EXHIBIT "A"

Woodburn Transportation System Plan

Woodburn, Oregon

Prepared for:
City of Woodburn

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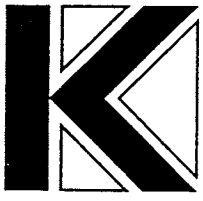
Project No.: 1374

June 1996



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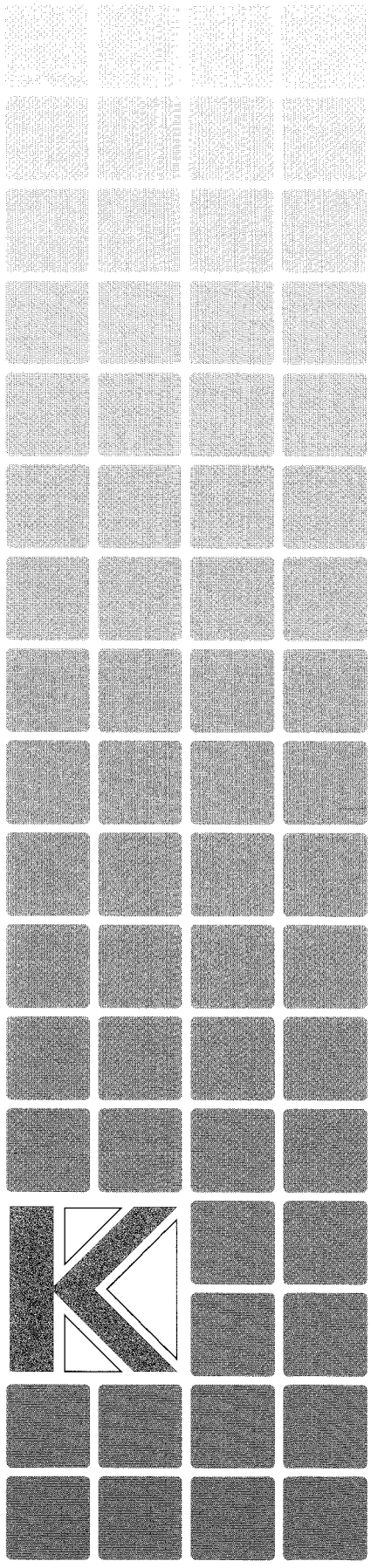


Section 1

Executive Summary

1.0 Executive Summary

Using a combination of funds from the Oregon Department of Transportation (ODOT) Transportation & Growth Management Program and the City of Woodburn, the City in 1994-95 sponsored the development of an updated Woodburn Transportation System Plan. The plan has a planning horizon to the year 2015, and represents for the first time a comprehensive, multi-modal transportation plan to guide transportation investment in the City over the next 20 years.

As an input into the plan, an assessment of existing conditions was conducted, as well as an assessment of highway and transit system alternatives, and potential financing mechanisms. To aid the alternatives analysis and plan development, an updated year 2015 traffic forecasting model was developed, using year 2015 population and employment projections.

The highway system alternatives analysis, in addition to a no-build alternative, focused on an assessment of three I-5 access alternatives:

1. develop a split diamond interchange;
2. develop a second interchange at Butteville Road; and
3. improve the existing interchange, including an option to convert to a partial cloverleaf configuration.

Included in all three "build" alternatives was the development of the South Arterial from Highway 214 on the west to Highway 99E on the east, as well as improvements to other minor arterials and collectors on the City street system.

The alternatives analysis included an assessment of different intracity and intercity bus service configurations to serve Woodburn. Improvements to the existing single fixed-route, one-way bus service in the city were assessed, including making the route two-way, increasing the service frequency, and/or establishing separate east and west side bus routes. Intercity shuttle bus service transportation plan options from Woodburn to Portland and Salem were also examined.

Finally, alternate pedestrian and bicycle facility and Transportation Demand Management (TDM) strategies were evaluated to further reduce vehicle trip marking in Woodburn.

Transportation Plan

The final Transportation System Plan includes recommended facilities, standards, and improvements for the following modes of transportation:

1. roadway;
2. transit;
3. pedestrian;
4. bicycle;
5. golf cart; and
6. rail.

Roadway

There are four critical elements to the roadway plan. The first is the designation of an I-5 interchange improvement, the specific configuration to be identified in a future Refinement Plan. The second is the development of a South Arterial facility between Highways 219 and 99E. The third is the reclassification of the collector street system into two categories: service collector and access street. Several streets are identified for minor widening to provide bike lanes and sidewalk treatments in the future. The fourth is the identification of potential local street connections within and between neighborhood areas.

Transit

The transit plan proposes initially converting the existing intercity bus route to two-way operation, with possible improvement in service frequency over time to 30 minutes, at least during weekday peak periods. Intercity shuttle bus service to downtown Portland (with an intermediate stop at the Tualatin park-n-ride), and to downtown Salem is also proposed. In the longer-term, a downtown transportation center should be considered if an intercity passenger rail stop is developed, and/or there is sufficient transit demand to warrant both east and west side routes. The existing paratransit and taxi services in the City are recommended to be maintained as well.

A more detailed Transit Development Program study is recommended to detail specific operating strategies and associated maintenance and capital requirements and funding sources.

Pedestrian

The pedestrian facility plan identifies providing sidewalks on all arterial and collector streets in Woodburn in the future. The plan also shows the development of an off-street pathways system along the Mill Creek and Goose Creek corridors.

Bicycle

The bicycle facility plan calls for an expansion of the existing system of bike lanes on City streets into a comprehensive system of bike routes and lanes. All arterials and service collectors are identified bike routes, with bike lanes desired where physically possible. The off-street pathways plan would include bike trails either combined or separated from pedestrian trails.

Golf Carts

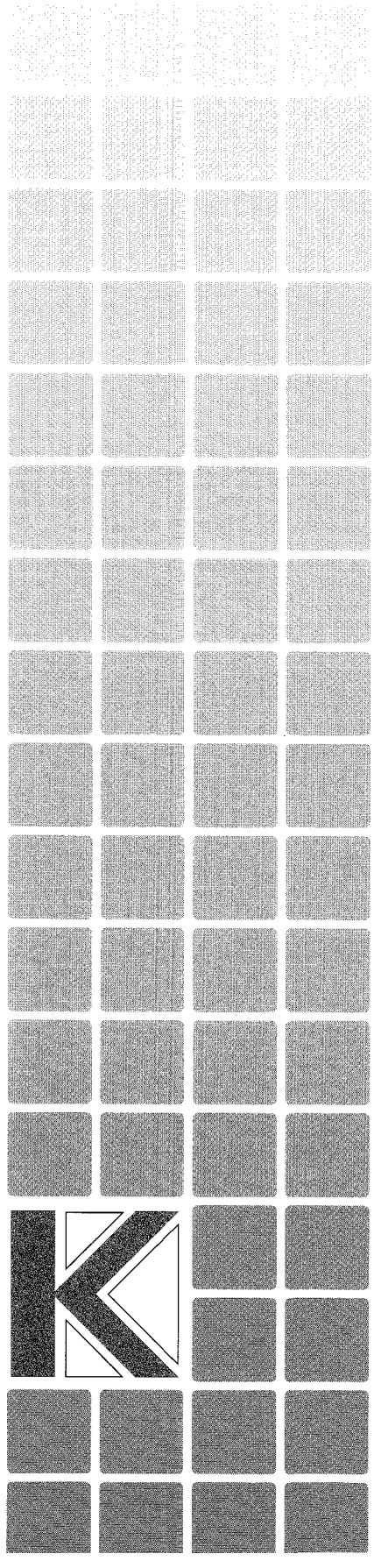
To improve accessibility of golf cart users to central Woodburn, certain streets between Senior Estates and downtown Woodburn would be designated for golf cart use, using widened shoulder areas which would also be used by bicycles. Golf carts would also be allowed on certain segments of the off-street pathways system, combined with bicycle use where allowed.

Rail

The rail plan recognizes the continued presence of the Southern Pacific Railroad through Woodburn, including spur tracks serving local businesses. All existing at-grade railroad/high-

way crossings are proposed to be maintained. In the longer-term, improvements to trackage and crossings could occur if intercity passenger rail service were implemented, with a possible stop in Woodburn.

A 20-year program for transportation improvements in Woodburn is an integral part of the TSP. Improvements needed in the 0-5, 5-10, 10-20, and 20+ year time frame have been identified. The current estimated cost of all identified improvements (in 1995 dollars) is about $62 million. Over $20 million of this is in the construction of an I-5 interchange improvement and the South Arterial. Potential funding sources include federal funding through the Intermodal Surface Transportation Efficiency Act (ISTEA), state gas and lottery funds, and local gas tax, traffic impact fee, bonding revenues, developer participation and other funding sources that may be developed during the effective time of the plan.



Section 2

Introduction

2.0 Introduction

In April 1991, the Land Conservation and Development Commission (LCDC), with the concurrence of the Oregon Department of Transportation (ODOT), adopted the Transportation Planning Rule (TPR), OAR 660 Division 12. The TPR requires local jurisdictions to prepare and adopt a Transportation System Plan (TSP) by May 1996.

The Transportation Planning Rule requires ODOT, Metropolitan Planning Organizations, and each county and city to prepare and adopt a transportation system plan (TSP) and implementing regulations (OAR 660-12-015). For a city with the population of the City of Woodburn, the TSP must include:

1. determination of transportation needs,
2. road plan for arterials and collectors,
3. public transportation plan,
4. bicycle and pedestrian plan,
5. air, rail, water and pipeline transportation plan,
6. policies and land use regulations for implementing the TSP as provided in OAR 660-12-045,
7. transportation financing plan, and
8. ordinances to assure coordinated planning of transportation facilities.

With a partial grant from the Oregon Department of Transportation, the City of Woodburn initiated its transportation system plan in November of 1994. As part of this process the City's Transportation Task Force (which previously existed), City Staff, ODOT, and Marion County provided guidance and review of preliminary products in the development of this plan. In addition three public open houses were held. The purpose of these open houses was to ensure that the recommended transportation system plan would reflect the local needs of the citizens of Woodburn.

The development of the Woodburn Transportation System Plan began with the Transportation Task Force, Woodburn, ODOT, and Marion County staff working together to develop the transportation system plan goals and objectives which are presented in **Section 3**.

The transportation analysis began in **Section 4** with an assessment of existing traffic conditions and operations in the city of Woodburn. In this section of the document, among other issues, existing average daily traffic, traffic operations at key intersections, transit, pedestrian and bicycle routes are summarized.

To determine transportation needs in the future, a travel demand model was developed which forecasted year 2015 weekday PM peak hour traffic volumes. In **Section 5** these forecast volumes were analysed on alternative roadway transportation system improvements. The results of this analysis indicated which alternatives would provide for the best traffic operations in the future.

Section 6 presents options for improving the public transportation system in Woodburn, including both intra city ind inter city bus service improvements.

Section 7 presents options for improving pedestrian and bicycle facilities in Woodburn, as well as Transportation Demand Management strategies.

Section 8 presents the results of the access management analysis performed on Highway 214 between Woodland Road and Settlemier Avenue, and on Highway 99E between Lincoln Street and the south city limits. In this analysis, public road, traffic signal and private access spacing was analyzed to determine the need for consolidating access in order to develop safer, more efficient State highways through Woodburn.

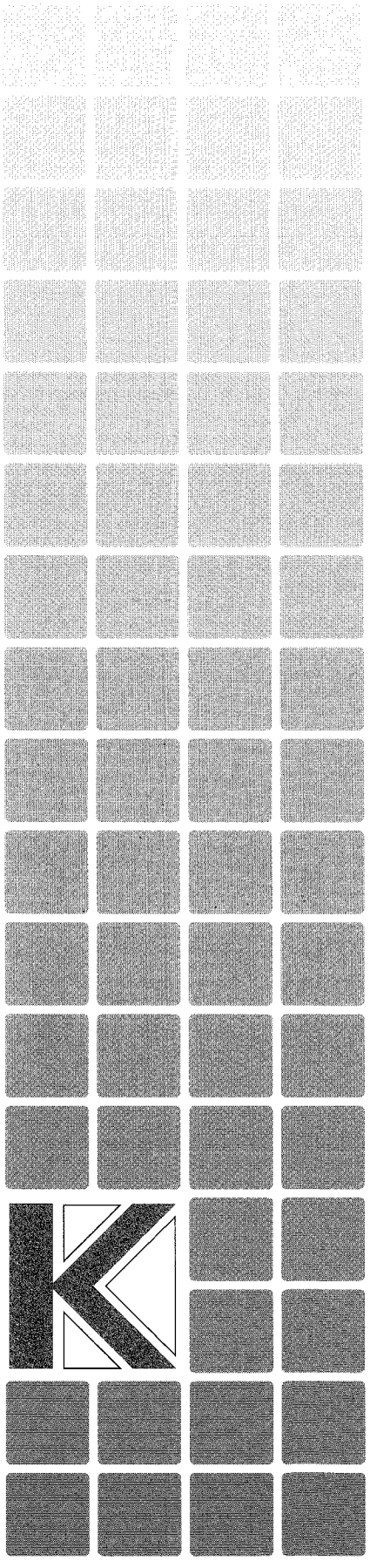
The next step, as summarized in **Section 9**, involved the development of the individual elements of the Woodburn Transportation System Plan. Included are the highway plan, transit plan, pedestrian/bicycle facility plans, golf cart facility plan, and a TDM plan.

In **Section 10** the transportation finance plan is developed. This plan identifies alternatives available to the City of Woodburn to fund transportation system improvements which would provide adequate capacity and access for all users of the Woodburn transportation system.

In **Section 11**, land use ordinances necessary to facilitate implementation of the Transportation System Plan are summarized.

This document concludes with **Section 12** which lists the requirements and recommendations of the Oregon Transportation Planning Rule (OAR 660 Division 12) and outlines how the Woodburn Transportation System Plan complies with the TPR.

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. TGM grants rely on federal Intermodal Surface Transportation Efficiency Act and Oregon Lottery Funds. The contents of this document do not necessarily reflect views or policies of the State of Oregon.



Section 3

Goals and Policies

3.0 Goals and Policies

The Woodburn Transportation Task Force in concert with City of Woodburn staff developed five principal goals (and associated policies) which guided the development and implementation of the Transportation System Plan. These goals are identified below:

Goal 1

Develop a multi-modal transportation system that avoids or reduces a reliance upon one form of transportation, and minimizes energy consumption and air quality impacts.

Policies

1. Develop an expanded intracity bus transit system which will provide added service and route coverage to improve the mobility and accessibility of the transportation disadvantaged, and to attract traditional auto users to use the system.
2. Develop a plan for providing travel options between Woodburn and Portland and/or Salem, including intercity bus service and potential bus/carpool park-n-ride facilities.
3. Develop a plan for accommodating golf cart travel in Senior Estates, Tukwila, and other new golf course residential communities and for connectivity between residential and commercial areas in the Woodburn area.
4. Develop a bikeway system which will provide routes and facilities to allow bicyclists to travel from residential areas to schools, parks, places of employment and commercial areas. Off-street facilities in City greenway/park areas will be identified. Insure all new collector and arterial streets are constructed with bike lanes.
5. Identify sidewalk and off-street pathway improvements to improve pedestrian mobility within neighborhoods and between residential areas and schools, parks, places of employment and commercial areas. Insure all new collector and arterial streets are constructed with sidewalks.

Goal 2

Develop a street system which will handle projected year 2015 traffic demands in the Woodburn area, and interconnects residential areas with employment centers, schools, parks, churches and regional transportation facilities.

Policies

1. Develop an updated roadway functional classification plan for the Woodburn area, that reflects the desired function of different roadways, and is consistent with current federal guidelines for the designation of major streets in an urban area.

2. Develop a strategy for providing improved access to I-5 from the Woodburn area, through either improvements to the existing Highway 214 interchange and/or a new interchange in the Woodburn vicinity (with supporting local roadway improvements). This strategy will be developed following a refinement study as outlined in the Transportation Planning Rule.
3. Develop a strategy for improving Highways 219/214, 211, and 99E through Woodburn, including added travel lanes, signalization, and access management.
4. Identify new east-west and north-south collector/minor arterial streets within the City to relieve traffic demands on Highways 219/214, 211, and 99E.
5. Develop updated street design standards for arterials, collectors, and local streets.
6. Identify a final strategy for paving current unimproved streets in the City.
7. Identify the need for added public parking provisions in Woodburn, including park and ride, as well as a plan to support increased carpooling and transit use in the future.
8. Develop a capital improvement program that will fulfill the transportation goals established by the community.

Goal 3

Develop transportation improvements that will improve overall traffic safety in the Woodburn area.

Policies

1. Develop access management strategies for Highways 219/214, 211 and 99E through Woodburn, particularly focusing on the section of Highway 214 between I-5 and Cascade Drive, and Highway 99E south of Lincoln Avenue.
2. Develop a plan for improving pedestrian and bicycle safety for travel to/from local schools.
3. Identify street/railroad crossings in need of improvement, and those that should be closed or relocated.
4. Develop a plan for designated truck routes through the City, and a plan to handle truck and rail hazardous cargoes.

Goal 4

Develop a set of reliable funding sources that can be applied to fund future transportation improvements in the Woodburn area.

Policies

1. Evaluate the feasibility of the full range of funding mechansims for transportation improvements.

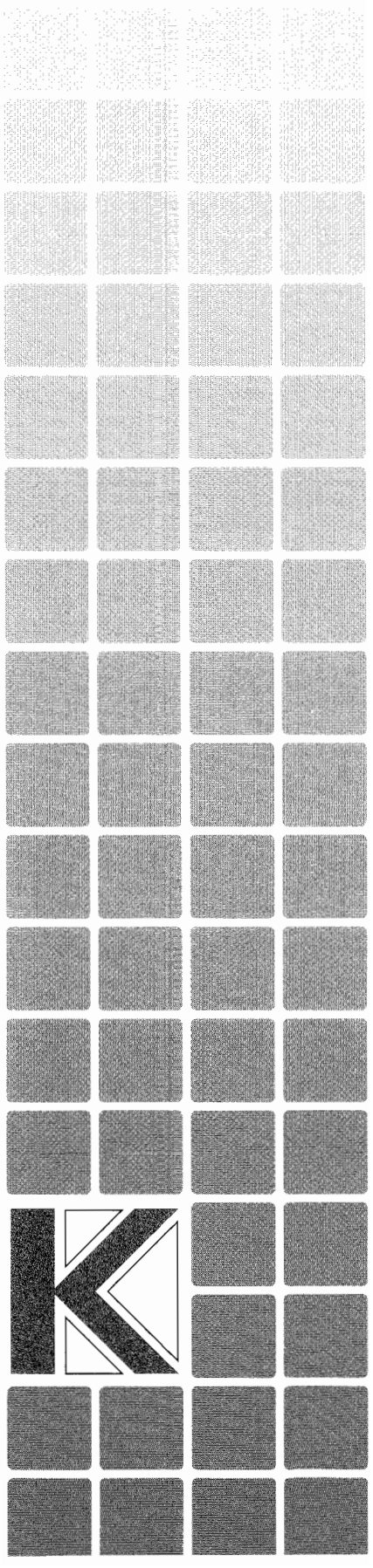
2. Evaluate the feasibility of instituting an added City gas tax for transportation improvements.
3. Identify a traffic impact fee structure associated with new developments in the Woodburn area to fund transportation improvements.

Goal 5

Develop amendments to City land use standards and ordinances to reduce travel demand and promote use of modes of transportation other than the automobile.

Policies

1. Identify changes in the Woodburn Zoning Ordinance to encourage implementation of Transportation Demand Management (TDM) strategies by local businesses. TDM strategies should include bicycle and carpool parking provisions, and allowable overall parking reductions for employer institution of TDM strategies, including transit fare subsidies, carpool matching programs, and flexible work hours.
2. Identify changes in the Woodburn Zoning ordinance to encourage transit and pedestrian-oriented development. This includes proper building orientation to improve access for transit users and patrons, direct pedestrian connections, and bus stop provisions where appropriate.
3. Identify changes in the Woodburn Subdivision Standards to encourage neo-traditional development patterns and adequate local street standards to accommodate all modes of transportation.
4. Adopt traffic impact analysis guidelines to be used by the City and developers to identify the impact of new development on street system improvement needs.



Section 4

Existing Conditions

4.0 Existing Conditions

4.1 Introduction

This section of the Woodburn Transportation System Plan provides a summary of existing transportation conditions within the Woodburn Urban Growth Boundary. The section is divided into two categories: transportation facilities, and traffic operations. The transportation facilities section summarizes the existing:

- street functional classification system;
- pedestrian and bicycle facilities;
- rail service/roadway grade crossings;
- air transport facilities; and
- water transport facilities.

In the existing traffic operations section, the principal issues are:

- intersection traffic control and lane configuration;
- recent 24-hour traffic counts;
- intersection PM peak hour traffic volumes;
- intersection PM peak hour traffic level of service; and
- high accident locations.

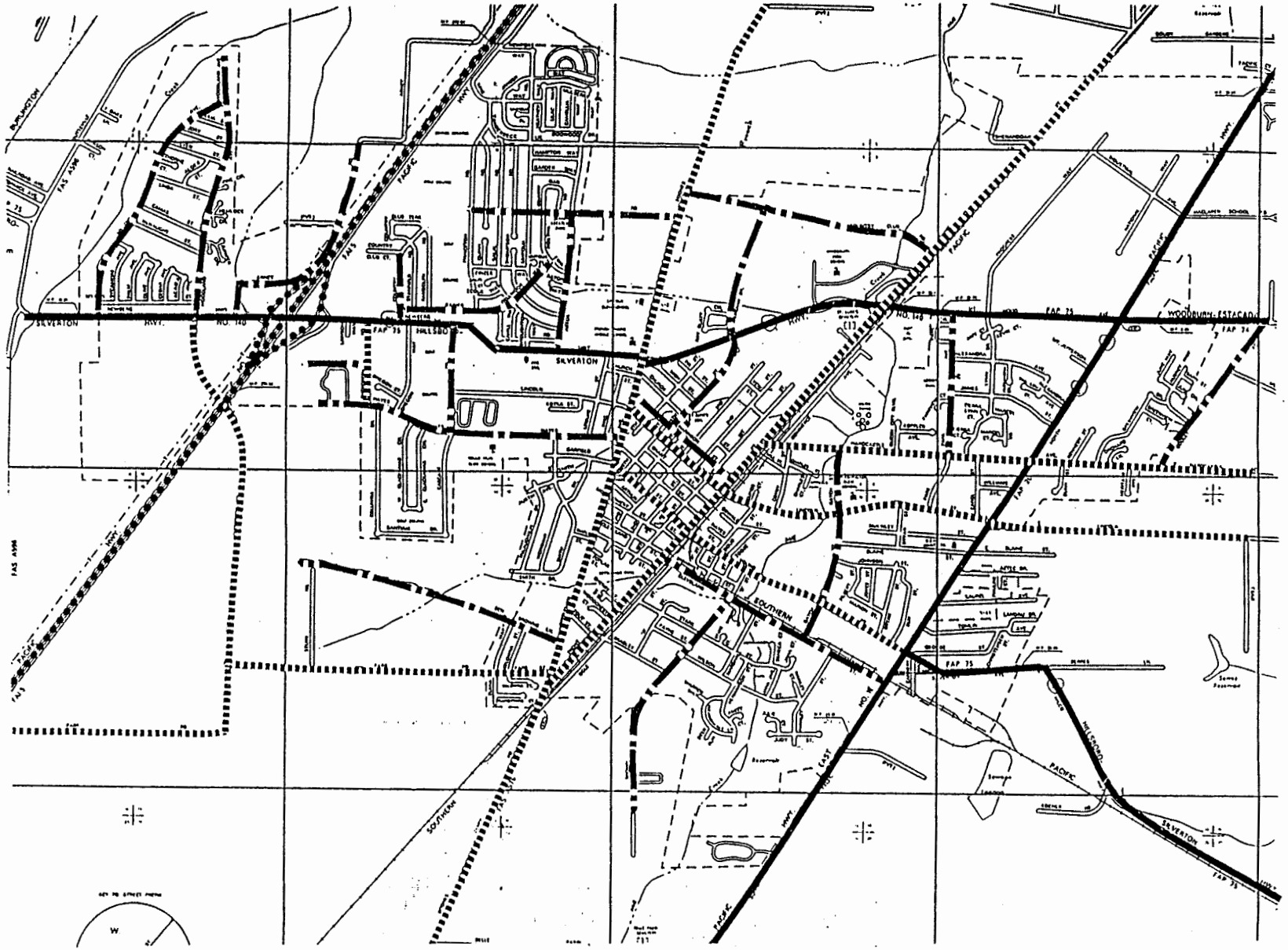
4.2 Transportation Facilities

4.2.1 Functional Classification

The 1985 Woodburn Transportation Plan identifies five categories of road facilities. Those categories are:

- freeway,
- principal arterial,
- minor arterial,
- collector, and
- local street.

The adopted functional classification plan is shown in Figure 1, and the roadway standards are summarized in Table 1.



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LEGEND

- FREEWAY
- MINOR ARTERIAL
- MAJOR ARTERIAL
- COLLECTOR

1985 STREET FUNCTIONAL CLASSIFICATION PLAN

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 1

Table 1

Existing Street Functional Classification Standards

Functional Classfication	R/W (ft)	Pavement (ft)	Lanes	Volume (AST)	Miles within UGB
Freeway	120+	12/lane	4-8	>30,000	2.2
Principal Arterial	80-120	12/lane	2-5	>10,000	6.3
Minor Arterial	80-100	36-44	2-4	3,000-10,000	9.8
Collector	60	34-44	2	2,000-5,000	9.3
Local	60	34-36	2	<2,000	27.0 (incl.cul-de-sac)
Cul-De-Sac	50-60	34-36			
Cul;-De-Sac (Turnaround)	45.6 Radius	40 Radius			

4.2.2 Pedestrian and Bicycle Facilities

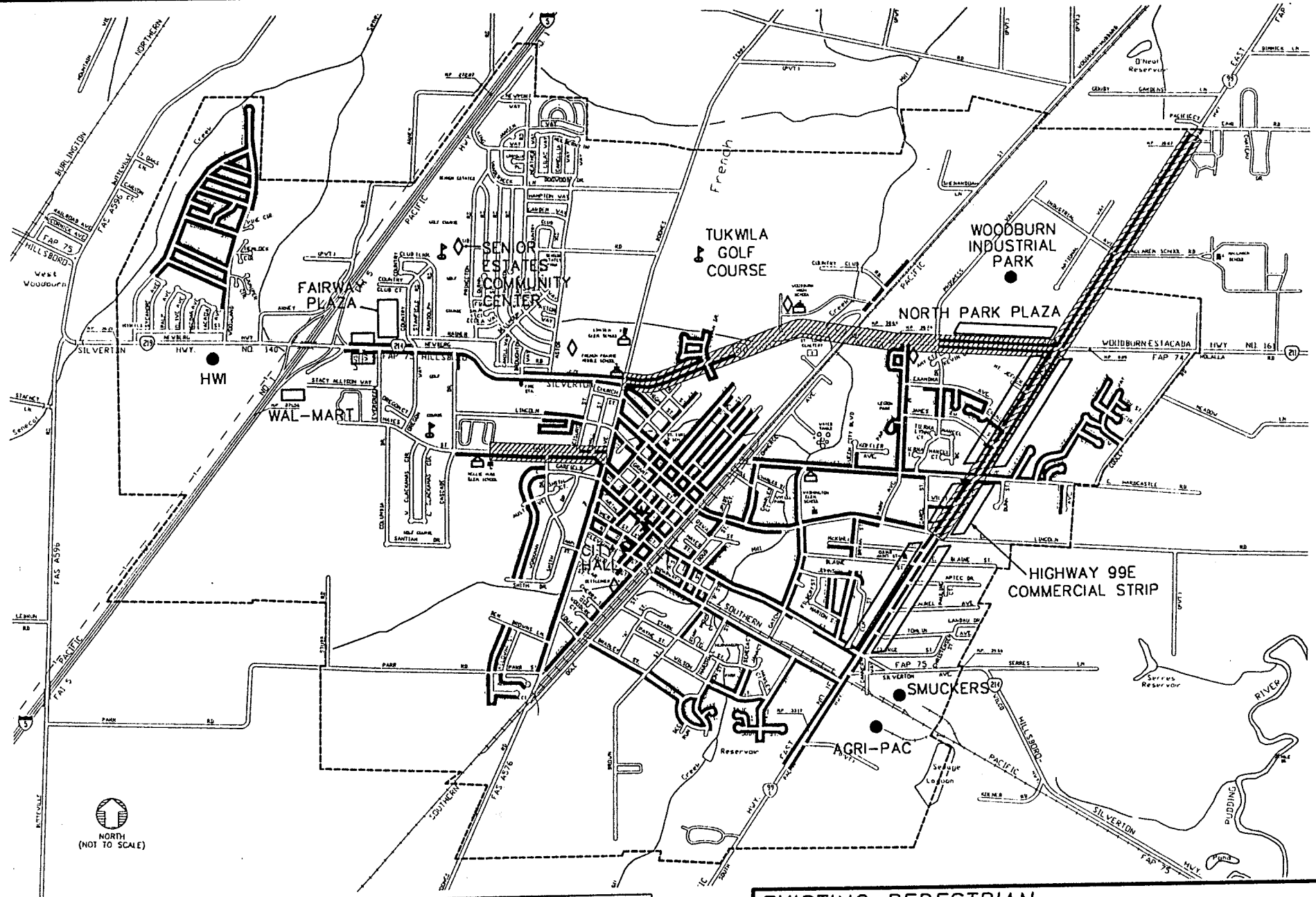
Figure 2 shows the location of pedestrian and bicycle facilities, and their relationship to major activity centers. Overall, the existing pedestrian and bicycle facility system is deficient due to lack of connectivity and incompleteness (particularly the overall lack of off-street pathways and bike routes).

The majority of the sidewalks in Woodburn are provided on local streets. With the exception of Senior Estates (north and south of Highway 214) sidewalks are provided in most of the residential areas and also in downtown Woodburn. Similarly, sidewalks are provided on the principal and minor arterials in Woodburn, although in many locations on only one side of the street. There are also sidewalks on Highway 214 between Interstate 5 and Meridian Drive, and from Progress Way through Highway 99E. In addition, there are sidewalks on Highway 99E from the northern city limits south to Lincoln Street. Finally, there are sidewalks on Settlemier Avenue from Garfield Street to Parr Road. There are very few off-street pathways.

Figure 2 also shows the location of existing bike routes within the City of Woodburn. As shown in this figure, there are three designated bike routes within the City:

- Highway 214 between Settlemier Avenue and Highway 99E;
- Highway 99E between the northern City limits, and Lincoln Road; and
- West Hayes Street from Nellie Muir School to Settlemier Avenue.

There are no current off-street bicycle facilities in Woodburn.



LEGEND

- SIDEWALKS WITH CURBS
- B' ROUTES
- ◊ = RECREATION
- ⌂ = SCHOOL
- ▭ = RETAIL
- ⚷ = GOLF COURSE
- ☆ = DOWNTOWN
- ● = EMPLOYMENT NODES
- O = GOVERNMENT CENTER

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 2

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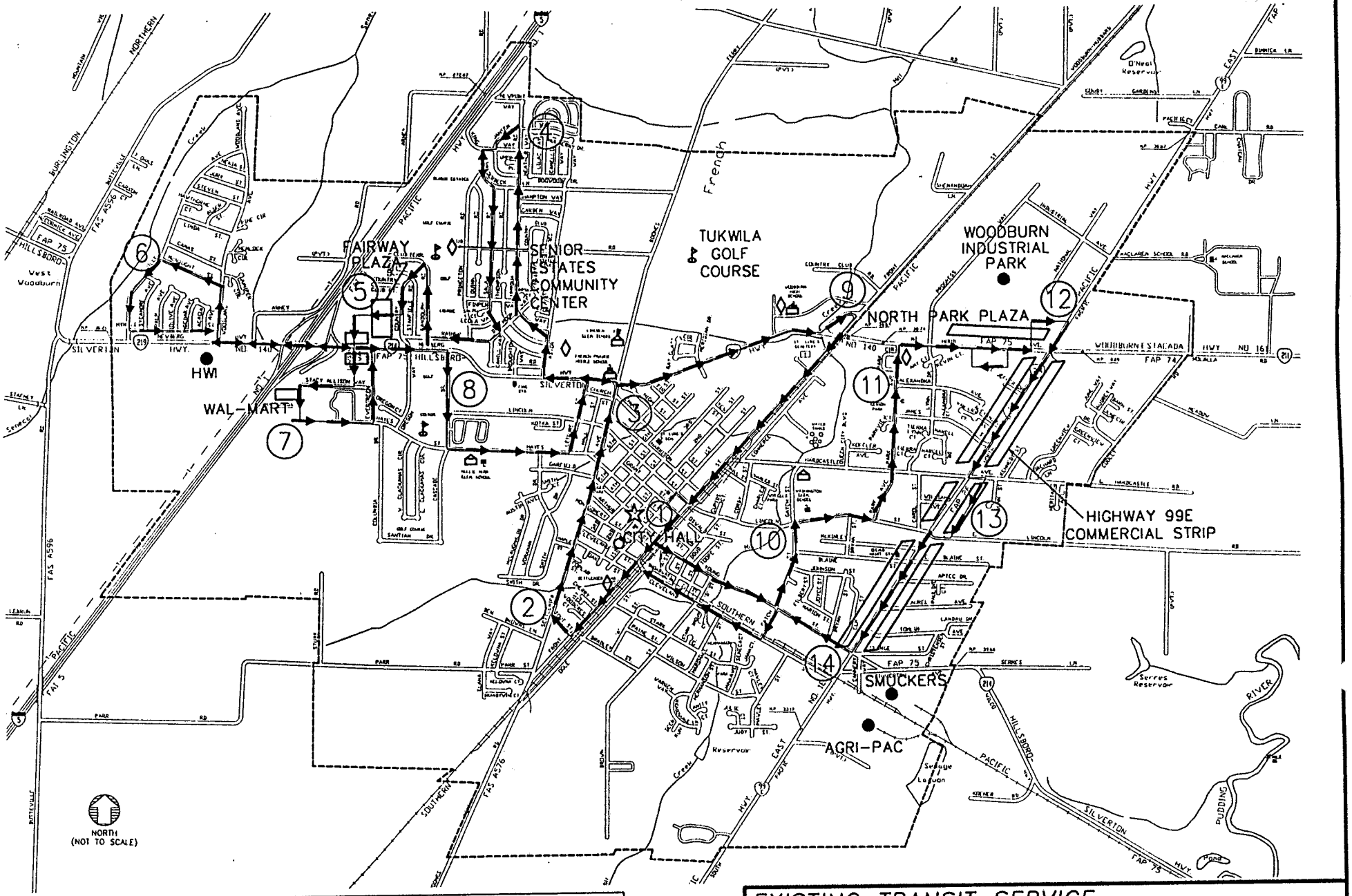


LEGEND

- DIRECTION OF TRAVEL
- (1) SCHEDULE TIME POINTS
- ◊ = RECREATION
- ⌂ = SCHOOL
- ▭ = RETAIL
- ⚷ = GOLF COURSE
- ☆ = DOWNTOWN
- ● = EMPLOYMENT NODES
- O = GOVERNMENT CENTER

EXISTING TRANSIT SERVICE (FIXED-ROUTE)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 3

1373FBUS

4.2.3 Woodburn Transit and Paratransit System

The City of Woodburn operates two transit systems: one is a single, fixed route system called the *Woodburn Transit System*; the other, the *Woodburn Paratransit System,* is a dial-a-ride system.

The *Woodburn Transit System* operates from 9:00 AM to 5:00 PM Monday through Friday[1]. Figure 3 shows the 15.3 mile fixed-route of the *Woodburn Transit System.* As shown in the figure, there are thirteen scheduled time points on this system. That is, there are thirteen locations where patrons can expect the bus to be at scheduled times. These locations are identified in Figure 3. Besides these locations, the bus will stop anywhere that it is safe to pick up or drop off passengers. In 1994, the adult fare was 75 cents, and children under the age of six could ride for free when accompanied by an adult.

As shown in Figure 4, the peak transit patronage for the *Woodburn Transit System* occurred in fiscal year (FY) 1985 (July 1 - June 30), most likely due to the introduction of Saturday service. From FY 1986 to FY 1992 patronage declined. Since 1992 transit patronage has been increasing. In 1994, approximately 28,000 people rode the *Woodburn Transit System.*

There are three part time drivers for the *Woodburn Transit System*, and the City owns two buses. The primary bus is a 1993 El Dorado 22-passenger bus which is lift equipped. The backup bus, which operates when the primary bus needs maintenance, is a 1987 Champion 23-passenger bus which is also lift equipped. In fiscal year 1993-1994, the City budgeted $130,525 for total operating expenses.

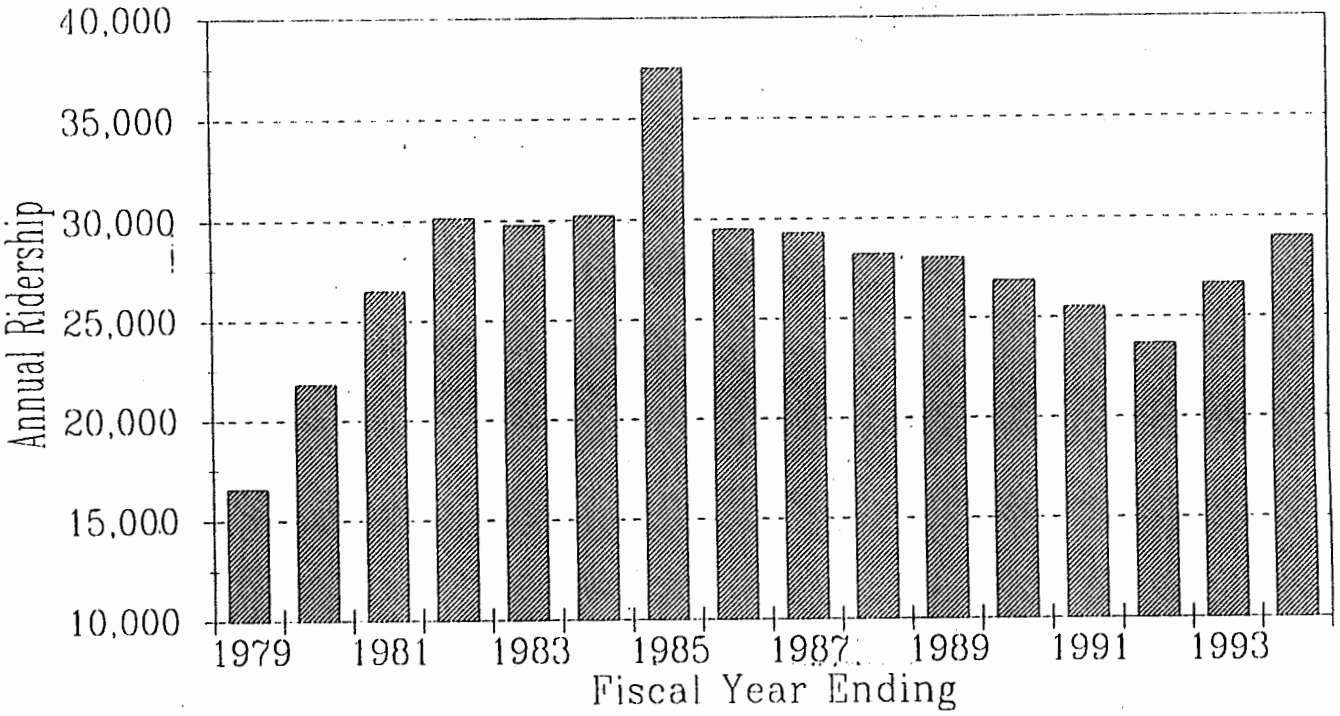
The *Woodburn Paratransit System* provides transportation for disabled persons who can not utilize the fixed route system. The City owns one van which operates Tuesday, Thursday and Friday from 9:00 AM to 5:00 PM. The service provides door-to-door transportation; reservations must be made 24 hours in advance. There is a $2 charge for each round trip.

As shown in Figure 5, transit patronage on the *Woodburn Paratransit System* has increased since FY 1992. In FY 1994, approximately 3,400 people used the *Woodburn Paratransit System.*

The City also sponsors a free volunteer driver service to transport elderly and disabled citizens from their homes to medical appointments in Woodburn, Salem, and Portland. The volunteers use their own vehicles. The City provides support through municipal tax dollars, personnel, office space and other materials. Donations are a main source of program funding.

In addition to the City-operated paratransit service, the privately-owned Woodburn Taxi company operates within a 100 mile radius of Woodburn. This service, which is seven years old, carries about 500 passengers per month, comprised primarily of Senior Citizens and the Hispanic population in the City. A lot of the trips are out-of-town, including trips to Portland Airport. One vehicle is used to provide the service. The operating hours for the service are 7 AM to 6 PM Monday through Saturday. The fare is an initial $2.40 at the start of a trip, plus $1.50 per mile thereafter. If the service is maintained over the long-term, the owners are contemplating expanding the service into the Canby area.

1 Saturday service was provided between 1985 and 1990.



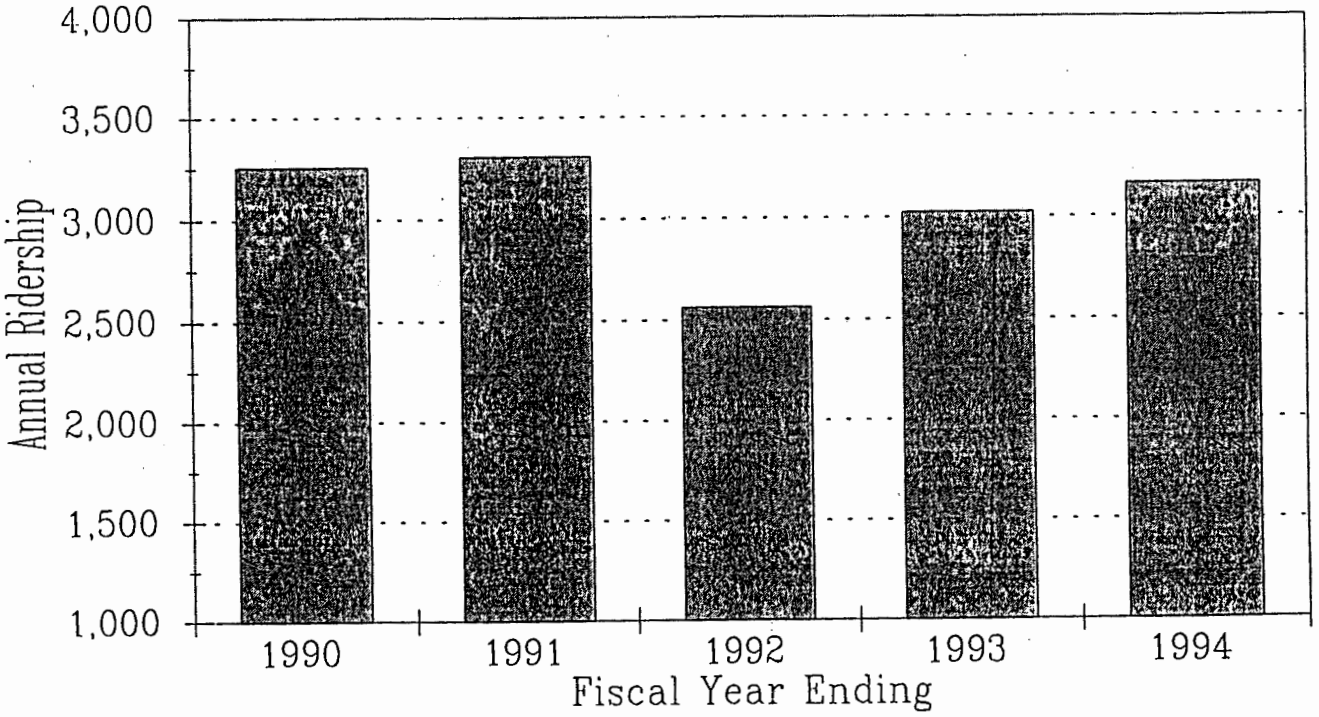
*Fixed Route Service. Saturday Service was included 1985-1990

13/3F04

WOODBURN TRANSIT SYSTEM
RIDERSHIP TRENDS (FY JULY 1-JUNE 30)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
4



* Door - to - Door service; provided three days per week.

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WOODBURN PARATRANSIT SYSTEM
RIDERSHIP TRENDS (FY JULY 1–JUNE 30)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
5

4.2.4 Rail Service/Roadway Grade Crossings

Figure 6 shows that there are nine at-grade railway crossings of the Southern Pacific Line in Woodburn. Freight trains run principally on the tracks along Front Street, with local businesses being served by the spur lines along Cleveland Street. There are no passenger train stops in the City.

In 1994, freight trains traveled through the City of Woodburn on average 25 times per day. The maximum allowable speed of freight trains within Woodburn is 45 miles per hour. Outside of the city limits trains can travel up to 70 miles per hour[2].

4.2.5 Air Transport Facilities

There are no air transport facilities within the Woodburn Urban Growth Boundary.

4.2.6 Pipeline Transport Facilities

There are no pipline transport facilities within the Woodburn Urban Growth Boundary.

4.2.7 Water Transport Facilities

There are no water transport facilities within the Woodburn Urban Growth Boundary.

4.3 Traffic Operations

4.3.1 Intersection Traffic Control and Lane Channelization

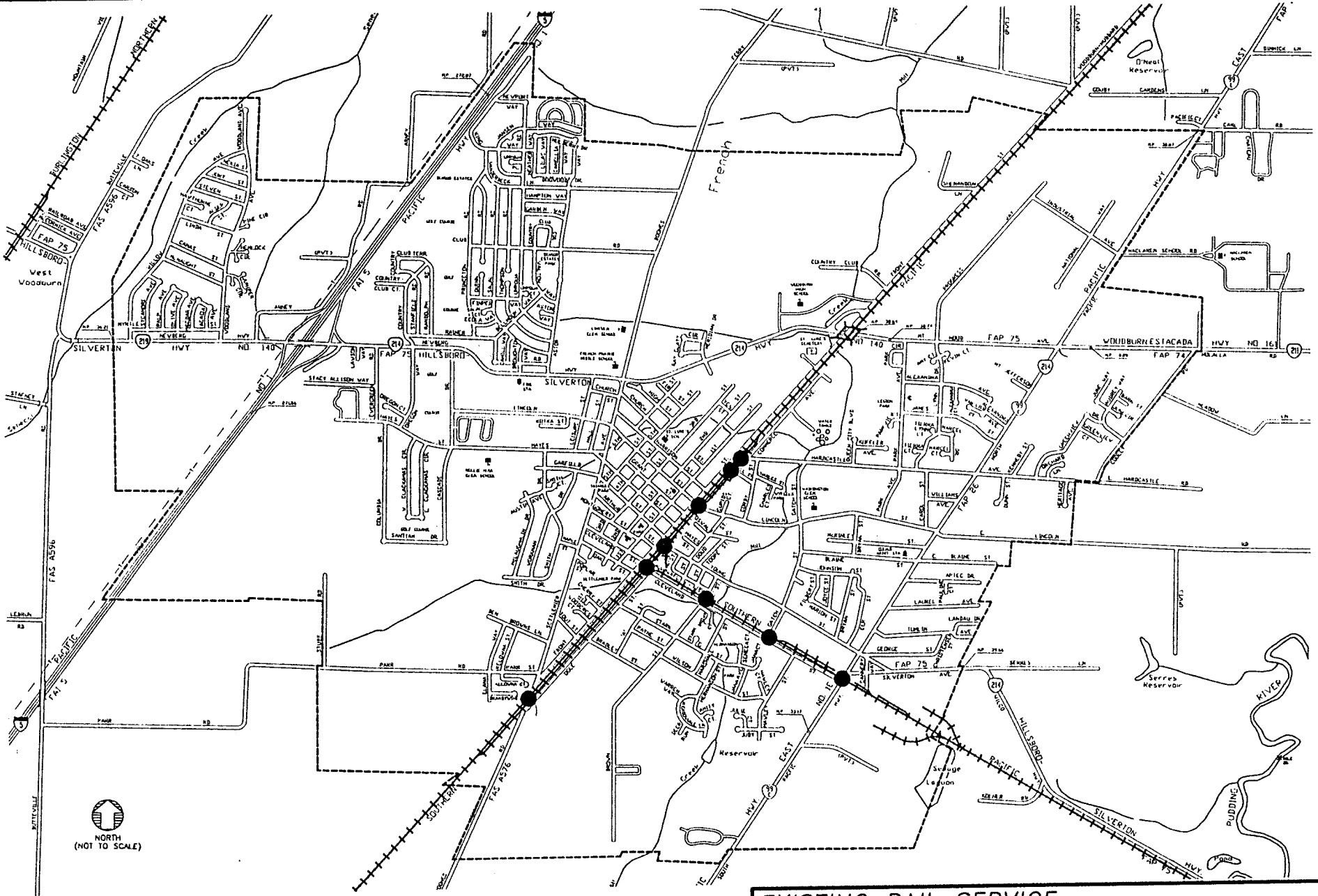
Figure 7 shows the existing intersection traffic control and lane channelization for the major intersections within the City of Woodburn. As shown in this map, of the eleven major intersections, eight are controlled with a traffic signal. Only the intersections of Highway 214/Northbound I-5 Ramps, Parr Road/Settlemier Avenue and Front Street/Settlemier Avenue are controlled with stop signs.

4.3.2 24-Hour Traffic Counts

Figure 8 shows the recent 24-hour traffic counts in Woodburn[3]. This traffic is called average daily traffic (ADT). As shown in this map, ADT in the City of Woodburn is highest on Interstate 5, Highway 214 east of I-5, and Highway 214/99E south of Highway 211. Traffic volumes are also relatively high on Highway 214 from I-5 west to Willow Avenue, Settlemier Avenue from Highway 214 south to West Hayes Street, and on Young Street from Highway 214/99E to Front Street.

2 Source: Southern Pacific Railroad

3 Source: City of Woodburn, 1991



EXISTING RAIL SERVICE
ROADWAY GRADE CROSSINGS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 6

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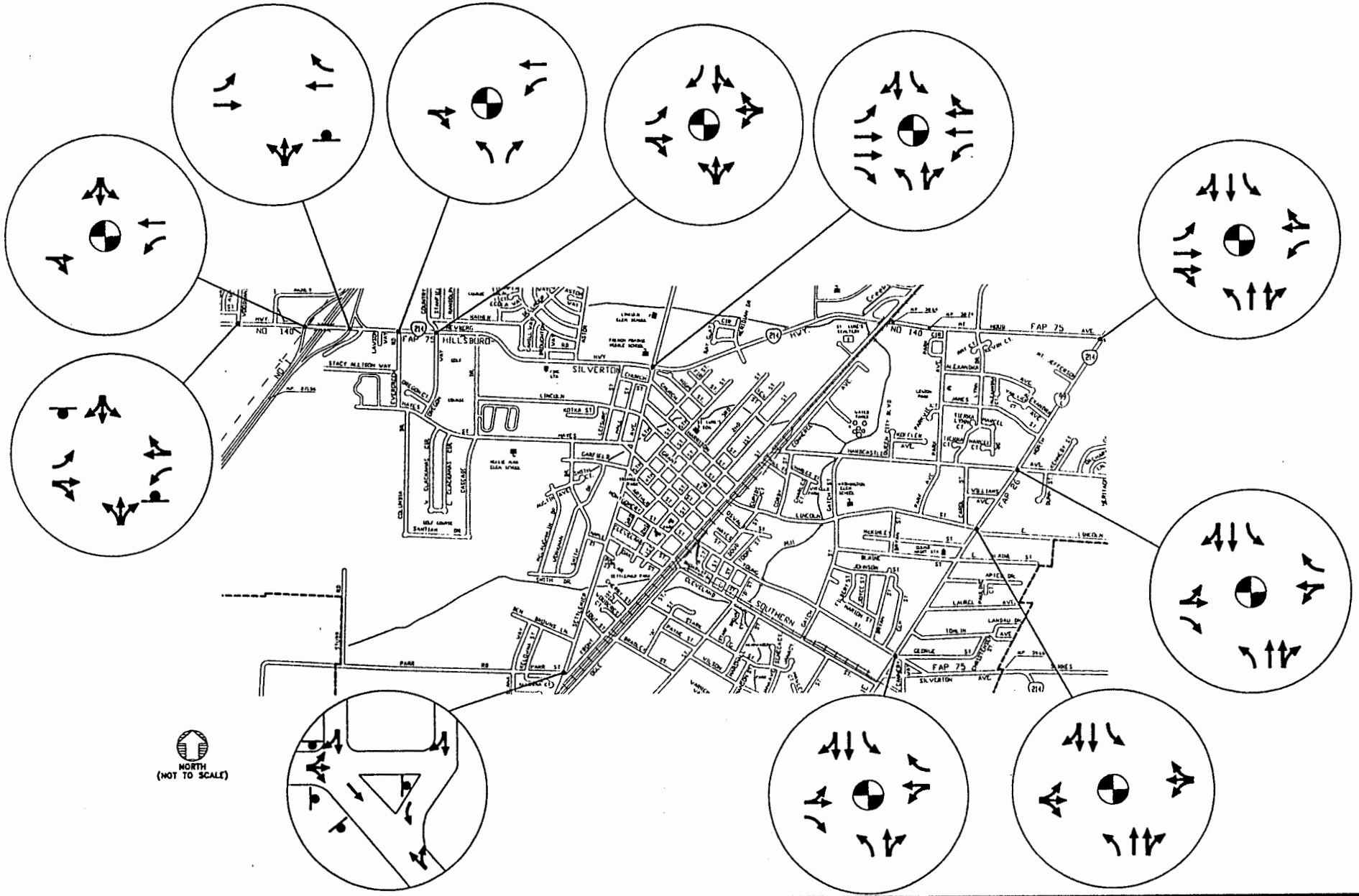


LEGEND

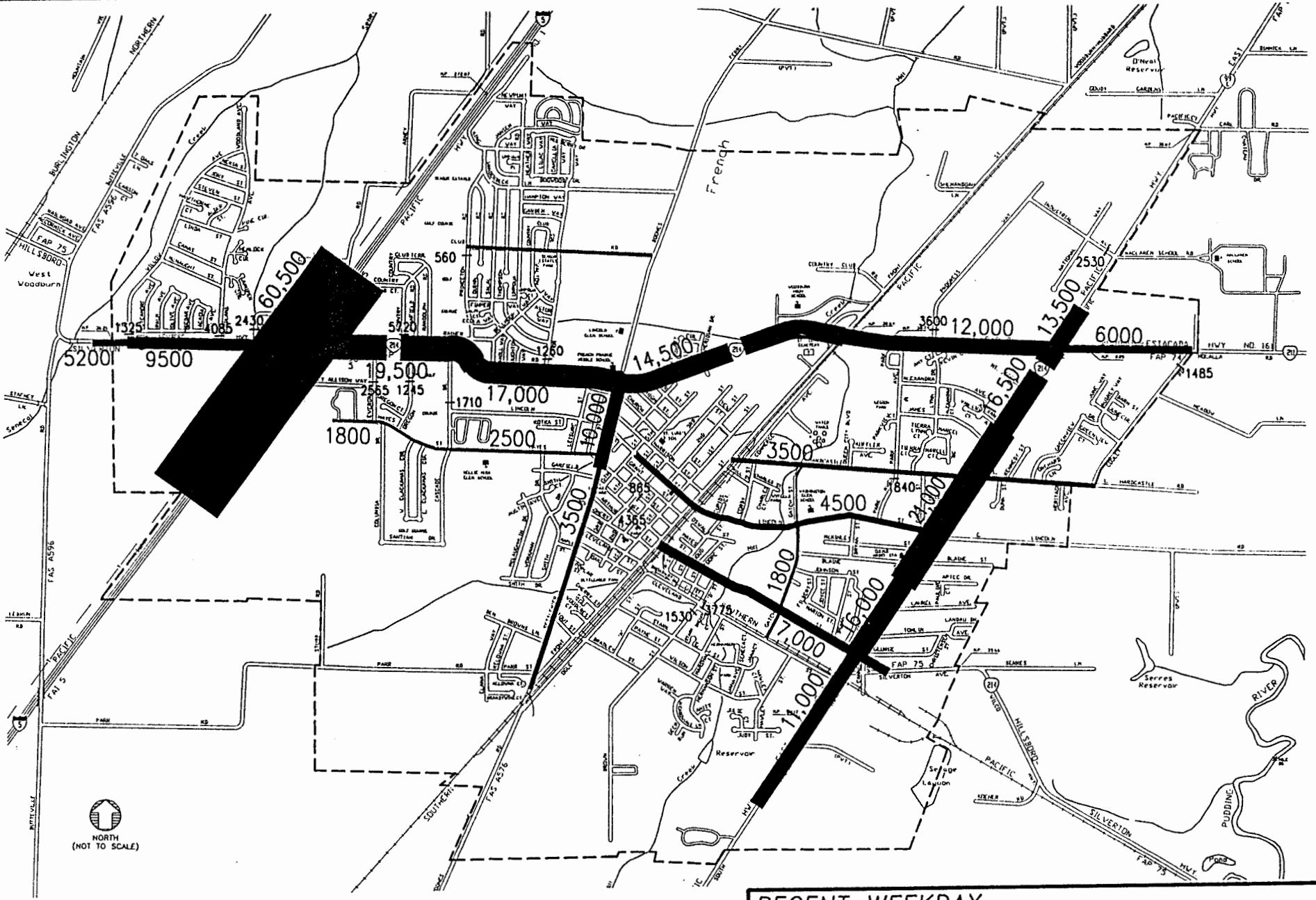
- TRAFFIC SIGNAL
- STOP SIGN

EXISTING INTERSECTION TRAFFIC CONTROL/CHANNELIZATION

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 7

1373FCTL



RECENT WEEKDAY
24-HOUR TRAFFIC COUNTS (1991)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN

JUNE 1996

FIGURE 8

1373FADT

4.3.3 Intersection PM Peak Hour Traffic Volumes

Traffic counts were obtained from ODOT and from a private traffic survey firm during a typical weekday PM peak hour. The traffic count by ODOT was performed in August of 1994, and the traffic count by the private traffic survey firm was performed in January of 1995. This data is summarized in Figure 9. This data will be used in coordination with the intersection traffic control and lane channelization information to calculate traffic level of service.

