

# **City of Sandy Transportation System Plan**

**Sandy, Oregon**

**December 1995**

**ADDENDUM  
TRANSPORTATION SYSTEM PLAN  
Ordinance No. 12-97  
September 29, 1997**

**SECTION 2 - EXISTING CONDITIONS**

**Page 21 - Roadway Facilities - US Hwy. 26**

Add to end of first paragraph: **“Control of and responsibility for Hwy 26 in the couplet section is governed by the March, 1965 agreement between the Oregon State Highway Commission, (now ODOT) and the City.”**

**Page 23 - Figure 4**

Bell Street should be depicted as a Minor Arterial.

**Page 26 - Table 3**

Bell Street should be listed as a Minor Arterial and 395<sup>th</sup> Avenue should be listed as a County Facility.

Dubarko Road should be listed as a Minor **Residential** Arterial

**Page 62 - Alternative 4: “Town Plan” Roadway Network**

Fifth and sixth bullets: add **“or Agnes Street”** after Olson Street.

**Page 71 - Alternative 4: Town Plan Transportation System**

Third bullet: add **“or Agnes Street”** after Olson Street.

**Page 72**

Add to the end of the bulleted list: **“It should be recognized that significant environmental, topographical and right-of-way constraints may make some of these new and extended roadways impractical.”**

**Page 73 - Figure 14**

depict Agnes Street as a proposed collector street.

**Page 94 - New Roadways - Arterial Streets**

Delete references to width of bike lanes, sidewalk widths, and planter strip widths for items 1 through 4.

2. Construct Dubarko Road as a **Residential** Minor Arterial from 362<sup>nd</sup> eastwards to the west end of the US 26/Vista Loop Drive intersection with a two-lane cross-section, providing turn pockets at intersections. **Construct Dubarko Road as a Residential Minor Arterial from Bluff Road to Hwy. 211 with a three-lane cross-section. Dubarko Road construction should be in compliance with Alternative No. 4, Recommended Street Plan Map (Figure 18) on Page 96,**

~~and Table 16 on Page 72. Provide five foot bike lanes, five foot sidewalks, and seven foot planter strips on both sides and parking on one side of the street. Right-of-way should be preserved for an ultimate five-lane section. with bike lanes, no on-street parking, and left turn pockets at intersections.~~ The length of the new construction is approximately 9,000 feet.

**Page 96 & 97 - Figures 18 & 19**

depict Agnes Street as a proposed collector street.

**Page 101 - Table 21**

Add “or Agnes Street” after Olson Street.

**Page 102 - Collector Streets**

Item 2. - Add “or Agnes Street” after Olson Street.

Delete references to width of bike lanes, sidewalk widths, and planter strip widths for items 1 through 11.

**Page 103 - Improvements to Existing Roadways**

Delete references to width of bike lanes, sidewalk widths, and planter strip widths for items 1 through 4.

**Page 105 - Roadway Standards**

second paragraph - Delete the second sentence and replace with: “These design standards are flexible and may be varied. ”

**Table 23**

Amend speed on residential minor arterial to “25” miles per hour

**Page 116 - Implementation Plan - Second Decade**

Add “or Agnes Street” after Olson Street.

**Page 125 - Transportation Needs Project List**

**New Roadways**

Add “or Agnes Street” after Olson Street.

Delete references to width of bike lanes, sidewalk widths, and planter strip widths for all New Roadway and Upgrade Roadway projects.

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13

## Transportation System Plan

# City of Sandy Transportation System Plan

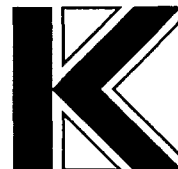
Sandy, Oregon

To the attention of:  
**Tamara DeRidder, Planning Director**  
City of Sandy  
39250 Pioneer Boulevard  
Sandy, Oregon 97055  
(503) 668-5533

Prepared by:  
**Kittelson & Associates, Inc.**  
610 SW Alder, Suite 700  
Portland, Oregon 97205  
(503) 228-5230

Project No.: 1359.00

**December 1995**



# Key Contributors

## Consulting Staff

Peter Haliburton  
Kittelson & Associates, Inc.

Phill Worth  
Kittelson & Associates, Inc.

Joe Dills  
Otak, Inc.

