Milton-Freewater Transportation System Plan

June 1999

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	average annual daily trips
ADT	average daily trips
DEA	David Evans and Associates, Inc.
EA	Environmental Assessment
EIS	Environmental Impact Statement
GO	general obligation (funds)
HCS	Highway Capacity Hardware
ISTEA	Intermodal Surface Transportation Efficiency Act
LID	local improvement district
LOC	League of Oregon Cities
LOI	Level of Importance
LOS	level of service
LTGO	limited tax general obligation (funds)
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
MP	mile post
MUTCD	Manual of Uniform Traffic Control Devices
SDC	systems development charge
SPWF	Special Public Works Fund
STIP	State Transportation Improvement Plan
TAC	Transportation Advisory Committee
TEA-21	Transportation Equity Act for the 21st Century
TDM	transportation demand management
TSP	transportation systems plan
TPR	Transportation Planning Rule
UGB	urban growth boundary
v/c	volume to capacity ratio
vpd	vehicles per day

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CHAPTER ONE: INTRODUCTION

The Milton-Freewater 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 Transportation System Plan constitutes the transportation element of the City of Milton-Freewater's Comprehensive Plan and satisfies the requirements of the Oregon Transportation Planning Rule (TPR).

STUDY AREA

The Milton-Freewater Transportation System Plan study area includes the City of Milton-Freewater as well as the area within the City's urban growth boundary (UGB) and adjacent areas that are currently developing or that have a strong potential to develop within the 20-year planning period. The study area is shown on Figure 1-1. Roadways included in the Transportation System Plan fall under several jurisdictions: the City of Milton-Freewater, Umatilla County, and the State of Oregon.

Approximately 6,000 people live in the City of Milton-Freewater, located in northeastern Oregon. Milton-Freewater is a relatively self-contained community, but has close economic ties to the Washington city of Walla Walla, approximately 10 miles to the north. Milton-Freewater provides a moderate variety of residential, shopping, employment, and recreational opportunities within its UGB and the surrounding countryside. The area's economy is stable, with a relatively low unemployment rate. Agriculture is important in the local economy. Non-agricultural jobs are concentrated in the industrial/manufacturing sector, service sector, and retail sector.

Milton-Freewater, like many other smaller communities in Oregon, developed along the state highway serving the region. State Highway 11, which travels north-south through the center of Milton Freewater, carries nearly all traffic traveling between Pendleton and Walla Walla. There are some conflicts between through and local traffic, particularly at the north end of the UGB.

A zoning map showing the various existing and future land uses in the Milton-Freewater Transportation System Plan study area is shown on Figure 1-2. The land use development patterns have evolved since the early part of this century. Milton-Freewater has two established commercial districts, reflecting the historic towns of Milton and Freewater. Residential areas radiate out from the downtown. Outside the downtown, commercial development is located along the Highway 11 corridor within the City and extending north toward Walla Walla. The area east of Highway 11 at the southern boundary of the City has recently been the site of new light industrial construction in the form of a computer call service facility.

PLAN ORGANIZATION

The Milton-Freewater Transportation System Plan was developed through a series of technical analyses combined with systematic input and review by the City, the Transportation Advisory Committee (TAC), Management Team, and the public. Key elements of the process included:

- Involving the Milton-Freewater community (Chapter 1)
- Defining goals and objectives (Chapter 2)

- Reviewing existing plans and transportation conditions (Chapters 3 and 4)
- Developing population, employment and travel forecasts (Chapter 5)
- Developing and evaluating potential transportation system improvements (Chapter 6)
- 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 was an important part of developing the Milton-Freewater Transportation System Plan. The community outreach program included work by a project management team, a transportation advisory committee, and public meetings.

The project management team consisted of staff members from the City of Milton-Freewater, Umatilla County, and the Oregon Department of Transportation (ODOT). The team met a several times over the course of the project to review work products produced by the consultant team. The management team provided direction on technical tasks as the plan was being prepared.

The TAC was appointed to this project by the Milton-Freewater Mayor and City Council. The TAC included members of the Milton-Freewater City Council and Planning Commission, and business people from the Milton-Freewater area. The TAC was responsible for reviewing all work products, community outreach with Milton-Freewater residents, and providing policy direction to both the management and consultant teams. The TAC met several times during the course of preparing this plan, and some members attended the two public meetings and the City Council presentation.

Two open community meetings were held in Milton-Freewater on April 1, 1998, and August 19, 1998. The first meeting was held near the beginning of the planning process in a workshop format to solicit public input on transportation issues and problems to be addressed. The results of this meeting formed the basis for the transportation goal and objectives presented in Chapter 2. The second meeting was held towards the end of the process for community review and comments upon completion of the draft Transportation System Plan. On December 7, 1998, the Transportation System Plan was presented to the Milton-Freewater Planning Commission for review, comments, and recommendations. The Planning Commission recommended a revised draft plan to the City Council in April, 1999.

Goals and Objectives

Based on input from the City, the TAC, and the community, one overall goal and a set of objectives were defined for the Transportation System Plan. The goal and objectives were used to make decisions about various potential improvement projects. They are described in Chapter 2. The TSP goals and objectives were formulated by the TAC. The TAC specifically limited the number of goals and objectives to address issues and concerns important to Milton-Freewater. The TAC periodically reviewed the goals and objectives as the TSP was being prepared.

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

To begin the planning process, all applicable Milton-Freewater and Umatilla 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 Milton-Freewater 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 Chapter 3 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.

Future Transportation System Demands

The TPR requires the Transportation System Plan to address a 20-year forecasting period. In accordance with this, 20-year travel forecasts were developed based on projections of population and employment by different land use categories within the UGB. 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 initial evaluation was the "No-Build" option, which is the existing street system plus any currently committed street system improvements. Then, transportation demand management measures and potential transportation improvements were developed and analyzed. These improvements were developed with the help of the TAC, 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 Transportation System Plan 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 TPR. 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.

Capital Improvement Program and Funding Options

The capital improvement program was developed from the short-term improvements and the recommended street system plan, while the funding analysis examines options for financing these improvements. These elements are described in Chapter 8.

Recommended Policies and Ordinances

The consultant team provided the City of Milton-Freewater with a set of model comprehensive plan policies and zoning code ordinance amendments that were prepared for ODOT Region 5. City staff reviewed the models and directed the consultant team to amend specific comprehensive plan policies and zoning code ordinances. Based on the review by city staff and the Management Team, a final set of comprehensive plan policies and zoning code ordinance amendments are detailed in Chapter 9 of this plan. It is recommended that the City of Milton-Freewater adopt the policies and ordinance amendments concurrent with the adoption of the TSP.

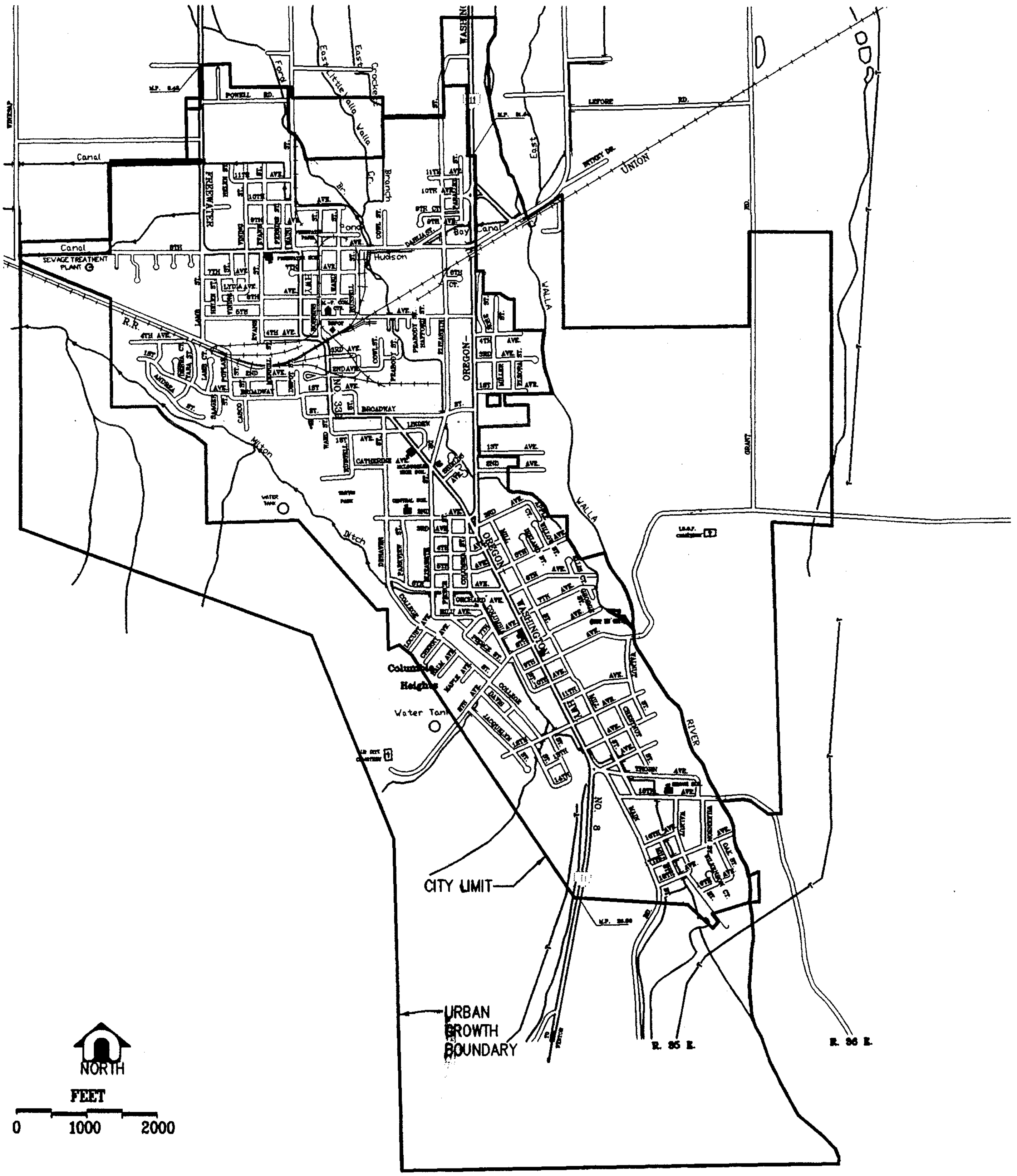

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FIGURE 1-1
STUDY AREA
MILTON - FREEWATER, OREGON

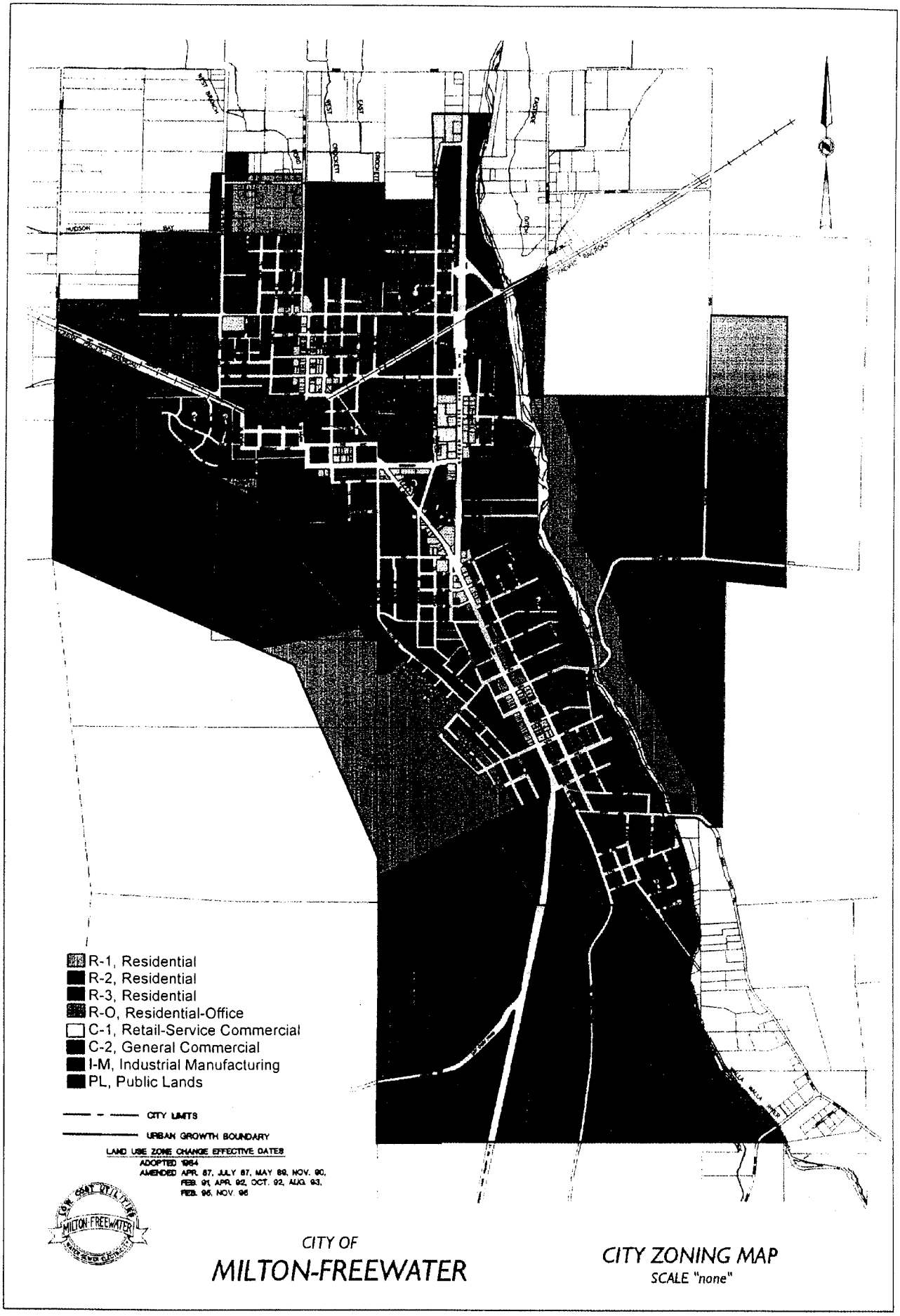


Figure 1-2. Zoning Map

CHAPTER TWO: GOALS AND OBJECTIVES

The purpose of the Transportation System Plan is to provide a guide for the City of Milton-Freewater to make sound decisions on transportation planning issues over the next 20 years. One of the initial steps in the planning process involved City staff, the Management Team, and the TAC reviewing existing City goals and objectives, including a review of existing City plans and reports.

The TAC select one overall goal and a number of supporting objectives to guide the preparation of the Milton-Freewater Transportation System Plan. The TAC chose the overall goal to address the broad transportation-related needs of the community. The objectives selected ensure that the plan conforms with the Milton-Freewater Comprehensive Plan and the TPR.

The goal and objectives were reviewed by the consultant, Management Team, TAC and the general public as project milestones were reached and technical work products produced.

OVERALL PROJECT GOAL

The City of Milton-Freewater will promote a balanced, well-integrated transportation system which provides safe, convenient and efficient access, and facilitates the movement of people and goods.

PROJECT OBJECTIVES

The preparation of the Milton-Freewater TSP is guided by the following project objectives:

- *Satisfies the Oregon Transportation Planning Rule.*
- *Involves participation by interested transportation user groups and the general public.*
- *Promotes coordination among the City of Milton-Freewater, Umatilla County, and ODOT.*
- *Considers all modes of transportation.*
- *Emphasizes pedestrian safety and access through adding sidewalks, upgrading existing pedestrian facilities to meet Americans with Disabilities Act requirements, improving intersections and pedestrian crossings, and calming traffic where appropriate.*
- *Improves the local traffic circulation pattern.*
- *Protects and enhances neighborhood livability.*
- *Identifies revenue sources for transportation projects.*

CHAPTER THREE: TRANSPORTATION SYSTEM INVENTORY

As part of the planning process, David Evans and Associates, Inc. (DEA) conducted an inventory of the existing transportation system in Milton-Freewater. 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 Milton-Freewater 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 Milton-Freewater, as well as those in Umatilla 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 existing roadway functional classification and jurisdiction.

State Highways

Discussion of the Milton-Freewater street system must include the state highways that traverse the planning area. Although Milton-Freewater has no direct control over the state highways, adjacent development and local traffic patterns are heavily influenced by the highways. Milton-Freewater is served by Oregon Highway 11 (Oregon-Washington Highway), and Freewater Highway. Highway 11 serves as the major route through the city connecting Milton-Freewater to other population centers in Umatilla County as well as Walla Walla, Washington.

The 1991 *Oregon Highway Plan* (OHP) classifies the state highway system into four levels of importance (LOI): Interstate, Statewide, Regional, and District. ODOT has established primary and secondary functions for each type of highway and objectives for managing the operations for each one.

OR Highway 11 is a highway of Statewide importance. According to the OHP, the primary function of a statewide highway is to "provide connections and links to larger urban areas, ports, and major recreation areas that are not directly served by interstate highways." A secondary function is to provide links and connections for intra-urban and intra-regional trips. The management objective for statewide highways is to provide for safe and efficient high-speed, continuous-flow operation in rural areas and high- to moderate-speed operations with limited interruptions of flow in urban and urbanizing areas.

Freewater Highway is a highway of District importance. According to the OHP, the primary function of a district highway is to "serve local traffic and land access." For highways of district significance, emphasis is placed on preserving safe and efficient higher speed through travel in rural areas, and moderate- to low-speed operations in urban or urbanizing areas with a moderate to high level of interruptions to flow. This means that design factors such as controlling access and providing passing lanes are of primary importance. The management objective is to provide for safe and efficient moderate to high-speed, continuous-flow operation in rural areas reflecting the surrounding environment, and moderate- to low-speed operation in urban and urbanizing areas with a moderate to high level of interruptions to flow.

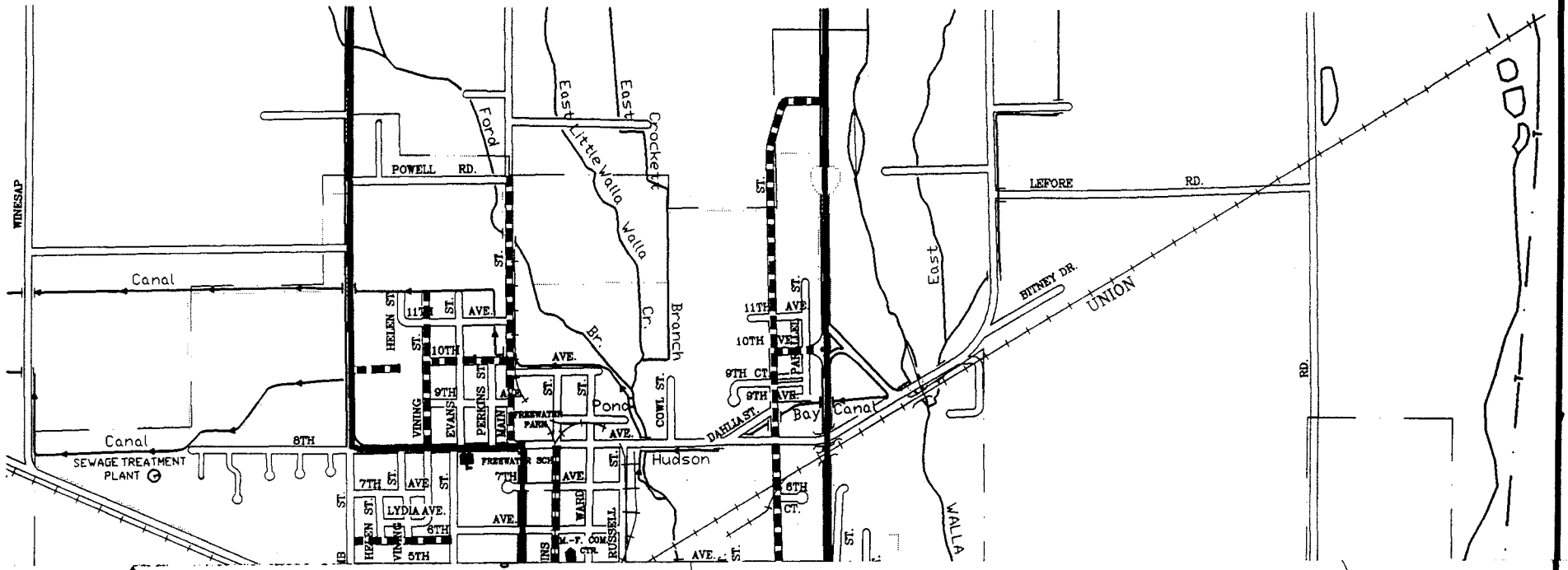
Highway 11

Highway 11 (Oregon-Washington Highway) is a highway of Statewide importance, which connects Milton-Freewater to numerous urban areas. The highway provides a high-speed link to Athena, Adams, Pendleton and US 395 and I-84 to the south, and to Walla Walla, Washington, to the north.

Highway 11 serves as the major north-south route through Milton-Freewater. The highway varies between three and five lanes within city limits. The posted speed limit varies between 25 and 50 mph within city limits. OR 11 is designated as a safety corridor between the Milton-Freewater city limits and the Oregon-Washington State Line.

In 1997, an ODOT study team and Corridor Management Team developed a Land Use and Transportation Plan for a section of the Highway 11 Corridor between Milton-Freewater and the Washington border. This plan addressed issues of connectivity, operations, and safety for a growing segment of the corridor and proposed improvements for that area.

Currently, ODOT is working with local teams to develop a Corridor Management Plan which will address issues along the entire length of the highway. This plan will create objectives for highway functioning and will identify, evaluate, and recommend actions for corridor transportation management, capital improvements, and service improvements. A major part of this plan will be an access management program which may affect Milton-Freewater's current access points to the highway.



function as collectors based on DEA's 1998 field reconnaissance.

LOCAL STREET

Sources:

1. Arterial Street Plan for the City of Milton-Freewater
2. 1989 Milton-Freewater Comprehensive Plan
3. 1998 field reconnaissance performed by David Evans and Associates, Inc.

CITY LIMIT

URBAN GROWTH BOUNDARY

NORTH

1" = 1300'

0 500 1000 1500

scale 1" = 1300' design

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FIGURE 3-1
ROADWAY FUNCTIONAL CLASSIFICATION
MILTON - FREEWATER, OREGON

Freewater Highway

Freewater Highway is of District importance. Beginning at the Oregon/Washington border, it extends through the communities of Ferndale, Sunnyside, and Milton-Freewater and continues south to the OR Highway 11 junction. Freewater Highway is primarily two lanes with some four-lane segments within the Milton-Freewater city limits. The speed limit along the rural residential segment of the highway is 40 mph. Within the Milton-Freewater city limits, traffic is subject to lower speeds varying between 20 and 25 mph.

Street Classification

Typically, streets are classified as either arterials, collectors, or local streets. The current comprehensive plan for the City of Milton-Freewater (1989) provides two functional classifications for the city's streets: city thoroughfare and city arterial, contradicting an earlier city roadway plan developed in 1972, entitled *Arterial Street Plan for the City of Milton-Freewater*, which followed a classification system using the more generally accepted arterial, collector, and local street designations. Based on field reconnaissance conducted by DEA in January 1998, roadways in Milton-Freewater were observed to function in a manner more closely associated with the 1972 Arterial Streets Plan, based on the classification of roadways as arterials, collectors, and local streets. Roadways currently classified under the 1989 Comprehensive Plan as city thoroughfares and city arterials were observed to function in a manner consistent with the generally more accepted classifications of arterials and collectors, respectively.

A comparison of existing and observed classifications are presented below. The classification system includes city, county, and state roadways.

Arterials (City Thoroughfares)

Arterials form the primary roadway network within and through a region. They provide a continuous road system which distributes traffic between cities, neighborhoods, and districts. Generally, arterials are high capacity roadways which carry high traffic volumes entering or leaving the city.

Roadways in Milton-Freewater currently performing the functions of an arterial, as described above, have been designated as city thoroughfares. The only roadway in Milton-Freewater currently classified as a city thoroughfare is Highway 11 (Oregon-Washington Highway). This roadway serves as the focus for much of the commercial development in the city. Additionally, field observations by DEA identified that the Freewater Highway also functions as an arterial (city thoroughfare) rather than as a collector (city arterial), as currently classified.

Collectors (City Arterials)

Collectors serve traffic within commercial, industrial, and residential neighborhood areas. They connect local neighborhoods or districts to the arterial network. Collectors help form part of the grid system; however, they are not intended to function as alternate routes to the arterial system.

Roadways in Milton-Freewater currently performing the functions of a collector, as described above, have been designated as city arterials. Eleven streets in Milton-Freewater have been classified as city arterials, including: Lamb Street (Freewater Highway north of 8th Avenue), Powell

Road, North Main Street, 8th Avenue, Hodgen Road, Broadway Avenue, Elizabeth Street (south of 8th Avenue), Dehaven Street, College Street (north of 8th Avenue), 9th Avenue/Cemetery Road, and 15th Avenue.

Field observations by DEA identified that the Freewater Highway functions more as an arterial (city thoroughfare) than as a collector (city arterial). Additionally, Powell Road functions more as a local street than as a collector (city arterial) while 5th Avenue and Elizabeth Street (north of 8th Avenue) were observed to function as collectors (city arterials) although not currently designated as such.

Local Streets

Local streets provide access to all parcels of land 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. Through traffic movements are discouraged on local streets.

The local streets in Milton-Freewater are comprised of all streets not classified as either arterials (city thoroughfares) or collectors (city arterials). Local streets in Milton-Freewater also form part of the grid system.

Street Layout

The majority of the Milton-Freewater streets are positioned in a grid pattern which typically extends three to five blocks east and west of Highway 11. Block sizes vary but are typically 300 to 400 feet square.

General Pavement Conditions

State Highways

ODOT's Pavement Unit surveys the State Highway System on an annual basis. Observed severity levels of certain distress types are used to determine a pavement condition rating score. These scores are used to stratify pavement segments into five condition categories: (1) Very Good, (2) Good, (3) Fair, (4) Poor, and (5) Very Poor. A brief definition of the pavement condition categories used by ODOT for both asphalt and Portland cement concrete pavements is provided below.

- **Very Good** – Asphalt pavements in this category are stable, display no cracking, patching or deformation, and provide excellent riding qualities. Nothing would improve the roadway at this time.

Concrete pavements in this category provide good ride quality, display original surface texture, and show no signs of faulting (vertical displacement of one slab in relation to another). Jointed reinforced pavements display no mid-slab cracks and continuously reinforced pavements may have tight transverse cracks with no evidence of spalling (or chipping away).

- **Good** – Asphalt pavements in this category are stable and may display minor cracking (generally hairline and hard to detect), minor patching, and possibly some minor deformation. These pavements appear dry or light colored, provide good ride quality and display rutting less than one inch deep.

- Concrete pavements in this category provide good ride quality. Original surface texture is worn in wheel tracks exposing coarse aggregate. Jointed reinforced pavements may display tight mid-slab transverse cracks and continuously reinforced pavements may show evidence of minor spalling. Pavements may have an occasional longitudinal crack but no faulting is evident.

- **Fair** – Asphalt pavements in this category are generally stable displaying minor areas of structural weakness. Cracking is easier to detect, patching is more evident (although not excessive), and deformation is more pronounced and easily noticed. Ride quality is good to acceptable.

Concrete pavements in this category provide good ride quality. Jointed reinforced pavements may display some spalling at cracks and joint edges with longitudinal cracks appearing at less than 20% of the joints. A few areas may require a minor level of repair. Continuously reinforced pavements may show evidence of spalling with longitudinal cracks appearing in the wheel paths on less than 20% of the rated section. Shoulder joints may show evidence of deterioration and loss of slab support and faulting may be evident.

- **Poor** – Asphalt pavements in this category are marked by areas of instability, structural deficiency, large crack patterns (alligatoring), heavy and numerous patches, and visible deformation. Ride quality ranges from acceptable to poor.

  Concrete pavements in this category may continue to provide acceptable ride quality. Both jointed and continually reinforced pavements display cracking patterns with longitudinal cracks connecting joints and transverse cracks occurring more frequently. Occasional punchout (or pothole) repair is evident. Some joints and cracks show loss of base support.

- **Very Poor** – Asphalt pavements in this category are in extremely deteriorated condition marked by numerous areas of instability and structural deficiency. Ride quality is unacceptable. Concrete pavements in this category display a rate of deterioration that is rapidly accelerating.

  According to the 1996 ODOT Pavement Condition Report, the section of Highway 11 through the Milton-Freewater urban area (MP 26.59 to MP 31.64) is in good condition. The section of the Freewater Highway from the northern city limits to North Main Street (MP 3.43 to MP 4.43) is in very good condition and the section from North Main Street to Highway 11 (MP 4.43 to MP 5.25) is in fair condition.

Other Roadways

The ODOT Pavements Unit published a 1994 report entitled, *Pavement Rating Workshop, Non-National Highway System.* This report thoroughly defines the characteristics that pavements must display to be categorized as Good, Fair, Poor and so on. The report also provides color photographs of roadways that display these characteristics, which aids in field investigation and rating of pavement condition. These established guidelines were employed by DEA in conducting a subjective evaluation of pavement condition for all collectors within Milton-Freewater.

An inventory of collectors (city arterials) was conducted in January 1998 by DEA. Most city arterials were observed to be in fair or better pavement condition.

Bridges

The Oregon Department of Transportation maintains an up to date inventory and appraisal of Oregon bridges. Part of this inventory involves the evaluation of three mutually exclusive elements of bridges. One element identifies which bridges are structurally deficient. This is determined based on the condition rating for the deck, superstructure, substructure, or culvert and retaining walls. It may also be based on the appraisal rating of the structural condition or waterway adequacy. Another element identifies which bridges are functionally obsolete. This element is determined based on the appraisal rating for the deck geometry, underclearances, approach roadway alignment, structural condition, or waterway adequacy. The third element summarizes the sufficiency ratings for all bridges. The sufficiency rating is a complex formula which takes into account four separate factors to obtain a numeric value rating the ability of a bridge to service demand. The scale ranges from 0 to 100 with higher ratings indicating optimal conditions and lower ratings indicating insufficiency. Bridges with ratings under 55 may be nearing a structurally deficient condition.

There are seven bridges within the City of Milton-Freewater listed on the state inventory. Three bridges are located along Oregon Highway 11 and are state-owned and maintained; another bridge along OR Highway 11 is owned and maintained by the Union Pacific Railroad. One bridge is located along the Freewater Highway and is owned and maintained by the state. The other two bridges are located on county roads within Milton-Freewater and are owned and maintained by Umatilla County.

As of August 1997, the ODOT bridge inventory information indicates that one of the two county bridges is functionally obsolete. This bridge (ODOT bridge No. 59C440) is located on county road number 564 (Cemetery Road) and crosses the Walla Walla River. No bridge improvements are scheduled under ODOT's 1998-2001 Statewide Transportation Improvement Program (STIP).

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 Milton-Freewater indicates that walking could be employed regularly 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.

Most of the major streets, city thoroughfares and city arterials in Milton-Freewater have a sidewalk on at least one side. However, sidewalks are generally in poor to fair condition and are generally not compliant with ADA design requirements. The Milton-Freewater pedestrian system inventory is shown in Figure 3-2.

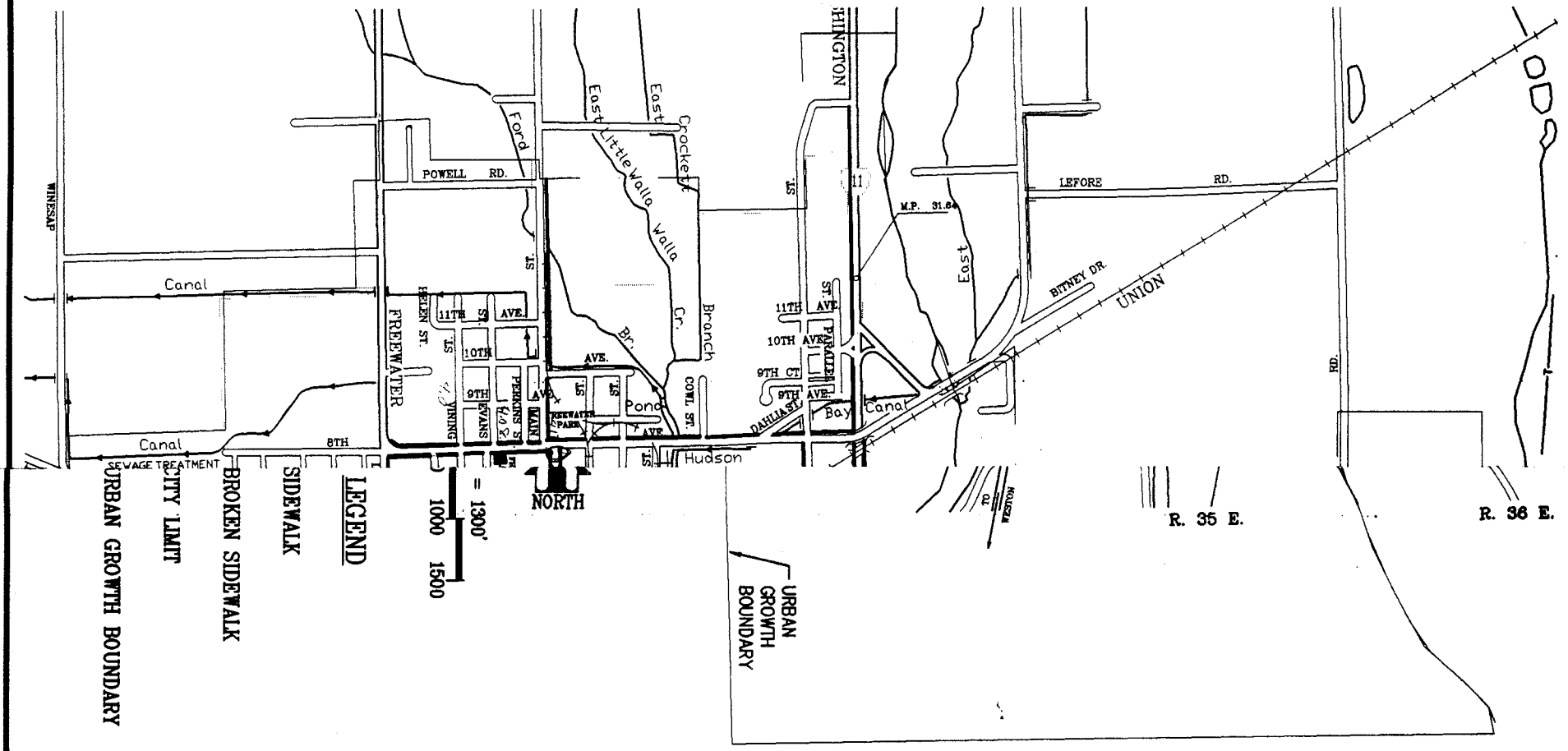

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FIGURE 3-2
PEDESTRIAN SYSTEM INVENTORY
MILTON - FREEWATER, OREGON

BIKEWAY SYSTEM

Like pedestrians, bicyclists are often overlooked when considering transportation facilities. Bicycles are not often considered as a serious mode of transportation. However, cycling is a very efficient mode of travel. Bicycles take up little space on the road or parked, do not contribute to air or noise pollution, and offer relatively higher speeds than walking. Because of the small size of Milton-Freewater, a cyclist can travel to any destination in town within a matter of minutes.

Bicycling should be encouraged to reduce the use of automobiles for short trips in order to reduce some of the negative aspects of urban growth. Noise, air pollution, and traffic congestion could be mitigated if more short trips were taken by bicycle or on foot. Typically, a short trip that would be taken by bicycle is around two miles; on foot, the distance commonly walked is around one half mile.

Milton-Freewater has no established bicycle facilitates such as bike lanes or multi-use paths. All bikeways are shared roadways requiring bicyclists to ride on-street with adjacent vehicle traffic.

On low volume roadways, such as many of the local streets, bicyclists and automobiles can safely use the roadway together. On higher volume roadways, particularly the arterial streets, safety for the bicyclists is an important issue. Another impediment to bicycle use is the lack of parking and storage facilities for bikes throughout the City of Milton-Freewater.

PUBLIC TRANSPORTATION

The only intercity bus service in Umatilla County is provided by Greyhound Bus Lines which provides service along Highway I-84, US 395, and Oregon 11 within Umatilla County. Greyhound has terminals located in Hermiston and Pendleton which connect these cities to each other and major population centers outside of the County, including Walla Walla, WA which is the closest terminal to Milton-Freewater. The Pendleton terminal has three daily departures southeast (with stops in La Grande, Boise and Salt Lake City); three daily departures west to Portland; and two daily departures north to Seattle via Walla Walla, Pasco, and Spokane daily. The line to Seattle could serve Milton-Freewater as it runs through the City along Oregon Highway 11.

Milton-Freewater has limited fixed-route transit service at this time. The City of Milton-Freewater and currently provide bus service between Milton-Freewater and Walla Walla, Washington on Mondays, Tuesdays, Thursdays, and Fridays. A loop with around 30 stops at services and shops is provided three times a day. Residents of the service area are not charged a fare. Non-resident one-way fare is 75 cents.

There is no dial-a-ride service for the elderly or the disabled in Milton-Freewater; however, taxi service is provided by Tim's Taxi which honors senior citizen and disabled discounted tickets which can be purchased at the City Hall. With the discounted tickets, senior citizens and the disabled pay $1.00 for any trip within the Milton-Freewater urban area. Otherwise, there is a flat rate charge of $4.00 for any trip within the urban area. Trips outside the urban area are provided at a cost of approximately $1.00 per mile. Tim's Taxi operates two cabs, Monday through Saturday, from 7:00 AM to midnight (later on Friday and Saturday nights). The discounted tickets for senior citizens and the disabled are honored until 6:00 PM.

RAIL SERVICE

Milton-Freewater has no passenger rail service. Until recently, AMTRAK service was available in Hermiston and Pendleton along the rail line which follows the Interstate 84 corridor from Portland to Boise, ID and points east. Amtrak is currently experiencing a funding crisis. As a result, passenger service between Portland and Denver, including service to cities within Umatilla county, was discontinued in May 1997. This line serves only freight traffic now.

Freight rail service is provided to Milton-Freewater by Blue Mountain Railroad Co. on a line which runs between Weston, OR and Wallula, WA, where there is an interchange with the Union Pacific Railroad. The service is used primarily to transport agricultural products. Service is sporadic, depending on the season, with a maximum of one train per day. Smith Frozen Foods, in Weston, and Garrett Packing (also a frozen food company) in Milton-Freewater are the two major shippers. Blue Mountain Railroad estimates that it runs 250 freight cars per year out of Weston and 100 freight cars per year out of Milton-Freewater, and that the railroad is able to meet the current need for freight rail service.

AIR SERVICE

Milton-Freewater does not have its own air service. However, there are airport facilities nearby. Walla Walla Airport is located in Walla Walla, WA, approximately 10 miles north of Milton-Freewater. Eastern Oregon Regional Airport is located in Pendleton, approximately 30 miles southwest of Milton-Freewater. Hermiston Municipal Airport is located in Hermiston, approximately 55 miles southwest of Milton-Freewater. Other small nearby airports include Oregon Sky Ranch and Kings Airport. These airports are small, private, uncontrolled airstrips mainly used for crop dusting operations.

Walla Walla Airport is owned and operated by the Port of Walla Walla. Located three miles from Walla Walla, it is a tower controlled airport with 25,000 annual enplanements. Passenger service includes ten scheduled flights per day to Seattle (five daily flights provided by Horizon Airlines and five daily flights provided by United Express). The airport has three runways varying in length from 6,450 feet to nearly 7,200 feet.

Eastern Oregon Regional Airport in Pendleton is a tower controlled airport with 40,600 annual enplanements. Passenger service includes 16 scheduled flights per day by Horizon Airlines, with flights to Portland and Seattle. The airfield is also home to 60 locally owned fixed-wing aircraft, 4 rotor, and 8 CH-47 Chinook helicopters with the Oregon Army Air Guard.

The City of Hermiston owns and operates a municipal airport. No commercial flights are available at the present time, but there is charter service available. The Hermiston Municipal Airport is located 1.5 miles from Hermiston and had 12,380 annual operations in 1995. The airport and has one runway which is 4,500 feet long. The airport is used by businesses such as Simplot, Gilroy foods, Les Schwab Tires, UPS, and other large organizations such as PGE, Bonneville Power, and the Army Corps of Engineers. There is an agricultural spray operation based at the airport, and local residents also use the airport for recreation. Because the Hermiston and Pendleton airports are governed by their own master plans and Walla Walla Airport is owned by a Washington State Port Authority, recommendations for improvements do not fall into the scope of this TSP. However, the airports are an essential part of the economy of the Milton-Freewater area.