4.3.4 Intersection Levels of Service (Weekday PM Peak Hour)

Traffic level of service (LOS) is measured on a scale of LOS A to LOS F. At intersections, LOS A means that drivers experience no delay or relatively low amounts of delay while traveling through the intersection; while LOS F means that drivers experience a great deal of delay while traveling through the intersection. Appendix A presents a detailed review of intersection traffic level of service concepts.

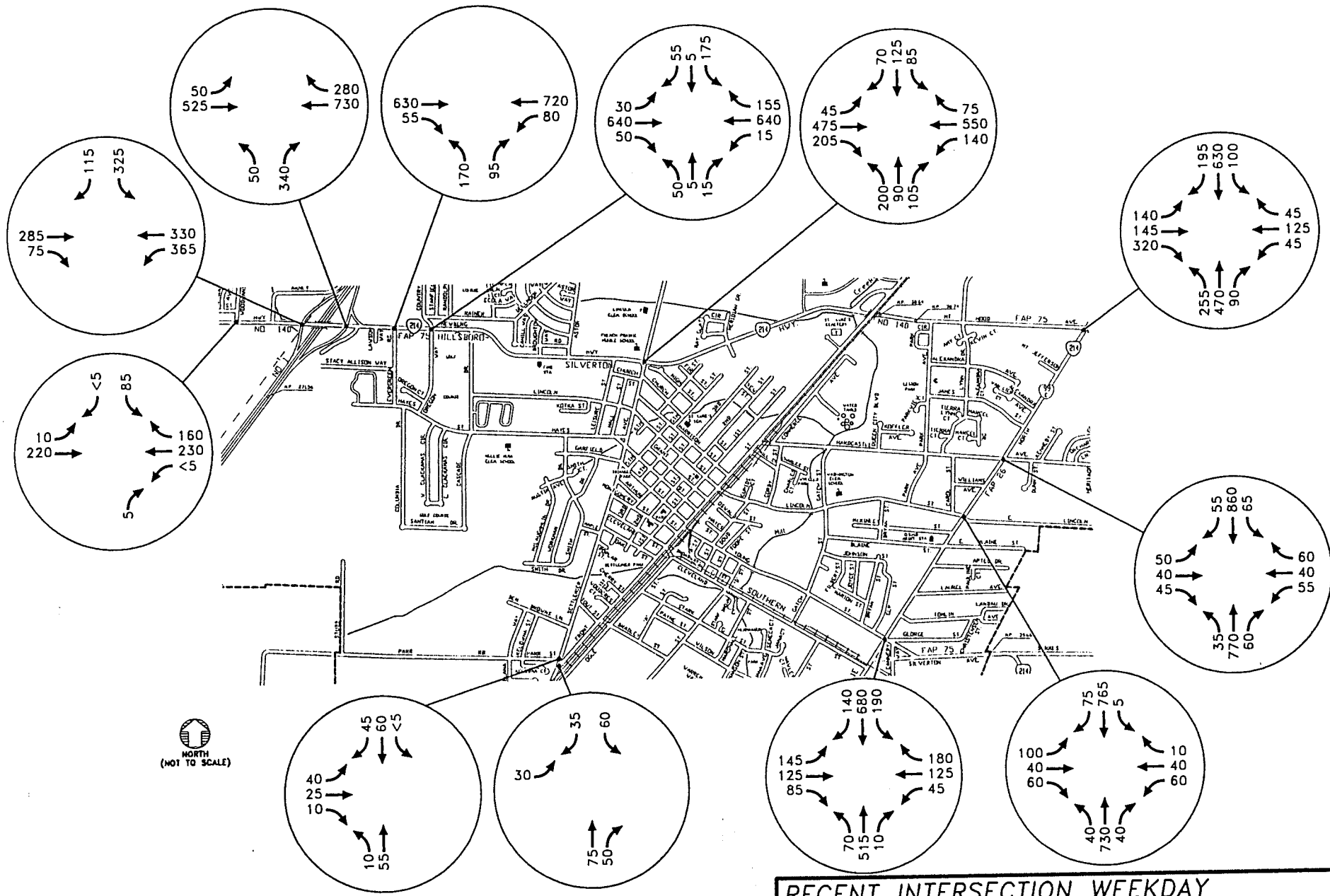
The LOS analysis performed for this study for the typical weekday PM peak hour revealed that traffic operations at the major intersections in Woodburn are generally acceptable (See Figure 10). All of the major study intersections operate at LOS C or better except for the Highway 214/I-5 interchange. At this interchange, the intersection of the northbound I-5 ramps with Highway 214 operates at LOS E for motorists turning left from the off-ramp onto westbound Highway 214, and operates at LOS D for motorists turning right from the off-ramp onto eastbound Highway 214. Also, during the PM peak hours, vehicle queues can form at the intersections of southbound I-5 ramps/Highway 214, northbound I-5 ramps/Highway 214, Highway 214/Evergreen Road, Highway 214/Country Club Road, and Highway 214/Oregon Way.

4.3.5 High Accident Locations

Figure 11 summarizes the incidence of accidents at the major Woodburn intersections over the following three years: 1992, 1993, and 1994. As shown on this map, and as expected, the most accidents occur at the highest volume intersections:

- Highway 214/99E/211;
- Highway 99E/Young Street; and
- Interstate 5/Highway 214.

Other high accident locations include the intersections of Highway 214/Settlemier Avenue, Front Street/Highway 214, and Young Street/Front Street. Again, these are also locations with relatively high traffic volumes.



RECENT INTERSECTION WEEKDAY PM PEAK HOUR VOLUMES (1994-95)

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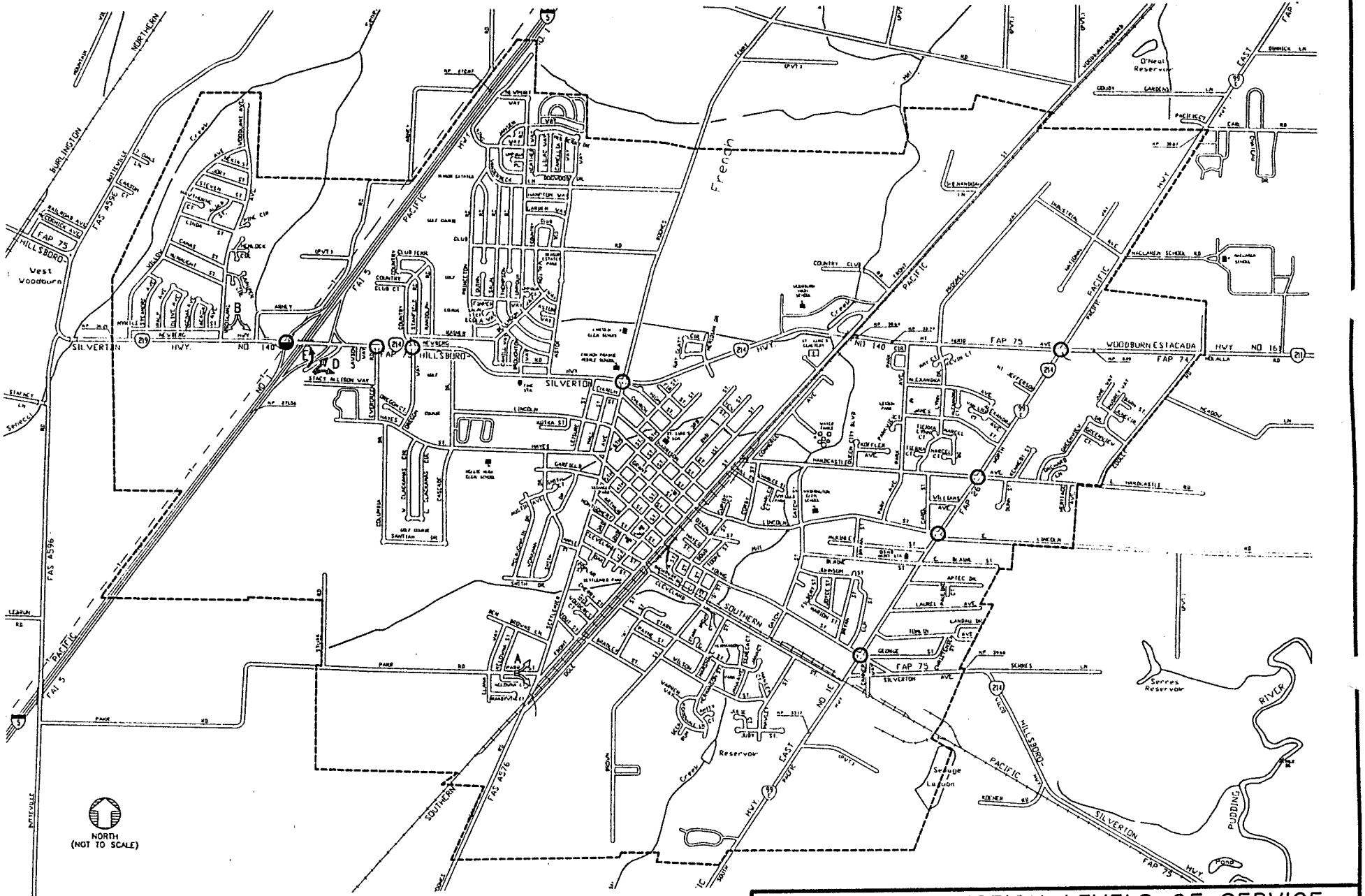
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 9

1373FVOL

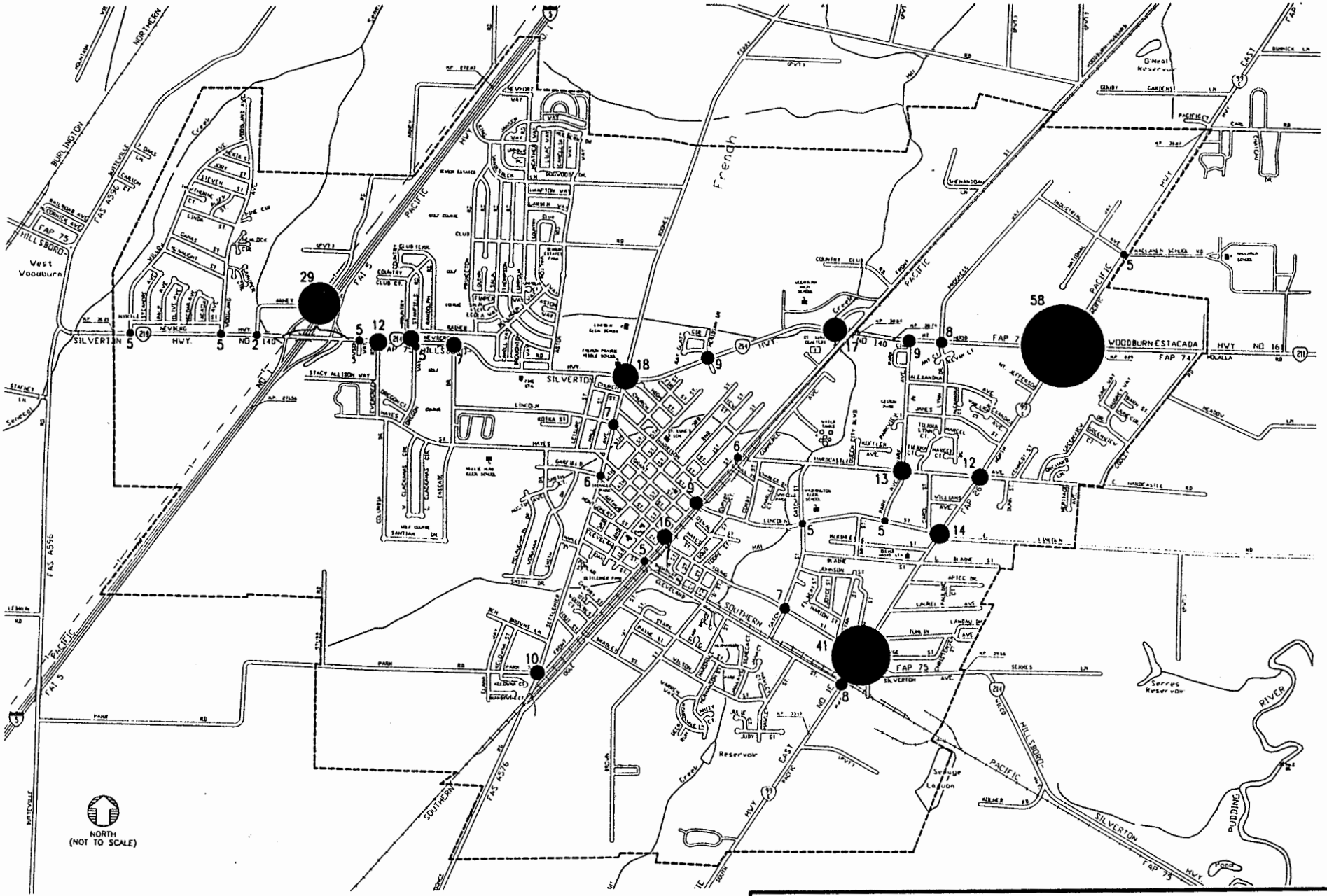


RECENT INTERSECTION LEVELS OF SERVICE-
WEEKDAY PM PEAK HOUR (1994-95)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
10

1373FLOS



HIGH ACCIDENT LOCATIONS (1992–1994)

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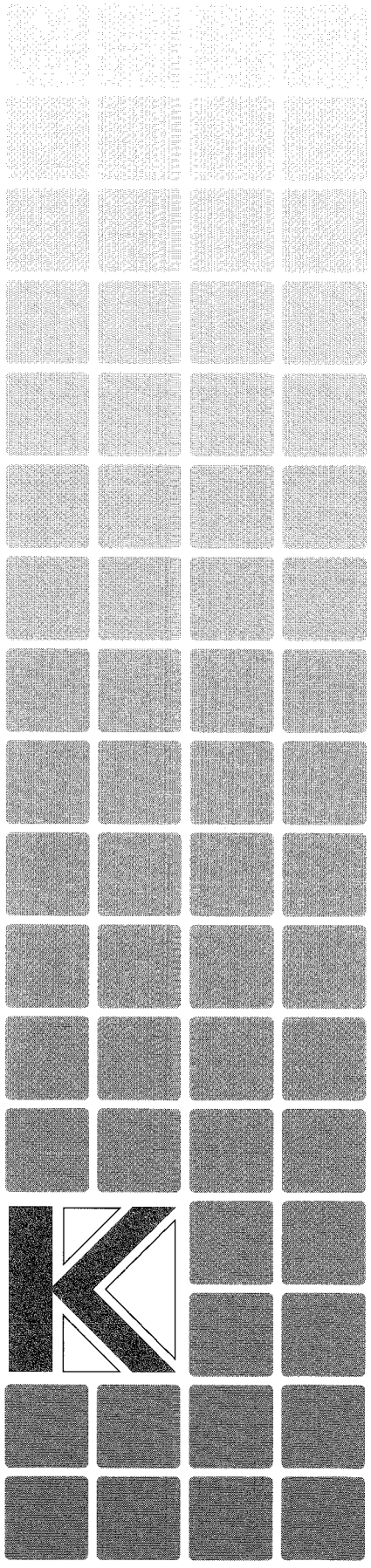
TRANSPORTATION SYSTEM PLAN

JUNE 1996

FIGURE 11

1373FACC



Section 5

Roadway System Alternatives Analysis

5.0 Roadway System Alternatives Analysis

5.1 Methodology

In this phase of the transportation system plan development, future travel demand (year 2015) was tested on four different roadway systems. The analysis period was the weekday PM peak hour. To forecast future travel patterns, a year 2015 weekday PM peak hour travel demand model was developed and future traffic volumes were assigned to each of the roadway system alternatives (described below). Following the assignment, an operations analysis was performed to evaluate the effectiveness of each of the alternative roadway improvement systems. This analysis is summarized below.

5.2 Travel Demand Model Development

As part of the roadway systems analysis, a year 2015 EMME/2 travel demand model was developed (see Appendix B for a description of the travel demand model). This model reflects future population and employment projections as provided by the City of Woodburn Community Development Department and was used to forecast future weekday PM peak hour traffic volumes. By the year 2015, it is anticipated that the population of Woodburn will grow from the current 15,000 to about 30,000. It is also projected that employment will grow from the current 5,000 employees to 14,000 employees. The population and employment projections include some development areas outside the existing Woodburn Urban Growth Boundary (UGB) with the expectation that the UGB will need to be expanded before year 2015 to handle anticipated growth.

5.3 Roadway System Evaluation Criteria

Several, evaluation criteria for the roadway system alternatives analysis were established:

Traffic Operations

- **Average Daily Traffic (ADT),** which is the forecast 24 hour traffic volume at a specific location on a given road. The model forecasts ADT for all roads on the network. With ADT, it is possible to compare 24 hour traffic volumes on the same road under different transportation alternatives.
- **Daily Vehicle Miles Traveled (VMT),** which is the forecast total number of vehicle miles traveled on the road system over a 24 hour period. For example, if the model forecasts that over a 24 hour period, 1,000 vehicles will travel on the road system and there are 20 miles of roads, the VMT is equal to 20,000 (1000 multiplied by 20). The lower the VMT the better, as this implies people do not have to travel as far for different trip purposes and thus less fuel is consumed and less pollution is created.
- **Daily Vehicle Hours of Travel (VHT),** which is the forecast number of hours that people spend traveling from their trip origin to their destination and back. For example, if, over a 24 hour period, there are 1,000 vehicles traveling on the road system and the model shows that it would take on average 30 hours for one vehicle to travel from its origin to its destination and back, the forecast VHT is equal to 30,000 (1,000 multiplied

by 30). VHT is a measure of system wide road congestion. The higher the VHT, the more congestion there is, as it takes vehicles longer to travel from their origins to their destinations.

- **Lane Miles Over Capacity,** which is the forecast number of lane miles operating over capacity. For example, if there is one four lane segment of road operating over capacity and that section of road is two miles long, the forecast lane miles over capacity is eight (two lane miles over capacity multiplied by four lanes). The fewer lane miles over capacity the less road congestion exists on the network.

In addition, on a microscopic level, the intersection traffic operations were evaluated based on a forecast weekday PM peak traffic level of service analysis.

Land Use Impact

The general land use impact of each alternative reflects the impact of roadway improvements to guide the location of and serve added development in the Woodburn area in the future. Critical to this analysis was the ability to develop roadway improvements within the existing Woodburn Urban Growth Boundary. This impact assessment also addressed right-of-way acquisition needs.

Environmental Impact

The general environmental impact of each roadway system alternative involves an assessment of how roadway improvements might impact environmentally sensitive areas, such as wetland and habitat areas.

Cost

The general cost of constructing the major roadway system improvements in each alternative was identified. The cost estimates are very conceptual and are based on assumed costs per mile for different types of facility improvements. Cost estimates are in 1995 dollars.

5.4 Description of Roadway System Alternatives

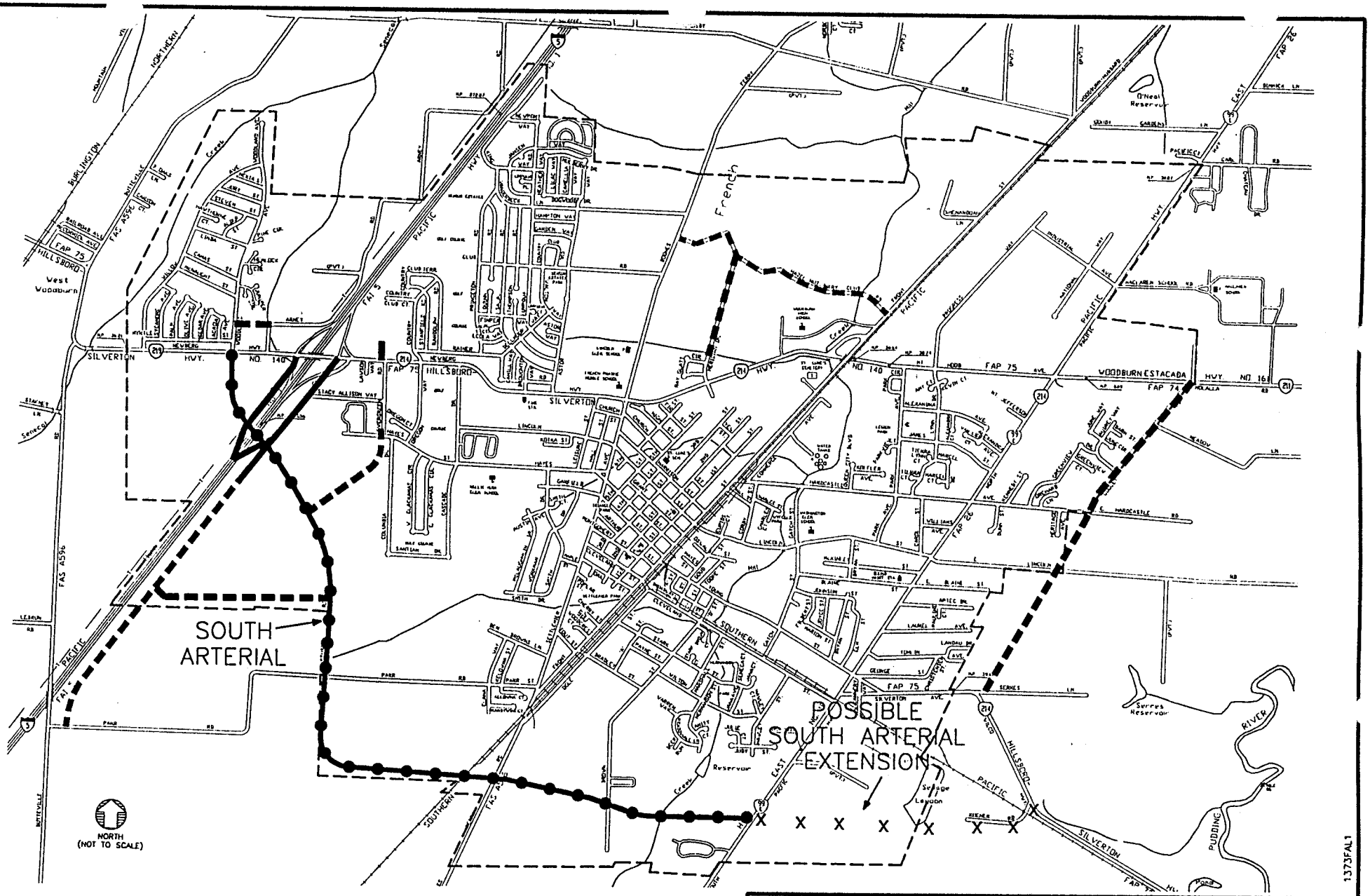
Traffic operations under four roadway alternatives were evaluated. These alternatives are:

No-Build Alternative:

In this alternative future traffic volumes are assigned to the existing roadway system. No substantial roadway improvements would be made.

Alternative #1: I-5 Split Diamond Interchange with South Arterial

The major features of this alternative, shown in Figure 12, include converting the existing I-5/Highway 214 interchange to a split diamond interchange, extending Woodland Road south to connect with the south end of the new split diamond interchange, constructing a South Arterial to connect with the new interchange, and developing a frontage road on the east side of Interstate 5.



ROAD ALT. #1:
I-5 SPLIT DIAMOND INTERCHANGE
WITH SOUTH ARTERIAL

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TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
12

1373FAL1

Also shown in Figure 12 is an alternative to extend the South Arterial east of Highway 99E to connect with Highway 214.

Alternative #2: Second I-5 Interchange with South Arterial

In this alternative, shown in Figure 13, a new Interstate 5 interchange would be constructed south of the existing Urban Growth Boundary just north of the existing Butteville Road over-crossing, with a South Arterial developed as an extension of Butteville Road to the east to connect with Highway 99E. Also in this alternative Woodland Road would be extended south to Butteville Road to connect with the interchange, with a frontage road constructed on the east side of I-5 between Highway 214 and the South Arterial.

Associated with this alternative is a possible extension of the South Arterial east of Highway 99E to connect with Highway 214.

Alternative #3: Improve Existing I-5 Interchange and Widen Highway 214/ South Arterial with I-5 Overpass

This alternative is shown in Figure 14 and does not include a new I-5 interchange. Instead in this alternative, the existing interchange would be improved by widening Highway 214 over Interstate 5, from Woodland Drive on the west to Highway 99E. In addition, a South Arterial would be constructed within the Urban Growth Boundary extending from Woodland Drive on the west to Highway 99E on the east, with an overpass of I-5.

Similar to Alternatives #1 and #2, shown in Figures 12 and 13, the South Arterial could be extended east from Highway 99E to connect with Highway 214.

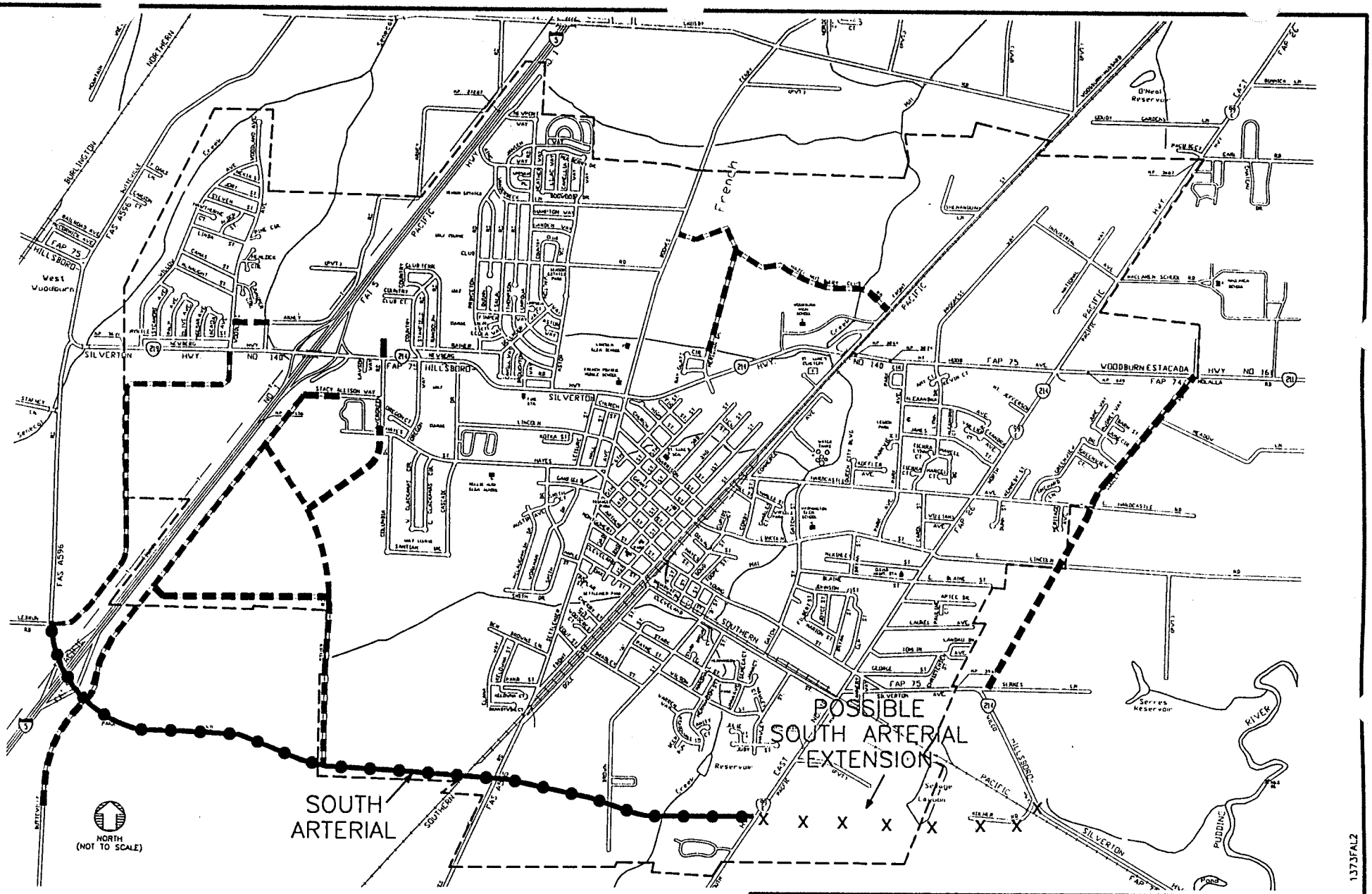
This alternative was analyzed for two improvement options to the existing I-5 Highway 214 interchange:

1. Improvements to the existing diamond configuration and,
2. Conversion to partial cloverleaf configuration.

5.5 Evaluation of Alternatives

5.5.1 Transportation System Performance

Following the development of three alternatives, and the incorporation of these alternatives (separately) into the travel demand model, the alternatives were evaluated using the previously described performance measures. Table 2 compares forecast average daily traffic (ADT) volumes at specific locations for the different roadway system alternatives (Appendix C presents year 2015 traffic flow maps for each alternative). As shown in the table, if no improvements were made to the road system, 2015 traffic volumes on Highway 214 east of the northbound Interstate 5 ramps would increase to 39,000 vehicles per day. This volume would decrease under each of the alternative road systems. Similarly at Highway 214 east of Settlemier Avenue, West Hayes Street west of Settlemier Avenue, and Young Street west of Highway 99E, the 2015 traffic volumes under any of the Build Alternatives would be less than the No-Build Alternative. This is not true on Highway 99E south of Lincoln Street. At this



LEGEND (NEW ROADWAYS)

- PRINCIPAL ARTERIAL/FREEWAY
- MINOR ARTERIAL
- COLLECTOR

ROAD ALT. #2
SECOND I-5 INTERCHANGE/SOUTH ARTERIAL

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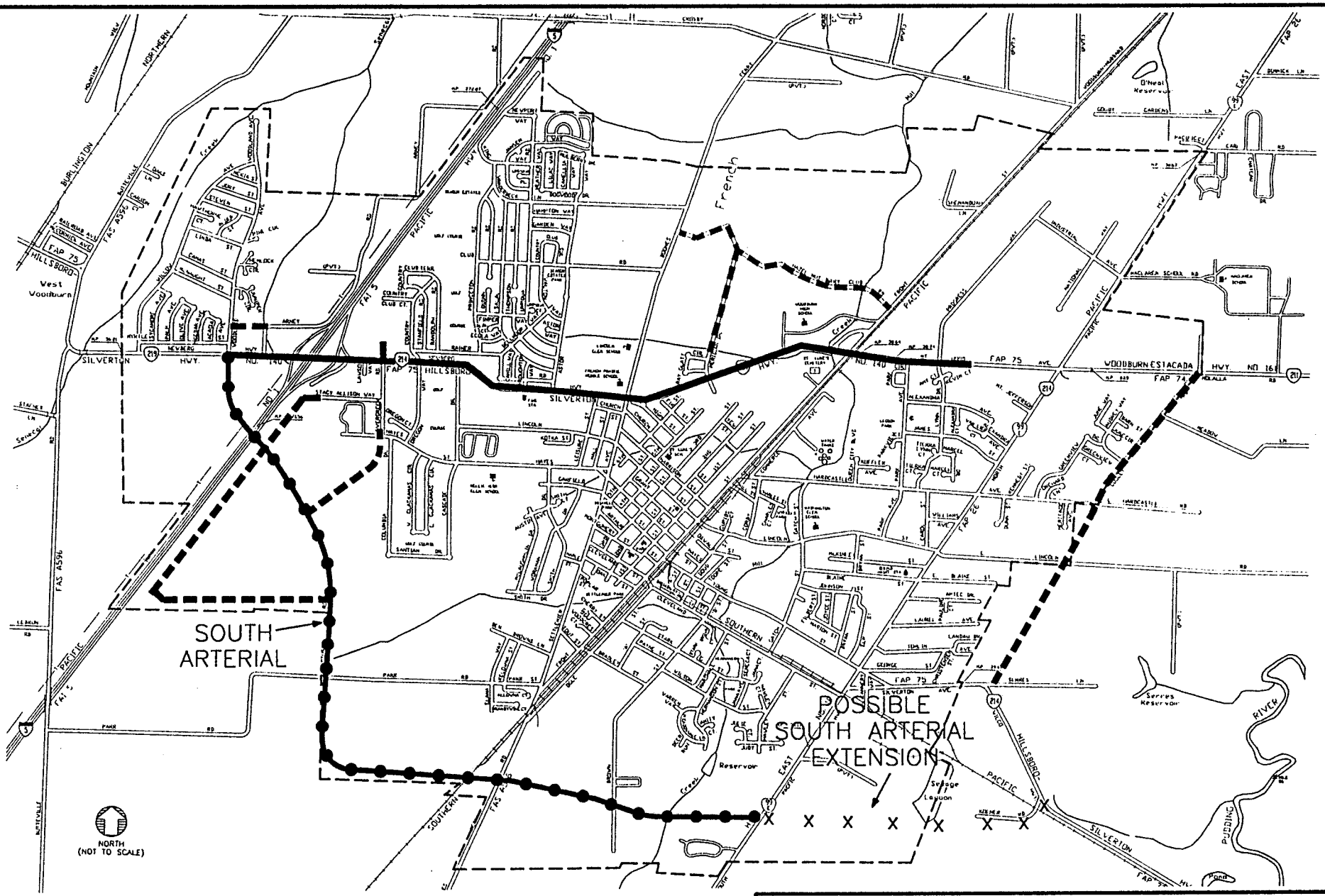
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
13



LEGEND (NEW ROADWAYS)

- PRINCIPAL ARTERIAL/FREEWAY
- MINOR ARTERIAL
- COLLECTOR

ROAD ALT. #3: IMPROVE EXISTING I-5 INTERCHANGE & HWY 219-214/SOUTH ARTERIAL WITH I-5 OVERPASS

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TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
14

Table 2

Year 2015 Average Weekday Traffic for Roadway System Alternatives

Alternative	Hwy. 214 East of NB I-5 Ramp	Hwy. 214 East of Settlemier	West Hayes West of Settlemier	Hwy. 99E South of Lincoln	Young Street West of Hwy. 99E
2015 No-Build	39,000	26,000	12,000	23,000	10,000
2015 Alternative # 1*	30,000	20,000	5,000	18,000	6,000
2015 Alternative #2*	27,000	17,000	5,000	22,000	7,000
2015 Alternative #3*	34,000	20,0000	6,000	26,000	9,000

* South Bypass or Parr Road extension east to Highway 99E.

location, under Alternative #1 forecast daily traffic volumes decrease relative to the No-Build Alternative; under Alternative #2 the forecast traffic volumes remain essentially the same relative to the No-Build Alternative; and under Alternative #3 the forecast traffic volumes increase relative to the No-Build Alternative.

In Table 3, lane miles over capacity (weekday p.m. peak hour), weekday vehicle hours of travel (VHT), and weekday vehicle miles of travel (VMT) for each of the three study alternatives are compared. These measures are interrelated and are thus best evaluated together rather than individually. As shown in this table, daily VMT, VHT, and the number of lane miles over capacity would increase dramatically between now and year 2015. VMT would increase approximately 80 percent, and VHT would increase approximately 185 percent. This dramatic increase in VHT relates directly to the increase of lane miles over capacity. Under existing conditions, there are no lane miles operating over capacity; however in the future, if no road improvements were made, there would be 1.1 lanes miles of road over capacity. The over-capacity roads would be:

Table 3

Summary of Traffic Operations Performance Measures

Scenario	Lane Miles Over Capacity (Weekday P.M. Peak Hour)	Weekday Vehicle Hrs. of Travel (VHT)	Weekday Vehicle Miles of Travel (VMT)
Existing	0	8,955	406,255
No-Build	1.1	25,625	730,260
Alternative #1A*	0.26	24,035	717,120
Alternative #1B**	0.26	23,995	718,055
Alternative #2A*	0.52	23,730	715,360
Alternative #2B**	0.52	23,745	714,815
Alternative #3A*	0.50	24,665	707,840
Alternative #3B**	0.70	24,680	707,300

* South Arterial east to Highway 99E.

** South Arterial east to Highway 214.

- Highway 214 between the northbound Interstate 5 ramps, and Evergreen Road,
- Evergreen Road between Highway 214 and its terminus, and
- Settlemier Avenue just south of West Hayes Street.

Figures 15 through 18 show which roadway segments are under, near, or over capacity for the no-build condition and roadway system alternatives #1, #2, and #3.

Compared to the No-Build Alternative, Alternative #1 (I-5 Split Diamond Interchange with South Arterial) would have the lowest number of lane miles over capacity of all three alternatives. In this alternative only 0.26 lane miles of Woodburn roads would be operating over capacity. This would be Woodland Road just north of Highway 219, which is likely a result of restricting the Arney Road access to Highway 219 to right-in, right-out only movements. Also, in this alternative Highway 214 would be operating near capacity for almost its entire length between Interstate 5 and Settlemier Avenue. Alternative #2 has the greatest effect of reducing congestion on Highway 214; however, it does have more lane miles over capacity than either Alternative #1 or #3. Congestion would occur on Parr Road in the vicinity of Interstate 5.

On a daily basis, VHT is the lowest in Alternative #2. VMT is most significantly reduced, relative to the No-Build alternative, by implementing Alternative #3 (South Arterial; Interstate 5 over crossing). However, both of these alternatives introduce more traffic congestion than Alternative #1 (I-5 Split Diamond Interchange).

5.5.2 Major Intersection Improvement Needs

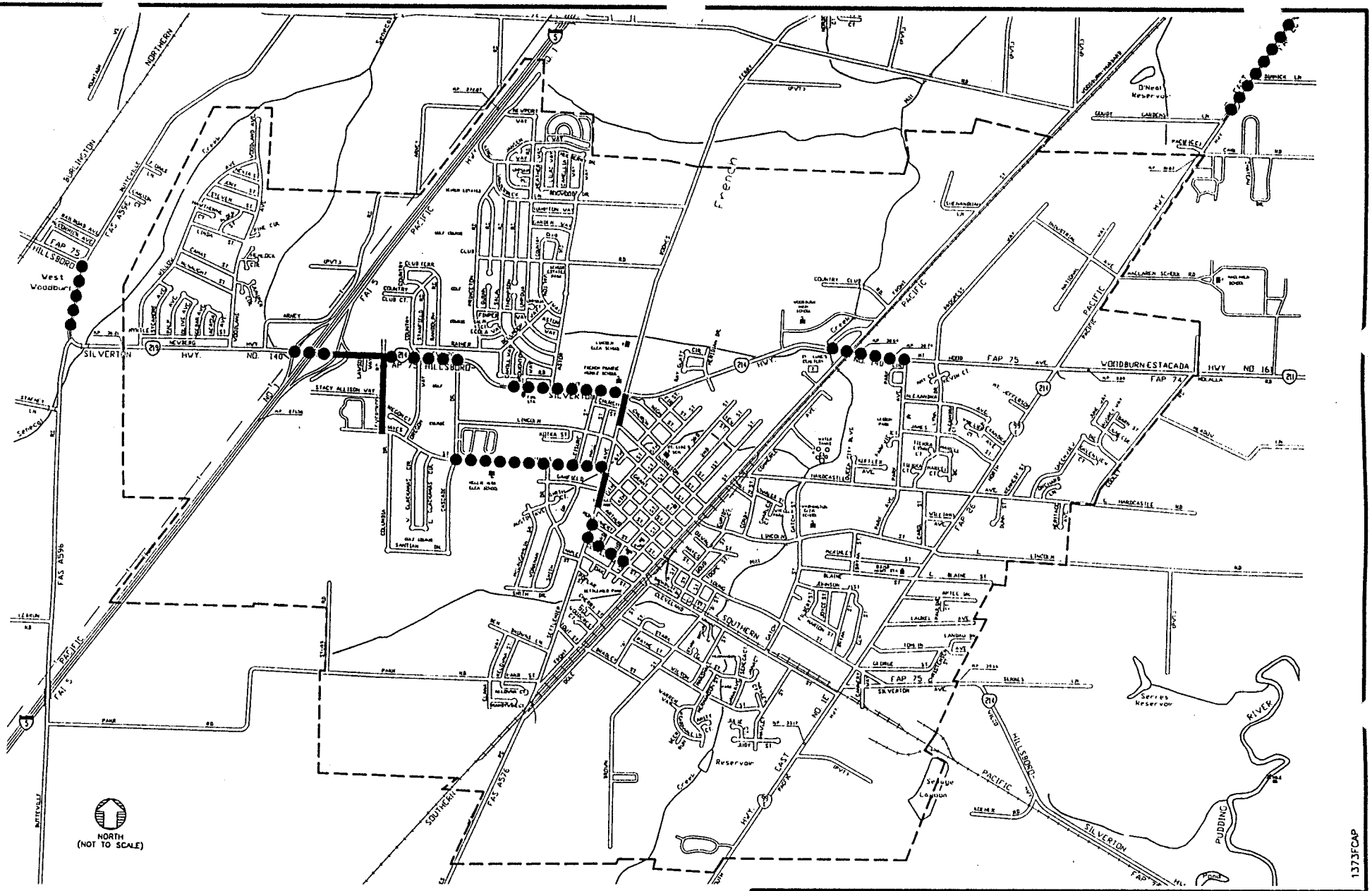
An initial year 2015 level of service (LOS) analysis was performed at five major intersections assuming no improvements to the City of the Woodburn street system in the future. The critical intersections are southbound I-5/Highway 214, northbound I-5/Highway 214, Highway 214/Settlemier Avenue, Highway 214/99E and Highway 99E/Young Street. A new signal was assumed at the northbound I-5 ramp intersection. As shown in Table 4, under the No-Build

Table 4

Summary of Level of Service Analysis

Intersection	Weekday P.M. Peak Hour Level of Service				
	2015 No-Build	2015 No-Build Mitigated	Alt. #1* (I-5 Split Diamond Interchange)	Alt. #2* (2nd I-5 Interchange)	Alt. #3* (Impr. Existing Interchange/ Hwy. 214)
SB I-5/Hwy 214	F	E	D	C	D
NB I-5/Hwy 214	F	C	C	A	B
Hwy 214/Settlemier Avenue	F	E	D	D	D
Hwy 214/Hwy 99E	F	E	E	E	E
Hwy 99E/Young Street	F	D	C	D	C

* With South Arterial extension to Highway 99E



2015 WEEKDAY PM PEAK HOUR LEVEL OF CONGESTION– NO–BUILD ALTERNATIVE

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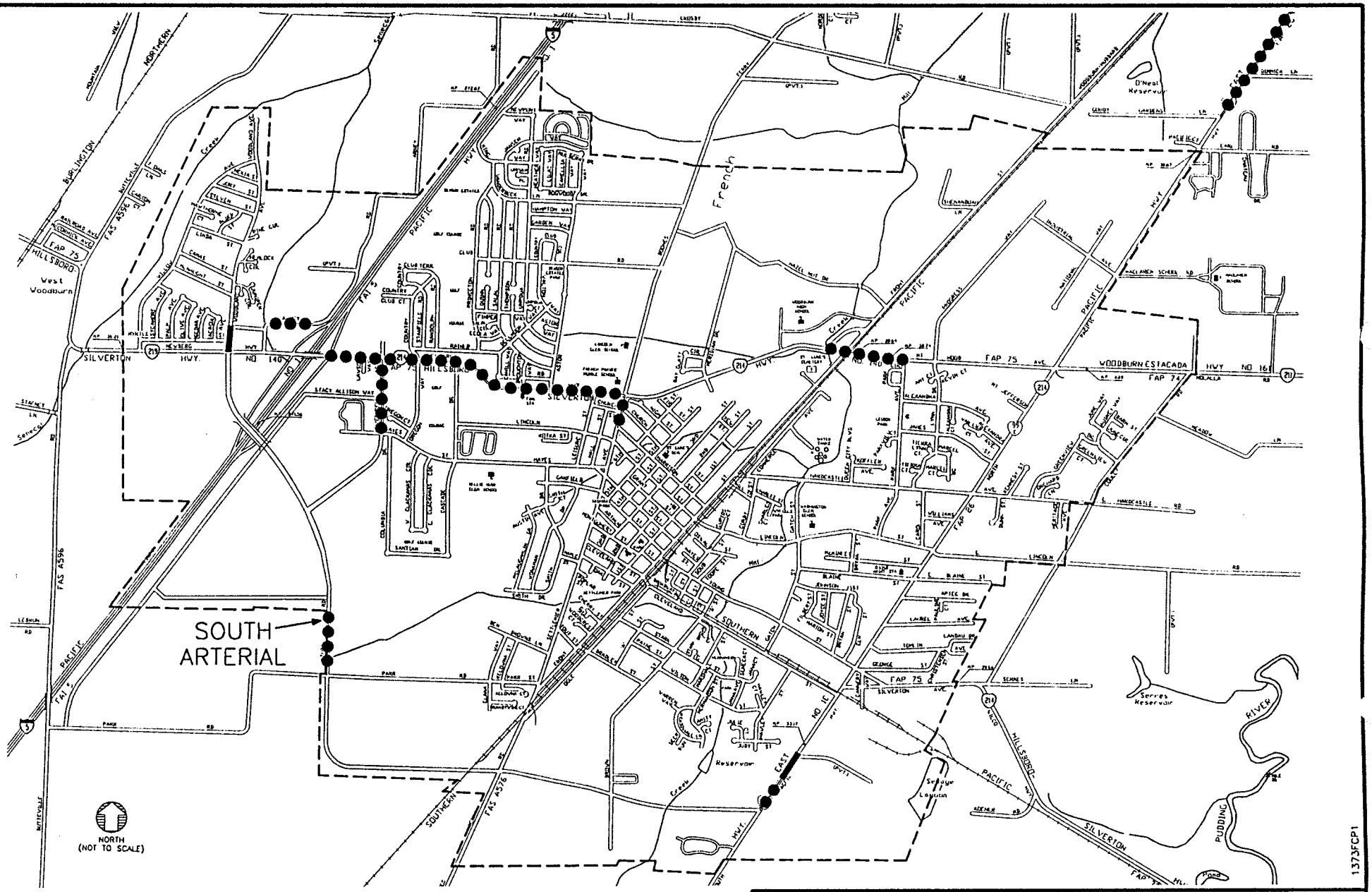
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
15



LEGEND

- UNDER CAPACITY
- APPROACHING CAPACITY
- AT OR OVER CAPACITY

2015 WEEKDAY PM PEAK HOUR
LEVEL OF CONGESTION- ROAD ALT.#1-
I-5 SPLIT DIAMOND INTERCHANGE

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TRANSPORTATION SYSTEM PLAN
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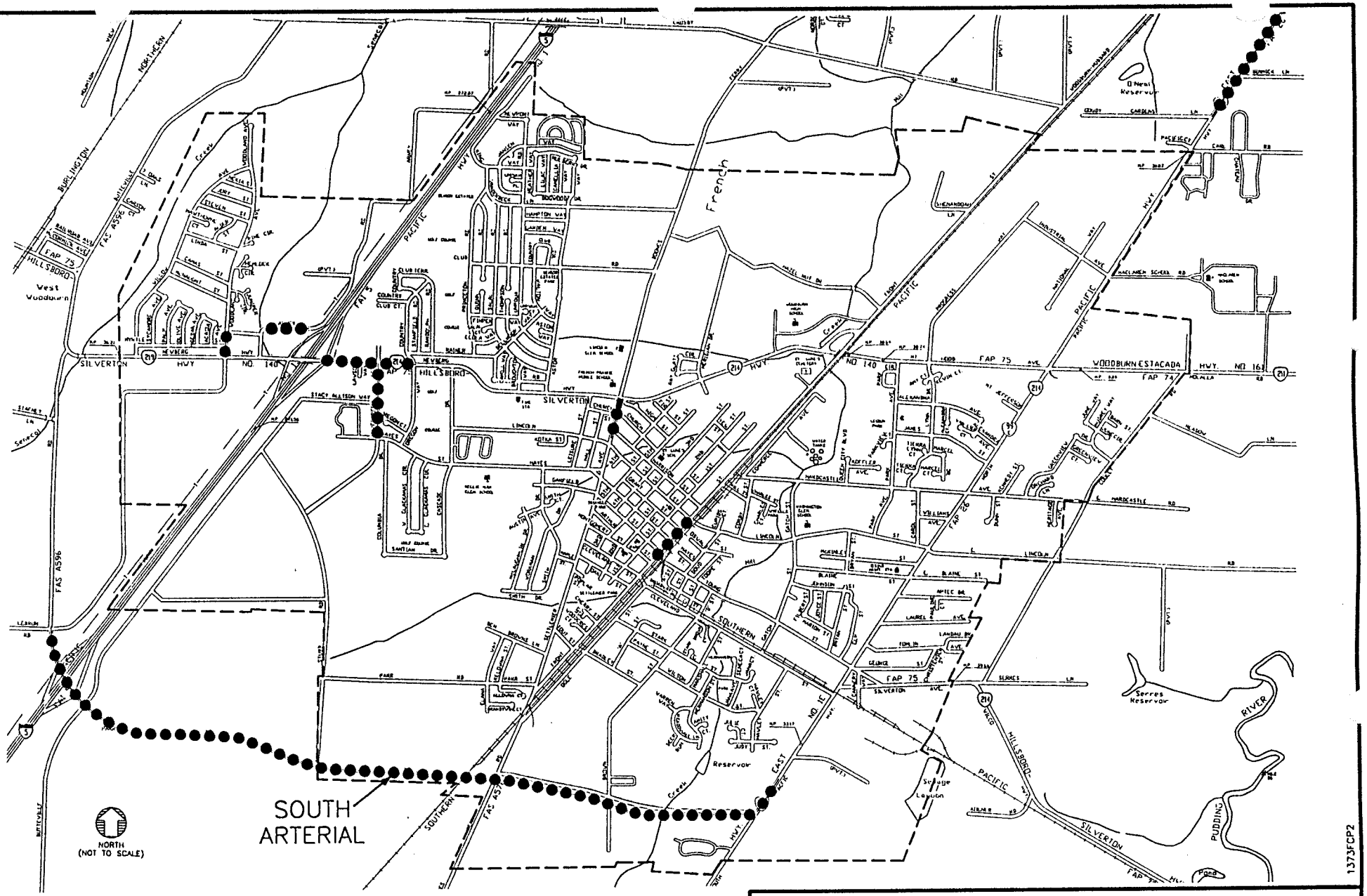
FIGURE
16



LEGEND

- UNDER CAPACITY
- APPROACHING CAPACITY
- AT OR OVER CAPACITY

2015 WEEKDAY PM PEAK HOUR LEVEL OF CONGESTION– ROAD ALT.#2– SECOND I–5 INTERCHANGE

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TRANSPORTATION SYSTEM PLAN
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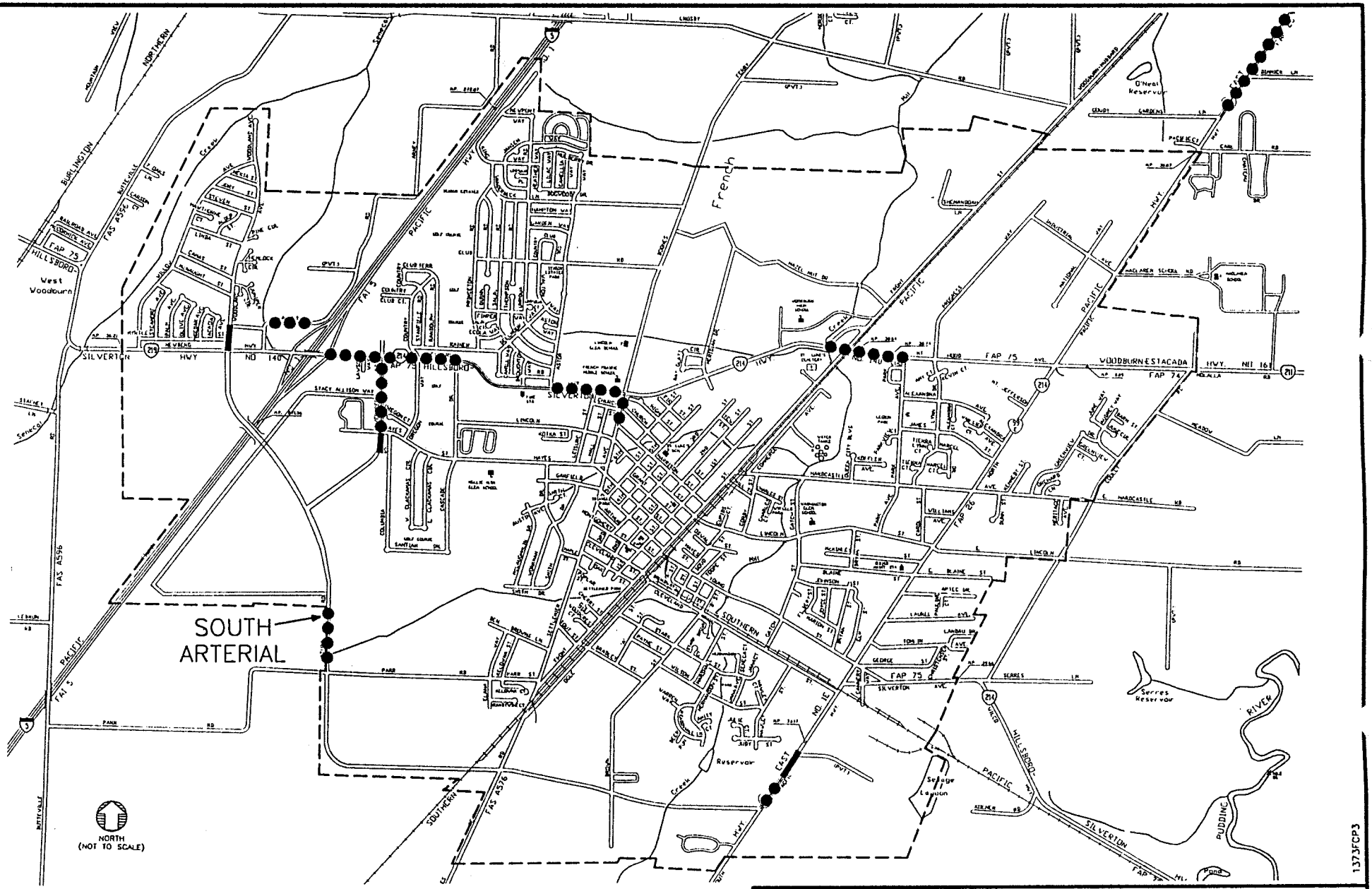
FIGURE 17

1373FCP2



LEGEND

- UNDER CAPACITY
- APPROACHING CAPACITY
- AT OR OVER CAPACITY

2015 WEEKDAY PM PEAK HOUR
LEVEL OF CONGESTION– ROAD ALT.#3–
IMPROVE EXISTING I–5 INTERCHANGE

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TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
18

alternative, future PM peak hour traffic level of service degrades to LOS F at all five intersections. LOS E is the typical minimum acceptable level of service at signalised intersections in an urban area such as Woodburn ("A" representing the best and "F" the worst level of service). Thus, all five identified intersections have an unacceptable level of service.