## Management Team

Tamara DeRidder  
City of Sandy

Fred Eberle  
ODOT-Region 1

Scott Lazenby  
City of Sandy

Dennis Mitchell  
ODOT-Region 1

Lidwien Rahman  
ODOT-Region 1

Mike Walker  
City of Sandy

## Transportation Advisory Group

Mike Annes  
Margaret Holman  
Kjell Rode  
Pamela Wolfe

Vern Buhler  
Jack Martin  
April Siebenaler  
Charles Zulauf

Dorothy Douglas  
Buz Ortiz  
Dennis Ward

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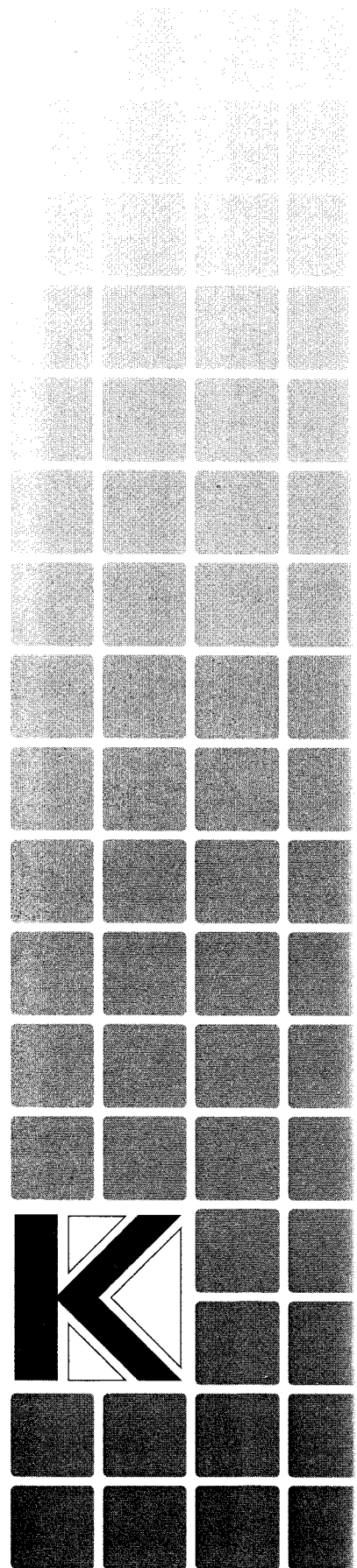


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## Executive Summary

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## Executive Summary

A comprehensive analysis of the transportation system within the Sandy area has been prepared, in accordance with the Oregon Revised Statute 197.712, OAR 660 Division 12 and the Transportation Planning Rule (TPR). This legislation and corresponding administrative rule states that by 1996 all jurisdictions must have developed and adopted a Transportation System Plan (TSP). Accordingly, this study is organized to provide the necessary elements for the City of Sandy to assemble its TSP. In addition, this document provides Clackamas County and the Oregon Department of Transportation (ODOT) with those necessary recommendations for incorporation into their respective TSPs.

The goals of this study, as developed by the technical and citizen advisory committees, were to develop a transportation system to provide mobility, improve circulation, and ensure the safety for all travel modes; preserve, protect, maintain, and improve the transportation environment as an enjoyable experience; balance the variety of demands on the transportation system to preserve and extend the useful life of all facilities; and, maximize the cost effectiveness of any necessary transportation improvements to the system.

Included in this study is an analysis of existing conditions, identification of short-term and long-term transportation system improvements, a preferred transportation system plan, a transportation finance plan, and a description of the plan's compliance with the Transportation Planning Rule.

The City of Sandy has an established grid network of collector and arterial streets to serve existing and future land development. Much of this network including the downtown grid network was designed and constructed with somewhat restricted rights-of-way and paved widths, in recognition of difficult topographic constraints. This has resulted in the limitation of the transportation system to adjust to increasing demands and variations in mode choice. The existing bicycle system for the City of Sandy is dependent upon the State's provision of bike lanes on U.S. 26. Limited and disconnected bike facilities are provided on sections of City streets. No posting of bike routes is currently provided by the City.

Sandy's collector and arterial streets generally have sidewalks on both sides of the street in the older downtown area; but there are many city streets within the UGB including sections along U.S. 26 where sidewalks are not provided. In addition, there are sidewalks in the older parts of town which are in dis-repair and require upgrading.

Other transportation system components in the Sandy area include a demand-responsive transit system for the elderly and the disabled, and Tri-Met commuter service which connects to the Gresham Transit Center. Additional transportation system components located outside the Sandy area include freight and Amtrak passenger rail service which are accessed in Portland approximately 25 miles to the west. Freight and passenger air service is available at the Portland International and Troutdale airports.

A detailed analysis of the street network revealed that the existing system of signalized and unsignalized intersections within Sandy is operating within acceptable standards for the associated facilities. During peak conditions some unsignalized intersections may approach threshold levels of delay for the side-street left turns; however, relief is provided and utilized at nearby signalized intersections.

The future growth potential for the City of Sandy was established through an effort of City staff and the community to develop a new "Town Plan" Comprehensive Land Use map. A 20-year target population of 15,000 and employment base of 8,675 was chosen, based on the new Town Plan. Estimates of future multi-modal travel demand were then developed, based on the neighborhood centered concepts incorporated in the Town Plan.