PIPELINE SERVICE

Pipelines carry liquids and gases very efficiently. The use of pipelines can greatly reduce the number of trucks and rail cars carrying fluids such as natural gas, oil, and gasoline. Cascade Natural Gas provides natural gas service to residences and commercial establishments throughout the city as well as some areas outside the city. Their main pipeline runs north-south on the east side of Milton-Freewater and draws from a Northwest Pipeline just east of Mission. Northwest Pipeline, based in Pasco, Washington, is a long-distance (interstate) transporter of natural gas.

WATER TRANSPORTATION

Milton-Freewater has no water transportation services.

CHAPTER FOUR: 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 Milton-Freewater. Census data were examined to determine travel mode distributions.

TRAFFIC VOLUMES

ODOT annually collects historic traffic volume counts for Highway 11 and Freewater Highway.

Average Daily Traffic

The Average Daily Traffic (ADT) on Highway 11 and Freewater Highway are reported annually by ODOT at several locations in the Milton-Freewater area. The 1996 reported ADT volumes on Highway 11 ranged from 6,300 vehicles per day (vpd) at the south city limits to 13,500 vpd at the north city limits. ADT volumes at these locations have averaged approximately 2 to 4% average annual growth since 1990. Reported traffic volumes have decreased at a rate of approximately 3% per year since 1990 on this highway, except for the section in the immediate vicinity of Highway 11 which has seen a slight increase in traffic. ADT volumes on Freewater Highway ranged from 2,500 vpd at the north city limits to 6,200 vpd in the center of town; although, reported traffic volumes on this highway have been decreasing at a rate of 2 to 5% per year since 1990. The ADT volumes on the state highways in Milton-Freewater are shown in Figure 4-1.

ADTs represent average volumes for the year, however summer is the season when volumes are highest. The traffic volumes shown in Figure 4-1 and other volume figures are average volumes for the year. ADT data from the ODOT permanent traffic recorder station on Highway 11, just south of the Oregon-Washington State Line indicates that summer season volumes are approximately 15% higher than average volumes. It is reasonable that Highway 11 within the City of Milton-Freewater would experience summer increases in volume that are within this range.

Hourly Traffic Patterns

The intersections of Highway 11 with 8th and 9th Avenues were identified by local officials as being high-volume intersections, possibly requiring traffic signals. Detailed hourly traffic volumes, collected in 1995, were provided by ODOT Region 5. These counts were adjusted by 3% annually to account for background growth and to represent 1998 volumes. This resulted in PM peak hour traffic volumes of 1,000 and 1,075 vehicles respectively for the 9th and 8th Avenue intersections, between 4:00 and 5:00 PM. A representative of DEA conducted hourly turning movement counts in January 1998 at the one signalized intersection in Milton-Freewater: The intersection of Highway 11 (Oregon-Washington Highway) and Freewater Highway (Main Street). This count indicated a peak hour intersection traffic volume of 795 vehicles occurring between 3:15 PM and 4:15 PM The hourly turning volumes at the intersections which were counted in Milton-Freewater are shown in Figure 4-2.

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. Six standards have been established ranging from Level A where traffic flow is relatively free-flowing, to Level F, where the street system is totally saturated with traffic and movement is very difficult.

Arterial Streets

Traffic operations were determined along four segments of Highway 11. Segments were primarily determined by changes in the number of lanes (three-, four- and five-lane segments) and the posted speed (25-50 mph). Since all of the roadway segments were less than one-mile in length, the 1994 Highway Capacity Software (HCS) for urban arterials was not used. Rather, the 1994 HCS for multi-lane highways which relates LOS to vehicle density, measured as passenger cars per mile per lane, and maximum service flow rate, measured as passenger cars per hour per lane, was primarily employed. The software used is based on the 1994 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board.

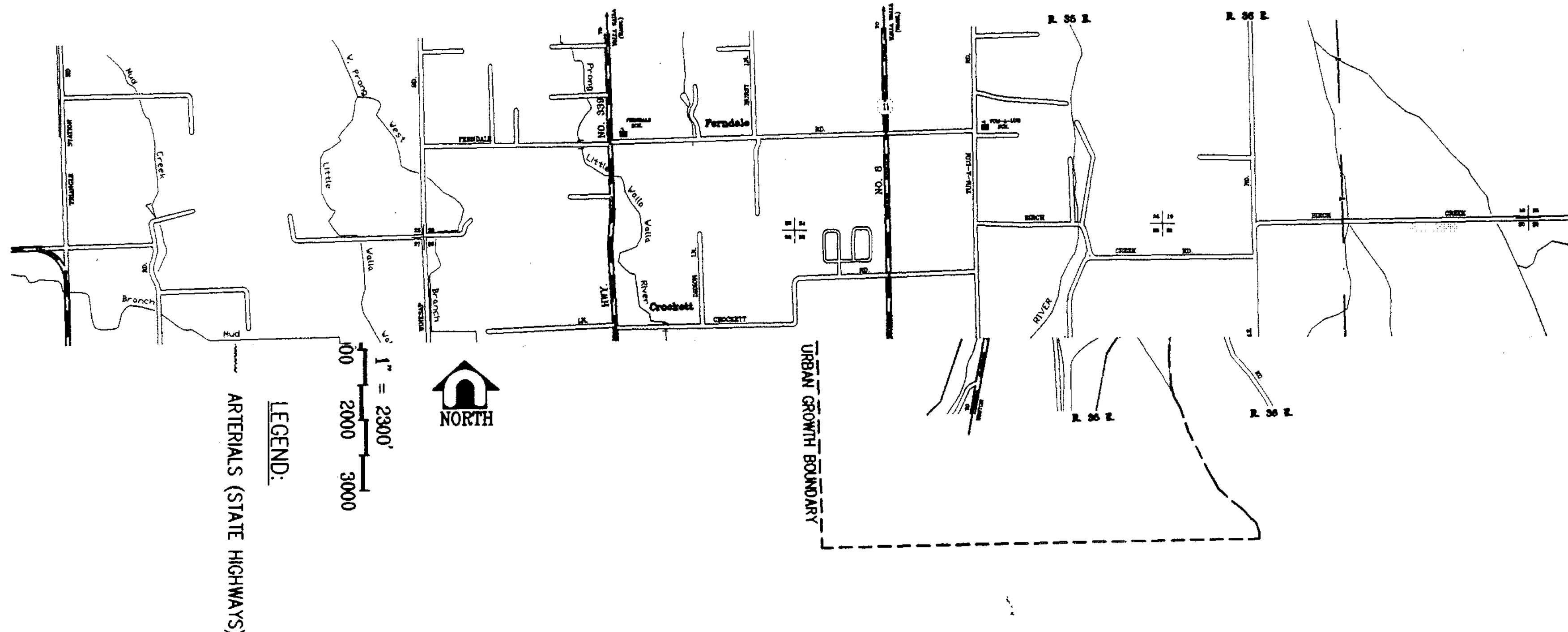
Table 4-1 presents the level of service criteria for multi-lane highways.

TABLE 4-1
LEVEL OF SERVICE CRITERIA FOR MULTI-LANE HIGHWAYS

Service Level	Typical Traffic Flow Conditions
A	Relatively free flow of traffic with some stops at signalized or stop sign controlled intersections. Maximum vehicle density ≤ 12 pc/mi/ln.
B	Stable traffic flow with slight delays at signalized or stop sign controlled intersections. Vehicle density > 12 but ≤ 20 pc/mi/ln.
C	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. Vehicle density > 20 but ≤ 28 pc/mi/ln.
D	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. Vehicle density > 28 but ≤ 34 pc/mi/ln.
E	Traffic flow would be unstable with congestion and intolerable delays to motorists. Vehicle density > 34 but ≤ 43 pc/mi/ln.
F	Traffic flow would be forced and jammed with stop and go operating conditions and intolerable delays. Vehicle density > 43 pc/mi/ln.

Source: Transportation Research Board, *Highway Capacity Manual*, Special Report 209. National Research Council, 1994.

Maximum service flow rates at each level of service are dependent on the free-flow speed. As noted above, sections of Highway 11 in Milton-Freewater have posted speeds ranging from 25 mph to 50 mph. Table 4-2 shows the maximum service flow rates for multi-lane highways with free-flow speeds of 50 mph, 35 mph and 25 mph.



scale 1"=2300'	design
date 3-20-98	drawn SMW
file O:\ODOT0242\11x2WAYV.DWG	

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FIGURE 4-1
1996 AVERAGE DAILY
TWO-WAY TRAFFIC VOLUMES
MILTON - FREEWATER, OREGON

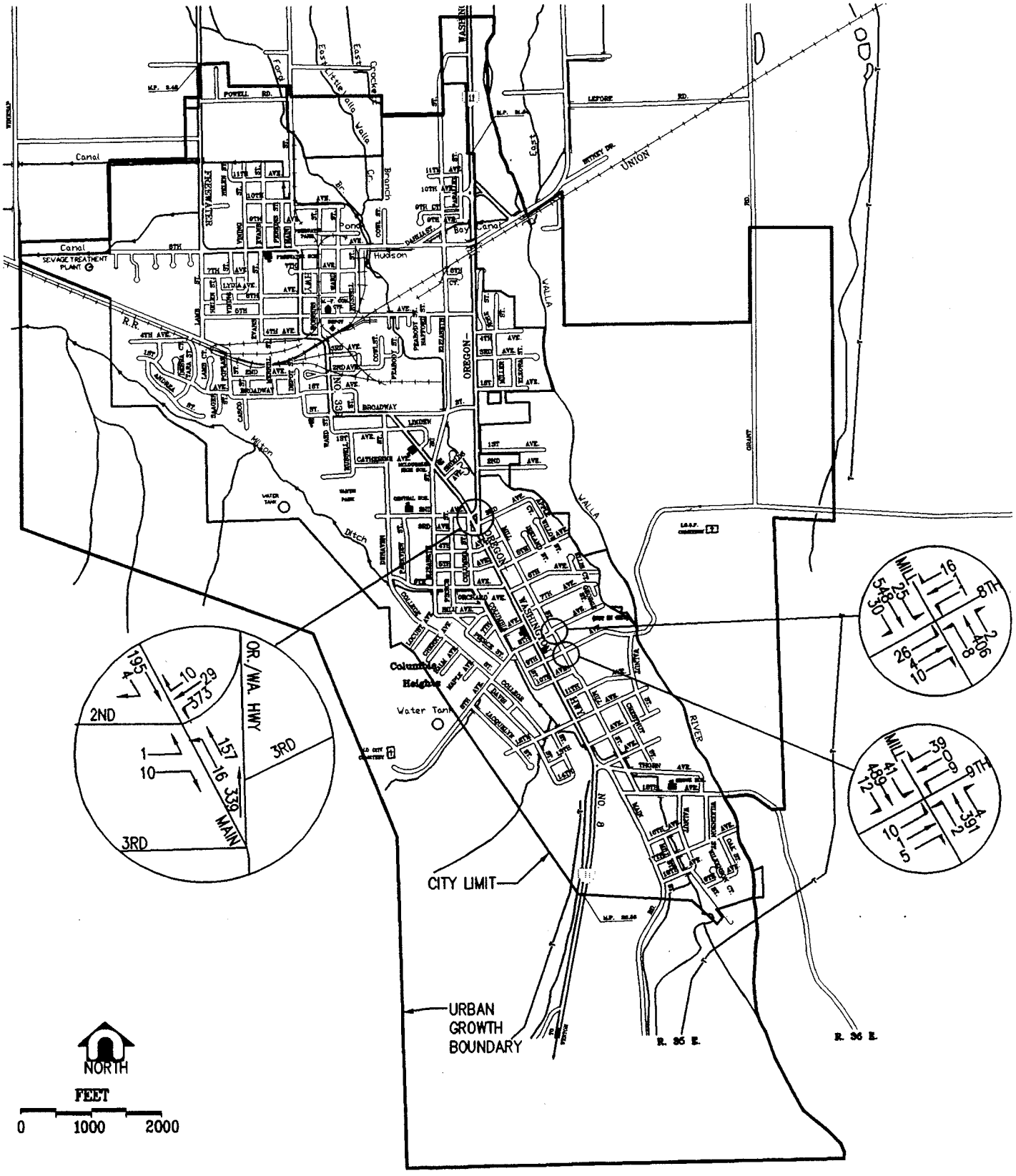

FIGURE 4-2
1998 P.M. PEAK HOUR
TURNING MOVEMENT VOLUMES
MILTON – FREEWATER, OREGON

scale 1" = 2000' design
date 3-19-98 drawn SMW
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TABLE 4-2
LEVEL OF SERVICE CRITERIA FOR MULTI-LANE HIGHWAYS

	Maximum Service Flow Rate (passenger cars per hour per lane)		
Level of Service	**50 mph**	**35 mph**	**25 mph**
A	600	400	300
B	1,000	700	500
C	1,400	950	700
D	1,670	1,200	825
E	2,000	1,550	1,100

The OHP establishes operating LOS standards for the state highway system. Highways of statewide importance, such as Highway 11, should operate at LOS C or better in urban and urbanizing areas. Highways of district importance, such as the Freewater Highway, should operate at LOS D or better in urban and urbanizing areas.

Southbound Highway 11

The traffic signal at the intersection of Highway 11 and Main Street was assumed to influence southbound traffic operations from the signal to a point approximately ½ mile north. The level of service for this segment was determined using the software package SIGCAP for signalized intersections. It was assumed that the calculated southbound level of service at the signal would reasonably represent southbound level of service within ½ mile upstream of the signal along Highway 11.

North of this segment the posted speed is 35 mph and traffic is negligibly influenced by the signal. Further north, the posted speed increases to 50 mph. Therefore, on the five-lane, 35 mph and 50 mph segments, level of service calculations were based on the HCS for multi-lane highways. The analysis was based on hourly traffic volumes, where available. Where hourly traffic volumes were not available, the peak hour volumes were estimated assuming a peak hour two-way traffic volume of 10% of the ADT and a southbound directional split of 60%, based on hourly counts on other sections of the highway.

The level of service for southbound traffic on Highway 11, south of the traffic signal at Main Street, is also based on the HCS for multi-lane highways. South of the traffic signal on Highway 11 the posted speed is 25 mph.

Under the above assumptions, during the PM peak hour, the three-lane segment of Highway 11 operates at LOS A, the four-lane segment operates at LOS C, the five-lane, 35 mph segment operates at LOS A, and the five-lane, 50 mph segment operates at LOS A. The PM peak hour level of service for these segments is shown in Table 4-2.

Northbound Highway 11

It was assumed, and verified by DEA during peak hour field investigation, that the northbound travel direction is not influenced by the traffic signal at Highway 11 and Main Street since vehicles utilize a free right-turn lane in advance of the signal. Therefore, the 1994 HCS for multi-lane highways was employed along all northbound segments except the southern three-lane segment where only one northbound lane operates. Since the HCS for multi-lane highways will not consider segments with less than two lanes, and the HCS for rural two-lane highways will not consider segments with posted speeds below 50 mph, a manual technique was employed. For this segment, the peak hour volume was estimated at 250 vehicles per hour (vph). This volume was determined assuming a peak hour two-way traffic volume of 10% of the ADT and a northbound directional split of 40 percent, based on hourly counts on other sections of the highway. The 250 vph flow rate was compared with the maximum service flow rates shown in Table 4-2, and found to correspond to LOS A.

On the four-lane, 25 mph segment, the five-lane, 35 mph segment, and the five-lane, 50 mph segment, level of service calculations were based on the HCS for multi-lane highways. The analysis was based on hourly traffic volumes, where available. Where hourly traffic volumes were not available, the peak hour volumes were estimated assuming a peak hour two-way traffic volume of 10% of the ADT and a northbound directional split of 40 percent, based on hourly counts on other sections of the highway.

Under the above assumptions, during the PM peak hour, the three-lane segment of Highway 11 operates at LOS A, the four-lane segment operates at LOS B, the five-lane, 35 mph segment operates at LOS A, and the five-lane, 50 mph segment operates at LOS A.

The PM peak hour level of service for these segments is also shown in Table 4-3.

TABLE 4-3

SUMMARY OF PM PEAK HOUR OPERATIONS ON OREGON HIGHWAY 11

Segment Location	One-way Pk. Hr. Vol.	No. of Lanes	Direction	Posted Speed	1998 LOS
South city limits to 14th St.	250	1	Northbound	25	A
(three-lane segment)	380	2	Southbound	25	A
14th St. to Hwy 11/Main St. Intersection	415	2	Northbound	25	B
(four-lane segment)	600	2	Southbound	25	C
Hwy 11/Main St. Intersection to MP 31.29	390	2	Northbound	35	A
(five-lane segment)	580	2	Southbound	35	A
MP 31.29 to Sunnyside Umapine Hwy	540	2	Northbound	50	A
(five-lane segment)	810	2	Southbound	50	A

Signalized Intersection Operations

Signalized peak hour intersection analyses were performed at the one signalized intersection in Milton-Freewater: the intersection of Highway 11 (Oregon-Washington Highway) and Freewater Highway (Main Street), using the software package SIGCAP for signalized intersections. SIGCAP

level of service standards for a metro area of population 20,000 or less are correlated with intersection saturation value as outlined in Table 4-4.

TABLE 4-4
SIGNALIZED INTERSECTION LOS STANDARDS

Level of Service (LOS)	Saturation Value
A	0.00 - 0.48
B	0.49 - 0.59
C	0.60 - 0.69
C-D	0.70 - 0.73
D	0.74 - 0.83
D-E	0.84 - 0.87
E	0.88 - 0.97
E-F	0.98 - 1.01
F	1.02+

Source: SIGCAP User's Guide, 1987

In general, the intersection operates very well, at LOS B. All movements on the northbound, eastbound, and southbound approaches operate at LOS A. In addition, the westbound through and right turn movements also operate at LOS A. Only the westbound left turn operates at LOS B. The PM peak hour level of service for this intersection is shown in Table 4-5.

TABLE 4-5
SUMMARY OF PM PEAK HOUR OPERATIONS AT SIGNALIZED INTERSECTIONS

Intersection Location	Direction	Movement	Saturation Value	1998 LOS
Highway 11 and Main Street	**Overall**		**0.51**	**B**
	Northbound	Left, Through	0.42, 0.42	A, A
	Southbound	Through, Right	0.41, 0.14	A, A
	Eastbound	Left, Right	0.16, 0.16	A, A
	Westbound	Left, Through, Right	0.51, 0.15, 0.15	B, A, A

Unsignalized Intersection Operations

The traffic operation was determined at several unsignalized intersections along Highway 11 using the 1985 Highway Capacity software for unsignalized intersections. This software is based on the 1985 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. Analysis of unsignalized intersections is based on traffic volumes on both the major street and side street approaches as well as the distribution of gaps in the major street traffic stream. The level of service criteria for unsignalized intersections is shown in Table 4-6.

TABLE 4-6
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Service Level	Typical Traffic Flow Conditions
A	Reserve capacity ≥ 400 passenger cars per hour (PCPH) with little or no delay.
B	Reserve capacity of 300 to 399 PCPH with short traffic delays.
C	Reserve capacity of 200 to 299 PCPH with average traffic delays.
D	Reserve capacity of 100 to 199 PCPH with long traffic delays.
E	Reserve capacity of 0 to 99 PCPH with very long traffic delays.
F	Demand volume exceeds lane capacity; extreme delays with queuing which may cause severe congestion affecting other traffic movements. Usually warrants intersection improvement.

Source: Transportation Research Board, *Highway Capacity Manual, Special Report 209.* National Research Council, 1985.

The traffic operations were analyzed for the intersections of Highway 11 with 8th and 9th Avenues using the 1985 Highway Capacity Software for unsignalized intersections. This software is based on the 1985 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. These intersections were chosen for analysis because they were identified by local officials as being high-volume intersections, possibly requiring traffic signals. Detailed hourly traffic volumes, collected in 1995, were provided by ODOT Region 5. An average annual growth rate of 3% per year, based on historic trends, was applied to the 1995 counts to represent current (1998) conditions in the capacity analysis.

In general, both unsignalized intersections operate well, at LOS A, except for the following approaches: eastbound and westbound left-turns operate at LOS D at both intersections and eastbound and westbound through movements operate at LOS C and D respectively for the 9th and 8th Street intersections. The traffic volumes served by these movements are low, in the range of one to 26 vehicles during the PM peak hour, and the lower than expected level of service is due more to high highway volumes than high side street volumes. The highway operates at LOS A at both intersections. The level of service for each unsignalized intersection is shown in Table 4-7.

TABLE 4-7
SUMMARY OF OPERATIONS AT UNSIGNALIZED INTERSECTIONS

Intersection Location	Direction	Movement	1998 LOS
Highway 11 and 8th Avenue	Northbound	Left	A
	Southbound	Left	A
	Eastbound	Left, Through, Right	D, D, A
	Westbound	Left, Through, Right	D, D, A
Highway 11 and 9th Avenue	Northbound	Left	A
	Southbound	Left	A
	Eastbound	Left, Through, Right	D, C, A
	Westbound	Left, Through, Right	D, C, A

Note: The level of service is not shown for all movements of the unsignalized intersections.

In addition, ODOT Region 5 conducted a traffic signal investigation at both of these intersections in 1996 and concluded that neither intersection met the warrants for installation of a traffic signal. Traffic volumes on the main highway are high enough to warrant a signal, but the side street traffic volume and pedestrian use are not high enough to justify the interruption of the main line traffic.

TRANSPORTATION DEMAND MANAGEMENT MEASURES

Transportation Demand Management (TDM) measures consist of efforts taken to reduce the demand on an area's transportation system. TDM measures include such things as alternative work schedules, carpooling, and telecommuting.

Currently, there are no TDM measures in effect in Milton-Freewater; however, a carpool program to Walla Walla, WA may be feasible. Roughly ten years ago, Key Technology (a high-tech food processing plant) relocated from Milton-Freewater to Walla Walla. The plant employs several hundred people, many of whom continue to live in Milton-Freewater and could participate in a carpool program from Milton-Freewater to the plant.

This section briefly describes two elements that may aid transportation demand management measures: 1) distribution of departure time to work and 2) distribution of travel modes.

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 4-8). Approximately 24% of the total employees (those not working at home) depart for work between 7:00 and 8:00 AM. Another 35% depart in either the hour before or the hour after the peak. Therefore, nearly 59% of all morning commute trips occur between 6:00 and 9:00 AM.

TABLE 4-8
DEPARTURE TO WORK

	1990 Census	
Departure Time	**Trips**	**Percent**
12:00 AM to 4:59 AM	69	3
5:00 AM to 5:59 AM	326	14
6:00 AM to 6:59 AM	497	21
7:00 AM to 7:59 AM	564	24
8:00 AM to 8:59 AM	323	14
9:00 AM to 9:59 AM	110	5
10:00 AM to 10:59 AM	53	2
11:00 AM to 11:59 AM	60	2
12:00 PM to 3:59 PM	177	8
4:00 PM to 11:59 PM	160	7
Total	**2,339**	**100%**

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 PM which, in many cases, corresponds with the peak hour of measured traffic volumes.

TRAVEL MODE DISTRIBUTION

Although the automobile is the primary mode of travel for most residents in Milton-Freewater, some other modes are used as well. Modal split data is not available for all types of trips. The 1990 Census statistics that were reported for journey to work trips are shown in Table 4-9 and reflect the predominant use of the automobile in this area.

In 1990, approximately 92% of all trips to work were in a private vehicle (auto, van, or truck). Trips in single-occupancy vehicles made-up nearly 74% of these trips, and 2-person carpooling accounted for 11%.

The 1990 census data indicated that less than 1% of all trips to work were made by bicycles (see Table 4-9). Since the data do not include trips to school or other non-work activities, higher bicycle usage may occur in Milton-Freewater. None of the City of Milton-Freewater roadways include dedicated bicycle lanes. Dedicated bicycle lanes can encourage bicycle commuting, along with other facilities, such as bicycle parking, showers, and locker facilities.

Pedestrian activity was also relatively low (5% of trips to work) in 1990. Statewide, 4.2% of trips to work were made on foot. Again, the census data only report trips to work; trips to school or other non-work activities are not included.

TABLE 4-9
JOURNEY TO WORK TRIPS

	1990 Census	
Trip Type	**Trips**	**Percent**
Private Vehicle	2,159	92.3
Drove Alone	*1,593*	*73.8*
Carpooled	*566*	*26.2*
Public Transportation	30	1.3
Motorcycle	12	0.5
Bicycle	7	0.3
Walk	125	5.3
Other	6	0.3
Total	**2,339**	**100.0%**

Source: US Bureau of Census.

COLLISION ANALYSIS

ODOT collects detailed collision information on an annual basis along Highway 11 and Freewater Highway within the Milton-Freewater city limits. The collision information data show overall collision rates for the routes and locations. The collision rate for a stretch of roadway is typically calculated as the number of collisions per million vehicle miles traveled along that segment of roadway.

Historic

Table 4-10 shows the collision rates for Highway 11 and Freewater Highway in Milton-Freewater urban area as well as the Oregon statewide average for urban non-freeway primary and secondary state highways from January 1, 1994 to December 31, 1996. The collision rates for both highways during the three years considered are substantially lower than the statewide average for similar highways indicating that these segments do not have any significant safety problems.

TABLE 4-10
HISTORIC COLLISION RATES FOR STATE HIGHWAYS IN MILTON-FREEWATER

Highway	1996	1995	1994
OR Highway 11 (Primary Highway)			
South city limits to Freewater Hwy Jct.	3.18	1.47	1.22
Freewater Hwy Jct. to north city limits	0.99	1.00	0.67
Freewater Highway (Secondary Highway)			
North city limits to Hwy 11 Jct.	2.15	1.44	1.80
Average for all Urban Non-freeway Primary/Secondary State Highways	**3.63/3.10**	**3.98/3.27**	**3.45/2.79**

Source: Oregon Department of Transportation Accident Rate Tables.

Table 4-11 contains detailed collision information on Highway 11 and Freewater Highway in Milton-Freewater from January 1, 1994 to December 31, 1996. It shows the number of fatalities and injuries, property damage only collisions, the total number of collisions, and the overall collision frequencies and rates for the segments of these roadways in Milton-Freewater.

TABLE 4-11

HIGHWAY COLLISION SUMMARIES IN MILTON-FREEWATER (JANUARY 1, 1994 TO DECEMBER 31, 1996)

Location	Fatalities	Injuries	Property Damage Only	Total Collisions	Collision Frequency (acc/mi/yr)	Collision Rate (acc/mvm)
OR Highway 11						
Milton-Freewater urban area (MP 26.59 to MP 31.64)	0	20	20	35	2.31	0.54
Freewater Highway						
Milton-Freewater urban area (MP 3.43 to MP 5.25)	0	7	9	15	2.75	1.80

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

Highway 11

A total of 35 collisions occurred along Highway 11 during the three-year period considered, resulting in no fatalities and 20 injuries. Twenty-two of the collisions occurred at intersections, 26 occurred during daylight hours, and seven occurred on wet or icy pavement. The collisions were scattered along the roadway segments and overall, there were no definitive patterns in the collision locations or types. Only one location experienced five or more collisions during the three-year period. The intersection of Main Street (Highway 11) and 9th Avenue experienced six collisions during the period. Of the six collisions, five were turning-related and one was rear-end related. The driver error cited in all of the turning collisions was failure to properly yield the right-of-way. There is no evidence to suggest that specific intersection operations (signing, striping, etc.) were a contributing factor in any of the collisions. The computed three-year collision rate along Highway 11 within the city limits was 0.54; substantially below the statewide average for similar highways suggesting that this highway segment does not have any significant safety problems.

Freewater Highway

A total of 15 collisions occurred along the Freewater Highway during the three-year period considered, resulting in no fatalities and seven injuries. Seven of the collisions occurred at intersections, 14 occurred during daylight hours, and two occurred on wet or icy pavement. The collisions were scattered along the roadway segments and overall, there were no definitive patterns in the collision locations or types. The intersection of Broadway and Russell Streets experienced two collisions during the three-year period and was the only location to experience two or more collisions. The computed three-year collision rate along the Freewater Highway within the city limits was 1.42; substantially below the statewide average for similar highways suggesting that this highway segment does not have any significant safety problems.

CHAPTER FIVE: TRAVEL FORECASTS

The traffic volume forecasts for Milton-Freewater are based on historic growth of the state highway system, historic population growth, and projected population growth. Forecasts were only prepared for the state highway system in the city, since the volumes on these roadways are much higher than on any of the city streets.

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 forecast was developed to determine future transportation needs. An employment forecast was developed as part of the Sykes Traffic Impact Study (included in the Appendix) and will be further expanded during the city's periodic review as part of the buildable commercial and industrial lands inventory.

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.

Population projections in Umatilla 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 Umatilla County include employment opportunities, available land area for development, and community efforts to manage growth.

Both historic and projected population for Umatilla County and Milton-Freewater are summarized in Table 5-1.

TABLE 5-1
UMATILLA COUNTY POPULATION TRENDS

	1970[1]	1980[1]	1990[1]	1996[2] Estimate	2017[3] Projected
Umatilla County	44,923	58,855	59,249	65,500	80,073
Milton-Freewater	4,105	5,086	5,533	6,055	8,300

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 Growth

The population of Umatilla County has grown since the 1970s, with significantly slower growth in the 1980s, reflecting a general slowdown in the state's economy. Estimated at 65,500 in 1996, the population of Umatilla County has grown relatively rapidly since the 1990 Census, with an average annual growth rate of 1.7 percent. Most of the jurisdictions in Umatilla County have grown at a healthy rate, comparable to the annual growth rate of 1.7% for the county overall. The smaller jurisdictions of Adams and Helix have grown at a slightly faster rate, starting from the smaller popu-

lation bases of 223 (Adams) and 150 (Helix) in 1990. Milton-Freewater has grown at the slightly slower rate of 1.5% since 1990.

Projected Growth

The State Office of Economic Analysis prepared long-term population projections by county. Based on these projections, preliminary population forecasts were developed in five-year increments. Overall, Umatilla County is expected to experience healthy rates of population growth, averaging nearly 1% annually over the planning horizon. The population of Milton-Freewater is expected to grow at a relatively rapid and steady rate of 1.5% per year through the 20-year planning horizon.

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 Milton-Freewater roadway system. Historic data are only available for the state highway system in Milton-Freewater; however, these roadways carry far more traffic than any other roads in the city. ODOT publishes traffic count data for the state highways (rural and urban sections) every year at the same locations. Data existing for Milton-Freewater include seven locations along Highway 11 (Oregon-Washington Highway) and nine locations along the Freewater in Milton-Freewater.

Historical growth trends along Highway 11 and the Freewater Highway in and around Milton-Freewater were established using the average annual daily traffic (AADT) volume information presented in the ODOT Traffic Volume Tables for the years 1976 through 1996. The AADT volumes were obtained for each of these years at selected locations along the highways in Milton-Freewater. Using a linear regression analysis of the average AADT volumes between 1976 and 1996, 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 1976-1996	Total Growth 1976-1996
OR Highway 11		
Urban section- south city limits	1.58%	37.0%
Urban section- 0.01 miles south of NE 5th Ave.	0.60%	12.7%
Urban section- north city limits	2.72%	70.9%
Freewater Highway		
Urban section- north city limits	-0.74%	-13.8%
Urban section- 0.01 miles west of N. Main Street	0.38%	7.9%
Urban section- 0.01 miles north of Broadway Street	0.43%	8.9%

Source: ODOT 1976-1996 Transportation Volume Tables; information compiled by DEA, Inc.

Based on traffic volumes from ODOT's data over the 20-year period from 1976 to 1996, the average annual growth rate on Highway 11 in Milton-Freewater has ranged from 0.6% to approximately 2.7% per year. On the rural section of the highway south of Milton-Freewater, traffic has been growing at a rate of approximately 1.6% per year. North of Milton-Freewater, traffic has been growing at a rate of nearly 2.5% per year. The largest increases in the number of trips over the 20-year period took place at the same locations experiencing the highest growth.

The average annual growth rate on the Freewater Highway in Milton-Freewater has ranged from approximately -0.7% to 0.4% per year. Average annual growth rates (either positive or negative) of less than 1% are within the acceptable margin of error of the data collection and are generally indicative of no material change in the average daily traffic volumes. In the case of the Freewater Highway, with an average daily traffic volume of 2,500 vehicles per day, the year-to-year variation of less than 1 percent represents fewer than 25 vehicles per day. The 20-year history of no growth on the Freewater Highway may be due to a slow down in the state's economy during the 1980's and few changes in land use along the corridor.

On the rural section of the highway north of Milton-Freewater, traffic has been growing at a rate of approximately 1.5% per year. Traffic volumes at the north city limits experienced minor negative growth over the 20-year period considered.

In most cases, traffic growth on Highway 11 within Milton-Freewater has exceeded population growth in the city itself, which has averaged 1.5% per year over the previous 20-year period from 1976 to 1996. This relationship reflects the modern trend toward an increase in per capita vehicle miles traveled. Also, some of the traffic on Highway 11 in Milton-Freewater is through traffic (with neither an origin nor a destination in the city), whose growth is not directly determined by the population and employment growth in the study area.

Forecasting Methodology

Traffic forecasts were prepared using a Level 2 - Cumulative Analysis[1] which, in addition to trending historical growth patterns, accounts for traffic generated from planned developments. This type of analysis is appropriate for cities with populations between 2,000 and 10,000. Future "background" traffic growth rates in Milton-Freewater are expected to closely follow historic rates. That is, the growth of through trips and trips generated by buildout of vacant land based on zoning and land use densities is expected follow historic rates. In addition to this background traffic growth, one major development is planned in Milton-Freewater: a 42,700 square foot customer call center for Sykes Enterprises, Inc. which would employ 400 people.

On the Freewater Highway, the linear regression analysis of historic traffic over 20 years produced a negative trendline. Rather than continue that negative trend into the future, a very nominal growth rate of 0.5% year (resulting in a total of 12% growth over 22 years) was applied to the that highway segment.

The proposed site of the Sykes development is located outside the city limits, but within the Milton-Freewater urban growth boundary, on the east side of Highway 11. The site was previously used as

[1] Transportation System Planning Guidelines, Oregon Department of Transportation, August 1995.

a farm, is currently vacant, and is zoned Business Park. The project is expected to generate approximately 1,770 trips per day. Two-thirds of the daily trips are expected to travel on Highway 11 between the site and points north, with origins and destinations either in Milton-Freewater or to the north (most likely Walla Walla). The resulting increase in traffic on Highway 11 at the south city limits would be approximately 1,185 daily trips.

The forecasts of background traffic for this section of highway, which were based on historic growth rates, show an increase of 2,595 daily trips on this section of highway. It was assumed for this study that the background traffic forecasts would account for the growth of through trips and trips generated by buildout of vacant land based on historic development patterns, but would not account for the traffic generated by the arrival of a major high-tech employer such as Sykes Enterprises. Traffic generated by this one project accounts for nearly half of the traffic growth expected on this section of highway over the next 20 years if historic growth patterns continue. For this reason, it was assumed that projecting historic trend lines would not account for the traffic generated by this project. Therefore a cumulative analysis was used.

Future Traffic Volumes

The background growth rates on Highway 11 at the north and south city limits are expected to be approximately 2.6% and 1.6% annually, respectively. This would result in overall background growth of nearly 76% and 42%, respectively, by the year 2018. In addition to this background traffic growth, the development of the Sykes project will add approximately 1,185 daily trips to Highway 11 at the south city limits and approximately 595 daily trips to the highway at the north city limits. This results in overall growth of 80% and 60%, respectively, by the year 2018 using a cumulative growth analysis.

The Freewater Highway is expected to experience growth rates of 0.5 and nearly 2.7% per year, respectively, over the same period, resulting in total growth of 12 and 79 percent, respectively. The forecast future traffic volumes and total growth from 1996 to 2018 are shown in Table 5-3.

TABLE 5-3
FORECAST TRAFFIC VOLUMES AND TOTAL GROWTH ON STATE HIGHWAYS

Location	1996 ADT (vehicles/day)	2018 ADT (vehicles/day)	Total Growth 1996-2018
OR Highway 11			
Urban section- south city limits	6,300	10,080	60%
Urban section- 0.01 miles south of NE 5th Ave.	8,900	11,040	24%
Urban section- north city limits	13,500	24,340	80%
Freewater Highway			
Urban section- north city limits	2,500	2,805	12%
Urban section- 0.01 miles west of N. Main Street	4,100	4,595	12%
Urban section- 0.01 miles north of Broadway Street	6,100	6,840	12%

HIGHWAY SYSTEM CAPACITY

Arterial Streets

Future year 2018 arterial traffic operations were determined in the same manner, and along the same four segments of Highway 11 for which the existing conditions were analyzed in Chapter 4. As in the existing condition analysis, the 1994 Highway Capacity software for multi-lane highways was primarily employed. Tables 4-1 and 4-2 presented the LOS criteria for multi-lane highways.

The OHP establishes operating LOS standards for the state highway system[2]. Highways of state-wide importance, such as Highway 11, should operate at LOS C or better in urban and urbanizing areas while highways of district importance, such as the Freewater Highway, should operate at LOS D or better in urban and urbanizing areas.

Southbound Highway 11

It was assumed that future traffic operations along the southbound five-lane, 35 mph portion of Highway 11 in Milton-Freewater would continue to be influenced by the traffic signal at the intersection of Highway 11 and Main Street. This signal is expected to influence southbound traffic operations to a point approximately ½ mile north. After adjusting 1998 intersection traffic volumes to reflect the total growth expected along both Highway 11 and the Freewater Highway by the year 2018, the LOS for this segment was determined using the software package SIGCAP for signalized intersections. It was assumed that the calculated southbound LOS at the signal would reasonably represent southbound LOS within ½ mile upstream of the signal along Highway 11.

North of this segment the posted speed is 35 mph and traffic is negligibly influenced by the signal. Further north, the posted speed increases to 50 mph. Therefore, on the five-lane, 35 mph and 50 mph segments, LOS calculations were based on the HCS for multi-lane highways. The analysis was based on hourly traffic volumes, where the peak hour volumes were estimated assuming a peak hour two-way traffic volume of 10% of the ADT and a southbound directional split of 60 percent.

The LOS for southbound traffic on Highway 11, south of the traffic signal at Main Street, is also based on the HCS for multi-lane highways. South of the traffic signal on Highway 11 the posted speed is 25 mph.

Under the above assumptions, during the PM peak hour, the three-lane segment of Highway 11 operates at LOS B, the four-lane segment operates at LOS D, the five-lane, 35 mph segment operates at LOS B, and the five-lane, 50 mph segment operates at LOS B. In general, the level of service on each segment is expected to drop by one level (e.g., from LOS B to LOS C) over the next 20 years. The PM peak hour level of service for these segments is shown in Table 5-5.

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[2] 1991 *Oregon Highway Plan*, Appendix A, Table 1, Operating Level of Service Standards for the State Highway System.

Northbound Highway 11

The 1994 Highway Capacity software for multi-lane highways was employed along all northbound segments of Highway 11 except the southern three-lane segment where only one northbound lane operates. Since the Highway Capacity software will not consider segments with less than two lanes, and the HCS for rural two-lane highways will not consider segments with posted speeds below 50 mph, a manual technique was employed. For this segment, the peak hour volume was estimated at 430 vehicles per hour (vph). This volume was estimated assuming a peak hour tow-way traffic volume of 10% of the ADT and a northbound directional split of 40%. The 430 vph flow rate was compared with the maximum service flow rates shown in Table 4-2, and found to correspond to LOS A.

On the four-lane, 25 mph segment, the five-lane, 35 mph segment, and the five-lane, 50 mph segment, level of service calculations were based on the HCS for multi-lane highways. The analysis was based on hourly traffic volumes, where the peak hour volumes were estimated assuming a peak hour two-way traffic volume of 10% of the ADT and a northbound directional split of 40%.

Under the above assumptions, during the PM peak hour, the three-lane segment of Highway 11 operates at LOS B, the four-lane segment operates at LOS C, the five-lane, 35 mph segment operates at LOS A, and the five-lane, 50 mph segment operates at LOS B. The PM peak hour level of service for these segments is also shown in Table 5-4.

TABLE 5-4
SUMMARY OF FUTURE PM PEAK HOUR ARTERIAL OPERATIONS ON OREGON HIGHWAY 11

Segment Location	One-way Pk. Hr. Vol.	No. of Lanes	Direction	Posted Speed	1998 LOS	2018 LOS
South city limits to 14th St.	430	1	Northbound	25	A	B
(three-lane segment)	650	2	Southbound	25	A	B
14th St. to Hwy 11/Main St. Intersection	580	2	Northbound	25	B	C
(four-lane segment)	840	2	Southbound	25	C	D
Hwy 11/Main St. Intersection to MP 31.29	480	2	Northbound	35	A	A
(five-lane segment)	720	2	Southbound	35	A	B
MP 31.29 to Sunnyside Umapine Hwy	970	2	Northbound	50	A	B
(five-lane segment)	1,460	2	Southbound	50	A	B

Signalized Intersection Operations

Future year 2018 LOS for signalized intersections was determined in the same manner, and at the same signalized intersection for which existing conditions were analyzed in Chapter 4. After adjusting 1998 intersection traffic volumes to reflect the total growth expected along both Highway 11 and the Freewater Highway by the year 2018, the software package SIGCAP for signalized intersections was used to determine future condition intersection LOS. Table 4-3 previously presented the LOS criteria for signalized intersections. In general, the intersection operates very well, at LOS B. All movements continue to operate at LOS B or better. The PM peak hour level of service for this intersection is shown in Table 5-5.