Given these unacceptable levels of service, a mitigation analysis was performed on the 2015 PM peak hour No-Build scenario in order to determine what intersection improvements at the five critical intersections would be necessary to restore acceptable operating conditions. The necessary improvements are as follows:

- **Southbound I-5/Highway 214:** Add a second left turn and right turn lane on the southbound I-5 ramp; re-stripe the eastbound intersection approach to include a through lane and a right turn lane; add a second left turn lane to the westbound approach.
- **Northbound I-5/Highway 214:** Signalize; add a second right turn lane on the northbound I-5 ramp; add a second left turn lane to the eastbound intersection approach; add a second through lane to the westbound approach.
- **Highway 214/Settlemier Avenue:** Optimize the signal timing to minimize delay; add a second left turn lane at the northbound approach; and restripe the southbound approach to the intersection to include one left turn, one right turn, and one through lane.
- **Highway 214/Highway 99E:** Add a second left turn lane to the eastbound intersection approach; restripe the westbound intersection approach to include one left turn lane, one through lane and one right turn lane; add a second left turn lane to the northbound approach to the intersection.
- **Highway 99E/Young Street:** Construct an exclusive right turn lane for vehicles to turn from westbound Young Street to northbound Highway 99E.

With these improvements all of the critical intersections will operate at LOS E or better in the future PM peak hour.

Next a PM peak hour traffic level of service analysis was performed on each of the identified road system alternatives. The intersection improvements identified above were included in this analysis. Under Alternative #1, the above mitigations will provide for acceptable operating conditions at all of the study intersections except the intersection of southbound Interstate 5/Highway 214. At this intersection it is necessary to add a second right turn lane to the southbound approach to the intersection.

As shown in Table 4, in Alternative #2 and #3 the above mitigation measures developed for the no-build alternative level of service analysis are sufficient to provide acceptable intersection operations in the future.

5.5.3 Operations Analysis of I-5 Interchange Alternatives

An additional analysis of year 2015 traffic conditions related to the various I-5 access alternatives under consideration in the Woodburn Transportation System Plan was undertaken. Appendix D identifies the traffic volumes and lane configurations assumed in the analysis to improve the I-5/Woodburn interchange operation.

Freeway Operation

The purpose of this evaluation was to develop a comparison of the expected freeway operation/level of service between the three interchange alternatives considered in the roadway system alternatives analysis. The three alternatives include:

- Existing diamond interchange;
- Split diamond interchange; and
- Two interchanges, with new interchange in the vicinity of the existing Butteville Road overcrossing.

A partial cloverleaf configuration at the existing Highway 214 interchange was also analyzed primarily to determine the benefits which might be achieved in the operation of Highway 214 through the signalized intersections. The results of this analysis along with the three alternatives are shown in Table 5.

Table 5

Southbound I-5 Freeway Operation - 2015 Weekday PM Peak Hour

Condition/Criteria	Interchange Configuration					
	Diamond	Split Diamond	Two Interchanges		Partial Cloverleaf	
			Butteville Road	Highway 214	First Ramp	Second Ramp
Diverge						
Ramp Volume (vph)	960	960	400	590	960	-
Freeway Volume (Lane 1,2)[1](vph)[2]	3,578	3,578	3,379	3,490	3,578	-
Level of Service	D	D	C	D	D	-
Density[3]	29	29	27	28	29	-
Speed (mph)	56	56	56	56	56	-
Merge						
Ramp Volume (vph)	1,220	1,220	790	460	840	380
Freeway Volume (Lane 1,2)[1](vph)[2]	3,968	3,968	3,769	3,352	3,534	3,579
Level of Service	D	D	D	C	D	D
Density[3]	32	32	30	27	29	29
Speed (mph)	54	54	55	56	55	56

1 lanes 1 and 2 are two right-most lanes on freeway

2 vph - vehicles per hour

3 density - vehicles per mile per lane

2015 PM peak hour traffic volumes were used for this analysis, as this period was considered the highest overall traffic period and most appropriate for design purposes. The PM peak hour volumes were derived from the daily EMME/2 model traffic projections by applying existing peak hour and intersection turning movement percentages. Southbound I-5 operations were analyzed as this represents the peak direction of traffic on I-5 during the PM peak hour.

The 1994 Highway Capacity Manual (HCM) procedures for freeway merge/diverge operation was applied for this analysis. This particular operational analysis procedure on I-5 represents a merge/diverge condition on the freeway rather than a weave since no added lanes between interchanges is proposed by any of the alternate interchange configurations.

As shown in Table 5, although there is a measurable change in calculated freeway/ramp junction level of service, there is no measurable change in the lane density or the operating speed of the freeway. This alone should not be used as criteria to select one alternative design over another.

Interchange Operation

The 2015 PM peak traffic volume/turn movement was assigned to the interchange configurations under consideration. A level of service analysis was performed for each ramp terminal with the cross street using the SIGCAP procedure, with a determination of the lane requirements at each intersection location to provide a balanced roadway section with adjacent intersections.

The results of this analysis is shown in Table 6. This provides a comparison of the volume to capacity ratio and level of service calculated for each alternative.

Table 6

I-5 Interchange Ramp Terminal Operation - 2015 Weekday PM Peak Hour

Interchange Configuration	Intersection	LOS	V/C
Diamond	Northbound Off/On-Ramp	E-F	98%
	Southbound Off/On-Ramp	E	96%
Split Diamond	North Off-Ramp (Hwy 214)	C-D	75%
	South Off-Ramp (South Arterial)	D-E	87%
	North On-Ramp (Hwy 214)	D	82%
	South On-Ramp (South Arterial)	D-E	88%
Two Interchanges	**Parr Road/Butteville Road**		
	Northbound Off/On-Ramp	D	84%
	Southbound Off/On-Ramp	D	81%
	Highway 214		
	Northbound Off/On-Ramp	C-D	75%
	Southbound Off/On-Ramp	D	77%
Partial Cloverleaf	Northbound Off/On-Ramp	E	97%
	Southbound Off/On-Ramp	E	94%

The analysis revealed that the best intersection level of service would be provided with the two interchange configuration, due to the dispersal of traffic. With this configuration, a three-lane section on the South Arterial at the interchange would be adequate.

The mitigation required at the south ramp terminals of the split diamond interchange is to provide a five-lane roadway section in the vicinity of the interchange. The extremely poor level of service forecast for the diamond interchange includes separate right turn lanes on Highway 214 as well as double left turn lanes from Highway 214 to the on-ramps. This would represent the maximum possible "build" for a diamond interchange design. Even with this configuration, it is very likely that the level of service will be significantly worse since it would be difficult to achieve the lane balance assumed in the analysis because of the influence of the upstream and downstream signalized intersections.

Possible variation to the diamond interchange design is to construct of a partial cloverleaf at Highway 214. A very important consideration in any interchange design is the potential lane balance which will be accommodated by the design. Lane balance is determined by evaluating the design to ensure traffic is distributed equally in all lanes as assumed by the intersection analysis program or to make the appropriate adjustment in the calculation to reflect the influence of the upstream and downstream traffic signal and roadway.

Analysis of the year 2015 PM peak hour westbound traffic volumes on Highway 214 reveals that 1900 vehicles per hour will approach I-5 in the westbound direction. This traffic would pass through the Evergreen Road traffic signal which is located 800 feet east of the northbound I-5 ramp terminal. In order to accommodate the 1900 vehicles per hour through the Evergreen traffic signal, the two westbound lanes must equally share the total westbound traffic.

This is equivalent to 950 vehicles per hour per lane in order to access either I-5 northbound or I-5 southbound. Since the location is no greater than 800 feet east of I-5, all the traffic to northbound I-5 and a majority of the traffic must be in the right lane. Even with a right turn lane, traffic will not be able to move out of the through lane until the platoon approaches the traffic signal and if this traffic is provided signal progression, which is required to minimize the queue on this approach, only 470 vehicles of the 840 vehicles desiring to enter I-5 southbound can be in the right lane at the northbound ramp terminal. This requires a total of nearly 400 vehicles to shift two lanes immediately after passing through the northbound ramp terminal signal and prior to entering the loop ramp to I-5 southbound.

Similar conditions will be created for eastbound traffic approaching the southbound ramp terminal traffic signal. The total volume of 1450 vehicles per hour would leave the Woodland/Highway 214 traffic signal. With the southbound on-ramp followed by a northbound on-ramp to I-5, 930 of the 1450 vehicles per hour must be in the right lane to avoid lane shifts on the I-5 structure.

When these conditions of poor lane balance occur downstream of a signalized intersection, the assumed lane balance as provided with the intersection level of service calculation will not be achieved. If lane balance is achieved as assumed in the calculation, congestion will occur downstream of the traffic signal, at the diverge point resulting in delay and safety problems extending back to the adjacent intersection. This lane balance may be alleviated somewhat by increasing the distance between the adjacent traffic signal and the downstream diverge point.

Conclusions

Based on the freeway and ramp intersection operations analysis conducted for the different I-5 interchange alternatives, the following conclusions can be drawn:

1. All of the alternatives would have similar operating characteristics on I-5, ranging from level of service C to D.

2. The proximity of a second interchange at Butteville Road would not have an adverse impact on Highway 214 interchange ramp operations, and vice versa.

3. The existing diamond interchange would experience very poor level of service E to F at the ramp terminal intersections, even with added through and left turn lanes at the northbound and southbound ramp intersections. The overall cross-section of Highway 214 would be a 6-7 lane roadway.

4. The split diamond interchange would improve level of service at the Highway 214 ramp intersection from C to D, with only five lanes required on the I-5 overpass structure. At the south interchange, five lanes on the South Arterial would be required to provide level of service D or better.

5. The best intersection ramp terminal level of service (C-D) is achieved with two interchanges, due to the dispersal of traffic with this configuration. However, Highway 214 would still have to widen to a five-lane section on the I-5 overpass. The South Arterial could operate as a three-lane facility at the south interchange.

6. The partial cloverleaf interchange would operate very similarly to the diamond interchange or the split diamond interchange for freeway merge/diverge conditions. Analysis of the ramp intersection level of service as shown in Table 6, reveals the overall operation very similar to the diamond interchange. This is due to the extremely poor lane balance which would result at the interchange traffic signals because of the lane balance required at the adjacent signalized intersections at Woodland Road and Evergreen Road to achieve level of service D.

5.5.4 Land Use/Environmental/Cost Impacts

Table 7 summarizes the general land use, environmental and cost impacts of the highway system alternatives. A discussion of each impact area follows.

Table 7

Summary of Land Use/Environmental/Cost Impacts

Impact Category	Roadway System Alternative			
	No-Build	Alternative #1 I-5 Split Diamond Interchange	Alternative #2 2nd I-5 Interchange	Alternative #3 Improve Existing Interchange
Land Use				
Serves Overall Development in Area	—	+	—	O
Promotes Development Inside Current UGB	O	+	—	+
Right-of-Way Requirements	+	—	—	O
Environmental				
Wetlands/Environmentally Sensitive Areas	+	+	+	+
Air Quality	—	+	+	O
Cost	+	—	—	—

+ Positive impact

O Minimal impact or not applicable

- Negative impact

Land Use

The no-build and three roadway system improvement alternatives would have different impacts on future land development patterns within the Woodburn area. The no-build alternative would severely limit added development potential in the City, as most of the current undeveloped area within the existing Urban Growth Boundary is in the southwest portion of the City, which has virtually no street system currently developed. The absence of improved I-5 access and a South Arterial facility under this alternative would limit the ability to develop this area in the future, without having significant traffic infiltration impacts through the Senior Estates area south of Highway 214.

The development of an I-5 split diamond interchange with a northerly South Arterial alignment would improve access to the undeveloped southwest portion of the City, but the South Arterial facility east of I-5 would bisect the proposed Woodburn Crossing mixed-use development area and potentially have a negative impact on the master plan for this development. The development of a second I-5 interchange in the vicinity of Butteville Road, with a southerly South Arterial alignment, would provide the best overall access to the southwest portion of the City, but could stimulate development pressures outside the existing Urban Growth Boundary, as the new interchange and a portion of the South Arterial would be located outside the UGB. With a northerly South Arterial option, the road could be developed entirely within the existing urban growth boundary.

Finally, the alternative to improve the existing I-5/Highway 214 interchange without a direct connection to the South Arterial (which would have a separate overpass of I-5 under this alternative) would provide only limited improved access to the southwest portion of the City. This alternative (assuming a partial cloverleaf ramp improvement were developed) would also require the taking of some existing businesses in the northwest and southeast quadrants of the interchange. The other interchange build alternatives would be developed in existing undeveloped areas and not have as great an impact on existing businesses. Also the widening of Highway 219/214 under this alternative would probably require significant right-of-way from existing businesses along this roadway.

Under any of the build alternatives, other collector and local street extensions and widening would result in some right-of-way acquisition thus impacting adjacent development to some extent.

Environmental

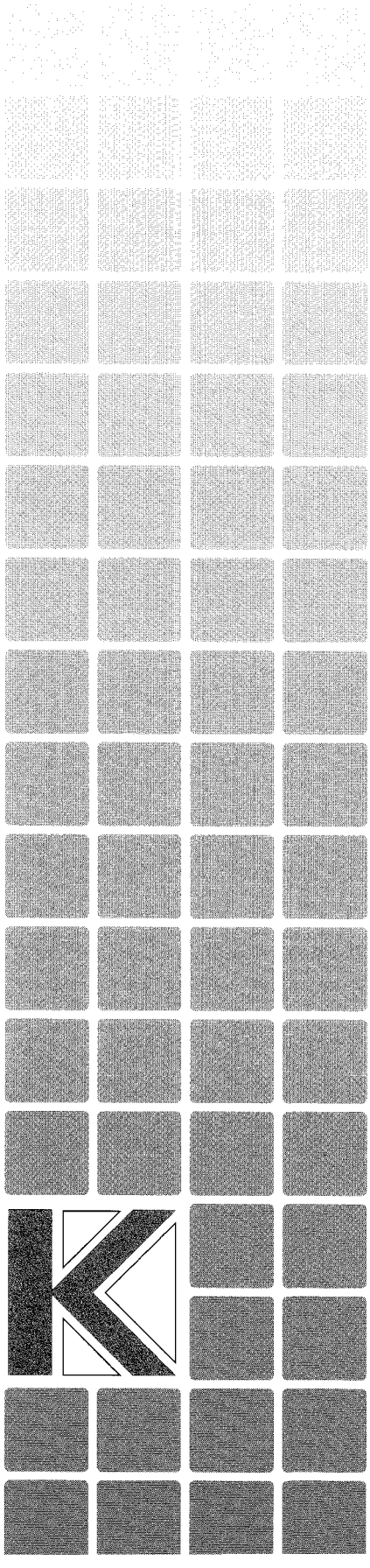
Under any of the build highway system alternatives, the potential alignments for new interchange and street construction appear to result in limited impact on environmentally-sensitive areas in the Woodburn area. The South Arterial could be aligned south of the small reservoir on the south side of the City, and be potentially located around the south side of the sewage lagoon east of Highway 99E if eventually connected to Highway 214.

Cost

The difference in cost of the different highway system alternatives is primarily associated with the different I-5 interchange configurations. The I-5 split diamond interchange configuration is estimated to cost as much as $15 million, while a second I-5 interchange at Butteville Road could cost as much as $20 million (pending the final location of the I-5 over-crossing and the extent of frontage road development between the existing Highway 214 interchange to the north and the new interchange). Improvements to the existing interchange (assuming conversion to a partial cloverleaf configuration with a new bridge) could be up to $10 million, and possibly more pending the level of I-5 frontage road development south of Highway 214.

The South Arterial improvement cost (from Highway 219 to Highway 99E) would probably range from $5-10 million for the split diamond/new interchange alternatives, being of lesser cost with the second I-5 interchange at Butteville Road due to the shorter length of new roadway to be constructed.

The cost of other street improvements in each highway system alternative would be similar, with the possible exception of street improvements in the current undeveloped southwest portion of the City, whose configuration will be dependent on a final master plan for that area as well as the eventual I-5 interchange/South Arterial improvement configuration. Improvements to arterial and collector streets could total up to $40 million.



Section 6

Transit Systems Alternatives Analysis

6.0 Transit System Alternatives Analysis

6.1 Transit Demand

In fiscal year 1994 (July 1, 1993 through June 30, 1994), the Woodburn fixed-route bus service had an annual ridership of 28,998 passengers. The paratransit system only had an annual ridership of 3,159 passengers. The combined 32,157 annual ridership on the two systems related to 2.11 transit trips per resident in 1994. Over the past ten years, annual ridership has stayed about the same on the transit system.

Figure 19 shows the 1994 population distribution in Woodburn, for nine zones within the city. For each zone, the population associated with more transit-dependent persons - 0-17 and over 60 years of age - is identified. The map reveals a high concentration of elderly in the Senior Estates area just east of I-5. In central and east Woodburn, there are more youngsters and younger and middle age adults.

By year 2015, population in Woodburn is projected to increase by 100 percent, to 30,000 persons. Assuming transit ridership would grow in proportion to the population increase, and assuming increased transit service were provided to handle the added population, an annual ridership of about 65,000 would be expected combined on the city fixed-route and paratransit services.

With the increasing number of people moving to Woodburn and commuting to either the Portland metro area or Salem, there appears to be some potential demand for shuttle bus service between Woodburn and these two areas. There currently is no transit service serving this demand.

6.2 Major Activity Centers

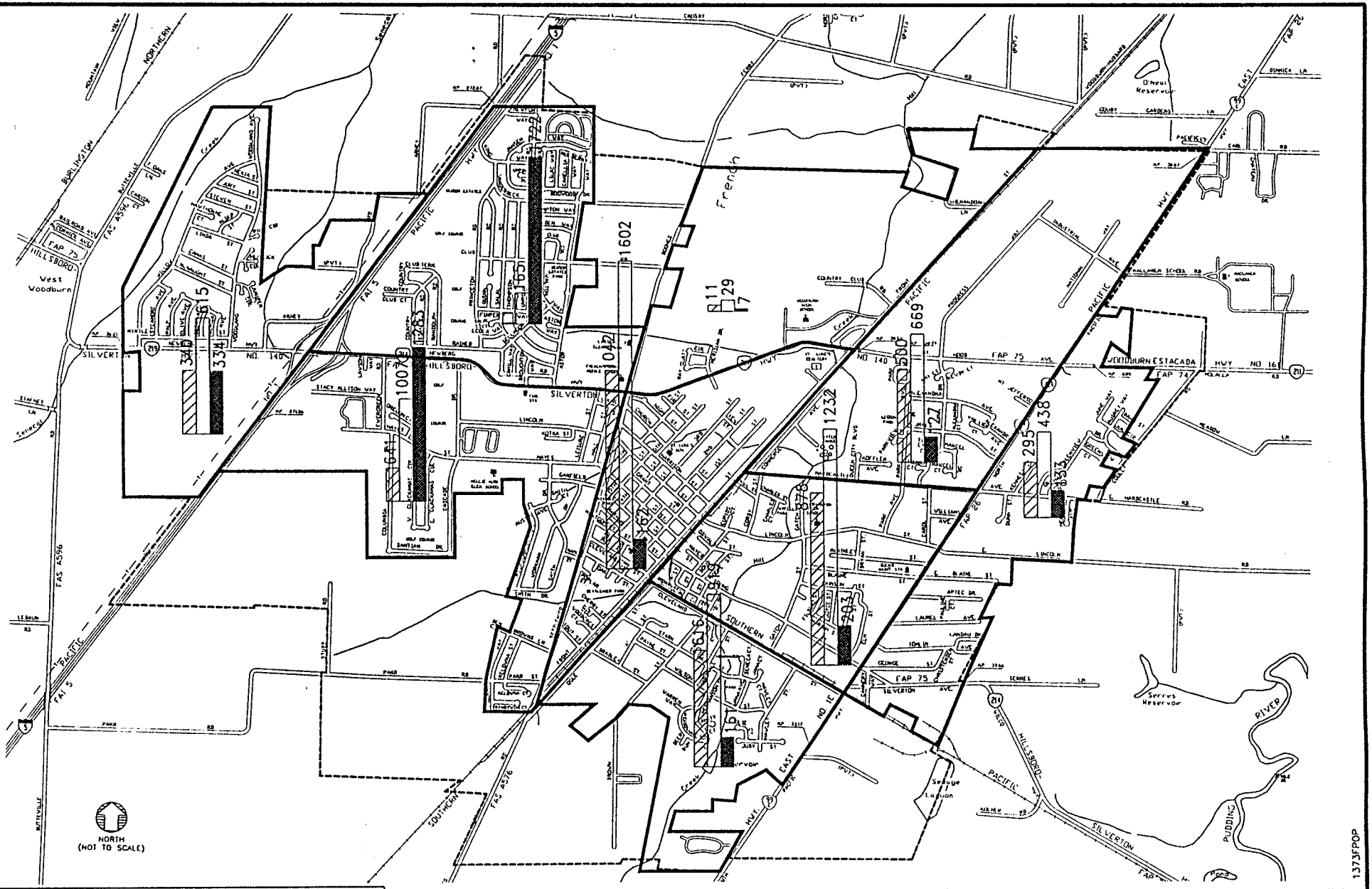
There are several trip attractions in Woodburn which should be served by public transit service. Figure 20 identifies these attractions, which comprise retail centers, employment concentrations, parks, golf courses, schools, retail centers, downtown Woodburn, and city offices. The existing fixed-route bus route serves most of these attractions, with the notable exception of not serving the employment area along Progress Way north of Highway 214 and west of Highway 99E.

6.3 Intracity Fixed-Route Bus Alternatives

Four fixed route bus alternatives were identified to the existing condition, which is a single, one-way loop route. The existing route and alternatives are illustrated in Figures 21 through 24, and are compared in Table 8. A description of each alternative follows:

Alternative #1: Increase Service Frequency on Existing Route

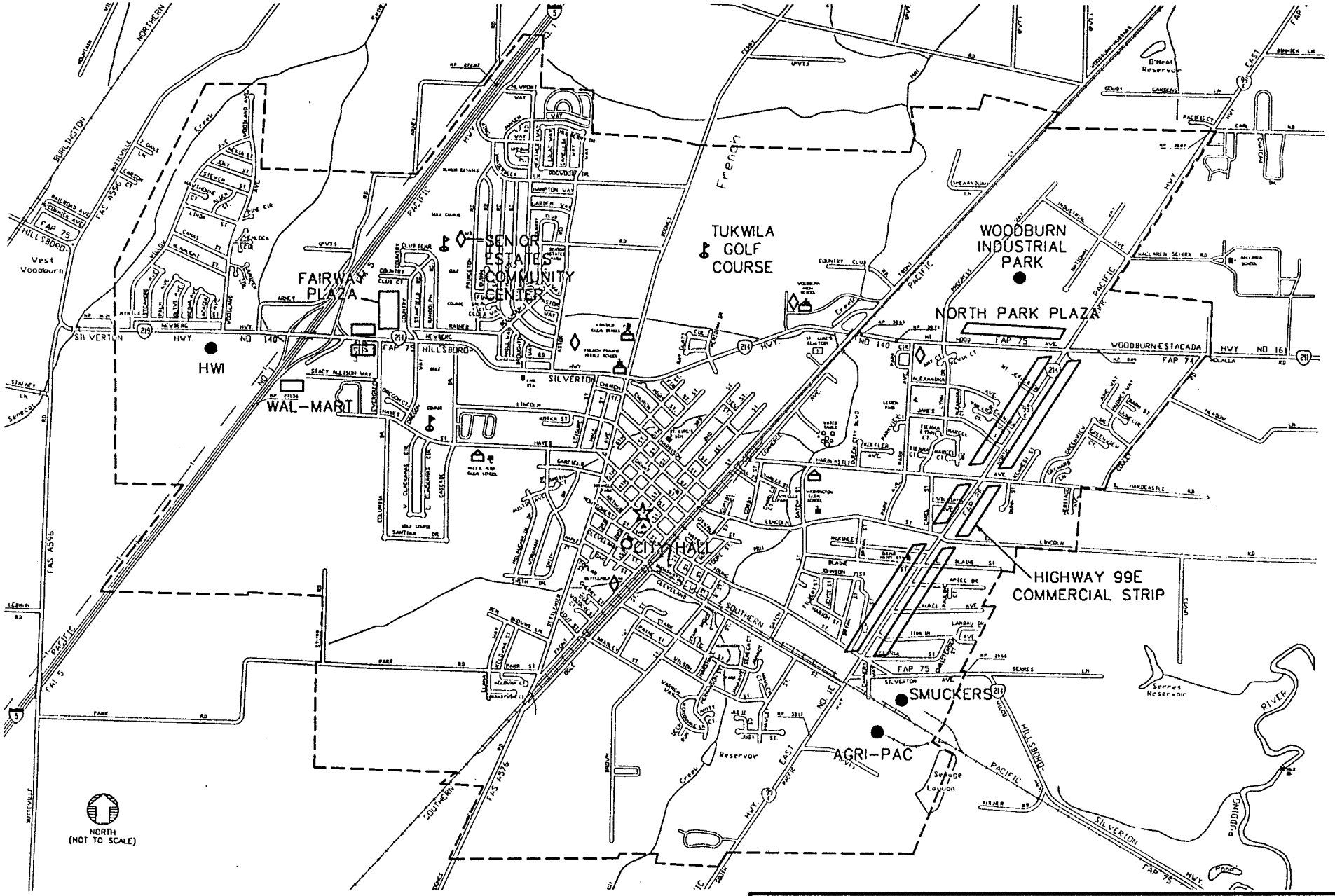
With this alternative (see Figure 21), the existing 15.3 mile one-way loop route would be maintained, with service extended to a 12-hour period from 7 a.m. to 7 p.m., with buses operating every 30 minutes. An expansion of the hours of operation of the fixed route service should be considered, to include the a.m. and p.m. peak commuting times. To achieve the



1994 POPULATION DISTRIBUTION

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 19



LEGEND

- ◊ = RECREATION
- ⛰ = SCHOOL
- ▭ = RETAIL
- ⚷ = GOLF COURSE
- ☆ = DOWNTOWN
- ● = EMPLOYMENT NODES
- O = GOVERNMENT CENTER

MAJOR ACTIVITY CENTERS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 20

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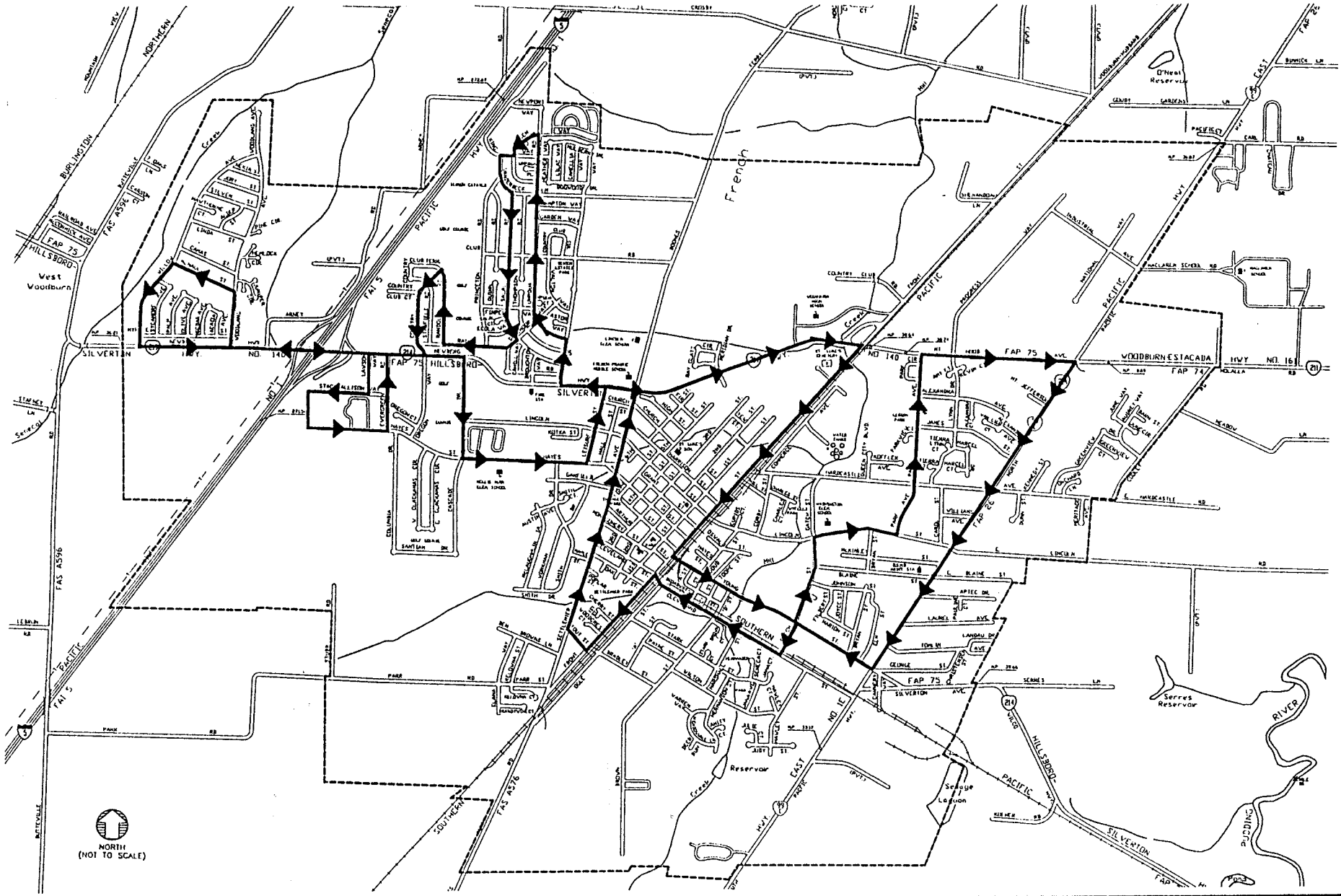


LEGEND

→→ BUS ROUTE AND DIRECTION OF TRAVEL

FIXED-ROUTE BUS ALT. #1: INCREASE SERVICE FREQUENCY ON EXISTING ROUTE (ONE-WAY)

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 21

Table 8

Comparison of Intracity Fixed- Route Bus Alternatives[1]

Fixed-Route Bus Alternative	Service Frequency (min.)	Route Miles (one-way)	Avg. Bus Travel Speed	# of Buses Required	Vehicle Miles/Year	Vehicle Hours/ Year	Added Vehicle Capital Cost	Vehicle Operating Cost/ Year[2]	Estimated Annual Ridership
1. Increase Service Frequency on Existing Route	30 (7a.m.-7p.m.)	15.3	13 mph	2	80,784	6,120	$110,000	$145,900	40,000
2. Convert Single Route to 2-way Operation	60 (7a.m.-7p.m.)	14.8	13 mph	2	78,336	6,120	$110,000	$141,500	50,000
3. Create 2 Routes (East/West) with 1-way operation	30 (7a.m.-7p.m.)	E - 9.15 W - 6.1	13 mph	3	80,478	6,120	$220,000	$145,400	60,000
4. Create 2 Routes (East/West) with 2-way Operation	30 (7a.m.-7p.m.)	E - 9.15 W - 6.1	13 mph	6	160,956	12,240	$550,000	$290,800	75,000
Existing	60 (9a.m.-4p.m.)	15.3	13 mph	1	40,392	3,060	$0	$73,000	28,000

1 Assumes bus operation only on weekdays for 51 weeks per year (thus accounting for no service on holidays).

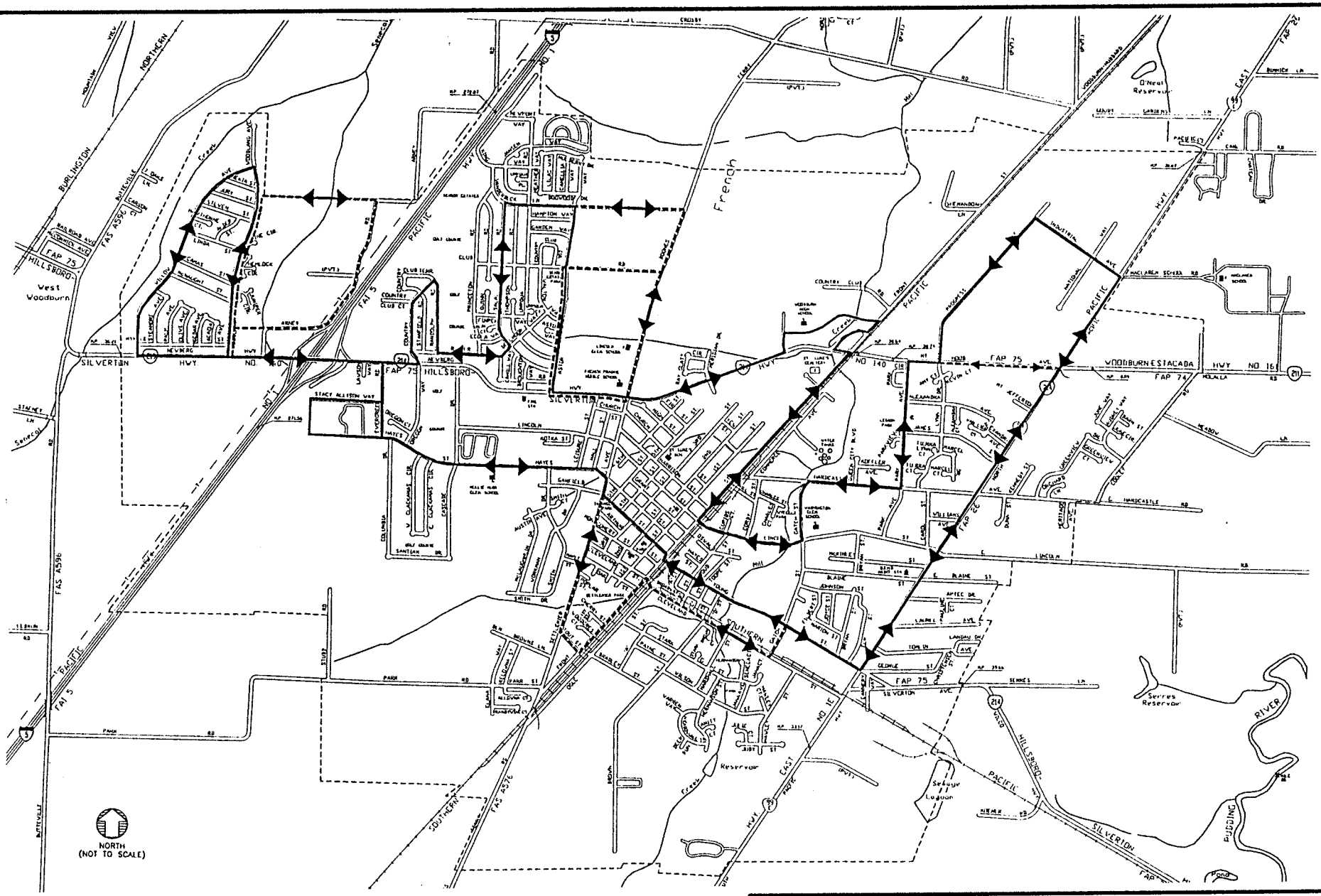
2 Based on 1993-94 Woodburn Transit System operating cost of $1.80/vehicle mile.

increased bus service, a second bus would need to be added to the fleet. Transit system operating costs are estimated to increase to $145,000 from the existing $73,000, assuming the operating costs would increase in proportion to the increase in vehicle miles and hours of travel (a somewhat conservative assumption as this also assumes a doubling of administrative costs). Also an added bus would be required, at a cost of about $110,000 (if the bus were similar to the existing 23-seat bus being operated).

A major problem with the one-way loop operation is that the bus service does not efficiently serve travel oriented in the opposite direction of the bus operation, particularly for short trips.

Alternative #2: Convert Single Route to Two-Way Operation

Overall passenger accessibility along the bus route could be improved by preserving the loop route, but modifying the service to have buses operating in both directions at the same time (see Figure 22). This service alternative was evaluated preserving the existing 60 minute service frequency, in each direction of travel. Service would be expanded to 7 AM to 7 PM on weekdays. This service concept would require two buses, with operating costs similar to increasing service frequency on the existing one-way loop route. Overall transit operating costs



LEGEND

- BUS ROUTE AND DIRECTION OF TRAVEL
- OPTIONAL BUS ROUTING

FIXED-ROUTE BUS ALT. #2: SINGLE ROUTE WITH TWO-WAY OPERATION

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 22

($143,000) would be similar to increasing service frequency on the existing one-way loop route, with an added bus required ($110,000).

The basic route evaluated for this alternative is similar to the existing route, with the exception of focusing the service on one street as opposed to two closely parallel streets in certain areas (e.g. service east of downtown is focused on Young Street, while along the existing route buses operate on both Young Avenue and Cleveland Street, one block to the south). A reconfiguration of the bus route through Senior Estates north of Highway 214 is also proposed with this alternative, to operate along Astor Way instead of Umpqua Road, and not operate north of Vanderbeck Lane. This provides better spacing of the service in that particular area. The route would also extend north of Highway 214 west of Highway 99E to serve the industrial area along Progress Way, thus linking residential areas of the community with this employment area.

There are also several route options within this alternative. Northwest of the I-5 interchange, the bus service initially might be oriented to the residential development along Woodland Drive. In the future, if commercial development occurs along Arney Road, the bus route might make a loop through that area using Arney Road and Woodland Drive. Also as the Tukwila and other residential subdivisions develop along Boones Ferry Road, it could be desirable to extend the bus route operating through north Senior Estates east of Astor Way to access Boones Ferry Road.

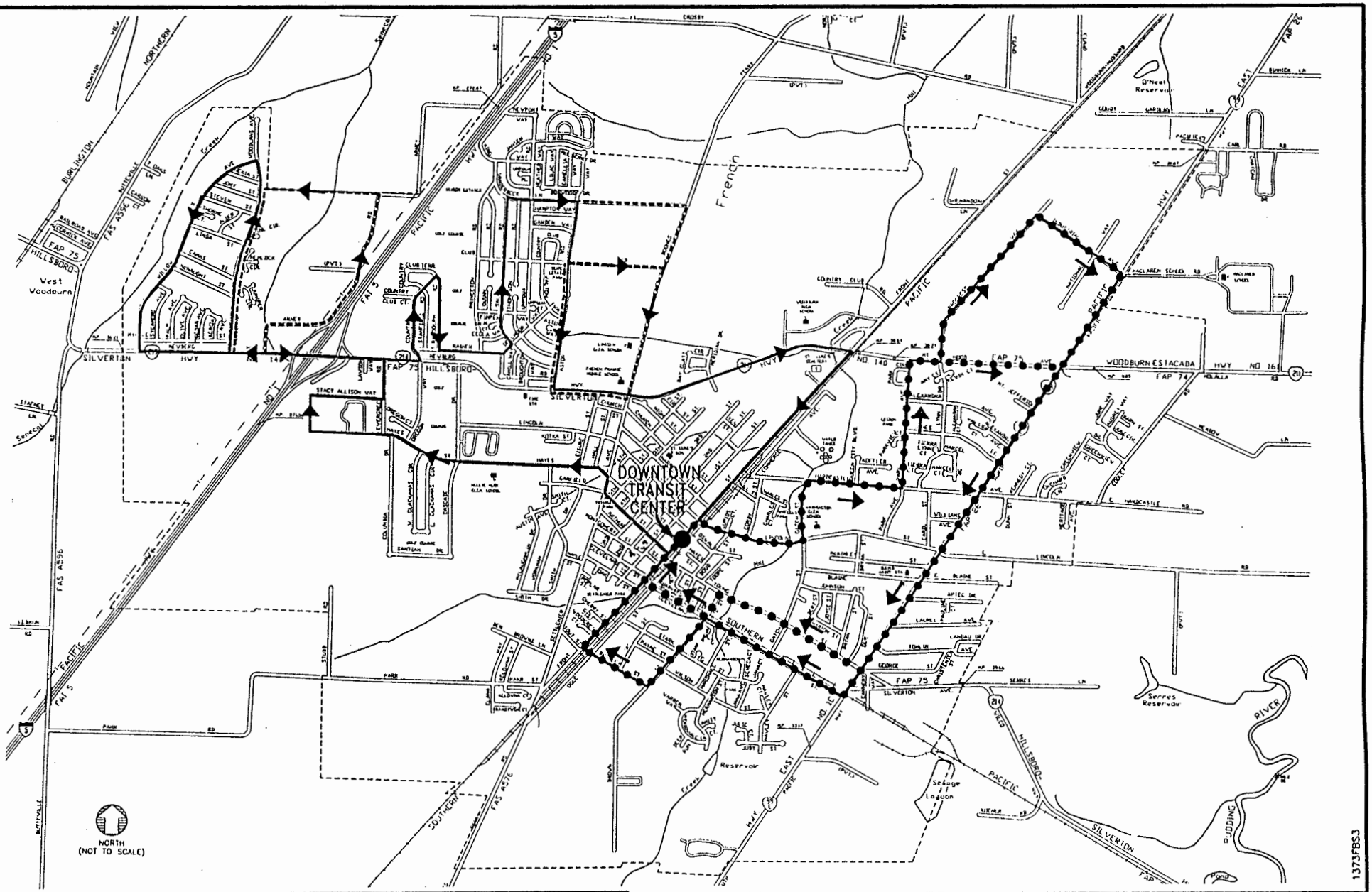
Alternative #3: Create Two Routes (East/West) with One-Way Operation

This alternative would preserve the basic one-way bus route that operates today, but splitting the route into two routes: 1) a 9.15 mile west side route operating on the west side of the Southern Pacific Railroad tracks, and a 6.1 mile east side route operating on the east side of the railroad tracks (see Figure 23). This service concept was evaluated with an increased service frequency of 30 minutes, again between 7 a.m. and 7 p.m. on weekdays. The bus service on each route would be scheduled so that buses would have coordinated arrivals in downtown Woodburn, at a so-called transit center, to facilitate transfers between routes. The major disadvantage of this alternative is that cross-city transit commuting would require transferring to another route in downtown Woodburn. The advantages of this alternative are two-fold:

1. It improves service frequency with a minimum increase in buses (only two buses are required - one for each route), with reverse commute trips along a particular route (trips in the opposite direction of the service would be accommodated more conveniently due to the more frequent bus service and shorter bus route); and

2. The downtown transit center concept for bus transferring purposes could serve as a stimulus for downtown redevelopment, particularly if tied into an intercity bus and/or rail station.

With this alternative, both transit operating and capital costs would be higher than the other two alternatives previously described, as a total of three buses would be required (two on the west route, and one on the east route). Operating costs are estimated to be about $175,000 per year, while an added two buses would cost $220,000.



LEGEND

- EAST SIDE BUS ROUTE AND DIRECTION OF TRAVEL
- WEST SIDE BUS ROUTE AND DIRECTION OF TRAVEL
- OPTIONAL EAST SIDE BUS ROUTING
- OPTIONAL WEST SIDE BUS ROUTING

FIXED-ROUTE BUS ALT. #3: TWO ROUTES WITH ONE-WAY OPERATION

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DRAFT TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 2.3

Alternative #4: Create Two Routes (East/West) with Two-Way Operation

Finally, this fixed-route alternative would operate two-way bus service on both west and east side routes, at a 30 minute service frequency (7 a.m. to 7 p.m. on weekdays) (see Figure 24). This is the most intensive service option, with operating costs increasing to about $290,000, and with six buses being required (four buses on the west route, and two on the east route). The five added buses over the existing single bus operation would cost $550,000. This service concept could operate with a 60 minute service frequency, which would reduce operating costs by about 50 percent (similar to alternatives #2 and #3).

6.4 Intracity Paratransit Service

If fixed-route bus service is improved, the City would have the option of reducing the provision of special paratransit service. However, the paratransit system, with door-to-door service, provides the only transit service option for many elderly and handicapped persons in the community, and thus some level of paratransit service will be desirable. In addition, the Americans with Disabilities Act (ADA) requires providers of fixed-route transit to provide complementary paratransit service.

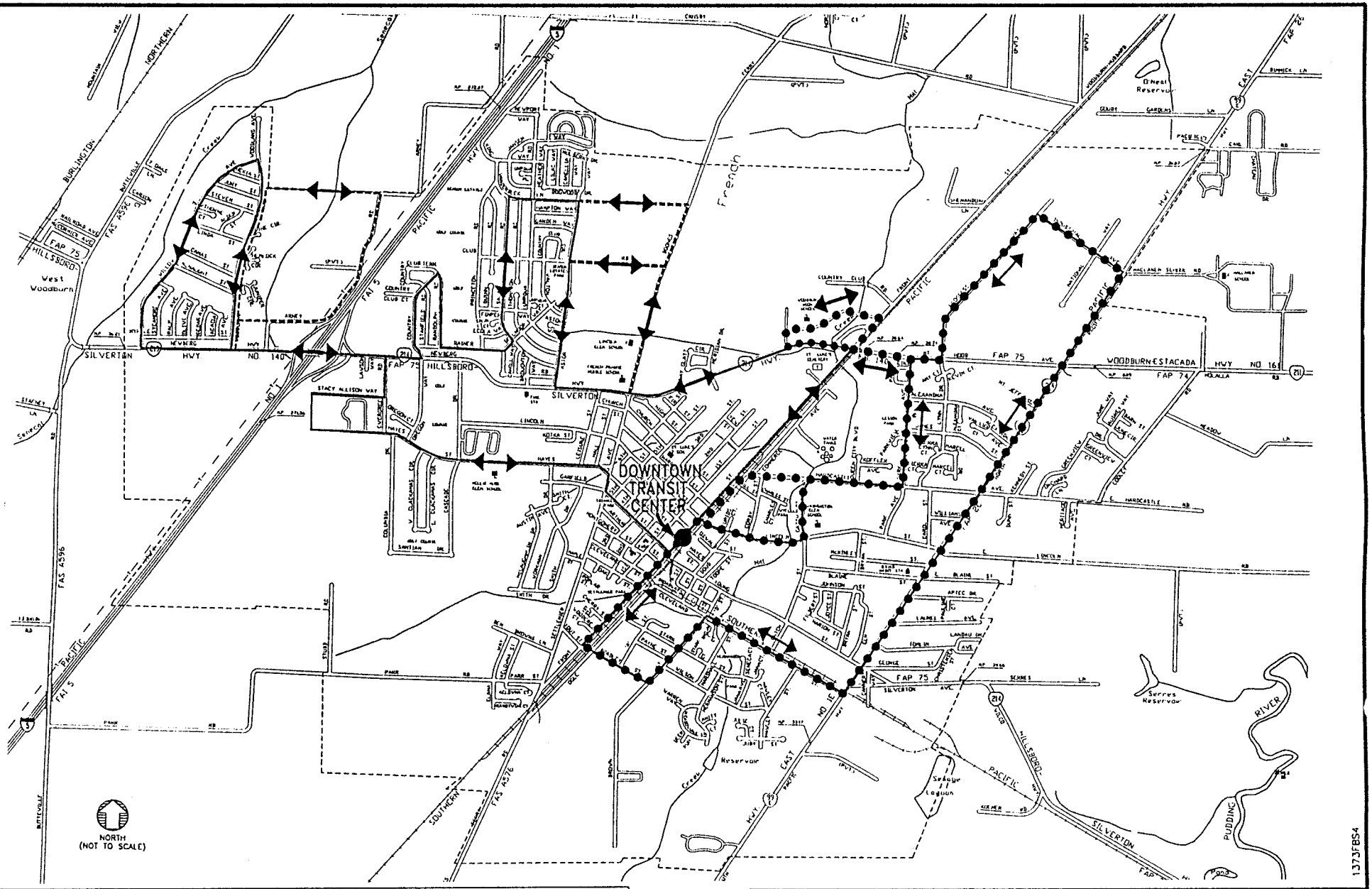
6.5 Intercity Transit Service

As mentioned previously, the Woodburn Transit System currently does not provide shuttle bus service between Woodburn and the Portland metro area or Salem. For direct service to the Portland Metropolitan area the City of Woodburn could either:

- provide service to Tualatin Park-n-Ride - transfer to Tri-Met bus routes to access downtown Portland and rest of system; or
- provide direct service to downtown Portland.

To Salem, the City of Woodburn could provide direct service to downtown Salem and the state office building area.

Table 9 identifies the estimated operating and capital costs for these three options. For all options, a weekday-only service was assumed to a particular destination, with two bus runs during the AM and PM peak hours, and a midday bus run. The same vehicle operating costs per mile ($1.80) were assumed for the intercity shuttle service as for the intracity bus service within Woodburn. The intercity bus service concepts in Table 9, for comparison purposes, were assumed to originate in the vicinity of the I-5/Highway 214 interchange, at a new park-n-ride facility. The service could be expanded further east into central Woodburn to either circulate through the city or terminate at a park-n-ride more central to the city. With a park-n-ride some distance away from the interchange, there would be less potential for this facility to be used by Salem to Portland commuters, thus increasing the available spaces for Woodburn commuters. If a park-n-ride were located in the vicinity of the interchange, it would be desirable to keep the park-n-ride east of I-5 so that commuter traffic accessing the park-n-ride would not have to travel through the I-5/Highway 214 interchange. Given current land availability, this would most likely result in the park-n-ride being developed in the southeast quadrant of the interchange, where there is still substantial undeveloped property. Further east in central Woodburn, there are more limited potential sites.



LEGEND

- EAST SIDE BUS ROUTE AND DIRECTION OF TRAVEL
- WEST SIDE BUS ROUTE AND DIRECTION OF TRAVEL
- OPTIONAL EAST SIDE BUS ROUTING
- OPTIONAL WEST SIDE BUS ROUTING

FIXED-ROUTE BUS ALT. #4: TWO ROUTES WITH TWO-WAY OPERATION

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
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FIGURE 21

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Table 9

Comparison of Intercity Shuttle Bus Alternatives[1]

Intercity Shuttle Bus Alternative	Service Frequency (weekday)	Route Miles (one-way)[2]	# of Buses Required	Vehicle Miles/ Year	Vehicle Hours/ Year	Added Vehicle Capital Cost[5]	Vehicle Operating Cost/ Year[6]	Estimated Annual Ridership
1. Service to Tualatin Park-n-Ride	2 Trips (AM & PM) 1 trip (Mid-day)	17.5	1	44,625	1,230[3]	$150,000	$80,300	35,000
2. Service to Downtown Portland	2 Trips (AM & PM) 1 trip (Mid-day)	31	2	79,050	2,675[4]	$300,000	$142,300	50,000
3. Service to Central Salem	2 Trips (AM & PM) 1 trip (Mid-day)	16.5	1	42,075	1,230[3]	$150,000	$75,700	40,000

1 Assumes bus operation only on weekdays, for 51 weeks/year (thus accounting for no service on holidays).

2 Assumes Woodburn Park-n-Ride within 0.5 miles of I-5 interchange.

3 Assumes one hour round-trip travel time to Tualatin Park-n-Ride or central Salem during peak hours (50 minutes during mid-day).

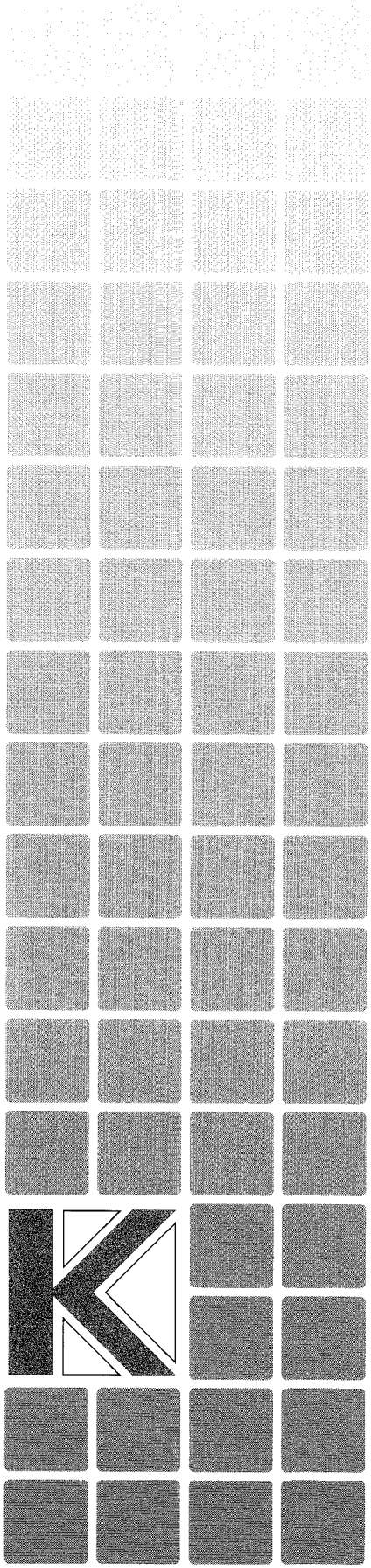
4 Assumes 2.25 hours round-trip travel time to downtown Portland during peak hours (90 minutes during mid-day).

5 Assumes purchase of 45 passenger buses.

6 Based on 1993-94 Woodburn Transit System operating cost of $1.80/vehicle mile.

Assuming that larger 45-passenger buses are used for the intercity shuttle, and under the maximum service scenario of two peak hour and one midday bus runs, and service to both Portland and Salem, the largest number of spaces anticipated for a park-n-ride would be 225. If a park-n-ride were developed, consideration should be given to provide more spaces than the anticipated transit demand to accommodate carpooling to Portland and/or Salem. Thus a maximum-sized park-n-ride of closer to 300 spaces could be applicable. If intercity bus service is provided to only one destination, and/or the level of service is curtailed, then the park-n-ride can be proportionally smaller. To accommodate 300 parking spaces, about a three acre site would be required. Such a facility could cost up to $1 million.

Recently as part of the preparation of the Marion County Transportation System Plan, the concept of extending the Salem area bus service (CHERRIOTS) to serve Woodburn has been discussed. This service extension could replace or supplement any City of Woodburn - provided fixed route bus service to Salem. To the north, it is highly unlikely that Tri-Met (the public transit provider in the Portland metro area) would ever extend their service to Woodburn as they are attempting to limit their service to the Portland area.



Section 7

Alternate Pedestrian/Bicycle TDM Strategies

7.0 Alternate Pedestrian/Bicycle/TDM Strategies

7.1 Introduction

In addition to a set of highway and transit system alternatives for the City of Woodburn, there are also alternate strategies for pedestrian and bicycle facility development and Transportation Demand Management (TDM) measures which should be evaluated toward developing a truly multi-modal Woodburn Transportation System Plan. This section identifies and evaluates facility and policy alternatives with respect to these important transportation system components.

7.2 Pedestrian Strategies

As discussed in Section 4, there is a fairly discontinuous system of sidewalks along existing streets within Woodburn, as well as an absence of off-street pathways. Many sections of arterial and collector streets do not have sidewalks at all or only on one side. There are several locations where pedestrian connections between adjoining neighborhoods or subdivisions have not been developed or are circuitous.

There appear to be two alternate strategies to added pedestrian facility development within Woodburn. These strategies differ by the degree of on-street vs. off-street development of sidewalks and pathways.

Alternative #1: Focus on Added Sidewalk Development

The first alternative would focus pedestrian facility development on adding sidewalks to all sections of existing arterial and collector streets, preferably with sidewalks on both sides of these streets. All new streets, including local streets, would also include sidewalks on both sides. There would be no or very little off-street pathway development.

The major disadvantage of this alternative is that this strategy would be fairly expensive, and probably not the most cost-effective means of improving pedestrian access to major activity centers in the City or to connect adjoining neighborhoods and subdivisions.

Alternative #2: Balanced Program of Sidewalks on Major Streets and Off-Street Pathways

The second alternative would be to develop a balance between added on-street sidewalk development and the development of an off-street pathways system. In particular, a trail system would be developed along the Mill and Goose Creek corridors in the City, totaling over seven miles of trails. In addition, off-street pathways connecting adjoining neighborhoods and subdivisions would be developed where local street connections are not possible. This would be supplemented by more limited sidewalk development, focusing on having sidewalks on at least one side of all arterial and collector streets, but not necessarily on both sides of these streets.

The Mill and Goose Creek corridors through Woodburn provide an opportunity to integrate pedestrian facilities into open space areas, thus enhancing access to these areas by the public

as well as providing more direct pedestrian connections to many activity centers in the City. The Mill and Goose Creek corridors are located next to or in close proximity to all of the schools in Woodburn, thus providing an opportunity to have school children use of safer off-street trails. to access the schools. The on-street sidewalk system could be focused to some extent, at least through signage, on directing pedestrians to the trailheads for the off-street pathway system.

7.3 Bicycle Facilities

Also as discussed in Section 4, the absence of dedicated bicycle facilities in Woodburn is even more critical than the discontinuity of the current sidewalk system. The alternatives for improved bicycle facilities mirrors the alternatives for pedestrian facility development.

Alternative #1: Focus on On-Street Bike Lane Development

This alternative would focus on developing designated bicycle routes and adding bicycle lanes on existing arterial and collector streets, with no or very limited off-street bicycle trail development. Preferably dedicated shoulder bicycle lanes on all arterial and collector streets would be developed, with portions of this system designated as bicycle routes serving different portions of the City and/or major activity centers.