Future transportation needs were identified based on an assessment of long-range impacts of local and regional growth on the transportation system and surrounding land uses. A No-Build Alternative was considered in the analysis and would result in unacceptable capacity or safety conditions. An evaluation process of Alternatives Analysis was performed to develop projects which mitigated the identified deficiency and restored the necessary capacity, while attempting to enable efficient connections within the community and adequately provide for and promote multi-modal activity. This methodology best facilitated satisfaction of the established goals and objectives and development of the Preferred Transportation System Alternative.

Transportation system improvement costs were calculated for the improvements identified in the Sandy Comprehensive Plan and for those necessary to mitigate future transportation system deficiencies. These improvements include new and upgraded sidewalks, bicycle facilities, and roadways to provide future capacity and access for autos, trucks, pedestrians, and bicycles. An implementation plan divides these projects up into the first and second decade, and prioritizes projects within each period.

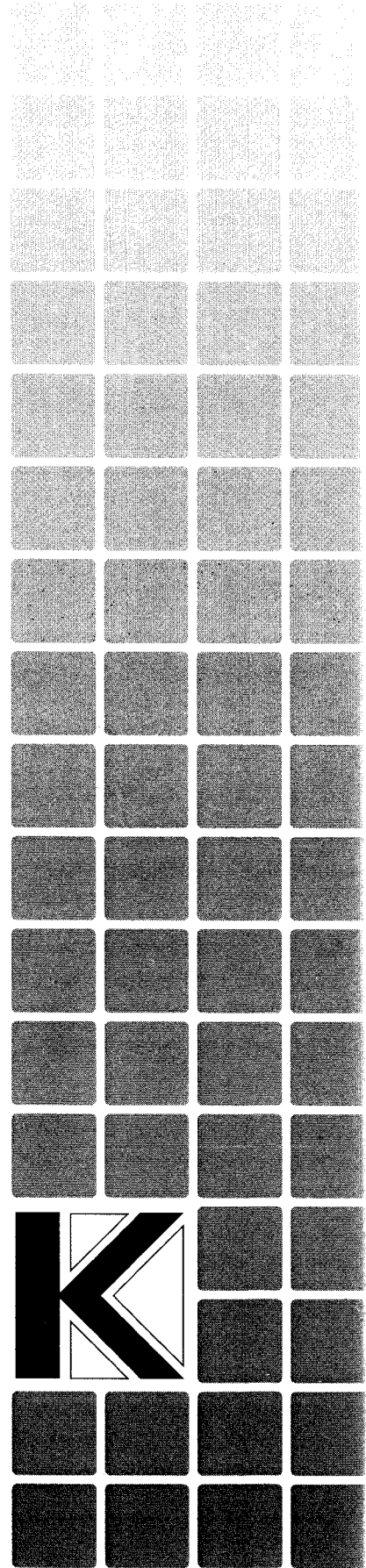
Recommended land use ordinance modifications are presented to enable Sandy to ensure the effective implementation of the plan, and to ensure compliance with State land use and transportation regulations.

The study includes a detailed examination of transportation system funding sources and identified financing mechanisms to pay for future transportation improvements attributable to each jurisdiction. No significant change in funding levels by jurisdiction were assumed when identifying funding sources or financing mechanisms.

Based on the findings of the Sandy Transportation System Study, it is recommended that the City of Sandy, by 1996, participate with the Oregon Department of Transportation and Clackamas County in the development of their respective transportation system plans to ensure a coordinated and consistent policy and plan, especially for cross jurisdictional transportation facilities.

**Section 1**

Introduction



## Introduction

The City of Sandy, in conjunction with the Oregon Department of Transportation (ODOT), initiated a study of the area transportation system. This study has been conducted in compliance with State of Oregon legislation requiring local jurisdictions to prepare a Transportation System Plan (TSP) as part of their overall Comprehensive Plan. Accordingly, this document is organized to provide the necessary elements for the City of Sandy to assemble its TSP. In addition, it provides Clackamas County and ODOT with those necessary recommendations for incorporation into their respective TSPs.

Oregon Revised Statute 197.712 and the Land Conservation and Development Commission administrative rule known as the Transportation Planning Rule (TPR) require all public jurisdictions to develop the following:

- A road plan for a network of arterial and collector streets.
- A public transit plan.
- A bicycle and pedestrian plan.
- An air, rail, water, and pipeline plan.
- A transportation finance plan.
- Policies and ordinances for implementing the transportation system plan.

In addition, the new State rule requires local jurisdictions to adopt land use and subdivision ordinance amendments to protect transportation facilities, and to provide bicycle facilities between residential, commercial, and employment/institutional areas. The new State rule also requires that local communities coordinate their plans with county and state transportation plans.