TABLE 5-5
SUMMARY OF PM PEAK HOUR OPERATIONS AT SIGNALIZED INTERSECTIONS

Intersection Location	Direction	Movement	Saturation Value	2018 LOS
Highway 11 and Main Street	**Overall**		**0.56**	**B**
	Northbound	Left, Through	0.53, 0.53	B, B
	Southbound	Through, Right	0.52, 0.14	B, A
	Eastbound	Left, Right	0.17, 0.17	A, A
	Westbound	Left, Through, Right	0.56, 0.15, 0.15	B, A, A

Unsignalized Intersections

Future year 2018 traffic operations were determined in the same manner, and at the same two unsignalized intersections for which existing conditions were analyzed in Chapter 4. After adjusting 1998 intersection traffic volumes to reflect the growth expected along Highway 11 at the intersections by the year 2018, the 1985 Highway Capacity software for unsignalized intersections was used to determine future condition level of service. Table 4-5 in Chapter 4 previously presented the level of service criteria for unsignalized intersections.

In general, both unsignalized intersections are expected to operate well during the future peak hour, at LOS A, except for the following approaches: eastbound and westbound left turns are expected to operate at LOS E at both intersections and eastbound and westbound through movements are expected to operate at LOS D at both intersections. The traffic volumes served by these movements are expected to be relatively low, in the range of two to 32 vehicles during the p.m. peak hour, and the lower than expected level of service is due more to high highway volumes than high side street volumes. The highway is expected to operate at LOS A at both intersections.

The level of service for each unsignalized intersection is shown in Table 5-6.

TABLE 5-6
SUMMARY OF OPERATIONS AT UNSIGNALIZED RURAL INTERSECTIONS

Intersection Location	Direction	Movement	1998 LOS	2018 LOS
OR Highway 11 and	Northbound	Left	A	A
8th Avenue	Southbound	Left	A	A
	Eastbound	Left, Through, Right	D, D, A	E, D, A
	Westbound	Left, Through, Right	D, D, A	E, D, A
OR Highway 11 and	Northbound	Left	A	A
9th Avenue	Southbound	Left	A	A
	Eastbound	Left, Through, Right	D, C, A	E, D, A
	Westbound	Left, Through, Right	D, C, A	E, D, A

Note: The level of service is not shown for all movements of the unsignalized intersections.

Signal Warrant Analysis

Existing

ODOT Region 5 conducted a traffic signal investigation at the unsignalized intersections of Highway 11 and 8th and 9th Avenues in 1996, concluding that neither intersection met the warrants for installation of a traffic signal. As of 1996, traffic volumes on the main highway were high enough to warrant a signal, but the side street traffic volume and pedestrian use were not high enough to justify the interruption of the main line traffic.

Future

A future condition planning level warrant analysis was conducted by DEA considering expected traffic growth along Highway 11 of 40% between years 1998 and 2018 at the intersections. Minor street volumes along both 8th and 9th Avenues were estimated to grow at 3% per year, reflecting nearly 81% total growth between years 1998 and 2018.

DEA conducted traffic counts at these intersections during the p.m. peak period in January 1998. These counts were adjusted based on expected growth along the highway over the 20-year planning period. The only traffic volume data available in the study area for testing future condition signal warrants are the p.m. peak hour forecasts. To determine if these intersections come close to meeting the four- and eight-hour signal warrants, two planning level assumptions were made:

- Three other hours in the day would operate at traffic volumes at least 75% of the p.m. peak hour volumes; and
- Four other hours in the day would operate at traffic volumes at least 50% of p.m. peak hour volumes.

Using these assumptions, the growth-adjusted future traffic volumes at the two existing intersections were compared against four of the eleven traffic signal warrants listed in the *Manual on Uniform Traffic Control Devices* (MUTCD), Section 4-C. The warrants tested include:

- Warrant 1 - minimum vehicular volume (8 hours)
- Warrant 2 - interruption of continuous traffic (8 hours)
- Warrant 9 - four hour volumes
- Warrant 11 - peak hour volume

Results of DEA's planning level warrant analysis using the assumptions outlined above indicate that both intersections would meet Warrants 2, 9, and 11 based on future traffic volumes. This analysis considers the fact Milton-Freewater is a community of less than 10,000 people, therefore only 70% of normal warrant traffic volumes would must be met. Traffic volumes along the highway are expected to be high enough to satisfy Warrant 1, however the minor street volumes are expected to be too low. Although the intersections indicate a future need for signals based on planning level assumptions, it may be worth periodically analyzing conditions at these intersections to see if a signal actually becomes warranted based on new future conditions.

CHAPTER SIX: IMPROVEMENT OPTION ANALYSIS

As required by the Oregon TPR, transportation options were formulated and evaluated for the City of Milton-Freewater TSP. These potential improvements were developed with the help of the TAC, and the public and address the concerns specified in the goals and objectives (Chapter 2).

Each of the transportation system improvement options was developed to address specific deficiencies, safety, access management, or other concerns. It should be noted that these projects were developed based on the best available data at the time of TSP preparation (1998). The list of medium and long-term projects should be reviewed every three to five years to confirm the appropriateness, level of need, and completeness as conditions change. The following list includes all of the potential transportation system improvement options considered. The location of the improvement options are illustrated in Figure 6-1.

The transportation system improvement options recommended for the Milton-Freewater TSP include both state highway and local road projects. This section of the TSP describes the individual improvements and their associated costs. Improvement options evaluated include:

1. Reconstruct sidewalks along NE 5th Avenue from Russell St to Hwy 11 (page 6-2).
2. Reconstruct sidewalks along NE 5th Avenue from Lamb St to Russell Street (page 6-3).
3. Provide sidewalks on east side of Main St from 8th Ave to 15th Ave (page 6-3).
4. Provide pedestrian crossing of Hwy 11 at NE 4th Ave (page 6-4) *(Note: not recommended)*
5. Provide pedestrian crossings of Hwy 11 at SE 8th or SE 9th Ave (page 6-5).
6. Provide bike lanes on the Freewater Hwy (page 6-8).
7. Provide bike lanes on Hwy 11 (page 6-10).
8. Construct a greenway multi-use path on the Walla Walla River levee (page 6-10).
9. Connect Broadway St and NE 5th Ave by extending Russell St (page 6-12)
10. Improve the sight distance at the intersection of 5th Ave and Hwy 11 (page 6-13).
11. Implement speed control measures along Hwy 11 on Milton Hill (page 6-14).
12. Address capacity deficiency on Hwy 11 between SE 14th Ave and Main St (page 6-15).
13. Improve the intersection of Broadway St and Ward St (page 6-16).
14. Implement Transportation Demand Management Strategies.(page 6-18).

All of these improvements were recommended by the TAC. Priorities were based on the evaluation of each project using the criteria described below.

EVALUATION CRITERIA

The evaluation of the following transportation improvement options was based on a quantitative review of traffic operations, including speed, delay, collision records, and congestion; and a qualitative review of safety, livability, and estimated cost. Only one quantitative issue (capacity) was identified during this study that will require transportation improvements over the next 20 years (see

Option 12). Therefore, perceived safety and comfort for all modes, as well as community livability, were the main factors used to determine and evaluate these options.

The final factor in the evaluation of each potential transportation improvement was cost. Costs were estimated in 1998 dollars based on preliminary identification of each potential transportation system improvement. The priority of each option was based on costs and benefits relative to the effectiveness of the improvement.

It should be noted that costs were estimated for construction by using a typical unit cost (such as per linear foot). Cost estimates do not include purchase of right-of-way, design, or other contingencies.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM PROJECTS

ODOT has a comprehensive transportation improvement and maintenance program encompassing 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.

The 1998 to 2001 STIP, published in 1996, identified one major overall highway improvement project scheduled within the City of Milton-Freewater. The Oregon-Washington Highway Solution Package identifies various scheduled preservation and safety corrections along the Oregon-Washington Highway (Hwy 11) between mileposts 0.6 and 35.3. The overall project is scheduled to begin in federal fiscal year 1998, however actual construction within Milton-Freewater may not begin in 1998. The overall Solutions Package project cost is estimated at nearly $2.4 million; however, the project costs within the City of Milton-Freewater are not delineated within the STIP.

EVALUATION OF POTENTIAL TRANSPORTATION IMPROVEMENTS

Option 1: Reconstruct sidewalks along NE 5th Avenue from Russell Street to Hwy 11.

Overview: 5th Avenue serves a significant amount of pedestrian, bicycle, and vehicular traffic. This use has intensified since the recent opening of the Safeway supermarket, the only full-service market in Milton-Freewater, at the corner of 5th Avenue and Highway 11. 5th Avenue is not currently designated as a collector. However, because the street functions as a collector it is recommended for upgrade in the proposed street system plan (Chapter 7). Also contained in Chapter 7 are the street standards, which require sidewalks on all streets. During the public involvement process, members of the community identified a specific need for sidewalks on 5th Avenue

New sidewalks exist on the south side of 5th Avenue between Highway 11 and Elizabeth Street along the Safeway site. There are broken and discontinuous sidewalks and a gravel path on both sides of the street between Elizabeth Street and the railroad tracks in the center of town. Approximately 3,000 feet of sidewalks would be added, reconstructed, and improved as necessary to provide continuous pedestrian access along this street.

Impacts: This improvement option addresses safety and comfort for pedestrians. There would be no adverse effects on motor vehicle traffic operation. A benefit to motorists may be achieved if pedestrians are not walking within the roadway. In addition, some motor vehicle trips may be re-

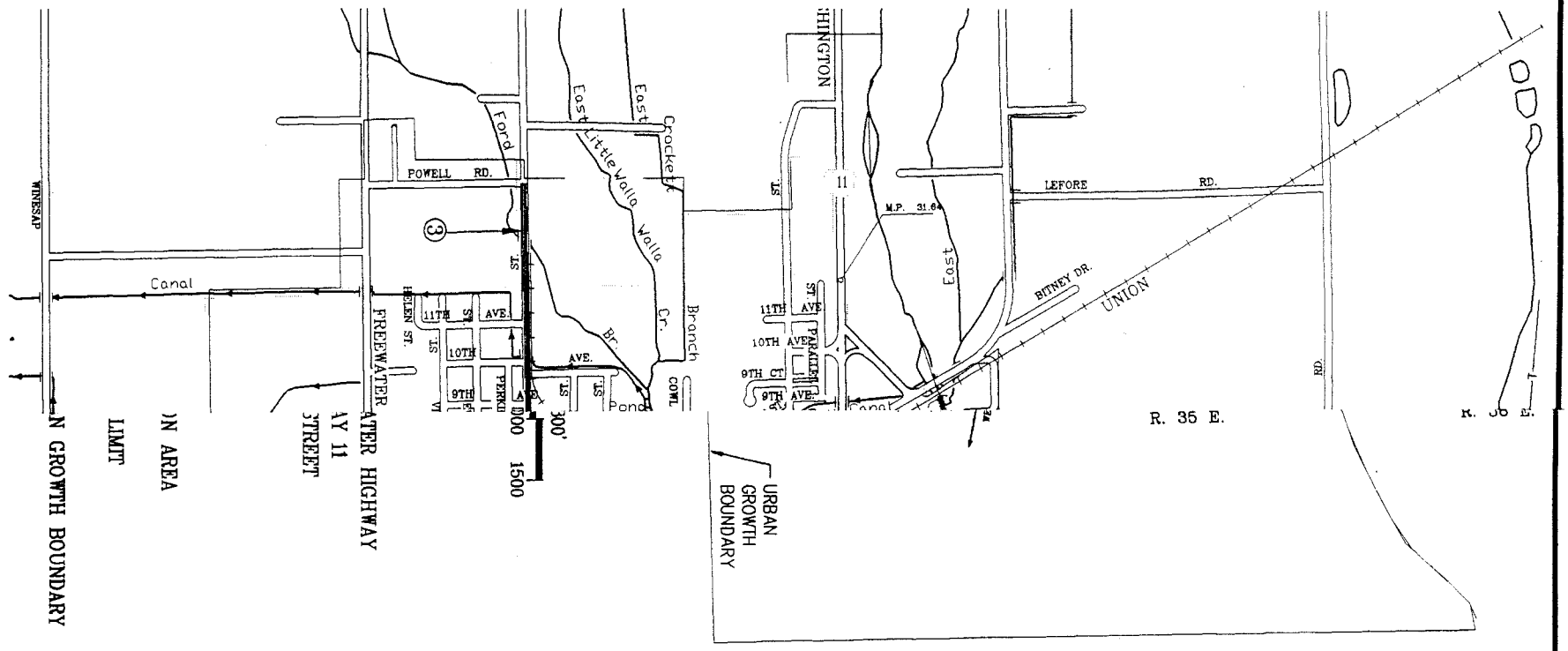

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FIGURE 6-1
LOCATIONS OF TRANSPORTATION OPTIONS
MILTON - FREEWATER, OREGON

placed by pedestrian trips if comfort and safety has been a limiting factor along the street. Option 1 is planned for Fiscal Year 1999.

Cost: The cost of the sidewalk portion of this project was estimated by the City Public Works Director at $180,000. Phase 1 of the project is budgeted for fiscal year 1999, with construction expected in Spring 1999.

Priority: High. Construct Option 1 in 1999.

Option 2: Construct sidewalks along NE 5th Avenue where none currently exist, from Lamb Street to Russell Street

Overview: This would be a continuation of Option 1, so that sidewalks would be continuous along NE 5th from the western City boundary to Highway 11. Presently, there are sidewalks on both sides of the street in fair to good condition between the railroad tracks and Evans Street. Between Evans and Lamb Streets, there are sidewalks along the south side of the street in good condition. This will add approximately 1,800 feet of sidewalk to the City system.

Impacts: Impacts would be similar to those of Option 1. There is sufficient right-of-way.

Cost: The cost of Option 2 is estimated to be approximately $30,000 (using a unit cost of $3.00 per square foot for a 5-foot wide sidewalk). Unlike Option 1, Option 2 is currently unfunded.

Priority: Medium. This section of sidewalk should be planned for construction within the next 5-10 years.

Option 3: Provide Sidewalks on East Side of N. Main Street from 8th Avenue to 15th Avenue

Overview: The TAC and public identified a need for pedestrian and bicycle facilities on N. Main Street between 8th and 15th Avenues. The Riverberry Estates housing development, which is under construction east of N. Main Street, between 11th and 15th Avenues, is expected to add a significant amount of pedestrian and bicycle travel between this residential area and the center of town.

The City Public Works Director has preliminary plans for a project which would widen N. Main Street by approximately 2,125 feet of 6-foot curbed sidewalk on the east side of the street. Right-of-way availability is limited, therefore the project is on one side of the street only.

Impacts: This option addresses safety for pedestrians by taking them out of the general flow traffic lanes. Providing sidewalks may also encourage walking for short trips, instead of driving, which would provide the benefit of fewer motor vehicle trips on the street system.

Cost: : The cost of Option 3 is estimated to be approximately $40,000 (using a unit cost of $3.00 per square foot for a 6-foot wide sidewalk).

Priority: High. Construct project within next 0-5 years.

Option 4: Provide Pedestrian Crossing on Highway 11 at NE 4th Avenue

Overview: The community identified a need for a safe and convenient pedestrian crossing for residents of the nursing care facility on the east side of the highway between NE 1st and NE 3rd Avenues to the new Safeway on the west side of the highway. For many of these people, driving is not an option, and the new Safeway on the west side of the highway is the only shopping opportunity close enough to reach on foot.

One method to increase pedestrian safety would be to construct a raised island as a pedestrian refuge in the center turn lane in the north leg of the intersection at 4th Avenue, which is located across the highway from, and forms an offset "intersection" with the Safeway entrance. However, it was determined during the public process for the TSP that the need for this crossing was very low, and the potential for impacts to turning traffic is too high. Therefore, this option was not recommended.

Option 5: Provide Pedestrian Crossings on Highway 11 at SE 8th or SE 9th Avenue

Overview: The community described a need for pedestrian improvements at the intersection of Highway 11 and either SE 8th or SE 9th Avenue. These locations were identified as having both high motor vehicle and pedestrian volumes and as being very difficult to cross due to high traffic speeds. City Hall is located on the west side of the highway, north of SE 8th Avenue, and the public library is on the east side of the highway, between SE 8th and SE 9th Avenues. There are also many residences along this section of the highway. Good sidewalks exist along both sides of the highway, encouraging pedestrian use. Several methods of accommodating pedestrians were suggested by the public, including signals and pedestrian bridges.

Traffic signal investigations were conducted by ODOT Region 5 at these two intersections in 1996. The conclusion of the study was that the intersections did not meet the required warrants for a traffic signal. Although the motor vehicle traffic volumes on the highway were high enough to warrant a signal, the side street volumes and pedestrian use were not high enough to justify the interruption of traffic flow on the state highway.

As part of this transportation system plan, DEA conducted a future condition planning level warrant analysis that considered expected traffic growth along Highway 11 at the intersections of SE 8th and 9th Avenues. The analysis indicated that during the 20-year forecast period, traffic volumes on the highway are expected to continue to be high enough to meet the minimum one and four-hour volume warrants for a traffic signal; however, the minor street volumes are expected to remain too low to meet the side street traffic warrants, even though an analysis of future traffic operations indicated that the left turn movements from the side streets would experience unacceptable levels of delay (LOS E). The operation of these movements could be improved with the installation of a traffic signal; however, the resulting increase in delay to through traffic on the state highway would be unacceptable to ODOT. Installation of a traffic signal at this location is not recommended at this time. Nonetheless, it may be worth periodically analyzing conditions at these intersections to see if signals actually becomes warranted based on future conditions. The cost of a traffic signal at a typical four-leg intersection is $100,000.

Pedestrian bridges are structures that allow pedestrians to cross over a busy street. These structures can be effective under conditions where there are exceptionally large numbers of pedestrians, extremely high traffic volumes and speeds, and a very strong pedestrian attraction. Access to a large

university or access across an interstate highway in an urban area would be a typical use of a pedestrian bridge. In general, however, the cost of these structures outweigh their benefits. The estimated cost of a pedestrian bridge over Highway 11 in this area would be a minimum of several hundred thousand dollars.

Although traffic signals or pedestrian bridges do not appear to be warranted for either of these two intersections within the 20-year planning period, there are other useful techniques for providing safe and convenient pedestrian crossing. The first of these is to increase the visibility of pedestrians to oncoming traffic by constructing curb extensions. Since there is on-street parking on this section of the highway, the curb extensions would have no adverse impacts to the street capacity or travel lanes because they would not extend into the street beyond the width of the parked cars. Curb extensions also facilitate pedestrian crossings by shortening the distance that pedestrians must cross between the street curbs. Curb extensions have the additional benefit to pedestrians of slowing traffic, since they narrow the appearance of the street. Curb extensions should be used in conjunction with adequate pavement markings. The cost to construct a single curb extension is approximately $2,000. The cost to construct curb extensions on all four corners of the intersection of SE 8th Avenue and Highway 11 is $8,000.

A second technique is to provide a center island refuge or median. Having a refuge means pedestrians only have to cross and watch for oncoming traffic from one direction at a time. This also shortens the crossing distance and is particularly beneficial for older people and younger children. Refuges, like curb extensions, have the additional advantage of making pedestrians more visible to motorists and of slowing traffic. Refuges are especially effective when used in combination with curb extensions and adequate pavement markings. This section of the highway is four lanes, with no center median. In order to construct an effective refuge area (of at least four feet) one of the travel lanes would have to be eliminated.

Where turning movements are high, four-lane highways can frequently be improved by reconfiguring the highway to three lanes. A three-lane cross section consists of one travel lane in each direction for through traffic and right turns, and a center lane turn refuge for left turns. A three-lane configuration, as opposed to a four-lane configuration, increases the amount of right-of-way for street improvements such as a center island refuge. There would also be enough additional roadway to provide for a bicycle lane on each side of the street. For example, the four 12-foot travel lanes that exist today occupy 48 feet of pavement width. The same 48-foot width could be striped with a 5-foot bike lane, 12-foot travel lane, 14-foot center refuge lane, 12-foot travel lane, and 5-foot bike lane. This configuration can improve motor vehicle safety by reducing rear-end accidents which occur when a vehicle stops in the left lane to make a turn and is hit by the vehicle behind it.

A center refuge lane can also reduce the number of accidents because it can reduce the number of unnecessary lane changes. When a vehicle stops to make a left turn, it blocks the use of that lane for other vehicles. As a result, drivers behind the stopped vehicle change to the right lane to go around it. This lane change causes several unsafe conditions. Other vehicles on either the main roadway or a side street, pedestrians trying to cross the road, and drivers getting our of parked cars may not be expecting the lane change which could result in an accident.

If a center island refuge or median is included at the intersection of Highway 11 and SE 8th or SE 9th Avenue either the northbound left turn movement or southbound left turn movement would have

to be prohibited, depending on whether the pedestrian refuge was located on the south side of the intersection or the north side. Because prohibiting left turns is contrary to the idea of changing the striping to a three-lane cross section to facilitate left turns, construction of a center island refuge is not recommended.

Therefore, the recommended improvement option to provide safer pedestrian crossings in this area is to construct curb extensions on all four corners of the intersection of SE 8th Avenue and Highway 11 and change the striping on Highway 11 from a four-lane cross section to a three-lane cross section. This improvement option has a much lower cost than providing a traffic signal or pedestrian bridge, and does not need to meet stringent warrants. In addition to the curb extensions, crosswalks should be painted draw drivers' attention to the fact that pedestrian volumes are high in this area.

There are more positive than negative impacts with a three-lane striping plan. The three-lane striping pattern would reduce capacity on Highway 11, but with the current volumes, traffic would still flow smoothly. In general, it would improve safety for both pedestrian and vehicular traffic, and increase capacity on the side streets because they would have fewer lanes to cross for many of their movements. In addition, a three-lane section allows for the provision of bike lanes, which are needed on Highway 11. The striping plan could be implemented for a test period of a year or so. If the community is unhappy with the way Highway 11 operates, it could return to the original four-lane striping plan.

Figure 6-3 demonstrates how the highway would look with curb extensions, painted crosswalks and a three-lane cross section.

Impacts: Curb extensions would improve safety for pedestrians by reducing the paved distance that pedestrians have to cross and by increasing pedestrian visibility for drivers by bringing the curb edge closer to the travel lanes. Construction of curb extensions would not reduce the number of on-street parking spaces, because parking is typically prohibited within ten feet of an intersection.

Although a three-lane roadway section has fewer moving lanes than a four-lane section, the capacity reduction may not be as great as one might expect. When left turns are made, the vehicle stopped to make its turn blocks the left lane, causing through-moving vehicles behind it to stop also, or change lanes to pass. The more vehicles make left turns, the more through-moving vehicles shift to the right lane. When left turning volumes are very high, almost all of the through traffic uses the right lane, and the left lane becomes an exclusive left-turn lane by default.

The capacity for side street approaches to Highway 11 would generally increase with a three-lane striping pattern versus the current four-lane pattern, resulting in shorter delays for vehicles waiting at these approaches. The increase in capacity occurs because the gaps in traffic needed for side street vehicles to either cross or make a left turn onto Highway 11 are reduced because the number of lanes of traffic that need to be crossed has been reduced.

Existing volumes and future traffic projections would not change with the curb extensions or the three-lane striping plan.

The disadvantage of converting a four-lane highway segment to three lanes is that a three-lane section has less capacity than a four-lane section. This is particularly important in this case because capacity on this highway segment becomes an issue toward the end of the 20-year planning period

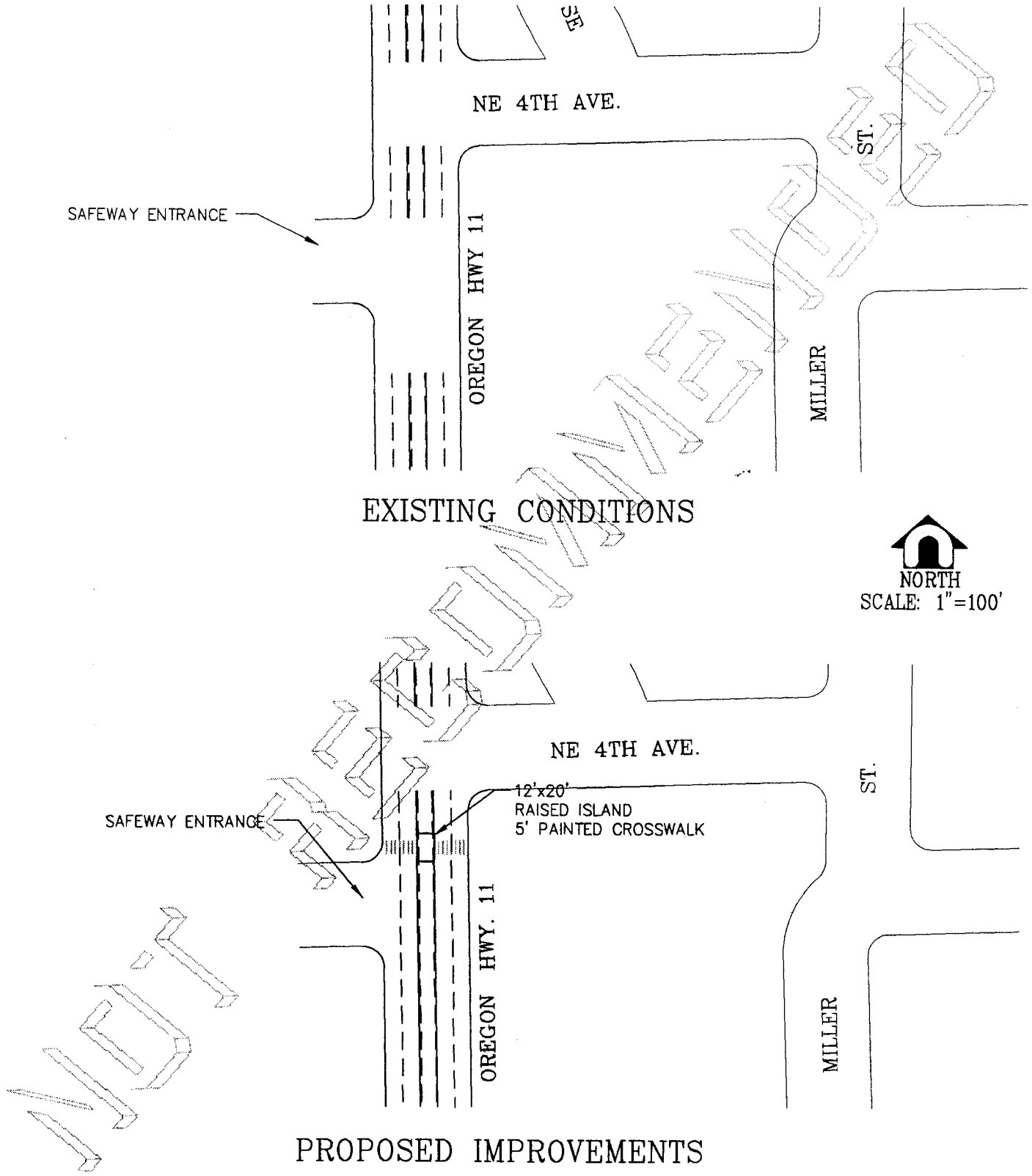

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FIGURE 6-2
PEDESTRIAN IMPROVEMENT
AT NE 4TH AVENUE
AND HIGHWAY 11

(see Improvement Option 12). A three-lane cross section provides two through travel lanes. Typical two-lane highways in Oregon can accommodate average daily traffic volumes of 10,000 vehicles per day (vpd), and are not considered for widening to four lanes until traffic volumes exceed 10,000 vpd. Existing traffic volumes on this segment of highway range between 9,000 and 12,000 vpd and are expected to increase to 12,000 to 15,000 vpd by the end of the 20-year planning period. If this section of highway is restriped to a three-lane cross section, traffic operations should be monitored to determine whether the highway still operates at an acceptable level of service. Because the restriping constitutes a very low cost improvement, it does not change the physical roadway width, and it can easily be changed back to a four-lane section, this improvement option is still recommended to address the near-term issue of pedestrian safety.

Cost: The estimated cost to construct curb extensions on all four corners of the intersection of SE 8th Avenue and Highway 11 is $8,000. The cost for restriping the four-lane segment of Highway 11 is relatively low and is already done on a regular basis because the paint normally wears off the roadway over time. There would be some additional cost for adding the bike lane striping and the appropriate signs. The estimated cost to restripe Highway 11 between SE 14th Street and Main Street (approximately 4,000 linear feet) and provide signing is $5,000. The total cost to do the restriping and construction of curb extensions at one intersection is $13,000.

Priority: High. Construct crossing improvement within next 0-5 years. In addition, it is recommended that the signal warrants be reviewed every 3-5 years.

Option 6: Provide Bicycle Lanes on Freewater Highway

Bike lanes should be added along the extent of Highway 11 and the Freewater Highway through the City. It is ODOT's policy to have bike lanes on urban highways because these streets provide the most direct routes to services. The following discussion details the Freewater Highway from north to south.

- **Lamb Street, City limits to 8th Avenue:** This arterial is a primary route north. Lamb Street north of NW 8th Avenue is 24 feet wide without curbs or sidewalks. Its condition is only fair. It should be widened to include shoulders (5 feet wide without curbs or 6 feet with curbs). The estimated cost to widen the street to add 5-foot shoulders for the 0.4 mile is approximately $100,000.

- **8th Ave, Lamb Street to N. Main Street:** The section of the Freewater Highway between Lamb Street and N. Main Street is approximately 0.25 mile long and is 36 feet wide with curbs, on-street parking, and 60 feet of right-of-way. There are adjacent commercial, school, park, and residential uses. An inexpensive alternative would be to remove on-street parking and stripe bike lanes. However, some on-street parking is most likely a necessary component of this older mixed use neighborhood. Parking bays could be provided as a less expensive option than widening the entire street section. There is insufficient right-of-way to widen the street to the full two-lane arterial standard shown in Chapter 7.

  The offset intersection with N. Main Street is a problem for cyclists. There is a right turn lane onto Main Street, combined with staggered curbs, makes a safe crossing difficult. Careful attention must be paid to providing cyclists with a clear line through the intersection. The bike

lanes should be dashed some distance from the intersection so that cyclists are prompted to begin merging well in advance.

Adding bike lanes to the existing street would cost about $2,500 for striping and approximately $1,000 for signs. The cost of parking bays would depend on the number needed and the available right-of-way.

- **N. Main, 8th to Broadway:** N. Main Street from NW 8th Street to Broadway Street is about 0.5 mile long. The street is 44 feet wide with two lanes and curbs. This portion of the Freewater Highway swings through the business district of Milton. There is a two-block section with marked on-street parking south of 8th. The existing 14-foot lanes are adequate for a shared roadway in this environment.

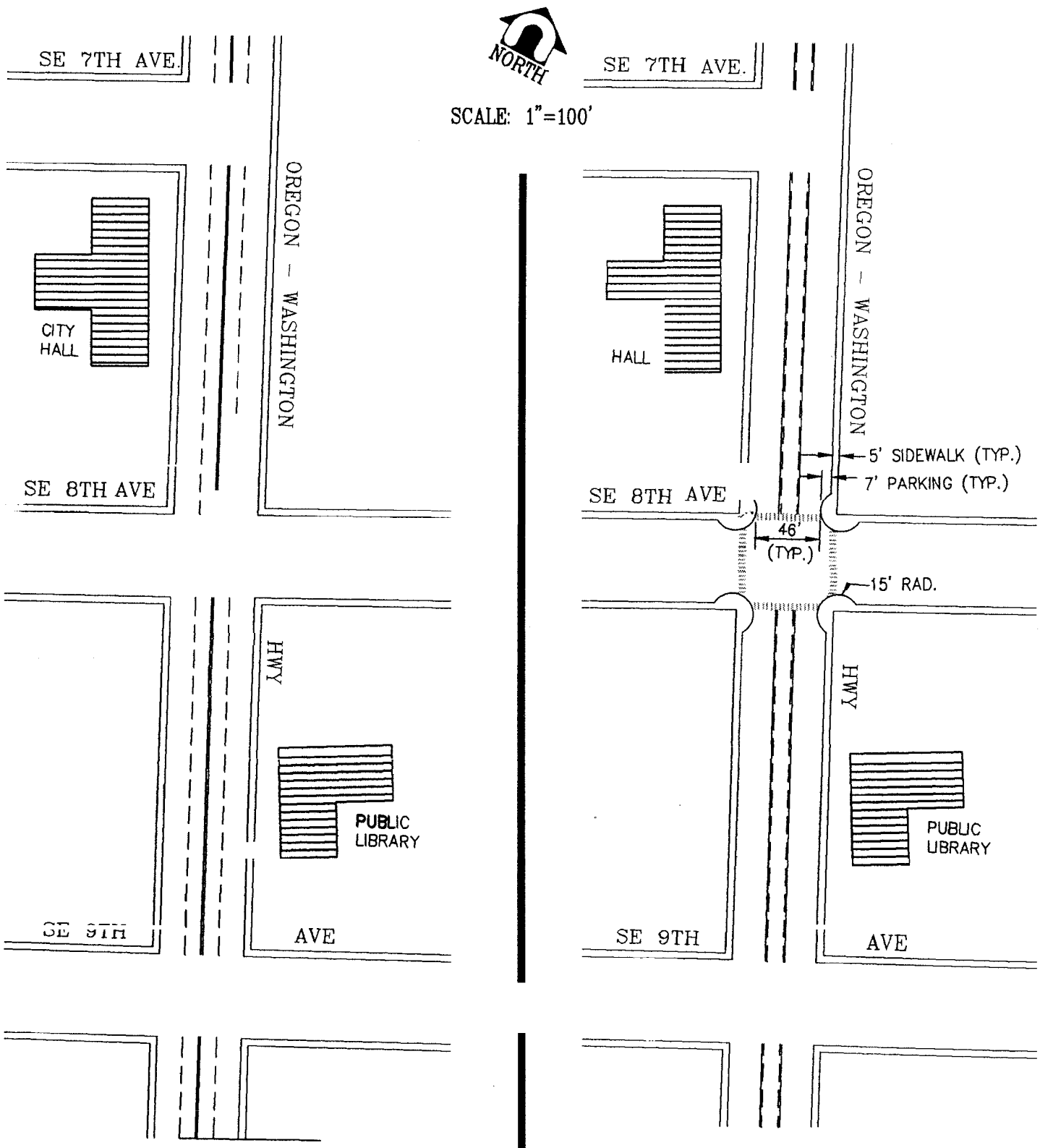
- **N. Broadway Street, N. Main to S. Main:** The section of the Freewater Highway that connects N. Main to S. Main on Broadway Street is approximately 0.15 mile long and 70 feet wide, with four lanes and curbs. This short link between N. and S. Main Streets provides the connection between the Milton and Freewater business districts. There are adjacent commercial, industrial and residential uses. The street presents problems to the bicyclist because of its size and the unrestricted right turns onto Main Street. There is ample room to stripe 6-foot bike lanes without removal of on-street parking, if the motor vehicle lanes are striped at 11 feet wide instead of 12 feet, with 7-foot wide parking lanes.

  Where possible, the intersections along this stretch of roadway should employ a right-turn lane with a through bike lane to the left of the turn lane. Additionally, a right-turn bike lane is recommended due to the high numbers of right turning vehicles. Through cyclists will have the opportunity to cross over to the left lane well before the intersection. Pavement markings, signs and education programs should be used to instruct riders in how to use this type of facility. For pedestrian safety, the free right turn for vehicles should be eliminated.

  The cost of striping bike lanes and signs along this section would be approximately $1,000. Bike lane striping should be done when the street requires restriping, simultaneously with restriping of the motor vehicle lanes.

- **S. Main Street, Broadway Street to SW 2nd:** The section of the Freewater Highway from Broadway Street to SW 2nd Ave is around 0.35 mile long, 56 feet wide, with two lanes and curbs. This section passes by the High School, residences and a shopping area before meeting Highway 11 (where the road turns into four lanes). On-street parking on the west side is heavily used due to the High School. There is ample room to stripe 6-ft bike lanes without removal of on-street parking (parking is always between the bike lane and curb). Striping and signs will cost about $2,000.

Impacts: Providing adequate facilities for pedestrians and bicyclists increases the livability of the city, and improves driver, pedestrian, and bicycle safety. With more emphasis on walking or biking in the city, conditions such as air quality and noise levels would be improved as well. Typically, costs are confined to striping and signing. The addition of paved shoulders or roadway widening can be accomplished at the time that the road needs resurfacing or reconstructing, which reduces costs as well.



EXISTING CONDITIONS

PROPOSED IMPROVEMENTS

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FIGURE 6-3
PEDESTRIAN IMPROVEMENT
AT SE 8TH AVENUE
AND HIGHWAY 11

Cost: The costs for adding bike lanes to the Freewater Highway are approximately $103,000, not including parking bays.

Priority: Medium to low. Bike lanes should be added to the Freewater Highway as part of regular restriping, overlays or reconstruction, and should be completed as opportunities present themselves.

Option 7: Provide Bicycle Lanes on Highway 11

This is the primary travel corridor through Milton-Freewater. The section of Highway 11 north of the Main Street intersection is 85 feet wide with four travel lanes, a center turn lane, and parking lanes. It passes through commercial and industrial areas and continues north to Walla Walla. The highway is a significant barrier to cross-traffic within the city, where there is only one signalized crossing (pedestrian activated at NE 1st Avenue).

As a bicycle route, the northern portion of Highway 11 (north of the Main Street intersection to the northern City boundary) is fairly functional, so long as the bicyclist does not need to cross. However, because this is a highway of statewide importance, bike lanes should be designated on the shoulder along the 1.6-mile length within the city. There is no apparent need for on-street parking (all businesses along this section have off-street parking); however, there is ample room for both on-street parking and a 6-foot bike lane. The costs of restriping this section of highway with the 8-inch stripe and adding bike lane signs would be approximately $7,000.

The 1.1-mile section of Highway 11 from the south boundary of Milton-Freewater to the Main Street intersection is 64 feet wide with four lanes and on-street parking. Along its route are an industrial area, the Freewater business district, the City Hall, the Police Department, and many residences. Due to the levels of truck traffic, this section should have bike lanes. A possible solution would be to restripe the section to three lanes, retaining on-street parking. The configuration would be two 12-foot travel lanes, a 14-foot center turn lane, 8-foot parking spaces, and 6-foot bike lanes between the parking and travel lanes. See Option 5 for a discussion of the advantages and disadvantages of restriping from four to three lanes.

Adding bike lanes and signs along this section of the Highway would be approximately $7,500.

Impacts: Providing adequate facilities for pedestrians and bicyclists increases the livability of the city, and improves driver, pedestrian, and bicycle safety. With more emphasis on walking or biking in the city, conditions such as air quality and noise levels would be improved as well. Typically, costs are confined to striping and signing. The addition of paved shoulders or roadway widening can be accomplished at the time that the road needs resurfacing or reconstructing, which reduces costs as well.

Cost: The costs for bike lanes on Highway 11 (striping and adding signs) will cost about $14,500.

Priority: The northern portion of project is low priority (10-20 years), since it is currently fairly accessible to cyclists because of the wide shoulders. When this portion of the highway is restriped as part of regular maintenance, the bike lanes could be added.

The southern part of the project is a medium priority (5-10 years) but could be accomplished sooner as part of Option 5.

Option 8. Construct a Greenway Multi-Use Path on the Walla Walla River Levee

Overview: The Walla Walla River presents an excellent opportunity for a linear park along the eastern edge of Milton-Freewater because of an existing flood control levee that could provide the foundation for a pathway. Greenways should provide a park-like experience, making the most of the natural amenities such as wildlife use, water, other existing parks, and views or vistas. Greenways also need to be accessible, safe, and maintainable. The main elements of the Walla Walla River Greenway are: the river and its banks, the pedestrian and bikeway path, and the interface between the path and adjacent private property.

The condition of the levee area ranges from unvegetated and industrial at the north end (NE 8th Avenue bridge) to residential with riparian native vegetation towards the southern end. There are street crossings of the river at East Side Road (NE 8th Avenue), SE 9th Avenue, SE 15th Avenue, and Course Creek Road just north of Marie Dorian Park.

The Corps levee was constructed on an easement granted by individual property owners along the river. Private property boundaries extend to the center of the river, so that the property owners along the greenway would need to grant permission for the greenway to be designated and a trail to be constructed. In the early 1990s, the Corps reportedly agreed to allow the greenway along its easement (DEA, 1992).