While this alternative would make strides in separating bicycles from motor vehicles on the Woodburn street system, bicycle safety would not be as high as if some off-street bike trails were developed to supplement on-street bicycle lanes. And along many existing streets bicycle lanes can only be developed by widening these streets and possibly requiring added right-of-way.

Alternative #2: Balanced Program of On-Street Bike Lanes and Off-Street Bike Trails

As for the pedestrian facilities, the Mill and Goose Creek corridors provide an opportunity for developing bicycle trails along these corridors, thus separating bicycle from motor vehicle traffic. This alternative would supplement the development of on-street bicycle routes and lanes by developing pathways for bicycles in these creek corridors. Options would exist on the degree of separation between bicycles and pedestrians in these corridors. Either a single pathway in each corridor could be developed to accommodate both bicycles and pedestrians (typically 8-10 feet wide), vs. developing separate pedestrian and bicycle trails (most likely on different sides of the creek corridors due to their limited width). With off-street bicycle trails in the creek corridors, school access by students would be tremendously enhanced.

7.4 Transportation Demand Management

The concept of Transportation Demand Management, or TDM, denotes the implementation of programs and policies to attract people to use modes of travel other than the single occupant auto for their travel, at least to their workplace. This strategy is an integral component of the Oregon State Transportation Planning Rule. Many TDM strategies are instituted or are suppported by employers. There is very limited application of TDM strategies by existing employers or businesses in Woodburn.

There are several potential TDM strategies that could have greater application in Woodburn. The characteristics of each strategy are discussed below (refer to Table 10 for a summary).

7.4.1 Transit Fare Subsidies

With the current transit system in Woodburn, and the potential for transit system expansion in the future, there will be an opportunity for employers to encourage their employees to ride transit to/from work by helping subsidize bus passes. Woodburn Transit today has no subsidy program for regular riders. Many jurisdictions or transit agencies operating bus services have instituted a partial subsidy program, with employees either receiving discounted bus passes or being reimbursed by their employer for actual bus fares.

7.4.2 Carpool Matching Programs

Likewise employers can sponsor carpool matching programs where a service is provided to match employees who live close to one another and on the same shift such that they can carpool together to and from work. In some cases, employers might actually purchase company vans which can be issued to certain employees who become designated vanpool drivers.

7.4.3 Carpool Parking Programs

An employer can also designate certain close up parking spaces to their building for recognized carpools or vanpools. The City of Woodburn could carry this a step further by instituting an ordinance that would reduce parking requirements for new developments if a certain number of parking spaces were reserved for carpools/vanpools. This parking limitation concept typically would encompass an overall employer ridesharing program including carpool matching programs and transit subsidies.

7.4.4 Flexible Work Hours

As most of the traffic congestion in an urban area occurs during commuter peak hours, employer provisions for flexible work hours will allow spreading of the peak hour during a weekday thus reducing congestion for any given peak period.

7.4.5 Telecommuting

Finally with the development of computers and communication software, including the Internet, it is becoming increasingly attractive for employers and businesses to allow their employees opportunities for telecommuting on their jobs, or to conduct other business. This in general reduces the number of vehicle trips on the street system.

7.4.6 Pedestrian/Transit-Oriented Development

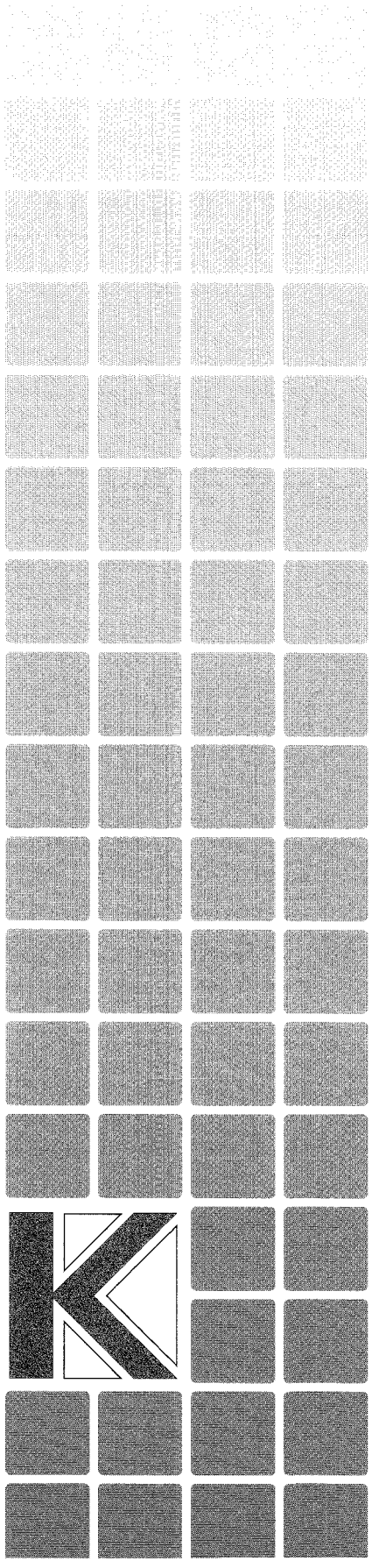
The development of more pedestrian and transit-oriented developments, through added and direct sidewalk connections, bus stop provisions, and proper building orientation, can attract more local trip making to these developments via non-auto modes, thus serving as TDM strategies to an extent.

Table 10

Comparison of Transportation Demand Management Strategies

TDM Strategy	Development Applicability	Site Design Consideration	Impact Category			
			Employer Policy	Developer/ Employer Parking Reduction Incentives	Cost	Potential Impact on Trip Reduction
Transit Fare Subsidies	C, S, O, I	NO	YES	YES	Could be substantial pending employer interest & level of subsidy	Limited until bus service is expanded
Carpool Matching Program	C, S, O, I	NO	YES	YES	Minimal	Fairly high if combined with preferential carpool parking
Carpool/Bicycle Parking Program	C, S, O, I	YES	NO	YES	Minimal if tied to parking reduction strategy	Fairly high if combined with carpool matching program
Flexible Work Hours	C, S, O, I	NO	YES	YES	Minimal	Impact on reducing peak hour congestion
Telecommuting	S, O	NO	YES	MAYBE	Minimal	Limited currently
Direct Pedestrian/Bus Stop Connections from Adjacent Development	C, S, O, I	YES	NO	YES	Minimal with proper site planning	Fairly high if tied to other TDM measures

C - Commercial, S - Services, O - Office, I - Industrial



Section 8

Highway 219/214 & 99E Access Management Analysis

8.0 Highway 219/214 & 99E Access Management Analysis

8.1 Introduction

The Oregon Highway Plan (OHP), adopted in June 1991, contains policies and strategies that will guide the Oregon State Highway Division's (OSHD) operating and fiscal activities during the 1991-2010 period. With implementation of the plan, the State will be able to maintain quality highways and bridges that are safe and cost-effective and provide efficient access throughout the state. One component of the Plan is the Access Management Policy, which is a long range policy intended to develop guidelines for the control of access (driveways, public roads and traffic signals) onto State facilities. This section of the TSP describes the Access Management Analysis performed on Highway 219/214 between the west city limits and Settlemier Avenue, and on Highway 99E between Lincoln Street, and the south terminus of the previous ODOT road improvement project on Highway 99E. The access management analysis includes a description of:

- the State Highway Access Management Guidelines;
- the methodology used to evaluate existing access conditions; and
- an analysis of existing access to Highway 219/214 and Highway 99E.

8.2 State Highway Access Management Plan Guidelines

The Access Management Policy guidelines of the OHP address the fact that, as communities have developed adjacent to state highways, the highways are no longer serving simply regional or interstate travel. In addition, some state facilities are serving a relatively high volume of local trips traveling to and from local services. The higher intensity of driveways, intersections, and traffic signals providing access to these local services has affected the safety, efficiency, and capacity of state highways.

The Access Management Policy guidelines categorize all state highways, including Highway 99E and Highway 219/214, based on a functional hierarchy in terms of Level of Importance (LOI). The four LOI categories are:

- **Interstate**: Providing connections between major cities, regions of the state, and other states.
- **Statewide Highways**: Providing access to larger urban areas, recreational areas, and the interstate system.
- **Regional Highways**: Providing connections to areas within regions of the state, between small urban areas and larger urban areas, as well as connections to higher level facilities.
- **District Highways**: Serving local traffic and land access, and having a relatively low level of significance from a statewide perspective.

The Access Management Policy guidelines also define for each LOI category guidelines for the management of access and traffic control. Table 11 summarizes the Access Management Policy.

Table 11

Oregon State Highway Access Management Classification System

Cat.	Access Treatment	Level of Importance	Urban/ Rural	Intersection				Signal Spacing	Median Control
				Public Road		Private Drive			
				Type	Spacing	Type	Spacing		
1	Full Control (Freeway)	Interstate/ Statewide	U R	Interchange Interchange	2-3 Mi. 3-8 Mi.	None None	NA NA	None None	Full Full
2	Full Control (Expressway)	Statewide	U R	At grade/intch At grade/intch	1/2-2 Mi. 1-5 Mi.	None None	NA NA	1/2-2 Mi. None	Full Full
3	Limited Control (Expressway)	Statewide	U R	At grade/intch At grade/intch	1/2-1 Mi. 1-3 Mi.	Rt Turns Rt Turns	800' 1200'	1/2 Mi. None	Partial Partial
4	Limited Control	Statewide/ Regional	U R	At grade/intch At grade/intch	1/4 Mi. 1 Mi.	Lt/Rt Turns Lt/Rt Turns	500' 1200'	1/2 Mi. None	Partial/None Partial/None
5	Partial Control	Regional/ District	U R	At grade At grade	1/4 Mi. 1/2 Mi.	Lt/Rt Turns Lt/Rt Turns	300' 500'	1/4 Mi. 1/2 Mi.	None None
6	Partial Control	District	U R	At grade At grade	500' 1/4 Mi.	Lt/Rt Turns Lt/Rt Turns	150' 300'	1/4 Mi. 1/2 Mi.	None None

Source: Oregon Highway Plan, ODOT, adopted 1991, pg. B-6

For each of these categories, the Access Management Policy guidelines also differentiate between Urban and Rural roadways. For both Urban and Rural roadways in each category, the guidelines specify the minimum spacing of public roads, private driveway spacing, and traffic signals along state highways. The Access Management Policy also addresses the type of intersections which can be built (at grade or interchange), and whether or not a median can be installed on the state highway. The state expects that these guidelines will be implemented as part of land development/redevelopment projects or roadway improvements projects on state highway corridors. Also, the Access Management Policy guidelines will be implemented to ensure that every property has access to a public road facility.

As an outcome of discussions between ODOT, and the city of Woodburn staff, it was determined that Highway 219/214 between the west city limits and Settlemier Avenue, and Highway 99E between Lincoln Street and the south city limits do "provide for efficient and safe medium to high-volume traffic movements on intercity, intracity, and inter-community routes. There is a reasonable balance between direct access and mobility needs within this category"[1]. Thus, these facilities should be categorized as Category 5 Urban. According to Table 10, on Category 5 Urban roadways:

- public roads should be spaced at least 1/4 mile apart;
- private driveways should be spaced at least 300 feet apart (which converts to approximately 18 driveways/mile on one side of the roadway); and

1 ODOT, Oregon Highway Plan, 1991, p. B-4

- traffic signals should be spaced at least 1/4 mile apart.

8.3 ODOT/City of Woodburn Access Management Agreement

In 1991, ODOT and the City of Woodburn entered into an agreement to implement an access management policy for state highway facilities within the City of Woodburn. The policy focused on three sections of roadway:

- Highway 99E from the north City limits to Lincoln Avenue;
- Highway 214 from the Front Street overpass to Highway 99E; and
- Highway 211 from Highway 99E to Cooley Street.

The purpose of the policy was to identify standards and procedures to preserve the capacity of state highway facilities in Woodburn, to carry traffic efficiently at a high level of service under safe conditions. The policy addressed criteria for public street intersection and driveway spacing and access restrictions, shared access between properties, and access design standards. The policy also included specific access management objectives for different undeveloped or partially developed properties along these roadways, including appropriate number of access points for these parcels, and the location of these access points.

This access management policy and objectives provided guidance on the structure of the access management analysis conducted as part of the Woodburn TSP preparation for the other sections of Highways 219/214 and 99E through the City.

8.4 Methodology

The first step in the access management analysis for the Highway 219/214 and 99E segments addressed in the Woodburn TSP was a review of traffic operations characteristics (level of service, accidents, intersection) and roadway intersection improvements identified in Woodburn Transportation System Plan (TSP) Technical Memorandums #2 (Existing Conditions) and #4 (Alternatives/Needs Analysis). This information was considered in conjunction with the access and signal spacing data in order to learn if there are any locations with unacceptable levels of service, or a high incidence of accidents which may be caused by the improper location of existing driveways, public roads, or traffic signals.

Next, in order to assess compliance with the guidelines of the potential access management classifications for Highways 219/214 and 99E, an existing conditions analysis was performed. In this analysis, a field survey of the study roadways was undertaken (April 1995) which identified the location of:

- existing driveways;
- existing public roads; and
- existing traffic signals.

Table 12 summarizes existing driveway spacing on these two roadways. The spacing of these facilities was evaluated and compared to the guidelines developed in the Oregon Highway Plan, as well as the previously developed traffic operations and safety data. The intent of this analysis

Table 12

Driveway Spacing Summary

Roadway Section	Length Ft. (Mile)	Number of Driveways				Driveways per Mile			
		Existing		With Consolidation		Existing		With Consolidation	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
Highway 214									
I-5 / Evergreen Rd.	900 (0.17)	6	5	4	5	35	29	23	29
Evergreen Rd./ Oregon Way	650 (0.12)	3	6	1	5[1]	25	50	8	42
Oregon Way / Broughton Way	800[1] (0.34)	1	5	1	5	3	15	3	15
Broughton Way/ Settlemier Ave.	1,700 (0.32)	2	9	2	9[1]	6	28	6	28
Highway 99E									
Lincoln St. / Aztec Dr.	1,000 (0.19)	10	7	6[1]	4	53	37	31	21
Aztec Dr./ Laurel Ave.	1,100 (0.21)	4	3	2	3	19	14	10	14
Laurel Ave./ Highway 214	900 (0.17)	10	11	5[1]	6[1]	59	65	29	35
Highway 214 / South City Limits	1,000 (0.19)	8	7	4	5	42	37	21	26

1 Additional consolidation should occur with redevelopment of the area.

was to develop a plan for managing access to Highway 214 and Highway 99E such that regional and local trips can be made in a safe and efficient manner.

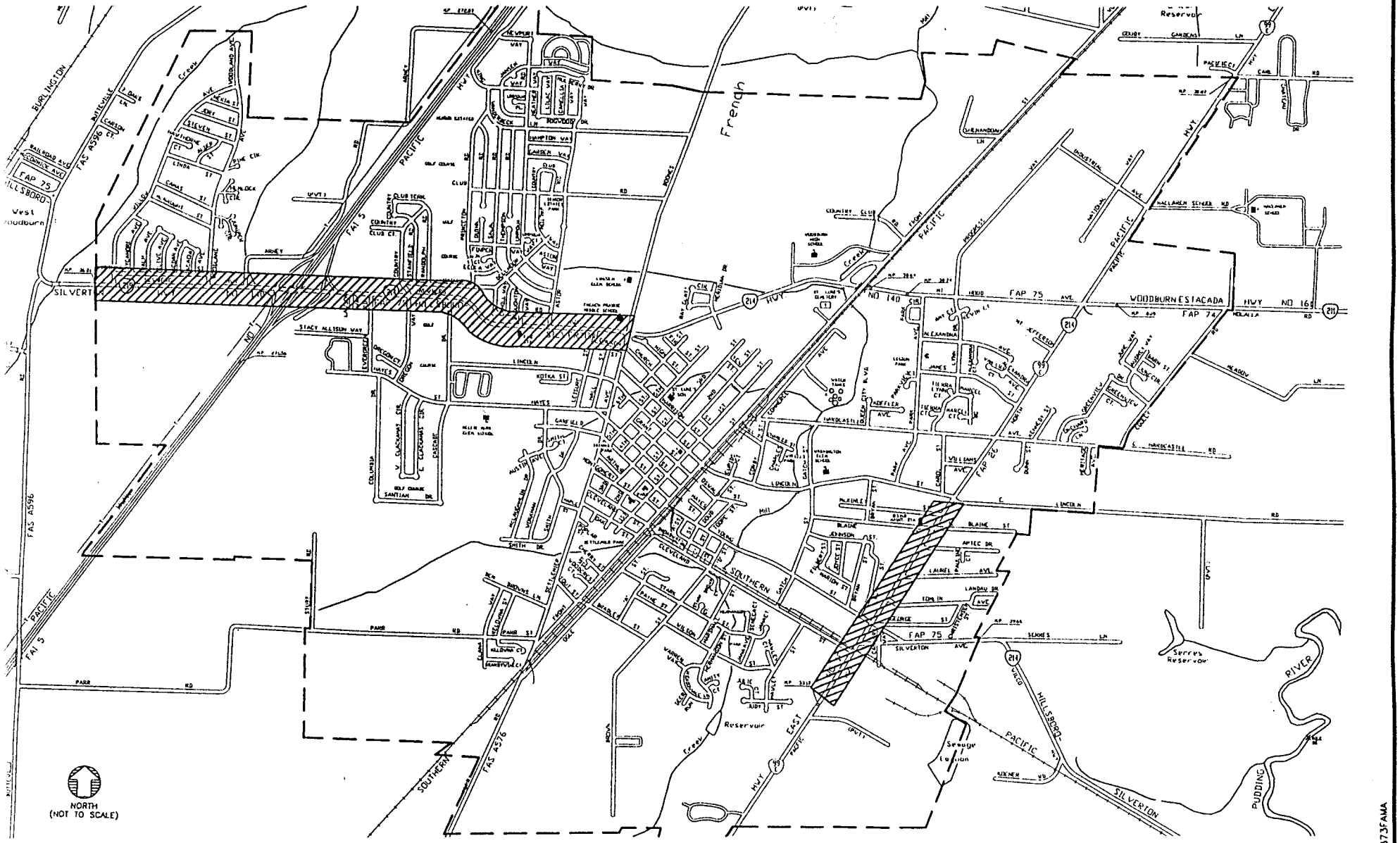
8.5 Highway 219/214 Analysis

Access to Highway 219/214 was studied between the west city limits, and Settlemier Avenue. This section of roadway is approximately 1.6 miles long. Highway 219 extends west of I-5, and Highway 214 east of I-5. In this section, Highway 219/214 is primarily a three-lane roadway consisting of one travel lane in each direction and a median lane for left turns. The Highway 219/214 study segments are summarized in Figure 25. Currently there are traffic signals at:

- the southbound I-5 ramp terminal;
- Evergreen Road;
- Oregon Way; and
- Settlemier Avenue/Boones Ferry Road.

For the purposes of the analysis, this segment of Highway 219/214 was divided into six subsections:

- Segment 1: West city limits to Woodland Road;
- Segment 2: Woodland Road to Interstate 5;
- Segment 3: Interstate 5 to Evergreen Road;
- Segment 4: Evergreen Road to Oregon Way;



ACCESS MANAGEMENT STUDY CORRIDORS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
25

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- Segment 5: Oregon Way to Broughton Way; and
- Segment 6: Broughton Way to Settlemier Avenue/Boones Ferry Road.

A review of ODOT accident data (1990 - 1993) showed that, on average, eight accidents per year occurred on Highway 214 between the west City limits and I-5 (0.58 miles). This equates to an accident rate of 6.0 accidents per million vehicle miles. The statewide average for similar types of roads is 3.6 accidents per million vehicle miles.

Between I-5 and Boones Ferry Road (1.06 miles), the accident rate for the same period is 3.3 accidents per million vehicle miles. This rate is lower because of the longer roadway section, and the low incidence of accidents east of Evergreen Road. The majority of the accidents occurred in the westerly one-half mile of this segment.

8.5.1 Segment 1: West City Limits to Woodland Road

Traffic Operations

Under existing conditions, the intersection of Woodland Road/Highway 219 operates at LOS B. Over the three year study period summarized in Technical Memorandum #2 (1992, 1993, and 1994), there were five accidents at both the intersections of Woodland and Willow Avenues.

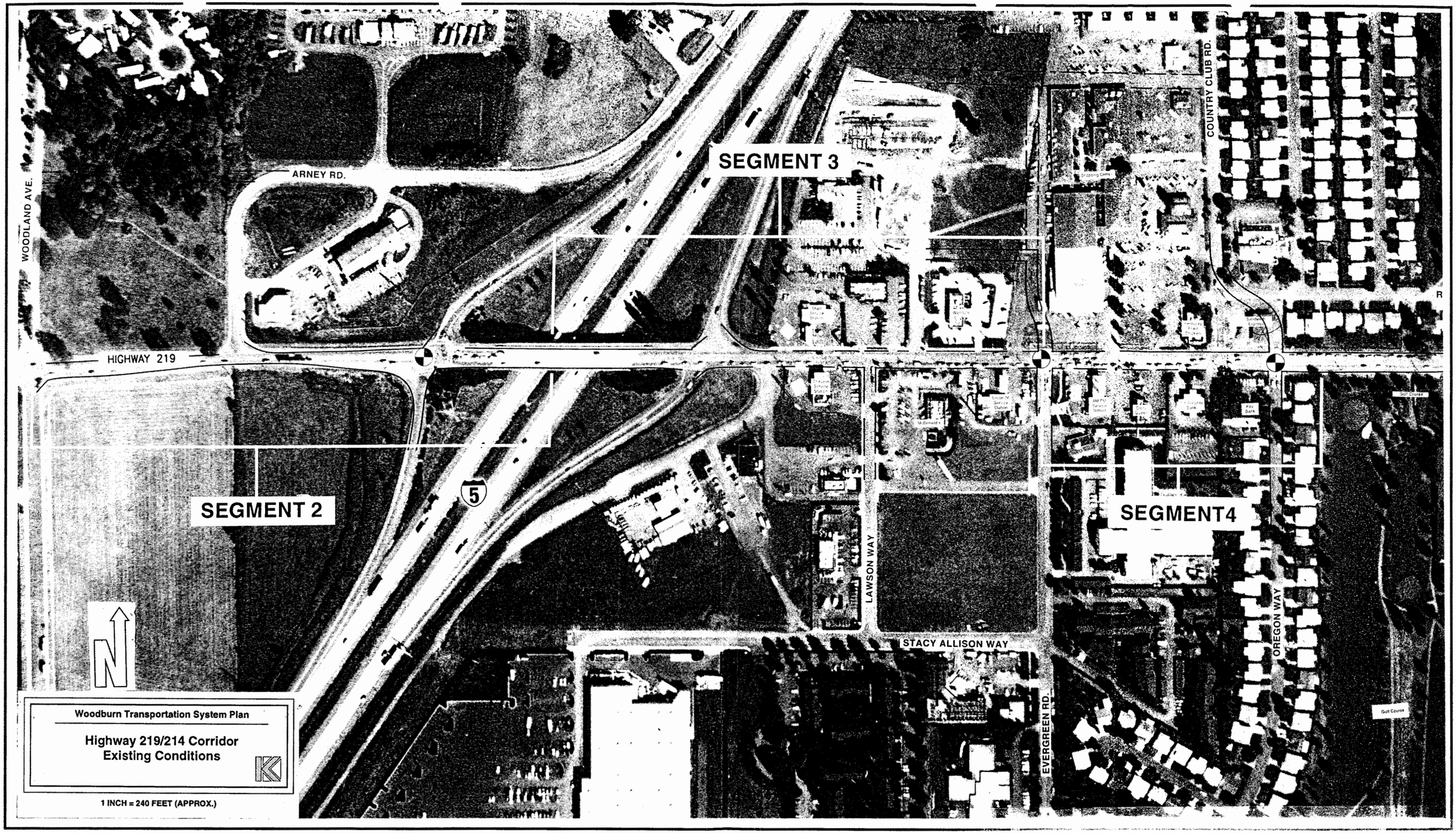
In the future (2015) it is expected that approximately 15,000 vehicles per day will travel on this segment of Highway 219. Currently, approximately 9,500 vehicles per day travel on this section of roadway.

Because of this higher volume of traffic, and in order to maintain acceptable traffic operations, the City plans to extend Arney Road to Woodland Road, with the existing Arney Road intersection converted to a right-in right-out intersection, and a traffic signal installed at Woodland Road.

Access Issues and Potential Modifications

Existing access conditions in this road segment are shown in Figure 26. The segment of Highway 219 between the west city limits and Woodland Road is approximately 1/4 mile in length and is in the early stages of light industrial/warehouse development on the south side of Highway 219, west of Woodland Road. Access to this 100+ acre industrial site is via Woodland Road south of Highway 214. As this area develops, an internal road system should be created to provide access to the parcels and circulation to Woodland Road. It appears that a curb cut could be provided at the westerly end of this property, approximately 1,200 feet west of Woodland Road to provide a secondary access into and out of the industrial/warehousing area. The area to the north of Highway 219, between Woodland Road and the west city limits, is primarily residential. As this area redevelops, care must be taken to control access along this portion of Highway 219 and provide the major access to this area via Woodland Road.

Since in this section of roadway, with the exception of the public roadways, there is no direct private access onto Highway 219, the driveway density is equal to zero. Thus, related to driveway density, there are no issues in developing compliance with the Oregon Highway Plan Access Management Policy.



HIGHWAY 219/214 EXISTING ACCESS
WEST CITY LIMITS TO OREGON WAY

CITY OF WOODBURN TRANSPORTATION SYSTEM PLAN	FIGURE 26
JUNE 1996	

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8.5.2 Segment 2: Woodland Road to Interstate 5

Traffic Operations

Under existing conditions, approximately 9,500 vehicles per day use this section of roadway. In the future it is forecast that 23,000 vehicles per day will use this segment. In order to accommodate this volume of traffic, it is expected that in the future, Arney Road will be extended to Woodland Road, and the existing Arney Road intersection will be converted to a right-in-right-out intersection. The previous alternatives/needs analysis (Technical Memorandum #4) also showed that in the future, if the existing diamond interchange configuration is maintained, the southbound I-5 ramp and Highway 214 bridge over I-5 will need to be widened to include second left turn lanes on the southbound and westbound approaches, with the Highway 214 eastbound approach also widened to include an additional through lane and a right turn lane.

Considering the OHP Access Management Policy, it is important to note that signals at the Woodland Road/Highway 214 and southbound I-5/Highway 219 intersection, will be approximately 1,150 feet apart. This separation is slightly less than the 1,320 foot (1/4 mile) separation called for in Category 5 of the Access Management Policy (see Table 11). Given the signal spacing in this section, and in other sections of Highway 214, as traffic signals are installed on Highway 219/214 it will be necessary to perform a detailed corridor operations analysis to verify that traffic operations with the traffic signals will be acceptable, in particular accommodating vehicle progression through a series of signals east and west of I-5.

Access Issues and Potential Modifications

Highway 219 between Woodland Road and I-5 is approximately 1,150 feet in length with no private driveways in this segment. The only access in this section of roadway is Arney Road, which intersects from the north approximately equal distance between the southbound I-5 ramp intersection and Woodland Road. Arney Road serves some freeway commercial development north of Highway 219 and a significant amount of undeveloped commercially-zoned land north of Highway 219.

As there are no existing driveways in this section, the driveway density is equal to zero, which clearly meets the guidelines for Category Urban 5 of less than 18 driveways per mile (see Figure 26). It is expected that no driveways will be added in this segment in the future.

8.5.3 Segment 3: Interstate 5 to Evergreen Road

Traffic Operations

Under existing conditions, during the peak traffic periods, this is a very congested section of Highway 214, with one of the poorest intersections within the City of Woodburn identified at the intersection of the northbound I-5 ramps and Highway 214. Significant vehicle queuing occurs at this intersection as well as at the intersection of Highway 214 with Evergreen Road. Currently approximately 19,500 vehicles per day travel on this section of roadway. In the future it is forecast that as many as 35,000 vehicles per day will travel on this segment.

In the near future, it is recommended that the northbound Interstate 5 ramps/Highway 214 intersection will be signalized. A signal is warranted at this location based on existing traffic volume. This intersection is approximately 900 feet west of the intersection of Evergreen Road/Highway 214, which is currently signalized. In this case, these two traffic signals would be spaced closer than the 1/4 mile spacing standard called for in Category 5 of the OHP Access Management Policy. In addition, a traffic signal at the northbound I-5 ramps would be spaced approximately 750 feet from the existing traffic signal at the I-5 southbound ramps. This spacing is also less than the 1/4 mile spacing specified in the Access Management Policy guidelines. A detailed signal operations analysis in this corridor (Evergreen Road to Woodland Road) is necessary to verify that with traffic signals installed at Woodland Road, and the northbound I-5 ramps, acceptable traffic progression can be maintained.

The accident analysis revealed that there were 29 accidents during the three year study period at the I-5 ramps onto and off of Highway 214. This incidence of accidents is most likely caused by the congestion, queuing, and low sight distance for vehicles turning onto northbound I-5 from westbound Highway 214. With an improved interchange, it is likely that the incidence of accidents will decrease.

Access Issues and Potential Modifications

This segment of Highway 214 is approximately 900 feet in length and is highly developed with freeway commercial uses. On the south side of Highway 214, there are five driveway locations along this segment serving three businesses (see Figure 26). Two of the three businesses are service stations which, as currently developed, require two driveways at each site for circulation. The public street access located approximately 200 feet east of the northbound I-5 ramp intersection, serving the property south of Highway 214, should be closed, with an internal street connection to Stacy Allison Way to direct site traffic to Oregon Way.

On the north side of Highway 214 through this section, there are six driveways serving three businesses adjacent to Highway 214. In addition, there are two major access points serving development located 400-500 feet north of Highway 214. It is recommended that two of the six driveways along this segment of Highway 214 be closed. The public access serving the property to the north of Highway 214 was recently realigned to intersect Highway 214 directly across from Evergreen Road. With this local access relocation complete, it would be possible to develop an east/west roadway parallel to Highway 214 on the north side to intersect with the new roadway being constructed opposite Evergreen Road (see Figure 26). Consideration should be given to extending this access road east of Evergreen Road parallel to Highway 214 to intersect with Country Club Road.

Under existing conditions, on the north side of Highway 214, there are approximately 35 driveways per mile); on the south side of Highway 214 there are approximately 29 driveways per mile (see Table 10). In both cases the driveway density exceeds the guidelines outlined in the Access Management Classification System. On the north side of Highway 214, if driveways are consolidated as described, driveway density would decrease to 23 driveways per mile which is closer to the Access Management Policy guidelines.

8.5.4 Segment 4: Evergreen Road to Oregon Way

Traffic Operations

This section of Highway 214 operates in a similar fashion to the previously described section. During the peak period there is a great deal of congestion and vehicle queuing at the major intersections. The Highway 214/Oregon Way/Country Club Road is a signalized intersection, separated from Evergreen Road by 650 feet. As previously shown in Table 11, this spacing is less than the Oregon Highway Plan guidelines of 1,320 feet for a Category 5 Urban roadway.

Over the three year accident analysis period, there were 12 accidents at Evergreen Road, eleven accidents at Country Club Road, and five accidents at Oregon Way. These accidents were most likely caused by the close proximity of the intersections, the offset alignment of Country Club Road and Oregon Way, as well as the congestion in the area. The recent realignment of Country Club Road and Oregon Way into a single intersection should reduce the incidence of accidents in this segment in the future.

Access Issues and Potential Modifications

This segment of Highway 214 is approximately 650 feet in length and is developed with freeway commercial uses. Traffic signals are located at the Evergreen Road and Oregon Way/Country Club Road intersections. On the south side of Highway 214 there are six driveways serving four separate properties. There is one shared driveway between a service station and the Dairy Queen on the south side of Highway 214. The most easterly driveway on this segment of Highway 214 should be consolidated with the adjacent driveway in order to remove this driveway from the influence of the Country Club Road/Oregon Way intersection.

On the north side of Highway 214 through this segment, Country Club Road was recently realigned to intersect Highway 214 at Oregon Way. There are two private driveways along this segment of Highway 214. In addition to these two driveways the Old Country Club Way intersection should be closed associated with the Country Club Road realignment. This public street intersection is within 150 feet of Oregon Way and is well within the influence of the Highway 214/Oregon Way intersection. In addition, the driveway which currently exists between the Old Country Club Way intersection and the new realigned Country Club Road intersection should also be closed. This property is best served from the north realigned off of Country Club Road. No other driveway relocations are recommended at this time. Figure 23 shows the existing driveway spacing in this section of Highway 214.

Under existing conditions, as shown again in Table 12, driveway density on the north side of Highway 214 is 25 driveways per mile; and on the south side the driveway density is approximately 50 driveways per mile. In the future, if driveways are consolidated as identified, the north side driveway density would decrease to eight driveways per mile which would meet Access Management Policy guidelines. The south side driveway density would decrease to 42 driveways per mile, which is still relatively high.

8.5.5 Segment 5: Oregon Way to Broughton Way

Traffic Operations

Under existing conditions, average daily traffic (ADT) on this segment of roadway is 17,000 vehicles per day. In the future, it is forecast that average daily traffic will grow to 33,000 vehicles per day. The recent accident analysis showed no accidents in this segment during the three year study period.

Access Issues and Potential Modifications

This segment of Highway 214 is approximately 1,800 feet in length and is well defined with curbing on both the north and south sides of the road (see Figure 27). There is a sidewalk along the entire south side. Within this section, the only access to Highway 214 is Cascade Drive, located on the south side of the road approximately 700 feet east of Oregon Way. It is expected that when the now vacant commercially-zoned parcel at the southwest corner of the intersection of Highway 214/Cascade Drive develops, access to this property will be provided via Cascade Drive. In the 600 feet of Highway 214 just east of Cascade Drive, there are four driveways on the south side of Highway 214. Three of these driveways serve the Woodburn Fire Station, with a fire truck-actuated signal at one driveway. One of these access points is a curb cut to vacant commercially-zoned land.

The north side of Highway 214 between Oregon Way and Broughton Way has no local access except for a 50 foot curb cut approximately 280 feet east of Cascade Drive (see Figure 27). This 50 foot curb cut serves a small triangular vacant commercially-zoned property which is land-locked because of residential development directly to the north. Although this driveway meets the current standards for driveway spacing, care must be taken as this property develops to ensure adequate sight distance and internal circulation on the property.

Under existing and future conditions, driveway density in this section of Highway 214 satisfies the OHP Access Management Policy (see Table 12).

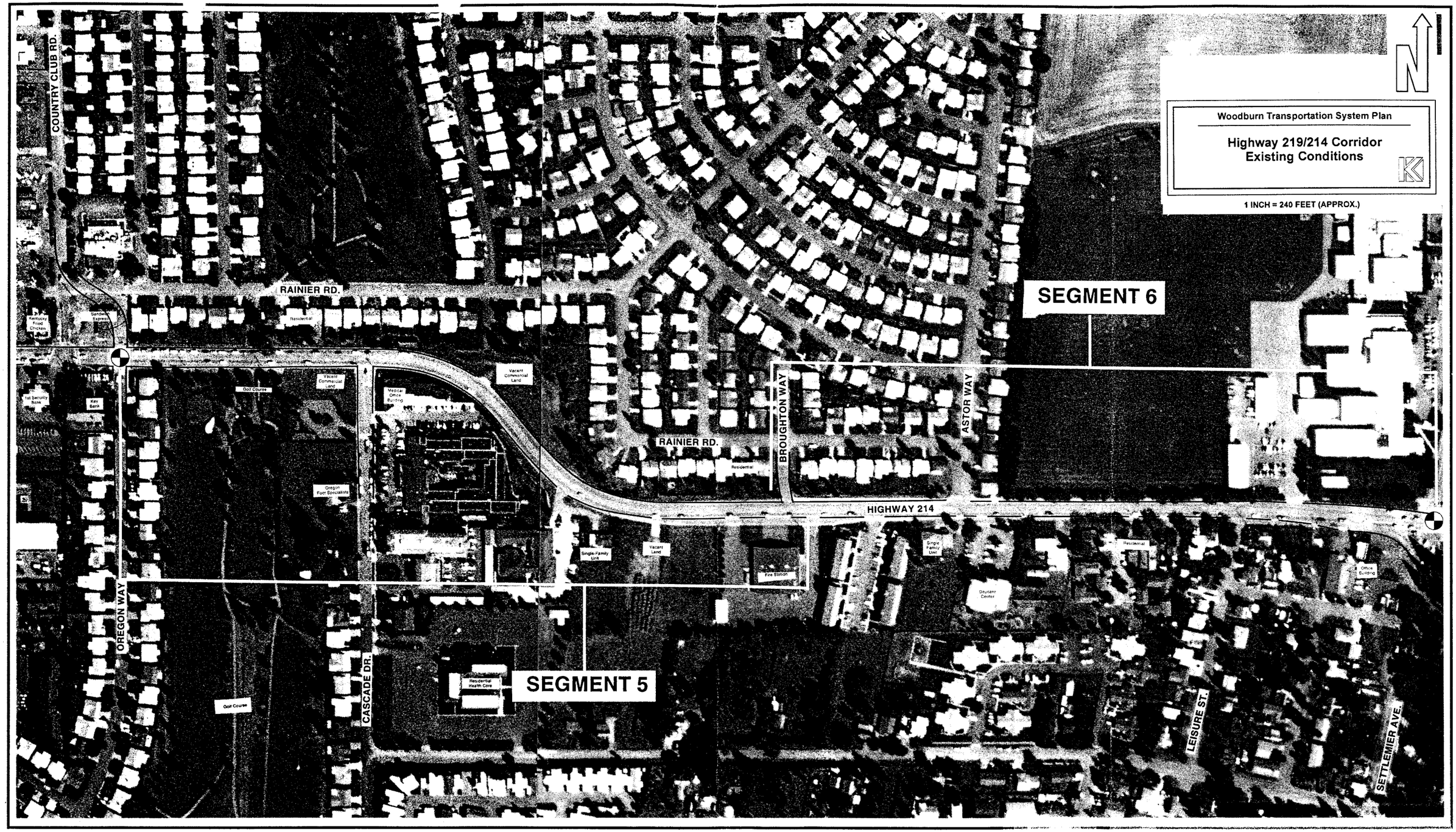
8.5.6 Segment 6: Broughton Way to Settlemier Avenue/Boones Ferry Road

Traffic Operations

The average daily traffic on this segment, under existing and future conditions it approximately the same as the previous section. Currently the average daily traffic is 17,000 vehicles per day, and this is expected to grow to 33,000 vehicles per day. Under existing conditions the intersection of Highway 214/Settlemier Avenue/Boones Ferry Road operates at level of service C. It is anticipated that in the future, with improvements made to the signal timing and lane channelization, this intersection will operate at LOS E.

The traffic signal spacing between this intersection and those traffic signals adjacent to it is greater than the quarter mile spacing called for in the Access Management Policy guidelines.

The accident review showed that during the three year study period, 1992-1994, there were 18 accidents at this intersection. Compared to other intersections in Woodburn, this is a relatively high incidence of accidents. Most likely, the incidence of accidents can be reduced by restriping



Woodburn Transportation System Plan

Highway 219/214 Corridor Existing Conditions

1 INCH = 240 FEET (APPROX.)

HIGHWAY 214 EXISTING ACCESS OREGON WAY TO SETTLEMIER AVE./BOONES FERRY RD.

CITY OF WOODBURN TRANSPORTATION SYSTEM PLAN JUNE 1996	FIGURE 27	

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the southbound approach to the intersection to include one left turn lane, one through lane and one right turn lane (as recommended in Woodburn TSP Technical Memorandum #4).

Access Issues and Potential Modifications

This segment of Highway 214 is over 1,700 feet in length and includes one public street access, Astor Street, on the north side of Highway 214, and one public street access, Leisure Street, on the south side of Highway 214 (see Figure 27). In addition to Leisure Street on the south side of Highway 214, there are nine private driveways in this 1,700 foot section. There are four single family residential units in this section, one office building, a children's day care center and an apartment complex.

As the south side of the road develops in the future, it could be possible to eliminate four of the five residential driveways in the vicinity of Leisure Street. In addition, the two driveways serving single family homes across from Astor Way could be consolidated into one driveway in the future. Prior to redevelopment, driveway density will remain at 28 driveways per mile (see again Table 12), which exceeds the Access Management Policy guidelines.

On the north side of Highway 214 between Broughton Way and Settlemier Avenue/Boones Ferry Road, there are two private driveways. Generally, the area is developed with residential properties which front on a street parallel to Highway 214, and with the remaining portion of Highway 214 fronting on the golf course. One single family residential driveway exists near Astor Street near the north side of Highway 214, and a second driveway serving commercial property is located 110 feet east of Leisure Way. As the driveway density is six driveways per mile (which is less than the guidelines), no additional access schemes are recommended for this segment of Highway 214.

8.6 Highway 99E Analysis

Access to Highway 99E was studied between Lincoln Street, the south terminus of the previous ODOT road improvement project along Highway 99E, to the south city limits (see again Figure 25). This section of roadway is approximately 4,000 feet long. Through this section, the highway consists of undefined driveway locations with a few short sections recently reconstructed with curb and sidewalks. Also through this section, Highway 99E is a five-lane roadway section with scattered older commercial development along its entire length. This area is expected to redevelop in the future. As this redevelopment occurs, care must be taken to improve the delineation of driveways, and in some cases, consolidate or close existing driveways.

Currently there are traffic signals at the intersections of Highway 99E with:

- Lincoln Street, and
- Young Street (Highway 214).

For the purposes of this access analysis, Highway 99E was divided into five subsections:

- Segment 1: Lincoln Street to Aztec Street,
- Segment 2: Aztec Street to Laurel Street,
- Segment 3: Laurel Street to Highway 214,

- Segment 4: Highway 214 to Cleveland Street, and
- Segment 5: Cleveland Street to South City Limits.

Highway 99E between Highway 161/Highway 214 and Highway 214 is 1.17 miles long (longer than the limits of the access management study corridor). In this segment of roadway, the ODOT accident data for the period (1990 - 1993) showed a steady decline in the number of accidents per year in this segment of roadway. The calculated accident rate for 1993 was 2.6 accidents per million vehicle miles. This rate is below the statewide average rate for similar road segments of 3.6 accidents per million vehicle miles.

8.6.1 Segment 1: Lincoln Street to Aztec Drive

Traffic Operations

Under existing conditions, average daily traffic on this segment is approximately 21,000 vehicles per day. In the future it is forecast that average daily traffic will grow only slightly to 22,000 vehicles per day. Currently the intersection of Lincoln Street/Highway 99E operates at LOS C or better.

The traffic signal at Lincoln Street is approximately 3,000 feet away from the traffic signal at Young Street which exceeds the ¼ mile spacing guideline in the Access Management Policy guidelines.

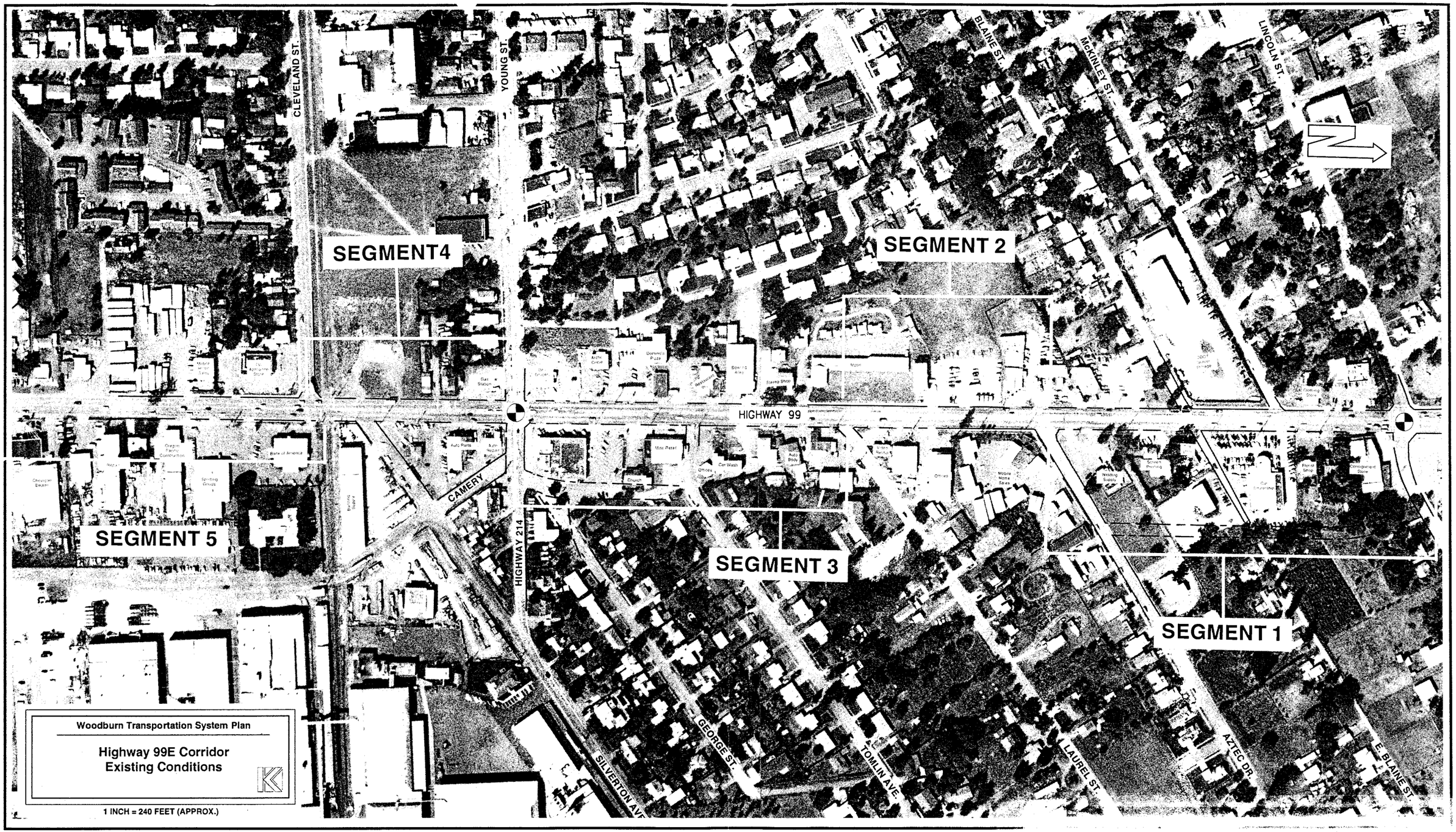
The accident analysis showed that over the three year study period, there were 14 accidents at the Lincoln Street intersection. Compared to other intersections in Woodburn, this intersection has an intermediate-level accident history.

Access Issues and Potential Modifications

This segment of Highway 99E is approximately 1,000 feet in length (see Figure 28). There are seven private driveways along the west side of Highway 99E through this segment. These seven access locations should be consolidated into no more than four private driveways in this segment. As shown in Table 12, this would decrease driveway density from 37 driveways per mile to 21 driveways per mile.

In addition, there are two public street accesses. There is little opportunity for developing parallel streets or frontage roads along the west side of Highway 99E through this segment.

On the east side of Highway 99E there are ten private driveways (53 driveways per mile) which vary in curb cut widths of 12 feet to 82 feet. The two driveways on the northeast corner of Highway 99E/Lincoln Street should be closed. One of these driveways is located within the curb return of the Highway 99E/Lincoln Street intersection which results in a very hazardous and confusing circulation for motorists in the area. The 82 foot curb cut located on the east side of Highway 99E is not usable and therefore should be closed. In addition to the two driveways on the north end of Highway 99E near Lincoln Street, two driveways in the location of Aztec Drive should be closed. If the driveway consolidation were implemented, driveway density in this section would decrease from 53 driveways per mile to 31 driveways per mile, which exceeds the Access Management Policy guideline of 18 driveways per mile.



HIGHWAY 99E EXISTING ACCESS
LINCOLN STREET TO
SOUTH CITY LIMITS

CITY OF WOODBURN TRANSPORTATION SYSTEM PLAN	FIGURE 28
JUNE 1996	

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The East Blaine Drive intersection exists approximately midway between Lincoln Street and Aztec Drive on the east side of Highway 99E. This street could be improved and extended to the east, intersecting a possible parallel frontage road to Highway 99E located approximately 300-350 feet east of Highway 99E between Lincoln Street and Aztec Drive.

8.6.2 Segment 2: Aztec Drive to Laurel Street

Traffic Operations

Existing ADT in this section of roadway is 16,000 vehicles per day. In the future it is forecast that traffic volumes will grow to 22,000 vehicles per day.

Access Issues and Potential Modifications

This segment of Highway 99E is approximately 1,100 feet in length with a majority of the west side of Highway 99E recently reconstructed with new curbs and a full sidewalk. There are three private driveways on the west side of Highway 99E in this segment. The only modification recommended in this section is possible consolidation of one driveway on the north end. Regardless of whether or not this consolidation is made, the future driveway density would satisfy the Access Management Policy guidelines (see Table 12).

Nearly 300 feet of frontage on the east side of Highway 99E, south of Aztec Drive, has been reconstructed with a new curb and sidewalk. No private driveways exist in this segment. South of the end of the new curb and sidewalk to Laurel Street, there are four private driveways in this approximately 700 foot section. Two of the four driveways could be closed and access to the properties provided via Laurel Street. If, as properties redevelop, driveways were consolidated, the driveway density could decrease from 19 driveways per mile to ten driveways per mile, which would satisfy the OHP Access Management Policy guidelines.

In addition, there is potential for developing an east side frontage road parallel to Highway 99E between Aztec Drive and Laurel Street. This frontage road would be a definite benefit to the area, particularly as the area redevelops.

8.6.3 Segment 3: Laurel Street to Highway 214

Traffic Operations

Existing average daily traffic in this area is 16,000 vehicles per day. Similar to the previous segment, it is expected that this traffic volume will grow to 22,000 vehicles per day.

Under existing conditions, the intersection of Highway 99E/Highway 214/Young Street operates at LOS C or better. In the future it will be necessary to construct an extended exclusive westbound right turn lane in order to ensure acceptable traffic operations. With the modified lane striping, it is forecast that the intersection will operate at LOS D.

The incidence of accidents at this intersection is relatively high. During the study period there were 41 accidents at this intersection; second only to the intersection of Highway 99E/Highway 214/Highway 211 where there were 58 accidents during the three year study period.

The intersection of Highway 99E/Highway 214/Young Street is a signalized intersection. This intersection is located approximately 3,000 feet south of the Lincoln Street traffic signal.

Access Issues and Potential Modifications

This section of Highway 99E is approximately 900 feet in length. Much of the curb and curb cuts in this area are in disrepair or non-existent. There are eleven private driveways on the west side of Highway 99E between Laurel Street and Highway 214. These private driveways vary in width from 25 to 84 feet. Five of the eleven driveways could be eliminated or consolidated by means of a shared access. There is adequate set back in many of the businesses through this area that will allow some internal circulation between properties. This study section has the highest driveway density of all the study segments: there are 65 driveways per mile. In the future, if driveways are consolidated the driveway density could decrease to 35 driveways per mile (Table 12).

There are ten private driveway locations on the east side of Highway 99E between Laurel Street and Highway 214. In addition, Tomlin Street exists approximately midway between Laurel Street and Highway 214. The curb cuts for the private driveways vary between ten and 35 feet in width. Five of the ten driveways could be closed or consolidated with adjacent driveways without major impact to the business operation in this area. In addition, some curb and sidewalk installation is required on Highway 214, east of Highway 99E. The curbing is required to delineate and reduce the wide access that exists east of Highway 99E and north of Highway 214. Consideration should be given to developing a parallel frontage road to Highway 99E between Highway 214 and Laurel Street in the future as this area begins to redevelop.

This section has the second highest driveway density of all study segments. Currently, there are 59 driveways per mile. If the driveways were consolidated in the future, the density could decrease to 29 driveways per mile, which still exceeds Access Management Policy guidelines for Category 5 roadways.

8.6.4 Segment 4: Highway 214 to Cleveland Street

Traffic Operations

Currently, no accident, or traffic level of service problems have been identified in this segment. Existing average daily traffic is 11,000 vehicles per day. In the future, average daily traffic will grow to approximately 18,000 vehicles per day. If the South Arterial is constructed, it can be expected that there will be still higher traffic volumes in this segment.

Access Issues and Potential Modifications

This section of Highway 99E is approximately 550 feet in length. The only development on the west side of Highway 99E in this section consists of a card lock gas station at the southwest corner of Highway 99E and Highway 214 and a converted motel/apartment complex immediately south of the gas station. There is some vacant developable land between the motel/apartments and the railroad. There are five private driveways on this 550 foot section of Highway 99E. One private access, to the gas station, is not usable with the current layout in the area. In addition, there are two accesses to the vacant portion of land just north of the

railroad track. As this land develops it appears reasonable that the major access should be across from Silverton Avenue. However, this may result in some safety problems due to the close spacing between the access and the railroad.

There are three private driveways located on the east side of Highway 99E between Highway 214 and Cleveland Street. These three driveways occur between Highway 214 and Silverton Avenue, and they serve commercial development. Two of these three driveways could be closed without impacting existing commercial operations. A formal curb should be developed on Silverton Avenue east of Highway 99E providing some separation between Highway 99E and the access to this property.

8.6.5 Segment 5: Cleveland Street to South City Limits

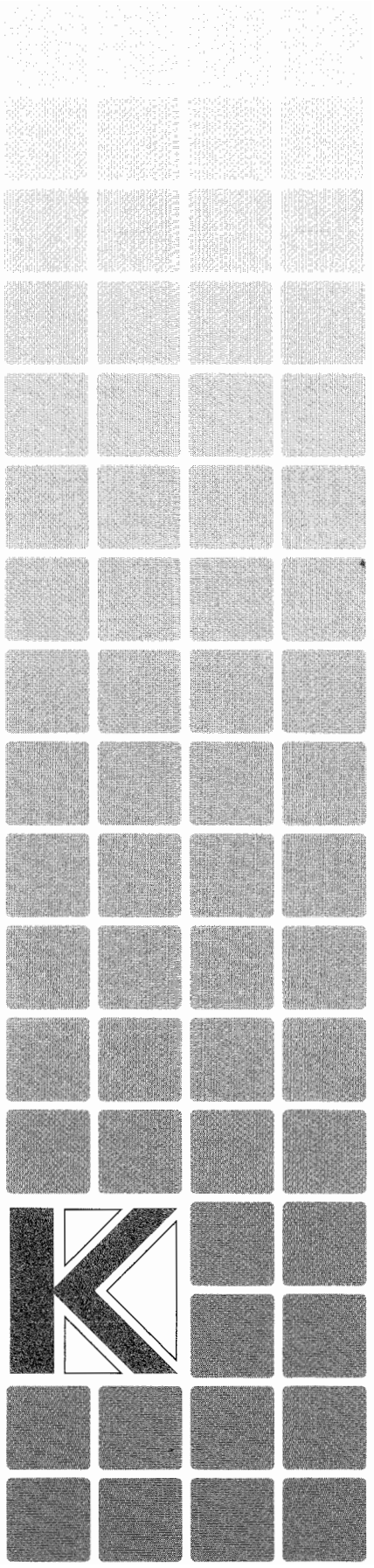
Traffic Operations

Similar to the previous study segment, currently no traffic level of service or safety problems have been identified in this segment of roadway. The existing and future average daily traffic volumes are similar to the previous section: 11,000 and 18,000 vehicles per day respectively. It can be expected that with the construction of the South Arterial, more traffic will use this segment of roadway and traffic conditions will change.

Access Issues and Potential Modifications

This section of Highway 99E is approximately 550 feet in length. The only development on the west side of Highway 99E in this section consists of a card lock gas station at the southwest corner of Highway 99E and Highway 214/Young Street and a converted motel/apartment complex immediately south of the gas station. There is some vacant developable land between the motel/apartments and the railroad. There are five private driveways on this 550 foot section of Highway 99E. One private access, to the gas station, is not usable with the current layout in the area. In addition, there are two accesses to the vacant portion of land just north of the railroad. As this land develops it appears reasonable that the major access should be across from Silverton Avenue. However, this may result in some safety problems due to the close spacing between the access and the railroad.

There are three private driveways located on the east side of Highway 99E between Highway 214 and Cleveland Street. These three driveways occur between Highway 214 and Silverton Avenue, serving commercial development. Two of these three driveways could be closed without impacting existing commercial operations. A formal curb should be developed on Silverton Avenue east of Highway 99E providing some separation between Highway 99E and the access to this property.



Section 9

Transportation System Plan

9.0 Transportation System Plan

9.1 Introduction

This section of the city of Woodburn Transportation System Plan recommends the transportation improvements needed to carry the city forward into the future. The improvements have been identified as an outcome of the existing conditions analysis, alternatives analysis, and access management analysis. In all cases the recommendations are sensitive to the adopted goals and policies of the City of Woodburn staff and Transportation Task Force.

