Union Pacific Railroad Crossing within the City UGB.

Recommendations: The following recommendations are additional implementation measures identified in plan preparation but not felt to be critical:

12-1. That every effort be made to continue the bus and stage service within the County and between Wallowa and La Grande.

12-2. That the County work with the cities in establishing cooperative road improvement programs and schedules.

No inventory of the City of Wallowa's streets was included in the plan; however, a street inventory does exist in a Street, Sidewalk, Bikeway, and Handicap Access Study prepared by Anderson Perry & Associates, Inc. in 1993. No existing traffic volume data nor projections of future traffic demand were presented. No analysis of existing or future system operations was performed. No future improvements were recommended. All of these elements will need to be included to meet the requirements of the TPR.

APPENDIX B

Existing Street Inventory

TABLE 1

1997 MAJOR STREETS INVENTORY

Wallowa Transportation System Plan

Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Nez Perce Avenue											
Storie Street to Holmes Street	City	local	25	N/A	15	2	no	no	no	no	poor
Lockwood Street											
Madison Street to Douglas Street	City	local	25	70	20	2	no	no	no	no	poor
Douglas Street to Clairmont Street	City	local	25	70	20	2	no	no	no	no	poor
Clairmont Street to Whipple Street	City	local	25	70	20	2	no	no	no	no	poor
Whipple Street to Spruce Street	City	local	25	70	20	2	no	no	no	no	poor
Donald Street											
west of Madison Street	City	local	25	43	25	2	no	no	no	no	fair
Madison Street to Douglas Street	City	local	25	43	25	2	no	no	no	no	fair
Douglas Street to Clairmont Street	City	local	25	43	25	2	no	no	no	no	fair
Clairmont Street to Whipple Street	City	local	25	43	25	2	no	no	no	no	fair
Upper Diamond Prairie Road											
west of Bear Creek Road	City	local	25	70	30	2	no	no	no	no	good
Bear Creek Road to Madison Street	City	local	25	70	30	2	no	no	no	no	good
Madison Street to Douglas Street	City	local	25	70	30	2	no	no	no	no	good
Troy Road (Whiskey Creek Road)											
Holmes Street to Riverside Avenue	City	local	25	70	25	2	no	no	no	no	fair
east of Riverside Avenue	City	local	25	70	25	2	no	no	no	no	fair

TABLE 1

1997 MAJOR STREETS INVENTORY

Wallowa Transportation System Plan

Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
2nd Street											
west of Madison Street	City	local	25	70	20	2	no	no	no	no	poor
Madison Street to Douglas Street	City	local	25	70	30	2	no	no	no	no	fair
Clairmont Street to Spruce Street	City	local	25	70	25	2	no	no	no	no	good
Spruce Street to Alder Street	City	local	25	70	25	2	no	no	no	no	good
Alder Street to Pine Street	City	local	25	70	25	2	no	no	no	no	good
Pine Street to Storie Street	City	local	25	70	25	2	no	no	no	no	good
Storie Street to Ellen Street	City	local	25	70	25	2	no	no	no	no	poor
Ellen Street to Sutton Street	City	local	25	70	15	2	no	no	no	no	poor
3rd Street											
west of Madison Street	City	local	25	70	25	2	no	no	no	no	fair
Madison Street to Douglas Street	City	local	25	70	25	2	no	no	no	no	fair
Douglas Street to Clairmont Street	City	local	25	70	25	2	no	no	no	no	fair
Clairmont Street to Spruce Street	City	local	25	70	25	2	no	no	no	no	fair
Spruce Street to Alder Street	City	local	25	70	25	2	no	no	no	no	fair
Alder Street to Pine Street	City	local	25	70	25	2	no	no	no	no	fair
Pine Street to Storie Street	City	local	25	70	25	2	no	no	no	no	fair
Touve Lane											
east of Storie Street	City	local	25	60	10	1	no	no	no	no	poor
4th Street											
west of Madison Street / Wallowa Lake Hwy	City	local	25	70	20	2	no	no	no	no	fair
Madison Street to Douglas Street	City	local	25	70	20	2	no	no	no	no	fair
Douglas Street to Clairmont Street	City	local	25	70	20	2	no	no	no	no	fair
Clairmont Street to Spruce Street	City	local	25	70	20	2	no	no	no	no	fair
Spruce Street to Alder Street	City	local	25	70	20	2	no	no	no	no	fair
Alder Street to Pine Street	City	local	25	70	20	2	no	no	no	no	fair
Pine Street to Storie Street	City	local	25	70	20	2	no	no	no	no	poor
east of Storie Street	City	local	25	70	10	1	no	no	no	no	poor