Because of the length of the project, it may be appropriate to phase the project over several years, as follows:

- **Phase 1--East Side Road to SE 9th Ave:** The first phase of the Greenway project should focus on the area between East Side Road at the north and SE 9th Avenue The west side of the river is the most appropriate location for the Greenway through this section because of the width of the levee and the logical connections to the City street system; however, there may be design difficulties associated with the west side at the 9th Avenue crossing because of a creek branch or irrigation diversion that causes a discontinuity in the levee.

  Creating this stretch of the Greenway will involve working with land owners of industrial lots to remove debris, receiving permission from property owners to use the easement, paving the trail surface, establishing the connections to the street system at SE 6th Avenue, placing appropriate signs, and establishing landscaping to buffer the trail from the industrial area and private property and landscaping along the river to improve aesthetics and wildlife habitat.

- **Phase 2--SE 9th Avenue to SE 15th Ave:** The creek branch north of SE 9th Avenue poses a problem to the continuity of the Greenway. One alternative would be to cross the creek branch at this point and continue south along the river. In the early 1990s, the City reportedly owned a historical bridge that might be used for this purpose (DEA, 1992). It is unknown if this bridge is still available. If it is not, a small footbridge could be constructed across the creek branch.

  Along this stretch of the Greenway, construction would involve receiving permission from private property owners to use the easement, paving the trail surface, establishing the connections to the street system at SE 12th Avenue, and landscaping to buffer the trail from private property and to improve aesthetics and wildlife habitat.

Impacts: A Walla Walla River Greenway would be an asset to the City of Milton-Freewater. The establishment of the linear park will be a long-term project that must involve the whole community.

Cost: Cost for the River Greenway would be about $28 per linear foot for the 12-foot wide path, plus landscaping cost of about $0.60 per square foot. Fencing costs range from about $4 per linear foot for square wire material to $12 per linear foot for 6-ft high chain link fencing. Signs are typically $100 to $200 apiece, and lighting can cost from $1,000 to $3,000 per installed pole. A rough total estimate of construction cost is $500,000.

Priority: This project should have a high priority for initiation (within 0-5 years). The Greenway project has been a high priority for the community for a number of years. However, it can be accomplished in phases over a longer period of time.

Option 9. Improve Street Connectivity Between Broadway Street and 5th Avenue by extending Russell Street

Overview: A complete and well-connected grid system consisting of relatively short blocks is an advantage to a community for several reasons. A grid system can minimize excessive volumes of motor vehicles on any one street by providing a series of equally attractive or restrictive travel options. A well-connected street system provides more motor vehicle capacity than a disconnected one. Equally important, a grid system is more pedestrian and bicycle friendly and fosters a higher level of livability. It is likely that Milton-Freewater's general lack of congestion is partly due to its existing grid street system. Ensuring that this grid is extended as development occurs is critical to Milton-Freewater's continued livability.

Street connectivity could be improved in Milton-Freewater in the industrial area north of Broadway Street, east of Ward Street, south of 5th Avenue, and west of Elizabeth Street The City Public Works Director identified the need for a new street connection between Broadway Street and 5th Avenue (along the Russell Street alignment in the north; see Figure 6-4). This new street connection would primarily serve truck traffic that accesses the adjacent commercial properties. The Public Works Director also indicated that the connection would provide better access for the Fire Department.

The City owns most of the right-of-way for this project and the proposed alignment would not require the removal of any existing buildings.

Impacts: This potential improvement option would provide a more direct route to the downtown industrial area for trucks, and would remove truck traffic from approximately six blocks of the Freewater Highway, including from the intersection of Ward Street and Broadway Street (an intersection that was identified by community members as being potentially hazardous).

This short, four-block connection would have two at-grade railroad crossings. Just south of 5th Avenue, this street connection would cross a Union Pacific Railroad mainline. Between 1st and 2nd Avenues, this street connection would cross a spur line of the Union Pacific Railroad. Before this connection can be built, the City will need authorization from ODOT's Rail Section to construct the at-grade railroad crossings. To begin the process, the City must submit an application to ODOT, justifying the need for the crossing as providing convenience and improving the general welfare of the public.

Cost: The cost to construct just the roadway described in this improvement option is estimated to be approximately $192,000, assuming 1,600 feet of new roadway is constructed at a cost of $120 per linear foot. This estimate does not include survey or design costs or any allowance for contingencies which, together, could add 40% to the cost of the project. This estimate does not include the cost to construct curbs or sidewalks, which should be included at a cost of $4 per linear foot of curb and $3 per square foot of sidewalk. The total cost to construct the road with curbs and sidewalks on both sides is estimated to be approximately $250,000. The at-grade railroad crossings will require warning signals with gate arms at a cost of $150,000 at each crossing, as well as new, concrete crossing surfaces at a cost of approximately $100,000 per crossing. The total cost to construct this project is estimated to be approximately $750,000.

Priority: This project is a medium priority, and should be constructed in the next 5-10 years.

Option 10. Improve the Sight Distance at the Intersection of 5th Avenue and Highway 11

Overview: 5th Avenue intersects Highway 11 just north of the new Safeway supermarket. The truck loading docks for the Safeway are located at this intersection. 5th Avenue is used daily by a large number of trucks serving Safeway, as well as by residents whose homes are located along this road. Highway 11 at this intersection is a five-lane roadway, with a relatively straight alignment north and south of 5th Avenue

The TAC and public expressed concern over safety at this intersection because of the large number of slow-moving trucks accessing the Safeway loading docks. The trucks accelerate and decelerate very slowly onto and off of the highway because of the short turning radii of the northwest and southwest corners of the intersection. In addition, community members indicated that trucks routinely stop along the west side of the highway and the north side of 5th Avenue while they await access to the Safeway loading docks. While sight distance along the highway may be adequate under normal conditions, it is not adequate when trucks are stopped on the west side of the highway and on the north side of 5th Avenue

The sight distance inadequacy could be eliminated by prohibiting trucks from stopping within 20 feet of the tangent of the corner of Highway 11 and 5th Avenue on both sides of 5th Avenue. Signing and pavement or curb markings, as well as proper enforcement, would be required for this option to be effective. In addition, the stop sign on 5th Avenue should be reinstalled so that it cannot be blocked by parked trucks.

Impacts: This project would improve safety for vehicles both on the highway and on 5th Avenue.

Cost: Costs associated with this improvement option would be minimal. They would include the cost to purchase and install "No Stopping or Standing" signs on one block of 5th Avenue and a few blocks of Highway 11. Assuming 10 signs were purchased at a cost of $100 each, the cost of this improvement option would be $1,000. Enforcement could be accomplished by existing City Police officers.

Priority: This improvement option would result in improved safety to motor vehicles on both 5th Avenue and Highway 11. The cost to implement this improvement would be minimal. Therefore, this improvement option is recommended as a high priority to be constructed within the next 0-5 years.

Option 11. Implement Speed Control Measures Along Highway 11 on Milton Hill

Overview: Community members are concerned about motorists exceeding the posted speed limits along Highway 11 as they descend Milton Hill and enter the city from the south. Residents would like to have a system developed that would encourage traffic to slow down to a more appropriate speed prior to entering the city.

The typical motorist drives at a speed that is comfortable. Comfort is the result of a combination of roadway design, maintenance, amount and type of traffic, levels of enforcement, and adjacent land uses. In many urban settings where the posted speed limit is less than 35 mph, motorists are comfortable exceeding the posted speed limit because of low levels of traffic and roads that are designed for higher speeds. An inherent conflict is set up when a state highway, with through traffic as its main purpose, is also the main street of a town where slow speeds are more appropriate. This is the situation faced in Milton-Freewater.

Speed control is typically accomplished by using a variety of enforcement techniques and engineered design. Passive speed control measures, such as regulatory signs (stop, speed limit, and speed-activated variable message signs), rely on driver compliance to be effective. This typically makes them less effective at slowing speeds than the physical control of an engineered design. The relatively low cost and ease of installation makes signing attractive to implement on a large-scale. However, it is generally ineffective without stringent and ongoing enforcement.

In areas where inappropriately high traffic speeds are found on existing streets, physical speed controls, commonly known as traffic calming, can be effective. An example of engineered design would be to narrow lanes from the highway standard of 12 feet to 11 or 10 feet within urban areas. This can be done at the time the road is constructed, or can be retrofitted through pavement markings, or by adding bike lanes, sidewalks, medians, and landscape strips. All of these design features signal to the driver that slower speeds are appropriate.

Other engineered designs include speed tables, curb extensions, center medians, and modern roundabouts in intersections. The drawbacks of traffic calming techniques are that they should be planned over an area so that speeding traffic is not displaced onto adjacent, uncalmed streets. Construction costs may also limit extensive use of some techniques.

The TAC and ODOT have suggested a median located at or near the City's southern boundary, in an area where light industrial development is expected to occur. Medians give the appearance of narrowing a roadway, and drivers tend to reduce their speeds when traveling on two-lane roads with center medians. Speeding at this particular location is a problem because, even though the area lies inside the city limits, the adjacent land has not yet been developed so the driver's perception is that he is still in a rural 55 mph speed zone.

Center medians have been demonstrated to slow traffic by narrowing the perceived travel land and signaling to motorists that the roadway character has changed. The Sykes development on the Milton Hill has resulted in the recent striping of a section of deceleration and turn lane, with a striped center median. Once the Sykes project is completed, these pavement markings may act as a traffic slowing device. It is recommended that this situation be monitored to evaluate the effectiveness of the new road treatment. Unfortunately, a pre-installation speed study was not done; however,

monitoring existing traffic speeds on the Milton Hill will allow the City to understand if traffic is exceeding established speed limits.

In the event that traffic speeds continue to significantly exceed the maximum posted limit, even with the Sykes project road improvements, the installation of a raised concrete median at this location would potentially have a stronger effect on motorists, alerting them to the fact that they are entering urban area. The median could begin approximately 800 feet south of the south city limits (the approximate location of the existing Sykes light industrial development (road improvements) and extend 2,600 feet north to 14th Avenue. For the cost estimates, it was assumed that the raised concrete median would be 5 feet wide.

An additional recommendation for Milton Hill is to narrow the travel lanes from 12 feet to 11 feet by restriping the highway with wider shoulders. This would be another method of traffic calming to attempt if the existing road improvements at the Sykes development fail to slow traffic.

Appropriate posted speeds should be posted at regular intervals on the hill as the desired speed diminishes from 55 to 25 mph. Currently, the posted speed limit drops from 55 to 25 mph at the city limits, even though the urbanized area does not extend that far south. As found in several nationwide studies, drivers tend to ignore speed limit signs which they feel to be unreasonable for the roadway conditions and adjacent land uses. A more appropriate treatment for this section of highway would be to move the 25 mph speed zone in closer to the urbanized area and to have a transitional speed zones of 45 mph and 35 mph beginning south of the city limits.

Impacts: Together, the improvement on Highway 11 for the Sykes project and the additional speed signs would announce to the motorist that the nature of the highway is changing from rural to urban, and drivers should slow to more appropriate speeds. Safety would not be compromised by the narrower lanes because the overall paved width of the highway would not change.

Cost: The restriping for the Sykes development has recently been completed. Four new speed limit signs should be purchased and installed for a cost of around $100 each.

The cost to implement the raised median is estimated at approximately $160,000, assuming that a 5-foot wide raised concrete median is constructed for a length of 2,600 feet.

Priority: Installation of new speed limit signs should be implemented as a high priority within the next 0-5 years. In the event that the entrance striping implemented for the Sykes development does not significantly slow traffic, the raised median should also be implemented as a high priority project.

Option 12. Address Capacity Deficiency on Hwy 11 between SE 14th Avenue and Main Street

Overview: The analysis of the year 2018 operating conditions on Highway 11 indicates that the four-lane highway segment between SE 14th Avenue and Main Street will begin to reach levels of unacceptable congestion (LOS D) at that time.

One way to address congestion on this highway segment is to change the lane configuration from four lanes to five lanes (two travel lanes in each direction with a center turn lane). This change would increase the capacity on the through travel lanes by removing left-turning vehicles from the

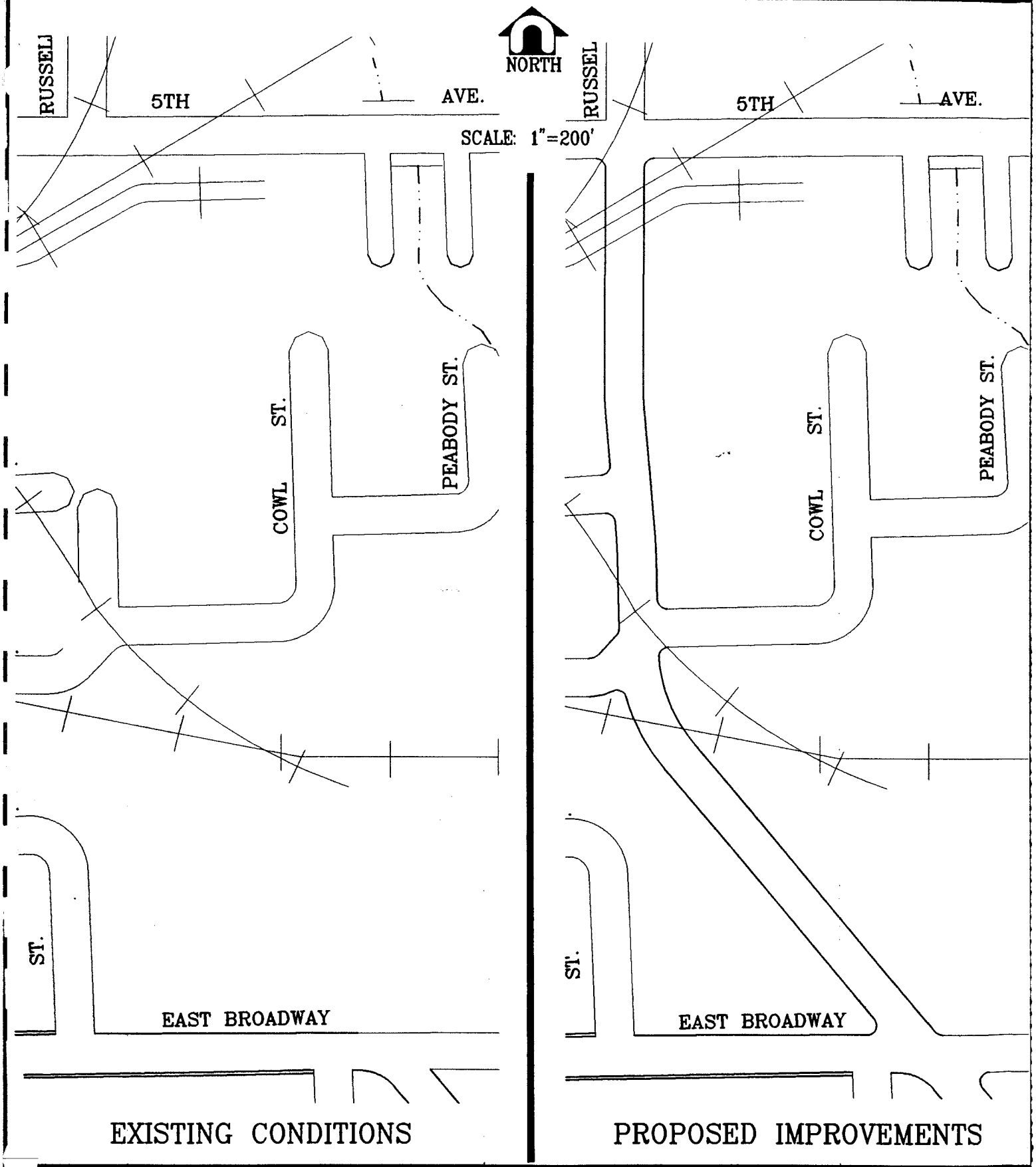

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FIGURE 6-4
STREET CONNECTIVITY
CONNECTION ALONG
RUSSELL STREET ALIGNMENT

general travel lanes. In order to have a five-lane cross section on this highway segment, without widening the paved width, on-street parking would have to be removed from both sides of the street. Entirely removing existing on-street parking is not a viable option in mixed-use areas, and is usually met with strong resistance from local business owners and residents.

A better solution to address congestion on this highway segment is to develop an alternative, parallel route for local trips. Mill Street could be designated and improved to collector standards to serve this purpose. The Public Works Director indicated that Mill Street currently functions as a collector.

The recommended improvement option for this highway segment is to develop Mill Street as a parallel, alternative route to the highway for short, local trips. It is not recommended that the highway be restriped with a five-lane cross section because it would result in lost on-street parking. No immediate improvements are necessary for Mill Street to function as a collector; however, as adjacent land is developed Mill Street should be built to collector standards. Some general information for the public would also be helpful to educate the driving public that Mill Street, rather than the highway, should be used for local trips.

Impacts: The segment of Highway 11 between SE 14th Avenue and Main Street would benefit from fewer short, local trips on the highway; however, the trade-off would be an increase in traffic on Mill Street, which today is a local street serving mostly adjacent residential land uses. This is not to say that alternative, parallel routes to the state highway system should not be allowed in residential areas if designed appropriately, especially for speed reduction. Elizabeth Street is an example of a collector parallel to the highway in a residential area of Milton-Freewater.

Cost: No immediate costs are associated with this improvement option.

Priority: This is a low priority project (10-20 years) since capacity problems on this section of Highway 11 are not expected to develop until toward the far end of the 20-year planning period. This issue should be re-examined every 5 years.

Option 13. Improve the Intersection of Broadway Street and Main Street

Overview: Freewater Highway lies along the Broadway Street (east-west) and Main Street (north-south) alignments at this intersection. This intersection is another location in the city where the highway turns 90° and right turns are permitted without stopping on an approach that is otherwise controlled by a stop sign. Northbound right turns and southbound left turns from the highway currently can be made without stopping. During the public involvement process, community members identified this intersection as a safety hazard and difficult to use. Vehicles approaching this intersection from the side streets (the west approach or the south approach) must cross one to three lanes of highway traffic to enter the highway stream. Eliminating "Right Turn Permitted Without Stop" locations is consistent with current ODOT trends.

One solution for this intersection may be to make this location a four-way stop for all movements. Four-way stops can significantly improve safety. However, they do cause minor delays in traffic movement, and tend to be disobeyed if there is insufficient cross-traffic. One of the primary benefits of this improvement option is the low construction cost. The only cost that would be incurred is the cost to remove the "Right Turn Permitted Without Stop" signs.

Another solution that may lend itself well to this intersection would be to install a modern roundabout that allows continuous movement in all directions (see Figure 6-5). This type of intersection has the advantage of not stopping traffic movement on the state highway, but also allowing local streets continuous and safer access.

A roundabout is an intersection design commonly used in Europe, Australia and Japan that is beginning to be used more widely in this country. Roundabouts use speed reduction and clear right of way to control traffic without expensive signals, and are most typically used in urban and suburban areas. Compared to signalized intersections, modern roundabouts increase capacity by about 30%, reduce crashes by 30% or more, reduce the severity of crashes, and usually cost less to construct than standard signalized intersections. Roundabouts benefit from lower operating and liability costs because there are no signals to maintain or to fail. Because traffic flows at a more even pace, motor vehicle pollution may also be reduced.

Roundabouts operate as a series of T-intersections around a circular or oval island. Approaching vehicles give way to the vehicles on the roundabout and enter when an acceptable gap in the circulating traffic develops. Because traffic speeds are kept low by design, motorists and bicyclists can easily judge when it is safe to enter.

A key feature of roundabouts is that incoming vehicles slow down and yield as necessary, but experience minimal delays. The need for vehicle storage capacity is small compared to signalized intersections, resulting in fewer through lanes and no need for dedicated turn lanes. A single-lane roundabout can typically handle from 750 to 1,500 vehicles per hour, depending on the dimensions and traffic mix. The ideal radius of a roundabout should be large enough to accommodate trucks but small enough to slow traffic speed. Experience shows that a 38- to 50-foot outside radius works best. Unusually large trucks are accommodated by a mountable curb around the island. The lane should be kept under 25 feet in width to prevent vehicles from trying to pass within the roundabout.

Vehicle operators approaching a roundabout must have a clear indication of the layout and the need to slow down. This is usually accomplished by lane curvature, splitter islands at the entrances and exits, and signing and striping. Adequate sight distance permits approaching vehicles and pedestrians to be seen; however, seeing across the island is unnecessary, and landscaping discourages excessive speed.

Pedestrians cross 20 to 40 feet back from the roundabout entrance, usually where a traffic splitter offers a refuge and only one lane needs to be crossed at a time. Pedestrians can cross with greater ease than a conventional intersection because they only have to watch one lane of traffic, crossing distances are short, and vehicle speeds are low.

It is recommended that there be an extensive public involvement and education process associated with the installation of the modern roundabout, since it is a relatively unfamiliar intersection treatment at the present time.

The recommended improvement option for this intersection is a modern roundabout with outside radius of 50 feet (the minimum radius that can accommodate a WB-15 truck on the state highway system).

Impacts: This improvement is intended to increase safety for motor vehicles, pedestrians, and bicyclists. This can be done by requiring all vehicles to stop at this intersection, regardless of whether or not they are continuing along the highway. Negative impacts to traffic operations would be minor, in the form of increased delays at this intersection. A modern roundabout would eliminate the increased delays and increase the capacity of the intersection.

Cost: The cost to construct a modern roundabout at this location is estimated at approximately $30,000, assuming a center island with a 50-foot radius is constructed at a cost of $3 per square foot for concrete and $4 per linear foot for curbs, and that four raised, concrete "traffic splitters" are constructed at each leg of the intersection.

Priority: Because the community does not feel that there is a serious problem at this intersection, this is a medium priority project to be completed within the next 5-10 years.

Option 14. Implement Transportation Demand Management Strategies (Carpooling)

Overview: One of the goals of the Oregon TPR is to reduce reliance on the single-occupant automobile in order to lessen the need for widening and building new roads, as well as to decrease air and noise pollution. The TPR recommends that cities evaluate TDM as part of their TSP Plans. These strategies are designed to diminish the demand on the transportation system by providing facilities for other modes of transportation, implementing carpooling programs, and staggering work schedules at larger employers.

Some types of TDM strategies are more effective in a larger city than Milton-Freewater; however, two types of TDMs would be useful in Milton-Freewater. One is the development of better facilities for modes of transportation other than the automobile. This would include providing paved shoulders, bike lanes, paths, and sidewalks to encourage pedestrians and bicyclists. Another TDM would be to implement a region-wide carpooling program, especially between Walla Walla and Milton-Freewater.

Improvements for Pedestrians and Bicyclists: Options 1 through 7 are specific pedestrian and bicycle improvements identified in recent public and TAC meetings and in previous reports (DEA 1992). All new or reconstructed streets within the urban area of Milton-Freewater must include a walkway or sidewalk (ORS 366.514). According to the TPR, urban arterials must include bike lanes as well. Bike lanes should also be planned for collectors where the average daily trips of motor vehicles is predicted to surpass 3,000, or where there is a special use, such as a school, park, or community pool.

Implementation of a region-wide carpool program is possible. Because intercity commuting is a factor in the region, residents who commute between Milton-Freewater and Walla Walla should be encouraged to carpool with a fellow coworker or someone who works in the same area. In addition, use of the recently revived intercity transit service should be actively encouraged.

Impacts: Improving conditions for pedestrians and bicyclists may reduce the number of short trips taken by car, there by delaying or eliminating the need to widen streets. Adding sidewalks and bikeways also has the advantage of generally improving safety and livability, especially for the youngest and oldest members of the community. Carpooling would have the most impact on the

State highway between Walla Wall and Milton-Freewater by potentially reducing the number of vehicles on the roadway. Carpooling also has the environmental benefits of decreasing air pollution.

Cost: The costs for the specific pedestrian and bicycle improvement options proposed for Milton-Freewater are described in Options 1-7.

Carpooling can take advantage of excess parking at larger retail areas, or parking unused during the week, such as at churches. Costs are typically limited to a full-time or part-time program administrator to provide public education, advertising, and coordinate park and ride lots and signing. For comparison purposes, a rideshare program located in Central Oregon has an annual operating budget of approximately $50,000. ODOT participates in this program by providing approximately 60% of the funding. Because the population base in Milton-Freewater is smaller, a rideshare program could be operated about half of that.

SUMMARY

Table 6-1 summarizes the recommendations for the transportation system based on the evaluation process described in this chapter. Chapter 7 discusses how these improvement options fit into the modal plans for Milton-Freewater.

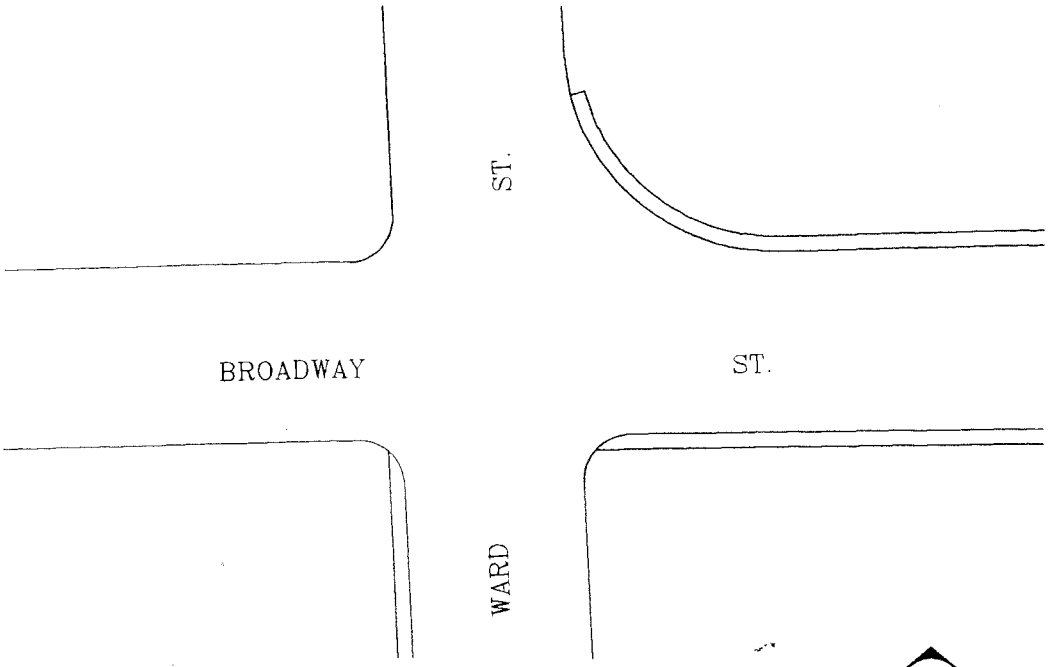
TABLE 6-1

SUMMARY OF TRANSPORTATION OPTIONS

Improvement Option	Priority	Cost
1. Sidewalks on NE 5th Ave, Russell St. to Hwy 11	High	$180,000
2. Sidewalks on NE 5th Ave, Lamb St. to Russell St.	Medium	$30,000
3. Sidewalks on E. side of Main St., 8th Ave to 15th Ave	High	$40,000
4. Pedestrian crossing, Hwy 11 at NE 4th.	Not recommended	
5. Pedestrian crossing, Hwy 11 at SE 8th/9th Ave	High	$13,000
6. Bike lanes on Freewater Hwy	Medium to low	$103,000
7. Bike lanes on Hwy 11	Medium to low	$14,500
8. Multi-use path on Walla Walla River	High	$500,000
9. Extend Russell St.	Medium	$750,000
10. Improve sight distance, 5th Ave/Hwy 11	High	$1,000
11. Speed control on Hwy 11 on Milton Hill	High	$160,400[2]
12. Capacity on Hwy 11, SE 14th Ave & Main St.	Low	$0
13. Intersection of Broadway St. & Ward St.	Medium	$30,000
14. TDM Strategies (Rideshare)- 20 yrs @ $25,000/yr	High	$500,000
TOTAL		$1,659,300

[1] High = 0-5 years; Medium = 5-10 years; Low = 10-20 years

[2] This estimate assume the construction of a raised median.



EXISTING CONDITIONS

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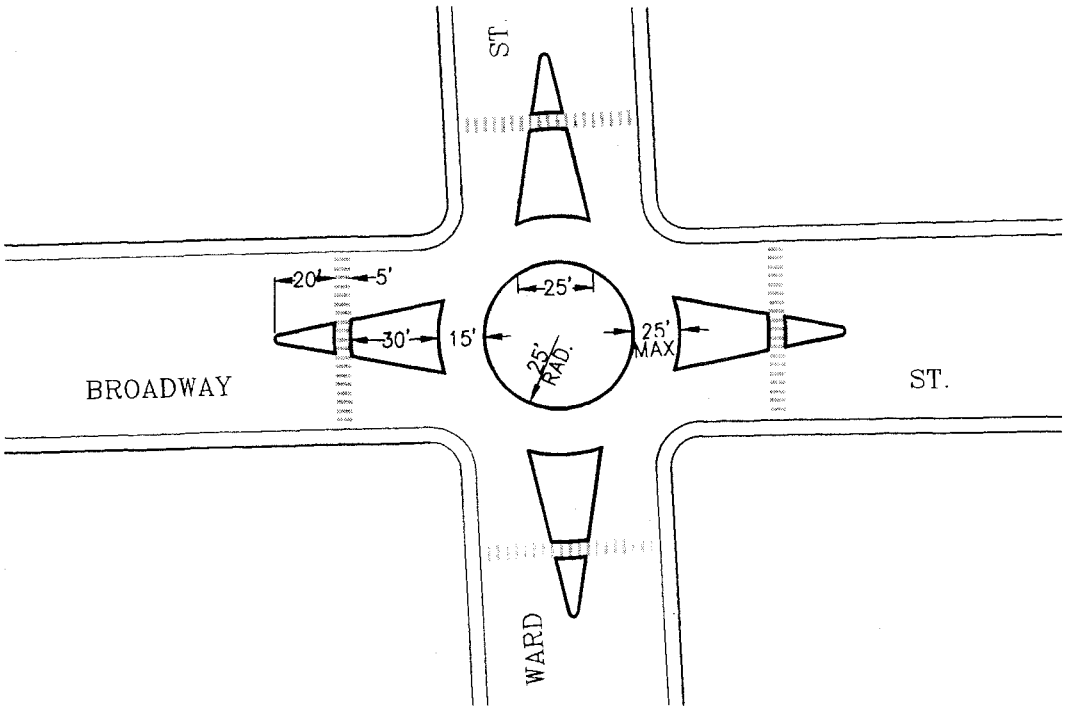

PROPOSED IMPROVEMENTS

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FIGURE 6-5
ROUNDABOUT AT THE INTERSECTION OF BROADWAY AND MAIN STREETS

CHAPTER SEVEN: TRANSPORTATION SYSTEM PLAN

The purpose of this chapter is to provide a detailed transportation system plan that will help to promote the goal and objectives set forth by the Milton-Freewater community. The plan addresses all modes of transportation available in the Milton-Freewater study area, including the street system, pedestrian and bicycle facilities, and rail, air, and pipeline services. The plan also includes existing and recommended street classification standards, recommended access management measures, and transportation demand management measures.

EXISTING STREET CLASSIFICATION STANDARDS

Street classification standards relate the design of a roadway to its function. The function is determined by operational characteristics such as traffic volume, desired speed, safety, and capacity. Street standards are necessary to provide a community with roadways that are relatively safe, attractive, and easy to maintain. The proposed standards are based on experience, research, and State and local policies.

The City of Milton-Freewater has jurisdiction for the design and construction of streets within the city. Umatilla County is responsible for the roads located outside the city limits and within the Milton-Freewater UGB. The Oregon Department of Transportation has jurisdiction for the design and construction of state highways within Milton-Freewater and Umatilla County. Both the City of Milton-Freewater and Umatilla County have street and road design standards. However, the existing standards are incomplete because they do not cover all street types, and are not in compliance with the intent of the TPR because they do not minimize the right-of-way and pavement widths

The existing City of Milton-Freewater street standards are summarized in Table 7-1.

TABLE 7-1
EXISTING MILTON-FREEWATER STREET STANDARDS

Type of Street	Min. Right-of-Way (ft)	Min. Roadway (ft)
Major Arterial	100	Varies
Secondary arterial	80	42
Service and industrial streets	80	42
Collector streets and continuing residential streets	60	40
Minor streets	50	30
Cul-de-sac radius	50	40
Alley	20	20

The development of the Milton-Freewater TSP provides the City and the County with an opportunity to review and revise their street design standards to more closely fit the functional street classification, and the goals and objectives of the TSP.

Figure 7-1 shows the proposed street classification system for all existing and proposed collectors and arterials street level. These street standards are recommended for all areas within the City limits and the urbanizing areas within the UGB. Street design standards corresponding to the proposed

classifications are listed in Table 7-2, illustrated in Figures 7-2 through 7-5, and summarized in the following pages. The street design standards also include provisions for local street standards.

STREET STANDARDS

All recommended street standards include curbs, gutters, and sidewalks. The street standards will be applicable within the Milton-Freewater UGB.

Local Residential Streets

Local residential streets have property access as their main priority; through traffic movement is discouraged. The design of a local residential street affects its operation, as well as the safety and livability of the area that road serves. Local streets should carry less than 1,200 vehicles per day at 15 to 25 mph. If traffic volumes rise above 1,200 vehicles per day, residents begin to notice increased levels of traffic and noise, particularly where the road design encourages excessive speed.

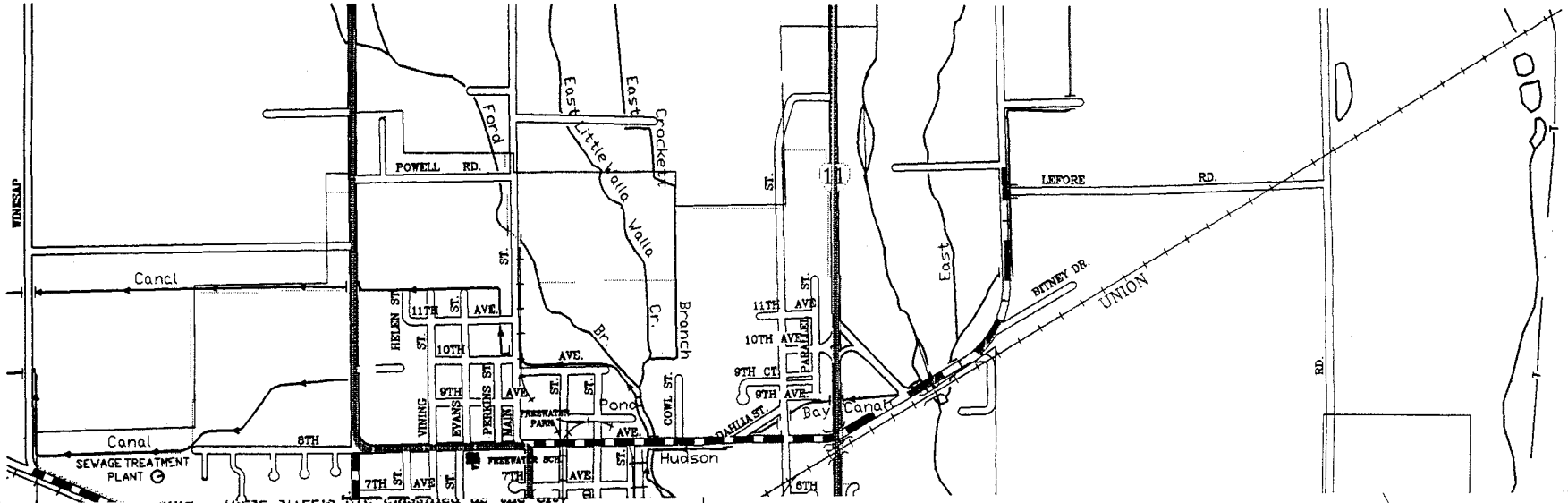
The City of Milton-Freewater has a well established grid system of local streets near the downtown area. A well-connected grid system of relatively short blocks minimizes excessive volumes of motor vehicles by providing a series of equal travel options. A grid street pattern also benefits pedestrians and bicyclists. This type of street development should be the pattern that is maintained as the vacant lands within Milton-Freewater's urban growth boundary are developed.

The standard for a local residential street should be a 28- to 32-foot roadway, from curb face to curb face, within a 50-foot right-of-way. Local residential streets should include 5-foot wide sidewalks located one foot from the property line, 4-foot wide planting strips, and 1-foot wide curbs and gutters on both sides of the street.

The 32-foot cross section, labeled as Option 1 in Figure 7-2, will provide two 10-foot travel lanes with parking on both sides. The 28-foot cross section, labeled as Option 2, will provide two 10-foot travel lanes with parking on one side. Both options provide a narrower street and improved neighborhood aesthetics than the current standard. The narrower width discourages speeding and through traffic, while allowing traffic to move freely but slowly. Both alternatives will also cut down on right-of-way needs, construction costs, stormwater run-off, and need to clear vegetation.

Cul-de-sac, or "dead-end" residential streets, are intended to serve only the adjacent land in residential neighborhoods. These streets should be short, serving 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 or one lane of traffic when vehicles are parked at the curb. The street width of a cul-de-sac street should be a maximum of 24 feet, curb face-to-curb face.

A 5-foot-wide sidewalk with a planting strip should be located on each side of the roadway as well as the cul-de-sac bulb. Because cul-de-sacs 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.



arterials in the 1989 comprehensive Plan and as collectors based on field reconnaissance.

LOCAL STREET

Sources:
Arterial Street Plan for the City of Milton-Freewater
1989 Milton-Freewater Comprehensive Plan
1998 field reconnaissance performed by David Evans and Associates, Inc.

CITY LIMIT

URBAN GROWTH BOUNDARY

NORTH

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FIGURE 7-1
PROPOSED ROADWAY
FUNCTIONAL CLASSIFICATION
MILTON - FREEWATER, OREGON

OPTION 1
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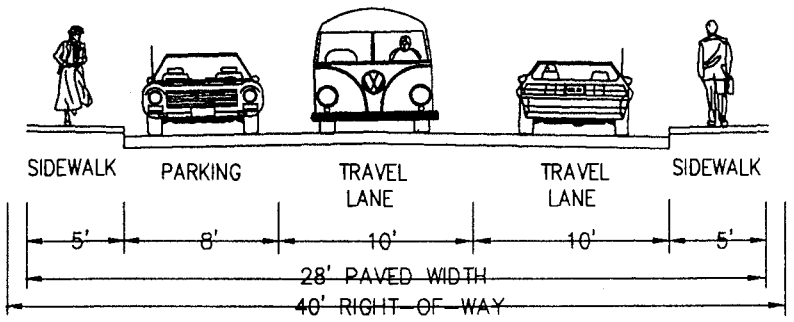

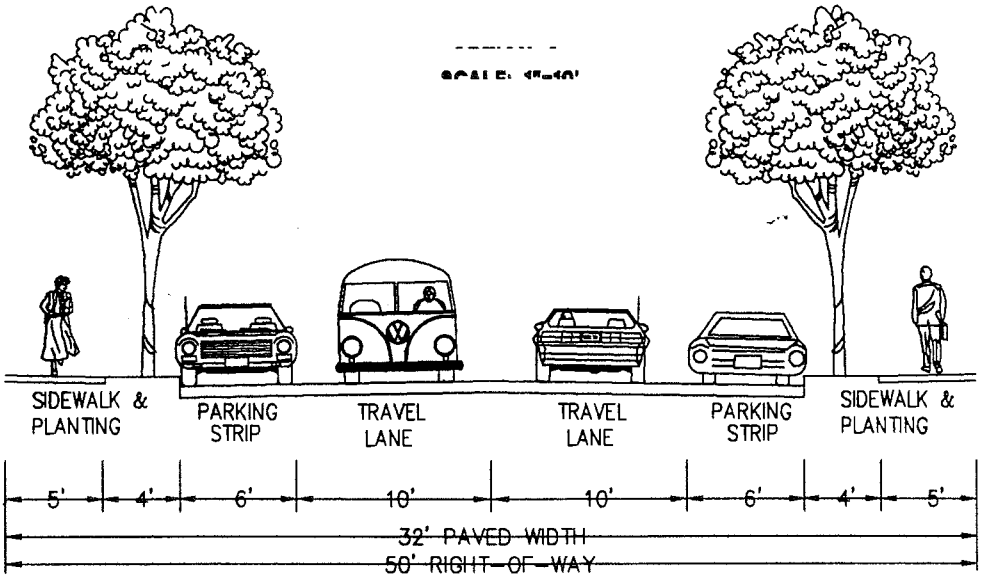

ALLEY

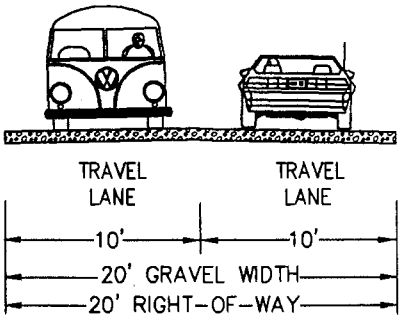

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FIGURE 7-2
RECOMMENDED STREET STANDARDS
LOCAL RESIDENTIAL
AND ALLEY STREETS

Alley should also be included as a local street standard. They can reduce the need for on-street parking, setbacks, and street-facing garages, as well as improving aesthetics by providing storage areas for trash cans, etc. Alleys should be a minimum of 16 feet wide and paved.