### STUDY AREA

The City of Sandy is situated at the oxbow of the Sandy River and the western foot of Mount Hood (part of the Cascade Mountains separating western and central Oregon). Sandy is located approximately 23 miles east of downtown Portland, at the intersection of U.S. 26 and Highway 211. The scenic nature of the setting within which the city has developed sets the tenor for the character and attractiveness of the community. The location of growth and development within the city has been driven in large part by topographic constraints and its relation to U.S. 26 and the type of traffic this highway serves.

The recognized boundary for this study area is the current Urban Growth Boundary (UGB) for the City of Sandy. Figure 1 reveals the study area including the current UGB and city limit for the City of Sandy.

The area within the UGB for the City of Sandy defined the central area for the study. The limits of the study were extended to include additional areas to ensure a comprehensive examination of the transportation system. Jurisdictional boundaries were blurred in an attempt to provide a seamless transportation system for all users.

## **PUBLIC INVOLVEMENT AND STUDY GOALS**

In order to assist the City, County, and State jurisdictions in meeting the requirements of the TPR, the partnering jurisdictions initiated this study in October 1994. Two committees were formed to guide the study process: the Management Team and the Transportation Advisory Group. The Management Team, consisting of technically proficient representatives from each jurisdiction, provided critical review of the analysis and guidance to the Advisory Group. The Advisory Group, comprised of representatives from various Sandy neighborhoods, associations, and agencies, was created to act as a conduit for information to/from the general public, provide direction for the needs of the study, and review the findings and results for reasonableness in each circumstance. This committee established a series of transportation system goals to provide direction and evaluation criteria to the study process. The goals developed by this committee included:

### **Mobility/Circulation/ Safety Goals**

- Develop a transportation system to facilitate all travel modes
- Ensure sufficient capacity to accommodate future travel demand (vehicular, bicycle, pedestrian, etc.) to, within, and through the City of Sandy
- Improve vehicular/pedestrian interface along U.S. 26 in downtown area
- Identify the potential for improving the local circulation system, in an effort to reduce reliance on U.S. 26 and Highway 211 for local traffic
- Improve the safety of interactive multi-modal facilities
- Provide mobility to the transportation disadvantaged
- Ensure adequate truck route network to reduce commercial/neighborhood conflicts
- Resolve U.S. 26 street design and sidewalk requirements along downtown couplet

### **Capital Improvement Goal**

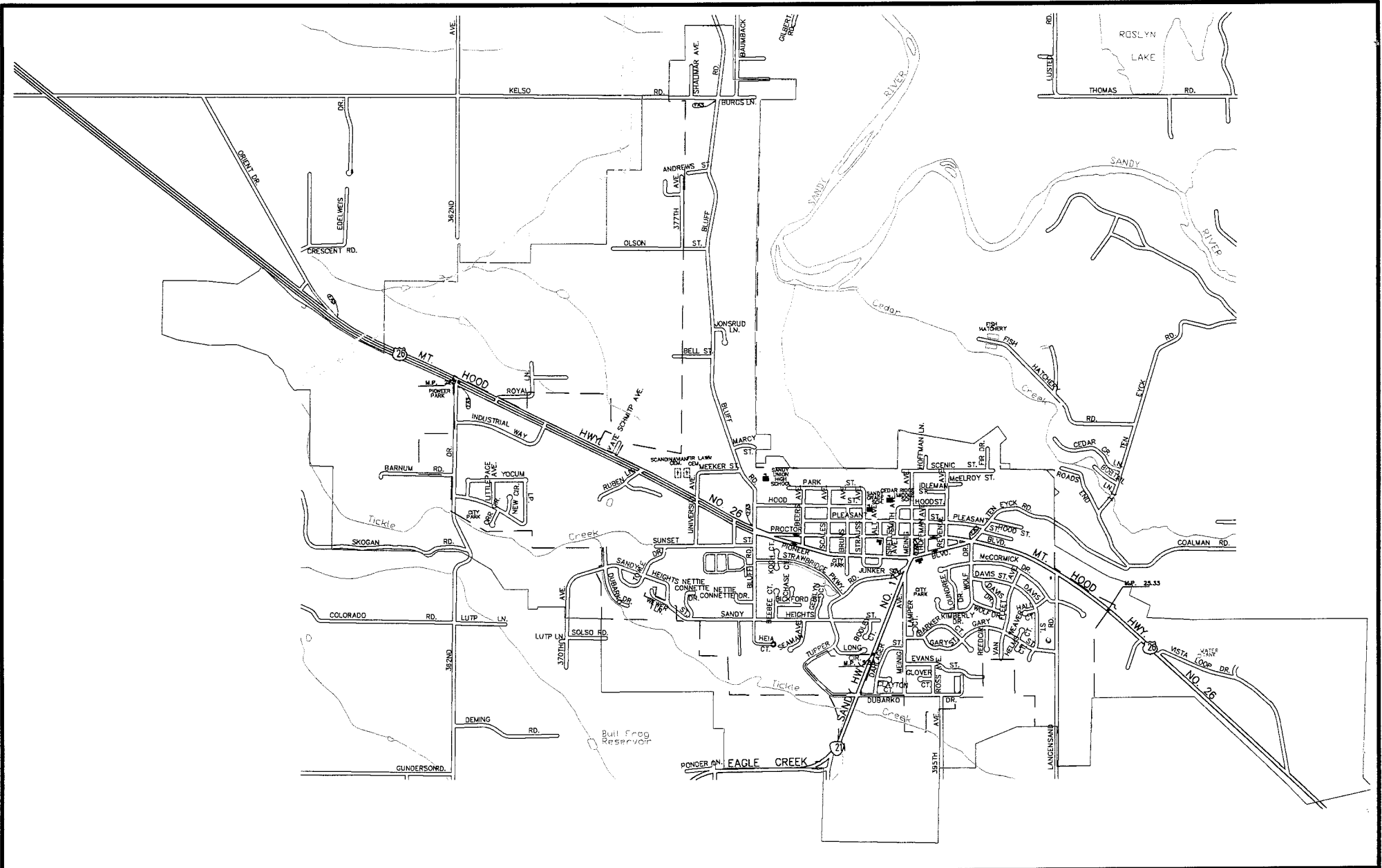
- Maximize the useful life of existing facilities
- Maximize the cost effectiveness of transportation improvements