TABLE 1											
1997 MAJOR STREETS INVENTORY											
Wallowa Transportation System Plan											
Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Lower Diamond Prairie Road / 5th Street											
west of Bear Creek Road	City	local	25	60	25	2	no	no	no	no	good
Bear Creek Road to N. Donald Street	City	local	25	60	25	2	no	no	no	no	good
N. Donald Street to Wallowa Lake Hwy	City	local	25	60	25	2	no	no	no	no	good
Wallowa Lake Hwy to Douglas Street	City	local	25	60	20	2	no	no	no	no	fair
Douglas Street to Clairmont Street	City	local	25	60	20	2	no	no	no	no	fair
Clairmont Street to Glenwood Street	City	local	25	60	25	2	no	no	no	no	fair
Glenwood Street to Spruce Street	City	local	25	60	25	2	no	no	no	no	fair
Spruce Street to Alder Street	City	local	25	60	25	2	no	no	no	no	fair
Alder Street to Pine Street	City	local	25	60	25	2	no	no	no	no	fair
Pine Street to Storie Street	City	local	25	60	25	2	no	no	no	no	fair
6th Street											
Douglas Street to Clairmont Street	City	local	25	68	20	2	no	no	no	no	fair
east of Clairmont Street	City	local	25	68	20	2	no	no	no	no	fair
7th Street											
Wallowa Lake Hwy to Douglas Street	City	local	25	60	20	2	no	no	no	no	fair
Douglas Street to Bear Creek Road Truck Route	City	local	25	60	20	2	no	no	no	no	fair
Frontage Road											
west of Wallowa Lake Highway	City	local	25	60	20	2	no	no	no	no	poor

TABLE 1											
1997 MAJOR STREETS INVENTORY											
Wallowa Transportation System Plan											
Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Bear Creek Road Truck Route											
south of Upper Diamond Prairie Road	City	local	25	60	20	2	no	no	no	no	fair
Upper Diamond Prairie Rd to Lower Diamond Prairie Rd	City	local	25	60	20	2	no	no	no	no	fair
Lower Diamond Prairie Rd to Couch Avenue	City	local	25	60	20	2	no	no	no	no	fair
Couch Avenue to Wallowa Lake Hwy	City	local	25	60	20	2	no	no	no	no	fair
Wallowa Lake Hwy to Douglas Street	City	local	25	60	25	2	no	no	no	no	good
Douglas Street to 7th Avenue	City	local	25	60	25	2	no	no	no	no	good
7th Avenue to 5th Avenue	City	local	25	60	25	2	no	no	no	no	good
Wallowa Lake Highway											
north of Frontage Road	State	arterial	55	60	30	2	no	no	no	no	good
Frontage Road to Bear Creek Road	State	arterial	55	60	30	2	no	no	no	no	good
Bear Creek Road to 7th Street	State	arterial	40	60	30	2	no	no	no	no	good
7th Street to 5th Street	State	arterial	40	60	30	2	no	no	no	no	good
5th Street to 4th Street	State	arterial	20	60	30	2	no	no	no	no	good
4th Street to 3rd Street	State	arterial	40	60	30	2	no	no	no	no	good
3rd Street to 2nd Street	State	arterial	40	60	30	2	no	no	no	no	good
2nd Street to Douglas Street	State	arterial	20	60	30	2	yes	no	no	no	good
Douglas Street to Clairmont Street	State	arterial	40	70	50	2	yes	no	yes	no	good
Clairmont Street to Whipple Street	State	arterial	40	70	50	2	yes	no	yes	no	good
Whipple Street to Spruce Street	State	arterial	40	70	50	2	yes	no	yes	no	good
Spruce Street to Alder Street	State	arterial	25	70	50	2	yes	yes	yes	no	good
Alder Street to Pine Street	State	arterial	25	70	50	2	yes	yes	yes	no	good
Pine Street to Storie Street	State	arterial	25	70	50	2	yes	yes	yes	no	good
Storie Street to Holmes Street	State	arterial	25	70	50	2	yes	yes	yes	no	good
Holmes Street to Wynema Street	State	arterial	40	70	30	2	yes	no	yes	no	good
Wynema Street to Sherrod Road / county road	State	arterial	40	70	30	2	no	no	no	no	good
south of Sherrod Road / county road	State	arterial	55	70	30	2	no	no	no	no	good

TABLE 1

1997 MAJOR STREETS INVENTORY

Wallowa Transportation System Plan

Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Madison Street											
2nd Street to 1st Street	City	local	25	60	20	2	no	no	no	no	fair
1st Street to Donald Street	City	local	25	60	20	2	no	no	no	no	fair
Donald Street to Lockwood Street	City	local	25	60	20	2	no	no	no	no	fair
Douglas Street											
north of Bear Creek Road	City	local	25	60	25	2	no	no	no	no	poor
Bear Creek Road to 7th Street	City	local	25	60	25	2	no	no	no	no	fair
7th Street to 6th Street	City	local	25	60	25	2	no	no	no	no	fair
6th Street to 5th Street	City	local	25	60	25	2	no	no	no	no	fair
5th Street to 4th Street	City	local	25	60	25	2	no	no	no	no	fair
4th Street to 3rd Street	City	local	25	60	25	2	no	no	no	no	fair
3rd Street to 2nd Street	City	local	25	60	25	2	no	no	no	no	fair
2nd Street to 1st Street	City	local	25	60	25	2	no	no	no	no	fair
1st Street to Donald Street	City	local	25	60	25	2	no	no	no	no	fair
Donald Street to Lockwood Street	City	local	25	60	25	2	no	no	no	no	fair
Clairmont Street											
6th Street to 5th Street	City	local	25	60	25	2	no	no	no	no	fair
5th Street to 4th Street	City	local	25	60	25	2	no	no	no	no	fair
4th Street to 3rd Street	City	local	25	60	25	2	no	no	no	no	fair
3rd Street to 2nd Street	City	local	25	60	25	2	no	no	no	no	fair
1st Street to Donald Street	City	local	25	60	25	2	no	no	no	no	fair
Donald Street to Lockwood Street	City	local	25	60	25	2	no	no	no	no	fair
Whipple Street											
1st Street to Donald Street	City	local	25	70	25	2	no	no	no	no	fair
Donald Street to Lockwood Street	City	local	25	70	25	2	no	no	no	no	fair
south of Lockwood Street	City	local	25	70	25	2	no	no	no	no	poor