9.2 Roadway Plan

A critical component of the Woodburn TSP is an updated roadway plan, identifying an appropriate functional classification of streets and associated design standards, and new and improved streets to meet future capacity and circulation needs.

9.2.1 Functional Classification

For the updated Woodburn Transportation System Plan, the major change from the street functional classification plan in the 1985 plan was dividing the collector street designation into two categories. The first designation is a service collector, those collector streets which tend to provide more mobility than land access and thereby would tend to carry a larger volume of traffic. The second class of collector is the access street. These streets tend to provide more land access and less mobility. The traffic volume on these streets would tend to be less than on a service collector.

Specific definitions for the different street classifications in the updated functional classification plan for Woodburn is as follows:

Arterials —Streets which provide for traffic flows between activity centers.

- Major Arterial—Streets and highways which provide service to traffic entering and leaving the area and traffic to major activity centers in Woodburn.
- Minor Arterial—Streets which feed the major arterial system and support moderate length trips and service to activity centers.

Collectors—Streets which link local streets with the arterial system.

- Service Collector—Streets which provide significant linkages with arterials and tend to accommodate a higher volume of traffic.
- Access Street—Streets which provide primarily single family residential local street access and tend to accommodate lower volumes of traffic.

Local Streets—Streets whose primary function is to provide access to abutting land uses.

Figure 29 shows the functional classification plan for each of the roads within the Woodburn Urban Growth Boundary. The major street designations are as follows:

Major Arterial

Highway 219/214
Highway 99E
Highway 211

Minor Arterial

South Arterial
Boones Ferry Road/Settlemier Avenue
Front Street
Hardcastle Avenue
Young Avenue (Highway 99E to Front Street)

Service Collector

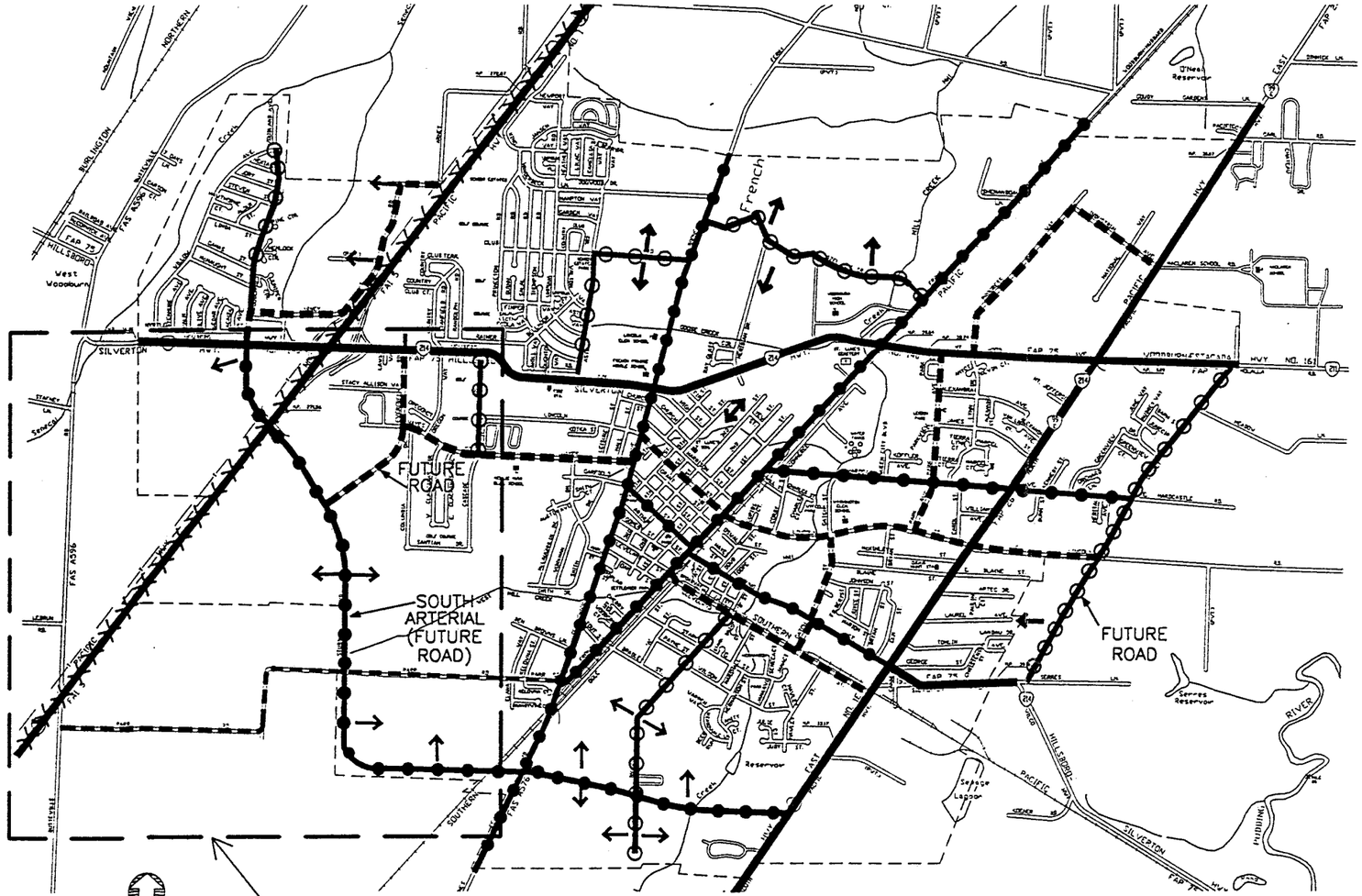
Parr Road
Lincoln Street (East City limits to Front Street)
Evergreen Road
West Hayes Street (Settlemier Avenue to Evergreen Road)
Arney Road
Progress Way/Industrial Avenue
Park Avenue (Lincoln Street to Highway 214)
Gatch Avenue (Young Street to Lincoln Street)
Cleveland Street (Highway 99E to Front Street)
Woodland Drive (Arney Road to Highway 219)

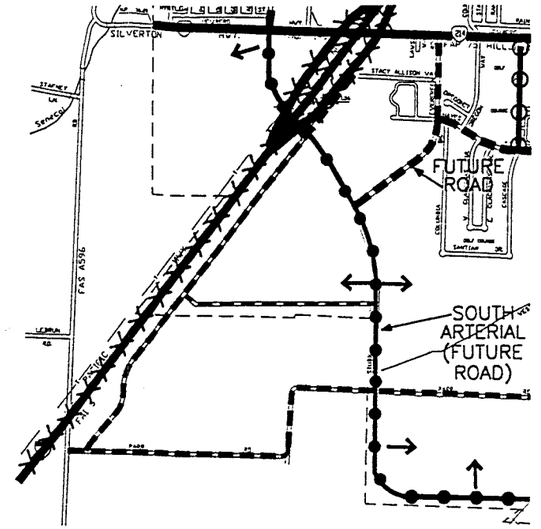
Access Street

Woodland Drive (Arney Road to Willow Avenue)
Cascade Drive (Highway 214 to West Hayes Street)
Astor Way (Country Club Road to Highway 214)
Country Club Road (Astor Way to Boones Ferry Road)
Hazelnut Drive
Brown Street (Cleveland Street to South Arterial)

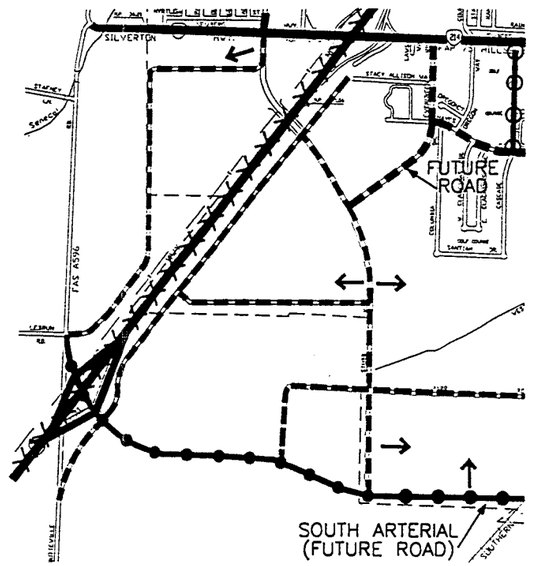
Truck traffic should be focused on Highways 219/214, 211, 99E and the future South Arterial. Any hazardous materials routing should be focused on I-5 in the north-south direction, and the South Arterial in the east-west direction. The specific alignment of the South Arterial (north or south alignment) will be determined as part of a refinement study to identify a final location and configuration for an I-5 interchange improvement.

Figure 29 also shows potential local street connections in the future to provide better neighborhood access and circulation. This includes extending existing dead-end streets where possible as well as developing connected local street systems within new developments.





INSET 1
I-5 SPLIT DIAMOND INTERCHANGE
ROADWAY SYSTEM OPTION



INSET 2
2nd I-5 INTERCHANGE
ROADWAY SYSTEM OPTION

LEGEND

- MAJOR ARTERIAL
- MINOR ARTERIAL
- FREEWAY
- SERVICE COLLECTOR
- ACCESS STREET
- POTENTIAL LOCAL STREET CONNECTIONS

NOTES:

1. INCOMPLETE FUNDING PLAN, NO CONSTRUCTION DATE SCHEDULE FOR I-5 INTERCHANGE, HIGHWAY 214/219, AND SOUTH ARTERIAL IMPROVEMENTS.
2. CONFIGURATION FOR I-5 INTERCHANGE AND SOUTH ARTERIAL IMPROVEMENTS TO BE RESOLVED IN REFINEMENT STUDY.

STREET FUNCTIONAL CLASSIFICATION PLAN

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 29

1373FINC

9.2.2 Street Standards

Figure 30 presents typical cross sections for the different street functional classifications. The cross sections reflect the desire to develop multi-modal roadway facilities in Woodburn in the future, incorporating sidewalks and bike lanes where possible. The identified cross sections are intended for planning and design purposes for **new** road construction, and where it is physically and economically feasible to improve existing streets.

The typical street sections present standards for both traditional subdivision width local residential streets, as well as "skinny" streets with restricted width. A developer would have the prerogative of developing skinny streets in their development to reduce cost and provide more of a pedestrian environment, particularly applicable to more compact residential areas (often referred to as neo-traditional development). Skinny street sections also could serve as a deterrent to through or speeding traffic on local streets. The identified skinny street sections are consistent with similar standards adopted by the City of Portland and Washington County.

The widest road sections are associated with major and minor arterials, with five travel lanes desirable on new or improved major arterials (two through lanes in each direction plus a center left turn lane), and three lanes on minor arterials (one through lane in each direction plus a center left turn lane). These roads could have raised median development in lieu of a center left turn lane in certain locations, per final access management plans developed for such facilities. A service collector could have either two or three lanes, while all access streets would be two lane facilities. On-street parking would be discouraged on arterial and service collector streets, but allowed on access streets. Bike lanes would be an integral part of all new arterial and service collector streets. Sidewalks on both sides of all new arterial and collector streets will be required. Major reconstruction of existing arterials and collectors will include sidewalks and bikeways if right-of-way conditions permit.

9.2.3 Required Street Upgrades

Freeways

An element of the TSP is an improvement to the existing I-5/Highway 214 interchange. In the short-term, the following improvements are required:

Southbound I-5 Ramp/Highway 214 Intersection: Add a second left turn and right turn lane on the southbound I-5 off-ramp; restripe the eastbound intersection approach to include a through lane and a right turn lane; add a second left turn lane to the westbound approach.

Northbound I-5 Ramp/Highway 214 Intersection: Signalize; add a second right turn lane on the northbound I-5 off-ramp; add a second left turn lane to the eastbound approach; add a second through lane to the westbound approach.

In the longer-term, a reconfiguration of the interchange is proposed. A specific improvement (including but not limited to the following: improve existing interchange, split diamond interchange or second interchange at Butteville Road) will be identified through a follow-up interchange refinement study to the TSP. The specific alignment for the western portion of the South Arterial will also be identified in this study. The South Arterial will have a grade separation with I-5, and have a direct connection to I-5 under either the split diamond or second

interchange alternatives. The alignment of the South Arterial will need to be coordinated with site development plans on both sides of I-5.

For the purposes of illustrating how the South Arterial and connecting roadways would tie into the overall street, transit, pedestrian, bicycle, and golf cart facilities, the existing interchange with a northerly alignment for the South Arterial is used to illustrate the functional classification and associated pedestrian and bicycle facilities along this roadway and connecting streets. The I-5 split diamond interchange option (with a north alignment for the South Arterial) and the second plan configurations with I-5 interchange (with a south alignment for the south alignment for the South Arterial are shown as plan insets).

Major Arterials

Highway 219/214

Highway 214 is proposed to be widened to a five-lane facility from Woodland Avenue on the west to Highway 99E on the east, with the potential for such widening extending east of Highway 99E to the east city limits. A final access management plan for this roadway should be developed associated with future project development studies for such improvements, based on the access management concepts identified in the access management analysis conducted as part of the Woodburn TSP development. Improved signal coordination along this roadway is also proposed.

In addition to the before-mentioned improvements to the I-5 ramp intersections, there are two other major intersection improvements required along Highway 214 in the short-term, irrespective of this roadway being widened to five lanes. These improvements include:

Highway 214/Settlemier Avenue—Optimize the signal timing to minimize delay; add a second left turn lane on the northbound approach; and restripe the southbound approach to the intersection to include one left turn, one right turn, and one through lane.

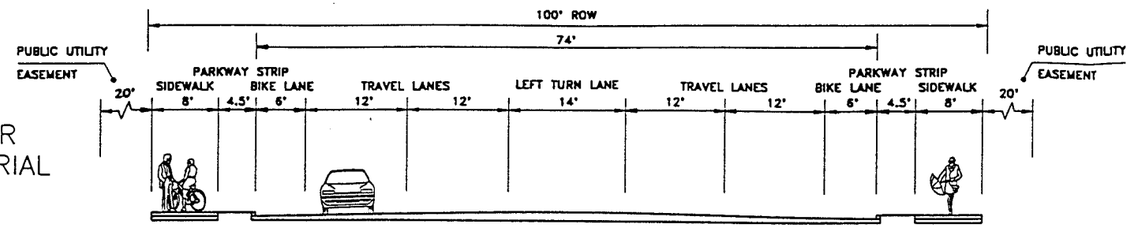
Highway 214/Highway 99E—Add a second left turn lane to the eastbound intersection approach; restripe the westbound intersection approach to include one left turn lane, one through lane and one right turn lane; and add a second left turn lane to the northbound intersection approach.

Highway 99E

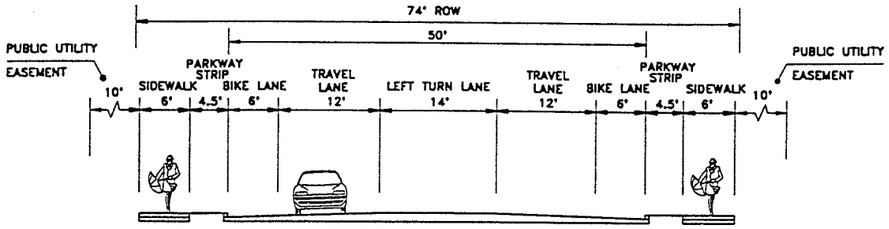
Highway 99E would remain a five-lane facility, with access management and sidewalk improvements on the section south of Lincoln Street. A final access management plan should be developed for this section as part of future project development studies, based on the acdcess management concepts developed as part of the Woodburn TSP study. As for Highway 214, improved signal coordination on this roadway is proposed.

At the Highway 99E/Young Street intersection, the reconfiguration of the east approach to the intersection is required, in particular realigning Cannery and George Streets away from the intersection. A westbound right turn lane on this approach is also required.

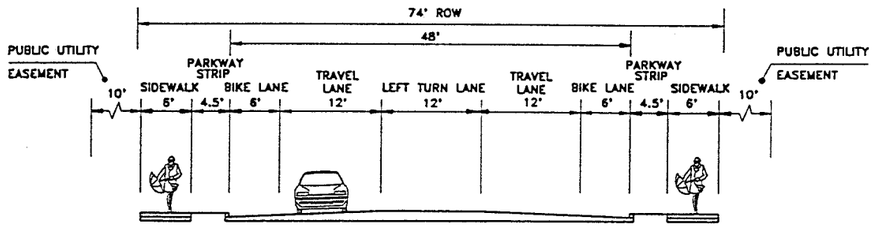
MAJOR ARTERIAL



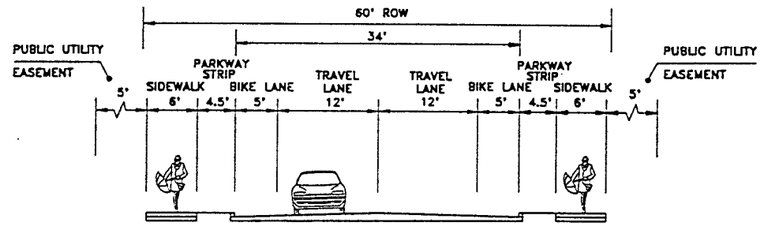
MINOR ARTERIAL



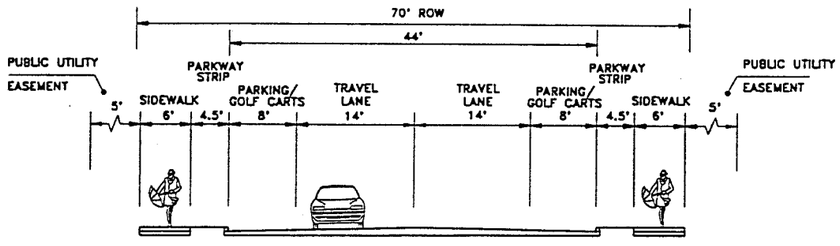
SERVICE COLLECTOR



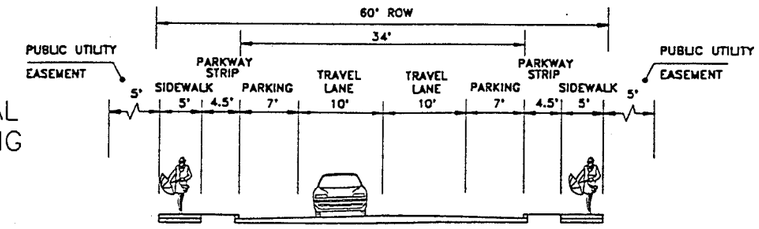
ACCESS STREET W/BIKE LANES



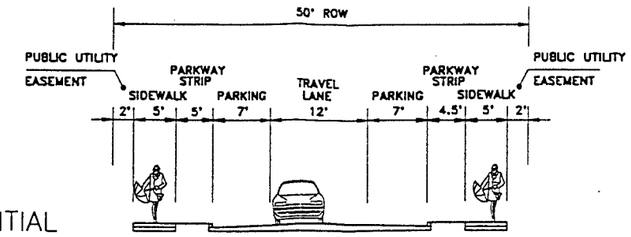
ACCESS STREET W/PARKING OR GOLF CARTS



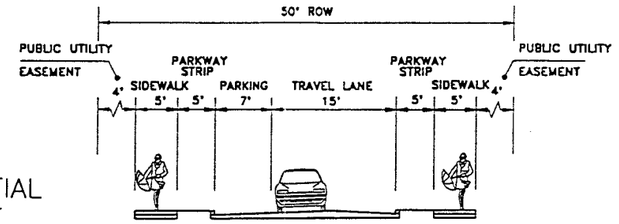
LOCAL RESIDENTIAL STREET W/PARKING BOTH SIDES



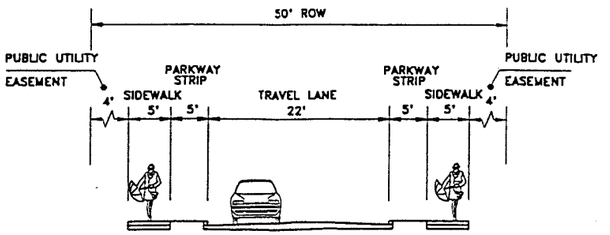
LOCAL RESIDENTIAL W/PARKING BOTH SIDES – ''SKINNY'' STREET



LOCAL RESIDENTIAL W/PARKING ONE SIDE – ''SKINNY'' STREET



LOCAL RESIDENTIAL W/ NO PARKING



1373FXSC

STREET TYPICAL CROSS SECTION

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 30

Highway 211

Highway 211 is envisioned to be either a three or five lane section east of Highway 99E in the future, pending the level of development along the roadway and the increase in traffic volumes.

Minor Arterials

The major minor arterial improvement in the TSP is the construction of a South Arterial between Highway 219 on the west and Highway 99E on the east. This roadway could tie into a new or modified I-5 (pending the results of an interchange refinement study). The road would be five lanes between Highway 219 and Evergreen Road, and three lanes east of Evergreen Road. This roadway would promote infill of existing vacant residentially zoned land in the southern part of the City within the UGB.

Front Street from Boones Ferry Road to Cleveland Street, from Hardcastle Avenue to Highway 214, and north of Woodburn High School is proposed to be improved to a widened 2-3 lane section. Likewise, Boones Ferry Road north of Highway 214 is envisioned to be improved to a three lane facility.

Service Collectors

Evergreen Road would be extended to the south to intersect the South Arterial wherever it is located. Service collector improvements are proposed along certain existing streets to create minor widening to develop bike lanes and sidewalks. In particular, West Hayes Street, Parr Road, and Arney Road should be widened. Also Cooley Road should be extended south of Lincoln Avenue to create a new north-south road east of Highway 99E.

Access Streets

Access streets in need of widening to accommodate bike lanes include Woodland Avenue north of an extended Arney Road, and Brown Street south of Bradley Street.

9.2.4 State Highway Access Management Strategies

There are operational and policy approaches to meeting the OHP Access Management Policy guidelines. From an operational perspective, the City of Woodburn and ODOT could (where appropriate) consider:

- planning for and developing a parallel road system which would provide local access to businesses adjacent to Highways 219/214 and 99E and reduce local traffic volumes on Highway 99E;
- planning for and developing intersection improvement programs in order to regularly monitor intersection operations and safety problems;
- purchasing right-of-way and closing driveways;
- installing median barrier and driveway access controls; and/or
- installing two-way left turn lanes.

Purchasing right-of-way and closing driveways, without a parallel road system and/or other local access can seriously effect the viability of the businesses impacted. Thus, if this approach is taken, either a parallel road system, or shared access needs to be developed prior to "land-locking" a business.

There are also trade offs which need to be considered when considering the advantages and disadvantages of installing a median or two-way left turn lane. A median will prevent motorists from crossing the highway mid-block in order to access businesses on the opposite side of the street. But a median could also increase the volume of left turning or U-turning traffic at the signalized intersections, which could have a negative effect on intersection operations. Alternately research has shown that two-way left turn lanes have a greater effect on reducing accidents than medians[1]. However there are obviously conflicts and confusion which can occur when motorists are using two-way left turn lanes in areas with a high driveway density. To assess the need for median access control, driveway density, average daily traffic, queuing information, and detailed mid-block accident data is needed. As the mid-block accident data was not available for this study, the assessment was not performed.

From a policy perspective, as part of every land use action, the City of Woodburn and ODOT should evaluate the potential need for conditioning development with the following items in order to maintain and/or improve traffic operations and safety along Highways 219/214 and 99E in Woodburn:

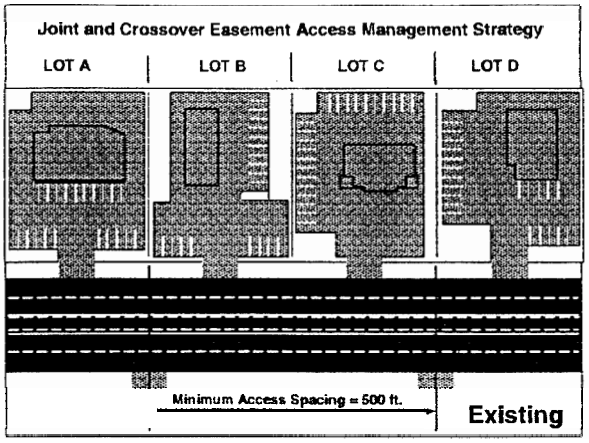
- Crossover easements should be provided on all compatible parcels (topography, access, and land use) to facilitate future access between adjoining parcels. Figure 31 shows how this process would, in the long run, facilitate compliance with the ODOT Access Management Classification System.
- Conditional access permits should be issued on developments which have proposed access points that do not meet the designated access spacing policy and/or have the ability to align with opposing driveways. With a conditional access permit, when there is an opportunity to rectify this condition, the ODOT would have the right to require this correction.
- Right-of-way dedications should be provided to facilitate the future planned roadway system in the vicinity of the proposed development.
- Half-street improvements (sidewalks, curb and gutter, bike lanes/paths, and/or travel lanes) should be provided along site frontages which do not have full-buildout improvements in place at the time of development.

9.2.5 City Street Access Management Strategies

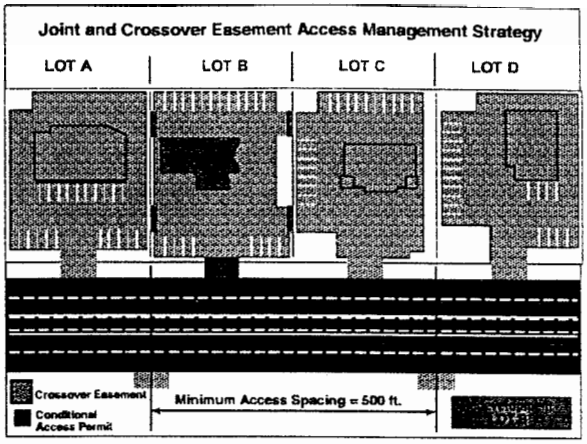
From a policy perspective, the City of Woodburn will manage access on new arterial and collector streets within its jurisdiction to provide efficient traffic movement and enhance safety. Policies would include criteria for street and driveway access, design of access and utilization of shared access when feasible. The City also intends to implement these policies along existing arterial and collector streets when significant redevelopment takes place.

1 FHWA, Technical Guidelines for the Control of Direct Access to Arterial Highways, August, 1975

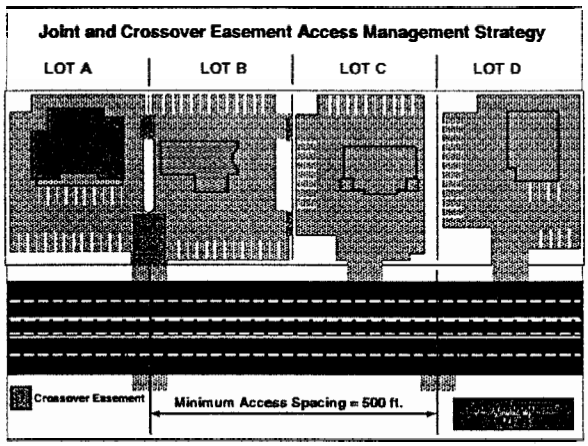
Proposed Access Management Strategy



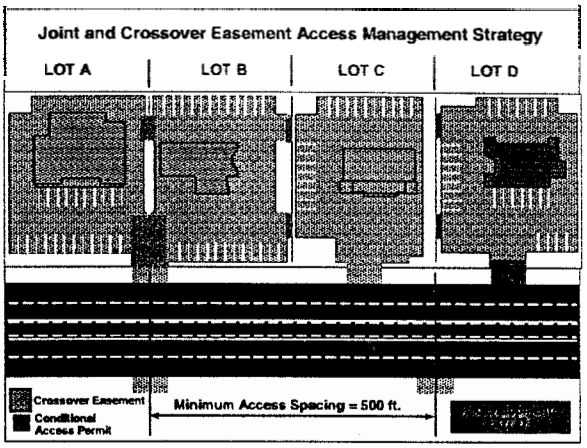
Step 1



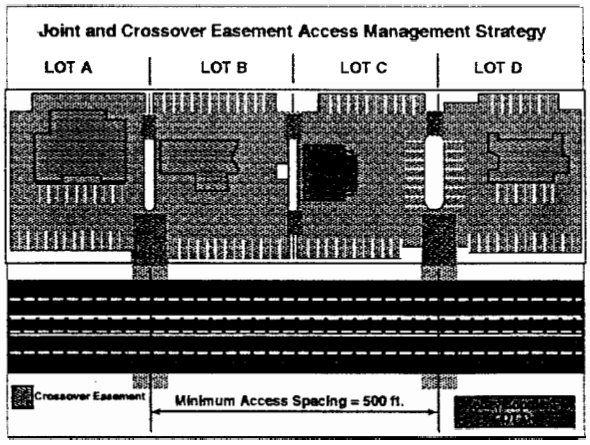
Step 2



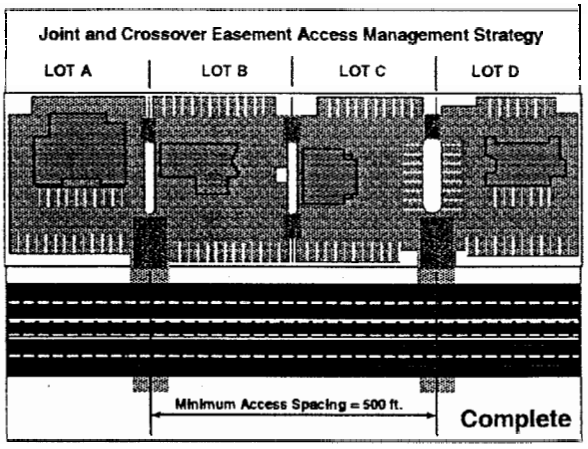
Step 3



Step 4



Step 5



Step 6

EXAMPLE OF CROSSOVER EASEMENT & CONDITIONAL ACCESS POLICY/PROCESS

CITY OF WOODBURN TRANSPORTATION SYSTEM PLAN APRIL 1996	FIGURE 31

1373F031.CDR

9.3 Transit Plan

The transit plan for the City of Woodburn includes both improved intracity transit service as well as developing an intercity shuttle bus service. Pending long-terms for intercity passenger rial service in the future, there is also the possibility of developing a downtown transportation center. Figure 32 illustrates the basic fixed route transit services in the plan.

9.3.1 Intracity Transit Service

The existing Woodburn fixed route transit system, operated by the City of Woodburn, is recommended to be initially expanded by converting the existing single bus route to two-way operation. Service frequency would be every 60 minutes, with service expanded to weekends. Over time, as ridership develops, service frequency could be expanded to every 30 minutes, at least during peak periods. As the residential area along north Boones Ferry Road, and the commercial area along Arney Road develop, minor deviations from the existing route should be considered to serve these areas. Bus service should also be extended to the Woodburn Industrial Park via Progress Way and Industrial Avenue. To operate a two-directional bus route at 60 minute headways, one added bus will have to be acquired. If service is increased to every 30 minutes, three added buses will be required.

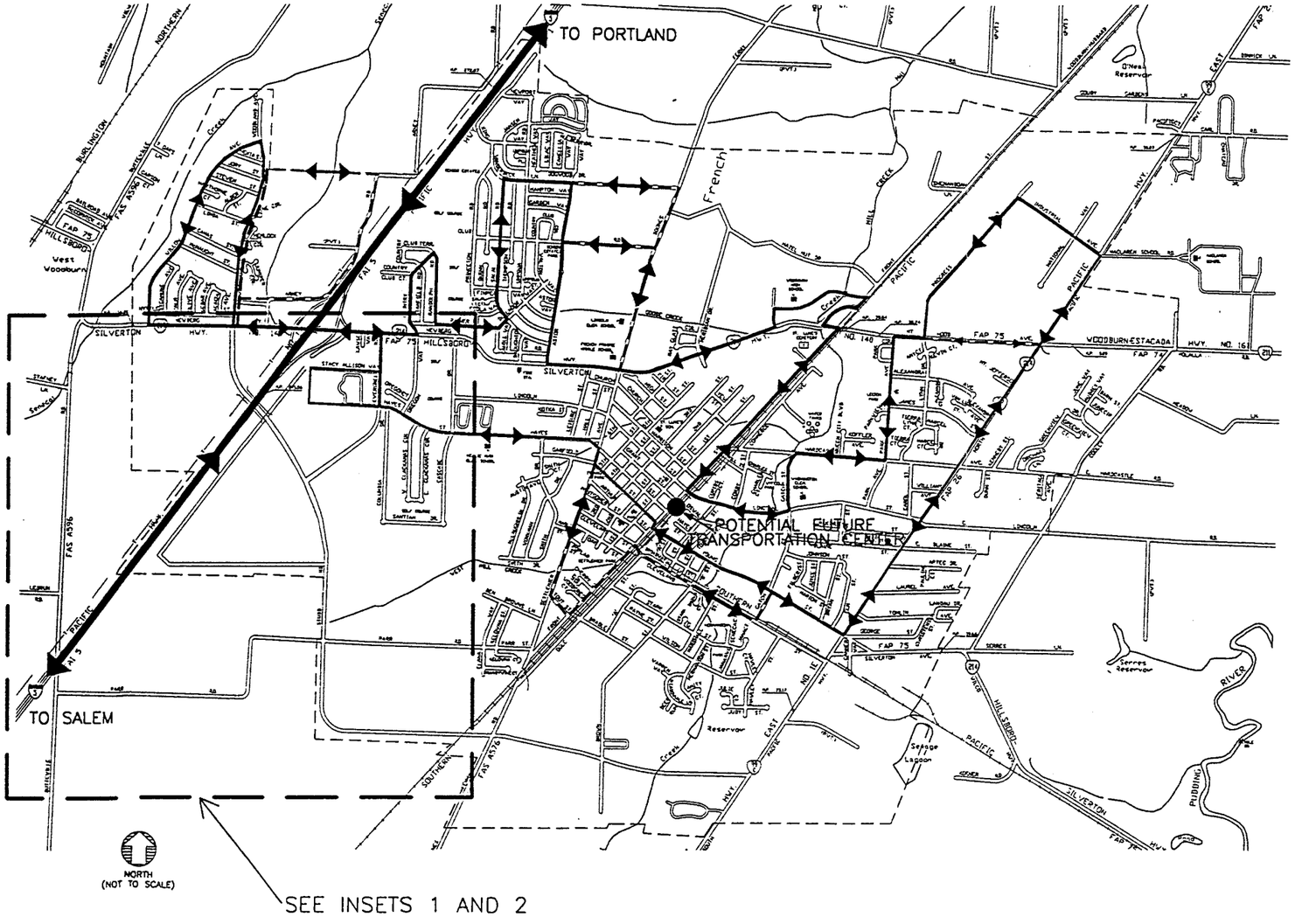
In addition to the fixed route bus service, the existing paratransit service provided by the City should continue to be provided, as well as a continuation of the Woodburn Taxi operation.

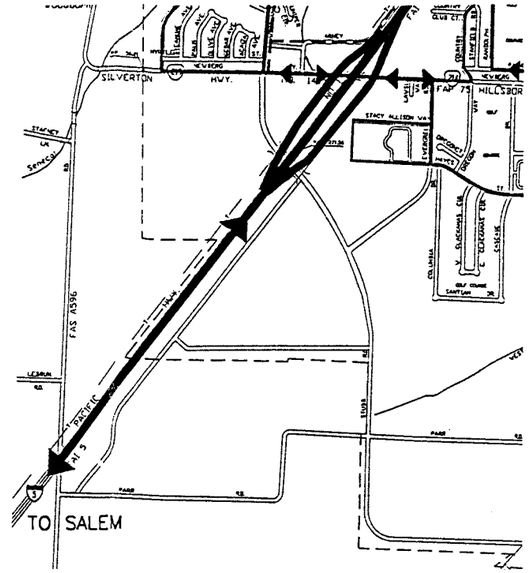
In the longer-term, as Woodburn continues to develop, and particularly if the City obtains an intercity passenger rail stop, consideration should be given to expanding the fixed route bus system to include two routes: east and west of the railroad tracks. Both routes would be oriented to a downtown transportation center, where intercity bus (and possibly) rail service would connect with the local system. A downtown transportation center should be located along Front Street, with at the minimum an auto passenger dropoff/pickup area provided. A limited park-n-ride facility could also be provided.

9.3.2 Intercity Transit Service

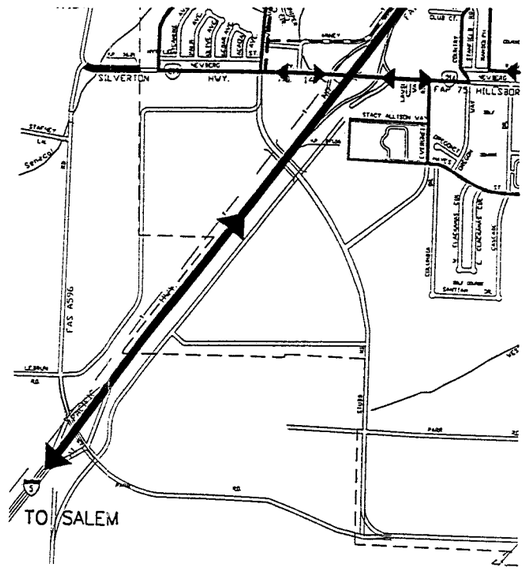
An added component of the Woodburn transit plan is the initiation of shuttle bus service between Woodburn and Portland and Salem. Top priority should be given to establishing service to downtown Portland, with an intermediate stop at the Tualatin park-n-ride. The second priority would be to establish service from Woodburn to downtown Salem, also serving the state office building area east of downtown. For each service, two round trips during both weekday AM and PM peak periods should be provided, with one midday round trip. 45-passenger buses are recommended for these intercity services, with two buses required for the Portland route, and one bus required for the Salem route. Consideration should be given to start-up of the Portland service with only one bus, with adding a second bus if ridership for this service develops.

To access the intercity shuttle bus service, a park-n-ride should be established in Woodburn, with a maximum of 300 spaces. The park-n-ride ideally should be located in the vicinity of the I-5/Highway 214 interchange, such that local traffic from both sides of the interchange could easily access this facility. To reduce park-n-ride-oriented traffic through the interchange, this facility might best be located off the proposed South Arterial, where there is vacant land





INSET 1
I–5 SPLIT DIAMOND INTERCHANGE
ROADWAY SYSTEM OPTION



INSET 2
2nd I–5 INTERCHANGE
ROADWAY SYSTEM OPTION

LEGEND

- INTERCITY BUS ROUTE AND DIRECTION OF TRAVEL
- OPTIONAL BUS ROUTING IN FUTURE AS AREA DEVELOPS
- INTERCITY SHUTTLE BUS SERVICE

NOTES:

1. TWO INTERCITY BUS ROUTES (EAST US WEST SIDE OF SOUTHERN PACIFIC RAILROAD) POSSIBLE IN LONG–TERM, POSSIBLY CONNECTED TO DOWNTOWN TRANSPORTATION CENTER.
2. PARK–IN–RIDE FOR INTERCITY SHUTTLE BUS SERVICE IN VICINITY OF I–5/HIGHWAY 214 INTERCHANGE.
3. INCOMPLETE FUNDING PLAN, NO CONSTRUCTION DATE SCHEDULE FOR I–5 INTERCHANGE, HIGHWAY 214/219, AND SOUTH ARTERIAL IMPROVEMENTS.
4. CONFIGURATION FOR I–5 INTERCHANGE AND SOUTH ARTERIAL IMPROVEMENTS TO BE RESOLVED IN REFINEMENT STUDY.

1373FBS2

PUBLIC TRANSPORTATION PLAN

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 32

currently available. If a downtown transportation center is eventually developed, with the intracity bus service transfers at that location, consideration should be given to extending the intercity shuttle service into the city to serve this center as well.

An extension of Salem Transit bus service to Woodburn could replace or supplement the need for intercity shuttle bus service between Woodburn and Salem.

9.3.3 Further Study

The transit system analysis conducted as part of the Woodburn TSP study was a fairly cursory analysis, based on generalized transit demand assumptions in the future, and with no consideration on long-term vehicle maintenance and system administrative facility requirements. Modifications to the existing City paratransit system were also not explored. It is recommended that the City of Woodburn conduct a more detailed study of transit system improvements, by pursuing a separate "Transit Development Program" study. Funds for such studies are available from Federal Transit Administration Section 18 funding grants (administered by the ODOT Public Transit Division). An alternate funding source could be the ODOT TGM program, if extended beyond the next two years.

9.4 Pedestrian Facilities Plan

The recommended pedestrian facility plan is shown in Figure 33. As shown in this figure it is recommended that sidewalks be constructed throughout the City to develop and maintain a comprehensive sidewalk system. Most importantly it is recommended that as new developments are constructed or as road improvements are made existing sidewalks be connected to new sidewalks. Sidewalks should be included in any reconstruction of arterials or collectors. In addition it is recommended that an off-street pathway system be developed along existing creek corridors to facilitate non-automotive travel to schools and recreational, commercial and employment areas within Woodburn.

9.5 Bicycle Facilities Plan

As shown in Figure 34, the recommended bicycle facility plan includes constructing bicycle lanes on most all roadways classified as service collector roads or higher. The figure also shows the existing bicycle lanes. When constructed this bicycle facility plan will provide a comprehensive system of bicycle lanes throughout Woodburn. This system will also interconnect with the recommended off-street pathway system allowing cyclists to travel off the main roadways to gain access to schools and recreational commercial, and employment facilities in Woodburn. Bike lanes should be incorporated into any arterial or collector reconstruction projects.

9.6 Golf Cart Facilities Plan

The recommended golf cart facility plan is shown in Figure 35. This plan was developed to allow golf carts access to downtown Woodburn, the retail development west of Senior Estates in the southeast quadrant of the interchange, and the off-street pathway system.

9.7 Rail Facilities Plan

As part of the transit facilities plan, and in order to encourage intermodal travel, it is recommended that as the opportunity arises, the City of Woodburn strive toward the developmet of a passenger rail stop in downtown Woodburn. This would facilitate the development of a multi-modal transportation facility in the downtown area which would encourage travelers to use Woodburn Transit to travel to the rail station and the train to travel to other destinations outside of Woodburn.

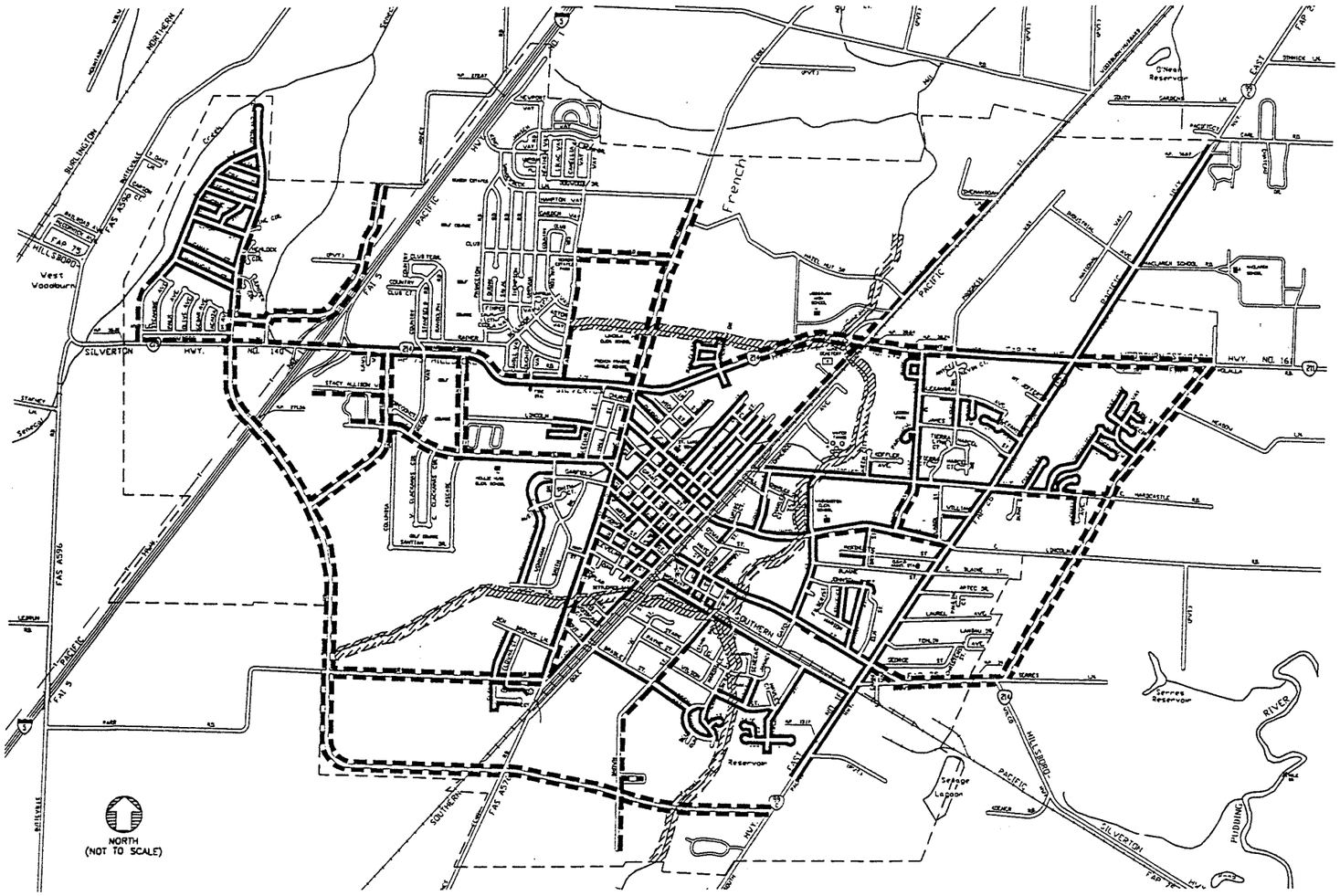
Regarding rail grade crossings, the city will make every effort to ensure that when appropriate rail grade crossings will be modified to ensure safe crossings for motorized and non-motorized modes of transportation. Modifications will be made in accordance with the guidelines described in the *Manual on Uniform Traffic Control Devices* (published by the United States Federal Highway Administration).

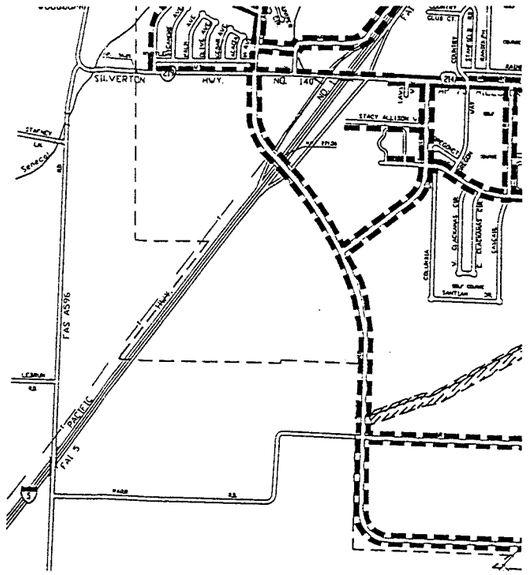
9.8 Air, Water, and Pipeline Transport Facilities Plan

As there are no significant, air, water or pipeline transportation facilities in Woodburn, no transportation system planning was performed for these modes.

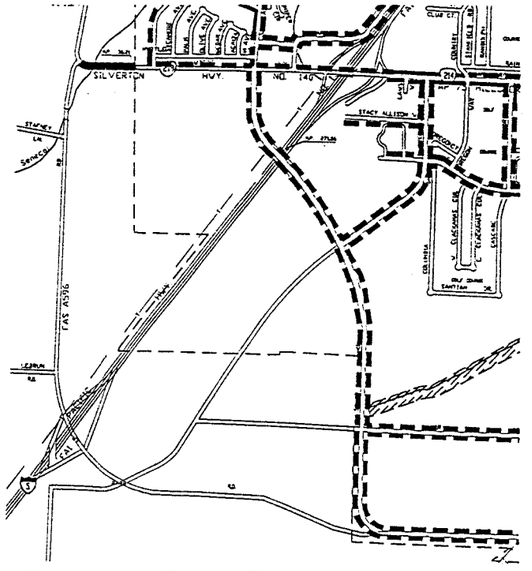
9.9 Transportation Demand Management Plan

To encourage a reduction in the use of motor vehicles in the future, the City should adopt in its zoning ordinance requirements by developers to provide bicycle/carpool parking and carpool matching services, as well as incentives to employers to provide transit fare subsidies and flexible work hours, as well as promote telecommuting opportunities. Possible text modifications to the ordinance to incorporate these provisions is presented in Section 11. Institution of improved intracity bus service as well as new intercity bus service as identified in the Woodburn TSP also serve as TDM strategies.





I-5 SPLIT DIAMOND INTERCHANGE
ROADWAY SYSTEM OPTION



2nd I-5 INTERCHANGE
ROADWAY SYSTEM OPTION

LEGEND
- EXISTING SIDEWALKS
- NEW SIDEWALKS
- NEW OFF-STREET PATHWAYS

NOTES:

1. INCOMPLETE FUNDING PLAN, NO CONSTRUCTION DATE FOR I-5 INTERCHANGE, HIGHWAY 219/214, AND SOUTH ARTERIAL IMPROVEMENTS.
2. CONFIGURATION FOR I-5 INTERCHANGE AND SOUTH ARTERIAL IMPROVEMENTS TO BE RESOLVED IN REFINEMENT STUDY.

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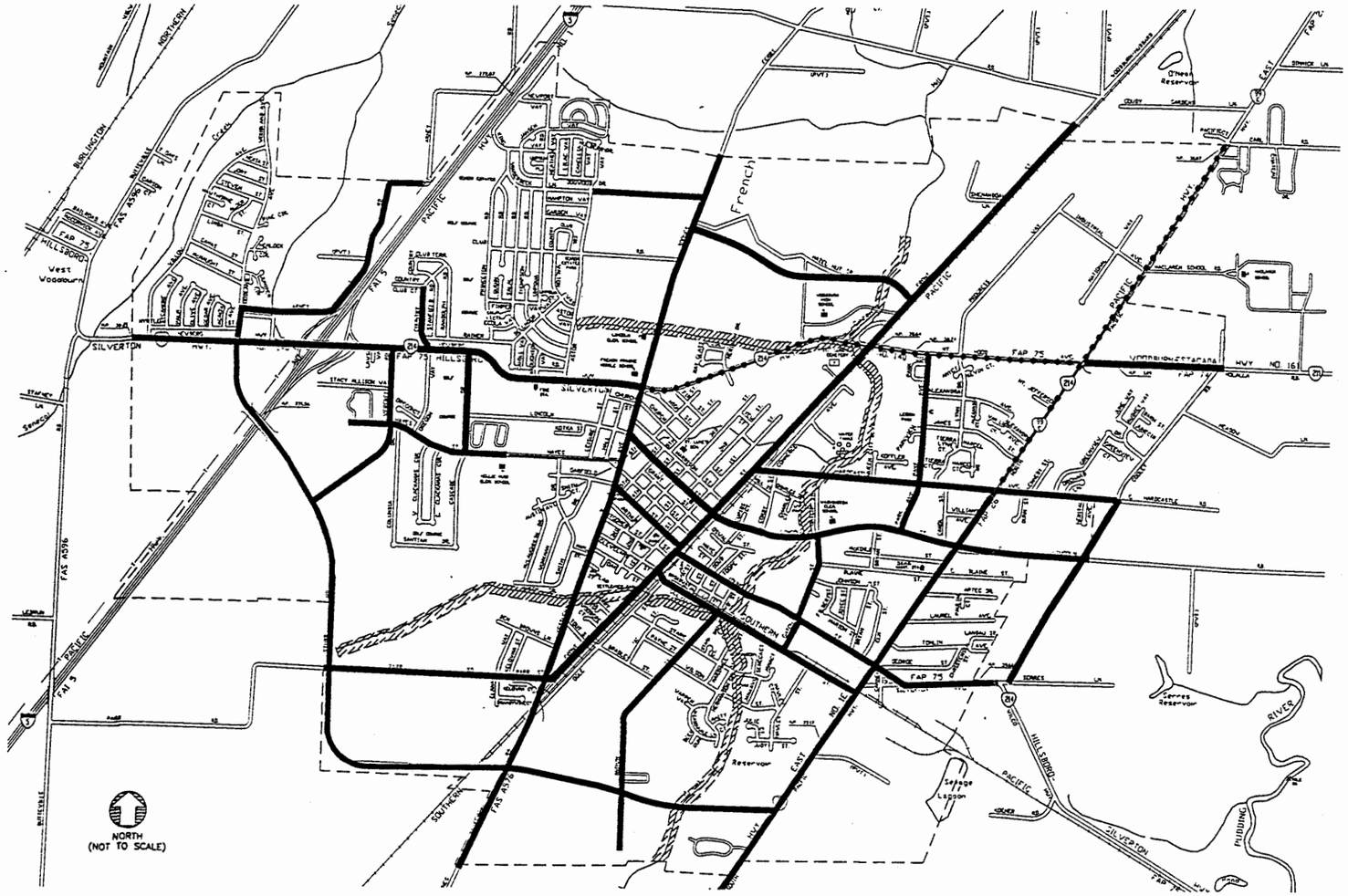
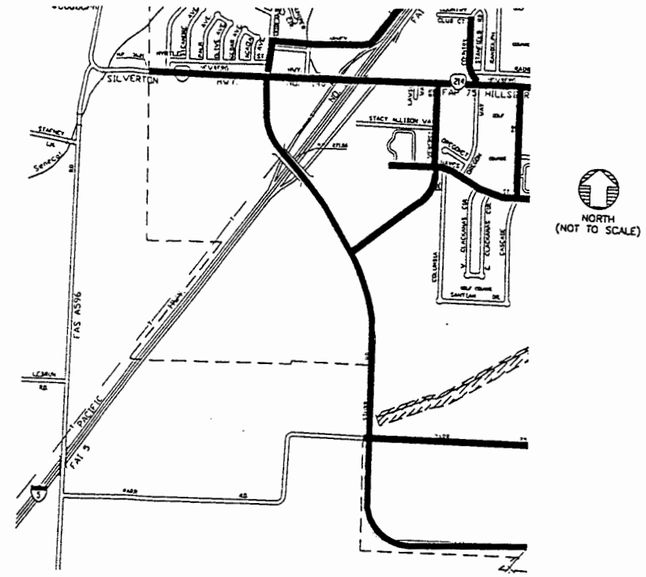
PEDESTRIAN FACILITY PLAN

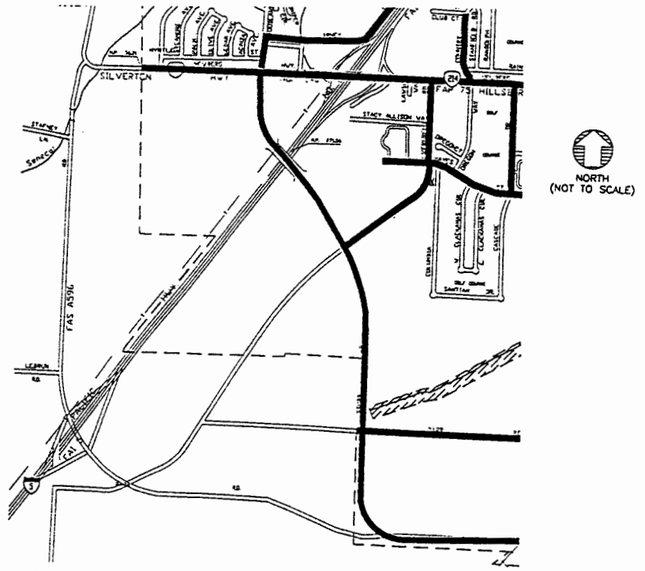
CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
33





I–5 SPLIT DIAMOND INTERCHANGE ROADWAY SYSTEM OPTION



2nd I–5 INTERCHANGE ROADWAY SYSTEM OPTION

NOTES:

1. INCOMPLETE FUNDING PLAN, NO CONSTRUCTION DATE FOR I–5 INTERCHANGE, HIGHWAY 219/214, AND SOUTH ARTERIAL IMPROVEMENTS.
2. CONFIGURATION FOR I–5 INTERCHANGE AND SOUTH ARTERIAL IMPROVEMENTS TO BE RESOLVED IN REFINEMENT STUDY.