### **Community Goals**

- Protect the scenic resources of the City
- Insure that U.S. 26 supports the pending Downtown Design Plan
- Preserve the historic character of "Old Sandy"
- Identify gateway and beautification treatments on U.S. 26 and Highway 211
- Maintain the beauty of the area by preserving critical View Sheds
- Improve pedestrian and bicycle access and safety within the Sandy urban core
- Enhance the vitality of the Sandy downtown area

**Figure 1**  
**Study Area**





**LEGEND**  
 --- CITY LIMITS  
 --- URBAN GROWTH BOUNDARY

<b>STUDY AREA</b>	
CITY OF SANDY TRANSPORTATION SYSTEM PLAN DECEMBER 1995	
FIGURE <b>1</b>	

Figure 1 (back-side)

- Assess the viability of the Town Plan to meet the needs of the community

#### **Economic Development Goal**

- Balance local access to U.S. 26 and Highway 211, while encouraging business activities, with the need to serve regional and statewide traffic
- Develop a transportation system which supports balanced growth of population and employment and the internalization of trips

Given these goals, the partnering jurisdictions are proceeding with developing their TSPs through a process that identifies the transportation needs in the Sandy area and the transportation system improvements required to serve those needs. The process also develops a comprehensive set of transportation policies with which to guide the future transportation system improvements necessary to meet growth requirements in the Sandy area.

These TSPs will be developed to balance the local needs of the citizenry with the needs of the region and the state. As such, the partnering jurisdictions undertook a planning process which promoted active participation by local, regional, and state agencies and guaranteed a balanced future transportation system which will serve the needs of all concerned. The partnering jurisdiction's approach was pro-active in the process of developing a Preferred System Alternative that may be adopted as a TSP.

Through a process which included numerous meetings with the Advisory Group (including two public workshops) and the Management Team, the Sandy transportation planning process was designed to facilitate general consensus by involvement of all interested and impacted parties.

#### **TRANSPORTATION SYSTEM STUDY ORGANIZATION**

The development of the Sandy Transportation System Plan began with an assessment of the existing transportation system conditions, as outlined in **Section 2** of this report. Transportation issues were identified by the Management Team with verification by the Advisory Group. An inventory of the existing transportation system was conducted to develop an understanding of the physical, operational, traffic safety, and travel characteristics of all major roadways within the Sandy urban area.

In **Section 3**, the study area's long-term future transportation system needs are identified in light of expected local and regional growth in the area based on the proposed Comprehensive Land Use Plan, called the "Town Plan", for Sandy through the year 2015. A No-Build alternative was considered and would result in safety and capacity deficiencies of such magnitude that the alternative was not advanced.

The next step, as summarized in **Section 4**, involved the assessment of alternatives to mitigate identified safety and capacity deficiencies, as well as strengthen and enhance the multi-modal transportation system. Alternatives were presented to both committees for review, decision, and direction. The impact of each alternative on the plans and policies of the responsible jurisdiction was examined for potential conflicts to integration and implementation. A preferred alternative satisfying the established goals of the study was advanced. Mitigation measures for this alternative were based on a transportation system designed to support the Town Plan and made every effort to extend the useful life of the existing transportation system.