TABLE 1											
1997 MAJOR STREETS INVENTORY											
Wallowa Transportation System Plan											
Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Glenwood Street											
5th Street to 4th Street	City	local	25	45	20	2	no	no	no	no	poor
Spruce Street											
5th Street to 4th Street	City	local	25	70	20	2	no	no	no	no	fair
4th Street to 3rd Street	City	local	25	70	20	2	no	no	no	no	fair
3rd Street to 2nd Street	City	local	25	70	20	2	no	no	no	no	fair
2nd Street to 1st Street	City	local	25	70	20	2	no	no	no	no	fair
south of 1st Street	City	local	25	70	40	2	yes	yes	yes	no	good
Alder Street											
5th Street to 4th Street	City	local	25	70	20	2	no	no	no	no	fair
4th Street to 3rd Street	City	local	25	70	20	2	no	no	no	no	fair
3rd Street to 2nd Street	City	local	25	70	20	2	no	no	no	no	fair
2nd Street to 1st Street	City	local	25	70	20	2	no	no	no	no	fair
south of 1st Street	City	local	25	70	25	2	no	no	no	no	fair
Pine Street											
Sewage disposal to 5th Street	City	local	25	60	20	2	no	no	no	no	fair
5th Street to 4th Street	City	local	25	60	20	2	no	no	no	no	fair
4th Street to 3rd Street	City	local	25	60	20	2	no	no	no	no	fair
3rd Street to 2nd Street	City	local	25	60	20	2	no	no	no	no	fair
2nd Street to 1st Street	City	local	25	60	40	2	no	no	no	no	fair
south of 1st Street	City	local	25	60	40	2	no	yes	no	no	fair
Storie Street											
4th Street to 3rd Street	City	local	25	70	40	2	no	yes	no	no	fair
3rd Street to 2nd Street	City	local	25	70	40	2	no	yes	no	no	fair
2nd Street to 1st Street	City	local	25	70	40	2	no	yes	no	no	fair
1st Street to Nez Perce Avenue	City	local	25	70	25	2	no	no	no	no	fair

TABLE 1

1997 MAJOR STREETS INVENTORY

Wallowa Transportation System Plan

Street Segment	Jurisdict.	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalks	Bikeway	Pavement Condition
Holmes Street											
1st Street to Nez Perce Avenue	City	local	25	50	25	2	no	no	no	no	fair
south of Nez Perce Avenue	City	local	25	50	15	2	no	no	no	no	poor
Ellen Street											
2nd Street to 1st Street	City	local	25	70	30	2	no	no	no	no	poor
Sutton Street											
2nd Street to 1st Street	City	local	25	N/A	20	2	no	no	no	no	poor
Wynema Street											
south of Wallowa Lake Hwy	City	local	25	60	30	2	no	no	no	no	poor
Sherrod Road											
south of Wallowa Lake Hwy / county road	City	local	25	60	25	2	no	no	no	no	poor
Riverside Avenue											
South of Riverside Avenue	City	local	25	60	25	2	no	no	no	no	poor

APPENDIX C

Population and Employment Analysis

METHODOLOGY AND DATA SOURCES

Population estimates and projections were developed from historical data as reported by the Census Bureau. Portland State University's Center for Population Research and Census (PSU CPRC) developed annual population estimates for cities and counties for the purpose of allocating certain state tax revenues to cities and counties. The State of Oregon Office of Economic Analysis (OEA) provided long-term (through year 2040) state population forecasts, disaggregated by county, for state planning purposes. OEA also developed county-level employment forecasts based on covered employment payrolls as reported by the Oregon Employment Department.

The Office of Economic Analysis used business-cycle trends (as reflected by the Employment Department's employment forecasts) as the primary driver of population and employment for the short term. For the long term, the forecasts shift to a population-driven model, which emphasizes demographics of the resident population, including age and gender of the population, with assumptions regarding life expectancy, fertility rate, and immigration. DEA used a methodology based on OEA's county-distribution methodology in developing population and employment forecasts for each of the cities in Wallowa County. DEA calculated a weighted average growth rate for each jurisdiction (weighting recent growth more heavily than past growth) and combined this average growth rate with the projected county-wide growth rate. This methodology assumes convergence of growth rates because of the physical constraints of any area to sustain growth rates beyond the state or county average for long periods of time. These constraints include availability of land and housing, congestion, and other infrastructure limitations.

These preliminary forecasts were used as a basis for discussion with individuals who have local knowledge and expertise. Issues raised in the discussions included constraints on Joseph's sewer capacity and development of an interpretive center in Wallowa. The projections were then revised based on local input.

These population and employment forecasts were developed to determine future transportation needs. The amount of growth, and where it occurs, will affect traffic and transportation facilities in the study area. This report is not intended to provide a complete economic forecast or housing analysis, and it should not be used for any purpose other than that for which it is designed.