TABLE 7-2
RECOMMENDED STREET STANDARDS FOR THE CITY OF MILTON-FREEWATER

Classification	Pavement Width	Right-of-Way Width	Minimum Posted Speed
Local Residential (Figure 7-2):			
1 2 lanes, on-street parking one side, adjacent sidewalks	28 ft.	40 ft.	15-25 mph
2 2 lanes, on-street parking both sides, separated sidewalks	32 ft.	50 ft.	15-25 mph
3 Alleys	16 ft.	20 ft.	15 mph
Collector (Figure 7-3):			
1 2 lanes, on-street parking one side, adjacent sidewalks	29 ft.	50 ft.	25-35 mph
2 2 lanes, on-street parking both sides, separated sidewalks	36 ft.	60 ft.	25-35 mph
Industrial/Service (Figure 7-4):			
1 3 lanes, on-street parking one side, adjacent sidewalks	42 ft.	60 ft.	25-35 mph
2 3 lanes, on-street parking both sides, separated sidewalks	50 ft.	70 ft.	25-35 mph
Arterial (Figure 7-5):			
1 3 lanes, bike lanes, no on-street parking, separated sidewalks	50 ft.	70 ft.	25-35 mph
2 4 lanes, bike lanes, no on-street parking, separated sidewalks	60 ft.	80 ft.	25-45 mph
3 2-lane, on-street parking both sides, wide sidewalks	36 ft.	70 ft.	20 mph

Collector Streets

Collector streets connect residential neighborhoods with smaller community centers and the arterial system; property access is generally a higher priority for collectors than arterials and through traffic is served as a lower priority. They are intended to carry between 1,200 and 5,000 vehicles per day, including limited through traffic, at design speeds of 25 to 35 mph.

Figure 7-3 shows the recommended cross sections for collector streets. The first option consists of two 11-foot wide travel lanes and 7-foot wide parking strips on both sides of the roadway. The resulting paved width is 36 feet. The second option consists of two 11-foot wide travel lanes and a 7-foot wide parking strip on one side of the roadway. The resulting paved width is 29 feet. Both options include 5-foot sidewalks on both sides of the street, set back from the curb by a planting strip.

Both of these recommended cross sections have narrower pavement widths than the existing minimum roadway width of 40 feet for collectors. The 11-foot travel lanes and on-street parking widths of 7 feet provide a narrower road that will discourage speeding and improve neighborhood. Both

alternatives will also cut down on right-of-way needs, construction costs, stormwater run-off, and need to clear vegetation.

Collector streets can also be striped to provide two travel lanes plus left-turn lanes at intersections or driveways by removing parking for short distances. If traffic volume forecasts exceed 5,000 vehicles per day on either type of collector, then driveways serving single-or multi-family houses should not be permitted on that section. In addition, on-street parking should be removed in favor of bike lanes when traffic volumes exceed 5,000, except in commercial areas where on-street parking is needed.

Service and Industrial Streets

Service and Industrial Streets serve short trips, provide access to each adjacent parcel and serve high volumes of truck traffic, at design speeds of 25-35 mph.

Figure 7-4 shows the recommended cross sections for service and industrial streets. The first option consists of one 11-foot wide travel lane in each direction, separated by a center lane for left turns to serve truck traffic, and a parking strip on one side of the roadway. The resulting paved width is 42 feet. This cross section was designed to meet the City's minimum paved roadway width of 42 feet. This option also includes 5-foot sidewalks on both sides of the street. The second option consists of one 11-foot wide travel lane in each direction, separated by a 14-foot center lane for left turns, and 7-foot wide parking strips on both sides of the roadway. The resulting paved width is 50 feet. This option includes 5-foot sidewalks on both sides of the street, set back from the curb by an optional planting strip. Both of these recommended cross sections have center left turn lanes to accommodate the high number of turns anticipated on these roads.

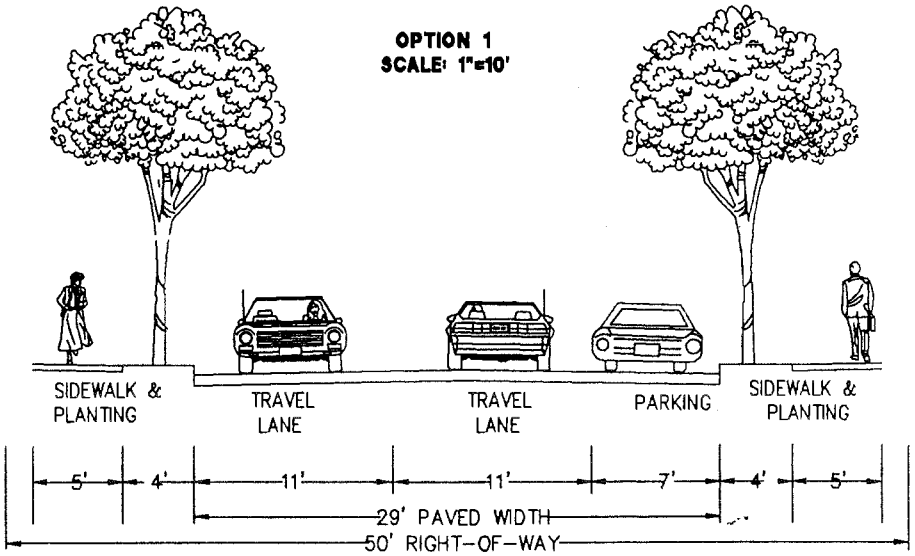
Arterial Streets

Arterial streets connect cities and other major traffic generators; they serve both through traffic and trips of moderate length and access is usually controlled. Arterials are higher volume roadways from the combination of local and through traffic. Traffic volumes typically range between 5,000 and 10,000 vehicles per day. Depending on adjacent land uses, speeds range between 25 and 45 mph.

Three designs were developed for arterials, as shown in Figure 7-5. The first design consists of one 12-foot wide travel lane in each direction, separated by a 14-foot center lane for left turns, 6-foot bike lanes, landscape strips, and no on-street parking. The resulting paved width is 50 feet. Six-foot sidewalks on both sides of the street are also included in this recommended cross section.

The second design consists of two 12-foot wide travel lanes in each direction, 6-foot wide bike lanes, and no on-street parking. The resulting paved width is 60 feet. Six-foot sidewalks on both sides of the street are also included in this recommended cross section.

The third design is a downtown commercial street, created to serve a commercial district with slow traffic speeds and high levels of pedestrian use. In these areas, travel lanes may be narrower, down to 10 feet, on-street parking is a requirement, and sidewalks should be at least 10 feet wide, but can be adjacent to the street. Tree wells should be included in the sidewalk design. Because of slow



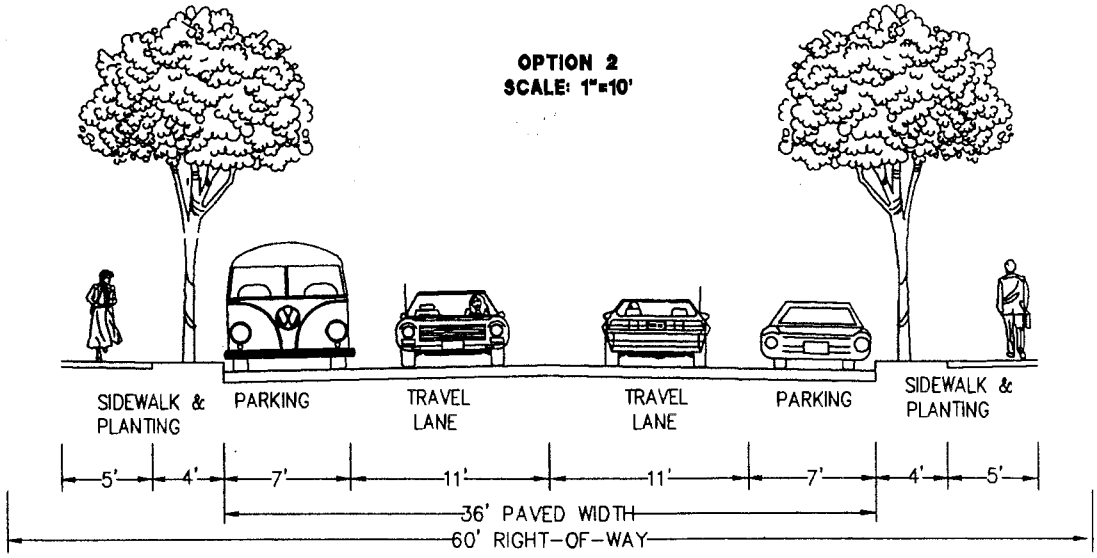


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FIGURE 7-3
RECOMMENDED STREET STANDARDS
COLLECTORS

OPTION 1
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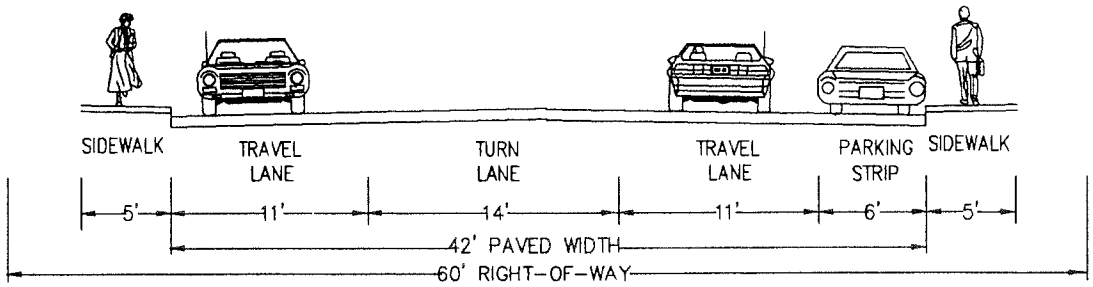

OPTION 2
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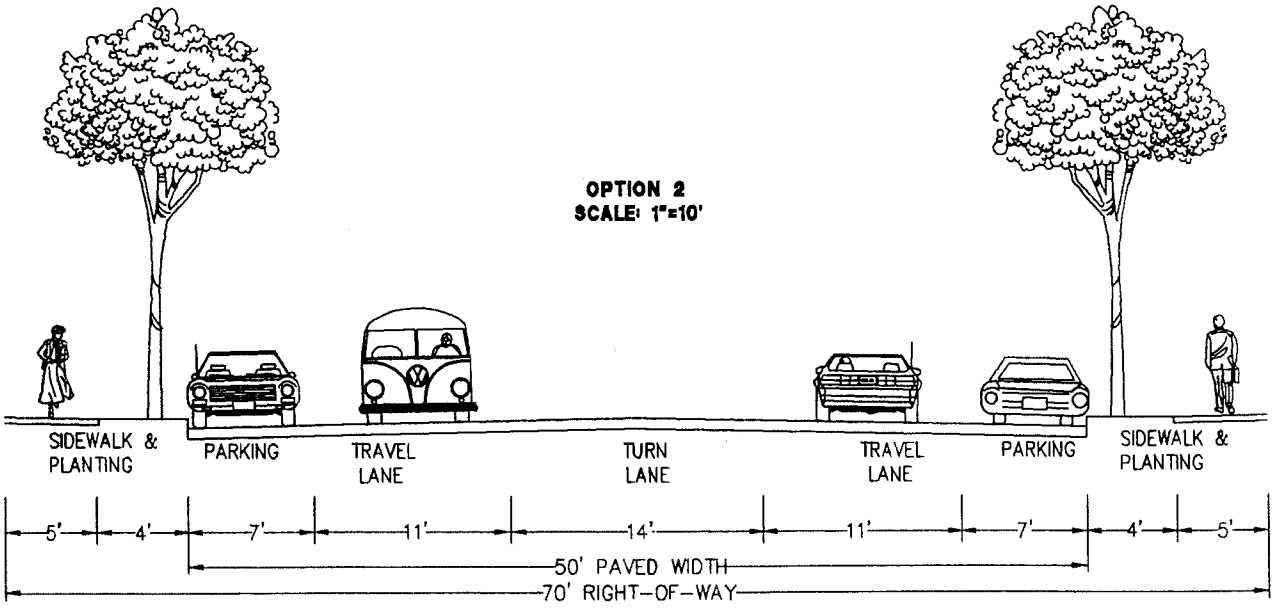

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FIGURE 7-4
RECOMMENDED STREET STANDARDS
SERVICE AND INDUSTRIAL STREETS

FIGURE 7-6
RECOMMENDED STREET STANDARDS
ARTERIAL STREETS

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traffic speeds typical in a downtown core, bike lanes are not required, but can be included if there is no diagonal parking.

ACCESS MANAGEMENT

Access management is an important tool for maintaining a transportation system. Too many access points along arterial streets lead to an increased number of potential conflict points between vehicles entering and exiting driveways, 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. Experience throughout the United States has also shown that a well-managed access plan for a street system can minimize local cost for transportation improvements needed to provide additional capacity or access improvements along unmanaged roadways. Therefore, it is essential that all levels of government maintain the efficiency of existing arterial streets through better access management.

The TPR defines access management as measures regulating access to streets, roads and highways from public roads and private driveways. The TPR requires that new connections to arterials and state highways be consistent with designated access management categories. As the City of Milton-Freewater continues to develop, the street system will be more heavily used for a variety of travel needs. It will become increasingly important to manage access on the existing and future street system as new development occurs.

One objective of the Milton-Freewater TSP is to develop an access management policy that maintains and enhances the integrity (safety, capacity, and function) of the city's streets. Too many access point along a street can contribute to a deterioration of its safety and, on some streets, interfere with traffic flow.

Access Management Techniques

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

- Restricting spacing 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 vehicle queuing onto adjoining roadways.
- Providing acceleration, deceleration, and right-turn only lanes.
- Based on ODOT design and safe operational procedures, 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 along the arterial to restrict access width to a minimum.
- Developing a long-term signal system plan for the state highways consistent with ODOT priorities for optimum signal progression performance.

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 7-3 describes recommended general access management guidelines by roadway functional classification.

TABLE 7-3
RECOMMENDED ACCESS MANAGEMENT STANDARDS

Functional Classification	Intersections			
	Public Road		Private Drive(2)	
	Type(1)	Spacing	Type	Spacing
Arterial				
Highway 11: General (Category 4)	at-grade	¼ mile	L/R Turns	500 ft.
Freewater Highway: General (Category 6)	at-grade	500 ft.	L/R Turns	150 ft.
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

Notes:
(1) For most roadways, at-grade crossings are appropriate.
(2) Allowed moves and spacing requirements may be more restrictive than those shown to optimize capacity and safety. Any access to a state highway requires a permit from the ODOT District Office. Access will generally not be granted where there is a reasonable alternative access.

It should be noted that existing developments and legal accesses on the transportation network will not be affected by the recommended access management techniques until either a land use action is proposed, a safety or capacity deficiency is identified that requires specific mitigation, a specific access management strategy/plan is developed, redevelopment of existing properties along the highway, or a major construction project is begun on the street.

Application

These access management restrictions 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 program 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 11 and the Freewater Highway in Milton-Freewater. The 1991 *Oregon Highway Plan (OHP)* specifies an access management classification system for state facili-

ties. The ~~Draft 1998~~ 1999 Highway Plan (OHP) updates the access management standards and establishes guidelines and criteria to be applied when making access management assignments (also see Highway 82 Corridor Plan). Future developments on state highways (zone changes, comprehensive plan amendments, redevelopment, and/or new development) will be required to meet the 1991 OHP Level of Importance (LOI) and Access Management policies and standards until the ~~1998~~ 1999 Highway Plan is adopted. Although Milton-Freewater may designate state highways as arterial roadways within their transportation systems, the access management categories for these facilities should generally follow the guidelines of the Oregon Highway Plan. This section of the Transportation System Plan describes the state highway access categories and specific roadway segments where special access areas may apply.

ORS 373.020 assigns ODOT with the responsibility of planning access on the State highway system

Future developments on state highways (zone changes, comprehensive plan amendments, redevelopment, and/or new development) will be required to meet the 1991 Oregon Highway Plan Level of Importance (LOI) and Access Management policies and standards. Within urban or urbanizing areas, a new development will need to maintain an 500-foot (*Category 4 highways*) or 150-foot (*Category 6 highways and other arterials*)[3] spacing (centerline-to-centerline) between either existing private or public access points on both sides of the roadway and to either side of the proposed access point. Additional property frontage along the state highway does not guarantee that additional approach roads will be allowed.

Proposed land use actions that do not comply with the designated access spacing policy will be required to apply for an access variance from the City of Milton-Freewater and/or ODOT. In addition, according to the 1991 OHP, the impact in traffic generation from proposed land uses must allow a Level Of Service (LOS) "C" to be maintained for *Category 4* segments within the development's influence area along the highway and a LOS "D" for *Category 6* segments. The influence area is defined as the area in which the average daily traffic is increased by 10% or more by a single development, or 500 feet in each direction from the property-line of the development (whichever is greater). Suggested construction standards for access on all roadways within the City of Milton-Freewater roadway system are listed in Table 7-3.

The existing legal driveway connections, traffic intersection spacing and other accesses to the state highway system are not required to meet the spacing standards of the assigned category immediately upon adoption of this access management plan. However, existing permitted connections not conforming to the design goals and objectives of the roadway classification will be upgraded as circumstances permit and during redevelopment. At any time, an approach road may need to be modified due to a safety problem or a capacity issue that exists or becomes apparent. By statute, ODOT is required to ensure the all safety and capacity issues are addressed.

A conditional access permit may be issued by ODOT and the City of Milton-Freewater for a single connection to a property that cannot be accessed in a manner that is consistent with the spacing standards (shown in Table 7-3). These conditions typically apply to properties that either have no reasonable access or cannot obtain reasonable alternative access to the public road system. The permit should carry a condition that the access may be closed at such time that reasonable access becomes available to a local public street. In addition, approval of a conditional permit might require ODOT-approved

[3] The City of Milton-Freewater currently includes Category 4 and Category 6 segments.

turning movement design standards to ensure safety and managed access. Under special circumstances, ODOT may be required to purchase property in order to prevent safety conflicts.

General

The Milton-Freewater Highway (Highway 11) is a state highway of statewide level of importance. Within the Milton-Freewater UGB, Oregon Highway Plan Category 4, "Limited Control"[4] applies. This classification permits at-grade intersections or interchanges at a minimum spacing of one-quarter mile. Private driveways should have a minimum spacing of 500 feet from each other and from intersections. Traffic signals are permitted at a minimum of one-half mile spacing. These requirements are similar to the general access management guidelines specified for major arterial roadways.

The Freewater Highway is classified as a Category 6 Highway. Within the Milton-Freewater UGB, Oregon Highway Plan Category 6, "Partial Control"[5] applies. This classification permits at-grade intersections at a minimum spacing of 500 feet, private driveway spacing at a minimum of 150 feet,

MODAL PLANS

Pedestrian System Plan

The pedestrian system should provide direct and safe access to all areas of the city and to every land use. Properly configured, the system encourages walking and enables neighbors to know each other and to enjoy their community. The system comprises sidewalks, paths, shoulders in rural areas, crosswalks, curb ramps, signals, signing, and supporting facilities.

Implementation

Every paved street should have sidewalks or walkways on both sides of the roadway meeting the requirements set forth in the street standards. Pedestrian facilities should be provided between all buildings and abutting streets and adjacent neighborhoods. (Ordinances specifying these requirements are included in Chapter 9.) Sidewalks should be added as new streets are constructed and existing streets reconstructed. Sidewalks and other pedestrian facilities may also be added as stand-alone projects as discussed in the next subsection.

Proposed Projects

Table 7-4 lists the specific pedestrian improvements to be accomplished over the next 20 years and rates them to help the City determine implementation priorities. Priorities are merely a guide for pursuing projects by incorporation into the capital improvements list. The proposed pedestrian projects are shown Figure 6-1.

[4] 1991 *Oregon Highway Plan*, Appendix B, Table 1, Access Management Classification System.
[5] 1991 *Oregon Highway Plan*, Appendix B, Table 1, Access Management Classification System.

Unit Costs

The estimated cost represents what it would take to add the improvement to the existing road. Most projects can be accomplished at reduced cost by combining them with other work such as road widening. Because costs vary over time, the figures provided are rough estimates intended to help set priorities and secure funding.

Other Streets

Spot projects along existing streets and intersections, where maintenance becomes a necessity, such as sidewalk infill, crosswalk striping, curb ramps, obstruction removal, and access, improvements should be completed incrementally until all identified needs are satisfied.

TABLE 7-4
PROPOSED PEDESTRIAN PROJECTS

Location	Project Description	Priority(1)	Cost
NE 5th Ave from Russell St. to Hwy 11	Reconstruct sidewalks	High	$180,000
NE 5th Ave from Lamb St. to Russell St.	Reconstruct sidewalks	Medium	$30,000
Main St. from 8th Ave to 15th Ave	Build sidewalk on east side	High	$40,000
Hwy 11 at NE 4th Ave	Provide pedestrian crossing	Not recommended	
Hwy 11 at SE 8th or 9th Ave	Provide pedestrian crossing	High	$8,000
Walla Walla River levee	Construct multi-use path	High	$500,000
		High Priority Total	$728,000
		Medium Priority Total	$30,000
		Low Priority Total	$0
		Total Pedestrian Projects	**$758,000**

(1) High = 0-5 years; Medium = 5-10 years; Low = 10-20 years

Bicycle System Plan

The bicycle system plan aims to provide direct and safe access to all areas of the city. Properly configured, the system encourages bicycling and enables people of average skill to reach most destinations comfortably. The system comprises bike lanes, paths, shoulders on rural roads, shared roadways on low-traffic streets, signals, signing, pavement markings, and parking facilities.

Implementation

Every arterial street should have a designated bikeway, typically bike lanes. Collectors should include bike lanes if traffic volume is expected to be above 3,000 cars per day. All bikeways should meet the requirements set forth in the street standards and in the Oregon Bicycle and Pedestrian Plan. For example, bike lanes should be one-way, marked in the same direction as the adjacent travel lane, five or six feet wide, and located against the curb except where there is curb parking or a right-turn lane in which case the bike lane is located between the travel lane and the parking or turn lane.

Bicycle access should be provided between adjacent neighborhoods in a direct manner, and bicycle parking should be provided at all major destinations. Shared roadways, where bicyclists share nor-

mal travel lanes with motorists, are appropriate for local streets where speeds and volumes of motor vehicles are relatively low (less than 3,000 cars per day).

Shoulders of at least four feet are usually adequate on rural roads that lack a significant destination (school, park, residential subdivision, etc.). Wider shoulders are desirable on truck routes, where traffic volumes are over 1,000 cars per day, and near pedestrian destinations.

Functional bikeways depend on regular maintenance. Sweeping, surface repair, calibration of signal sensors, restriping, and control of vegetation are essential to useful, attractive and enduring facilities. Regular maintenance is often the easiest and most cost-effective means of enhancing the bikeway system. Construction projects should consider a long-term commitment to maintenance for bikeways.

Bikeways should be added as new streets are constructed and existing streets reconstructed.. Bikeways and other bicycle facilities may also be constructed as stand-alone projects where the need exists.

Proposed Projects

The recommended bicycle projects are illustrated in Figure 6-1. Table 7-5 lists the specific improvements that will be needed over the next 20 years and rates them to help the City determine implementation priorities. Each of these options have been discussed in Chapter 6 (Improvement Options Analysis).

The most important attributes in rating a project are its potential use, barrier removal, connectivity, and cost effectiveness. Appropriate design to full standard is assumed unless otherwise stated; projects proposed to lesser standards should be examined to determine if the compromise jeopardizes safety or functionality. Priorities are merely a guide for pursuing projects by incorporation into the capital improvements list. It is difficult to know exactly what developments will be proposed and what funding opportunities will be realized. Projects should be sequenced to take advantage of other road work being performed, and a project should not be overlooked simply because it is a low priority if conditions are favorable to proceed.

Unit Costs

The estimated cost represents what it would take to add the improvement to the existing road. Most projects can be accomplished at reduced cost by combining them with other work such as an overlay. In many cases, the recommended work includes general roadway improvements, such as shoulders, that benefit all users and should be done as part of general roadway upgrades. It has been noted in Table 7-8 if a proposed bicycle improvement project can be part of a street improvement alternative stated in Chapter 6. Because costs vary over time, the figures provided are rough estimates intended to help set priorities and secure funding.

Other Streets

Spot projects, such as grate improvements, pavement patching, bike racks and access improvements, shall be completed incrementally until all identified needs are satisfied. Areas radiating

from schools, shopping areas and major employers generate the most bicycle traffic and should be dealt with first, followed by outlying areas.

Railroad Crossings

Railroad crossings should be upgraded to concrete aprons to eliminate hazards posed to narrow wheels such as those on wheelchairs and bicycles..

Bicycle Parking

Bicycle racks should be installed in front of downtown businesses, large employers, and all public facilities (schools, post office, library, city hall, and parks). Typical rack designs cost about $50 per bicycle plus installation. An annual budget should be established to place racks as needed.

TABLE 7-5
PROPOSED BICYCLE PROJECTS

Location	Project Description (1)	Priority(2)	Cost
Hwy 11	Bike lanes	Medium to low	$103,000
Freewater Hwy	Bike lanes	Medium to low	$14,500
		High Priority	$0
		Medium to Low	$117,500
		Total Bicycle Projects	$117,500

Notes: (1) See Chapter 6 for a detailed description.
(2) High = 0-5 years; Medium = 5-10 years; Low = 10-20 years

Street System Plan

The street system plan outlines a series of improvement options that are recommended for construction within Milton-Freewater during the next 20 years. Each of these options have been discussed in Chapter 6. (Improvement Options Analysis). The proposed street system options are summarized on Table 7-6 and shown on Figure 6-1.

The Transportation Advisory Committee evaluated and ranked the transportation alternatives detailed in Chapter 6 dealing with the street system. A total of 7 improvements were selected and prioritized. The ranking was based on local knowledge of the Milton-Freewater area, traffic circulation and traffic safety concerns, and cost of the improvements.

Transportation Demand Management Plan

As discussed in Chapter 6, TDM is a technique applied to peak travel times to help reduce the use of the transportation network system. A variety of methods are utilized in combination to yield a more efficient transportation system that does not rely upon building new or wider roads to accommodate traffic growth. The most appropriate TDM for the City of Milton-Freewater would be to institute a carpooling program, especially for travel between Milton-Freewater and Walla Walla, Washington.

TABLE 7-6
PROPOSED STREET SYSTEM IMPROVEMENT PROJECTS[1]

Project Description	Priority[2]	Cost ($)
Extend Russell St.	Medium	$250,000
Improve sight distance, 5th Ave/Hwy 11	High	$1,000
Speed control on Hwy 11 on Milton Hill	Medium	$2,400
Capacity on Hwy 11, SE 14th Ave & Main St.	Low	$0
Intersection of Broadway St. & Ward St.	Medium	$30,000
	High Priority Total [3]	$1,000
	Medium Priority Total	$282,400
	Low Priority Total	$0
	Total Street Improvement Projects	**$283400**

Notes: (1) See Chapter 6 for a detailed description.
(2) High = 0-5 years; Medium = 5-10 years; Low = 10-20 years

Carpooling and vanpooling programs help to reduce travel and parking requirements as well as to alleviate traffic congestion and the associated air pollution on fixed roadway systems. Employers can encourage ridesharing through a variety of promotional incentives that include providing matching services subsidizing vanpools, establishing preferential car and vanpool parking, and by providing convenient drop-off sites. The City of Milton-Freewater can encourage carpooling and vanpooling by establishing a ridesharing program that allows interested drivers to call a toll-free number to receive information about coordinating ridesharing with other interested parties.

It is estimated that a rideshare program for the Milton-Freewater area would cost about $25,000 per year, or a total of $500,000 for 20 years. This would pay for a part-time staff member, signage, advertising, and coordination of park and ride lots.

It is also important to encourage bicycling and walking by implementing projects discussed earlier in this plan.

Public Transportation Plan

Public transportation in Milton-Freewater consists primarily of a demand response system for local trips. This includes taxicab service and a senior citizen and special needs transport service. Public transportation for regional and long distance trips is provided by commercial bus service. The City has recently resumed service between Milton-Freewater and Walla Walla in the near future.

The existing public transportation services in Milton-Freewater meet the requirements of the Oregon Transportation Plan. Convenient connections and service frequencies are provided to users. Growth should be guided to encourage future public transportation development.

Rail Service Plan

Milton-Freewater has no passenger rail service. Until recently, AMTRAK service was available in Hermiston and Pendleton along the rail line which follows the Interstate 84 corridor from Portland to Boise, ID and points east. Amtrak is currently experiencing a funding crisis. As a result, passenger service between Portland and Denver, including service to cities within Umatilla county, was

discontinued in May 1997. This line serves only freight traffic now. The City of Milton-Freewater needs to recognize the importance of having passenger service and obtain support by promoting the service to Milton-Freewater residents and outlying communities.

Freight rail service is provided to Milton-Freewater by Blue Mountain Railroad Co. on a line which runs between Weston, OR and Wallula, WA, where there is an interchange with the Union Pacific Railroad. The service is used primarily to transport agricultural products. Service is sporadic, depending on the season, with a maximum of one train per day. Smith Frozen Foods, in Weston, and Garrett Packing (also a frozen food company) in Milton-Freewater are the two major shippers. Blue Mountain Railroad estimates that it runs 250 freight cars per year out of Weston and 100 freight cars per year out of Milton-Freewater, and that the railroad is able to meet the current need for freight rail service.

Air Service Plan

Milton-Freewater does not have its own air service within the city. However, there are several airport facilities nearby. Walla Walla Airport is located in Walla Walla, WA, which is approximately 10 miles north of Milton-Freewater. Eastern Oregon Regional Airport is located in Pendleton, approximately 30 miles southwest of Milton-Freewater. Hermiston Municipal Airport is located in Hermiston, approximately 55 miles southwest of Milton-Freewater. Walla Walla and Eastern Oregon Regional Airports provide commercial service to Portland and Seattle; Hermiston Municipal Airport provides charter service. Other small nearby airports include Oregon Sky Ranch and Kings Airport. These airports are small, private, uncontrolled airstrips mainly used for crop dusting operations. Because the Hermiston and Pendleton airports are governed by their own master plans and Walla Walla Airport is owned and operated by a Washington State Port Authority, recommendations for their improvement do not fall into the scope of this TSP.

Pipeline Service

The use of pipelines can reduce the number of trucks and rail cars carrying fluids such as natural gas, oil, and gasoline. Cascade Natural Gas provides natural gas service to residences and commercial establishments throughout the city as well as some areas outside the city. Their main pipeline runs north-south on the east side of Milton-Freewater and draws from a Northwest Pipeline just east of Mission. Northwest Pipeline, based in Pasco, Washington, is a long-distance (interstate) transporter of natural gas. Currently, the existing demand for natural gas service is met, and no expansions of this service are planned.

Water Transportation

Milton-Freewater has no water transportation services.

CHAPTER EIGHT: FUNDING OPTIONS AND FINANCIAL PLAN

The TPR 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, a review of potential funding mechanisms, and an analysis of existing sources' ability to fund proposed transportation improvement projects. Milton-Freewater's TSP identifies over $1.8 million in 15 specific projects over the next 20 years. This section of the TSP provides an overview of Milton-Freewater's revenue outlook and a review of some funding and financing options that may be available to the City to fund the improvements.

Milton-Freewater will need to work with Umatilla County and ODOT to finance the potential 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. This TSP assumes Milton-Freewater will grow at an annual rate of 1.5%. If population growth exceeds this rate, the improvements may need to be accelerated. Slower than expected growth will relax the improvement schedule.

HISTORICAL STREET IMPROVEMENT FUNDING AND EXPENDITURES

Revenues and expenditures for the City of Milton-Freewater's Street Fund are shown in Table 8-1. Sources of revenues available for street operations and maintenance include the state highway fund, interest from the working capital balance, and grants for specific projects.

TABLE 8-1
CITY OF MILTON-FREEWATER STREET FUND REVENUES

	1996 Actual	1997 Actual	1998 Estimate	1999 Proposed
Beginning Balance	$192,789	$71,679	$131,363	$158,077
Assessment Interest	$381	$499		
Assessment Principal	$2,043			
State Landscaping Contract		$36,322		
State Gas Tax	$271,586	$264,485	$293,000	$300,900
Urban Renewal Agency Support				$70,000
OR State STP allocation				$95,253
County Storm Water Match				$5,000
Community Development Block Grant				$150,000
Weed Abatement		$6,986	$5,000	$4,500
Merchandising	$9,066	$87	$100	$100
Dust Control		$462	$250	$500
Interest	$4,134	$4,280	$7,500	$4,400
Misc	$11,238	$384	$2,000	
Note Proceeds				$63,000
Transfer from Street Improvement				$25,000
	$298,448	$313,505	$307,850	$718,653

Source: The City of Milton-Freewater

As shown in Table 8-2, funds from the State Highway Fund provide a large proportion (about 90%) of the revenues available to the City of Milton-Freewater's Street Fund. The 1999 proposed budget anticipates a larger proportion of the budget attributable to specific grant funds.

TABLE 8-2
CITY OF MILTON-FREEWATER STREET FUND EXPENDITURES

	1996 Actual	1997 Actual	1998 Estimate	1999 Proposed
Street Maintenance	$256,728	$134,401	$170,634	$273,533
Street Cleaning	$47,214	$50,046	$42,080	$49,077
Snow Control	$14,355	$13,799	$13,407	$19,103
Street Construction	$9,706	$41,397	$420	$391,000
Storm Drainage	$82,590	$2,827	$52,408	$111,521
Weed Abatement			$13,613	$15,739
Traffic Control	$8,965	$11,351	$20,744	$16,757
	$419,558	$253,821	$313,306	$876,730

Source: City of Milton-Freewater

Over one-half of the Street Fund expenditures are used for maintenance, with fairly small amounts (an amount estimated to be as low as $420 in 1998) available for street construction projects. In 1996, a Street Improvement Fund was established to account for revenues collected from street opening permits. Resources from this and other funds are expected to pay for the reconstruction of NE 5th Avenue. Its short balance-sheet history is shown below in Table 8-3.

TABLE 8-3
CITY OF MILTON-FREEWATER STREET IMPROVEMENT FUND

	1997 Actual	1998 Estimate	1999 Proposal
Beginning Fund Balance		$690	$31,090
Revenues			
Licenses & Permits	$688	$5,000	$5,000
Interest	$2	$400	$1,000
Transfer from General Fund		$25,000	
	$690	$30,400	$6,000
Expenditures			
Transfer to Street Fund			$25,000
Capital Projects		$-	$12,090
	$-	$-	$37,090

Source: City of Milton-Freewater.

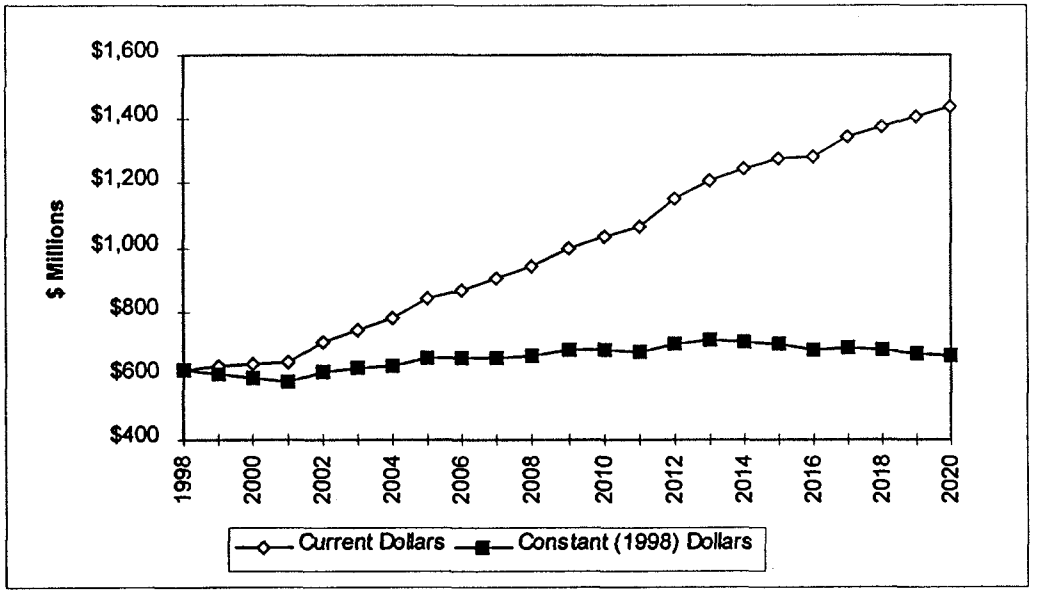
Transportation Revenue Outlook in the City of Milton-Freewater

ODOT's policy section recommends certain assumptions in the preparation of TSPs. In its *Financial Assumptions* document (May 1998), ODOT projected the revenue of the State Highway Fund through 2020. The estimates are based on not only the political climate, but also the economic structure and conditions, population and demographics, and patterns of land use.

This requirement will affect the 20-year revenue forecast from the fuel tax. ODOT recommends the following assumptions:

- Fuel tax increases of 1 cent/gallon/year (beginning in 2002), with an additional 1 cent/gallon every 4th year;
- Vehicle registration fees would be increased by $10/year in 2002, and by $15/year in year 2012;
- The revenues will be shared among the state, counties, and cities on a "50-30-20%" basis rather than the previous "60.05-24.38-15.17%" basis;
- Inflation occurs at an average annual rate of 3.6%.

Figure 8-1 shows the forecast in both current-dollar and inflation-deflated constant (1998) dollars. As highlighted by the constant-dollar data, the highway fund is expected to grow slower than inflation early in the planning horizon until fuel-tax and vehicle-registration fee increases occur in 2002, increasing to a rate somewhat faster than inflation through 2015, continuing a slight decline through the remainder of the planning horizon.



Source: ODOT Financial Assumptions.

As the State Highway Fund is expected to remain a significant source of funding for Milton-Freewater, the City is highly susceptible to changes in the State Highway Fund. From 1994 to 1998, the State Highway Fund supplied over 85% of Milton-Freewater's total street fund revenue. In order to analyze the City's ability to fund the recommended improvements from current sources, DEA applied the following assumptions:

- ODOT State Highway Fund assumptions as outlined above;
- The State Highway Fund will continue to account for the majority of the City's Street Fund;
- Interest and other local sources continue to provide stable revenue streams; and
- The proportion of revenues available for capital expenditures for street improvements will remain a stable, but small, proportion (about 6%, as averaged for years 1996, 1997, and 1998) of the state tax resources.

Applying these assumptions to the estimated level of the State Highway Fund resources, as recommended by ODOT, resources available to the Milton-Freewater for all operations, maintenance, and capital outlay purposes are estimated at approximately $260,000 to $320,000 annually (in current 1998 dollars), as shown in Table 8-4.

TABLE 8-4
ESTIMATED RESOURCES AVAILABLE TO MILTON-FREEWATER FROM STATE HIGHWAY FUND, 1998 DOLLARS

Year	Total Estimated Resources: State Highway Fund	Estimated Funds Available for Capital Outlay
1999	$271,000	$17,900
2000	$265,000	$17,500
2001	$259,000	$17,100
2002	$274,000	$18,100
2003	$278,000	$18,300
2004	$282,000	$18,600
2005	$294,000	$19,400
2006	$291,000	$19,200
2007	$293,000	$19,300
2008	$294,000	$19,400
2009	$303,000	$19,900
2010	$303,000	$19,900
2011	$301,000	$19,800
2012	$313,000	$20,600
2013	$318,000	$21,000
2014	$316,000	$20,800
2015	$313,000	$20,600
2016	$304,000	$20,000
2017	$307,000	$20,200
2018	$303,000	$20,000
2019	$299,000	$19,700

The amount actually received from the State Highway Fund will depend on a number of factors, including:

- The actual revenue generated by state gasoline taxes, vehicle registration fees, and other sources; and
- The population growth in Milton-Freewater (since the distribution of state highway funds is based on an allocation formula which includes population).

Based on the amount of resources historically available to fund capital improvements this analysis suggests that the City of Milton-Freewater will have between $17,000 and $21,000 available annually for capital improvements.

REVENUE SOURCES

In order to finance the recommended transportation system improvements requiring expenditure of capital resources, it will be important to consider a range of funding sources. Although the property tax has traditionally served as the primary revenue source for local governments, property tax revenue goes into general fund operations, and is typically not available for street improvements or maintenance. Despite this limitation, 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. The alternative revenue sources described in this section may not all be appropriate in Milton-Freewater 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 source 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, in large part, 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 to base taxes upon. This is as opposed 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% 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 is changing with the passage of Ballot Measure 5 in the early 1990s. Ballot Measure 5 limits 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 the 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.