LEGEND

- EXISTING ON–STREET BIKE ROUTES
- NEW ON–STREET BIKE ROUTE
- OFF–STREET BIKE PATH

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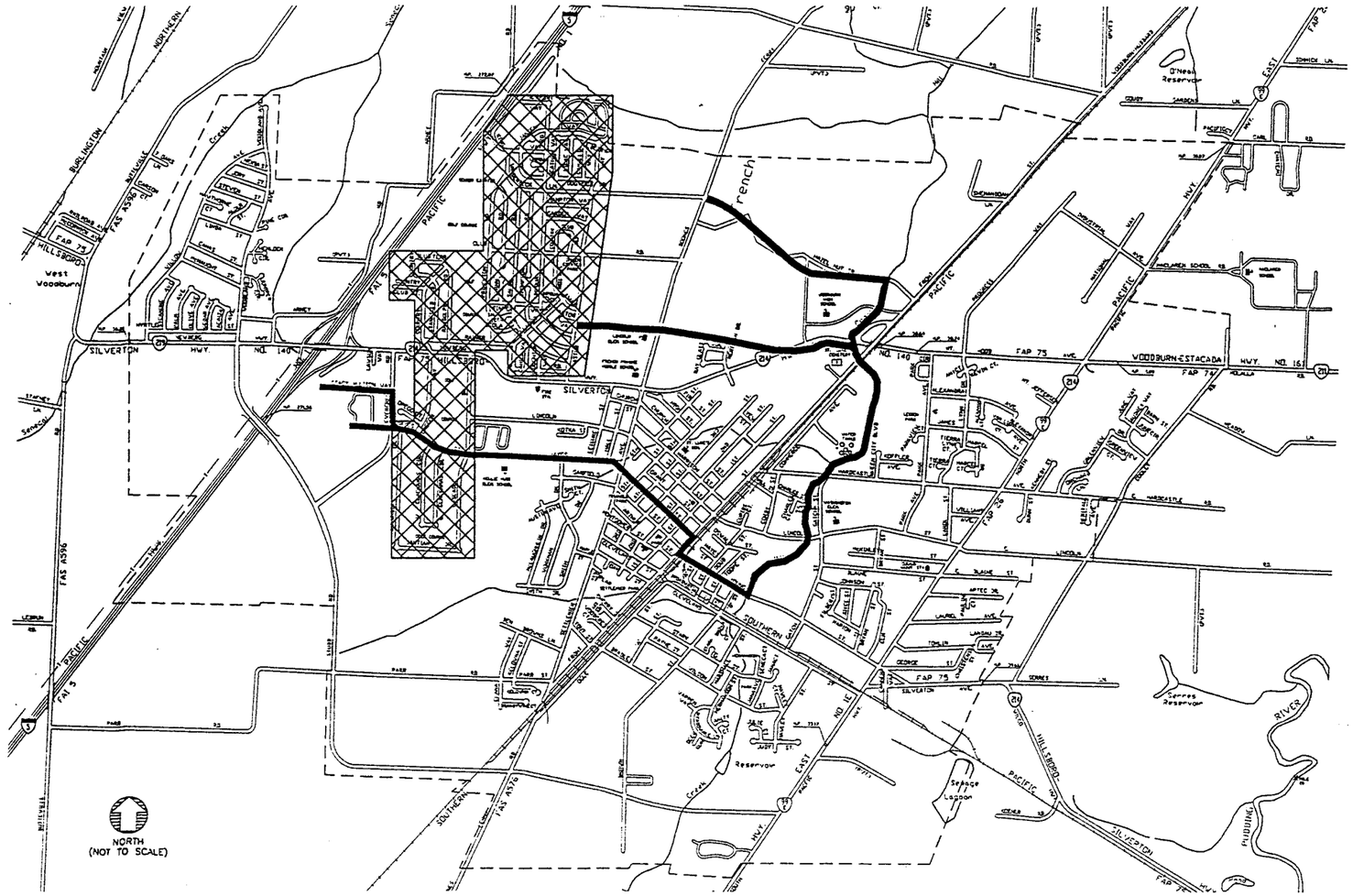
BICYCLE FACILITY PLAN

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE 34

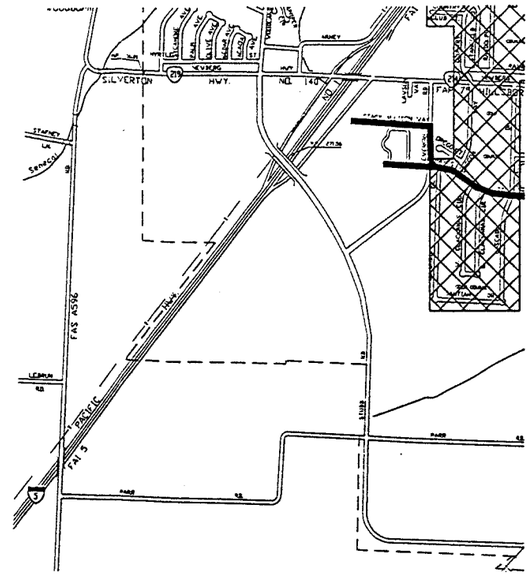


NOTES:

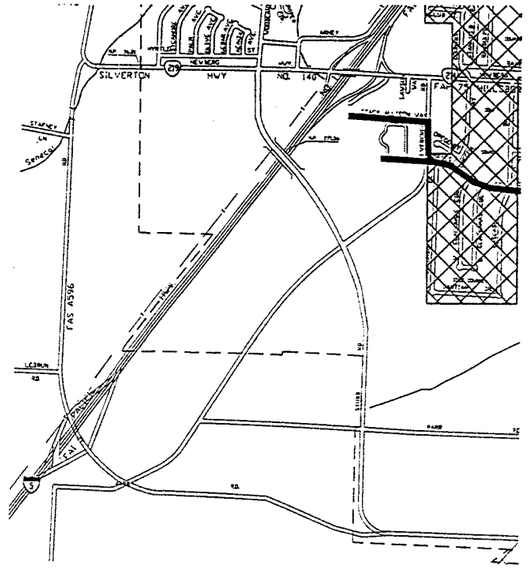
1. INCOMPLETE FUNDING PLAN, NO CONSTRUCTION DATE FOR I-5 INTERCHANGE, HIGHWAY 219/214, AND SOUTH ARTERIAL IMPROVEMENTS.
2. CONFIGURATION FOR I-5 INTERCHANGE AND SOUTH ARTERIAL IMPROVEMENTS TO BE RESOLVED IN REFINEMENT STUDY.

LEGEND

- AREA WHERE GOLF CARTS PERMITTED ON LOCAL STREETS
- NEW STREETS/PATHWAYS WITH DESIGNATED GOLF CART USE



I-5 SPLIT DIAMOND INTERCHANGE
ROADWAY SYSTEM OPTION



2nd I-5 INTERCHANGE
ROADWAY SYSTEM OPTION

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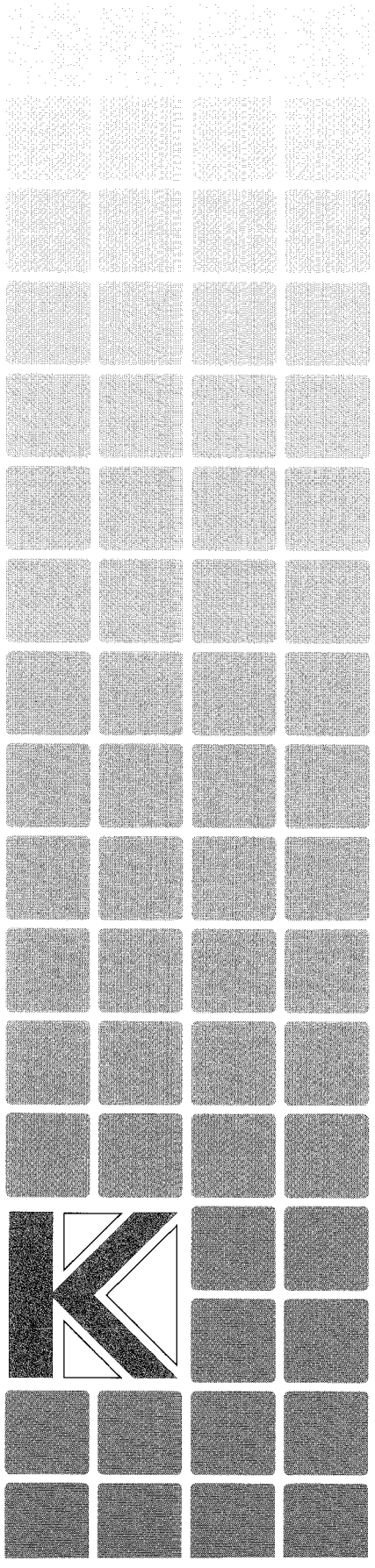
GOLF CART FACILITY PLAN

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
35



Section 10

Transportation Financing Plan

10.0 Transportation Financing Plan

10.1 Introduction

The Goal 12 Transportation Planning Rule (*OAR 660-12-040*) requires that Transportation Systems Plans for cities with populations over 2,500 persons include a transportation financing program. Transportation financing programs must include a list of planned transportation facilities and improvements, and an estimate of the timing and costs of proposed projects. They must also include an analysis of the ability of existing and potential funding mechanisms to fund proposed transportation improvements.

According to the *1993 Oregon Roads Finance Study*, nearly one-third of Oregon's road miles are in poor condition. City transportation financing needs for the next 20 years total nearly $8 billion. Over 40 percent of this need is unfunded at this time. Woodburn almost certainly shares some of this unfunded transportation need. Growth pressures combined with the general anti-tax sentiment of Oregon voters make the development of adequate and equitable funding mechanisms an important part of an overall transportation strategy.

The City of Woodburn will probably need to find new financing mechanisms to address transportation systems maintenance and improvements over the next 20 years. This memorandum provides an analysis of transportation financing options for the City of Woodburn. It describes transportation financing mechanisms used by the City, identifies and evaluates potential financing alternatives and programs, and describes funding guidelines associated with selected programs.

The analysis of financing options began with a review of the City's budget and Capital Improvement Plans. This review identified the current status of transportation financing in Woodburn. To identify existing and potential funding programs existing studies were reviewed and phone interviews were conducted with people knowledgeable about transportation finance. Existing and potential funding mechanisms were evaluated against standard criteria:

1. Legal authority;
2. Financial capacity;
3. Administrative cost;
4. Equity;
5. Political acceptability; and
6. Stability.

Transportation funding sources are summarized in Chapter 3.

In the financing program the terms *funding* and *financing* are distinguished. *Funding* describes any mechanism that **generates revenue** for transportation-related projects. *Financing* more narrowly refers to ways to spread out the impact of collecting funds through the issuance of debt obligations that are repaid over time, with interest. In other words, all transportation projects are funded by some means; some funding is financed by borrowing money to pay for the projects. Funding can occur on a pay-as-you-go basis or through various financing mechanisms.

10.2 Existing Transportation Funding in Woodburn

Transportation-related expenditures in Woodburn, including transit, are $1.4 million (approximately 17%) of Woodburn's proposed 1995-96 budget of $20 million.

10.2.1 Road-Related Funding

Table 13 summarizes recent road-related transportation funding in Woodburn, for the last five fiscal years (1990-91 to 1994-95). This table consolidates revenues and expenditures tracked by separate funds in the City of Woodburn budget. Table 13 reports on the State Revenue Sharing, Street, City Gas Tax, Special Assessment, Street/Storm Drain Capital Improvement, and Transportation Impact Fee Funds.

Table 13

Road-Related Funding in Woodburn

	1990-91 Received	1991-92 Received	1992-93 Received	1993-94 Received	1994-95 Received
Revenues					
Working Capital Carryover	238,540	284,559	274,044	339,841	341,629
Interest from Investments	26,524	9,985	8,270	10,603	14,169
State Highway Trust Fund	486,165	530,628	580,618	638,150	689,686
State Revenue Sharing	56,505	70,376	64,340	66,500	71,500
Federal ISTEA Revenue	0	0	0	0	0
City Gas Tax	94,729	103,873	101,900	99,552	107,139
Fees and Assessments	156,400	216,258	39,221	28,129	344,028
Bond Proceeds	0	0	0	0	0
Other Revenues	43,415	9,008	186,773	29,877	36,383
Total Revenues	1,102,278	1,224,687	1,255,166	1,212,652	1,604,534
Expenditures					
Personal Services	192,676	217,102	231,230	252,660	279,507
Materials and Services	179,210	217,678	211,934	247,698	288,551
Capital Outlay	335,141	366,860	356,062	197,665	322,692
Bond & Assessment	6,495	0	150	0	0
Transfers/Contingencies/UNAP	104,696	149,000	169,000	175,000	215,000
Total Expenditures	818,218	950,640	968,376	871,023	1,105,750

Source: City of Woodburn Budget, 1990-1991, 1991-1992, 1992-1993, 1993-1994, and 1994-1995.

Table 13 also reports as expenses transfers to the Street Equipment Replacement Reserve, Transit Equipment Replacement Reserve, and the Technical and Environmental Service Funds (these funds accumulate minor amounts of interest revenue that is not included in Table 13). Transit fund revenues and expenditures are reported separately in Table 14.

Table 13 shows that the State Highway Trust Fund and other shared state revenue is the largest contributor to road-related revenue in Woodburn, contributing $486,000–$690,000, or about 50% of total road-related revenue. Locally-generated revenue includes the city's $0.01/gallon gas tax, LID bonds funded by assessments to property owners that benefit from improvements, Transportation Impact Fees paid by new development, and a gas and electrick utility privilege tax. Together, these revenues contribute 11–26% of road-related revenue.

The city's gas tax is a stable source of revenue, ranging from $95,000–107,000 in the past five fiscal years, an average annual increase of 2.5%. LID assessments and Transportation Impact Fees (TIFs) vary widely with construction of specific projects and the amount of new development that pay impact fees. The City's TIF is a System Development Charge designed to assess new development for the costs of off-site transportation infrastructure needed to meet increased demand generated by the new development. A consultant developed a method for allocating the cost of road improvements to new development. The City Council adopted the TIF at 25% of the level recommended by the consultant; the fee will increase 1% per year for five years. At the end of the five year period the City Council will re-evaluate the TIF; FY96 is the third year of this five-year period.

Capital Outlay expenditures typically account for 23–41% of total annual city expenditures. Recent projects funded by LIDs include the K-Mart/Bi-Mart traffic signal on Highway 214 ($123,000) and Cleveland Street improvements ($308,000). Capital improvements to the Woodland Drive/Highway 214 intersection ($394,000) were funded by an Economic Development grant and property owner reimbursements. Remaining capital expenditures are for road resurfacing and various other improvements.

Expenditures for Personal Services (wages, salaries, and benefits) and Materials and Services typically account for 45–58% of total annual city expenditures. The largest line item included in Materials and Services is for Street Light Installation and Operation, followed by Road Supplies and Materials. Materials and Services also includes a wide variety of smaller expenditure items, such as gasoline, uniforms, office supplies, insurance, and paint. Transfers/Contingencies/Unappropriated funds are largely transfers to Technical and Environmental Services, for management of the Public Works Department and Garage, and to the Street Equipment Replacement Fund, which accumulates money to replace street equipment.

Remaining expenditures are for administration of bond sales and property owner assessments, transfers to the Street Equipment Replacement Reserve Fund and the Technical and Environmental Services Fund, contingency set-asides, or unappropriated expenses.

10.2.2 Transit-Related Funding

The Transit System Fund accounts for 4% of Woodburn's $3.4 million General Fund budget proposed for FY 1995-96. Table 14 summarizes revenues and expenditures in the Transit System Fund over the past five fiscal years (1990-91 to 1994-95), which reports separate accounts for the city's fixed-route transit and dial-a-ride services. Property tax typically provides 24–37% of total transit revenue in Woodburn. State grants and a special transportation grant (reported as Revenue From Other Agencies) are the second largest revenue source, typically providing 17–22% of total revenue. Transit fares, reported in Other Revenues, account for about 7-14% of annual transit revenue, reaching the highest percentage in FY 1994-95.

Table 14

Transit Funding in Woodburn

	1990-91 Received	1991-92 Received	1992-93 Received	1993-94 Received	1994-95 Received
Revenues					
Working Capital Carryover	49,175	53,776	63,392	69,615	68,782
Property Taxes	40,061	42,592	48,907	41,360	56,385
Interest from Investments	5,010	3,747	3,256	2,469	4,072
Revenue from Other Agencies	61,862	33,688	127,577	31,019	30,656
Transit Fares	14,576	16,377	18,799	17,614	25,075
Total Revenues	170,684	150,180	261,931	162,077	184,970
Expenditures					
Personal Services	56,143	65,159	61,858	62,766	68,941
Materials and Services	26,934	21,611	25,476	26,529	29,054
Capital Outlay	33,831	20	104,984	0	0
Transfers/Contingencies/UNAP	-	-	-	4,000	7,000
Total Expenditures	116,908	86,790	192,318	93,295	104,995

Source: City of Woodburn Budget, 1990-1991, 1991-1992, 1992-1993, 1993-1994, and 1994-1995.

The $104,984 capital outlay in FY 1992-93 was for a bus that provides most of the transit service in Woodburn; this purchase was primarily funded by a state grant. In other years, expenditures for Personal Services and Materials and Services account for almost all transit expenditures.

10.3 Summary Of Outlook For Existing Transportation Funding Sources

The State Highway Fund should be a relatively stable source of revenue for Woodburn. Because these funds are distributed to cities based on population, Woodburn's share could increase or decrease depending on whether its population increases faster or slower than the state average. It is expected that Woodburn's population will grow at a rate greater than the state average. Nonetheless, Woodburn's share of state funds will probably not increase as fast as its street maintenance requirements will, as the system expands to serve the growing population and through traffic. State Revenue Sharing funds are likely to decrease gradually in real terms. ODOT's forecast of ISTEA revenue available to the state shows funds are not expected keep pace with inflation.

Revenue from the City's $0.01/gallon Gas Tax may also gradually erode by increasing less than inflation. Since the tax is based on quantity rather than price, tax revenues will not increase with as gasoline prices rise. In fact, a large increase in gasoline prices could *decrease* tax revenue by reducing demand. Population growth and increased through traffic may cause Gas Tax revenue to increase faster than inflation in some years. Actual change in real Gas Tax revenues depends on the inflation rate, population growth, gasoline demand, and changes in the tax rate. We do not have enough information about these variables to accurately forecast the change in Gas Tax revenue relative to inflation.

Bonds financed by Local Improvement Districts (LIDs) and fees from the Systems Development Charge (SDC) will remain important sources of transportation revenue in Woodburn. Future bond revenue depends on the willingness of property owners to form LIDs to levy assessments. Typically, LIDs are formed to finance projects that benefit existing or new commercial development, while SDCs are assessed only to new residential and commercial development. Population growth in Woodburn will increase SDC revenue and should contribute to continued support for LIDs because growth will increase the value of existing commercial property and create demand for new commercial development. To the extent that these funding sources charge the full cost of the transportation improvements, they should allow Woodburn to construct capital improvements to serve commercial and residential development.

ODOT's forecast of ISTEA revenue available to small cities shows funds are not expected to keep pace with inflation. The actual amount Woodburn receives depends on whether the City has projects that qualify for ISTEA funding, the extent to which the City pursues the funds, and the level of competition for the funds from other small cities in Oregon. Since Woodburn has only occasionally received ISTEA funds in the past, it is not expected a significant increase in the share these funds contribute to transportation revenue.

Property tax revenue to the City General Fund should increase faster than inflation due to continued rapid appreciation of real property values and new development in Woodburn. Property tax revenue will likely remain a significant source of revenue for transit operations. The forecast decline in the state's Special Transportation Fund should be offset by continued ISTEA funding for transit capital improvements and increasing revenues available for state matching grants. Woodburn has been successful in securing these funds for equipment purchases in the past and should continue to do so. State funds available for transit operation are expected to decline in real terms over the next 20 years unless taxes for transit are increased. The current Statewide Transportation Improvement Program (STIP) includes state revenue for transit operations in Woodburn—$86,700 in FY95 and $16,700 annually in the following three fiscal years. The STIP also includes $65,000 for Woodburn to purchase a transit vehicle in

FY96. Farebox revenue will probably continue to provide only a small share of transit revenues.

In summary, it is expected that federal and state sources of transportation revenue to gradually decline in real terms over the next 20 years. Revenues from ISTEA and the State Highway Fund, even under the optimistic forecast of ODOT, are not expected keep pace with inflation. Woodburn's gas tax and utility privilege tax should remain a relatively stable source of revenue in this period, particularly if it is raised a few cents as gas prices rise. Population growth should help provide continued support for LID-financed improvements, SDCs assessed on new development will allow the City to put some money toward future improvements, and population growth will give the City a slightly bigger share of the State Highway Fund, which should remain at a near-constant level statewide.

10.4 Cost Estimates for Transportation System Improvements

Needed transportation improvements in the City of Woodburn were identified in the Transportation System plan presented in Section 9. Estimated costs for these improvements, were developed, with improvements grouped by the time period in which they should be constructed; 0 to 5 years, 5 to 10 years, 10 to 20 and 20+ years (Tables 15 - 18). In all, about $62 million (in 1995 dollars) of road and transit service improvements for the City of Woodburn over the next 20 years have been identified.

Transportation improvements include changing the functional classification of some city streets and bringing certain streets up to the City standards for their classification. This process includes adding sidewalks and bike lanes to some streets. Tables 15 - 18 present the total cost estimate for bringing certain streets up to City standards, including sidewalks and bike lanes and also identify the cost for adding only sidewalks to certain streets with physical constraints to pavement widening.

In addition to costs for transportation improvements, the City of Woodburn envisions future operation and maintenance costs for street overlay, drainage, and lighting to be $750,000 annually over the next 20 years.

10.5 Financing Needed Transportation Improvements

Potential federal sources of transportation funding are listed in Table 19 and state sources are listed in Table 20.

The projects identified represent an ambitious program of roadway and transit capital improvements for the City of Woodburn. Constructing these improvements will require a significantly higher level of transportation expenditures than Woodburn has spent in the past. In the past five fiscal years, Woodburn spent a total of $935,216–1,310,745 each year for road improvements and transit service. Including $750,000 as the average annual operation and maintenance costs, the improvements identified will require Woodburn to spend per year in the next five years, per year in the following five years, and per year in the following ten years.

It is expected that Woodburn will want to pursue funding sources for transportation improvements from the following sources:

Table 15

Proposed Transportation Improvements: Next 5 Years

Project Title	Estimated Cost (1995 $)	Potential Funding Source
Roadway System Capacity Improvements		
I-5 Interchange-Reconn. Study	$300,000	W, S, C
Realign Arney Road to Intersect Woodland Drive/Restrict Arney Road Access on Highway 214	$365,000	D
Extend Meridian Drive to Intersect Hazelnut Drive	$700,000	D
Improvements to Meet Woodburn Street Design Standards		
Arney Road - Existing Arney Road to UGB	$1,480,000	D
Boones Ferry Road - Highway 214 to UGB	$1,730,000	W, D, C
Country Club Road - Boones Ferry Road to Astor Way	$590,000	D
Front Street - Hardcastle Avenue to Highway 214	$950,000	W
Intersection/Access Management Improvements		
Added Signal - Highway 214/NB I-5 Ramp	$100,000	W
Added Signal - Highway 214/Woodland Drive	$120,000	D
Added Signal - Highway 214/Front Street	$120,000	D
Intersection Channelization - I-5/Highway 214	$500,000	W, D
Intersection Channelization - Settlemier Avenue/Front Street/Parr Road	$440,000	W
Intersection Channelization - Highway 214/Settlemier Avenue	$70,000	W
Signal Coordination Along Highway 214-Woodland Drive to Cascade Drive	$100,000	D
Sidewalks		
West Hayes Street - Evergreen Road to Cascade Drive	$60,000	W
Park Avenue - Lincoln Street to Hardcastle Avenue	$50,000	W
Brown Street - Cleveland Street to Bradley Street	$25,000	W
Off-Street Pathways		
Mill Creek Corridor - Hazelnut Drive to Young Street	$620,000	W, D
Public Transit System Improvements		
Increase Intracity Bus Service Frequency - Additional Vehicle	$110,000	W, S
Increase Intracity Bus Service Frequency - Operating Cost (2 years)	$280,000	W, S
Total Cost	**$8,710,000**	
Cost/Year	**$1,742,000**	

Funding Sources: S - State, W - City of Woodburn, C - Marion County, D - Developer

Table 16

Proposed Transportation Improvements: Next 6-10 Years

Project Title	Estimated Cost (1995 $)	Potential Funding Source
Roadway System Capacity Improvements		
South Arterial - Woodland Drive to Boones Ferry Road	$6,550,000[1]	W, D
I-5 Interchange - Design/Environmental Studies	$1,000,000	W, S, D
Widen Highway 214 - Woodland Drive to Cascade Drive	$2,460,000	W, S, D
Extend Evergreen Road to South Arterial	$1,100,000	D
Improvements to Meet Woodburn Street Design Standards		
Front Street - High School to UGB	$1,800,000	W, D
Brown Street - Bradley Street to South Bypass	$1,030,000	D
Evergreen Road - Highway 214 to Stacy Allison Way	$550,000	W, D
Parr Road - Front Street to UGB	$1,370,000	W, D, C
West Hayes Street - Cascade Drive to Settlemier Avenue	$800,000	W
Intersection/Access Management Improvements		
Signal Coordination Along Highway 99E	$100,000	W, S
Added Signal - Highway 214/Park Avenue	$120,000	W
Sidewalks		
Front Street - Cleveland Street to Parr Road	$100,000	W
Off-Street Pathways		
Goose Creek Corridor - Mill Creek to Astor Way	$430,000	W
Public Transit System Improvements		
Intercity Bus Service Phase 1 (to Portland) - One Vehicle	$150,000	W, S
Intercity Bus Service Phase 1 (to Portland) - Operating Cost (5 Years)	$400,000	W, S
Park-n-Ride (Phase 1) (150 spaces)	$500,000	W
Intracity Bus Service - Operating Cost (5 years)	$700,000	W, S
Total Cost	**$19,160,000**	
Cost/Year	**$3,832,000**	

Funding Sources: S - State, W - City of Woodburn, C - Marion County, D - Developer

1 Cost estimate of northerly South Arterial alignment (with split diamond or existing interchange).

Table 17

Proposed Transportation Improvements: Next 11-20 Years

Project Title	Estimated Cost (1995 $)	Potential Funding Source
Roadway System Capacity Improvements		
I-5 Interchange	$13,500,000[1]	W, S
Widen Highway 214 - Cascade Drive to Park Avenue	$1,520,000	W, S
South Arterial - Boones Ferry Road to Highway 99E	$3,070,000	W, S
Cooley Road Extension	$2,350,000	W, D
Improvements to Meet Woodburn Street Design Standards		
Hardcastle Avenue - Cooley Road to Front Street	$2,360,000	W
Young Street - Highway 214 to Front Street	$1,130,000	W
Lincoln Avenue - UGB to Highway 99E/Gatch Street to Front Street	$1,480,000	W
Intersection/Access Management Improvements		
Intersection Channelization - Highway 214/Highway 211/Highway 99E	$230,000	W, S, D
Sidewalks		
Astor Way - Highway 214 to Country Club Road	$100,000	W
Lincoln Street - Highway 99E to Gatch Street	$75,000	W
Various Local Streets (0-20 Years)	$100,000	W
Off-Street Pathways		
Mill Creek Corridor - Young Street to South Arterial	$360,000	W
West Mill Creek Corridor - Mill Creek to UGB	$440,000	W
Public Transit System Improvements		
Intracity Bus System - Added Vehicles	$330,000	W, S
Intracity Bus System - Operating Cost (10 years)	$2,900,000	W, S
Intercity Bus Service Phase 2 (to Salem) - Additional Vehicles	$150,000	W, S
Intercity Bus Service Phase 2 (to Salem) - Operating Cost (10 years)	$800,000	W, S
Intercity Bus Service Phase 1 - Operating Cost (10 years)	$800,000	W, S
Park-n-Ride - Phase 2 (100 spaces)	$300,000	W
Total Cost	**$31,995,000**	
Cost/Year	**$3,199,000**	

Funding Sources: S - State, W - City of Woodburn, C - Marion County, D - Developer

1 Cost estimate for I-5 split diamond interchange.

Table 18

Proposed Transportation Improvements: Next 21+ Years

Project Title (Time Period)	Estimated Cost (1995 $)	Potential Funding Source
Improvements to Meet Woodburn Street Design Standards		
Cascade Street - West Hayes Street to Highway 214	$500,000	W
Cleveland Street - Brown Street to Highway 99E	$920,000	W
Woodland Avenue - Highway 214 to Willow Avenue	$940,000	W
Total Cost	**$2,360,000**	

Funding Sources: S- State, W-City of Woodburn, C - Marion County, D - Developer

Table 19
Summary of Transportation Funding Programs: Federal Sources

Program Name	Description	Potential for Woodburn Urban Area
Intermodal Surface Transportation Efficiency Act (ISTEA)	ISTEA is designed to provide flexibility in federal funding of transportation projects. ISTEA established several funding programs including teh: 1) National Highway System; 2) Interstate Program; 3) Surface Transportation Program; 4) Congestion Management and Air Quality Improvements Program; and 5) National Scenic Byways Program. Federal funding for transity under ISTEA is discussed with the Special Transportation Grant Program under State Sources because these federal funds are combined with state and local funds.	As a grant/transfer program, ISTEA provides opportunities to fund selected projects meeting the program's funding criteria. As with all grants, cost to local residents are low, political acceptability is high, and financial capacity and stability are less predictable than for many local funding sources. Woodburn should coordinate with the ODOT Region2 planner, and the Mid-Willamette Valley Council of Governments to identify projects that are suitable for funding under ISTEA.
Surface Transportation Program (STP)	The Surface Transportation Program was uathorized by Title I of the ISTEA. The STP funds are allocated to the State and suballocated to cities and counties on a formula basis by the Oregon Transportation Commission. STP funds may be used for any road that is not functionally classified as a local or rural minor collector and must be included in the Transportation Improvement Program to receive STP funds.	Each eligible city is suballocated as a portion of the State's STP funds. Cities can propose projects through their regional ODOT offices. The project sponsor (County, City, or State) must request inclusion of the project in the annual Statewide Transportation Improvement Program. The STP provides opportunities to fund selected projects that meet program criteria. Woodburn should coordinate with the ODOT Region 2 planner, and the Mid-Willamette Valley Council of Governments to identify projects that are suitable for funding under ISTEA.
Transportation Enhancement Program (Part of STP)	The ISTEA includes provisions that require the State to set aside a portion of its Surface Transportation Program (STP) funds for projects that will enhance the cultural and environmental value of the State's transportation system. Eligible transportation enhancement projects must be directly related to the intermodal transportation system. This program funds enhancements including pedestrian and bicycle facilities; preservation of abandoned railway corridors; landscaping and other scenic beautification; control and removal of outdoor advertising; acquisition of scenic easements and scenic or historic sites; scenic or historic highway programs; historic preservation; rehabilitiation and operation of historic transportation buildings, structures, or facilities; archaeologocial planning and research; and mitigation of water pollution due to highway runoff.	Enhancement project applications are submitte dto the applicant's ODOT Region Manager. Proposed projects are then screened and prioritized by the Transportation Enhancement Committee. Approved projects receive funding under the State's transportation enhancement activities program. Transportation enhancement projects are selected as part of the State Transportation Improvement Program (STIP) development This program provides opportunities to fund selected projects that meet program criteria. Woodburn should coordinate with the ODOT Region 2 planner, and the Mid-Willamette Valley Council of Governments to identify projects that are suitable for funding under ISTEA.
Highway Enhancement System (HES)	The FHWA Highway Enhancmeent System Program provides funding for safety improvement projects on public roads. Safety improvement projects may occur on any public road and must be sponsored by a county or city. To be eligible for Federal aid, a project should be part of either the annual element of a Regional Transportation Plan or the annual listing of rural projects by ODOT, although they do not have to be part of the approved State Highway Improvement Program to receive HES funding.	The HES provides opportunities to fund selected projects that meet program criteria. Woodburn should coordinate with the ODOT Region 2 planner, and the Mid-Willamette Valley Council of Governments to identify projects that are suitable for funding under ISTEA.

Table 19
Summary of Transportation Funding Programs: Federal Sources (continued)

Program Name	Description	Potential for Woodburn Urban Area
Timber Receipts (USFS)	The United States Forest Service shares 25 percent of national forest receipts with counties. By Oregon law (ORS 294.060), Marion County then allocates 75 percent of the national forest receipts to the road fund and 25 percent to local school districts. Marion County has received an average of $3.5 million per year in timber revenues between FY86 - FY90. The County Share of forest revenues is a gradual decline due to the "spotted owl compromise" under which counties are guaranteed revenues on a schedule set by Congress that gradually reduces this support over the next decade, reaching $2.1 million in FY03.	U.S. Forest Service revenues have permitted Marion County to make significant capital improvements to its road system. With respect to Woodburn, timber revenues get mixed in with other sources to the Marion County Road Fund. Marion County has occasionally participated in cost-sharing with the city on project within Woodburn's city limits. Opportunities for county cost-sharing are discussed on a project-by-project basis, and Woodburn should continue to seek county cost-sharing where possible. Though its political feasibility has not been explored, there is an argument to be made that part of the County's allocation of federal timber receipts should be spent inside Woodburn because residents of Woodburn are also residents of Marion County. To some extent that already occurs: County Road Funds are used on County roads inside the UGB. They could also be used, however, on major city streets.
Community Development Block Grants (CDBG)	Community Development Block Grants (CDBG) are administered by the Department of Housing and Urban Development (HUD) and could potentially be used for transportation improvements in eligible areas.	CDBG has the potential to provide funding for eligible projects, but, the prospects for increased municipal revenues for CDBG are limited. Long-term stability of this source is uncertain. Cities have traditionally used CDBG funds for projects other than transportation. Although CDBG funds could be used for transportation, the City may have other priorities for this funding source. Overall potential of this source for transportation funding is low.

Source:Compiled by ECO Northwest

Table 20
Summary of Transportation Funding Programs: State Sources

Program Name	Description	Potential for Woodburn Urban Area
State Highway Fund	The State Highway Fund composed of gas taxes, vehicle registration fees, and weight-mile taxes assessed on freight carriers. In 1994, the state gas tax was $0.24 per gallon. Vehicle registration fees were $15 annually. Revenues are divided as follows: 15.57 percent to cities, 24.38 percent to counties, and 60.05 percent to the State Highway Division. The city share of the State Highway Fund is allocated based on population. Both Marion County and Woodburn use their allocations to fund street maintenance. ORS 366.514 requires at least one percent of the State Highway Fund received by the State Highway Division, counties and cities be expended for the development of footpaths and bikeways. The Highway Division adminsiters the bicycle funds, handles bikeway planning, design, engineering and construction, and provides technical assistance and advice to local governments concerning bikeways.	Woodburn has received an average of about $569,000 annually from this source in recent years Marion County will receive about $12.2 million in FY95. Revenues from this source are relatively stable, but, because the State Highway Fund is not indexed for inflation, the relative share could decrease if taxes are not increased. The per capita allocation of State Highway Fund revenues will probably not increase significantly. The City should continue to use this source to fund street maintenance. Though its political feasibility has not been explored, there is an argument to be made that part of the County's allocation from the Oregon Highway Fund should be spent inside Woodburn because vehicle registrations inside Woodburn help generate those revenues, and Woodburn roads are used substantially by vehicles registered elsewhere in Marion County. To some extent that already occurs: County Road Funds are used on County roads inside the UGB. They could also be used, however, on major city streets. The bikeway program provides opportunities to fund bicycle and pedestrian projects that meet program criteria. The City should work with ODOT Region 2 Planner identify projects that are suitable for funding under this program.
Special Public Works Fund (SPWF)	The State of Oregon allocates a portion of revenues form the state lottery for economic development. The Oregon Economic Development Department provides grants and loans through the SPWF program to construct, improve and repair infrastructure to support local economic development and create new jobs. The SPWF provides a maximum grant of $500,000 for projects that will help create a minimum of 50 jobs.	Cities and counties can use SPWF funds for transportation projects. One potential use for SPWF funds is to develop infrastructure in office or industrial parks. As with all grant programs, stability and long-term potential of this source is uncertain. Woodburn should contact OEDD to pursue funding from this source.
Transportation Access Charges	The most familiar form of a transportation access charge is a bridge or highway toll. Transportation access charges are most appropriate for high-speed, limited access corridors; service in high-demand corridors; and bypass facilities to avoid congested areas. Congestion pricing, where drivers are charged electronically for the trips they make based on location and time of day, is the most efficient policy for dealing with urban congestion. It not only generates revenue for maintenance and improvements, but also decreases congestion and the need for capital improvements by increasing the cost of trips during peak periods. The Oregon Revised Statutes allow ODOT to construct toll bridges to connect state highways and improve safety and capacity. The Statues also allow private development of toll bridges. Recent actions by the Oregon legislature provide authority for developing toll roads. State authority for congestion pricing does not exist; new legislation would be required.	Toll roads are relatively uncommon in Oregon and would not receive public support unless the benefits *improved access, safety, or decreased travel times) were clearly perceived by users. Despite its clear benefits, congestion pricing will be a tough sell in Woodburn. Congestion pricing, if pursured by the City of Woodburn, should cover all major roads and be viewed first as a congestion management strategy, and only secondarily as a revenue source.

Table 20
Summary of Transportation Funding Programs: State Sources (continued)

Program Name	Description	Potential for Woodburn Urban Area
Traffic Control Projects	The State maintains a policy of sharing isntallation, maintenance, and operational costs for traffic signals and luminaire units at intersections between State highway and city streets (or county roads). Intersections involving a State highway and a city street (or county road) which are included on the state-wide priority list are eligible to aprticipate in the cost sharing policy. The Oregon State Highway Division establishes a statewide priority list for traffic signal installations on the State Highway Ssytem. The priority system is based on warrants outlined in the Manual for Uniform Traffic Control Devices. Local agencies are responsible for coordinating the statewide signal priority list with lcoal road requirements.	The Traffic Control Projects program provides opportunities to fund projects that meet programcriteria. Woodburn should coordinate with the ODOT Region 2 planner, and the Mid-Willamette Valley Council of Governments to identify projects that are suitable for funding under ISTEA.
Special Transportation Grant Program	The *Community Transportation Program (CTP)* provides grants for passenger transportation services for senior citizens, people with disabilities, and the general public. The CTP combines two programs that were previously run separately; the *Special Transportation Grants (STG)* program, the *Small and Rural Area Capital Assistance Program.* The *Special Transportation Fund (STF)* program provides ongoing revenue to transportation districts to finance transportation services for people over 60 years of age or people with disabilities. The fund may be used for the creation, maintenance or expansion of transportation services for the elderly and disabled. Counties, transportation districts, cities and nonprofit organizations are eligible for these funds. Private passenger transportation companies may also participate through service agreements with local governments. Eligible activities include planning, capital investments, operating assistance, system development, and transportation demand management projects.	The Community Transportation Program is financed by a combination of State, Federal, and local matching funds. The program has two matching ratios. The matching ratio for capital purchase/construction projects and planning projects is: CTP Financing, 80 percent; and grant recipient 20 percent. The matching ratio for net operating expenses of an operating assistance proposal is; CTP Financing, 50 percent, and recipient, 50 percent. The Special Transportation Fund is distributed to eligible districts and counties in the following ways: - Three-fourths of the fund on the basis of population. - A minimum allcoation of $15,000 - Annual adminsitrative allotment of $2,000. - Remaining funds deposited in the State STG account. The CTP program provides opportunities to fund pbulic transportation services to senior citizens and disable individuals.

1. State or Marion County funds. Obtain more projects or funds from the State for improvements to state highway facilities. Options for cost sharing with the County for mutually beneficial projects should be explored.
2. For the projects that are needed as a result of proposed development, the property owners or developers that directly benefit where appropriate should fund all or a portion of the project cost.
3. For projects that do not tie directly to new development or directly benefit property owners that are willing to pay for the project, spread the cost should be provided from existing transportation funding sources such as TIF fees.
4. Use general obligation bonds backed by property tax revenue, where this source is determined by City staff and the governing body to be fair and viable.

The likely funding sources for transportation improvements in Woodburn by jurisdiction level: (state, county, and local) are presented below. Following this discussion are three tables that describe specific transportation funding sources at the federal, state, and local level, and the potential for these sources to fund projects in Woodburn.

10.5.1 Federal and State Sources

For a small city like Woodburn, a key point to understand about federal funding is that the State passes through much of the funding to local jurisdictions. Woodburn would access those funds primarily by working with ODOT, especially ODOT planners in Region 2. The key factor for major transportation improvements is getting them included as part of the State Transportation Improvement Plan that gets adopted every two years.

ODOT maintains interstate and state highways—in Woodburn, I-5 and Highways 99E, 211, 214, and 219. Therefore, state and federal funds administered through ODOT are the primary sources of funding for improvements to I-5 and Highways 99E, 211, 214, and 219—projects that involve these highways account for $1.3 million in the next 5 years, $11.3 million in the following 5 years, and $15 million in the following 10 year period. In addition, the City may be able to secure federal or state funding for improvements that would reduce congestion or otherwise improve traffic flow on state-maintained roadways. The City should take an active role in representing the transportation priorities of Woodburn to ODOT during its process of formally incorporating priorities into its State Transportation Improvement Program.

ODOT typically funds half of the traffic signals on state highways. If this arrangement can be made for each of the traffic signals identified in the Woodburn Transportation Improvement program, ODOT would provide $320,000 for traffic signals.

State funding is available for funding bike lane modifications in Woodburn. State law requires 1% of the State Highway Fund received by cities be expended for the development of footpaths and bikeways—for Woodburn this amounts to $4,800–6,250 annually.

Another state source of revenue is lottery funds that are allocated to the Special Public Works Fund and the Immediate Opportunity Fund. These funds provide grants and loans to construct and improve infrastructure that supports local economic development. Woodburn should pursue lottery funding through the Oregon Economic Development Department.

Federal ISTEA programs fund selected transportation projects that meet program criteria. The Surface Transportation Program provides funds for any street that not classified as a local or rural minor collector. The Transportation Enhancement Program provides funds for enhancing pedestrian and bicycle facilities, landscaping and other scenic beautification, and improvements to scenic or historic sites. This program may be a source of funds for projects that include adding bike lanes, sidewalks, and/or off-street paths, and possibly for projects in historic areas such as downtown Woodburn. The Highway Enhancement Program provides funds for safety improvement projects on public roads. To receive ISTEA funding from these programs, a project must meet the criteria and be included in the Statewide Transportation Improvement Program. Woodburn should work with Region 2 planners at ODOT to identify projects eligible for ISTEA funds and to have these projects included in the Transportation Improvement Program.

Woodburn should continue to seek federal and state grants for transit operation and equipment purchases. Given Woodburn's past success at securing grants for equipment purchases, the City may be able to fund all of the equipment purchases identified in this chapter with federal and state grants. ODOT's forecast of funds in the Special Transportation Fund indicates that state funds available for local transit operations will dwindle over the next 20 years.

10.5.2 County Sources

The City of Woodburn and Marion County occasionally participate in cost sharing on individual projects. There is no formal process for the City to seek cost sharing—decisions are made on a project-by-project basis. Woodburn may be able to secure an occasional cost-sharing arrangement or grant from Marion County. Currently, Marion County maintains roadways outside the city limits but inside the UGB. Woodburn should seek to coordinate with Marion County on transportation improvements in this area to direct County funds to identified transportation projects where possible.

10.5.3 Local Sources

Woodburn should continue to pursue federal, state, and county funds for transportation projects. External funding sources are not likely to fund all the improvements identified in the list of transportation improvement needs. Woodburn will need to find local sources to fund some if not most of the transportation improvements.

Woodburn should continue to seek funds from property owners that directly benefit from transportation improvements and from new development. Roadway system capacity Improvement projects may place new streets near properties that currently lack automobile access—access that is necessary for the properties to develop. In these cases there is a very direct benefit to property owners and a direct relationship to future development on the properties, making these improvements eligible for funding through Local Improvement Districts and Transportation Impact Fees (TIF). Other roadway improvements should help improve access to existing businesses; in these cases Woodburn should pursue LID financing. When the Woodburn City Council evaluates the TIF after its five-year trial, they should consider increasing the fee to cover more of the full cost of projects needed to serve new development. Woodburn may want to issue revenue bonds backed by TIF revenue to construct projects in advance of new development it will serve.

If additional local revenue sources are needed, Table 21 shows the range of possibilities that the City could consider. Increasing the "local option" gas tax may be politically attractive because it places some of the burden on non-residents. At current levels of gasoline consumption, every 1¢ cent per gallon increase will generate around $100,000 in annual revenue.

Given the high level of annual expenditures needed to construct the transportation projects identified, it is likely that existing sources of transportation revenue will fall short. In this case Woodburn should carefully evaluate projects to look for lower-cost alternatives and to make sure the projects are needed. If additional funding sources are still needed, Woodburn may want to consider implementing the Street Utility Fee described in Table 19. While this fee charges residents and local businesses based on the transportation demand they generate, it will probably not have strong political support. The City may use property tax revenue and/or issue General Obligation bonds backed by property tax revenue to finance transportation improvements. Given population growth in Woodburn, there will likely be many competing uses for property tax revenue.

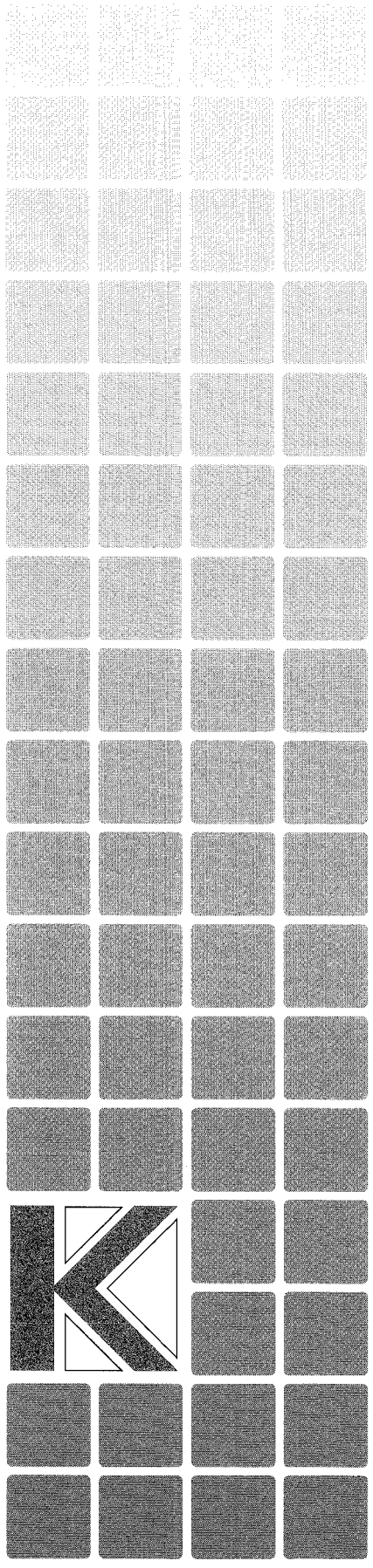
Increases in property values and continued development in Woodburn should increase property tax revenues available to the City General Fund for transit operation funding. This increased revenue should come close to meeting the increased operating costs associated with improvements in transit service. Improvements in transit service will have to compete with other City services such as police, library, and parks for property tax revenues. Significant increases in service will probably be tied to identification or implementation of supplemental funding sources. Farebox revenue will probably continue to contribute only a small share of transit funding in Woodburn.

Table 21
Summary of Transportation Funding Programs: Local Sources

Program Name	Description	Potential for Woodburn Urban Area
Special Assessments/Local Improvement Districts	Special assessments are charges levied on property owners for neighborhood public facilities and services, with each property assessed a portion of total project cost. They are commonly used for such public works projects as street paving, drainage, parking facilities, and sewer lines. The justification for such levies is that many of thes epublic works activities provide services to or directly enhance the value of nearby land, thereby providing direct and/or financial benefit to its owners. Local Improvement Districts (LIDs) are legal entities established by the City to levy special assessments designed to fund improvements that have local benefits. Through a local improvement district (LID), streets or other tranpsortation improvements are constructed and a fee is assessed to adjacent property owners. The City of Woodburn has generated an average of $29,000 annually from special assessments in the last four fiscal years.	Special assessments require property owners pay assessments for transportation infrastructure. If based on trip generation rates, this approach is somewhat equitable; however, individuals have different transportation needs and habits. Designing a fee structure that recognizes these differences would be difficult to administer. With respect to LIDs, as long as the projects directly benefit the local residents, LIDs are a relatively equitable means of funding tranpsortation improvements. Woodburn should continue to use special assessments to finance transportation improvements wherever property owner support appears possible.
Systems Development Charges (Impact Fees)	Systems Development Charges (SDCs) are fees paid by land developers intended to reflect the increased capital costs incurred by a municipality or utility as a result of a development. Development charges are calculated to include the costs of impacts on adjacent areas or services, such as increased shcool enrollment, parks and recreation use, or traffic congestion. Numerous Oregon citiefs and counties presently use SDCs to fund transportation capacity improvements. SDCs are authorized and limited by ORS 223.297 - 223.314. The City of Woodburn generated $14,000 in FY93-94 from transportation impact fees, and over $200,000 in FY95.	The basic principle for setting a transportation SDC is to charge each new development its proportional share of the cost of constructing enough new road and other system improvements to accommodate traffic from all new development causing the need for improvement. The financial capacity of a systems development charge depends on the volume of development and the amount of the SDC. Fees are seldom set to recover the full cost of developing off-site road capacity ot accommodate the new development. Woodburn should continue to use transportation imapct fees to finance transportation improvements. The TIF is currently 26% of the level recommended by the consultant that developed the mothod for assessing the fee; a 100% TIF would have generated $56,000 in FY93-94.
Local Gas Tax	A local gas tax is assessed at the pump and added to existing state and federal taxes. Tillamook and The Dalles are two Oregon cities that have a local gas tax. Multnomah and Washington Counties also have gas taxes. Woodburn currently has a $.01 per gallon gas tax that has generated an average of $103,000 per year ove rhte last five fiscal years.	Local gas taxes typically range from $.01 to $.03. Woodburn could expect to generate about $100,000 annually per penny increase in the gas tax, based on recent gas tax revenue. A gas tax increase may require city-wide voter approval.
Local Parking Fees	Parking fees are a common means of generating revenue for public parking maintenance and development. Most cities have some public parking and many charge nominal fees for use of public parking. Cities also generate revenues from parking citations. These fees are generally used for parking-related maintenance and improvements.	Parking fees are a reasonable means of paying for a scare resource (parking spaces) in densely developed areas. The City's ability to generate enough additional revenue from this course to address unfunded transportation needs is limited.

Table 21
Summary of Transportation Funding Programs: Local Sources (continued)

Program Name	Description	Potential for Woodburn Urban Area
Street Utility Fee	Most city residents pay water and sewer utility fees. Street user fees apply the same concepts to city streets. A fee would be assessed to all businesses and households in the city for use of streets based on the amount of use typically generated by a particular use. For example, a single-family residence might, on average, generate 10 vehicle trips per day compared to 130 trips per 1,000 square feet of floor area for retail uses. Therefore, the retail use would be assessed a higher fee based on higher use. Street service fees differ from water and sewer fees because usage cannot be easily monitored. Street user fees are typically used to pay for maintenance more than for capital projects. A street utility fee currently generates about $1.3 million annually in Medford. The amount of the fee is based on the type of land use which relates to trip generation. Single-family residences pay $2.00 per month in Medford. In Ashland, a fee of $1.60 per month generates $200,000 per year.	Woodburn could expect from $208,800 to $261,000 in revenue from a street user fee of $2.00 per month for residences. With about 5,441 residences, the residential share would be $130,500 (12*2*5,441) and the commercial share would probably produce between 60 to 100 percent of the amount paid by residential properties, or $78,300-$130,500 (information on the square feet of non-residential development in the City is not available). Street user fees would be a very stable revenue source. They could be expected to increase at a rate comparable to population in Woodburn. Street utility fees could provide a substantial, stable revenue stream for the City. This is a relatively equitable approach that assesses fees based on trip generation.
Vehicle Registration Fees	Counties can implement a local vehicle registration fee. The fee would operate similar to the state vehicle registration fee. A portion of the County fee would be allocated to Woodburn.	A vehicle registration fee would produce a relatively reliable revenue stream. A vehicle registration fee would be a stable and equitable approach to funding transportation improvements.
Property Taxes	Local property taxes could be used to fund transportation. The City policy, however, has been to use property taxes to fund public safety, libraries, parks, transit and other miscellaneous services.	In Oregon and Woodburn, Ballot Measure 5 places a $15 per $1,000 in assessed value ceiling on property taxes. The potential for using property tax revenues for transportation purposes is limited in Woodburn more by the need for voter approval than by Ballot Measure 5.
Revenue Bonds	Revenue Bonds are bonds whoe debt service is financed by user charges, such as service charges, tolls, admissions fees, and rents. If revenues from user charges are not sufficient to meet the debt service payments, the issuer generally is not legally obligated to levy taxes to avoid default, unless they are also backed by the full faith and credit of the issuing governmental unit. In that case, they are called indirect general obligation bonds. Revenue bonds could be secured by a local gas tax, street utility fee, or other transportation-related stable revenue stream.	The City could sell revenue bonds using one of several income streams pledged to repay the bonds. Bond underwriters analyze the reliability of the revenue stream when rating the bonds and assigning an interest rate. The city should use or develop an income stream that is indexed to transportation facility use before using revenue bonds to fund transportation projects.



Section 11

Land Use Ordinance Modifications

11.0 Land Use Ordinance Modifications

11.1 Introduction

The Transportation Planning Rule (OAR Chapter 660, Division 12) stipulates that each local jurisdiction in the State of Oregon adopt an approved transportation plan and make amendments to its land use regulations in order that transportation plans be properly implemented. The primary goal of the required ordinance amendments is to make future developments more pedestrian and transit friendly. The Rule was originally adopted by the Land Conservation and Development Commission (LCDC) in April 1991. In 1993, an amendment to the rule extended the implementing measures compliance deadline for local jurisdictions to May, 1994. In May, 1995, the urban portions of the Transportation Planning Rule were updated to include greater emphasis on bicycle, pedestrian, changed building orientation, and transit friendly developments.

This section introduces proposed land use ordinance concepts designed to bring the City of Woodburn into compliance with the rule. Sources used to prepare this report include recommendations of the American Planning Association (APA) Transportation Rule Working Group, the Oregon Department of Transportation's (ODOT) Best Management Practices manual (August 1992 draft), the City of Newberg's Pedestrian Oriented Commercial Development Workbook, and Tri-Met's Planning and Design for Transit.

This section outlines the state-mandated land use regulations to implement the Woodburn Transportation System Plan, and recommends methods for satisfying those requirements. Specific Woodburn plan and ordinance text modifications are in Appendix E.

11.2 Requirements of the Transportation Planning Rule

Section 660-12-045 of the Transportation Planning Rule sets forth several land use regulation issues that must be addressed to implement a Transportation Systems Plan. Key issues are discussed below.

Protection Of Transportation Facilities And Corridors

Ordinance regulations are required to protect transportation facilities and corridors including:

- access control measures;
- standards to protect future operations;
- a process for coordinated review;
- a process for providing notice to public agencies; and
- regulations assuring that development standards are consistent with transportation system capacity.

Land Use And Subdivision Regulations

Land use and subdivision regulations are required for the following:

- bicycle parking for multifamily, commercial, and institutional development;

- sidewalks and bikeways that provide safe and convenient access within new development and from it to nearby residential areas, transit stops, and activity centers; and
- internal pedestrian connections provided in new office parks and commercial development

Transit Facilities

Land use and subdivision regulations are required for transit facilities. Ordinances shall provide:

- bus stops and other facilities where appropriate;
- preferential access to transit through building orientation and clustering for new retail, office, and institutional buildings near planned transit stops;
- preferential parking for carpools and vanpools;
- opportunities to redevelop parking areas for transit-oriented use;
- road systems that include pedestrian and bicycle access to identified transit routes; and
- designation of types and densities of land use adequate to support transit.

Reduced Reliance On The Automobile

In Metropolitan Planning Organization (MPO) areas, local governments are required to adopt regulations that reduce reliance on automobiles including:

- allowing transit-oriented development along transit routes;
- adopting a demand management program;
- adopting a parking plan; and
- requiring major industrial institutional retail and office uses to provide a transit stop along transit trunk routes.

Improvements For Bicycle And Pedestrian Travel

Identification of improvements to facilitate bicycle and pedestrian travel in developed areas are required, including:

- improvements providing direct, convenient, and safe bicycle and pedestrian travel within and between residential areas and activity centers.

11.3 Suitability of Existing Ordinances

The Transportation Planning Rule requires that cities and counties reduce reliance on the automobile and promote alternative modes of travel, such as walking, cycling, and transit. The rule also stipulates that local development ordinances be consistent with the objectives of the rule. Generally, this requirement has required that new standards and policies be added to local ordinances to assure that new development and new facilities are pedestrian and transit friendly.

As in other communities, new standards have been developed in Woodburn to address street widths, sidewalks, connections between buildings and developments and other related design

concepts. These concepts are implemented through site review procedures and through subdivision and partitioning procedures.