CURRENT POPULATION AND EMPLOYMENT LEVEL

Estimated at 7,250 in 1995, the population of Wallowa County has remained relatively stable since the 1990 Census, with an average annual growth rate of less than one percent. The following table shows the estimated change in population for Wallowa County and the jurisdictions of Enterprise, Joseph, Lostine, and the City of Wallowa from 1990 to 1995.

Wallowa County Population Level

			1990-1995 Change	
	1990	1995	Number	CAARG*
Wallowa County	6,911	7,250	339	0.96%
Enterprise	1,905	2,010	105	1.08%
Joseph	1,073	1,190	117	2.09%
Lostine	231	230	(1)	-0.09%
City of Wallowa	748	755	7	0.19%

** Compound Average Annual Rate of Growth*

Source: Portland State University Center for Population Research and Census.

Employment levels have declined since 1990. This decline is, in part, attributable to an increase in the unemployment rate throughout Oregon. Average unemployment rates for Wallowa County hit a low for the decade at 7.5 percent in 1989. Since then, unemployment has climbed, reaching an average 11.1 percent in 1995.

Wallowa County Employment

			1990-1995 Change	
	1990	1995	Number	CAARG*
Wallowa County Employment	3,270	2,970	(300)	-1.91%
Unemployment Rate	7.6%	11.1%	n.a.	n.a.

** Compound Average Annual Rate of Growth*

Note: These figures are reported as place-of-work series, rather than place-of-residence. In other words, these estimated total jobs in Wallowa County may be held by residents of other counties. The impact of this difference is considered minimal for Wallowa County as the 1990 Census reports that over 96 percent of workers who live in Wallowa County also work in the County.

Source: Oregon Employment Department.

The unemployment rates contrast with the economic performance of the state as a whole. The state's unemployment rate has been at approximately 5 percent for several years, and has just begun creeping upward. As of November 1996, the statewide unemployment rate was 5.5 percent--still a historically low rate, but the state's highest level in over two years.

HISTORICAL GROWTH

Interestingly, population levels in most of Eastern Oregon are close to, or actually lower than, those experienced earlier in the century. Counties included in this phenomenon include Baker, Harney, Union, Grant, and Wallowa Counties. The population of Wallowa County actually declined in the 1960s and 1980s, reflecting the general slowdown in the state's economy during these time periods. As a result of this activity, the population of Wallowa County declined overall between the 1960 and 1990 Censuses (from 7,102 in 1960 to 6,911 in 1990). The following table shows the population trend for Enterprise, Joseph, Lostine, they City of Wallowa and Wallowa County as a whole.

Wallowa County Historical Population Trend

					1960-1990 Change	
	1960	**1970**	**1980**	**1990**	**Number**	**CAARG***
Wallowa County	7,102	6,247	7,273	6,911	(191)	-0.09%
Enterprise	1,932	1,680	2,003	1,905	(27)	-0.05%
Joseph	788	839	999	1,073	285	1.03%
Lostine	240	196	250	231	(9)	-0.13%
City of Wallowa	989	811	847	748	(241)	-0.93%

* *Compound Average Annual Rate of Growth*

Source: U.S. Bureau of the Census.

The only jurisdiction able to achieve positive population growth between 1960 and 1990 was Joseph, growing from 788 in 1960 to 1,073 in 1990. This growth can attributed, in part, to the community's proximity to Wallowa Lake, and the recreational opportunities this amenity provides.

Despite minimal growth in population since 1970, other demographic changes have occurred that may impact the community's employment and travel patterns. For example, there have been national trends of both decreasing household size and increasing numbers of workers per household.

Household size in Wallowa County has gone from an average of 2.93 persons per household in 1970 to an average of 2.44 persons in 1990. Changes in life expectancy and lifestyle choices (i.e. electing to delay marriage and childbearing) have resulted in relatively high proportions of "empty-nester," "singles," and "couples-without-children" households.

The number of jobs per household has also been increasing. With 6,247 reported persons in 1970 and total employment estimated at 2,420, the population/employment ratio in 1970 was 2.58 persons per job. In 1995, there were 2,970 jobs for the estimated population of 7,250, for a population/employment ratio of 2.44 persons per job. The increasing numbers of jobs in relation to population is due to a number of factors including a low savings rate, increased life expectancy, and higher education levels. These factors have combined to increase the labor participation rate, particularly by women and older adults.

POPULATION AND EMPLOYMENT FORECASTS

Wallowa County is expected to experience small population gains for the next 20 years. Like much of Eastern Oregon, the economy of Wallowa County remains largely seasonal, with more than one-quarter of all employment agriculture-based. Therefore, population increases are difficult to predict, and are not likely to be as stable as the forecasts appear to imply.

The population forecast for Wallowa County and the jurisdictions of Enterprise, Joseph, Lostine, and the City of Wallowa are shown in five-year increments in the following table.

Wallowa County Population Forecast

	1995	2000	2005	2010	2015	1995-2000 CAARG	1995-2015 CAARG
Wallowa County	7,250	7,458	7,632	7,815	8,025	0.57%	0.51%
Enterprise	2,010	2,060	2,106	2,153	2,206	0.49%	0.47%
Joseph	1,190	1,260	1,329	1,396	1,460	1.15%	1.03%
Lostine	230	233	235	238	242	0.26%	0.25%
City of Wallowa	755	763	769	777	789	0.21%	0.17%

Source: 1995 estimates developed by Portland State University Center for Population Research and Census; County forecasts developed by State of Oregon Office of Economic Analysis; and Jurisdiction forecasts developed by David Evans and Associates, Inc.