Measure 47, an initiative petition, was passed by Oregon voters in November 1996. It is 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 the 1995-96 tax minus 10%, or the 1994-95 tax. It limits future annual property tax increases 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% voter participation.

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.

The League of Oregon Cities (LOC) estimated that direct revenue losses to local governments, including school districts, will total $467 million in fiscal year 1998, $553 million in 1999, and increase 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 increase thereafter because of increased personal and corporate tax receipts due to lower property tax deduction.

Measure 50 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.

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 SDCs 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.

Typically, the fee is collected when new building permits are issued. The City 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 employee ratios for the type of business or industrial uses. The SDC revenues would help fund the construction of transportation facilities necessitated by new devel-

opment. For example, the City of Pendleton has recently adopted SDCs for transportation improvements.

A key legislative requirement for charging SDCs is the link between the need for the improvements and the developments being charged. As the need for the recommended capital improvements in Milton-Freewater does not result from new development or capacity constraints, SDCs could not be used to fund them.

State Highway Fund

Gas tax revenues received from the State of Oregon are used by all counties and cities to fund street and road construction and maintenance. In Oregon, the State collects gas taxes, vehicle registration fees, overweight/ overheight fines and weight/mile taxes and returns a portion of the revenues to cities and counties through an allocation formula. The revenue share to cities is divided among all incorporated cities based on population. Like other Oregon cities, the City of Milton-Freewater uses its State Gas Tax allocation to fund street construction and maintenance.

Local Gas Taxes

The Oregon Constitution permits counties and incorporated cities to levy additional local gas taxes with the stipulation that the moneys 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) which levy a local gas tax. The City of Milton-Freewater may consider raising its local gas tax as a way to generate additional street improvement funds. However, with relatively few jurisdictions exercising this tax, an increase in the cost differential between gas purchased in Milton-Freewater and gas purchased in neighboring communities may encourage drivers to seek less expensive fuel elsewhere. Any action will need to be supported by careful analysis to minimize the unintended consequences of such an action.

Vehicle Registration Fees

The Oregon Vehicle Registration Fee is allocated to the State, counties and cities for road funding. Oregon counties are granted authority to impose a vehicle registration fee covering the entire county. The Oregon Revised Statutes would allow Umatilla County to impose a biannual registration fee for all passenger cars licensed within the County. Although both counties and special districts have this legal authority, vehicle registration fees have not been imposed by local jurisdictions. In order for a local vehicle registration fee program to be viable in Umatilla County, all the incorporated cities and the county would need to formulate an agreement that would detail how the fees would be spent on future street construction and maintenance.

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.

GRANTS AND LOANS

There are a variety of grant and loan programs available, most with specific requirements relating to economic development or specific transportation issues, rather than for the general construction of new streets. Many programs require a match from the local jurisdiction as a condition of approval. Because grant and loan programs are subject to change as well as statewide competition, they should not be considered a secure long-term funding source for Milton-Freewater. Most of the programs available for transportation projects are funded and administered through ODOT and/or the Oregon Economic Development Department (OEDD). Some programs which may be appropriate for the Milton-Freewater are described below.

Bike-Pedestrian Grants

By law (ORS 366.514), all road street or highway construction or reconstruction projects must include facilities for pedestrians and bicyclists, with some exceptions. 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. An 80% state/20% local match ratio is required. Eligible projects include curb extensions, pedestrian crossings and intersection improvements, shoulder widening and restriping 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 the acquisition of right-of-way, or have environmental impacts should be submitted to ODOT for inclusion in the STIP.

Enhancement Program

This federally-funded program earmarks $8 million annually for projects in Oregon. 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 for eligibility. Each proposed project is evaluated against all other proposed projects in its region. Within the five Oregon regions, the funds are distributed on a formula based on population, vehicle miles traveled, number of vehicles registered and other transportation-related criteria. The solicitation for applications was mailed to cities and counties the last week of October 1998. Local jurisdictions have until January 1999 to complete and file their applications for funding available during the 2000-2003 fiscal years which begin October 1999.

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. They are ranked against other projects statewide, and require state and local matches of 10% each. It includes the Local Bridge Inspection Program and the Bridge Load Rating Program.

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 coordination a number of statewide programs. These funds are intended to be used as seed money, funding a program for three years. Eligible programs include programs in impaired driving, occupant protection, youth, pedestrian, speed, enforcement, 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.

Special Transportation Fund

The Special Transportation Fund (STF) awards funds to maintain, develop, and improve transportation services for people with disabilities and people 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 these funds are distributed to mass transit districts, transportation districts, and where such districts do not exist, counties, on a per-capita formula. The remaining funds are distributed on a discretionary basis.

Special Small City Allotment Program

The Special Small City Allotment Program (SCA) is restricted to cities with populations under 5,000 residents. Unlike some other grant programs, 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. Criteria for the $1 million in total annual grant funds include traffic volume, the five-year rate of population growth, surface wear of the road, and the time since the last SCA grant.

Immediate Opportunity Grant Program

The Oregon Economic Development Department (OEDD) and ODOT collaborate to 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 are primary factors in determining eligible projects for the Immediate Opportunity Grant Program:

- 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 which have received grants under the program include: Washington County, Multnomah County, Douglas County, the City of Hermiston, 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 1995 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 which support commercial and industrial development that result in permanent job creation or job retention. To be awarded funds, each 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, and 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 the cities of Baker City, Bend, Cornelius, Forest Grove, Madras, Portland, Redmond, Reedsport, Toledo, Wilsonville, Woodburn, and Douglas County.

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 accesses, and right-of-way costs. Capital outlays such as buses, light-rail cars and lines, maintenance years and passenger facilities are also eligible.

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 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 Milton-Freewater. 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 (GO) bonds 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 3% 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, 47, and 50. Although new bonds must be specifically voter approved, Measure 47 and 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, 47, and 50.

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, 47, and 50. As a result, since 1991, Bancroft bonds have not been used by municipalities who were required to compress their tax rates.

FUNDING REQUIREMENTS

Milton-Freewater's TSP identifies both capital improvements and strategic efforts recommended during the next 20 years to address safety and access problems and to expand the transportation system to support a growing population and economy. The TSP identifies 15 projects, classified into three priority levels:

- High priority: within the next five years;
- Medium priority: between year six and year 10; and
- Low priority: after year 10.

Estimated costs by project, listed by priority level are shown in Table 8-5.

TABLE 8-5
RECOMMENDED PROJECTS AND FINANCIAL RESPONSIBILITY

Priority Level and Improvement Option	Cost	Responsibility
High Priority		
Sidewalks on NE 5th Ave, Russell St. to Hwy 11	$180,000	City
Sidewalks on E. side of Main St., 8th Ave to 15th Ave	$40,000	ODOT
Pedestrian crossing, Hwy 11 at SE 8th/9th Ave	$8,000	City/ODOT
Multi-use path on Walla Walla River	$500,000	City
Improve sight distance, 5th Ave/Hwy 11	$1,000	City/ODOT
TDM Strategies (Rideshare)- 20 yrs @ $25,000/yr	$500,000	City/ODOT
Speed control on Hwy 11 on Milton Hill	$160,400	ODOT
High Priority Subtotal	*$1,389,400*	
Medium Priority		
Sidewalks on NE 5th Ave, Lamb St. to Russell St.	$30,000	City/ODOT
Intersection of Broadway St. & Ward St.	$30,000	ODOT/City
Extend Russell St.	$250,000	City
Medium Priority Subtotal	*$310,000*	
Low Priority		
Bike lanes on Freewater Hwy*	$103,000	ODOT
Bike lanes on Hwy 11*	$14,500	ODOT
Capacity on Hwy 11, SE 14th Ave & Main St.	$0	ODOT/City
Low Priority Subtotal	*$117,500*	
TOTAL FOR ALL PRIORITY LEVELS	**$1,816,900**	

Seven of the projects, totaling an estimated $1.4 million, have been classified as high priority. This classification is attached to the projects which the City would like to see completed within five years of

completion of this plan. One of these recommendations involves development of TDM strategies, not an actual capital improvement "project," but still an important commitment of resources. Another four projects are estimated to cost around $283,000 and are classified as medium priority. The remaining four projects have been classified as low-priority projects. They have an estimated total cost of $147,000 and are scheduled for years 10 through 20 of the planning horizon.

Based on current revenue sources for the City of Milton-Freewater and the improvements identified in this Transportation System Plan, the City is not expected to be able to fund the projects in the high- and medium-priority classifications, as shown in Table 8-6. Based on the current project list and its priority classifications, the City is expected to experience a budget deficit of $1.1 million in the first five years, growing to a $1.3 million deficit in the second five years of the planning horizon.

TABLE 8-6
ESTIMATED CAPITAL FUNDING BALANCE

	Available	Needed	Surplus (Deficit)	Cumulative Surplus (Deficit)
High Priority	$88,900	$1,389,400	$(1,300,500)	$(1,300,500)
Medium Priority	$95,900	$310,000	$(214,100)	$(1,514,600)
Low Priority	$222,500	$117,500	$105,000	$(1,409,600)

Many jurisdictions look to System Development Charges to fund public works infrastructure; however, the projects identified for Milton-Freewater are not a direct result of new development. Because a key legislative requirement for charging SDCs is the link between the need for the improvements and the developments being charged, SDCs could not be used to fund these public improvements.

If jobs are created or retained as a result of these improvements, the projects may be eligible for certain grant monies, such as the Immediate Opportunity Grant Program or the Oregon SPWF (which offers both grants and loans).

FUNDING OPTIONS CONCLUSIONS

This Transportation System Plan identifies 15 projects recommended for the City of Milton-Freewater over the 20-year planning horizon. The cost of the projects is estimated at over $1.5 million in current 1998 dollars. Although the City expects some funding available for capital improvements, the amount will be limited to approximately $407,000 over the next 20 years; with project requirements of around $1.8 million, relying on existing funding sources would result in a budget shortfall of over $1.4 million over the 20-year planning horizon. The City of Milton-Freewater will need to work with Umatilla County and ODOT to explore grants, loans, and other alternative sources of funding to finance these transportation projects over the 20-year planning horizon.

CHAPTER NINE: IMPLEMENTATION

Implementation of the Milton-Freewater Transportation System Plan will require both changes to the city comprehensive plan and zoning code and preparation of a 20-year Capital Improvement Plan. These actions will enable Milton-Freewater to address both existing and emerging transportation issues throughout the urban area in a timely and cost-effective manner. This implementation program is geared towards providing Milton-Freewater with the tools to amend the comprehensive plan and zoning ordinance to conform with the Oregon TPR and to fund and schedule transportation system improvements. It is recommended that the City of Milton-Freewater take the following actions to adopt and implement the TSP.

- Amend policies of the Milton-Freewater Comprehensive Plan as detailed in this chapter.
- Amend the Milton-Freewater Zoning Ordinance as detailed in this chapter.
- Amend the Milton-Freewater Subdivision Ordinance as detailed in this chapter.
- Incorporate the prioritized capital improvement plan, detailed in Chapter 8, into the existing Milton-Freewater Capital Improvement and Public Facilities Plans.

RECOMMENDED COMPREHENSIVE PLAN AMENDMENTS

Revisions to Findings, Policies, and Conclusions 12-E and 12-F

Finding 12-E: The TPR (660-12-045(3)) requires that urban areas plan for bicycling and walking as part of the overall transportation system.

- Policy 12-E-1: The City of Milton-Freewater shall provide safe and convenient pedestrian and bicycle circulation through the following actions:
  - ⇒ Development of a network of streets, accessways, and other improvements, including bikeways, sidewalks, and safe street crossings to promote safe and convenient bicycle and pedestrian circulation within the community.
  - ⇒ Streets and accessways shall be provided to provide direct and convenient access to major activity centers, including downtown, schools, shopping areas, and community centers.
  - ⇒ Bikeways shall be included on all new arterials and major collectors within the UGB.
  - ⇒ Retrofit existing arterials with bike lanes on a prioritized schedule as shown in the TSP.
  - ⇒ Sidewalks shall be included on all new streets within the UGB.
  - ⇒ Retrofit existing streets with sidewalks on a prioritized schedule as shown in the TSP.
  - ⇒ Bikeways and pedestrian accessways shall be designed and constructed following the guidelines of the Oregon Bicycle and Pedestrian Plan.
  - ⇒ Bicycle parking facilities be provided at all new residential multifamily developments of four units or more, commercial, industrial, recreational, and institutional facilities.
  - ⇒ Establish a citizens advisory committee to protect and promote bicycle and pedestrian transportation within the UGB.

Additions to Findings and Policies 12H, I and J

Finding 12-H: Section 660-12-045(1) of the TPR requires that cities and counties amend their land use regulations to conform with the jurisdiction's adopted Transportation System Plan. This section of the TPR is intended to clarify the approval process for transportation-related projects. The approval process for different types of projects should be clear.

- Policy 12-H-1: The City of Milton-Freewater will provide a clear and objective process for the approval of transportation projects.
- Policy 12-H-2: The Milton-Freewater TSP is an element of the City of Milton-Freewater Comprehensive Plan. As such, it identifies the general location of transportation improvements and allows the following actions without land use review:
  - ⇒ Changes in the specific alignment of proposed public road and highway projects are permitted without plan amendment if the new alignment falls within a transportation corridor identified in the TSP.
  - ⇒ Operation, maintenance, repair, and preservation of existing transportation facilities without land use review, except where specifically regulated.
  - ⇒ Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, for improvements designated in the TSP, the classification of the roadway and approved road standards without land use review.
  - ⇒ Changes in the frequency of transit, rail and airport services that are consistent with the TSP without land use review.
- Policy 12-H-3: Draft Environmental Impact Studies (EIS) or Environmental Assessments (EA) will serve as the documentation for State projects that require local land use review, if local review is required in the following circumstances:
  - ⇒ Where the project is consistent with the TSP, formal review of the draft EIS or EA and concurrent or subsequent compliance with applicable development standards or conditions;
  - ⇒ Where the project is not consistent with the TSP, formal review of the draft EIS or EA and concurrent completion of necessary goal exceptions or plan amendments.

Finding 12-I: Section 60-12-045(2) of the TPR requires that jurisdictions protect future operation of transportation corridors. In addition, the proposed function of a future roadway and other transportation facilities, such as airports, must be protected from incompatible land uses.

- Policy 12-I-1: The City of Milton-Freewater will protect the operation of existing and future transportation facilities as identified in the TSP through the use of one or more of the following actions:
  - ⇒ Consider the impact of all land use decisions on existing or planned transportation facilities.
  - ⇒ Protect the function of existing or planned transportation corridors through appropriate land use regulations.

⇒ Consider the potential to establish or maintain accessways, paths, or trails prior to the vacation of any public easement or right-of-way.

⇒ Preserve right-of-way for planned transportation facilities through exactions, voluntary dedication, or setbacks.

Finding 12-J: Section 660-12-045(2)(d) of the TPR requires that jurisdictions develop a process for the coordinated review of land use decisions affecting transportation facilities.

- Policy 12-J-1: The City of Milton-Freewater will provide coordinated review of land use decisions affecting transportation through the use of one or more of the following actions:.

  ⇒ Coordinate with ODOT to implement the highway improvements listed in the STIP that are consistent with the TSP and comprehensive plan.

  ⇒ Consider the findings of ODOT's draft EISs and EAs as integral parts of the land use decision-making procedures.

RECOMMENDED ADDITIONS TO THE ZONING ORDINANCES

Chapter 10-2: Construction and Definitions

10--2-2 DEFINITIONS

ACCESS. A way or means of approach to provide pedestrian, bicycle, or motor vehicular entrance or exit to a property.

ACCESS CONNECTION. Any driveway, street, turnout or other means of providing for the movement of vehicles to or from the public roadway system.

ACCESS MANAGEMENT. The process of providing and managing access to land development while preserving the regional flow of traffic in terms of safety, capacity, and speed.

ACCESSWAY. A walkway that provides pedestrian and bicycle passage either between streets or from a street to a building or other destination such as a school, park, or transit stop. Accessways generally include a walkway and additional land on either side of the walkway, often in the form of an easement or right-of-way, to provide clearance and separation between the walkway and adjacent uses. Accessways through parking lots are generally physically separated from adjacent vehicle parking or parallel vehicle traffic by curbs or similar devices and include landscaping, trees, and lighting. Where accessways cross driveways, they are generally raised, paved, or marked in a manner that provides convenient access for pedestrians.

BICYCLE. A vehicle designed to operate on the ground on wheels, propelled solely by human power, upon which any person or persons may ride, and with two tandem wheels at least 14 inches in diameter. An adult tricycle is considered a bicycle.

BICYCLE FACILITIES. A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities and all bikeways.

BIKEWAY. Any road, path, or way that is some manner specifically open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are shared with other transportation modes. The five types of bikeways are:

⇒ *Multi-use Path. A paved 10 to 12-foot wide way that is physically separated from motorized vehicular traffic; typically shared with pedestrians, skaters, and other non-motorized users.*

⇒ *Bike Lane. A 4 to 6-foot wide portion of the roadway that has been designated by permanent striping and pavement markings for the exclusive use of bicycles.*

⇒ *Shoulder Bikeway. The paved shoulder of a roadway that is 4 feet or wider; typically shared with pedestrians in rural areas.*

⇒ *Shared Roadway. A travel lane that is shared by bicyclists and motor vehicles.*

⇒ *Multi-use Trail. An unpaved path that accommodates all-terrain bicycles; typically shared with pedestrians.*

CROSS ACCESS. A service drive providing vehicular access between two or more contiguous sites so the driver need not enter the public street system.

EASEMENT. A grant of one or more property rights by a property owner to or for use by the public, or another person or entity.

FRONTAGE ROAD. A public or private drive which generally parallels a public street between the right-of-way and the front building setback line. The frontage road provides access to private properties while separating them from the arterial street. (see also Service Roads)

FUNCTIONAL CLASSIFICATION. A system used to group public roadways into classes according to their purpose in moving vehicles and providing access.

JOINT ACCESS. A driveway connecting two or more contiguous sites to the public street system.

LOT, FLAG. A lot not meeting minimum frontage requirements and where access to the public road is by a narrow, private right-of-way line.

PARCEL. A division of land comprised of one or more lots in contiguous ownership.

PEDESTRIAN FACILITIES. A general term denoting improvements and provisions made to accommodate or encourage walking, including sidewalks, accessways, crosswalks, ramps, paths, and trails.

REASONABLE ACCESS. The minimum number of access connections, direct or indirect, necessary to provide safe access to and from the roadway, as consistent with the purpose and intent of this ordinance and any applicable plans and policies of the City of Milton-Freewater.

REASONABLY DIRECT. A route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.

SAFE AND CONVENIENT. Bicycle and pedestrian routes that are reasonably free from hazards, and provide a reasonably direct route of travel between destinations, considering that the optimum travel distance is one-half mile for pedestrians and three miles for bicyclists.

STUB-OUT (Stub-street). A portion of a street or cross access drive used as an extension to an abutting property that may be developed in the future.

WALKWAY. A hard-surfaced area intended and suitable for pedestrians, including sidewalks and the surfaced portions of accessways.

Chapter 10-5: Supplementary Provisions

10-5-13 TRANSPORTATION IMPROVEMENTS

(A) Uses Permitted Outright. Except where otherwise specifically regulated by this ordinance, the following improvements are permitted outright:

1) Normal operation, maintenance, repair, and preservation activities of existing transportation facilities.

2) Installation of culverts, pathways, medians, fencing, guardrails, lighting, and similar types of improvements within the existing right-of-way.

3) Projects specifically identified in the Transportation System Plan as not requiring further land use regulation.

4) Landscaping as part of a transportation facility.

5) Emergency measures necessary for the safety and protection of property

6) Acquisition of right-of-way for public roads, highways, and other transportation improvements designated in the Transportation System Plan except for those that are located in exclusive farm use or forest zones.

7) Construction of a street or road as part of an approved subdivision or land partition consistent with the applicable land division ordinance.

(B) Conditional Uses Permitted

1) Construction, reconstruction, or widening of highways, roads, bridges or other transportation projects that are: (1) not improvements designated in the Transportation System Plan or (2) not designed and constructed as part of a subdivision or planned development subject to conditional use permit review, which shall comply with the Transportation System Plan and applicable standards, and shall address the following criteria. For State projects that require an Environmental Impact Statement (EIS) or EA (Environmental Assessment), the draft EIS or EA shall be reviewed and used as the basis for findings to comply with the following criteria:

a) The project is designed to be compatible with existing land use and social patterns, including noise generation, safety, and zoning.

b) The project is designed to minimize avoidable environmental impacts to identified wetlands, wildlife habitat, air and water quality, cultural resources, and scenic qualities.

c) *The project preserves or improves the safety and function of the facility through access management, traffic calming, or other design features.*

d) *Project includes provision for bicycle and pedestrian circulation as consistent with the comprehensive plan and other requirements of this ordinance.*

2) *If review under this Section indicates that the use or activity is inconsistent with the Transportation System Plan, the procedure for a plan amendment shall be undertaken prior to or in conjunction with the conditional permit review.*

(C) Time Limitation on Transportation-Related Conditional Use Permits

1) *Authorization of a conditional use shall be void after a period specified by the applicant as reasonable and necessary based on season, right-of-way acquisition, and other pertinent factors. This period shall not exceed three years.*

10-5-14. ACCESS MANAGEMENT AND CONNECTIVITY

The intent of this ordinance is to manage access to land development while preserving the movement of people and goods in terms of safety, capacity, functional classification, and level of service as categorized in the Transportation System Plan.. This ordinance shall apply to all arterials and collectors within City of Milton-Freewater and to all properties that abut these roadways.

(A) Joint Use Driveways and Cross Access

1) *Adjacent commercial or office properties classified as major traffic generators (i.e. shopping plazas, office parks), shall provide a cross access drive and pedestrian access to allow circulation between sites.*

2) *A system of joint use driveways and cross access easements shall be established wherever feasible.*

3) *Shared parking areas shall be permitted a reduction in required parking spaces if peak demands do not occur at the same time periods.*

4) *Pursuant to this section, property owners shall:*

a) *Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;*

b) *Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the City of Milton-Freewater and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;*

c) *Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners.*

5) *The City of Milton-Freewater may reduce required separation distance of access points where they prove impractical, provided all of the following requirements are met:*

a) *Joint access driveways and cross access easements are provided in accordance with this section.*

b) *The property owner enters into a written agreement with the City of Milton-Freewater, recorded with the deed, that pre-existing connections on the site will be closed and eliminated after construction of each side of the joint use driveway.*

6) *The City of Milton-Freewater may modify or waive the requirements of this section where the characteristics or layout of abutting properties would make the development of a unified or shared access and circulation system impractical.*

(B) Access Connection and Driveway Design

1) *Driveways shall meet the following standards:*

   a) *If the driveway is a one way in or one way out drive, then the driveway shall be a minimum width of 10 feet and shall have appropriate signage designating the driveway as a one way connection.*

   b) *For two-way access, each lane shall have a minimum width of 10 feet and a maximum width of 12 feet.*

2) *Driveway approaches provide an exiting vehicle with an unobstructed view. Construction of driveways along acceleration or deceleration lanes and tapers shall be avoided due to the potential for vehicular weaving conflicts.*

3) *The length of driveways shall be designed in accordance with the anticipated storage length for entering and exiting vehicles to prevent vehicles from backing into the flow of traffic on the public street or causing unsafe conflicts with on-site circulation.*

(C) Nonconforming Access Features

1) *Legal access connections in place as of (date of adoption) that do not conform with the standards herein are considered nonconforming features and shall be brought into compliance with applicable standards under the following conditions:*

   a) *When new access connection permits are requested;*

   b) *Change in use or enlargements or improvements that will increase trip generation.*

(D) Reverse Frontage

1) *Lots that front on more than one street shall be required to locate motor vehicle accesses on the street with the lower functional classification.*

2) *When a residential subdivision is proposed that would abut an arterial, it shall be designed to provide through lots along the arterial with access from a frontage road or interior local road. Access rights of these lots to the arterial shall be dedicated to the City of Milton-Freewater and recorded with the deed.*

(E) Shared Access

1) *Subdivisions with frontage on the state highway system shall be designed into shared access points to and from the highway. Normally a maximum of two accesses shall be allowed regardless of the number of lots or businesses served. If access off of a secondary street is possible, then access should not be allowed onto the state highway. If access off of a secondary street becomes available, then conversion to that access is encouraged, along with closing the state highway access.*

2) *New direct accesses to individual one and two family dwellings shall be prohibited on all State highways except District-level State Highways.*

(F) Connectivity

1) The street system of proposed subdivisions shall be designed to connect with existing, proposed, and planned streets outside of the subdivision as provided in this Section.

2) Wherever a proposed development abuts unplatted land or a future development phase of the same development, street stubs shall be provided to provide access to abutting properties or to logically extend the street system into the surrounding area. All street stubs shall be provided with a temporary turn-around unless specifically exempted by the City Engineer. Restoration and extension of the street shall be the responsibility of any future developer of the abutting land.

3) Minor collector and local residential streets shall connect with surrounding streets to permit the convenient movement of traffic between residential neighborhoods or facilitate emergency access and evacuation. Connections shall be designed to avoid or minimize through traffic on local streets. Appropriate design, such as narrow streets, traffic control such as four-way stops, and traffic calming measures are the preferred means of discouraging through traffic.

(G) Pedestrian and Bicycle Circulation.

1) On-site facilities shall be provided that accommodate safe and convenient pedestrian and bicycle access within new subdivisions, multi-family developments, planned development, shopping centers, and commercial districts, and connecting to adjacent residential areas and neighborhood activity centers within one-half mile of the development. Residential developments shall include streets with sidewalks and accessways. Pedestrian circulation through parking lots shall be provided in the form of accessways.

2) Bikeways shall be required along arterials and collectors with ADTs greater than 3,000. Sidewalks shall be required along arterials, collectors, and most local streets, except that sidewalks are not required along controlled access roadways (freeways).

(H) Cul-de-Sacs and Accessways.

1) Cul-de-sacs or permanent dead-end streets may be used as part of a development plan; however, through streets are encouraged except where topographical, environmental, or existing adjacent land use constraints make connecting streets infeasible. Where cul-de-sacs are planned, accessways shall be provided connecting the ends of cul-de-sacs to each other, to other streets, or to neighborhood activity centers.

2) Accessways for pedestrians and bicyclists shall be 10 feet wide and located within a 20-foot-wide right-of-way or easement. If the streets within the subdivision are lighted, the accessways shall also be lighted. Stairs or switchback paths may be used where grades are steep.

3) Accessways for pedestrians and bicyclists shall be provided at mid-block where the block is longer than 600 feet.

4) The Hearings Body or Planning Director may determine, based upon evidence in the record, that an accessway is impracticable. Such evidence may include but is not limited to:

a) Physical or topographic conditions make an accessway connection impractical. Such conditions include but are not limited to freeways, railroads, extremely steep

slopes, wetlands, or other bodies of water where a connection cannot reasonable be provided.

b) Buildings or other existing development on adjacent lands physically preclude a connection now or in the future, considering potential for redevelopment.

c) Where accessways would violate provisions of leases, easements, covenants, restrictions, or other agreements existing as of May 1, 1995 that preclude a required accessway connection.

(I) Blocks.

1) The maximum perimeter lengths for blocks shall be 1,600 feet.

2) The maximum length of any block shall be 400 feet.

Chapter 10-6: Off-Street Parking

10-6-5. BICYCLE PARKING

(A) A minimum of 2 bicycle parking spaces per use (one sheltered and one unsheltered) shall be required.

B) The following Special Minimum Standards shall be considered as supplemental requirements for the number of required bicycle parking spaces.

1) Multi-Family Residences. Every residential use of four (4) or more dwelling units shall provide at least one sheltered bicycle parking space for each unit. Sheltered bicycle parking spaces may be located within a garage, storage shed, basement, utility room or similar area. In those instances in which the residential complex has no garage or other easily accessible storage unit, the required bicycle parking spaces shall be sheltered under an eave, overhang, an independent structure, or similar cover.

2) Parking Lots. All public and commercial parking lots and parking structures shall provide a minimum of one bicycle parking space for every 10 motor vehicle parking spaces.

3) Schools. Elementary and middle schools, both private and public, shall provide one bicycle parking space for every 10 students and employees. High schools shall provide one bicycle parking space for every 5 students and employees. All spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.

4) Colleges. Colleges, universities, and trade schools shall provide one bicycle parking space for every 10 motor vehicle spaces plus one space for every dormitory unit. Fifty percent of the bicycle parking spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.

5) Downtown Areas. In downtown areas with on-street parking, bicycle parking for customers shall be provided along the street at a rate of at least one space per use. Spaces may be clustered to serve up to six (6) bicycles; at least one cluster per block shall be provided. Bicycle parking spaces shall be located in front of the stores along the street, either on the sidewalks in specially constructed areas such as pedestrian curb extensions. Inverted "U" style racks are recommended. Bicycle parking shall not interfere with pedestrian passage, leaving a clear area of at least 5 feet. Customer spaces are not required to be sheltered. Sheltered parking (within a building, or under an eave, overhang, or similar structure)

shall be provided at a rate of one space per 10 employees, with a minimum of one space per store.

6) *For facilities with multiple uses (such as commercial centers), the bicycle parking requirements shall be calculated by using the total number of motor vehicle parking spaces required for the entire development.*

Chapter 10-8: Site Plan Review

10-8-4 SITE PLAN REQUIREMENTS

(P) Bicycle Parking. The development shall include the number and type of bicycle parking facilities required in the Off-Street Parking and Loading section of this Title. The location and design of bicycle parking facilities shall be indicated on the site plan.

(Q) Pedestrian Access and Circulation.

1) *Internal pedestrian circulation shall be provided in new commercial, office, and multi-family residential developments through the clustering of buildings, construction of hard surface walkways, landscaping, accessways, or similar techniques.*

(R) Commercial Development Standards.

1) *New commercial buildings, particularly retail shopping and offices, shall be oriented to the street, near or at the setback line. A main entrance shall be oriented to the street. For lots with more than two front yards, the building(s) shall be oriented to the two busiest streets.*

2) *Off-street motor vehicle parking for new commercial developments shall be located at the side or behind the building(s).*

(S) All site plans (industrial and commercial) shall clearly show how the site's internal pedestrian and bicycle facilities connect with external existing or planned facilities or systems.

Chapter 10-12: Amendments

10-12-?? AMENDMENTS AFFECTING TRANSPORTATION FACILITIES

(A) A plan or land use regulation amendment significantly affects a transportation facility if it:

1) *Changes the functional classification of an existing or planned transportation facility;*

2) *Changes standards implementing a functional classification system;*

3) *Allows types or levels of land use that would result in levels of travel or access that are inconsistent with the functional classification of a transportation facility; or*

4) *Would reduce the level of service of the facility below the minimum acceptable level identified in the Transportation System Plan.*

(B) Amendments to the comprehensive plan and land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the Transportation System Plan. This shall be accomplished by one of the following:

1) *Limiting allowed land uses to be consistent with the planned function of the transportation facility;*

2) *Amending the Transportation System Plan to ensure that existing, improved, or new transportation facilities are adequate to support the proposed land uses consistent with the requirement of the Transportation Planning Rule; or,*

3) *Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes.*

RECOMMENDED ADDITIONS TO THE SUBDIVISION ORDINANCE

Chapter 4: Preliminary Subdivision Procedure

11-4-!A Subdivision Standards:

1. *A subdivision shall conform to the following standards:*
   a. *Each proposed lot must be buildable in conformance with the requirements of this ordinance and all other applicable regulations.*
   b. *Each lot shall abut a public or private street for the required minimum lot frontage for the zoning district where the lots are located*
   c. *If any lot abuts a street right-of-way that does not conform to the design specifications of this ordinance, the owner may be required to dedicate up to one-half of the total right-of-way width required by this ordinance.*
2. *Further subdivision of the property shall be prohibited unless the applicant submits a plat or development plan in accordance with requirements in this ordinance.*

Chapter 8: Standards for Design and Improvements

Chapter 8 should be updated to reflect the street standards discussed in Chapter 7 of this Plan.

Chapter 14: Public Works Details

Chapter 14 should be upgraded to reflect the revised street standards of Chapter 7 of this Plan.

REVIEW OF EXISTING PLANS AND POLICIES

Several planning documents were reviewed to establish the history of planning in Milton-Freewater, and a comparison was made of the information in the existing plans with the requirements of the Oregon Transportation Planning Rule. These plans included the Milton-Freewater Comprehensive Plan, the Milton-Freewater/Stateline Highway 11 Corridor Land Use and Transportation Plan, the 1986 Hermiston Municipal Airport Master Plan Update, the Master Plan Update for the Eastern Oregon Regional Airport at Pendleton and the Arterial Street Plan for the City of Milton-Freewater.

Milton-Freewater Comprehensive Plan

The Milton-Freewater Comprehensive Plan was adopted May 1987. Transportation-related policies found in this document are summarized below. Recommendations for updating these findings, policies, and conclusions are included in Chapter 9 of the Milton-Freewater TSP.

Goal 8: Recreation

- *Policy 8-A-1 (Recreation): Recreation needs listed in Table 8-2 will be pursued as the priority developments and programs in City budgeting and operations.*

- *Table 8-2, City Recreation Development and Program Needs,* item 8, *Bicycle lanes built into City streets to make at least a north-south route through the City or a circuit route if possible.*

Goal 11: Public Facilities and Services

***Finding 11-A:** The City has a major investment in its existing street, water, and sewer systems. The first priority of the public facility program is to protect the existing facilities.*

- *Policy 11-A-1: The City will...work to secure additional funding for replacement and maintenance of sewer and street systems.*

- *Policy 11-A-2: User charges for public facilities shall be at levels which support and maintain the various systems.*

***Finding 11-B:** Orderly and efficient development of the existing utility system is in the economic interest of existing facilities before extending services to the urbanizable area.*

- *Conclusion 11-B-1: The City and developers should make every effort to develop vacant land within the City and close to existing facilities before extending services to the urbanizable area.*

***Finding 11-E:** Extension of services to major new sections of the urbanizable area will involve major capitol improvements.*

- *Policy 11-E-1: New developments which generate the need for these facilities shall have responsibility for their placement.*

- *Policy 11-E-2: New development within the City shall continue to pay system development charges to the City so that facility systems can be upgraded and expansions can be assisted.*

Goal 12: Transportation

Finding 12-A: *The private automobile will continue to be the main mode of transportation for virtually all citizens of the community.*

- *Conclusion 12-A-1: SE 15th, NW 8th, and the Highway 11 underpass need improvement. The State Department of Transportation is strongly encouraged to include these projects in the Highway Improvement Plan and project funding priorities as soon as possible.*

Finding 12-B: *Local low density rail lines are being abandoned by railroad companies with increasing regularity.*

- *Policy 12-B-1: The City objects to the abandonment of the remaining Union Pacific line which serves Milton-Freewater and Weston. Abandonment of this line would have potentially serious negative effects on area industries.*
- *Conclusion 12-B-1: In spite of local objections, national trends in the industry indicate that Milton-Freewater may not have direct rail service for many more years. Industrial operators should keep well informed of railroad activities.*

Finding 12-C: *Burlington Northern Railroad abandoned its service to the City in 1985 and is in the process of selling certain lands which were designated industrial because of the presence of rail service and because of railroad ownership.*

- *Conclusion 12-C-1: Loss of rail transport makes industrial development of these properties highly unlikely. Their designation should be reviewed to provide for a more appropriate use of the property.*

Finding 12-D: *The Milton-Freewater Taxi Service is an important service for the elderly and transportation disadvantaged.*

- *Conclusion 12-D-1: The City supports the taxi service and encourages continued community and State support.*

Finding 12-E: *Pedestrian travel is important to the transportation and leisure needs of the community.*

- *Policy 12-E-1: Sidewalks will be required in new developments. Handicapped access ramps will be required.*

Finding 12-F: *Bicycle travel is an important transportation and leisure activity.*

- *Conclusion 12-F-1: Bicycle travel has not been sufficiently provided for in the community.*
- *Policy 12-F-1: The City will work toward establishment of a bicycle path linking the two historic downtown areas.*

Finding 12-G: *Very little infill area is available along existing City streets. Virtually all new development, either inside the existing City Limits or on newly annexed land, will occur on land which does not front on existing streets.*

- *Policy 12-G-1: Developers shall construct streets to City specifications so that every new parcel created for development has frontage on an improved City street. Partitions of land will be permitted in infill areas where existing City streets are unimproved.*

Highway 11 Corridor Land Use And Transportation Plan

The Highway 11 Corridor Land Use and Transportation Plan was a cooperative effort of Umatilla County, the City of Milton-Freewater, the Oregon Department of Transportation. It was developed by planning consultants at David Evans and Associates, Inc. with input from these jurisdictions, the local residents, Walla Walla County, and the Washington Department of Transportation. The plan was adopted in 1997.

The plan evaluated existing and projected conditions within the corridor regarding basis layout and connectivity; conditions of transportation facilities, land use, and population and employment. It analyzed existing deficiencies and proposed strategies for addressing them.

The primary deficiencies in the corridor were physical design of facilities, insufficient access control, and inadequate of nonexistent facilities for pedestrians and bicyclists.. Recommended actions to improve these conditions can be broken into policy and ordinance amendments and transportation system improvements.

Policy and Ordinance Amendments

Umatilla County and the City of Milton-Freewater should adopt access management standards consistent with ODOT Guidelines.

Umatilla County and the City of Milton-Freewater should adopt or amend conditional use and site review procedures, whereby it is clear which types of actions can result in approvals with conditions attached.

Umatilla County and the City of Milton-Freewater should adopt provisions to notify ODOT of development and land use applications for properties within the planning corridor.

The coordinated review process will allow the county and ODOT to hold land use development along state facilities to the applicable access management standards. Enacting general access control standards, and incorporating them into other county land use plans, will help create a process whereby a land use application is reviewed for its land use and transportation impacts to the area. Specific access control standards and policies are listed in the Access Management section of this report under Access Control Policies. It is recommended that these comprehensive plan and zoning code amendments be formulated and adopted as part of the TSP planning process for Umatilla County and the City of Milton-Freewater.

Highway 11 Improvements

- Install signals at the Sunnyside-Umapine Highway intersection and the Ferndale Road intersection. The first traffic signal should be installed at the Sunnyside-Umapine Highway intersection. The schedule for signal installations will depend on meeting traffic warrants and state funding.
- Level county road and widen approaches to intersections with Sunnyside-Umapine Highway, Ballou Road, Crockett Road, and Locust Road.
- Widen county road approaches to the highway To intersections with Ferndale Road, Tum-a-Lum Road, Appleton Road, and Cobb Road,.
- Repave Highway 11 from the south end of Milton-Freewater to the Oregon/Washington State line. ODOT plans to repave this section of Highway 11 during 1997.
- Replace highway directional signs within the corridor as part of the paving project.

- Investigate parking restrictions along congested segments of Highway 11. Priority should be given to the north side of Highway 11 west of the Sunnyside-Umapine Highway intersection.
- Adopt sidewalk/driveway standards for properties fronting Highway 11, with the requirement that sidewalks and driveway approaches be installed when fronting properties are developed or a change of use occurs.
- Install sidewalks and handicap ramps when county/state intersections are improved.
- Add striped crosswalks across Highway 11 when traffic signals are installed.

Freewater Highway (339) and Sunnyside-Umapine Highway (332) Improvements

- Add four- to six-foot-wide shoulders on both sides of the highways through the entire corridor. This would require relocating the drainage ditches which are located adjacent to both of these facilities.
- Add 12-foot-wide left-turn lanes at the north and south approaches of Freewater Highway to the intersection with Stateline Road.
- Evaluate changing the two-way stop at the intersection of Freewater Highway and Sunnyside-Umapine Highway to a four-way stop.
- Replace school zone signs near Ferndale School.
- Evaluate pedestrian pathways and signage in the vicinity of Ferndale School.
- Investigate the opportunity for a pedestrian and bikeway along the abandoned Walla Walla Valley Railway line.
- Umatilla County and the City of Milton-Freewater should adopt interagency coordination provisions with the following agencies:

  Oregon Department of Transportation (ODOT)

  Oregon State Police (OSP)

  Washington Department of Transportation (WSDOT)

  Walla Walla County
- Umatilla County, the City of Milton-Freewater and ODOT should continue to work with OSP to implement the traffic safety and education recommendations of the OSP Tactical Safety Plan.

1986 Hermiston Municipal Airport Master Plan Update

The Municipal Airport Master Plan Update provides a comprehensive analysis of the Hermiston Airport including an inventory of facilities, a discussion of use for a twenty year planning period (ending in 2006), and recommendations for facility improvements. The introduction of the plan also provides a good overview of all the major transportation facilities serving Hermiston and Northeast Oregon.