There are sections of the Woodburn Zoning Ordinance that need to be made more clear and objective to avoid staff use of discretion. Planning Commission review and the opportunity for a de novo hearing provide a check for the discretionary process, however this review can result in procedural delays. Establishment of more clear and objective standards and streamlining the staff-level review process could simplify the development review process.

11.4 Recommendations - General Issues

The following sections address the specific requirements of the Transportation Planning Rule. Each section provides background information of relevant issues, recommendations, and a reference to proposed amendments to the Comprehensive Plan, Zoning Ordinance, Subdivision Standards, or other amendments as deemed necessary.

Issue: Incorporation Of New Standards In Zoning And Land Division Ordinances

Background/Options: The Woodburn Zoning Ordinance needs to incorporate the development standards that are currently outlined in the Woodburn Draft Transportation System Plan. Some of the standards, notably those pertaining to street widths, cul-de-sacs, alley ways, block widths, block lengths, and related development issues need to be updated.

The Zoning Ordinance needs to make more references to the Subdivision Standards document.

Recommendation: Amend the zoning ordinance by adding a new Section 8.011 - Transportation Planning Design Standards and Procedures. Revise the Subdivision Standards by modifying Section 12.

See Appendix E: New Zoning Ordinance, Section 8.011-Transportation Planning Design Standards and Procedures and Appendix E: Subdivision Standards Amendments, Section 12J.

11.5 Recommendations - Protection of Transportation Facilities, Corridors, and Sites

Issue: Access Control Measures and Standards to Protect System Operation and Airports

Rule Requirements: OAR 660-12-045 (2) (a-c)

Background/options: Access control is a critical component of maintaining operation of the transportation system. The Oregon Department of Transportation (ODOT) manages access control on State Highways 211, 214, and 99E through Woodburn. Currently, ODOT relies on ORS 374.310(3) and OAR 734-50-030(2) and -065 to manage access. Guidelines for access are provided in the Access Management Classification System of the 1991 Oregon Highway Plan.

The City of Woodburn accepts dedicated rights-of-way as part of the subdivision or partition plan review process. Standards for right-of way widths are specified for each street classification in the Subdivision Standards but such standards need to be included in the Zoning Ordinance and as part of the site plan review process.

Recommendation: Apply the standards and include them in the site plan review section of the Zoning Ordinance (Appendix E).

See Appendix E: New Zoning Ordinance Section, Section 11.070 (i)-Access Control Standards and Guidelines.

11.6 Recommendations - Land Use And Subdivision Regulations

Regulations

Issue: Bicycle Parking For Multifamily, Commercial And Instituional Development

Rule Requirements: OAR 660-12-045 (3)(a).

Background/options: Bicycle parking requirements can either be tied directly to the number of automobile parking spaces or to a separate list. It is generally simpler to tie the requirements to existing parking requirements. Key issues include:

1. **Applicability**

   The rule requires parking for buildings containing four units or more. Exemptions for temporary uses and land extensive uses should be provided.

2. **Number and Type**

   Some jurisdictions provide standards for both short and long term bicycle parking. This results in relatively complex standards. Standards may be applied as a percentage of auto parking. Typical ranges include 5% (Portland) to 20% (Ashland), with a minimum number.

3. **Location**

   The location of a bicycle parking facility influences how often it is used. Typical standards include:

   - within 50 feet of a main entrance
   - closer to the entrance than the nearest auto space
   - direct access to the right-of-way
   - dispersed parking for multiple entrances.

4. **Amenities**

   Amenities also influence how often a facility is used. Amenity standards should specify the type of rack to be provided and whether racks are lighted and openly visible. In addition standards should address covered parking typical standards including:

   - covered bicycle parking when auto parking is covered
   - covering 50%, if more than 10 spaces are required

Recommendation: Include the bicycle parking standards as part of Section 10.070-Parking and Loading Area Development Requirements of the Zoning Ordinance. Bicycle parking

standards also need to be included in the Woodburn Bicycle Plan. Apply the concepts listed above and tie to 10% of the auto parking standard.

See Appendix E: Amendments to the Parking and Loading Area Development Requirements Section of the Zoning Ordinance for Bicycle Parking, Section 10.071 - Bicycle Parking.

Issue: Sidewalks and Bikeways that Provide Safe and Convenient Access Within and From NewDevelopment to Nearby Residential Areas, Transit Stops, and Activities Centers

Rule Requirements: OAR 660-12-045 (3)(b)

Background/options: A primary purpose of the Transportation Planning Rule is to reduce reliance on automobiles and make other forms of transportation, such as walking and bicycling, more accessible. To this end, the rule requires sidewalks and bikeways on arterials and collectors and separate accessways, where appropriate.

1. **Sidewalks**

   Some streets in Woodburn do not have sidewalks. Although the Transportation Planning Rule requires sidewalks only on collectors and arterials (which is current policy for the City of Woodburn), provision of sidewalks on all city streets, including local streets, would further enhance access linkages for pedestrians. The Senior Estates area would be exempt from this requirement, and as such would constitute a special area in the pedestrian plan. With this requirement, it is assumed that neighborhoods of the city currently lacking sidewalks would participate in local improvement districts to provide the facilities.

   The standard width for all existing sidewalks (on local, collector, or arterial streets) is five feet. Standards recommended by the APA Transportation Rule Working Group range from a five-foot width for a setback residential sidewalk on a local street to a ten-foot width for a commercial curbed sidewalk on an arterial (an eight-foot width for sidewalks along major arterials has been proposed). It should be noted that for pedestrian safety and comfort sidewalks should be set back from the curb.

2. **Bikeways**

   The rule requires bikeways on arterials and collectors. Bikeways should meet minimum American Association of State Highway Officials (AASHTO) standards and the standards of the 1992 Oregon Bicycle Plan. To provide five-foot to six-foot-wide bikeways, right-of-way standards should be adjusted where on street parking is desired. It may be appropriate to identify bikeways on certain local streets. Appropriate right-of-way dedications will be needed on those streets.

3. **Connections/Accessways**

   Street connections and accessways between developments are important links that promote, rather than prevent, cycling and walking. One way to create these connections is to limit the use of cul-de-sacs and to require new streets to connect with the existing street network.

   Changes in the Woodburn Subdivision Standards are needed to include:

   - a requirement to submit a future street plan, which includes all land located within 400 feet of the subdivision;

- a limit or prevention for the use of cul-de-sacs and a restriction on cul-de-sac length;
- a provision for pedestrian accessways at a minimum of 600-foot intervals; and
- a requirement that pedestrian accessways to be a minimum of 15 feet wide with a 10 foot-wide paved surface.

4. **Block and Street Spacing**

Block length and spacing between streets influences access through a neighborhood. Generally, shorter block lengths provide easier access. Currently, Woodburn Subdivision Standard limit block length to 1,200 feet. The APA Working Group recommends that block perimeters not exceed 1,500 feet (i.e. 550 foot block lengths with 100 foot deep lots). As an alternative, a 1,600-foot perimeter would allow 600-foot block lengths with 100-foot-deep lots.

Recommendations: Provide sidewalks on all streets consistent with the APA Working Group recommendations. Amend city standards and the land division ordinance, as appropriate. Develop bikeways consistent with AASHTO standards.

Discourage the use of cul-de-sacs and limit their length to a maximum of 400 feet; cul-de-sacs shall serve no more than eighteen single-family dwellings. Each cul-de-sac shall have a circular end with a minimum diameter of right-of-way width.

Develop new standards for block length and accessways, as noted above. Block length shall not exceed 1,200 feet. In addition, when necessary for public convenience and safety, the Planning Commission may require a land divider to dedicate to public access ways to connect to cul-de-sacs, to pass through oddly shaped or unusually long blocks, to provide networks for public paths according to adopted plans, or to provide access to schools, parks, or other public areas.

Establish platting standards for alleys. The width of right-of-way and paving design for alleys should not be less than 20 feet, except in the case where an alley abuts land not located in the subdivision or partition. In this case, a lesser width may be allowed at the discretion of the Planning Commission, but the pavement width should not be less than 16 feet. Where two alleys intersect, 10 feet corner cutoffs are recommended. Unless otherwise approved by the Planning Commission, grades should not exceed 12 percent.

See Appendix E: New Plan Policies, Policy 4, Appendix E: New Zoning Ordinance Section, Section 8.011- Sidewalks, Section 8.012- Bikeways, and Section 8.013 - Street Standards Appendix E: Subdivision Standards, Section 12(J).

Issue: Carpool Matching Programs and Preferential Parking for Carpools and Vanpools

Rule Requirements: OAR 660-12-045 (4)(c)

Background/options: The Transportation Planning Rule (TPR) requires that demand management measures be included as a component for evaluation of transportation system alternatives. Transportation demand management measures help improve the performance of transportation facilities and reduces the need for additional roadway capacity. Methods include but are not limited to alternatives to single-occupancy vehicle travel, such as carpooling, vanpooling, cycling, walking, and other trip reduction measures.

The APA Working Group recommends that 10 percent of required parking, but not less than one parking space, be reserved for carpool and vanpool parking. An alternative is to apply the requirement only to new developments with 50 or more employees.

1. **Carpool Matching Programs**

   Transportation demand management is primarily addressed through the provision of programs to encourage alternative modes for work related trips. In Woodburn, carpool programs are a possibility. The City should consider a program to encourage businesses with more than fifty employees to set up carpool matching programs, based on employees' residential location and work shift.

2. **Parking Reductions**

   Parking reductions need to be incorporated into approved transportation demand management (TDM) plans for new developments and redevelopment. Parking reductions of up to 10 percent would be appropriate in proposed high density areas to encourage alternatives to single-occupancy automobile travel, (i.e., carpools, vanpools, walking, and cycling).

   Parking should be made available on a preferential basis. Bicycle parking should be more accessible to buildings than parking for single-occupancy automobile travelers. Parking subsidies for carpool and vanpool users could also be implemented to discourage single-occupancy automobile travel. Alternatively, parking for single-occupancy vehicle travelers could be reduced in number or percentage or made to be more inaccessible to buildings.

Recommendations: Provide TDM measures to encourage carpooling, vanpooling, and reduce parking requirements.

See Appendix E: New Comprehensive Plan Policies and Appendix E: Section 10.100 of the Zoning Ordinance - Carpool and Vanpool Parking.

11.7 Recommendations—Other Modes

Issue: Improvements to Facilitate Bicycle and Pedestrian Travel

Rule Requirements: OAR 660-12-045 (6)

Background/Options: The Transportation Planning Rule requires identification of improvements to facilitate bicycle and pedestrian travel in undeveloped areas. Improvements should provide more direct, convenient, and safe bicycle and pedestrian travel within and between residential areas and activity centers.

Specific improvements should be part of the Transportation System Plan. The standards discussed above will help facilitate development of improvements. One method that has been used in other jurisdictions to create more pedestrian friendly streets is to narrow street width along local streets. Narrowing street widths has the effect of slowing traffic and creating a more compact and efficient development pattern. Currently, the required paved street width for local commercial and industrial streets is 36 feet. Typical widths for narrower pedestrian friendly streets range from 24 to 28 feet.

Recommendation: Include the improvements as part of the City's Transportation Systems Plan. Sidewalks shall be provided on both sides of local, collector, and arterial streets.

See Appendix E: New Plan Policies, Policy 1. Section 8.013 of the Zoning Ordinance Minimum Street Width.

Issue: Internal Pedestrian Connections - Walkway Connections Within Commercial and Office Park Development

Rule Requirements: Recent amendments to the Transportation Rule deleted this requirement, but it is recommended that it be included in the City of Woodburn's Zoning Ordinance.

Background/options: The TPR requires provision of internal pedestrian connections in new office parks and commercial developments. Methods for meeting this provision include:

- At least one sidewalk connection between abutting developments should be provided.
- Walkways should be provided to the street for every 300 feet of frontage.
- Connections should all be direct and driveway crossings minimized.
- Connections should be linked to the internal circulation of the building.
- Walkways should be at least five feet wide. Where possible, walkways should be raised, have curbing, or have different paving material when crossing driveways.

Recommendation: Amend the zoning ordinance by adopting the design standards noted above. Walkway connections should not be less than five feet in width.

See Appendix E: New Zoning Ordinance Section, Section 8.014 - Internal Connections.

Issue: Golf Carts

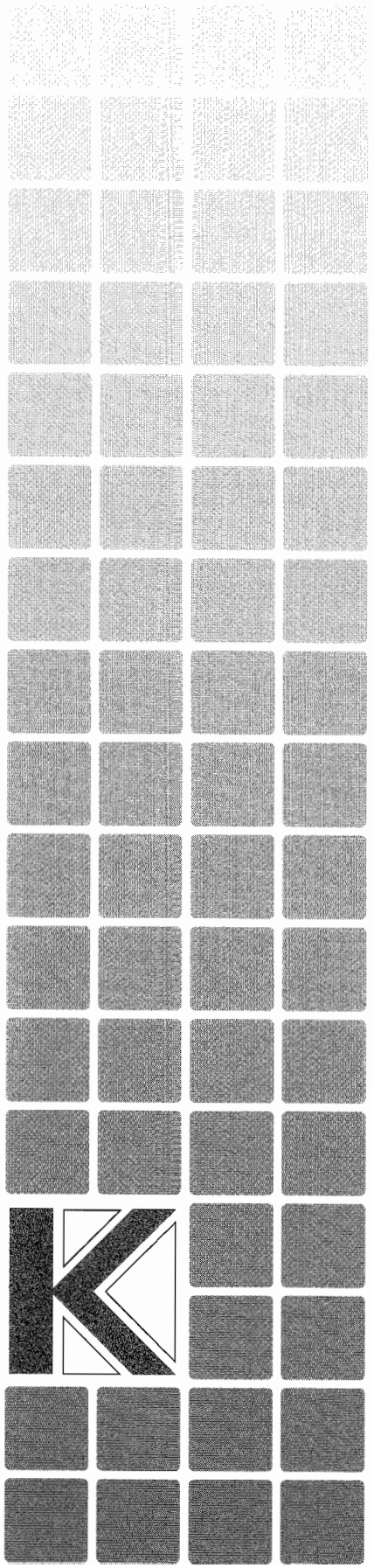
Background/Options: Approximately 25 percent of population in the City of Woodburn is over the age of sixty-five. This sector of the population is often mobility disadvantaged. Allowing residents to use golf carts in designated sections of the City or on designated streets would help alleviate the mobility challenges that these people encounter.

Woodburn Ordinance Number 18412 officially defines golf carts, and allows those vehicles fitting this description to use all streets in Senior Estates, and those streets providing access to Fairway Plaza. The Ordinance prohibits the use of golf carts on Highway 214. The Ordinance does not require that golf carts be registered with the State of Oregon. The City is interested in developing more off-street and on-street designated routes for golf cart travelers.

Recommendation: Amend the Zoning Ordinance to allow golf carts as an outright use in designated sections and on designated streets of the City, particularly along West Hayes Street from the area of Senior Estates (See Section 6.3-Golf Cart Facility Plan of the TSP) to downtown Woodburn, and Country Club Road for access to the Tukwila residential area and golf course. Golf carts could also use the off-street trail system developed along Mill Creek. With this expanded system, golf cart travelers would have access to downtown Woodburn, future new development in the vicinity of the I-5/Highway 214 interchange, and to the proposed off-street pathway system, which would circulate back to Senior Estates. Parking should be required along any expanded golf cart routes outside the Senior Estates area.

Amend the Zoning Ordinance to modify road widths in areas where golf carts are permitted, to provide exclusive lanes for the use of such vehicles.

See Appendix E: New Zoning Ordinance Section 10.090 -Golf Carts. Modify Zoning Ordinance Section 8.013 - Street Widths. Appendix E: New Section 10.072 - Golf Cart Parking.



Section 12

Compatibility with State Transportation Planning Rule & Other Policies

12.0 Compatibility with State Transportation Planning Rule & Other Policies

12.1 State Transportation Planning Rule

In April 1991, the Land Conservation and Development Commission (LCDC), with the concurrence of the ODOT, adopted the Transportation Planning Rule (TPR), OAR 660 Division 12. The TPR requires local jurisdictions to prepare and adopt a Transportation System Plan (TSP) by May 1996. Table 22 is a list of requirements and recommendations (designated by italics) for a Transportation System Plan for an Urban Area with a population between 2,500 and 25,000, and how each of those were addressed in the Woodburn TSP. The comparison shows that the Woodburn TSP is in compliance with the provisions in the TPR.

12.2 ODOT Bypass and Major Improvement Planning Policy

In 1995, the Oregon Transportation Commission adopted a policy on the development of bypasses and other major improvements to state transportation facilities in local comprehensive plans. The intent was to identify a framework that would promote new facility development only as a last resort, after improvements to the existing transportation system, including TDM measures and operational improvements, were implemented.

Major improvements to a state transportation facility could only be identified as a short-range project (0-5 years) if the project was already identified in the construction section of ODOT's State Transportation Improvement Program (STIP). Such improvements could only be identified in a local comprehensive plan as a long-range project (5-20+) years only if:

- the improvement is needed to satisfy a state transportation objective or objectives;
- the scope of the project is reasonably justified, considering the long-range projection of need;
- the improvement was identified through a planning process that include public involvement, evaluation of reasonable transportation alternatives including measures to manage the existing transportation system, and sufficient environmental analysis to determine if there is a reasonable likelihood the improvement can be built;
- transportation management measures will not satisfy identified transportation needs during the planning period or there is a need to preserve a future transportation corridor for future needs beyond the planning period;
- the improvement would be a cost-effective means to achieve the objective(s);
- the proposed timing of the improvement is consistent with priorities established in corridor plans and regional transportation plans and if the financing program identified construction is dependent on the future availability of funds;
- funding for the project can be reasonably expected at the time the project is ready for development and construction; and
- the plan includes measures to effectively manage the existing transportation infrastructure and services in accordance with Policy G of the OTP;

Table 22

Evaluation of Woodburn TSP With State Transportation Planning Rule

TPR Recommendations/Requirements	Woodburn TSP Compliance
Public and Interagency Involvement	
Establish Advisory Committee	A Transportation Task Force (TTF) previously existed in Woodburn. This Task Force reviewed the development of the Transportation System Plan. Transportation Task Force members are listed in the acknowledgements at the beginning of the document.
Develop informational material	Materials (including technical memoranda, charts and maps) were prepared for public and agency review illustrating and defining critical components of the Woodburn TSP.
Schedule informational meetings, review meetings and public hearings throughout the planning process. Involve the community	Eight TTF meetings and four open houses were held in developing the Draft TSP. In addition, the TTF meetings were video recorded for airing on the local cable access.
Coordinate plan with other agencies	Representatives from Marion County, ODOT, FHWA and other agencies were apprised of the TSP development and participated when appropriate at the TTF.
Review Existing Plans, Policies, Standards, and Laws	
Review and evaluate existing comprehensive plan	The 1985 Woodburn Comprehensive Plan was reviewed and evaluated as part of the TSP development.
Land use analysis - existing land use/vacant lands inventory	The Woodburn Comprehensive Plan served as the basis for all population/employment forecasts, inventory of vacant lands, and initial location and type of collector/arterial streets serving the Woodburn Comprehensive Plan land uses.
Review existing ordinance - zoning, subdivision, engineering standards	Existing City ordinances and engineering standards were reviewed and incorporated where the appropriate development of the Woodburn TSP.
Forecast population and employment	The Woodburn Comprehensive Land Use Plan served as the basis for forecasting future year 2015 population and employment (see Section 5 of the Woodburn TSP).
Determination of transportation capacity needs (cumulative analysis, *transportation gravity model*)	Future p.m. peak hour traffic assignments were calculated using the travel demand model which was previously developed by Kittelson & Associates and updated for this project. The travel demand model includes the use of a gravity model.
Develop and evaluate alternatives (no-build system, all build alterantives, transportation system amangment, transit alternative/feasibility, improvements/additions to roadway system, land use alternatives, combination alternatives)	Section 5 identifies three roadway system alternatives to assess long-term transportation needs. These alternatives principally focused on identifying the impacts of differnt I-5 access scenarios and on South Arterial. Intra city and intercity transit system alternatives were also evaluated.

Table 22

Evaluation of Woodburn TSP with State Transportation Planning Rule (continued)

TPR Recommendations/Requirements	Woodburn TSP Compliance
Determine Transportation Needs	
Select recommended alternative	The recommended roadway, transit, pedestrian, bicycle, and golf cart transportation facilities are summarized in Section 9 of the TSP.
Produce a Transportation System Plan	
Transportation goals, objectives, and policies	Specific recommendations regarding transportation goals and policies are outlined in Section 3 (Goals and Policies), Section 7 (Access Management), and Section 11 (Land Use Ordinances) of the documents.
Streets plan element (functional street classification and design standards, proposed facility improvements, access management plan, truck plan, safety improvements)	The streets plan element is outlined in Section 8 of the TSP.
Public transportation element (transit route service, transit facilities, special transit services, intercity bus and passenger rail)	The public transportation element is outlined in Section 9 of the TSP.
Bikeway system element	The bicycle plan is outlined in Section 9 of the TSP.
Pedestrian system element	The pedestrian plan is outlined in Section 9 of the TSP.
Airport element (land use compatibility, future improvements, accessibility/connections/conflicts with other modes)	An air transportation element is not relevant in Woodburn.
Freight rail element (terminals, safety)	The rail element is outlined in Section 9 of the TSP.
Water transportation element (terminals)	A water transportation element is not relevant in Woodburn.
Parking Plan	A parking plan was not identified as an issue in the Woodburn TSP.
Transportation System Management Element	TSM element not applicable per OAR 660-12-020(2)(f) and (g).
Transportation Demand Management Element	TDM element not applicable per OAR 660-12-020(2)(f) and (g)
Review existing significant transportation studies	Significant transportation studies were reviewed as part of the Woodburn TSP including the Interstate 5/Highway 214 Interchange Study, Woodburn Crossing Traffic Impact Analysis, Woodburn High School Pedestrian Study, and the West Hayes Street Closure traffic analysis.
Review existing capital improvements program/spublic facilities plans	Woodburn's most recent CIP was included as part of the TSP development.
Americans with Disabilities Act requirements	The ADA requirements were reviewed and incorporated where appropriate into the Woodburn TSP development.

Table 22

Evaluation of Woodburn TSP with State Transportation Planning Rule (continued)

TPR Recommendations/Requirements	Woodburn TSP Compliance
Inventory Existing Transportation System	
Street system (number of lanes, lane widths, traffic volumes, level of service, traffic signal location and jurisdiction, pavement conditions, structure locations and conditions, functional classification and jurisdiction, *truck routes, number and location of accesses, safety, substandard geometry)*	An inventory of the existing street network, traffic volumes, traffic control devices and levels of service is provided in Section 4 of the TSP.
Bicycle ways (type, location, width, condition, *ownership/jurisdiction)*	A summary of the existing bicycle route system is given in Section 4 of this TSP.
Pedestrian ways (location, width, condition, *ownership/jurisdiction)*	An inventory of existing sidewalks in Woodburn is included in Section 4 of the TSP.
Public Transportation Services (transit ridership, volumes, route, frequency, stops, fleet, intercity bus, passenger rail, special transit services)	A summary of Woodburn public transit and paratransit is presented in Section 4 of this TSP.
Intermodal and private connections	No significant intermodal and private carrier transportation services and/or connections currently exist within Woodburn.
Air transportation	No air transportation facilities exist within Woodburn; as summarized in Section 4 of this document.
Freight rail transportation	Southern Pacific Railroad freight service is summarized in Section 4.
Water transportation	No significant water transport facilities exist within Woodburn; as summarized in Section 4 of this document.
Pipeline transportation	No significant pipeline transportation facilities exist within Woodburn; as sumamrized in Section 4 of this document.
Environmental constraints	With the development of the recommended off-street pathway system, special attention should be given to any environmental constraints that exist in the creek easements.
Existing population and employment	As outlined in Section 5 of the TSP and Technical Memorandum #3, the current population of Woodburn is approximately 15,000 people. 1991 employment was approxiamtely 5,045 jobs.
Plan Review and Coordination	
Consistent with ODOT and other applicable plans	forthcoming
Adoption	
Is it adopted?	forthcoming
Implementation	
Ordinances (facilities, services and improvements; land use or subdivision regulations)	See Section 11
Transportation financing/capital improvements program	See Section 10

- the plan includes policies and implementing measures which protect the corridor and its intended function; and
- any maps showing a new alignment include a note stating "Incomplete funding plan, no construction date established".

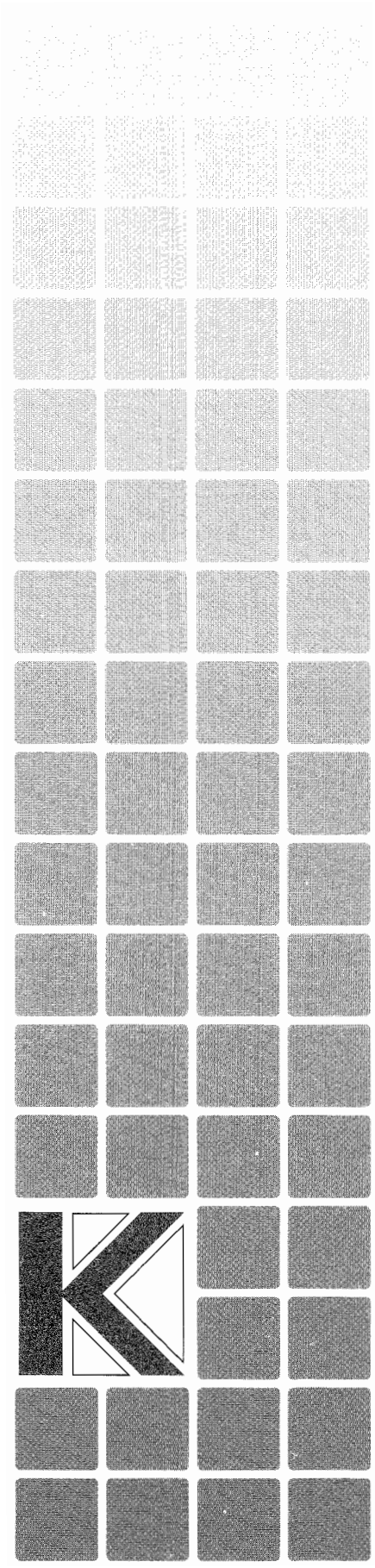
Related to the Woodburn Transportation System Plan, this new policy relates to the development of I-5 interchange improvements and widening of Highway 219/214. It is important to note that the South Arterial is not intended to be a state facility. It would function as much of a local access road in the south Woodburn area as it would serve as a reliever facility to Highways 219, 214 and 99E.

Table 23 compares the policy criteria with respect to three different transportation improvements. The need for all three improvements over the 20+ year planning period is based on existing traffic operating conditions, projected traffic growth, and the extent to which a reasonable level of transit, TDM, and traffic operational improvements can be implemented to relieve the need for street capacity improvements. For the undeveloped southwest portion of Woodburn, some level of highway development to provide adequate access and circulation is needed. The City of Woodburn's ultimate goal is to implement a balanced, multi-modal set of transportation improvements to meet the needs of the community.

Table 23

Evaluation of Woodburn TSP With ODOT Bypass/Major Improvement Planning Policy

Policy	Evaluation
1. Proper Transportation Priorities	Project and program emphasis on improving existing transportation system. I-5 interchange improvement shown as longer-term (11-20 year) need. Widening of portion of existing Highway 214 before South Arterial identified. Balanced multi-modal TSP presented.
2. Short-Term Improvement to State Transportation Facility (0-5 years) Must be in STIP (Applicable to I-5 and Highway 219/214 improvements).	Improvements to I-5 interchange and Highways 219/214 programmed beyond five years. South Arterial not to be a designated state transportation facility, or planned to be a designated bypass facility.
3. Longer-Term Improvement to State Transportation Facility (5-20+ years) Must Meet Following Criteria (Applicable to I-5 and Highway 219/214 improvements).	I-5 Interchange & Highway 219/214 Improvements
- Satisfy Transportation Objectives	Consistent with Woodburn TSP goals and policies.
- Needed Based on Travel Demand/Congestion	Needed to serve projected traffic demand without Highways 219, 214 & 99E going substantially over capacity.
- Identified Through Planning Process	Developed as part of Woodburn TSP, which included public and agency involvement. No significant environmental impacts anticipated (will be assessed in follow-up refinement studies).
- TDM Will Not Satisfy Identified Transportation Needs, or Need to Preserve Corridor	TDM will not meet projected need, even with substantial transit and pedestrian/bicycle facility improvements.
- Cost-Effective Solution	Most cost-effective solution given road capacity improvement need.
- Timing Consistent with ODOT Corridor and Regional Transportation Plans	Marion County TSP is showing need for improved I-5 access in Woodburn area.
- Project Funding Expected at Time Project is Ready for Development and Construction	Project development (beyond initial I-5 interchange reconnaissance study) will not proceed until a framework for funding construction is identified (as part of reconnaissance study).
- Includes Measures to Manage Existing Transportation Infrastructure in Accordance with OTP Policy 4G	Access management strategies for Highways 219/214 a part of Woodburn TSP.
- Plan Includes Policies and Implementing Measures Which Protect Corridor and Its Intended Function	Access management strategies for Highways 219/214 a part of Woodburn TSP.
- Any Maps Showing a New Alignment Include a Note Stating "Incomplete Funding Plan, No Construction Date Established"	Included on all Woodburn TSP modal plan maps.



Appendix A

Level of Service Analysis Concepts

Appendix A

Level of Service Concept

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various LOS from A to F.[1]

Signalized Intersections

The six LOS grades are described qualitatively for signalized intersections in Table A1. Additionally, Table A2 identifies the relationship between level of service and average stopped delay per vehicle. Using this definition, LOS D is generally considered to represent the minimum acceptable design standard.

Table A1

Level of Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average stopped delay, less than five seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average stop delay is in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a LOS A, causing higher levels of average delay.
C	Average stopped delay is in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average stopped delays are in the range of 25.1 to 40.0 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average stopped delays are in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay.These high delay values generally indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average stop delay is in excess of 60 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay levels.

1 Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, Special Report 209 (1994).

Table A2

Level-of-Service Criteria for Signalized Intersections

Level of Service	Stopped Delay per Vehicle (Seconds)
A	≤ 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The *1994 Highway Capacity Manual* provides new models for estimating total vehicle delay at both TWSC and AWSC intersections. Unlike signalized intersections, where LOS is based on stopped delay, unsignalized intersections base LOS on total vehicle delay. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table A3. A quantitative defination of LOS for unsignalized intersections is presented in Table A4. Using this definition, LOS E is generally considered to represent the minimum acceptable design standard.

Table A3

General Level-of-Service Descriptions for Unsignalized Intersections

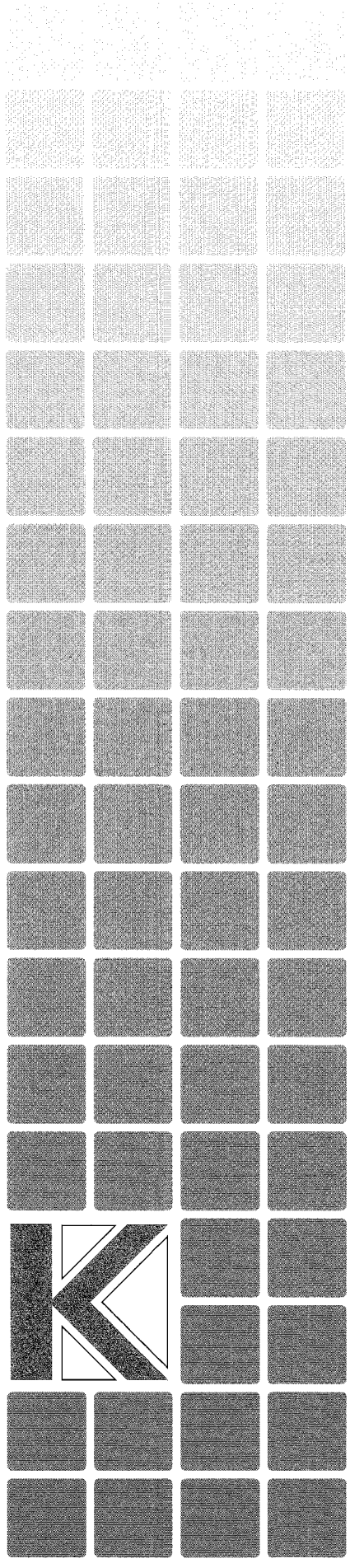
Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in the queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in the queue.
C	• Many times there is more than one vehicle in the queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in the queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accomodated by the movement. • There is almost always more than one vehicle in the queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table A4

Level-of-Service Definitions (Unsignalized Intersections)

Level of Service	Average Total Delay per Vehicle
A	< 5 Seconds
B	5 to 10 Seconds
C	10 to 20 Seconds
D	20 to 30 Seconds
E	30 to 45 Seconds
F	> 45 Seconds

It should be noted that the LOS criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the total delay threshold for any given LOS is less for an unsignalized intersection than for a signalized intersection. **While overall intersection LOS is calculated for AWSC intersections, LOS is only calculated for the minor approaches and the major street left turn movements at TWSC intersections.** No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection LOS is defined by the movement having the worst LOS (typically a minor street left turn).



Appendix B

Travel Demand Model

Travel Demand Model Development

1.0 PREPARATION FOR THE MODEL

The Woodburn Travel Forecasting Model is designed to estimate and forecast major arterial and collector street travel flows; and to test future land use/transportation system alternatives in the Woodburn urban area. The EMME/2 transportation modeling software package was used for the purposes of estimating trip generation, trip distribution and trip assignment. This modeling software was developed by INRO Consultants, Inc. in Montreal, Canada and is available for use on PC-computers as well as mini-computers. Output from the model developed in EMME/2 includes both black and white and color plots as well as tabular print-outs from the various modeling steps (trip generation, distribution, and assignment). A QRS-II based model was originally created by the Oregon Department of Transportation (ODOT) for the Woodburn urban area. The basic simulation network (nodes and links) were converted to EMME/2 format by Kittelson and Associates, Inc.. Currently, ODOT is in the process of standardizing all of the modeling efforts throughout the state into EMME/2 format.

1.1 Creation of the Transportation Analysis Zone System

To facilitate development of travel forecasts, the household and employment data were assembled by the City of Woodburn and ODOT into 97 Transportation Analysis Zones (TAZ's # 1-20 are "external station" zones, TAZ's # 21-97 are zones internal to the urban area). Boundaries for these TAZ's were established in an attempt to meet the following criteria:

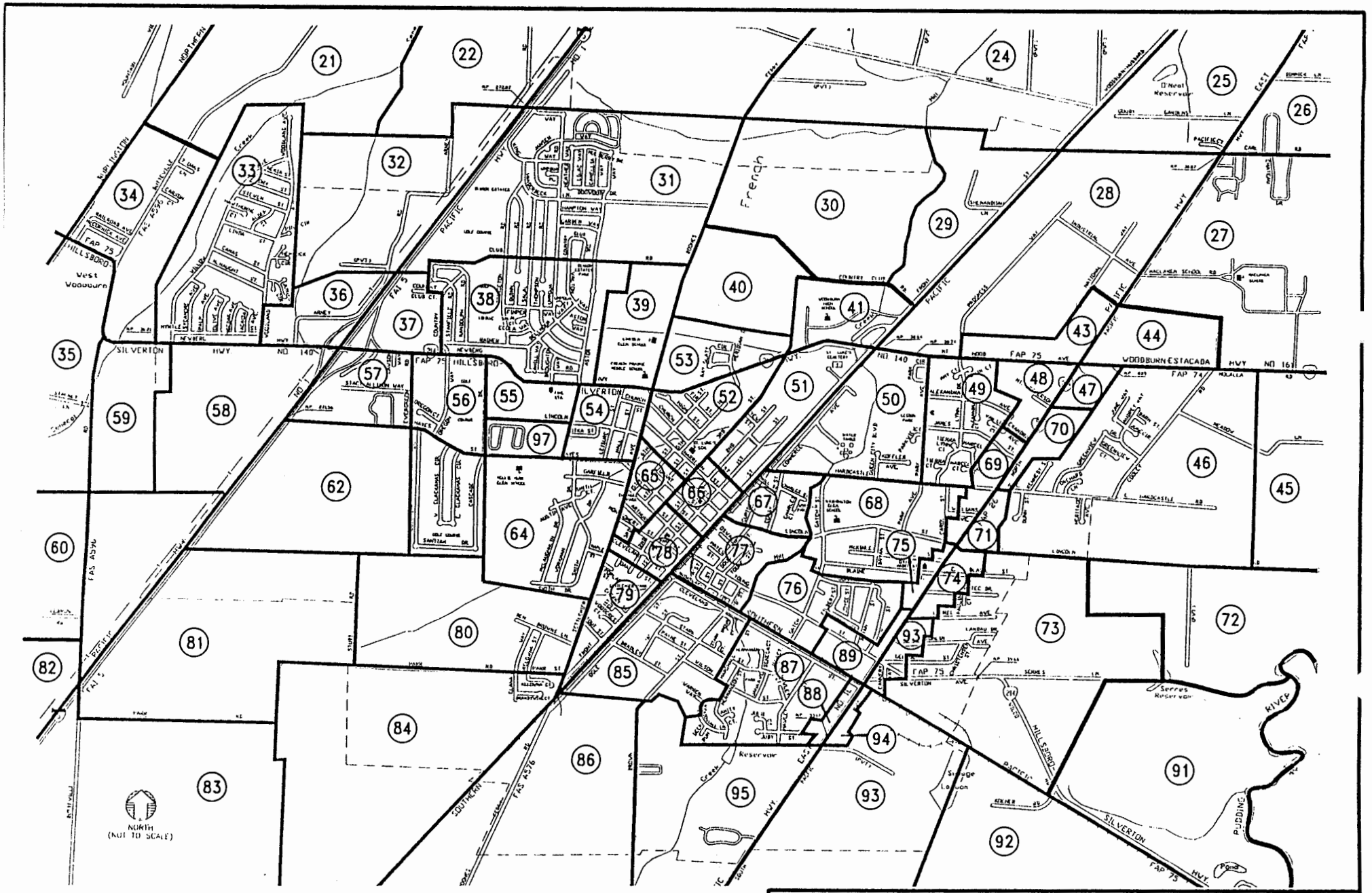
- homogenous land use;
- conformance with major boundaries
    - major transportation corridors
    - physical boundaries which prevent continuous development; and
- homogenous access of land use to transportation system (collector/arterial street system).

Figure 1 illustrates the Woodburn TAZ system.

1.2 Creation of the Roadway Network

All of the Woodburn urban areas' arterial and collector street intersection locations were converted from the QRS-II software in order to develop a computerized roadway network in the EMME/2 software. The EMME/2 database contains 97 centroids (TAZs and external stations), 218 regular nodes (intersections) and 732 links (roadway segments). All links in the study area were assigned the following characteristics based upon their existing function:

- **distance** (in hundredths of miles);
- **travel speed** (average free-flow, off-peak travel speed which includes potential delays at intersections);


LEGEND
TRANSPORTATION ANALYSIS ZONE BOUNDARY
NORTH (NOT TO SCALE)
TRANSPORTATION ANALYSIS ZONES
CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
FEBRUARY 1995
FIGURE 1

- **link type** (all links were assigned a link type based on **functional classification** for arterials and collectors); and
- **link capacity** (peak hour roadway capacities were assigned based upon roadway functional classification).

Many of the travel speeds, link types, and link capacities were copied directly from the original QRS-II database.

A detailed explanation of the link classes is provided in Table 1.

Table 1

Existing Roadway Network
EMME/2 Link Class

Link Type	Definition	Speed (mph)	# of Lanes (one Direction)	Link Capacity (vph)[1]	# of One-Way Links
1	Centroid Connector	15 - 20	1	9,999	254
2	Interstate 5	45 - 65	2 - 3	1,800 - 3,600	18
3	Principle Arterials	25 - 55	1 - 2	1,100 - 2,200	112
4	Minor Arterials	25 - 55	1	900	52
5	Minor Arterials	20 - 55	1	900	48
6	Minor Arterials	20 - 45	1	900 - 1,100	56
7	Collectors	20 - 45	1	900	58
8	Collectors	20 - 35	1	900	26
9	Collectors	25 - 35	1	900	26
10	Local Roads	20 - 35	1	900	14
11	County Facilities	25 - 55	1	900	68

[1] As defined in original QRS-II network provided by ODOT.

Special note should be made in the handling of centroid connectors. The distance assigned to centroid connectors was computed by measuring the distance from the centroid to the nearest node in the collector/arterial network via the local street network. Centroid connectors are theoretically representative of the local access systems, and thus were considered to have adequate capacity to handle any volumes anticipated. Thus, centroid connectors were assigned a very high p.m. peak hour capacity of 9,999 vehicles per hour, per direction.

The travel model was designed to model *vehicle trips* only. Therefore, all trips made using other modes (i.e. bicycle, walk, bus) were not considered in this model. It is understood that, in the future, transit, bicycles, and pedestrian modes of travel will play a more significant role within the overall area transportation system, but it was deemed that the effort involved in developing a separate non-auto mode model would not yield sufficient results to warrant a full mode-split model development. It was assumed that, given the high proportion of elderly and minority (Hispanic) residents in the community today and expected to continue in the future (who traditionally have less auto ownership), that there is and will be an unmet travel demand by these residents. Added transit, carpooling, and bicycle/pedestrian facilities would serve to a large extent to meet this

latent demand, without having a major impact on vehicle trip generation. Hence, the current vehicle trip generation characteristics in the community were used for the year 2015 travel modeling effort on reducing vehicle trip demand.

2.0 CALIBRATION OF THE MODEL

The performance of a model to forecast future travel is measured by its ability to accurately estimate existing conditions. Thus, the first major step is developing a model that estimates existing travel demand based on land use inputs (i.e. existing households and employment) for trip generation, distribution, and the assignment of trips to the simulation network, then comparing volume estimates to measured traffic flows on the arterial/collector street system. The base year for calibration of the Woodburn model was 1991 as substantial traffic counts and population/employment estimates were available for that year.

2.1 Land-Use Assumptions

ODOT provided estimates of households and employees in each TAZ in the study area for 1991. A summary of the results is provided below:

Housing Type	1991 Housing Units
Single Family	4,463
Multi-Family	1,103
Mobile Home	495
TOTAL	6,061

Employment Type	1991 Employees
Retail	1,277
Industrial	1,909
Service	927
Education	396
Government	479
Other	57
TOTAL	5,045

In addition, there were 49 motel rooms and 148 recreation vehicle park spaces in the Woodburn urban area in 1991.

2.2 Trip Generation

The number of trips entering or leaving a transportation analysis zone is dependent on the trip-making characteristics of residents and land use in that zone. Therefore, trip generation is divided into two categories based on land use including trips *produced* by the home and trips *attracted* by employment.

Three basic trip types were developed for the Woodburn urban area to reflect basic travel patterns of existing residents and workers including: home-based-work (HBW), home-

based-other (HBO), and non-home-based (NHB), and were supplemented with special external travel behavior trip purposes. Basic trip generation rates and equations established by ODOT during the development of the Woodburn QRS-II model were used as the basis to calculate the HBW, HBO, and NHB trips.

The daily trip production equations for each trip purpose are shown below:

$$HBW_{PROD} = [0.16 \times (SF_{HH} \times 10 + MF_{HH} \times 6 + MH \times 6)]$$

$$HBO_{PROD} = [0.61 \times (SF_{HH} \times 10 + MF_{HH} \times 6 + MH \times 6)]$$

$$NHB_{PROD} = [0.23 \times (SF_{HH} \times 10 + MF_{HH} \times 6 + MH \times 6)]$$

Where:	HBW, HBO, NHB	=	Trip Purpose
	PROD	=	Daily Vehicle Trip Productions
	SF_{HH}	=	Number of Single-Family Households
	MF_{HH}	=	Number of Multi-family Households
	MH	=	Number of Mobile Homes

Trip attraction equations were calculated to ensure that total daily attractions within the study area matched total daily productions. The resultant daily vehicle trip attraction equations are shown below:

$$HBW_{ATT} = [0.16 \times (RETAIL_{EMP} \times 20 + INDUSTRIAL_{EMP} \times 2.5 + SERVICE_{EMP} \times 15 + EDUCATION_{EMP} \times 11 + GOVERNMENT_{EMP} \times 8 + OTHER_{EMP} \times 3.5 + MOTEL_{ROOM} \times 10.2 + RV\ PARK \times 3)]$$

$$HBO_{ATT} = [0.61 \times (RETAIL_{EMP} \times 20 + INDUSTRIAL_{EMP} \times 2.5 + SERVICE_{EMP} \times 15 + EDUCATION_{EMP} \times 11 + GOVERNMENT_{EMP} \times 8 + OTHER_{EMP} \times 3.5 + MOTEL_{ROOM} \times 10.2 + RV\ PARK \times 3)]$$

$$NHB_{ATT} = [0.23 \times (RETAIL_{EMP} \times 20 + INDUSTRIAL_{EMP} \times 2.5 + SERVICE_{EMP} \times 15 + EDUCATION_{EMP} \times 11 + GOVERNMENT_{EMP} \times 8 + OTHER_{EMP} \times 3.5 + MOTEL_{ROOM} \times 10.2 + RV\ PARK \times 3)]$$

Where:	HBW, HBO, NHB	=	Trip Purpose
	ATT	=	Daily Vehicle Trip Attractions
	EMP	=	Number of Employees by Type

During the development and calibration of the QRS-II model, ODOT made the following adjustments to the production and attraction equations to account for special generators in specific zones.

- The trip production equations were reduced in zones 31, 38, 55, 56, 63, and 97 to account for lower trip-making characteristics by the residents in the Senior Estates. Specifically,

the home-based work productions in those zones were set equal to zero, the home-based other productions were calculated at 72 percent of the total productions in the zone, and the non-home based productions were calculated at 28 percent of the total productions in the zone. In addition, the total number of trip productions by household type in these zones were reduced from 10 to 5.6 daily trips per single family unit and from 6 to 5.6 daily trips per mobile home.

- The trip production equations were increased in zones 68 and 76 to account for increased trip making in the densely populated residential areas (apartments). Specifically, the number of trips produced by a single family home were increased from 10 to 15 daily trips and the number of trips produced by a multi-family unit were increased from 6 to 10 daily trips.
- The trip attraction equations were increased in zones 43, 48, and 57 to account for the greater trip generation characteristics of large discount stores.

The trip production and attraction equations were then applied to 1991 Woodburn population and employment. Based upon the above trip generation equations, the Woodburn area currently produces an estimated 67,800 daily HBW, HBO and NHB vehicle trips.

2.3 Trip Distribution

Home-Based Work, Home-Based Other, and Non Home-Based Trip Purposes

This section describes the calculations and eventual validation process which was used in the development of the trip distribution model. The standard gravity model was employed to distribute trips between "producers" (households) and "attractors" (employment). The fundamental principle upon which the gravity model is based assumes that the volume of travel between two places is directly related to the size of these places, and inversely related to the distance between the places. The basic form of the gravity model used in the Woodburn model is:

$$T_{ij} = P_i \frac{A_j F_{ij} K_{ij}}{\sum A_j F_{ij} K_{ij}}$$

Where:

T_{ij}	=	trips produced in zone i and attracted to zone j
P_i	=	trips produced in zone i
A_j	=	trips attracted to zone j
F_{ij}	=	Friction factors derived from zone-to-zone travel times that are a function of the spatial separation between zones i and j and the area wide effect of this separation on the level of trip interchange.
K_{ij}	=	Specific zone-to-zone adjustment factor to account for the effect on travel patterns of defined social or economic linkages not otherwise incorporated in the gravity model formu-

lations (none were applied in the Woodburn model data set).

The calibration of a gravity model is the process of determining appropriate travel time factors which adequately reflect the effect of spatial separation between unique locations (zones). To calculate travel times factors by purpose for the Woodburn EMME/2 model, the exponential function outlined below was used.

$$F_{ij} = e^{(-\beta \times T_{ij})}$$

The beta values, calculated as the inverse of the average trip lengths, by purpose, were borrowed from the original QRS-II assignment, and are outlined below.

$\beta_{HBW} = 0.167504$

$\beta_{HBO} = 0.134048$

$\beta_{HBW} = 0.236968$

After calculating the appropriate travel time factors, an initial set of daily trip tables (HBW, HBO and NHB) were developed based on a set of zone-to zone travel costs (travel times).

The resulting daily trip tables were added to the "external" trips (copied from ODOT's QRS-II model) to determine total new travel generated in the study area. The number and distribution pattern of "external" trips were calculated based upon existing travel volumes.

2.4 Trip Assignment

The total existing daily trip table was assigned to the network using an equilibrium assignment algorithm. The calibration process of the daily volume trip assignment required relatively minor adjustments of travel speeds on a limited number of links to yield a proper balance of roadway volumes as compared to observed traffic counts. Tables 2 and 3 compare the resulting EMME/2 travel assignment volumes to existing traffic counts on each collector/arterial facility across east-west and north-south screenlines. As shown in the tables, the overall model screenline volumes are generally within 10 - 15 percent of the observed volumes, thereby indicating that calibration is achieved. A comparison of the modeled volumes vs. the observed volumes is also shown by the Regression Line in Figure 2. As shown in the Figure, the correlation coefficient (R^2) is equal to 0.87, also indicating calibration (A value of 1 indicates that the assigned volume on each road is exactly equal to the observed volume). The resulting 1991 daily travel volumes are shown in Figure 3.