The population of Wallowa County is expected to increase by 11 percent over the next 20 years, from the 1995 estimate of 7,250 to an estimated 8,025 in year 2015. The only jurisdiction expected to grow faster is Joseph, with a forecast increase of nearly 23 percent over 20 years, from 1,190 in 1995 to 1,460 in 2015.

Despite the City of Wallowa's historical population loss, other factors suggest future population growth. These factors include its strong schools, relative affordability, planned development of the Wallowa Band Nez Perce Interpretive Center, and the strength of the overall county-wide economy. Therefore, the City of Wallowa growth rates and the resulting forecasts were increased, based on local input.

The Office of Economic Analysis also developed forecasts of Non-Agricultural Employment by county. Oregon Employment data suggests that over one-quarter (an estimated 29 percent in 1995) of all employment in Wallowa County is agriculture-based. This agriculture-based proportion, although higher than the state average, is typical for counties in Eastern Oregon. The economy of Wallowa County has been moving toward a greater degree of diversification, going from 46 percent agricultural-based employment in 1970, to 29 percent in 1995, as shown in the table below.

Agricultural Employment Trend

Wallowa County

	1970	1975	1980	1985	1990	1995
Total Estimated Employment	2,420	2,820	3,280	3,080	3,270	2,970
Nonfarm Payroll Employment	1,310	1,620	1,860	1,780	2,270	2,110
Agricultural Proportion	46%	43%	43%	42%	31%	29%

Source: Oregon Employment Department.

The shift from agriculture occurred primarily in the late 1980s with agriculture-based employment accounting for 42 percent of all employment in 1985, falling to 31 percent just five years later. Statewide, the Office of Economic Analysis expects this diversification to continue, but at a decreasing rate. Applying this principle to Wallowa County employment, the following table shows forecast non-agricultural and estimated total employment for Wallowa County.

Wallowa County Employment Forecast*

	1995	2000	2005	2010	2015	1995-2000 CAARG	1995-2015 CAARG
Non-Agricultural Employment	2,110	2,302	2,377	2,423	2,438	1.76%	0.73%
Estimated Total Employment	2,970	3,201	3,274	3,314	3,317	1.51%	0.55%
Agricultural Proportion	29.0%	28.1%	27.4%	26.9%	26.5%	n.a.	n.a.

* *The Office of Economic Analysis inflated non-agricultural employment to 2,151 to correct for Oregon jobs not attributed to any specific county.*

Source: Non-Agricultural employment forecasts developed by the State of Oregon Office of Economic Analysis; 1995 Estimates developed by the Oregon Employment Department; and Estimated total employment forecasts developed by David Evans and Associates, Inc.

Employment is expected to grow by over 11 percent over the next twenty years, with the proportion captured by agricultural employment declining over time, from its current level of 29 percent, reaching 26.5 percent of total employment in Wallowa County in year 2015. The population/employment ratio will remain relatively stable (decreasing slightly from 2.44 persons per job to 2.42 persons per job).

TECHNICAL MEMORANDUM

SPEED CONTROL MEASURES

Numerous studies have been carried out to determine the influence of particular roadway features on traffic speed. Some of the most significant characteristics of roadway features are curvature, grades, length of grade, number of lanes, surface condition, sight distance, lateral clearance, number of intersections, and built-up areas near the roadways. Some of the main reasons drivers give for speeding include being in a hurry, to avoid a potential danger, to keep up with other traffic, and to maintain a speed with which the driver feels comfortable.

This technical memorandum describes a variety of speed control measures to address public concern over high-speed traffic through the downtown areas of many of the cities in Grant County. Speed control measures consist of physical controls, passive controls, and psycho-perception controls. Specific speed control techniques for each of these three categories are summarized in the following pages and listed in Table 1 located at the end of this memorandum.

Physical Controls

Physical speed controls are those measures which are physically constructed to restrict or affect vehicle operation or performance. Speed control techniques that can be designed or built into transportation systems include the use of road markings, texturing, medians, street narrowing, and other physical features. They often result in other "traffic calming" benefits such as reduced traffic volumes and noise levels in congested areas. High construction costs somewhat limit extensive use of these types of speed control measures.

Speed Bumps

Speed bumps are short bumps in a roadway used in parking lots, on private roads, and around universities. Their effectiveness at reducing speed is somewhat inconsistent, as drivers tend to slow down to reduce vehicle rocking while traveling over the bumps but will then increase their speeds between the bumps to make up for lost time. They increase the likelihood of vehicle damage and loss of control even when driving over them at low speeds. Speed bumps can be effective in lowering traffic volumes; however, they cause an increase in noise. They also cause problems for snowplows. Speed bumps have moderately high construction costs and little to no maintenance costs once constructed.

Road Humps

Road humps are typically 12 feet long and three to four inches high and can be safely crossed at speeds of 30 mph. Extensive testing has indicated that road humps are effective in reducing speeds on residential streets; that in the 85th percentile, speeds closely match the 25 mph speed limit used on most residential streets. Road humps are less likely than speed bumps to cause loss of control or vehicle damage caused by vehicles bottoming-out. Tests also showed a reduction in injury accidents and no statistically significant change in accidents on surrounding streets that could have been used as alternate routes. Speed bumps tend to reduce traffic volumes by discouraging through traffic on local neighborhood streets. Noise levels go down by slowing down traffic. Speed humps have moderately high construction costs and little to no maintenance costs once constructed.