Although the plan does not address the need to control the surrounding land-uses, this may be attributable to the fact that the City and airport management acquired land around the airport during the planning process. This action was seen as success fully preventing conflicting land use and infringement upon airport facilities within the twenty-year planning period.

According to the plan, the airport is a General Utility Facility serving itinerant and fixed base aircraft. It is showing signs of a reemerging trade in itinerant multi-engine GUII aircraft, despite a decrease in use in the early 80's. This reflected the importance of the airport to large agricultural and industrial companies as well as the Department of Army Depot (the largest in the Northwest). Estimated total operations were 23,100 for 1985 and projected to be 49,140 for 1995 and 76,020 for 2005.

To meet projected use, the Plan recommends extending the runway and taxiway to 4500 feet, expanding tie-down and T-hanger facilities, improving the auto parking area and the access road from Highland Avenue, obtaining a weather reporting system or personnel (NAV Aids), and improving the approach to the runway for larger aircraft. Upgrading the facility to a Transport Category was not recommended, but keeping that option open was encouraged. Noise was not considered to be a concern within the planning period.

The ODOT 1996 Transportation Volume Tables, published in June 1997, lists estimates of operations at Hermiston Municipal Airport at 12,380 for the year 1995, significantly lower than the projection of 49,140 in the Airport Master Plan, and half the level reported for 1985 in the Master Plan.

Master Plan Update For Eastern Oregon Regional Airport At Pendleton

The Master Plan Update for Eastern Oregon Regional Airport at Pendleton was prepared by Bucher, Willis & Ratliff in December 1996.

The primary objective of the Master Plan program was to re-evaluate the recommendations of previous airport planning studies, to determine the long-range requirements for airport development, to identify and assess development alternatives, and to produce an airport development/improvement plan that will yield a safe, efficient, economical, and environmentally acceptable public facility with capacity for future air transport needs of the Eastern Oregon area. When approved by the various local, regional, state, and federal agencies, the Airport Master Plan represents the long-term intentions of all agencies regarding the location and extent of airport improvements. This permits long-range programming and budgeting, reduces lengthy review periods for each project, and provides for orderly and timely development.

The following objectives were identified as significant to the study:

- Provide airport facilities and services for all users in a manner that maximizes safety, efficiency, and opportunity for use.
- Consider safety as a primary factor in all decision making situations in the development of the airport.
- Develop Eastern Oregon Regional Airport in a manner that meets acceptable physical development standards promoted by federal, state, and local agencies.
- Develop a plan for the airport that maximizes the effective use of available land.
- Coordinate off airport development needs with on airport landside and airside requirements.
- Identify improvements necessary to ensure adequate surface access both on and off the airport.
- Enhance the opportunities for local economic development and improved employment opportunities.
- Plan for future terminal facilities that reflect community values and standards.
- Ensure compatibility with local land use patterns and plans.
- Develop a coordinated plan that logically locates airport facilities.
- Provide an effective graphic presentation for further development of the airport and anticipated land uses in the vicinity of the airport.

- Identify priorities for allocation of financial resources and establish a realistic schedule for the implementation of proposed development.
- Develop a public awareness of the airport planning and development process.
- Encourage and utilize comments from all sectors of the aviation community in developing an updated airport master plan that can be adopted, endorsed, and implemented.
- Ensure that the public, along with federal, state, and local officials, has an opportunity to participate in the decision making process during the development of the plan.

Arterial Street Plan for the City Of Milton-Freewater

The Arterial Street Plan for Milton-Freewater was developed in 1972. The plan provides a summary of the street classification system, a functional definition of each roadway classification level, and an inventory of key roadway characteristics (e.g., curbs, sidewalks, pavement condition, etc.) for all city roadways as of 1972.

According to this 1972 plan, roadways were classified within one of four categories based on how important the streets were in the basic function of carrying vehicular traffic. The four categories and a brief description of their function follows:

1. Major Arterial: Function is to, "carry traffic from one community to another and to carry traffic to and from major traffic generators such as the various business districts. To connect Milton-Freewater with the highway system to other cities."

2. Secondary Arterial: Function is to, "supplement major arterials in collecting and distributing traffic from and to less important streets. To carry traffic to and from secondary traffic generators such as high schools, parks, shopping centers and places of industrial employment."

3. Collector Streets: Function is to, "carry traffic between primary and secondary arterials and neighborhood areas; to serve lesser traffic generators such as elementary schools and smaller groupings of stores. To be located within a neighborhood to discourage the use of residential streets for through traffic."

4. Feeder Streets: Function is to, "provide access to abutting properties in residential areas."

The roadway classification system outlined in this 1972 plan contradicts the current roadway classification system outlined in Milton-Freewater's 1989 Comprehensive Plan. Under the Comprehensive Plan, roadways are currently classified as either city thoroughfares or city arterials.

Based on field investigation conducted by DEA in January 1998, roadways in Milton-Freewater were observed to function in a manner more closely associated with the 1972 Arterial Streets Plan, based on the classification of roadways as arterials, collectors, and local streets. Roadways currently classified under the 1989 Comprehensive Plan as city thoroughfares and city arterials function in a manner consistent with the more accepted classification of arterial and collector streets, respectively.

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Transportation Impact Study

Sykes Enterprises, Inc. Customer Call Center

Milton-Freewater, Oregon

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EXPIRES: 6/30/99

September 1998

DAVID EVANS AND ASSOCIATES, INC.

Transportation Impact Study

Sykes Enterprises, Inc. Customer Call Center

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Contents

I. Introduction

A. Purpose and Objectives

This study analyzes the transportation impact of a proposed customer call center in Milton-Freewater, Oregon and recommends actions to ensure the safety and efficiency of the area's transportation system.

B. Summary

1. Site Location and Study Area

The proposed project will be located east of Highway 11 in the Milton-Freewater urban area about 0.5 mi south of 14th Avenue. The study area includes Highway 11 south of 14th Avenue and the surrounding street network affected by the highway.

2. Development Description

The proposed project comprises a 42,700 square-foot customer call center for Sykes Enterprises, Inc. Sykes provides technical support services for computer software and hardware manufacturers. The center will employ about 400 people in three 8-hour shifts.

3. Findings

- The proposed project will generate 1,769 daily trips, with 100 entering and 75 exiting during the weekday PM peak hour. All trips will use Highway 11, with about 67% of the trips traveling to and from the north and the remainder to and from the south.
- The proposed project will contribute 21% of the traffic to this segment of Highway 11 during the 1998 PM peak hour and 16% in 2018.
- The critical approach of the intersection of Highway 11 and Sykes Boulevard is the westbound left turn. This approach operates at LOS D (UNSIG10) or C (1994 HCM) in 1998, and LOS E (UNSIG10) or C (1994 HCM) in 2018.
- Warrants are met for a southbound left-turn lane on Highway 11.
- Although volume warrants are not met for northbound deceleration or acceleration lanes, the slope of the highway makes a deceleration taper desirable for safety.
- Northbound passing sight distance is inadequate at the proposed location of Sykes Boulevard.
- The site is not accessible by walkway or bikeway from Milton-Freewater, and the building as shown on the preliminary site plan is not accessible by walkway from Sykes Boulevard.
- The western driveway on Sykes Boulevard as shown on the preliminary site plan is too close to the highway.

4. Recommendations and Conclusions

- Construct a southbound left-turn lane with storage for at least 2 vehicles.
- Construct a northbound deceleration taper.
- Narrow the travel lanes on Highway 11 to 11 feet and increase the southbound shoulder width to at least 4 feet.
- Create speed transition zones south of the city limits as recommended in the TSP.
- Prohibit passing northbound within 2,000 feet of Sykes Boulevard.
- Locate the western driveway on Sykes Boulevard at least 150 feet from the intersection.
- Provide continuous walkways from Sykes Boulevard and from the parking lot to the building entrances.
- Connect Sykes Boulevard to the city's walkway network.

II. Proposed Development

A. Maps

The site is located within the Milton-Freewater urban growth boundary on the east side of State Highway 11, the Oregon-Washington Highway (Figure 1). The preliminary site plan is shown in Figure 2.

B. Description

1. Land Use and Intensity

The proposed project is a 42,700 square foot customer call center.

2. Project Phasing

Construction of the customer call center is assumed to be in 1998.

3. Uses Sharing Access

No other uses will share the access, although there is potential for adjacent, undeveloped parcels to connect to it.

III. Area Conditions

A. Study Area

1. Development Area

The development area extends about 675 feet along the east side of Highway 11 (see Figure 1).

2. Traffic Impact Area

All traffic will use Highway 11. This will affect cross streets to the north in Milton-Freewater, with the impact diminishing further north as the added traffic disperses. The greatest impact will probably be at 14th Avenue.

3. Existing Street Network

The backbone of the area's transportation system is Highway 11 which is designated as a Highway of Statewide Importance (the second highest designation) in the *Oregon Highway Plan* (January 1998 Draft). Other nearby streets are shown in Figure 1. Because the proposed project site is beyond existing development, access is limited to the highway. The next closest public street is Main Street to the east, which is unpaved south of the city limits. Main Street is about 900 feet from Highway 11 and 200 feet from the project site.

At the proposed intersection with Sykes Boulevard, Highway 11 has two southbound lanes and one northbound lane. The highway grade is 4.9% towards the south to Milton Hill. The pavement width is 46 feet (from west to east: a 3-foot shoulder, two 11.5-foot lanes, one 13-foot lane, and a 7-foot shoulder). The posted speed is 55 mph, dropping to 25 mph at the city limits about 775 feet north of the proposed intersection with Sykes Boulevard.

The southbound shoulder on Highway 11 does not meet width criteria for a shoulder bikeway (6-feet recommended, 5-feet minimum on steep grades) in the 1995 Oregon Bicycle and Pedestrian Plan, nor does it meet the 8-foot standard for a Highway of Statewide Importance. There are no sidewalks on Highway 11 south of 14th Avenue; the nearest sidewalk is about 2,400 feet from the proposed location of Sykes Boulevard.

The intersection of Highway 11 with 14th Avenue/Main Street has a stop sign on the minor approach.

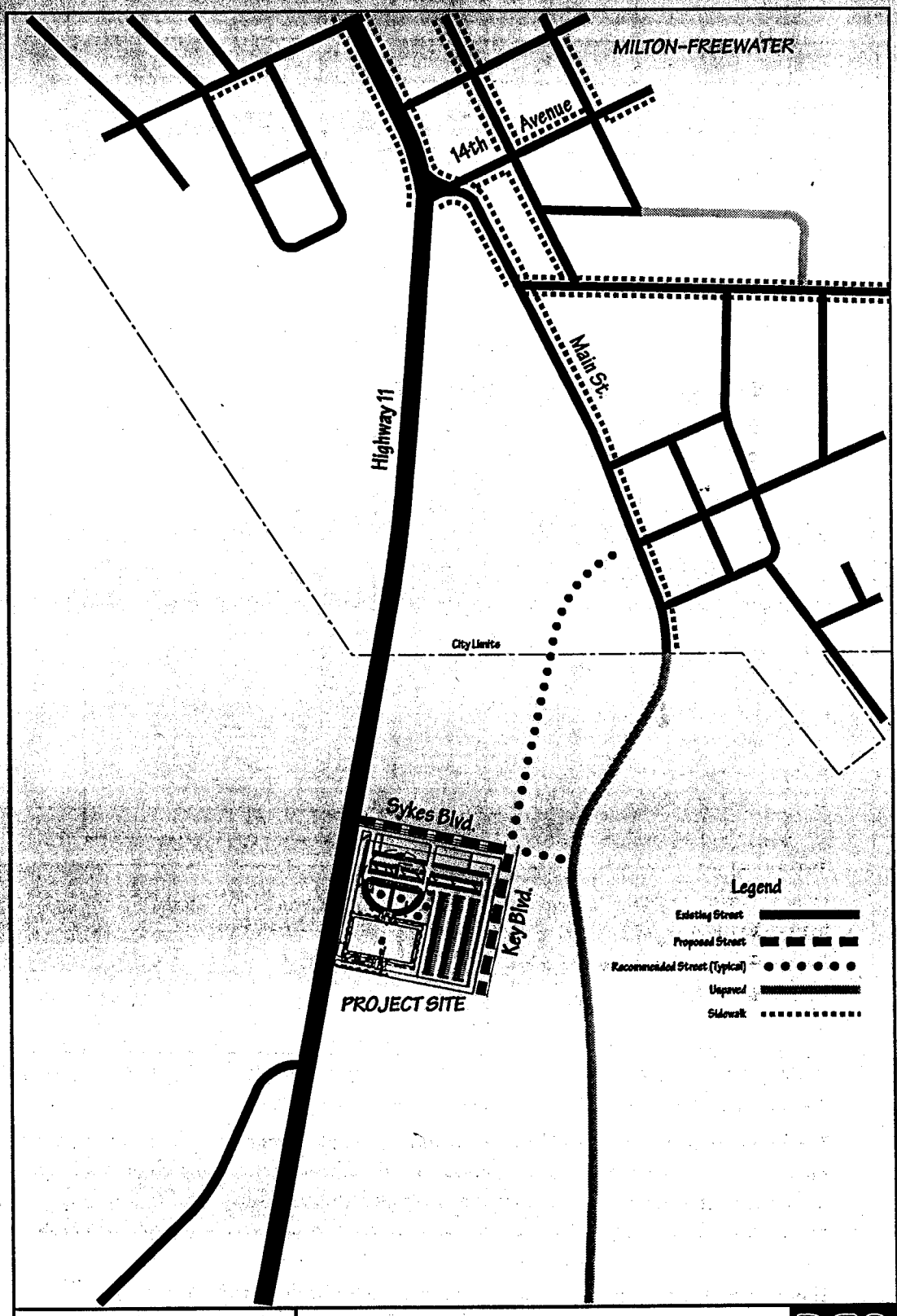

Fig. 1
Vicinity Map

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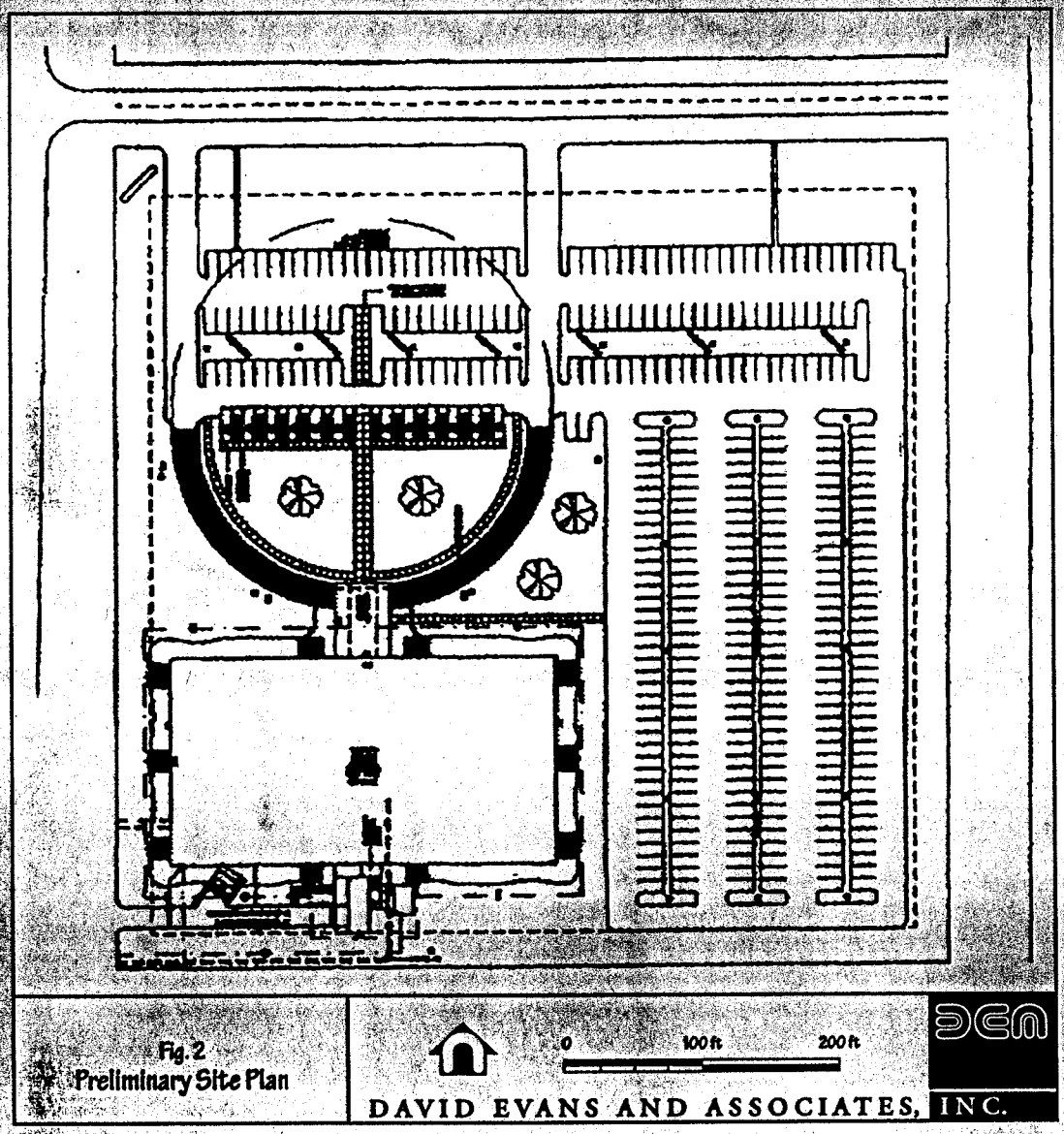


Fig. 2
Preliminary Site Plan

4. *Planned Street Improvements*

Planned improvements in the area are addressed in the *Milton-Freewater Transportation System Plan* (TSP), August 1998 Draft. The plan discusses speed-control measures along Highway 11 on Milton Hill, including 11-foot travel lanes and transitional speed zones.

The proposed project includes two new streets: Sykes Boulevard along the north edge of the site, and Key Boulevard along the east edge. Since this area is planned for annexation into the city, these streets would presumably be built to the city's industrial street standards of 42–50 feet with 3 lanes and separated sidewalks.

5. *Committed Street Improvements*

None.

6. Existing Traffic Volumes

Average Daily Traffic

Highway 11 had the following average daily trips (ADT) during 1997 (the most recent data available) with an annual increase based on the average annual 10-year growth rate to arrive at an estimated 1998 volume:

Location	ADT	Adjust.	1998 ADT
South City Limits	6,400	+1.6%	6,500
North of 14th Avenue	9,400	+1.6%	9,550
South of Main Street	12,800	+1.6%	13,000
North City Limits	13,600	+2.7%	13,950

Turning Counts

Turning movement counts for the weekday PM peak hour at 3 locations on Highway 11 (9th Avenue, 8th Avenue, and 3rd Avenue/Main Street) are given in the TSP and were used to estimate the proportion of northbound (45%) and southbound (55%) traffic.

7. Public Transit

None.

8. State and Local Programs, Policies and Regulations

The City of Milton-Freewater has street standards which specify, among other things, the configuration of new streets. The proposed streets, Sykes Boulevard and Key Boulevard, would probably fall in the Service and Industrial Streets category which has two options: a 50-foot paved width in a 70-foot right-of-way or a 42-foot paved width in a 60-foot right-of-way (refer to the TSP). The 70-foot right-of-way includes an 11-foot travel lane in each direction, a continuous center-turn lane, parking on one or both sides, and 5-foot sidewalks behind 5-foot planting strips.

The State has an objective of maintaining a motor vehicle level of service (LOS) C-D in urban areas on highways of statewide importance such as Highway 11 (refer to *Oregon Highway Plan, January 1998 Draft*). Signalization and driveway spacing standards for the 1998 plan have not yet been determined, although previous standards (1991 Oregon Highway Plan) permit at-grade intersections at a minimum spacing of one-quarter mile (1,320 feet) and recommend that private driveways have a minimum spacing of 500 feet from each other and from other intersections; both left and right turning movements in and out of driveways are permitted.

B. Land Uses

1. Existing Land Uses

The site was previously used as farm land. A parcel to the north is a helicopter business.

2. Existing Zoning

The parcel is zoned Business Park (BP).

3. Planned Future Development

No development is planned for the surrounding parcels.

IV. Projected Traffic

A. Non-Site Traffic

1. Projection Method

For build-out conditions without the proposed project (background traffic), 2018 volumes from the TSP were used:

Location	Estimated 2018 ADT
South City Limits	8,895
North City Limits	23,745

2. Historic Data

Average daily counts on Highway 11 at the permanent recording station 0.9 mile south of Oregon-Washington State Line over the past decade were:

1988 10,909	1993 12,967
1989 11,620	1994 13,884
1990 11,714	1995 14,270
1991 11,670	1996 14,238
1992 12,717	1997 14,342

This yields an annual average growth rate of 3.1%.

B. Site-Generated Traffic

1. Generation Method

Trip generation was computed using *Trip Generation*, 6th Edition, 1997, Institute of Transportation Engineers (ITE) equations. The closest ITE land uses are Single Tenant Office Building (715) and Research and Development Center (750). These are close in terms of trips per employee. Since a customer call center supports technical businesses remotely, the trip characteristics are probably closer to a Research and Development Center.

There will reportedly be three 8-hour shifts. Sykes Enterprises did not provide details but, based on experience with other technology companies with in-house support staff, it is likely that about 40% of the employees will be assigned to the standard 9 AM to 5 PM shift and 30% to each of the other shifts (many administrative and support positions are staffed for only one shift). For the purposes of computing trip generation, this is equivalent to three separate businesses with staggered arrival and departure times, as shown in Table 1.

For Shift 2, the "AM peak hour" from ITE is listed under the PM peak hour column because that is when employees are arriving for their shift. Similarly for shift 3, "PM peak hour" from ITE is listed under the AM peak hour column. Based on this methodology, the proposed customer call center would generate 1,685 daily trips, with 71 entering and 93 exiting trips during the weekday PM peak hour. The PM peak hour was analyzed because peak travel demand typically occurs during this period.

Table 1. Site-Generated Traffic, Unadjusted

Shift	Employees	24-Hour 2-Way Volume	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
9 AM - 5 PM	160	651	78	13	9	83
5 PM - 1 AM	120	517	—	—	62	10
1 AM - 9 AM	120	517	7	65	—	—
TOTAL	400	1,685	85	78	71	93
AM Peak Total = 163 (52% ENTER, 48% EXIT) PM Peak Total = 164 (43% ENTER, 57% EXIT)						
Source: Institute of Transportation Engineers Trip Generation, 6th Edition, 1997						

2. *Trip Distribution and Assignment*

Based on the available workers in the Milton-Freewater, Pendelton and Walla Walla areas and the travel distances, it was estimated that about two-thirds of the employees will arrive from and leave to the north and one-third from and to the south. All trips will access the site from Highway 11 (Figure 3).

3. *Modal Split*

Sites at which the ITE studies were conducted would be expected to have from 5% to 10% of their employees arrive by walking, bicycling and transit. The proposed project site does not connect to the city's local street network, the nearest walkway is nearly 0.5 mile away, Highway 11 lacks bikeways, and there is no transit. Therefore, the PM peak hour trips were increased by about 5%, so that the entering trips became 75 and the exiting trips became 100. The daily volume when adjusted became 1,769 trips.

4. *Pass-By, Diverted Linked, and Captured Trips*

None apply to this type of land use.

C. *Total Traffic*

Total traffic is the sum of the background traffic and the site-generated traffic from the trip assignment. Total traffic was computed for 1998 and for 2018 (see intersection worksheets with diagrams in Appendix A).

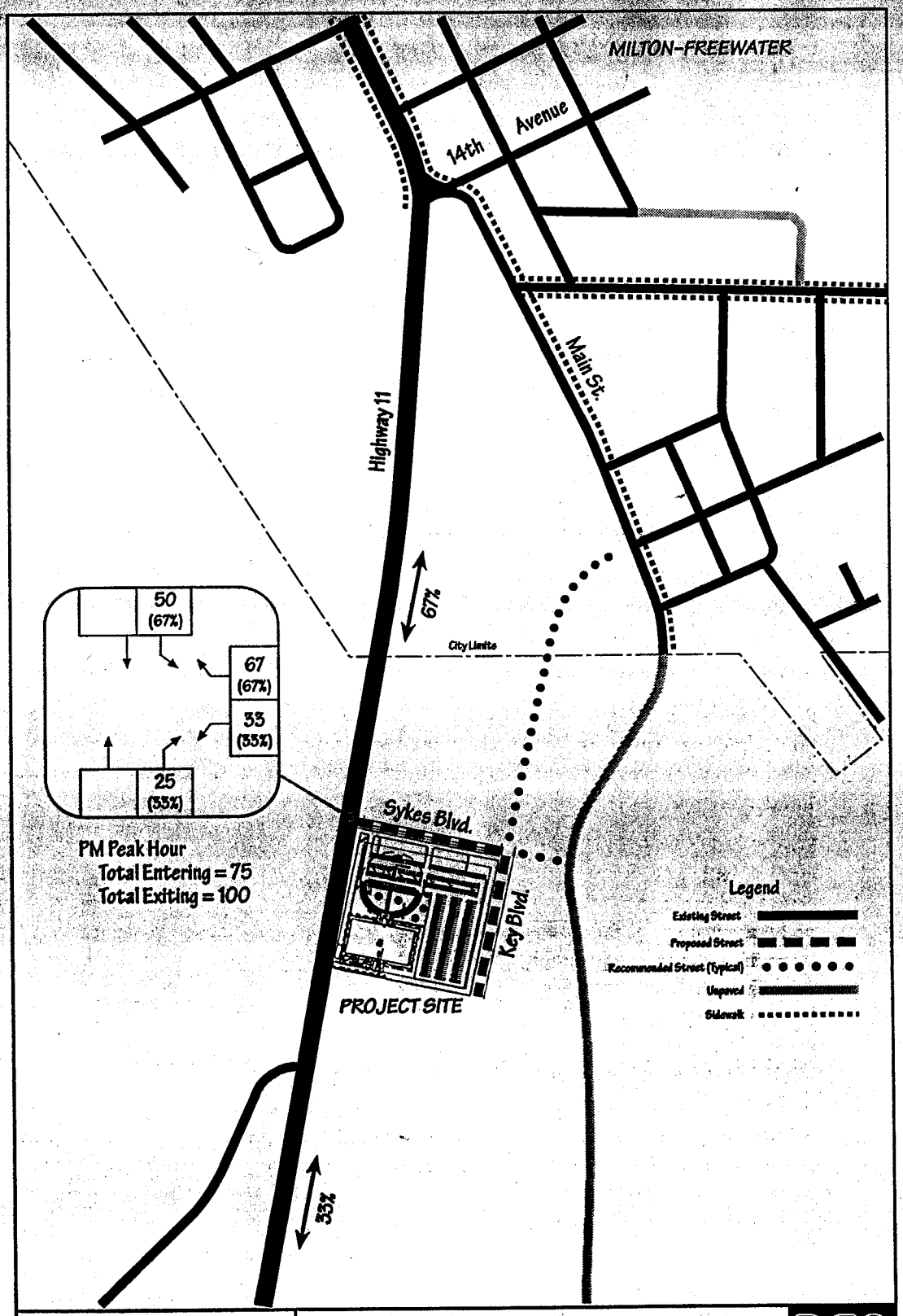


Fig. 4
Site Traffic Distribution & Assignment (PM Peak Hour)

DAVID EVANS AND ASSOCIATES, INC.

V. Traffic Analysis

A. Level of Service and Capacity

1. Approach

The proposed T-intersection of Highway 11 and Sykes Boulevard was evaluated for level of service (LOS), reserve capacity and delay. UNSIG10 (Unsignalized Intersection Capacity Analysis Program, March 18, 1987) was used, supplemented by calculations based on the 1994 Highway Capacity Manual (HCM).

Level of Service	Description	Reserve Capacity, pcph	Delay, sec
A	No delays	400	0-5.0
B	Short delays	300-399	5.1-10.0
C	Moderate delays	200-299	10.1-20.0
D	Long delays	100-199	20.1-30.0
E	Very long delays	0-99	30.1-45.0
F	Extreme delays	<0	>45.1

Level of service is a measure of intersection delay and is described by a letter from A to F, A representing minimum delay and F representing intersection failure (see table at right). LOS may be applied to individual turning movements as well as to the entire intersection. As calculated in UNSIG10, LOS is related to reserve capacity.

The intersection was evaluated for 1998 and 2018 conditions in two configurations:

- The existing 3-lane section on Highway 11 without a separate turn lane, and one westbound approach lane on Sykes Boulevard.
- A southbound left-turn lane added to Highway 11, and two westbound approach lanes on Sykes Boulevard.

The second configuration was added because left-turn lane warrants are met on the highway, and because the TSP specifies 3 lanes on industrial streets such as Sykes Boulevard.

In addition, the intersection of Highway 11 and 14th Avenue was analyzed for 2018 using estimated turning movements. Like 8th and 9th Avenues to the north, the left turn from 14th Avenue will probably operate poorly as traffic increases.

2. Findings

Table 2 summarizes the LOS findings. Analysis sheets are in Appendix A. The critical approaches for the proposed intersection are the southbound left onto Sykes Boulevard and the westbound approach (either the combined left-right turn or the left turn, depending on whether Sykes Boulevard is constructed with separate left and right turn lanes).

The segment of Highway 11 from 14th Avenue to the south city limits without the project will operate at LOS B in 1998 and 2018 (refer to Table 5-5 in the TSP).

Table 2. Intersection Performance Summary

	Critical Approach	UNSIG10 LOS	UNSIG10 Reserve (pcph)	1994 HCM LOS	1994 HCM Delay (sec)
1998					
• Existing Lanes on Hwy 11 & 1 WB Lane on Sykes	SB LT	A	662	A	9
	WB LT/RT	B	306	B	10
• SB LT on Hwy 11 & 2 WB Lanes on Sykes	SB LT	A	596	A	8
	WB LT	B	172	C	19
2018					
• Existing Lanes on Hwy 11 & 1 WB Lane on Sykes	SB LT	A	591	A	9
	WB LT/RT	D	195	C	19
• SB LT on Hwy 11 & 2 WB Lanes on Sykes	SB LT	A	568	A	8
	WB LT	C	97	F	51

The southbound left turn on Highway 11 at the proposed intersection will operate at LOS A in 1998 and 2018.

The combined left-right turn lane on westbound Sykes Boulevard will operate at LOS B in 1998. If Sykes Boulevard is configured with 2 westbound lanes, the separate left-turn lane will operate at LOS D with a reserve capacity of 178 pcph according to UNSIG10 (the LOS D range is 100–199 pcph). According to the 1994 HCM, the westbound approach will operate at LOS C with a delay of 12 sec.

In 2018, the combined left-right turn lane will operate at LOS D with a reserve capacity of 193 pcph according to UNSIG10. According to the 1994 HCM, the westbound approach will operate at LOS C with a delay of 12 sec.

In 2018 with 2 westbound lanes, the separate left turn lane will operate at LOS E with a reserve capacity of 97 pcph according to UNSIG10 (the LOS E range is 0–99 pcph). According to the 1994 HCM, the westbound approach will operate at LOS C with a delay of 19 sec (in a range that goes to 20 sec). Note that UNSIG10 is based on the 1984 HCM and relates LOS to reserve capacity rather than delay.

Finally, the intersection of Highway 11 and 14th Avenue was analyzed for 2018 using 1994 HCM methods. The critical approach is the westbound left-turn lane which will operate at LOS E with 36 sec delay during the PM peak hour.

B. *Signal Warrants*

The intersection of Highway 11 and Sykes Boulevard did not meet the following signal warrants as specified in the Manual on Uniform Traffic Control Devices (MUTCD).

Warrant 10, Peak Hour Delay (all conditions must be met during any one hour):

Total delay on a minor approach of 5 hours for 2-lane approach..... Not Met

150 vehicles per hour on minor street (2 lanes) ..... Not Met

650 vehicles per hour entering T-intersection ..... Met

Warrant 11, Peak Hour Volume (for population less than 10,000) for any one hour:

Vehicles per hour on major street (both approaches) and minor street (one approach) falls above curve in Figure 4-6 of the MUTCD ..... Not Met

C. *Safety Issues*

The accident rate on Highway 11 is below the statewide average for similar highways (refer to the TSP). No special problems were noted in the area of the proposed project.

There are two southbound lanes because of the 5% grade and the 55 mph posted speed. Slow-moving vehicles are expected to use the right lane to allow faster vehicles to proceed up the hill unobstructed. Passing is permitted from the single northbound lane. The highway striping has reduced the southbound shoulder to 3 feet, below the 6-feet recommended in the 1995 Oregon Bicycle and Pedestrian Plan, and below the 8-foot standard for highways of statewide importance. There is a 7-foot shoulder on the northbound side, so some of this width could be used for a wider southbound shoulder.

Public input to the TSP mentioned a northbound speeding problem due to the grade and the abrupt speed change from 55 to 25 mph when entering the city limits. Recommendations included narrowing the travel lanes from 12 to 11 feet and creating transitional speed zones (45, 35 and 25 mph). With the proposed project, the city limits will be extended to south, providing another reason to lower the speed. Note that narrowing the travel lanes will also free up some width for shoulders and a turn lane.

The proposed project will also attract some pedestrian and bicycle trips for which the highway is poorly equipped. This could pose a safety problem. Sidewalks and shoulders are normally a part of urban highway design. In this area, opportunities also exist for connecting to the local streets to the northeast (discussed in Section VI.C, Alternative Improvements).

D. Southbound Left-Turn Lane

The left-turn volume meets warrants specified in *Volume Warrants for Left-Turn Storage Lanes at Unsignalized Grade Intersections*, Highway Research Board, Record 211. The worksheet is included in Appendix B.

E. Northbound Speed-Change Lanes

A speed-change lane is an auxiliary lane, including tapers, for the acceleration or deceleration of vehicles entering or leaving the highway.

The proposed project is expected to generate 25 peak-hour entry trips as right turns. At this right-turn volume, a 450 peak-hour approach volume is needed to warrant a right-turn taper in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program, Transportation Research Board, Report 279. Northbound Highway 11 will have a northbound volume of 318 in 1998 and 427 in 2018, both below the 450 volume warrant.

Although the right turn does not meet the volume warrant, other factors that may make a deceleration lane desirable are the 5% downslope and the fact that Sykes Boulevard will be the first city street that northbound drivers will encounter and they may not be expecting vehicles in front of them to slow down suddenly.

Acceleration lanes for entering vehicles are generally used on high-volume roads where gaps between vehicles in the peak-hour traffic are infrequent and short. A right-turn acceleration lane is generally recommended when highway volumes exceed 10,000 ADT, speeds are greater than 35 mph, and there are at least 75 right-turn egress movements during the peak hour. Highway 11 is forecast to carry under 9,000 ADT in 2018 and so the volume warrant is not met.

F. Queue Storage

The queue storage requirements at Highway 11 and Sykes Boulevard were calculated for 1998 and 2018 conditions (refer to worksheet in Appendix C). Estimated maximum queues during the weekday PM peak hour count were:

- Southbound left-turn ..... 0 vehicles
- Westbound combined left/right-turn ..... 2 vehicles

For separate left and right turn lanes on westbound Sykes Avenue, the requirement would be 1 vehicle in each lane. However, these calculations do not take into account that many employees may be entering and leaving during a short period which could make the queues longer. Nor do the calculations factor in future development that would use Sykes Boulevard. Queue storage for at least 2 southbound vehicles and 6 westbound vehicles is recommended.

G. Sight Distance

Sight distance was evaluated at the Highway 11–Sykes Boulevard intersection. Sight distance is the length of the roadway visible to the driver, either a driver on the highway approaching the minor road or a driver entering the highway from the minor road.

1. Stopping Sight Distance

A driver must be able to see an object that requires a stop, apply the brakes and stop from the operating speed. This is referred to as the stopping sight distance and is normally measured for wet conditions from a height of 3.5 feet above the roadway to an object 6 inches high.

For a speed of 55 mph (presumed speed on Highway 11), the distance is from 450–550 ft on level ground, according to the *Policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 1990; ref. Table III-1. For a 5% down-

grade, about 80 feet should be added; for a 5% upgrade, about 50 feet should be subtracted (Table III-2 in AASHTO). The sight distance from the proposed Sykes Boulevard was found to exceed 1,200 feet to the north and south, which should be adequate under most conditions.

2. *Passing Sight Distance*

Drivers need safe passing sight distance where passing is allowed. Minimum passing sight distance at 55 mph on a 2-lane road is over 2,000 feet (ref. AASHTO, Figure III-2). Passing on the single northbound lane should not be permitted.

3. *Intersection Sight Distance*

A driver stopped on the proposed Sykes Boulevard to turn left onto Highway 11 needs to see in both directions to judge when it is safe to enter the roadway. They must cross the northbound lane and then enter the southbound lane with enough space to accelerate before advancing traffic overtakes them.

At 55 mph with approaching vehicles on a 5% downgrade, the required sight distance to clear the left lane is about 630 feet (ref.: AASHTO, Figure IX-40, curve B-1). The sight distance to attain 45 mph (85% of 55 mph) without being overtaken by a westbound vehicle on a 5% upgrade approaching from the right that does not drop below 45 mph is about 650 feet (ref.: AASHTO, Figure IX-40, curve B-2b).

The intersection sight distances were measured at about 1,200 feet in either direction. (Note: measurements are normally taken at a point 20 feet behind the edge of the pavement where the driver's eye is assumed to be, but because the land falls away at the proposed access road, making this point difficult to reach, the stopping sight distances were used instead.) The sight distances should be adequate for judging a left or right turn under most conditions.

H. *Site Access and Circulation*

The supplied preliminary site plan (Figure 2) shows access from Sykes Boulevard via two driveways, one of them less than 100 feet from the highway turnoff. There could be conflicts between cars exiting the parking lot and cars entering Sykes Boulevard from the highway. Furthermore, a car exiting the parking lot would be blocked if there were more than four cars queued on westbound Sykes Boulevard. These problems could be avoided by moving the driveway about 100 feet to the east.

There appears to be a loading dock at the southwest corner of the building, but it is unclear how trucks would reach it. The plan is not of sufficient detail to completely evaluate access and circulation.

A small fraction of the parking lot is accessible by walkways, and there does not appear to be any walkway connection to Sykes Boulevard.

A surveying map dated August 1996 shows a street labeled Key Boulevard forming a T-intersection with Sykes Boulevard at the east edge of the site. Presumably, Key Boulevard would extend to the north and south as development occurs. Site access could be improved by extending Sykes Boulevard 200 feet east to Main Street or extending Key Boulevard to the north into the local street system (discussed in Section VI.C, Alternative Improvements).

VI. Recommendations and Conclusions

A. Traffic Impacts

- The proposed project will generate 1,769 daily trips, with 100 entering and 75 exiting during the weekday PM peak hour. All trips will use Highway 11, with about 67% of the trips traveling to and from the north and the remainder to and from the south.
- The proposed project will contribute 21% of the traffic to this segment of Highway 11 during the 1998 PM peak hour and 16% in 2018.
- The critical approach of the intersection of Highway 11 and Sykes Boulevard is the westbound left turn. This approach operates at LOS D (UNSIG10) or C (1994 HCM) in 1998, and LOS E (UNSIG10) or C (1994 HCM) in 2018.
- Warrants are met for a southbound left-turn lane on Highway 11.
- Although volume warrants are not met for northbound deceleration or acceleration lanes, the slope of the highway makes a deceleration taper desirable for safety.
- Northbound passing sight distance is inadequate at the proposed location of Sykes Boulevard.
- The site is not accessible by walkway or bikeway from Milton-Freewater, and the building as shown on the preliminary site plan is not accessible by walkway from Sykes Boulevard.
- The western driveway on Sykes Boulevard as shown on the preliminary site plan is too close to the highway.

B. Recommended Improvements/Mitigation

- Construct a southbound left-turn lane with storage for at least 2 vehicles.
- Construct a northbound deceleration taper.
- Narrow the travel lanes on Highway 11 to 11 feet and increase the southbound shoulder width to at least 4 feet.
- Create speed transition zones south of the city limits as recommended in the TSP.
- Prohibit passing northbound within 2,000 feet of Sykes Boulevard.
- Locate the western driveway on Sykes Boulevard at least 150 feet from the intersection.
- Provide continuous walkways from Sykes Boulevard and from the parking lot to the building entrances.
- Connect Sykes Boulevard to the city's walkway network.

C. Alternative Improvements

Given the study areas's existing isolation, the primary strategy to improve the performance of the transportation system is to fill out the street grid, especially links that shorten trip distances, provide a choice of routes, and encourage walking and bicycling. This strategy is especially critical for the intersection of 14th Avenue and Highway 11 which will continue to degrade if most trips are funneled through it. The arterial street system works best when there is a functional local street system providing access.