**Section 5** summarizes the decisions and recommendations developed through this process by presenting the individual elements of the recommended Sandy Draft Transportation System Plan. Included are the bicycle/pedestrian plan, the public transportation plan, the air/rail/water/pipeline plan and the street system plan, as well as a specific Downtown Plan. In addition, this section details the anticipated implementation plan including the timing of street improvements.

The Funding and Financing Plan is presented in **Section 6** and identifies the alternatives available to the responsible jurisdictions to fund transportation system improvement needs. A Financing Plan was developed by the City to fund the identified projects.

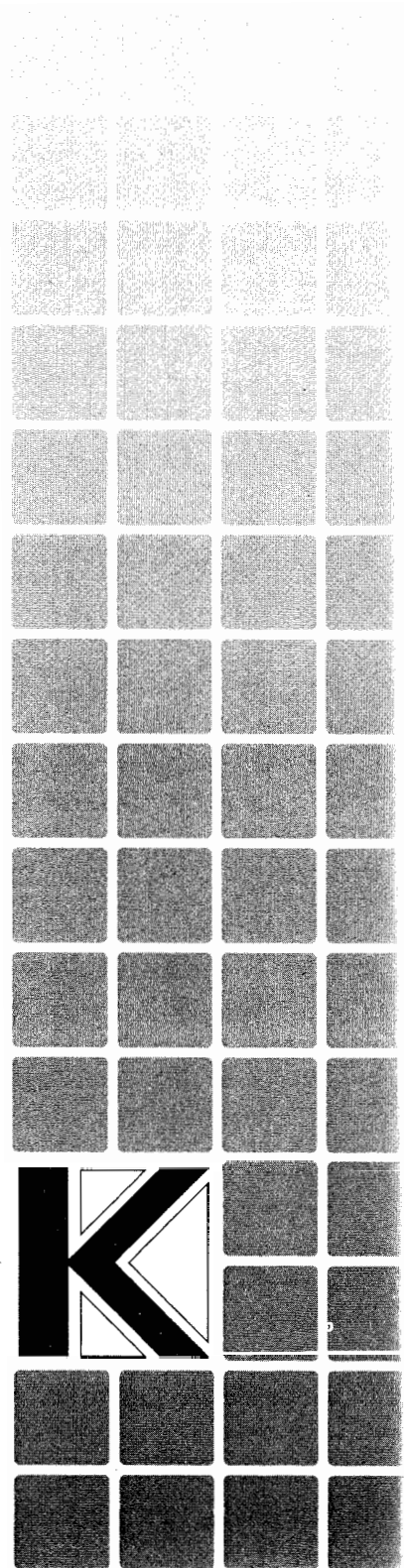
**Section 7** includes land use ordinance modifications which could be adopted by the City of Sandy to ensure that the Transportation System Plan can be effectively implemented. Proposed land use ordinance concepts are presented, with the particular aim of supporting alternative modes of transportation.

The study is concluded in **Section 8** by listing the requirements and recommendations of the Oregon Transportation Planning Rule (OAR 660 Division 12) and outlining how the Sandy Transportation System Plan provides the analysis and findings needed by each jurisdiction to comply with the TPR.

**Section 2**

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Existing Conditions



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# Existing Conditions

## INTRODUCTION

This section reports on the existing conditions found to occur on the transportation network within Sandy's Urban Growth Boundary. The current seasonal peak hour conditions have been studied to determine the operational and safety characteristics of the existing transportation network when the peak load is experienced, during the height of summer travel.

This section includes a discussion on the following topics:

- **Existing Land Use/Demographics**
  - Current population and employment estimates.
- **Transportation Facilities**
  - A summary of the pedestrian system associated with the public street system with corresponding map.
  - A summary of the bicycle system planned and/or provided by the three jurisdictions in the study area with corresponding map.
  - An analysis of the existing fixed route and demand-responsive transit operations within Sandy.
  - A summary of the existing arterial/collector street and state highway system with corresponding map.
- **Existing Transportation Operations**
  - A summary of the traffic control and lane geometry at critical intersections in the study area with corresponding maps.
  - The type and method of data collection including seasonal weekday p.m. peak hour traffic volumes with corresponding maps.
  - The analysis methodology used to develop and assess existing traffic conditions including historical and existing volume figures.
- **Traffic Safety**
  - A summary of existing safety and operational characteristics of the transportation system.
  - The identification of deficiencies requiring mitigation to restore safety and/or capacity to the multi-modal transportation system.
- **Downtown Access Conditions**
  - An inventory of existing accesses on the couplet.