Rumble Strips

Like road humps, rumble strips have been found to be effective in reducing average travel speeds and are less likely than speed bumps to cause loss of control or vehicle damage. Rumble strips typically consist of rows of raised metallic saucer-like elements affixed to the roadway which cause a mild rumbling under the vehicle and a significant amount of noise when driven over. The effect is to make motorists more aware of their speed and their surroundings with the intent of causing drivers to slow down. This in turn improves safety. Rumble strips have moderate construction costs and low maintenance costs once installed.

A significant disadvantage to this control measure is that it is difficult to construct a rumble surface that would not generate too much noise for adjacent residents. Raised metallic rumble strips also cause maintenance problems for snowplows and can be a hazard if dislodged.

Rumble strips can also be constructed by scoring the roadway pavement, which may be more desirable as they would create less noise. They would not result in a raised profile which would interfere with snowplows and there would be nothing that could become dislodged.

Median Barrier

The primary function of medians is to restrict conflicting turning movements by not allowing left turns from a travel lane into a driveway. Wide medians can also allow for turning pockets at intersections, provide pedestrian refuge, and reduce pavement width. Medians can be as narrow as two to four feet wide within a limited right-of-way.

Medians often slow traffic by giving the appearance of a parkway setting and narrow lanes. They improve safety and may increase the capacity of high-volume streets by limiting conflicting mid-block movements and channelizing traffic at complex intersections. They may improve safety at certai. locations by making side street driveways right turn in and out only. Medians also increase pedestrian

safety and ability to cross wider streets by providing mid-street pedestrian refuge. Construction costs for medians are high; however, they have low maintenance costs once constructed.

Traffic Circle

Traffic circles are primarily used to reduce delay at intersections and improve safety. Traffic circles have advantages over traffic signals because they improve intersection operations, tend to have lower accident rates, less severe accidents, and cost less. Entry into traffic circles is continuous and controlled by yield signs. In many situations the capacity is similar to other intersection traffic control.

Traffic circles may reduce delays at intersections and can improve local street access as well as decrease speed depending on design. Traffic circles reduce the number of conflict points and the number and severity of crashes at some locations. Safety may be an issue in areas where drivers are not used to and are unclear about how to use them. Other disadvantages are that they may reduce the opportunity for pedestrians to cross roads and they can be intimidating to bicyclists. Traffic circles also have high construction costs.

Chokers and Road Narrowing

Lateral clearance on a roadway has been proven to have an effect on travel speeds, albeit a minor effect. The narrower a road is, the more slowly drivers tend to travel.

Where on-street parking exists, constructing sidewalks with curb extensions, or bulbs at intersections such that the sidewalk is extended to the end of the parking lane is an effective way to narrow a road. Narrower streets mean shorter crosswalk lengths, thus improving pedestrian safety by reducing the amount of time pedestrians are in the street. Narrow streets also shorten the pedestrian phase at signalized intersections, thus allowing a redistribution of green time to the traffic movements which need it most. They can also slow traffic in these areas.

Road narrowing usually does not result in reduced traffic volumes nor in reduced noise. This measure may cause problems for cyclists if the curb extension conflicts with a bike lane.

This improvement option can be made at a moderate to high construction cost. The cost of a single curb extension is about $2,000. For all four corners of an intersection, the total cost would be about $8,000. Once constructed, there is little to no maintenance required for this option.

Passive Controls

Passive speed control measures do not physically alter vehicle operation or speed. They typically consist of regulatory signs or signals and rely on driver compliance to be effective. This inherently makes them

less effective at controlling speeds than physical controls. Their relatively low construction costs, however, may make them more practical to implement on a large-scale basis.

Stop Signs

Experience in the United States over the years indicates that stop signs installed on local streets have little effect on speed except in the immediate vicinity of the signs. Tests found that motorists start to slow down 200 feet before the intersection and return to near normal speed about 100 feet past the stop point. Studies also showed that speeds between intersections are not significantly changed but tend to increase slightly after the installation of stop signs. In addition, some tests found that stop signs installed to control speed were disobeyed on a wide scale. When not forced to stop by a priority vehicle, few drivers came to a complete stop and many did not stop at all. The Manual on Uniform Traffic Control Devices requires that stop signs not be used for speed control.

Speed Limit Signs

Speed limit laws often specify general limits for residential streets, business districts, school zones, or rural areas. The laws usually recognize that safe speed varies from road to road and permit highway agencies to raise or lower speed limits on the basis of an engineering or traffic survey. The basic intent of speed zoning is to identify a safe and reasonable limit for a given road section or zone. The most widely accepted method of setting speed limits is the 85th percentile speed. This is the speed that 85 percent of traffic is moving at or below and reflects the safe speed for the given roadway conditions as determined by a large majority of drivers. The 85th percentile speed is in the speed range where the accident involvement rate is lowest.