Opportunities for street connections in the area should be examined, including the extension of Sykes Boulevard to the east to connect with Main Street (currently unpaved outside the city limits) and the extension of Key Boulevard to the north to connect with Main Street within the city limits (see Figure 1 for typical routes).

These connections would be beneficial even if they were closed to motor vehicles. If 5% of the trips to the proposed project were made by walking and bicycling, this would remove 84 daily trips and save about $50,000 in annual transportation costs (assuming that these trips replace car trips of 2 miles in length on average and cost $0.817 per vehicle mile which includes all internal and external costs).

D. Transportation System and Demand Management

System improvements generally include alternatives to building additional automotive capacity. The proposed project will affect Highway 11 to the north as an estimated two-third of employees travel in that direction. The potential connections to Main Street could provide alternate routes to the highway and shorter routes to nearby residential neighborhoods, thereby reducing the need to travel on the highway.

Demand management includes actions to reduce peak use or improve traffic flow by reducing single-occupancy vehicles. The potential for this development to reduce automotive trips rests largely with creative programs that encourage employees to participate in vanpools (supplied by the employer), to carpool (such as cashing out parking spaces), to avoid unnecessary trips (such as by lunch deliveries), and to travel at off-peak times (such as staggered work hours).

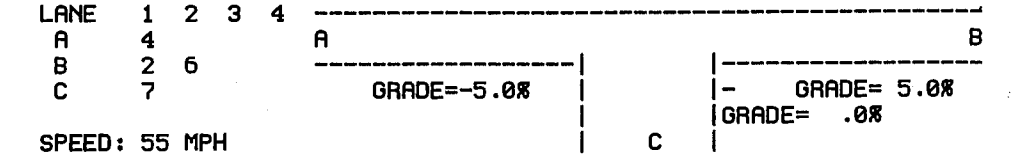
Appendix A
Intersection Analysis Worksheets

UNSIGNALIZED - T - INTERSECTION CAPACITY CALCULATION FORM

CITY: Milton-Freewater ANALYST: NRE
INTERSECTION: Hwy 11 and Sykes Blvd
ALTERNATE: EXISTING LANES METRO SIZE: LESS THAN 20,000
COUNT: 1998 PM Peak Hour TYPE OF CONTROL: STOP
LOCATION PLAN: SYKES1.UNS

APPROACH CODES ARE

LANE	1	2	3	4
A	4			
B	2	6		
C	7			



SPEED: 55 MPH
RESTRICTED SIGHT CODE IS 1
MINOR STREET ADJUSTMENTS -
ACCELERATION LANE? NO
CURB RADIUS OR TURN ANGLE? NO

APPROACH	A		B		C	
MOVE	AT	AR	BL	BT	CL	CR
VOLUME	293	25	50	358	33	67
PCH			85		36	74
LANES		1		2	1	

STEP 1 RIGHT TURN FROM C — CR
CONFLICTING FLOWS = MH = 306. VPH
CRITICAL GAP = TG = 6.5 SECS
POTENTIAL CAPACITY = M1 = 629. PCH

SHARED LANE - SEE STEP 3

NO SHARED LANE DEMAND = 0 PCH
AVAILABLE RESERVE = 0. PCH
DELAY & LOS = N/A

STEP 2 LEFT TURN FROM B — BL
CONFLICTING FLOWS = MH = 318. VPH
CRITICAL GAP = TG = 5.5 SECS
POTENTIAL CAPACITY = M2 = 767. PCH
DEMAND = BL = 85 PCH
CAPACITY USED = 11.08 %
IMPEDANCE FACTOR = P2 = .923
AVAILABLE RESERVE = 682. PCH
DELAY & LOS = A

STEP 3 LEFT TURN FROM C — CL
CONFLICTING FLOWS = MH = 714. VPH
CRITICAL GAP = TG = 7.5 SECS
POTENTIAL CAPACITY = M3 = 268. PCH
ADJUSTING FOR IMPEDANCE = M3 = 247. PCH

NO SHARED LANE DEMAND = 0 PCH
AVAILABLE RESERVE = 0. PCH
DELAY & LOS = N/A

SHARED LANE DEMAND = 110 PCH
POTENTIAL CAPACITY = M13 = 418. PCH
AVAILABLE RESERVE = 308. PCH
DELAY & LOS = B

LOS C VOLUMES: LEG C
VEHICLES PER HOUR 199.

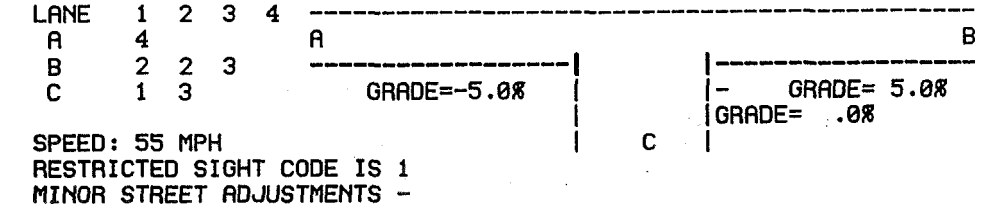
UNSIGNALIZED - T - INTERSECTION CAPACITY CALCULATION FORM

CITY: Milton-Freewater
INTERSECTION: Hwy 11 and Sykes Blvd
ALTERNATE: TURN LANES
COUNT: 1998 PM Peak Hour
LOCATION PLAN: SYKES2.UNS

ANALYST: NRE
METRO SIZE: LESS THAN 20,000
TYPE OF CONTROL: STOP

APPROACH CODES ARE

LANE	1	2	3	4
A	4			
B	2	2	3	
C	1	3		



SPEED: 55 MPH
RESTRICTED SIGHT CODE IS 1
MINOR STREET ADJUSTMENTS -
ACCELERATION LANE? NO
CURB RADIUS OR TURN ANGLE? NO

APPROACH	A		B		C	
MOVE	AT	AR	BL	BT	CL	CR
VOLUME	293	25	50	358	33	67
PCH			85		36	74
LANES		1		3	2	

STEP 1 RIGHT TURN FROM C — CR
- CONFLICTING FLOWS = MH = 306. VPH
- CRITICAL GAP = TG = 6.5 SECS
- POTENTIAL CAPACITY = M1 = 629. PCH

SHARED LANE - SEE STEP 3

- NO SHARED LANE DEMAND = 74 PCH
- AVAILABLE RESERVE = 555. PCH
- DELAY & LOS = A

STEP 2 LEFT TURN FROM B — BL
- CONFLICTING FLOWS = MH = 318. VPH
- CRITICAL GAP = TG = 6.0 SECS
- POTENTIAL CAPACITY = M2 = 683. PCH
- DEMAND = BL = 85 PCH
- CAPACITY USED = 12.45 %
- IMPEDANCE FACTOR = P2 = .913
- AVAILABLE RESERVE = 598. PCH
- DELAY & LOS = A

STEP 3 LEFT TURN FROM C — CL
- CONFLICTING FLOWS = MH = 714. VPH
- CRITICAL GAP = TG = 8.0 SECS
- POTENTIAL CAPACITY = M3 = 235. PCH
- ADJUSTING FOR IMPEDANCE = M3 = 214. PCH

- NO SHARED LANE DEMAND = 36 PCH
- AVAILABLE RESERVE = 178. PCH
- DELAY & LOS = D

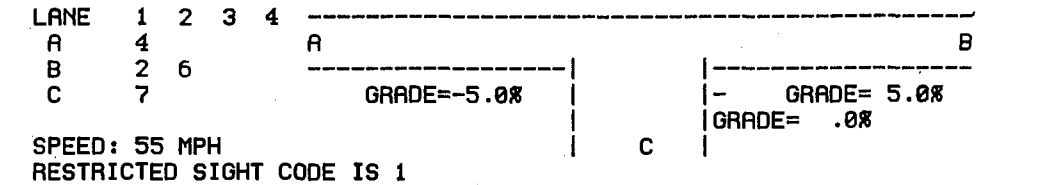
- SHARED LANE DEMAND = 0 PCH
- POTENTIAL CAPACITY = M13 = 0. PCH
- AVAILABLE RESERVE = 0. PCH
- DELAY & LOS = N/A

LOS C VOLUMES — LEG C
VEHICLES PER HOUR — 167.

UNSIGNALIZED - T - INTERSECTION CAPACITY CALCULATION FORM

CITY: Milton-Freewater ANALYST: NRE
INTERSECTION: Hwy 11 and Sykes Blvd
ALTERNATE: EXISTING LANES METRO SIZE: LESS THAN 20,000
COUNT: 2018 PM Peak Hour TYPE OF CONTROL: STOP
LOCATION PLAN: SYKES3.UNS

APPROACH CODES ARE



SPEED: 55 MPH
RESTRICTED SIGHT CODE IS 1
MINOR STREET ADJUSTMENTS -
ACCELERATION LANE? NO
CURB RADIUS OR TURN ANGLE? NO

APPROACH	A		B		C	
MOVE	AT	AR	BL	BT	CL	CR
VOLUME	400	25	50	489	33	67
PCH			85		36	74
LANES	1		2		1	

STEP 1 RIGHT TURN FROM C — CR
CONFLICTING FLOWS = MH = 413. VPH
CRITICAL GAP = TG = 6.5 SECS
POTENTIAL CAPACITY = M1 = 544. PCH

SHARED LANE - SEE STEP 3

NO SHARED LANE DEMAND = 0 PCH
AVAILABLE RESERVE = 0. PCH
DELAY & LOS = N/A

STEP 2 LEFT TURN FROM B — BL
CONFLICTING FLOWS = MH = 425. VPH
CRITICAL GAP = TG = 5.5 SECS
POTENTIAL CAPACITY = M2 = 676. PCH
DEMAND = BL = 85 PCH
CAPACITY USED = 12.58 %
IMPEDANCE FACTOR = P2 = .912
AVAILABLE RESERVE = 591. PCH
DELAY & LOS = A

STEP 3 LEFT TURN FROM C — CL
CONFLICTING FLOWS = MH = 952. VPH
CRITICAL GAP = TG = 7.5 SECS
POTENTIAL CAPACITY = M3 = 174. PCH
ADJUSTING FOR IMPEDANCE = M3 = 159. PCH

NO SHARED LANE DEMAND = 0 PCH
AVAILABLE RESERVE = 0. PCH
DELAY & LOS = N/A

SHARED LANE DEMAND = 110 PCH
POTENTIAL CAPACITY = M13 = 303. PCH
AVAILABLE RESERVE = 193. PCH
DELAY & LOS = D

LOS C VOLUMES: LEG C
VEHICLES PER HOUR 164.

UNSIGNALIZED - T - INTERSECTION CAPACITY CALCULATION FORM

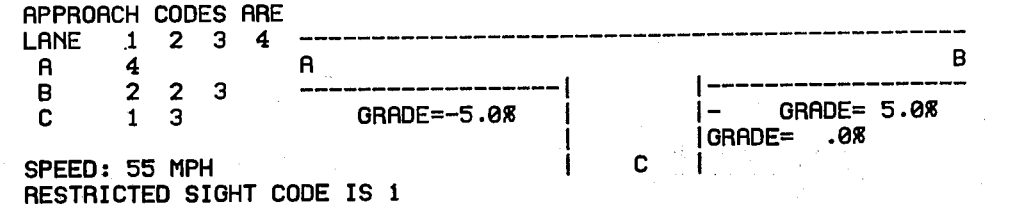
CITY: Milton-Freewater
INTERSECTION: Hwy 11 and Sykes Blvd
ALTERNATE: TURN LANES
COUNT: 2018 PM Peak Hour
LOCATION PLAN: SYKES4.UNS

ANALYST: NRE

METRO SIZE: LESS THAN 20,000
TYPE OF CONTROL: STOP

APPROACH CODES ARE

LANE	1	2	3	4
A	4			
B	2	2	3	
C	1	3		



SPEED: 55 MPH
RESTRICTED SIGHT CODE IS 1
MINOR STREET ADJUSTMENTS -
ACCELERATION LANE? NO
CURB RADIUS OR TURN ANGLE? NO

APPROACH	A		B		C	
MOVE	AT	AR	BL	BT	CL	CR
VOLUME	400	25	50	489	33	67
PCH			85		36	74
LANES	1		3		2	

STEP 1 RIGHT TURN FROM C — CR
CONFLICTING FLOWS = MH = 413. VPH
CRITICAL GAP = TG = 6.5 SECS
POTENTIAL CAPACITY = M1 = 544. PCH

SHARED LANE - SEE STEP 3

NO SHARED LANE DEMAND = 74 PCH
AVAILABLE RESERVE = 470. PCH
DELAY & LOS = A

STEP 2 LEFT TURN FROM B — BL
CONFLICTING FLOWS = MH = 425. VPH
CRITICAL GAP = TG = 6.0 SECS
POTENTIAL CAPACITY = M2 = 594. PCH
DEMAND = BL = 85 PCH
CAPACITY USED = 14.32 %
IMPEDANCE FACTOR = P2 = .899
AVAILABLE RESERVE = 509. PCH
DELAY & LOS = A

STEP 3 LEFT TURN FROM C — CL
CONFLICTING FLOWS = MH = 952. VPH
CRITICAL GAP = TG = 8.0 SECS
POTENTIAL CAPACITY = M3 = 148. PCH
ADJUSTING FOR IMPEDANCE = M3 = 133. PCH

NO SHARED LANE DEMAND = 36 PCH
AVAILABLE RESERVE = 97. PCH
DELAY & LOS = E

SHARED LANE DEMAND = 0 PCH
POTENTIAL CAPACITY = M13 = 0. PCH
AVAILABLE RESERVE = 0. PCH
DELAY & LOS = N/A

LOS C VOLUMES: LEG C
VEHICLES PER HOUR 138.

RoadRunner -- TWSC T-Intersection Analysis v5.2 -- HCM Third Edition 1994 9:47 9/11/98

David Evans and Associates, Inc., Bend, Oregon

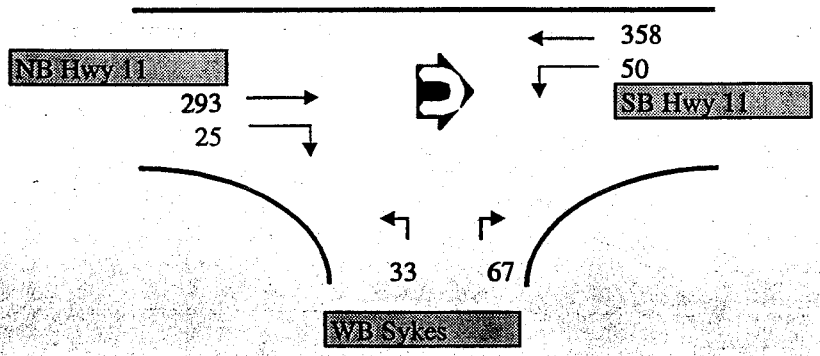
Intersection:	Highway 11/Sykes Blvd.
Location:	Milton-Freewater, Oregon
Analysis Period:	1998 Design Hour - Build Existing Lanes

TRAFFIC VOLUMES:

		EB	WB	NB	SB	
Base:	LT					
	TH			293	358	
	RT					
Development:	LT		33		50	
	TH					
	RT		67	25		
Analysis:	LT	0	33	0	50	
	TH	0	0	293	358	
	RT	0	67	25	0	
	TOTAL	0	100	318	408	826 vph

VOLUME ADJUSTMENTS:

Time of Day =	PM
Base Year =	1998
Analysis Year =	1998
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.00
Analysis Period =	HOUR
Peak Hr Factor =	0.95
pce =	1.54
Number TH Lanes A+B =	3
NB Hwy 11 - Exclusive RT?	N
NB Hwy 11 - Channel RT w/ Yield?	N
SB Hwy 11 - Exclusive LT?	N
WB Sykes - Shared LT & RT?	Y
Add Development?	Y



CALCULATIONS:

	WB Sykes LT		WB Sykes RT	SB Hwy 11 LT	
Analysis Volumes (v) =	51		103	77	pcph
Conflicting Flows (Vc) =	714		306	318	vph
Potential Capacity (cp,i) =	370		969	1157	pcph
Capacity Adj Factor (fi) =	0.92		NA	NA	
Movement Capacity (cm,i) =	339		969	1157	pcph
Shared Lane Capacity (cSH) =	601	<->	601	NA	pcph
Prob Queue-free State (p0,i) =	NA		NA	0.93	
Maj LT Shared Lane Prob Q-free (p*0,i) =	NA		NA	0.92	
Volume/Capacity Ratio (x) =	0.26	<->	0.26	0.07	
Average Total Delay =	8	<->	8	3	sec/veh
Level of Service =	B	<->	B	A	

Average Intersection Total Delay =	1	sec/veh
Level of Service =	A	

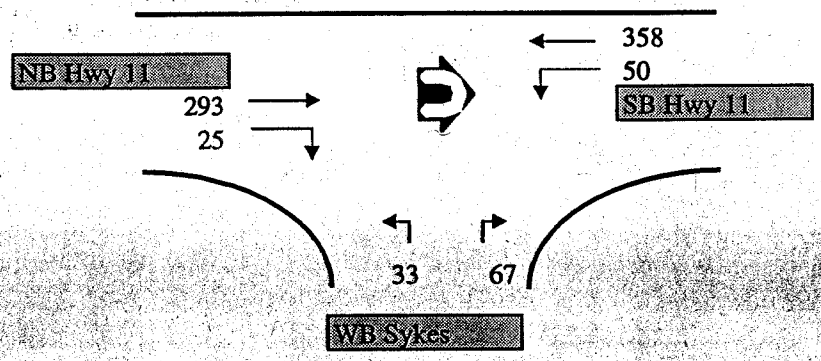
RoadRunner -- TWSC T-Intersection Analysis v5.2 -- HCM Third Edition 1994 9:47 9/11/98

David Evans and Associates, Inc., Bend, Oregon

Intersection:	Highway 11/Sykes Blvd.
Location:	Milton-Freewater, Oregon
Analysis Period:	1998 Design Hour - Build SB LT Lane & 2 WB Lanes

TRAFFIC VOLUMES:

		EB	WB	NB	SB	
Base:	LT					
	TH			293	358	
	RT					
Development:	LT		33		50	
	TH					
	RT		67	25		
Analysis:	LT	0	33	0	50	
	TH	0	0	293	358	
	RT	0	67	25	0	
	TOTAL	0	100	318	408	826 vph



VOLUME ADJUSTMENTS:

Time of Day =	PM
Base Year =	1998
Analysis Year =	1998
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.00
Analysis Period =	HOUR
Peak Hr Factor =	0.95
pce =	1.54
Number TH Lanes A+B =	3
NB Hwy 11 - Exclusive RT?	N
NB Hwy 11 - Channel RT w/ Yield?	N
SB Hwy 11 - Exclusive LT?	Y
WB Sykes - Shared LT & RT?	N
Add Development?	Y

CALCULATIONS:

	WB Sykes LT	WB Sykes RT	SB Hwy 11 LT	
Analysis Volumes (v) =	51	103	77	pcph
Conflicting Flows (Vc) =	714	306	318	vph
Potential Capacity (cp,i) =	370	969	1157	pcph
Capacity Adj Factor (fi) =	0.93	NA	NA	
Movement Capacity (cm,i) =	346	969	1157	pcph
Shared Lane Capacity (cSH) =	NA	NA	NA	pcph
Prob Queue-free State (p0,i) =	NA	NA	0.93	
Maj LT Shared Lane Prob Q-free (p*0,i) =	NA	NA	NA	
Volume/Capacity Ratio (x) =	0.15	0.11	0.07	
Average Total Delay =	12	4	3	sec/veh
Level of Service =	C	A	A	

Average Intersection Total Delay =	1	sec/veh
Level of Service =	A	

RoadRunner -- TWSC T-Intersection Analysis v5.2 -- HCM Third Edition 1994 9:50 9/11/98

David Evans and Associates, Inc., Bend, Oregon

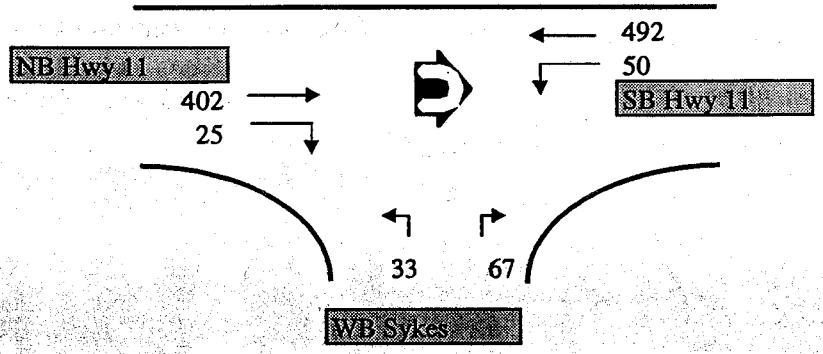
Intersection:	Highway 11/Sykes Blvd.
Location:	Milton-Freewater, Oregon
Analysis Period:	2018 Design Hour - Build Existing Lanes

TRAFFIC VOLUMES:

		EB	WB	NB	SB	
Base:	LT					
	TH			293	358	
	RT					
Development:	LT		33		50	
	TH					
	RT		67	25		
Analysis:	LT	0	33	0	50	
	TH	0	0	402	492	
	RT	0	67	25	0	
	TOTAL	0	100	427	542	1069 vph

VOLUME ADJUSTMENTS:

Time of Day =	PM
Base Year =	1998
Analysis Year =	2018
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.37
Analysis Period =	HOUR
Peak Hr Factor =	0.95
pce =	1.54
Number TH Lanes A+B =	3
NB Hwy 11 - Exclusive RT?	N
NB Hwy 11 - Channel RT w/ Yield?	N
SB Hwy 11 - Exclusive LT?	N
WB Sykes - Shared LT & RT?	Y
Add Development?	Y



CALCULATIONS:

	WB Sykes LT		WB Sykes RT	SB Hwy 11 LT	
Analysis Volumes (v) =	51		103	77	pcph
Conflicting Flows (Vc) =	957		415	427	vph
Potential Capacity (cp,i) =	259		853	1011	pcph
Capacity Adj Factor (fi) =	0.89		NA	NA	
Movement Capacity (cm,i) =	231		853	1011	pcph
Shared Lane Capacity (cSH) =	452	<->	452	NA	pcph
Prob Queue-free State (p0,i) =	NA		NA	0.92	
Maj LT Shared Lane Prob Q-free (p*0,i) =	NA		NA	0.89	
Volume/Capacity Ratio (x) =	0.34	<->	0.34	0.08	
Average Total Delay =	**12**	<->	**12**	**4**	sec/veh
Level of Service =	**C**	<->	**C**	**A**	

Average Intersection Total Delay =	**1**	sec/veh
Level of Service =	**A**	

RoadRunner -- TWSC T-Intersection Analysis v5.2 -- HCM Third Edition 1994 — 9:52 9/11/98

David Evans and Associates, Inc., Bend, Oregon —

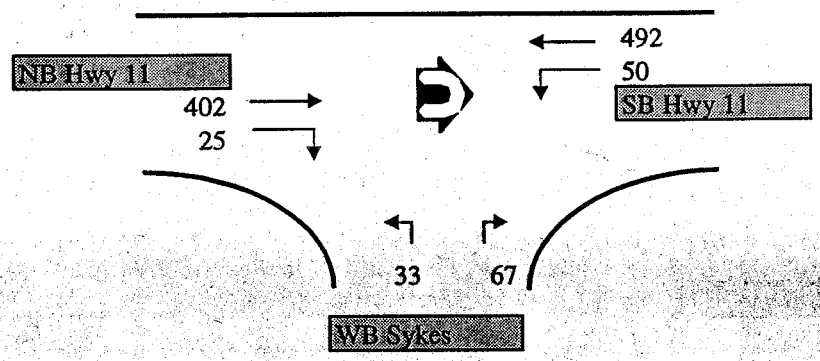
Intersection:	Highway 11/Sykes Blvd.
Location:	Milton-Freewater, Oregon
Analysis Period:	2018 Design Hour - Build SB LT Lane & 2 WB Lanes

TRAFFIC VOLUMES:

		EB	WB	NB	SB	
Base:	LT					
	TH			293	358	
	RT					
Development:	LT		33		50	
	TH					
	RT		67	25		
Analysis:	LT	0	33	0	50	
	TH	0	0	402	492	
	RT	0	67	25	0	
	TOTAL	0	100	427	542	1069 vph

VOLUME ADJUSTMENTS:

Time of Day =	PM
Base Year =	1998
Analysis Year =	2018
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.37
Analysis Period =	HOUR
Peak Hr Factor =	0.95
pce =	1.54
Number TH Lanes A+B =	3
NB Hwy 11 - Exclusive RT?	N
NB Hwy 11 - Channel RT w/ Yield?	N
SB Hwy 11 - Exclusive LT?	Y
WB Sykes - Shared LT & RT?	N
Add Development?	Y



CALCULATIONS:

	WB Sykes LT	WB Sykes RT	SB Hwy 11 LT	
Analysis Volumes (v) =	51	103	77	pcph
Conflicting Flows (Vc) =	957	415	427	vph
Potential Capacity (cp,i) =	259	853	1011	pcph
Capacity Adj Factor (fi) =	0.92	NA	NA	
Movement Capacity (cm,i) =	239	853	1011	pcph
Shared Lane Capacity (cSH) =	NA	NA	NA	pcph
Prob Queue-free State (p0,i) =	NA	NA	0.92	
Maj LT Shared Lane Prob Q-free (p*0,i) =	NA	NA	NA	
Volume/Capacity Ratio (x) =	0.21	0.12	0.08	
Average Total Delay =	19	5	4	sec/veh
Level of Service =	C	A	A	

Average Intersection Total Delay =	1	sec/veh
Level of Service =	A	

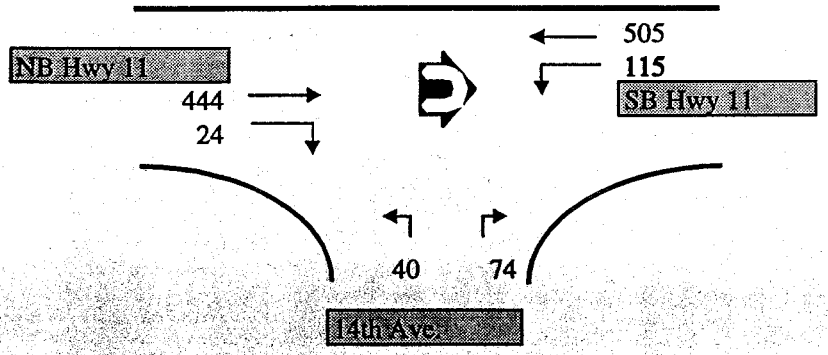
RoadRunner -- TWSC T-Intersection Analysis v5.2 -- HCM Third Edition 1994 9:53 9/11/98

David Evans and Associates, Inc., Bend, Oregon

Intersection: Highway 11/14th Ave.
Location: Milton-Freewater, Oregon
Analysis Period: 2018 Design Hour - Build Existing Lanes

TRAFFIC VOLUMES:

		EB	WB	NB	SB	
Base:	LT		27		84	
	TH			278	331	
	RT		54	15		
Development:	LT		3			
	TH			62	50	
	RT			3		
Analysis:	LT	0	40	0	115	
	TH	0	0	444	505	
	RT	0	74	24	0	
	TOTAL	0	114	467	620	1202 vph



VOLUME ADJUSTMENTS:

Time of Day =	PM
Base Year =	1998
Analysis Year =	2018
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.37
Analysis Period =	HOUR
Peak Hr Factor =	0.95
pce =	1.54
Number TH Lanes A+B =	3
NB Hwy 11 - Exclusive RT?	N
NB Hwy 11 - Channel RT w/ Yield?	N
SB Hwy 11 - Exclusive LT?	N
14th Ave. - Shared LT & RT?	N
Add Development?	Y

CALCULATIONS:

	14th Ave. LT	14th Ave. RT	SB Hwy 11 LT	
Analysis Volumes (v) =	62	114	178	pcph
Conflicting Flows (Vc) =	1076	456	467	vph
Potential Capacity (cp,i) =	217	814	962	pcph
Capacity Adj Factor (fi) =	0.74	NA	NA	
Movement Capacity (cm,i) =	160	814	962	pcph
Shared Lane Capacity (cSH) =	NA	NA	NA	pcph
Prob Queue-free State (p0,i) =	NA	NA	0.82	
Maj LT Shared Lane Prob Q-free (p*0,i) =	NA	NA	0.74	
Volume/Capacity Ratio (x) =	0.39	0.14	0.18	
Average Total Delay =	36	5	5	sec/veh
Level of Service =	E	B	A	

Average Intersection Total Delay =	2	sec/veh
Level of Service =	A	

Appendix B
Left-Turn Lane Warrants Worksheet

RoadRunner -- Left Turn Lane Warrants v5.2 -- Harmelink 1966 10:51 9/11/98

David Evans and Associates, Inc., Bend, Oregon © 1996 RSG, Inc.

Intersection: Highway 11/Sykes Blvd.
Location: Milton-Freewater, Oregon
Analysis Period: 1998 Design Hour - Build

HOURLY VOLUMES:

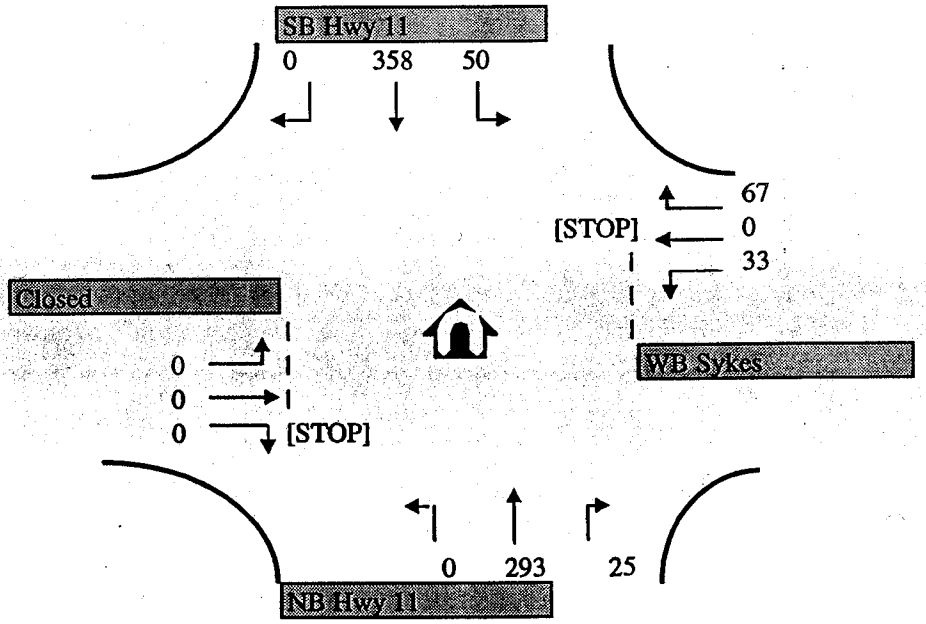
		EB	WB	NB	SB	
Base Volumes:	LT					
	TH			293	358	
	RT					
Devel Volumes:	LT		33		50	
	TH					
	RT		67	25		
Analysis Volumes:	LT	0	33	0	50	
	TH	0	0	293	358	
	RT	0	67	25	0	
	TOTAL	0	100	318	408	826 vph

VOLUME ADJUSTMENTS:

TIme of Day =	PM
EB/WB= Major or Minor?	Minor
Base Year =	1998
Analysis Year =	1998
Growth/Year =	1.02
DHV Adjustment =	1.00
Total Vol Adjustment =	1.00
Speed Limit=	55 mph
Add Development?	Y

Channelized right turn for:

EB?	N
WB?	N
NB?	N
SB?	N



CALCULATIONS:

	EB	WB	NB	SB
Advancing Volume:	0	100	318	408
Opposing Volume:	100	0	408	318
% Left Turns:	NA	33%	0%	12%
Adv. Volume not to exceed:	NA	NA	NA	295
Lane Warranted?	NA	NA	NA	Y
Storage length				75

Appendix C
Queue Storage Worksheet

David Evans and Associates, Inc., Bend, Oregon

Location	Movement	*Probability of Queue Longer than M* $P(x > M)$	*Arrival Rate* λ	*Service Rate* μ	*Utilization Factor* $\rho = \lambda / N\mu$	*Statistic* Q_M	*Queue Storage Required* $M = \frac{\lceil \ln P(x>M) - \ln Q_M \rceil}{\lfloor \ln \rho \rfloor} - 1$	*Queue Storage Required*
Hwy 11 & Sykes Blvd. (1998 PM Peak)	NB RT	5%	25 pcph		#N/A	#N/A	#N/A	#N/A
	SB LT	5%	50 pcph	766 pcph	0.07	0.07	None	None
	WB LT/RT	5%	100 vph	415 vph	0.24	0.24	1 vehicle	25 feet
Hwy 11 & Sykes Blvd. (2018 PM Peak)	NB RT	5%	25 vph		#N/A	#N/A	#N/A	#N/A
	SB LT	5%	50 vph	674 vph	0.07	0.07	None	None
	WB LT/RT	5%	100 vph	301 vph	0.33	0.33	2 vehicles	50 feet

Legend:

NB, SB, EB, WB	= Northbound, Southbound, Eastbound, Westbound
LT	= Left Turn
RT	= Right Turn
pcph, vph	= passenger cars per hour, vehicles per hour

Notes:

Service rates are calculated per lane, accounting for shared lane use.

Sykes Blvd. (WB) assumed to have one exit lane for analysis.

APPENDIX C

STREET INVENTORY

Street Inventory — Milton-Freewater, OR — Sheet A

Street	From	To	Classification	mph	ROW (ft)	Width (ft)	Lanes	Pavement Condition	Length (mi)	Curbs
Broadway St	N Main	S Main	E-W arterial	25	100	70	4	Good	0.15	Yes
Broadway St	Poplar	N Main	E-W arterial		80-100	40	2	Good	0.3	Yes
Broadway St	S Main	St Rt 11	E-W arterial		100	60	2	Good	0.25	Yes
East Side Rd	St Rt 11	River	N-S arterial			22	2	Good	0.2	No
Hodgen Rd	City Limits	Lamb	E-W arterial			22	2	Poor	0.25	No
Main St. (OR-WA Hwy)	SW 2nd	SW 14th	N-S arterial	25	100	64	4	Good	0.7	Yes
N Elizabeth St	NE 8th	Broadway	N-S arterial		60	42	2	Good	0.45	Yes
N Elizabeth St	St Rt 11	NE 8th	N-S collector		60	42	2	Good	0.6	Yes
N Main St	NW 11th	NW 8th	N-S arterial	25	25-50	28	2	Good	0.2	East
N Main St	Powell	NW 11th	N-S arterial	25	50	22	2	Fair	0.2	No
N Main St (Freewater Hwy)	NW 8th	Broadway	N-S arterial	25	60	44	2	Good	0.5	Yes
NE 8th Ave	N Main	St Rt 11	E-W arterial		60	38	2	Good	0.75	Yes
NW 8th Ave (Freewater Hwy)	Lamb	N Main	E-W arterial		60	36	2	Good	0.75	Yes
NW Evans St	11th	8th	N-S residential		60	36	2	Good	0.2	West
NW Evans St	8th	4th	N-S residential		60	27	2	Good	0.25	Yes
NW Lamb St	8th	Hodgen	N-S arterial	25	50-60	36	2	Good	0.25	Yes
NW Lamb St (Freewater Hwy)	Powell	8th	N-S arterial	25	60	24	2	Fair	0.4	No
NW Powell Rd	Lamb	Main	E-W arterial	25	40	20	2	Fair	0.25	No
NW/NE 5th Ave	Lamb	St Rt 11	E-W collector		60	36	2	Good	0.75	Yes
Poplar St (Saager)	Lamb	Broadway	N-S arterial		80	40	2	Good	0.2	Partial
S Elizabeth St	Broadway	S Main	N-S residential		60	40	2	Good	0.15	Yes
S Elizabeth St	S Main	SW 2nd	N-S residential		60	40	2	Good	0.15	Yes
S Elizabeth St	SW 2nd	SW Hill	N-S residential		45-65	36	2	Good	0.3	Yes
S Main St	Broadway	SW 2nd	N-S arterial		60	56	2	Good	0.35	Yes
SE 12th Ave	Main	River	E-W collector		60-80	36	2	Good	0.25	Yes
SE 15th Ave	Main	River	E-W arterial		60	42	2	Good	0.25	Yes
SE 6th Ave	Main	River	E-W residential		50-60	36	2	Good	0.25	Yes
SE 9th Ave	Main	River	E-W arterial		60-80	40	2	Fair	0.25	Yes
St Route 11 (OR-WA Hwy)	8th	Main	N-S arterial	35	120	85	5	Good	0.77	Yes
St Route 11 (OR-WA Hwy)	Elizabeth	8th	N-S arterial	35	120	85	5	Good	0.53	Yes
St Route 11 (OR-WA Hwy)	SW 14th	S City Limits	N-S arterial	35	100	50	4	Good	0.35	No
SW 12th Ave	College	Main	E-W collector		80	36	2	Good	0.1	Yes
SW 6th Ave	College	Main	E-W collector		45-50	30	2	Good	0.3	Yes
SW 8th Ave	College	Main	E-W arterial		45-80	36	2	Good	0.15	No
SW College St	SW 6th	SW 8th	N-S arterial		30-60	24	2	Good	0.4	Partial
SW College St	SW 8th	SW 12th	N-S collector		50	36	2	Good	0.2	Yes
SW Dehaven St	Broadway	SW 6th	N-S arterial	15	60	40	2	Good	0.45	Yes

Street	From	To	Parking	Walkways	Bikeways	Land Use
Broadway St	N Main	S Main	Yes	South	Shared	Commercial, Industrial
Broadway St	Poplar	N Main	Yes	South	Shared	Residential, Park, Stadium & PO
Broadway St	S Main	St Rt 11	Yes	Partial	Shared	Commercial
East Side Rd	St Rt 11	River	No	No	Shared	Recreational
Hodgen Rd	City Limits	Lamb	No	No	Shared	Rural, Industrial
Main St. (OR-WA Hwy)	SW 2nd	SW 14th	Yes	Yes	Shared	Residential, Commercial
N Elizabeth St	NE 8th	Broadway	Yes	West	Shared	Residential, Commercial
N Elizabeth St	St Rt 11	NE 8th	Yes	No	Shared	Residential, Industrial
N Main St	NW 11th	NW 8th	No	East	Shared	Residential, Park
N Main St	Powell	NW 11th	No	North	Shared	Residential
N Main St (Freewater Hwy)	NW 8th	Broadway	Partial	Yes	Shared	Commercial , Industrial
NE 8th Ave	N Main	St Rt 11	Yes	North	Shared	Industrial, Park
NW 8th Ave (Freewater Hwy)	Lamb	N Main	Yes	Yes	Shared	Residential, Commercial, School
NW Evans St	11th	8th	Yes		Shared	Residential, School
NW Evans St	8th	4th	Yes		Shared	Residential, School
NW Lamb St	8th	Hodgen	Yes	East	Shared	Residential, Industrial
NW Lamb St (Freewater Hwy)	Powell	8th	No	No	Shared	Residential
NW Powell Rd	Lamb	Main	No	No	Shared	Residential
NW/NE 5th Ave	Lamb	St Rt 11	Yes	Partial	Shared	Industrial, Commercial
Poplar St (Saager)	Lamb	Broadway	Yes	Partial	Shared	Residential
S Elizabeth St	Broadway	S Main	Yes	No	Shared	Residential, Schools
S Elizabeth St	S Main	SW 2nd	East	No	Shared	Residential, Schools
S Elizabeth St	SW 2nd	SW Hill	Yes	No	Shared	Residential, Schools
S Main St	Broadway	SW 2nd	Yes	Yes	Shared	High School, Commercial
SE 12th Ave	Main	River	Yes	Yes	Shared	Residential
SE 15th Ave	Main	River	Yes	Yes	Shared	Industrial , School, Residential
SE 6th Ave	Main	River	Yes	Partial	Shared	Residential
SE 9th Ave	Main	River	Yes	No	Shared	Residential, Industrial
St Route 11 (OR-WA Hwy)	8th	Main	Yes	Yes	Shoulder	Commercial, Industrial
St Route 11 (OR-WA Hwy)	Elizabeth	8th	Yes	West	Shoulder	Commercial, Industrial
St Route 11 (OR-WA Hwy)	SW 14th	S City Limits	No	No	Shared	Commercial, Industrial
SW 12th Ave	College	Main	Yes	No	Shared	Residential
SW 6th Ave	College	Main	No	South	Shared	Residential
SW 8th Ave	College	Main	Yes	Yes	Shared	Residential
SW College St	SW 6th	SW 8th	No	No	Shared	Residential
SW College St	SW 8th	SW 12th	Yes	No	Shared	Residential
SW Dehaven St	Broadway	SW 6th	Yes	West	Shared	Residential, Schools, Park