## EXISTING LAND USE/DEMOGRAPHICS

The following vital statistics for the City of Sandy reflect the current condition for population and employment. Information on the number of persons per household and jobs per dwelling

unit is included. In addition, recent growth trends are noted for both population and employment.

### **Population**

The 1990 census revealed a population within the city limits of Sandy of 4,154 residents. The occupied housing stock was approximately 1,480 at the time of the census. This resulted in an average of 2.80 residents per occupied dwelling unit for the City. The Population Research and Census Center located on the Portland State University campus estimates the population for the City of Sandy to be approximately 4,520 as of July 1994. This would represent an annual compounded population growth rate of 2.2 percent over the four-year period. The Center estimated the 2.80 residents per occupied dwelling unit ratio to remain constant during this four-year period, resulting in an estimated 1,615 occupied dwelling units within the city limits of Sandy as of July 1994.

### **Employment**

There were 2,146 jobs located within the city limits of Sandy at the time of the 1990 census. This resulted in approximately a 1.45 jobs-to-housing ratio in 1990. The estimated number of jobs in Sandy as of July 1994 was approximately 2,340 jobs, based on the same jobs-to-housing ratio and residents per occupied dwelling unit ratio at the time of the 1990 census. This would represent an annual compounded growth rate in employment of approximately 2.3 percent over the same four-year period.

## **TRANSPORTATION FACILITIES**

### **Jurisdictions**

Three jurisdictions are responsible for the bicycle, sidewalk and roadway facilities which are located within the study area. In many instances, a roadway or other facility is identified as an essential facility and included as a part of the transportation plan for more than one jurisdiction. Such duplicity is normally supplemented with intergovernmental agreements which identify the responsibilities each jurisdiction accepts regarding a particular facility. The jurisdictions responsible for facilities within the UGB of Sandy are:

- The Oregon Department of Transportation (ODOT)
- Clackamas County
- City of Sandy