Numerous studies have been carried out on the effects of speed limits. Studies on urban and rural roads indicate that speed limits have little or no effect on traffic speed and that drivers respond to changing roadway conditions more so than posted speed limits. A survey of drivers indicated that over three-fourths of the motorists indicated they drive at a speed that traffic and road condition will permit regardless of the posted speed limit. Although the motorists tended to think of speeding as one of the primary causes of accidents, they did not feel that going ten mph over the legal limit was very wrong. One speed study indicated that when the speed limit was raised to match the 85th percentile speed, there was essentially no change in speed. Where the speed limit was lowered, the spread in speeds increased and compliance dropped from 89 percent to 24 percent.

In summary, changing the posted speed limit can be done at a low construction cost with little to no maintenance problems or cost; however, lowering posted speed limits rarely results in actual reductions in speed. Speed zones need to be constantly enforced to be effective. Lowering the posted speed limit rarely results in improved safety because any safety benefits realized by slower speeds is negated by an increase in speed variance. Speed limits can also give pedestrians a false sense of security by expecting drivers to obey signs. Changes to the posted speed limit are not likely to result in any changes in traffic volumes or noise either.

Traffic Activated Signs

Radar can be used to activate variable message signs when vehicles are traveling faster than the speed limit. These signs display the speed indication and the message SLOW DOWN or TOO FAST with flashing beacons to drivers exceeding the posted speed limit. Speed limit signs without beacons produced no significant reductions in speed. Some tests indicated that there was an increase in the speed variance with the speed violation sign. This is an unfavorable effect since it has been shown to increase the likelihood of accidents. Other tests indicated that speeds became more uniform. It is unlikely that a traffic activated sign would have any effect on traffic volumes or noise. These signs have moderately high construction costs and low maintenance costs.

Psycho-Perception Controls

Psycho-perception controls are those speed control measures that rely on drivers' attitudes, perceptions, and reactions to their surroundings. These include knowledge about speed enforcement, perceived safe traveling speed, and reaction to changes in the surrounding environment. They rely less on physically slowing vehicles or driver compliance with the law and more on the human psyche. Nonetheless, their benefits can be quantified and they make an important contribution to speed control.

Enforcement

In the presence of police enforcement, motorists tend to slow down. The magnitude of the speed decrease depends on the relative level of the speed limit and the perceived severity of the threat and enforcement. A marked police vehicle parked with lights flashing and simulating an arrest produces the largest reduction in speed. Stationary enforcement is more effective than moving enforcement in controlling speed. In most cases, the decrease in speed is less than three mph but reductions up to ten mph have been observed. As would be expected, the greater the number of enforcement measures present in a given area or the greater the frequency of presence, the greater the impact on the speed of traffic in that area.

The distance that the speed suppression effect extends from the enforcement measure depends on the frequency or strategy of patrol, the patrol method, the traffic situation, and other factors. In most cases, this distance is less than three miles either side of the measure, but there have been reports of an effect up to four miles upstream and ten miles downstream of the enforcement.

Enforcement also appears to have a carryover effect. That is, the speed suppression effect remains for some period of time after the enforcement unit is removed. The duration of this effect and the factors which can alter it are not well defined, but are associated with driver communication and frequency of exposure.

Speed enforcement not only reduces speed but also has the tendency to reduce accident severity as well. Studies have shown that the variance of speed distribution is reduced by enforcement. The effect of enforcement on speed variance is of interest since it is related to accident involvement. Other studies have shown that the effect of enforcement is to shift the entire speed distribution in the direction of lower speeds without actually altering speed distribution.

Economic and manpower constraints usually prohibit widespread or long-term employment of speed enforcement measures.

Transverse Markings

Transverse markings consist of a series of pavement markings placed across the road. Pavement marking materials consist of paint, thermoplastic, or pre-cut adhesive backed lines. The spacing between the markings gradually decreases as the area of speed control is approached. The marking pattern is intended to give the illusion of high speed and cause drivers to slow down. Tests have shown transverse markings to be successful in producing speed reductions, especially for speeders, and to reduce speed-related accidents, as well as all accidents. The technique may not affect those who are familiar with the area.

Transverse markings do not result in a decrease in traffic volumes nor a decrease in noise. They can create a hazard to pedestrians and bicyclists because some markings are slicker than the normal pavement when wet. Providing painted markings can be accomplished at a low construction cost and do not require much maintenance beyond routine painting.

Crosswalks

Providing marked crosswalks is primarily to improve pedestrian safety. Sometimes crosswalks are effective in causing drivers to slow down when approaching intersections with marked crosswalks. Raised or textured crosswalks are more effective than painted crosswalks at producing this effect, as they act as speed humps; however, they could result in an increase in noise and are not recommended for streets with high traffic volumes. They could also create a safety hazard for bicyclists.

Marked crosswalks indicate to drivers that they are approaching an area of high pedestrian volumes and that they are expected to yield the right-of-way to pedestrians. Crosswalks make crossing streets more pleasant because they delineate and reinforce pedestrian crossing. Area businesses may consider this option a plus.

A danger associated with this improvement option is that marked crosswalks could give pedestrians a false sense of security, especially at unsignalized intersections.

Providing painted crosswalks can be accomplished at a low construction cost (approximately $3 per linear foot) and do not require much maintenance beyond routine painting. Raised or textured crosswalks have higher construction costs and little to no maintenance costs.

Odd Speed Limit Signs

Differentiated speed limits and advisory speed limits can be considered "odd" speed limits. Differentiated speed limits can consist of different speed limits for day and night or different speed limits for cars and trucks. Advisory speed limits are often used to aid drivers in selecting safe speeds for hazardous locations such as curves, roadwork sites, intersections, and road sections with lower design speeds.