Table 2

Observed vs. Modeled Volumes—East-West Screenlines

Roadway Segment	1991 2-Way Daily Traffic	1991 Model Assignment 2-Way Daily Volumes	Observed vs. Modeled (%)
East-West Screenline #1: North of Highway 214			
Woodland	4,085	4,400	
Arney	2,430	1,580	
Country Club Rd.	5,720	2,480	
Astor	1,255	3,345	
Boones	5,140	5,720	
Progress	3,600	1,770	
Highway 99E	13,700	16,150	
Total EW #1	35,930	35,445	98.7%
East-West Screenline #2: South of Highway 214			
Interstate 5	60,500	58,880	
Evergreen	2,565	2,495	
Oregon Way	1,245	990	
Cascade	1,170	710	
Boones	10,195	12,570	
Park	3,465	1,325	
Highway 99E	16,700	16,875	
Cooley	1,485	1,155	
Total EW #2	97,325	95,000	97.6%

Table 3

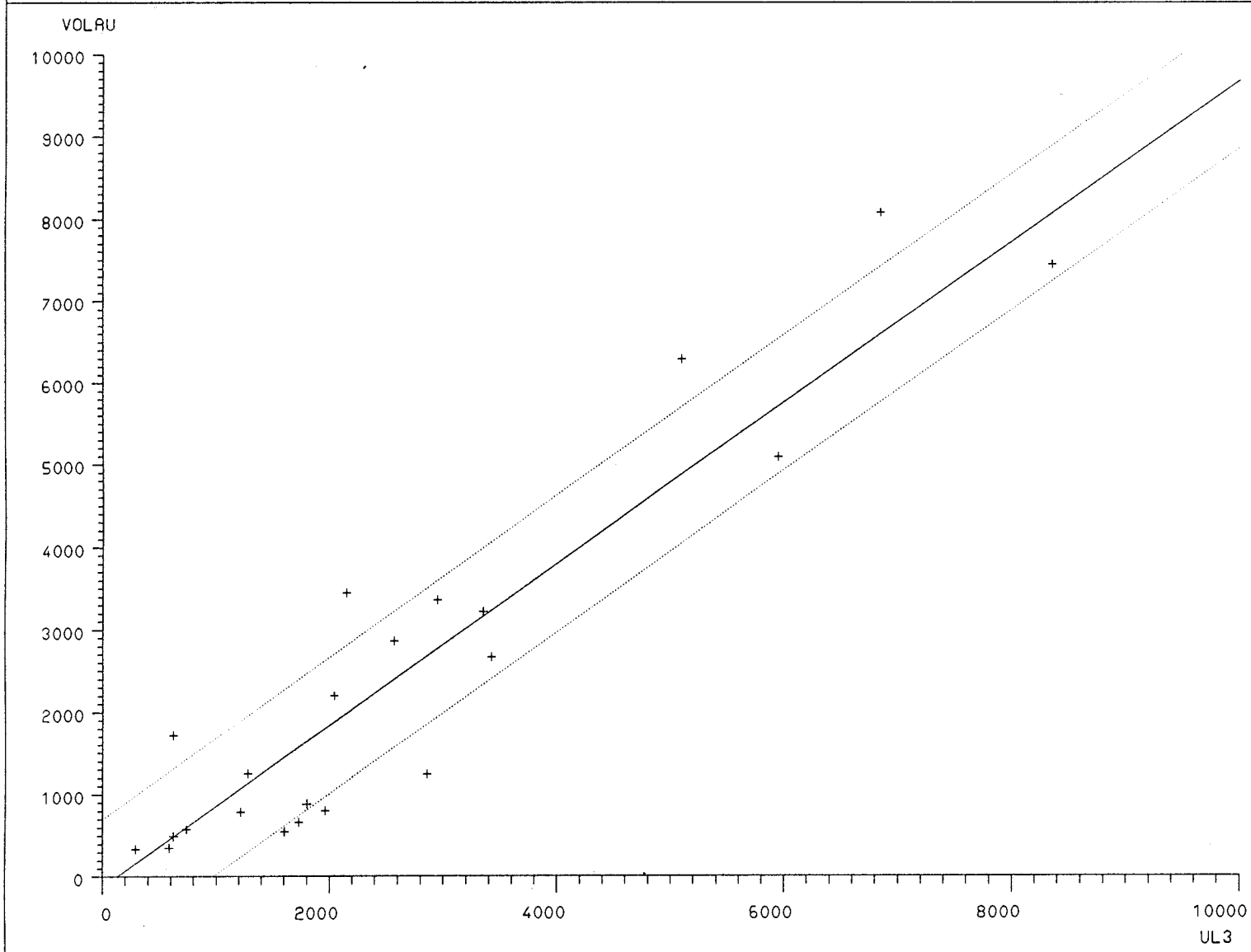
Observed vs. Modeled Volumes—North-South Screenlines

Roadway Segment	1991 2-Way Daily Traffic	1991 Model Assignment 2-Way Daily Volumes	Observed vs. Modeled (%)
North-South Screenline #1: West of Highway 99E			
Highway 214	11,900	10,610	
Hardcastle	3,920	1,590	
Lincoln	4,300	6,885	
Young	6,850	5,325	
Total NS #1	26,970	24,410	90.5%
North-South Screenline #2: East of Highway 99E			
Highway 214	5,900	6,725	
Hardcastle	3,210	1,090	
Lincoln	575	680	

Roadway Segment	1991 2-Way Daily Traffic	1991 Model Assignment 2-Way Daily Volumes	Observed vs. Modeled (%)
Young	6,700	6,430	
Total NS #2	16,385	14,925	91.1%

LINK SCATTERGRAM

emme/2



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B= .98122
R2= .98145
STD= 827.1025
OUTSIDE: 2

EMME/2 PROJECT: CITY OF WOODBURN TSP
SCENARIO 4: 1991 Network Calibration

Figure 2: Observed Volumes vs. Assigned Volumes

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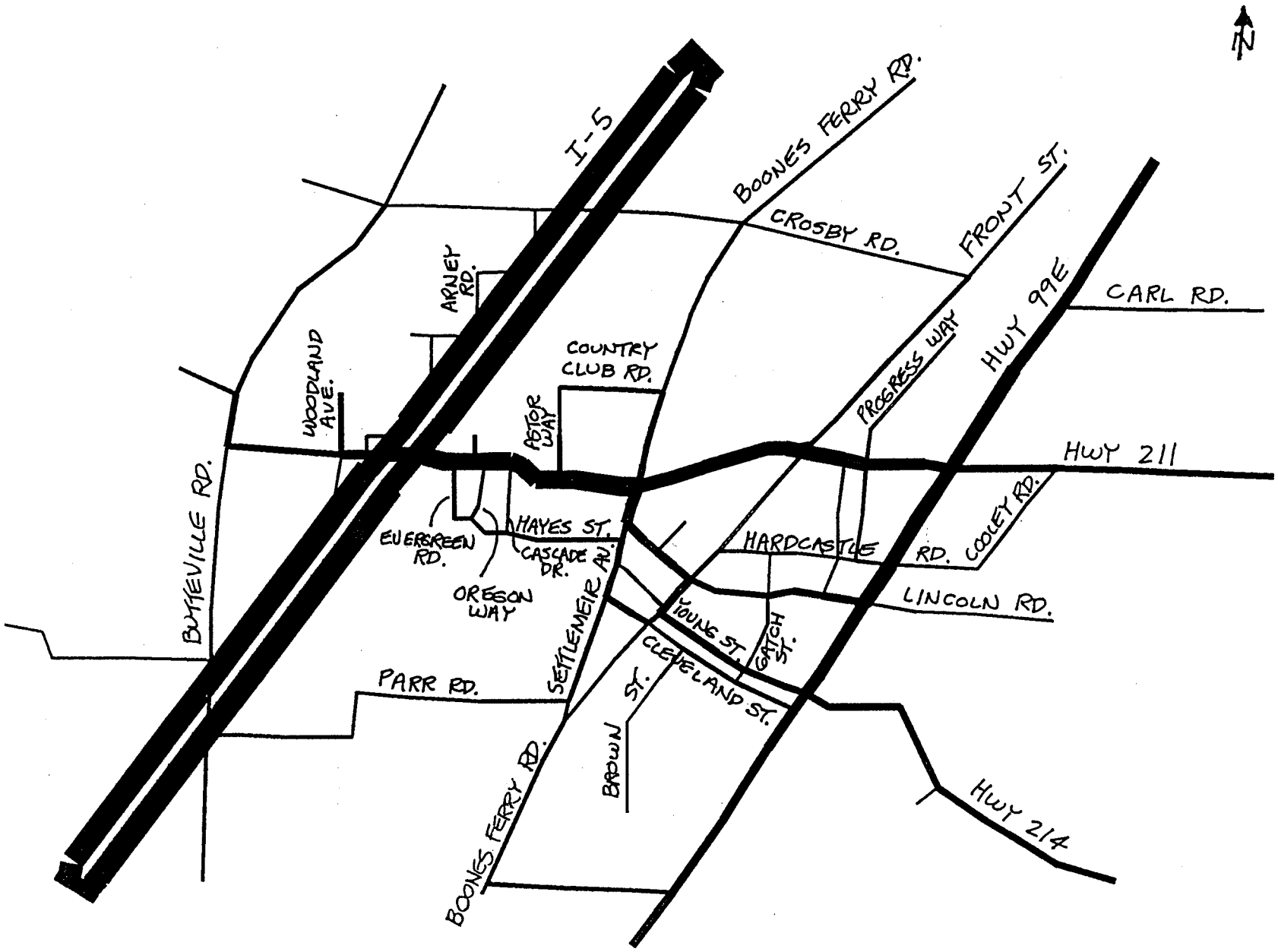
MODULE: 2.43
KAINC.....jak

HUTU VOLUMF

E.Y111 9/2



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SCALE: 2000

5000
10000
15000
20000
25000

WINDOW:
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601.6/ -19.8

EMME/2 PROJECT: CITY OF WOODBURN TSP
SCENARIO 2: 1991 Network Calibration

Figure 3: 1991 Daily Volumes

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MODULE: 6.12
KAINC.....jak

WOODBURN 1991 LAND USE DATA INPUT REQUIRMENTS

TAZ	EMPLOYEES								HOUSEHOLDS		
	RETAIL	INDUST	SERVICE	EDUC	GOV'T	OTHER	MOTEL	RV PARK	SF	MF	MH
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21		75							12		
22									17		
23									12		
24									75		
25									15		
26									22		
27					260				25		114
28		1137	59		10						
29		94							7		
30									0		
31	23		1						560		85
32		10							5		
33									393		78
34									35		4
35									9		
36	36						49	148	1		
37	68		40		71					20	
38	6								614		
39		2	2	141					3		
40									11		
41				75							
42		0	0		0						
43	340		0								
44	10	52	26						9		
45									17		
46									208		
47									1		
48	128		80								
49					6	13			150	158	
50									90	26	
51	1	35							119	198	
52			2	22					123	16	
53			74	5	11						
54	6		11	13					100	111	

WOODBURN 1991 LAND USE DATA INPUT REQUIRMENTS

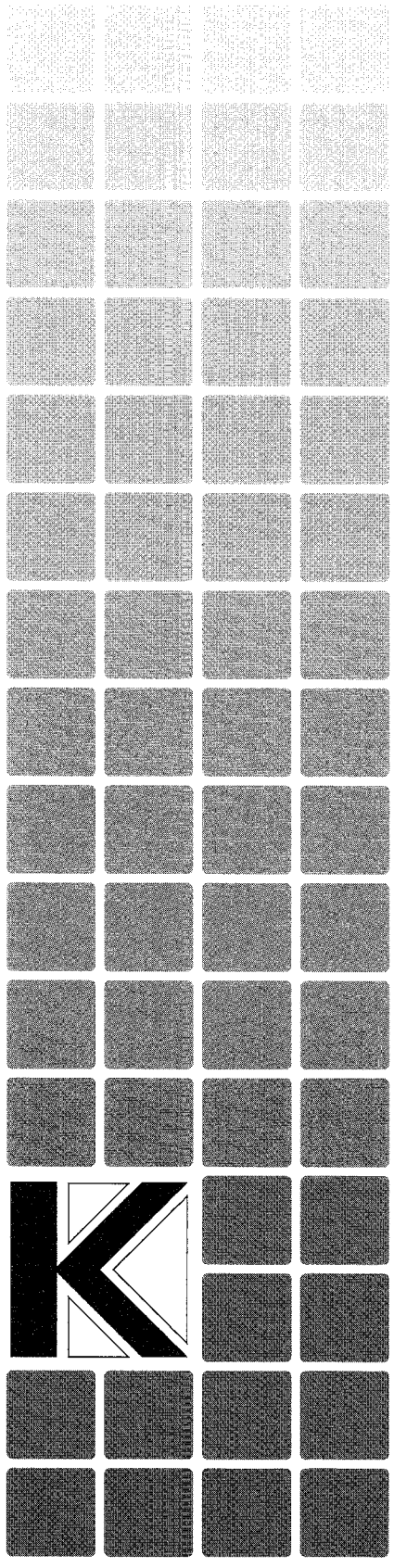
	EMPLOYEES								HOUSEHOLDS		
Z	RETAIL	INDUST	SERVICE	EDUC	GOVT	OTHER	MOTEL	RV PARK	SF	MF	MH
55			98						4		
56	37		39						94	174	
57	0		83							70	
58		70									
59						2					
60									1		
61											
62											
63									254		
64			2	55					142		
65			54		16				85		
66	68		30	4	38				34	8	
67		35							58		
68				55		15			179	75	
69	25		23			15			2	8	
70	48		3							25	
71	184		4						3		
72									11		
73		143							103		
74	36	2	12						12		
75	16		12		12				6		
76						6			114	116	
77	33	53	33	24					64		
78	48	21	97	2	53				34	8	
79									65		
80						4			52		
81									15		
82									1		
83									3		
84									45		
85						2			185		
86									21		
87									166	53	
88			47						2		
89	58		47						9	37	
90	59		32		2				19		
91									4		
92									6		
93	14	150							6		
94	25	30	10						1		
95	8		2						15		92
96			4						10		
97									5		85
TOTAL	1277	1909	927	396	479	57	49	148	4463	1103	495

WOODBURN 2015 LAND USE DATA INPUT REQUIRMENTS

TAZ	EMPLOYEES								HOUSEHOLDS		
	RETAIL	INDUST	SERVICE	EDUC	GOV'T	OTHER	MOTEL	RV PARK	SF	MF	MH
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21	0	75	0						115	278	
22	0		0						17	357	
23	0	0	0						204		
24	0	152	0						100		
25		256							15	0	
26									22	500	
27					260				25		
28		1411	65		10				70		
29		293							7		
30						15			349	200	
31	23		1						991		85
32	125	10	0						5	1490	
33									393		7
34		20							127		4
35									9	0	
36	76		45				49	148	1		
37	90		57		71					20	
38	6								614		
39		2	2	141					79		
40									0		
41				95					40		
42		595	0		0						
43	352		0								
44	60	52	57						9		
45	0		0						120		
46									457		
47	41		26						1		
48	148		93								
49					6	13			150	158	
50	27		13						118	26	
51	1	35							119	267	
52			2	22					123	70	
53	28		93	5	11						
54	6		11	13					105	111	
55			98						4	15	
56	37		39						94	174	
57	151		102							70	

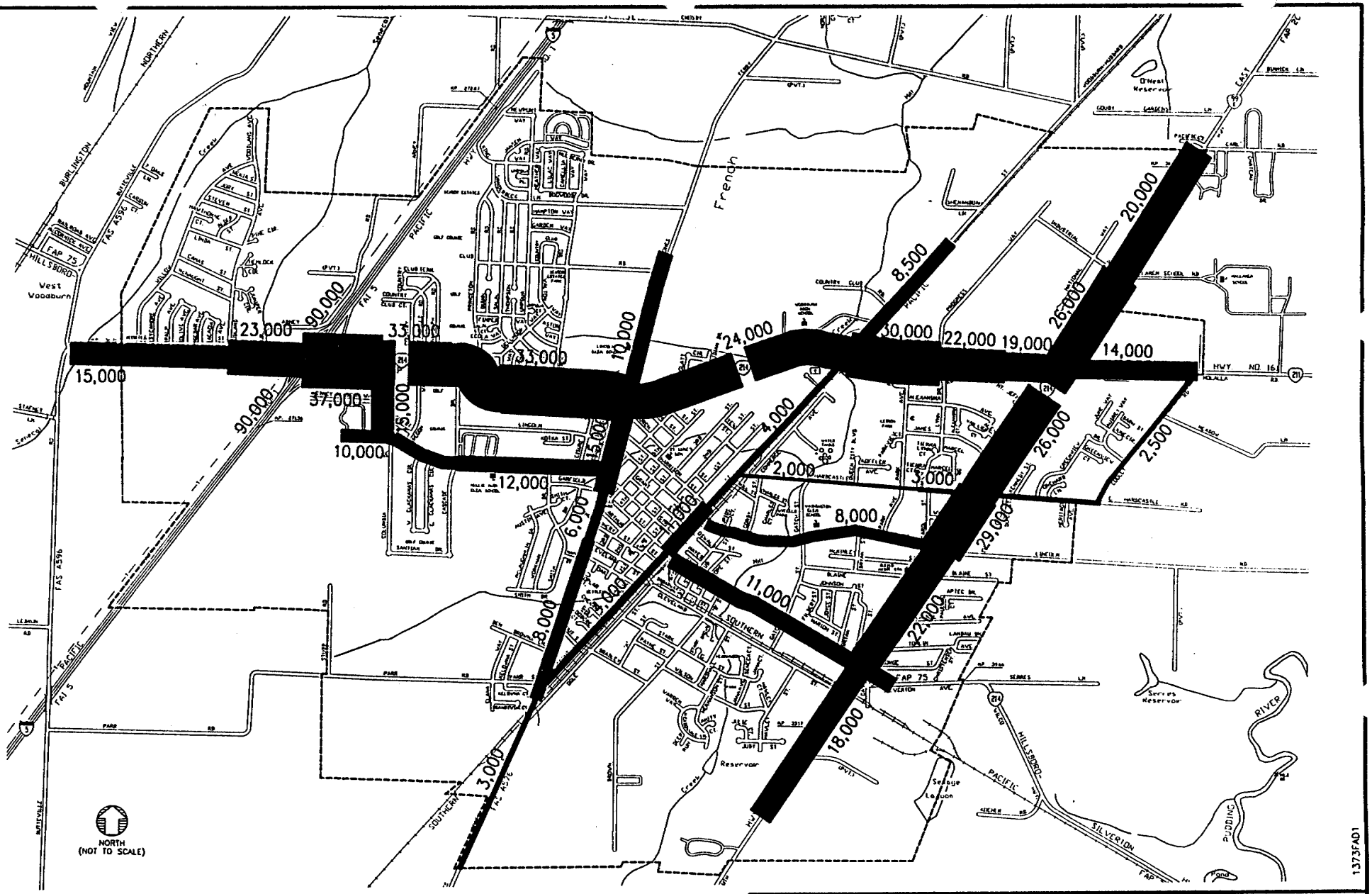
WOODBURN 2015 LAND USE DATA INPUT REQUIRMENTS

	EMPLOYEES								HOUSEHOLDS		
\Z	RETAIL	INDUST	SERVICE	EDUC	GOV'T	OTHER	MOTEL	RV PARK	SF	MF	MH
58		369									
59		101				2					
60	0		0						1	0	
61		220									
62	254		146						260	210	
63									254		
64			2	55					208		
65			54		16				85		
66	68		30	4	38				34	8	
67		35							58		
68				55		15			179	75	
69	25		23			15			2	8	
70	48		3						10	25	
71	184		4						3		
72	0		0						101	188	
73	0	403	0						232	290	
74	36	2	12						12		
75	16		12		12				31		
76						6			114	185	
77	33	53	33	24					71		
78	48	21	97	2	53				34	8	
79									65		
80						4			382		
81	140		60						250	60	
82	0		0						1		
83	0	0	0						3	0	
84									287		
85						2			248		
86		0							140	200	
87									171	53	
88			47						22		
89	58		47						9	37	
90	59		32		2				19		
91									3		
92	0	0	0						6	0	
93	14	351							6		
94	25	30	10						1		
95	8		2						320	440	92
96		100	4						10		
97									5		85
TOTAL	2187	4586	1322	416	479	72	49	148	8120	5523	495



Appendix C

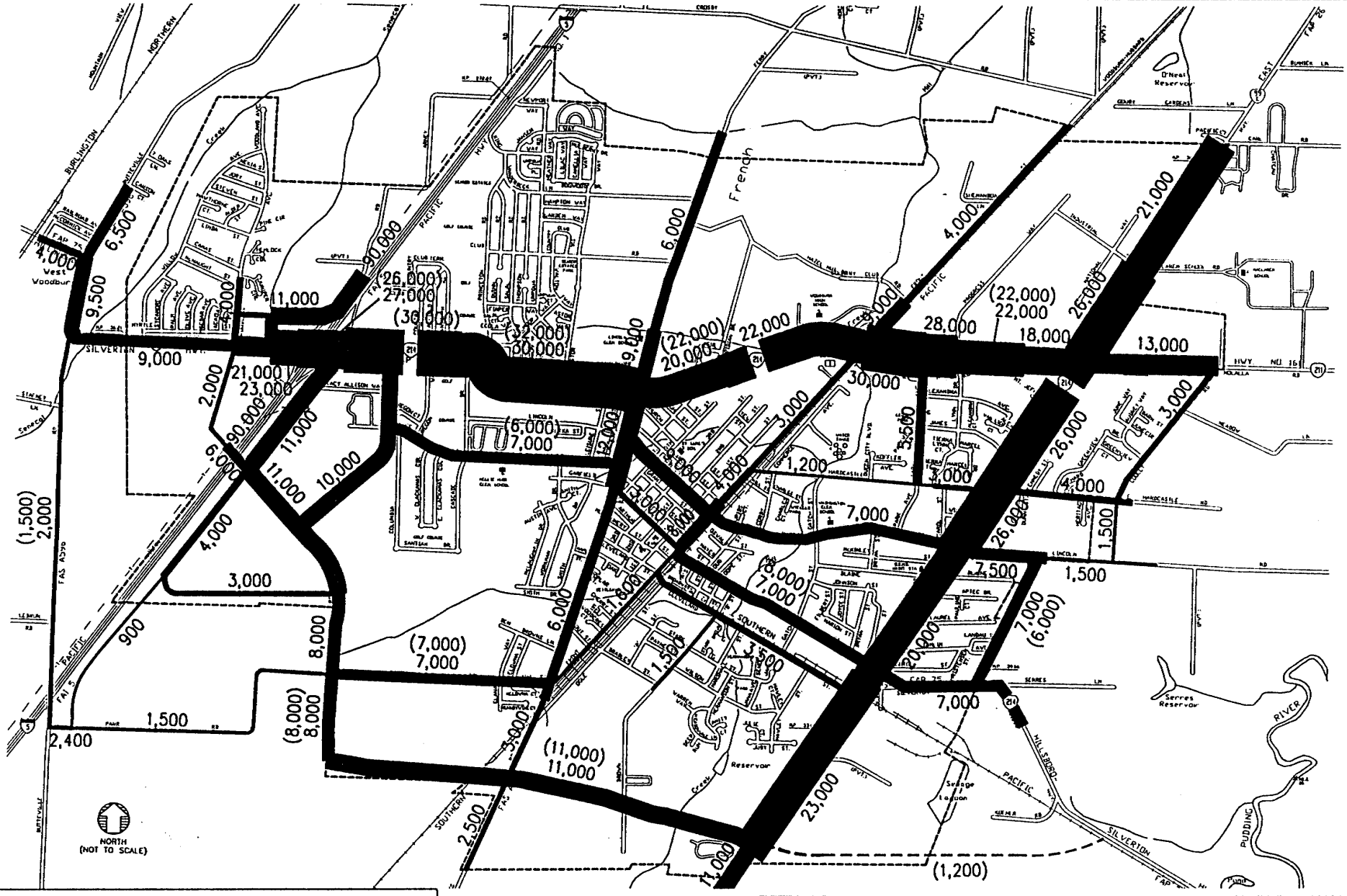
Year 2015 Traffic Flow Maps—Roadway System Alternatives



ROAD NO-BUILD ALTERNATIVE
2015 AVERAGE DAILY TRAFFIC

CITY OF WOODBURN
DRAFT TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
C-1



LEGEND

XX,XXX – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 99E

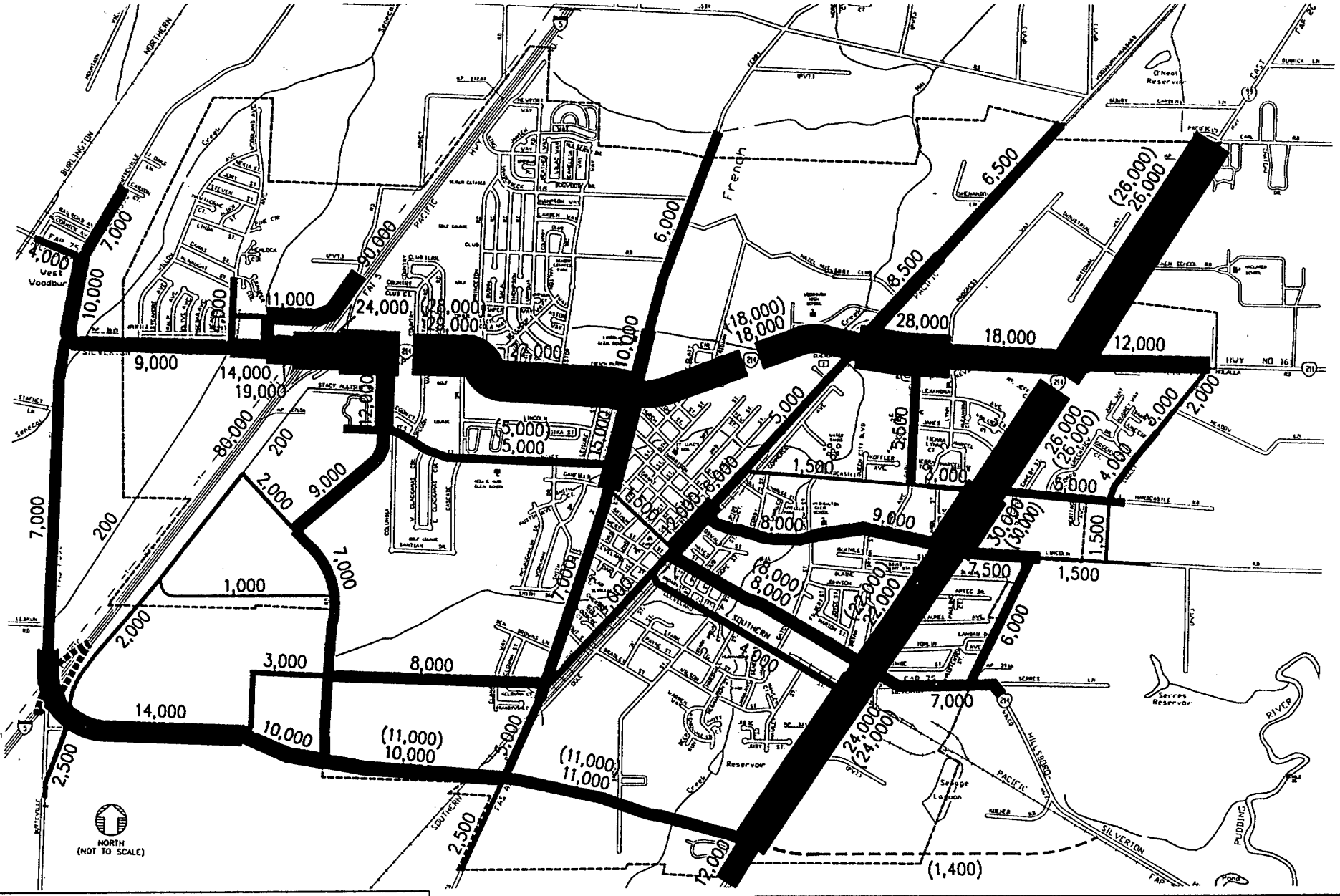
(XX,XXX) – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 214

REVISED 4/13/95

ROAD ALT. #1: I-5 SPLIT INTERCHANGE WITH SOUTH ARTERIAL 2015 AVERAGE DAILY TRAFFIC

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE C-2



LEGEND

XX,XXX – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 99E

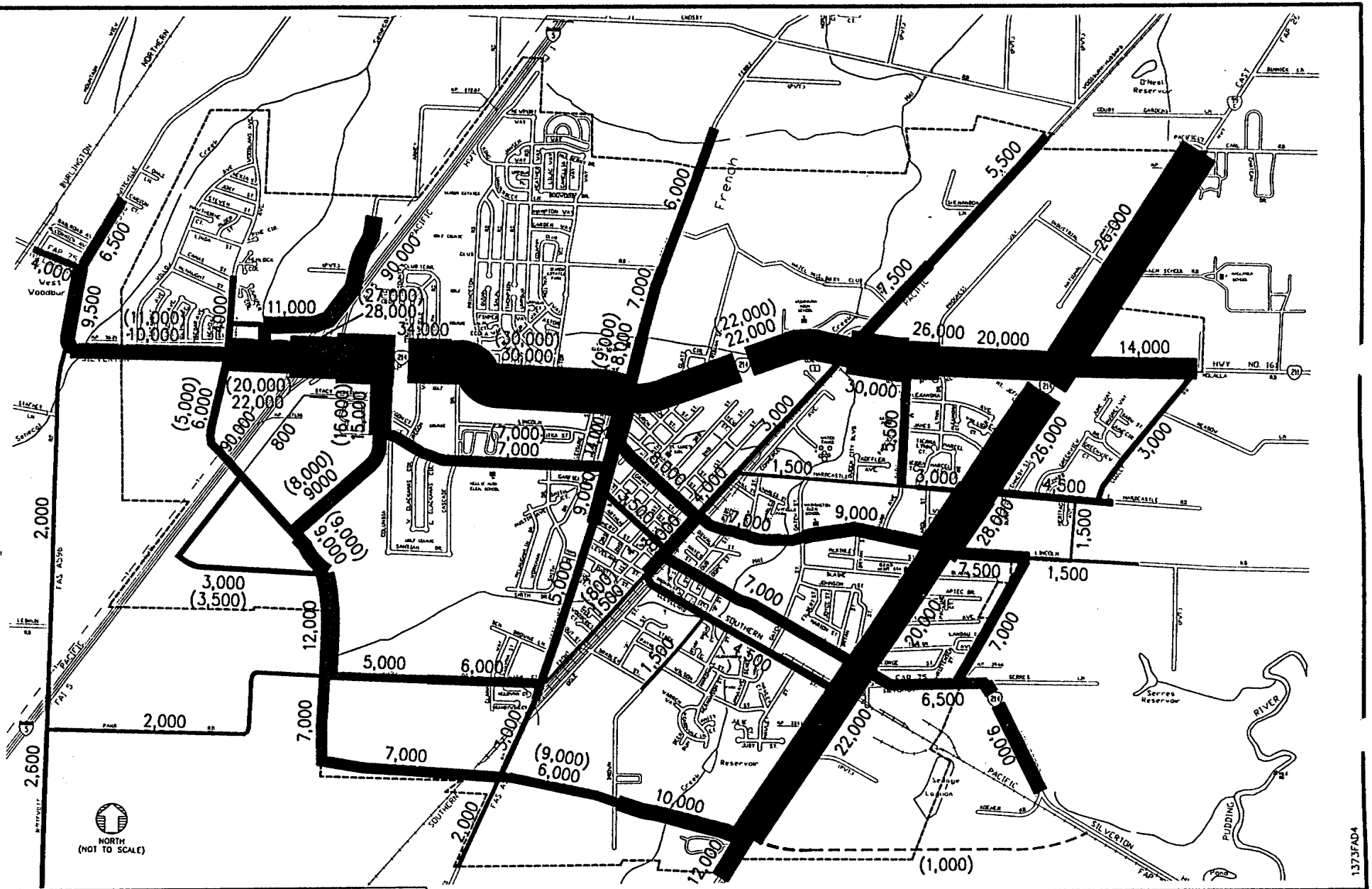
(XX,XXX) – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 214

REVISED 4/13/95

ROAD ALT. #2: SECOND I-5 INTERCHANGE/ SOUTH ARTERIAL 2015 AVERAGE DAILY TRAFFIC

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE C-3



LEGEND

XX,XXX – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 99E

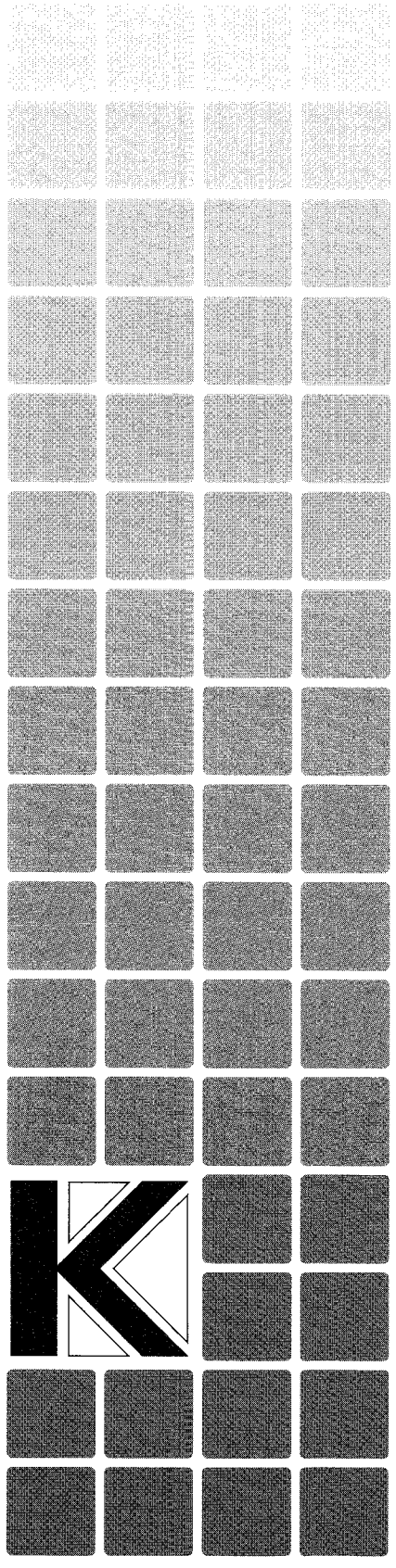
(XX,XXX) – 2015 AVERAGE DAILY TRAFFIC WITH SOUTH ARTERIAL EXTENDED TO HWY 214

REVISED 4/13/95

ROAD ALT. #3: IMPROVE EXISTING I-5 INTERCHANGE & HWY 214 SOUTH ARTERIAL WITH I-5 OVERPASS – 2015 AVERAGE DAILY TRAFFIC

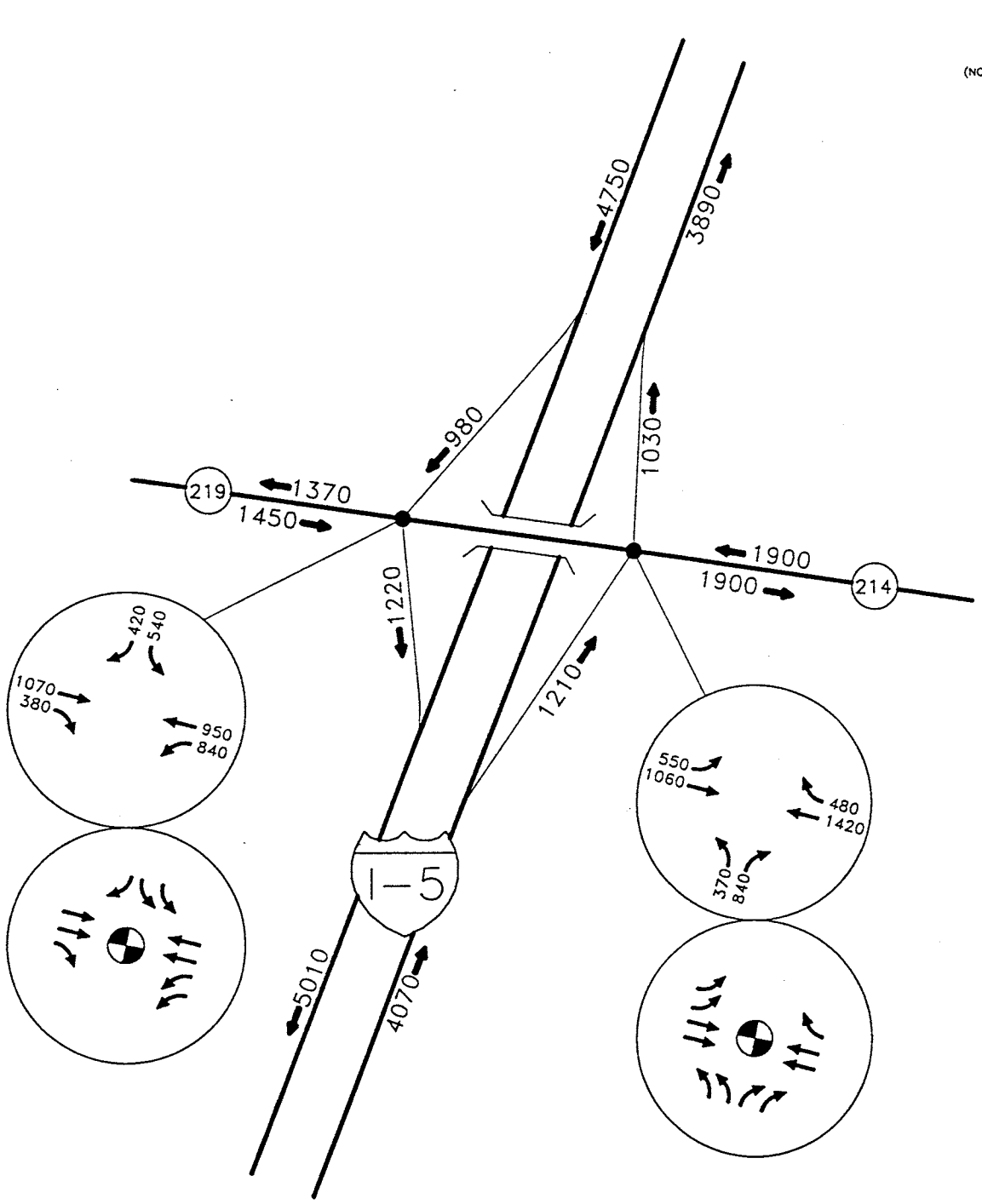
CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
C-4



Appendix D

Year 2015 Ramp/Intersection Volumes—I-5 Interchange Alternatives



EXISTING DIAMOND INTERCHANGE

LEGEND

380 ↘ – YEAR 2015 PM PEAK HOUR TRAFFIC VOLUME ASSUMED

– LANE CONFIGURATION

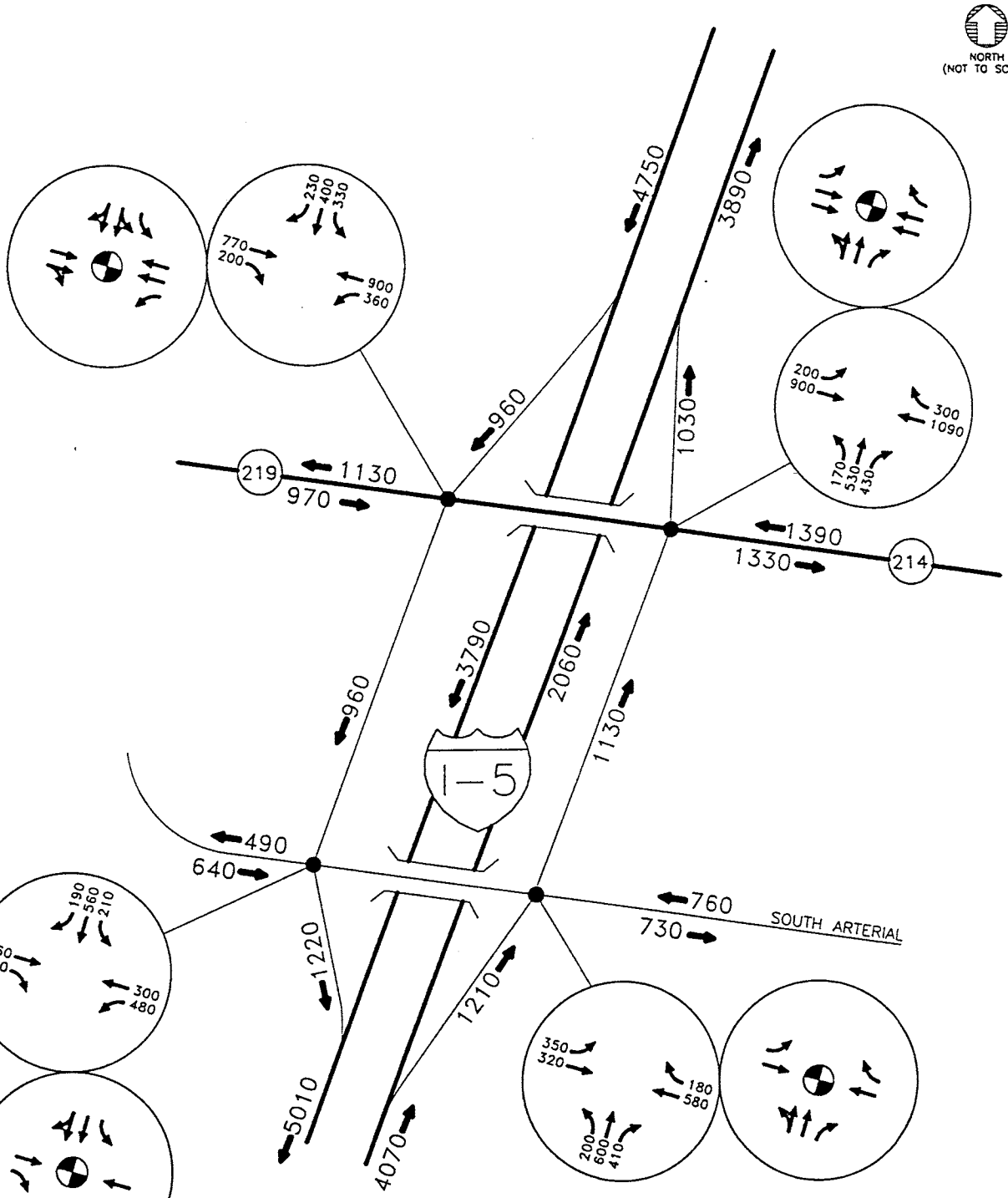
– TRAFFIC SIGNAL

2015 PM PEAK HOUR TRAFFIC AND LANE CONFIGURATIONS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
D-1

1373FD-1



SPLIT DIAMOND INTERCHANGE

1373FD-1

LEGEND

85 – YEAR 2015 PM PEAK HOUR TRAFFIC VOLUME ASSUMED

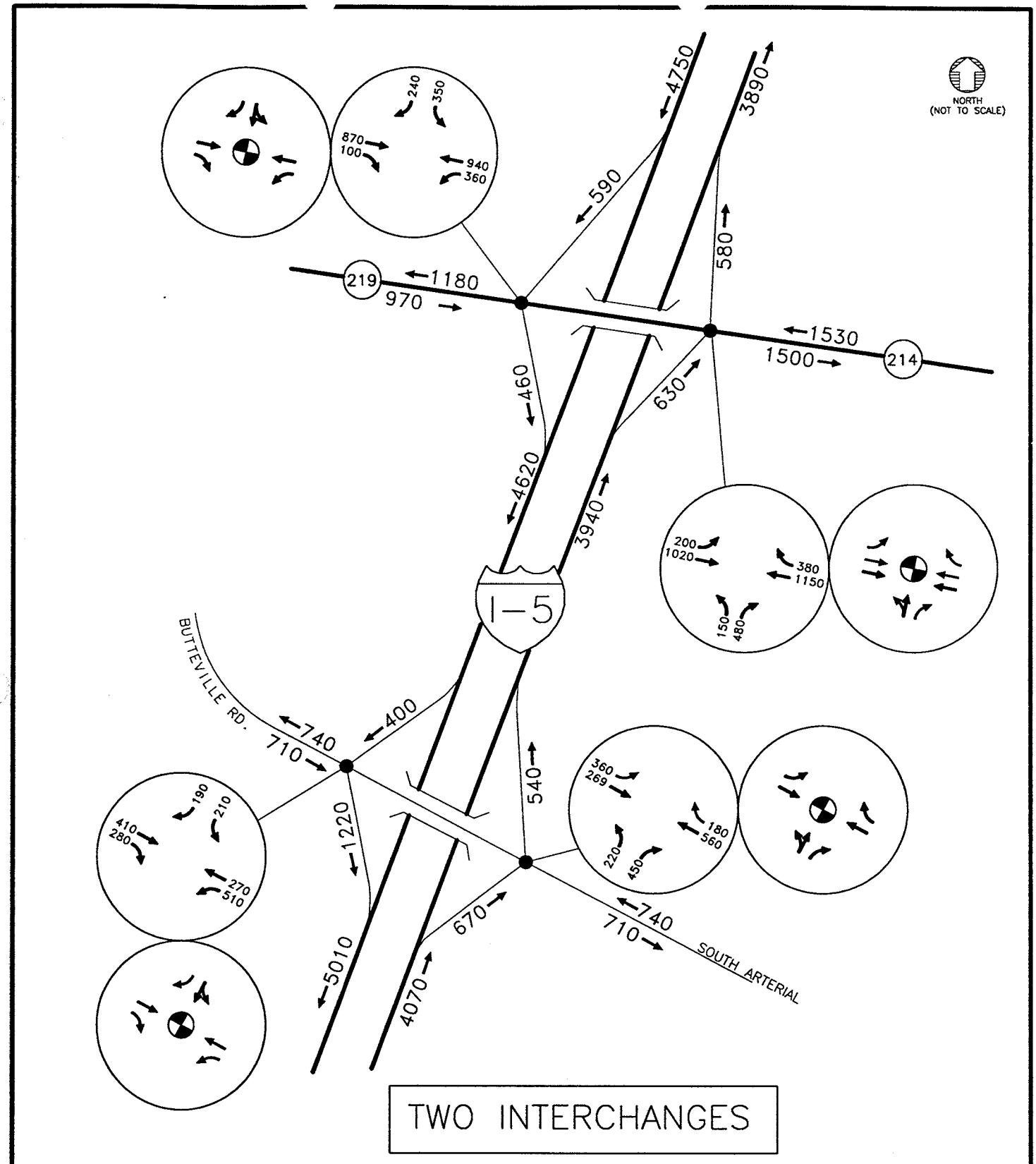
– LANE CONFIGURATION

– TRAFFIC SIGNAL

2015 PM PEAK HOUR TRAFFIC AND LANE CONFIGURATIONS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

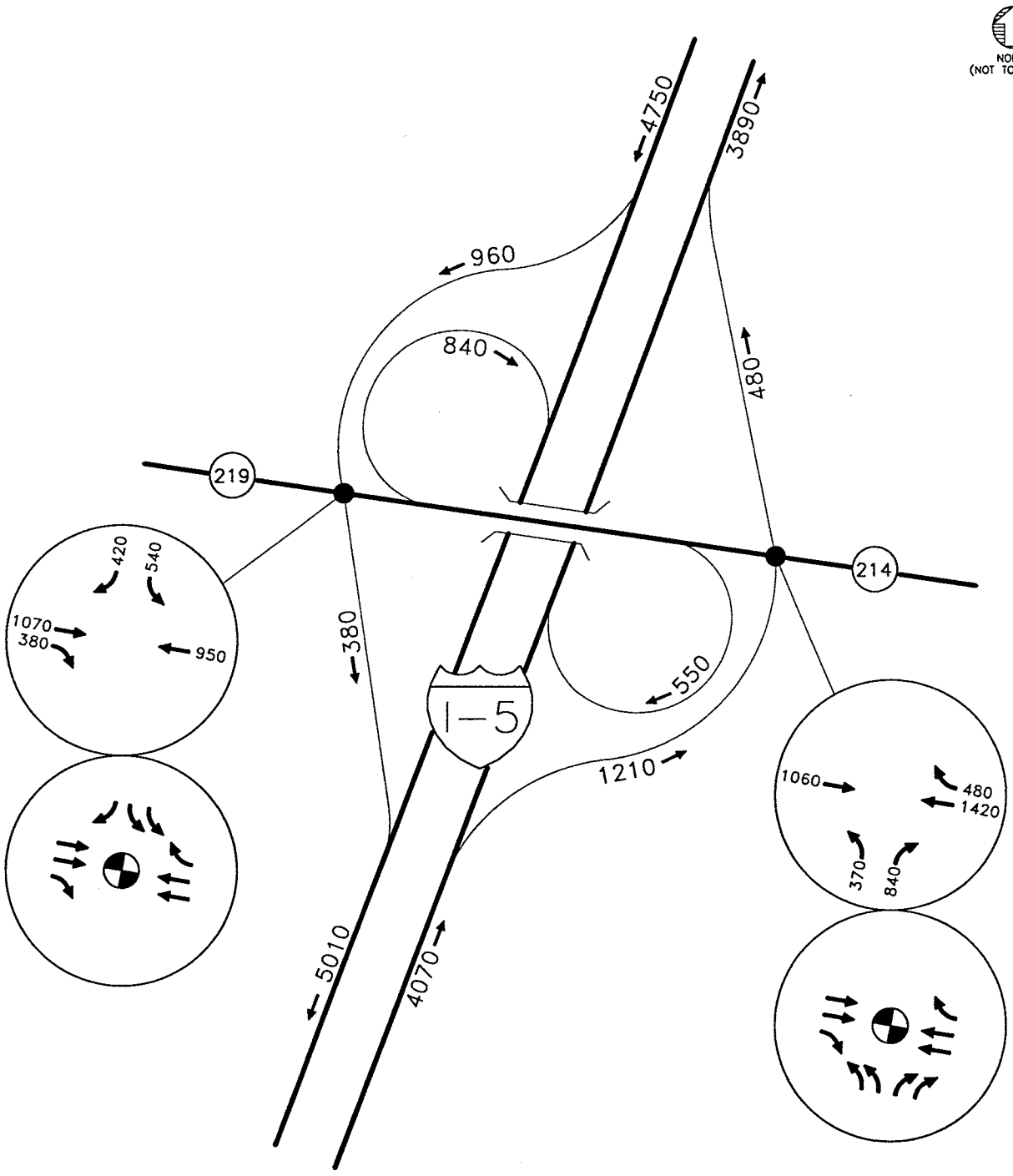
FIGURE
D-2



2015 PM PEAK HOUR TRAFFIC AND LANE CONFIGURATIONS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
D-3



PARTIAL CLOVERLEAF

LEGEND

380 – YEAR 2015 PM PEAK HOUR TRAFFIC VOLUME ASSUMED

– LANE CONFIGURATION

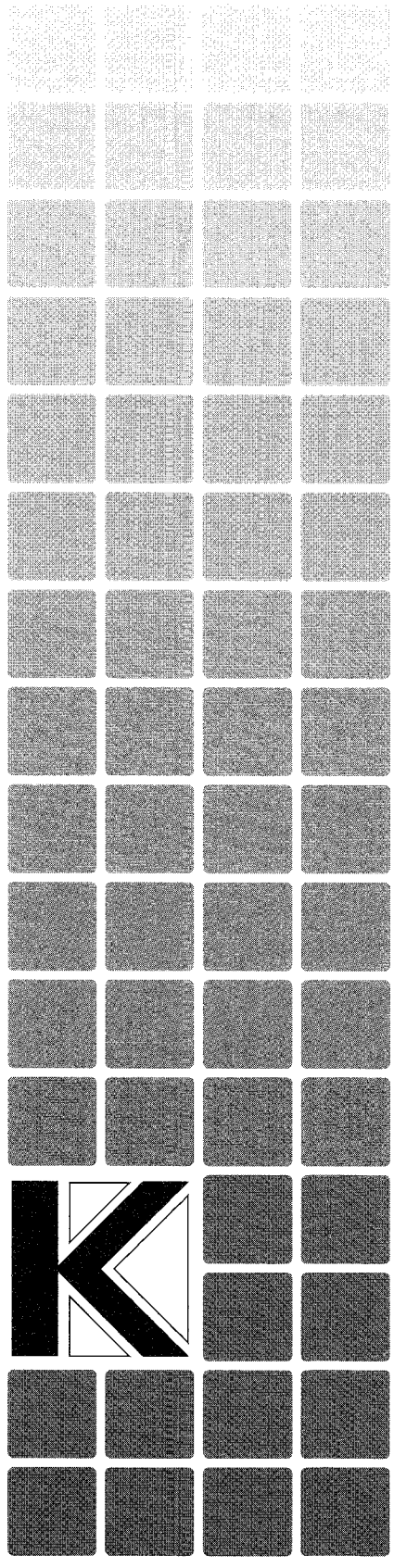
– TRAFFIC SIGNAL

2015 PM PEAK HOUR TRAFFIC AND LANE CONFIGURATIONS

CITY OF WOODBURN
TRANSPORTATION SYSTEM PLAN
JUNE 1996

FIGURE
D-4

1373FD-1



Appendix E

Proposed Woodburn Plan/ Ordinance Text Modifications

New Comprehensive Plan Policies

New Comprehensive Plan Policies

New Plan Policy 1 - Pedestrian Safety

The City shall encourage pedestrian safety and foster pedestrian activity, sidewalks shall be provided on all arterial, service collector, and access streets. Where possible, sidewalks should be detached from the curb, separated by a minimum 4-foot wide parkway strip.

New Plan Policy 2 - Carpool and Vanpool Programs

The City shall encourage large businesses in Woodburn to set up carpool and vanpool matching programs, based on employees' residential location and work shift.

New Plan Policy 3 - Parking Reductions

The City shall encourage a reduction in parking for single-occupancy vehicle travel. Where carpool/vanpool, or shared parking is provided, minimum parking requirements may be reduced by 10%.

New Plan Policy 4 - Access Control Policies and Guidelines

Access to a development site shall be consistent with an adopted access management plan for specific streets. Until such time that access management plans have been adopted by the City of Woodburn, access shall be consistent with applicable standards of the Oregon Highway Plan, the applicable standards of the zoning district or overlay zone, or the applicable standards or guidelines outlined in the Transportation System Plan.

Policy 4(a) - Road Classification

Highway 214 (between the west City limits and Settlemier Avenue/Boones Ferry Road) and Highway 99E between Lincoln Street and the South City limits. The 1991 Oregon Highway Plan classifies the following as Category 5 Highways:

- Public roads shall be spaced a minimum of one-quarter mile apart;
- Private driveways shall be full access spaced at least 300 feet apart (which equates to 18 driveways per mile on each side of the roadway); and
- Traffic signals shall be spaced at least one-quarter-mile apart.

Policy 4(b)- Driveway Access

Where possible, driveway access along Highway 214 and Highway 99E shall be consolidated to meet the driveway density guidelines outlined in the Access Management Classification System of the Oregon Highway Plan. Where possible, driveway access along the following sections of Highway 214 shall be consolidated:

- I-5 / Evergreen Road;
- Evergreen Road / Oregon Way;
- Oregon Way / Broughton Way; and
- Broughton Way / Settlemier Avenue.

Where possible, driveway access along the following sections of Highway 99E shall be consolidated:

- Lincoln Street / Aztec Drive;
- Aztec Drive / Laurel Avenue;
- Laurel Avenue / Highway 214; and
- Highway 214 / End of Curb.

Policy 4(c) - Compliance with Access Management Guidelines

In order to bring Highway 214 and Highway 99E into compliance with the Access Management Policy guidelines, the City of Woodburn shall coordinate with ODOT to:

- Develop a parallel road system to provide local access to businesses adjacent to Highways 214 and 99E and reduce the traffic volumes on Highway 99E; and
- Install two-way left turn lanes along the sections of Highways 214 and 99E outlined in Section 11.070(i)(2)- Driveway Access.

Zoning Ordinance Amendments

New Zoning Ordinance Section

There are several general issues that need to be addressed as part of the amendments to the Zoning Ordinance.

SECTION 8 (Add)TRANSPORTATION PLANNING, DESIGN STANDARDS AND PROCEDURES

Section 8.011 Sidewalks

Sidewalks shall be provided along both sides of all arterial, service collector, and access streets and also on local streets if possible. Sidewalks shall meet the following minimum widths:

Curb sidewalks shall have a minimum unobstructed width two feet less than the required width above. A detached setback sidewalk shall be separated from the curb by a planting strip at least four feet in width.

Section 8.012 Bikeways

A comprehensive bicycle plan facility system shall be constructed providing access to major activity centers within the City. The bicycle facility system shall provide continuity and interconnectivity so that bicycle lanes do not terminate leaving a cyclist with no option but to ride on the shoulder of the road. The bicycle facility system shall provide continuous access to Downtown Woodburn, schools, recreational areas, and many of the residential areas in Woodburn. As new developments are constructed, the City shall provide safe, well lit, covered bicycle storage facilities. If the new development is an office building, the developer should be required to provide shower facilities as well.

Section 8.012(1) Bicycle Lane Width

Bicycle lanes and bikeways shall be provided in accordance with the Transportation System Plan. Bicycle lanes shall be six feet wide and shall be provided for each direction of travel. Except as amended or altered by the transportation plan, bicycle lanes shall be provided along collector and arterial streets. Bicycle lanes and bikeways shall be constructed consistent with ODOT Bicycle Plan standards.

Section 8.013 Street Standards

Streets shall meet the following standards:

Conform to the Streets Standard Ordinance.

Section 8.014Internal Connections

Section 8.014(a)Connections To The Right-of-way

Every commercial, office, and institutional building shall include a pedestrian walkway connected to the public right-of-way. A walkway shall be provided for every 300 feet of street frontage.

Section 8.014(b) Connections Between Developments

Opportunities for at least one pedestrian walkway and one potential vehicular connection shall be provided between adjacent commercial, office, and institutional development. If connections are currently not available, then planned connections shall be designed to provide an opportunity to connect adjoining developments.

Section 8.014(c) General Walkway Standards

Walkways shall be designed to connect with internal circulation patterns within buildings. Walkways shall meet City standards for sidewalk construction and shall not be less than five feet in width. If adjacent to a parking area where vehicles will overhang the walkway, a seven-foot-wide walkway shall be provided. The walkways shall be separated from parking areas and internal driveways using curbing, landscaping, or distinctive paving material.

Section 10.090 Golf Carts

Section 10.091 Street Width Right-of-way

Streets that allow golf carts shall provide a minimum of an eight-foot wide exclusive lane for golf cart users on both sides of the street.

Section 10.092 On-site Right-of-way For Golf Carts

Land uses that allow the use of golf carts on site shall ensure that an eight-foot wide right-of-way access.

Amendments To The Parking Section Of The Zoning Ordinance For Bicycle And Carpool/vanpool Parking

Section 10.071 Bicycle Parking

Section 10.071(a) Applicability

Bicycle parking shall be provided for all new commercial, industrial, institutional, and multi-family development. In the downtown area, such uses that are be exempt from vehicle parking requirements shall provide bicycle parking.

Section 10.071(b) Number Of Spaces

The number of bicycle parking spaces shall be at least 10% of the required automobile parking for the use. In no case shall less than two spaces be provided.

Section 10.071(c) Space Standards And Racks

The dimension of each bicycle parking space shall be a minimum of two and one-half by six feet. A five-foot-wide access aisle must be provided. If spaces are covered, seven feet of overhead clearance must be provided. Bicycle racks must be securely anchored and designed to allow the frame and one wheel to be locked to a rack using a high security, u-shaped, shackle lock.

Section 10.071(d) Location

Bicycle parking facilities shall be:

- located within 50 feet of the main building entrance;
- closer to the entrance than the nearest automobile parking space;
- designed to provide direct access to a public right-of-way;
- dispersed for multiple entrances; and
- in a location that is visible to building occupants or from the main parking lot.

Section 10.071(e) Covered Parking

Covered bicycle parking shall be provided when 10% or more of automobile parking is covered. If more than 10 bicycle parking spaces are required, then a minimum of 50% of the spaces shall be covered.

Section 10.071(f) Lighting

Lighting shall be provided in bicycle parking areas to thoroughly illuminate facilities during working hours. Bicycle parking areas shall be at least as well lit as automobile parking areas.

Section 10.072 Carpool and Vanpool Parking

New industrial, institutional, and commercial development with 50 or more employees shall provide carpool/vanpool parking. Carpool/vanpool parking shall be provided for at least 10 percent of the required employee parking and shall be located no further from the primary employee entrance than any other employee parking spaces.

Section 11.020(g) Site Plan Review

Section 11.020(g)(1) Purpose

The purpose of this section is to provide standards and procedures to implement provisions of the State Transportation Planning Rule (OAR 660, Division 12) and local, regional, and state transportation plans.

Section 11.020(g)(2) Applicability

The standards and procedures of Section 8.011 shall apply to all commercial, industrial, institutional, and multifamily residential development. any construction, renovation, expansion or alteration of an existing use or portion of a use that is non-conforming and has a development permit value that exceeds 50% of the value of the land and structures, based on the county assessor's records, will be required to bring the property into conformance with the standards of this section. Permit value shall be determined by the building official.

If the development permit value is less than 50% of the land value, than an equal percentage of the site must comply with the standards as the percentage of building expansion or site alteration. For example, if building area is expanded by 25%, then a minimum of 25% of the site must be brought in to compliance with the standards in this section.

In all cases, regardless of permit value, new construction, renovation, expansion or alternation shall provide bicycle parking in accordance with this ordinance.

Section 11.020(g)(3) Coordinated Review

If a proposed development is within 200 feet of a state highway or an existing or planned transit route, notice of the proposal shall be provided to ODOT, participating transit operators, and Marion County. The notice shall be part of the administration review process.

Section 11.020(g)(4) Consolidated Review

Development review associated with proposed transportation facilities, services, and improvements shall be conducted in conjunction with other jurisdictions when appropriate.

Section 11.020(g)(5) Criteria

The criteria on which the Planning Director shall base development review decisions are as follows:

1. Compliance with standards and procedures of section 8.
2. Compliance with standards of the applicable zoning district.
3. Compliance with supplementary regulations and parking standards.

Subdivision Standards Amendments

Section 12(J) New Development Standards

Section 12(j)(1) Sidewalk, Bikeway, And Street Standards

The sidewalk, bikeway, and street standards shall meet the standards outlined in the Street Standards Ordinance.

Section 12(J)(2) Cul-de-Sacs

Cul-de-sacs shall only be provided when no opportunity exists for creating a through street connection. A cul-de-sac shall have a maximum length of 250 feet.

Section 12(J)(3) Block Size

Except where required for access management, block length shall not exceed 600 feet. In addition, when necessary for public convenience and safety, the Planning Commission may require the land divider to dedicate to public access ways to connect to cul-de-sacs, to pass through oddly shaped or unusually long blocks, to provide networks for public paths according to adopted plans, or to provide access to schools, parks, or other public areas.

The perimeter of blocks formed by streets shall not exceed 1,600 feet, except where street location is restricted by natural topography, wetlands, or other bodies of water.

Section 12(J)(4) Pedestrian Ways

In any block over 600 feet in length between intersecting street lines, a pedestrian way with a minimum width of 15 feet shall be provided through the block near the middle.

Section 12(J)(5) Alleys

The width of right-of-way and paving design for alleys shall not be less than 20 feet, except that for an alley abutting land not in the subdivision or partition a lesser width may be allowed at the discretion of the Planning Commission. Where two alleys intersect, 10 feet corner cutoffs shall be provided. Unless otherwise approved by the Planning Commission, grades shall not exceed 12 percent.

New Definitions

Access ways: A walkway that provides pedestrian and or bicycle passage either between streets or from a street to a building or other destination such as a school, park, or transit stop. Access ways generally include a 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.

Bikeways: Any road, street, or path which in some manner is specifically designated for the use of bicycles or for shared use by bicycles and other transportation modes. The term "bikeway" includes bicycle lane, bicycle path, and bicycle route.

Bicycle Lane: A portion of a road, street, or shoulder which has been designated for use by bicyclists through the application of a paint stripe.

Bicycle Path: A separate trail or path on which motor vehicles are prohibited and which is for the exclusive use of bicycles or the shared use of bicycles and pedestrians.