When different speed limits are used for day and night, the night speed limits are generally set at five to ten mph lower than day speed limits. There are no reports available on the effectiveness of these limits, although speeds are generally lower and accident risk has been found to be greater at night.

Different speed limits for cars and trucks have also been used. One study of differentiated speed limits indicated that the actual difference in car and truck speeds was less than the posted ten mph differential except on steep upgrades where trucks could not maintain speed. At most sites studied the actual difference between car and truck speeds was less than six mph.

Studies have indicated that drivers exceeded advisory speeds of 15 to 35 miles per hour but did not exceed 45 and 50 mph speed advisories. Advisory and regulatory 35 mph speed limit signs were shown to have little if any effect on speed compared to the standard curve sign. In general, drivers were not influenced by raising or lowering advisory speeds, but they were influenced by the sharpness of the curve. Additionally, drivers using a highway repeatedly, quickly learn the speed that curvature and road conditions will allow and advisory speeds can be expected to have little effect on them.

As with typical speed limit signs, odd speed limit signs can be installed at a low construction cost with little to no maintenance problems or cost; however, they rarely result in actual reductions in speed. These signs also have a tendency to be ignored, and are more subject to vandalism.

Vertical Elements Along Roadway

This option consists of adding a vertical architectural element to the sides of a two-lane highway within an urban area to give the appearance of narrowness. This technique, sometimes called "Gateway Treatment," also gives drivers a sense of "place," i.e., the feeling that they have entered an urban area with lower speed limits, on-street parking, conflicting pedestrian and bicycle movements, and increased highway access.

This treatment may improve pedestrian safety because it causes drivers to be more alert; however, it could also distract motorists' attention.

The most common and most aesthetically pleasing way of accomplishing this is with the use of trees in a landscaped strip along the highway's edge. Trees provide shade and improve the landscape. The subliminal effect of getting drivers to slow down when driving a stretch of highway treated in this way is best achieved when the trees consist of mature shade trees which provide a canopy over the road somewhat limiting peripheral vision; however, it takes many years for newly-planted trees to reach the maturity level needed to provide the desired effect. The disadvantages of using trees are that trees may conflict with utility lines and outdoor advertising, they may obscure traffic signs and limit sight distance, and trees with heavy leaves or fruit can create slippery conditions. Issues of maintenance including irrigation and drainage must be determined. Appropriate species must be selected so that roots do not disturb sidewalks.

Other vertical elements which could be used in place of trees are period street lamps, signs or even moving building lines closer to the highway edge to provide the illusion of a more narrow right-of-way. Care should be taken so as not to block drivers' sight distance.

This option is a popular improvement because of its aesthetic value, and because it does not compromise safety nor create negative noise impacts. This improvement option is estimated to have moderate to high construction costs; however, there is little to no maintenance required after construction.

Narrowing Lane Widths

Narrowing lane widths may slow traffic through the perceived higher risk of collision in narrower lanes. One study indicated no reduction in roadway capacity when changed from 12-foot-wide to 11-foot-wide lanes. This study noted a decrease in accidents; however, the reduction could not clearly be attributed to the lane modification. Another study of arterials and collectors suggests that for speeds of 30 mph, a 20-foot width is sufficient for a two-lane, two-way road.

Narrowing lane widths marginally shortens crossing distance and may increase pedestrian safety. This technique also has the effect of widening pedestrian space.

Significant narrowing is not feasible where through traffic volumes are close to road capacity. Lanes narrower than 11 feet on through, high volume streets may have higher accident rates. In addition, this technique may limit some truck movements depending on how narrow the streets are. There may also be a decrease in bicycle safety depending on how narrow the lanes are. Motorists may not wait, but attempt to move around a bicyclist even in narrow lanes. The presence of bike lanes might help although motorists might drive in bike lanes.

Narrowing lanes with the use of pavement markings can be accomplished at a low construction cost and little to no maintenance cost.

Bicycle Lanes

Bicycles should be accommodated on virtually all roadways. For most local streets, the traffic volume and speeds are low enough that bicycles and autos can safely share the same roadway. On collector streets and arterials, both the volume and speed of the automobile traffic is high enough that a designated space is needed for bicyclists. In urban areas where there are curbs, a six-foot bike lane is recommended for bicycles, and special care taken to secure safe bicycle passage through intersections. In rural areas without curbs and sidewalks, the typical recommended facility is a shoulder bikeway, where a six-foot standard paved shoulder is provided for bicycles. According to the Oregon Bicycle and Pedestrian Plan, the guideline for rural arterials with a design hour volume of less than 200 vpd is for a paved shoulder which is four feet wide.

Bicycle lanes also improve bicyclist safety and encourage more bicycle trips by improving the cycling experience by taking bike trips out of the general flow traffic lanes. Depending on the existing pavement width, bike lanes can be provided at a low construction cost simply by restriping an existing road (approximately $0.40 per linear foot). If a roadway has to be widened to provide a bike lane or a paved shoulder, it can be done at a relatively high construction cost (approximately $45 per linear foot for a facility five feet wide on both sides of the road, built to highway standards, with curbs and striping). After construction, little to no maintenance is required except for routine painting of pavement markings.

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