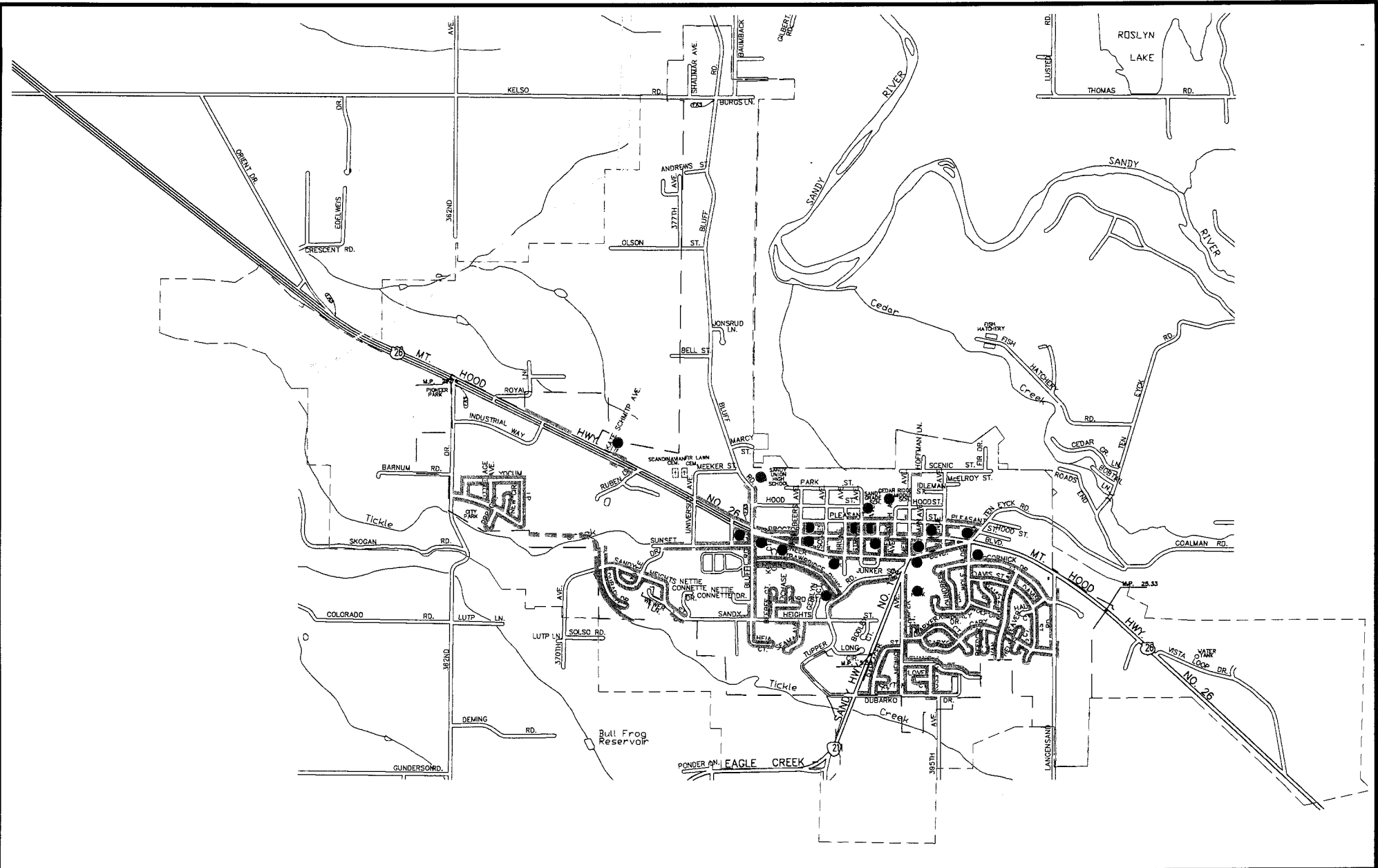
### **Pedestrian Facilities**

#### **Inventory and Condition**




Figure 2 shows the existing pedestrian facilities available within the UGB of the City of Sandy. The figure shows roadway segments which have standard sidewalks (shown in blue) on one or both sides of the street. Also shown are substandard sidewalks due to width or surface treatment

**Figure 2**  
**Existing Pedestrian Facilities**





**LEGEND**

-  - SIDEWALKS
-  - SUBSTANDARD SIDEWALKS
-  - PEDESTRIAN GENERATORS

**PEDESTRIAN FACILITIES**  
 CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE  
 2



Figure 2 (back-side)

(shown in orange) on one or both sides of the street and key pedestrian generators (in red) identified by City staff. All remaining public streets within the UGB provide no sidewalk amenities.

The condition of sidewalks associated with public streets within Sandy were generally found to be in good condition. However, certain locations provide dilapidated concrete, rough asphalt, or gravel pedestrianways which would be considered unsafe. These locations include the following:

***North side of U.S. 26:***

An approximately 400 foot section on the north side of U.S. 26, immediately west of Bluff Road.

***East side of Bluff Road:***

The east side of Bluff Road extending approximately 200 feet north of the U.S. 26 intersection.

***East side of Bluff Road:***

The east side of Bluff Road between Hood Street and the high school.

***South side of Pioneer Boulevard:***

The south side of Pioneer Boulevard from Meinig to Wolf Drive.

***Both sides of Proctor Boulevard:***

Both sides of Proctor Boulevard between Shelley and Alt Avenues.

***South side of Proctor Boulevard:***

The south side of Proctor Boulevard between Strauss and Bruns Avenues.

***North side of Proctor Boulevard:***

The north side of Proctor Boulevard 100 feet east from Bruns Avenue towards Scales Avenue.

Beyond the downtown area there are sections of sidewalk missing along U.S. 26 near Kate Schmitz Avenue, along Bluff Road from Sunset to Sandy Heights Streets, and along Sandy Heights Road. A gap of 340 feet in length also exists on the east side of Langensand Road south of McCormick Drive.

**Pedestrian Signal Warrant Analysis**

Pedestrian signal warrant analysis was conducted for the critical unsignalized intersections identified in the downtown couplet section of U.S. 26. The *Manual on Uniform Traffic Control Devices*, Federal Highway Administration, 1988 Edition, provides the accepted analysis methodology for determining the warrant for a pedestrian signal. Such signals are provided under circumstances of high pedestrian activity (greater than 100 pedestrian crossings per hour for four or more hours during the **average** day), in areas where safe signalized crossings are greater than 300 feet away from the intended pedestrian crossing location, and the provision of said signal would not unduly restrict the platooned flow of traffic. Under such circumstances a pedestrian actuated signal would be installed and interconnected with the existing signal system

to ensure good vehicular progression. Parking would be prohibited within 100 feet upstream and 20 feet downstream of the new pedestrian signal on both sides of the street.

Table 1 summarizes the results of the pedestrian signal warrant analysis conducted on the critical unsignalized intersections within the downtown couplet. Several intersections would not be eligible for pedestrian signal treatment due to their proximity to existing signalized intersections. None of the remaining intersections serve pedestrian volumes sufficient to warrant a pedestrian signal.

**Table 1**  
**Summary of Pedestrian Signal Warrant Analysis**

Intersection	Distance from Signal	Estimated Average Hourly Pedestrian Crossing Volume	Pedestrian Signal Warranted
Pioneer/Beers	> 300 feet	5	No, insufficient volume
Pioneer/Scales	> 300 feet	10	No, insufficient volume
Pioneer/Bruns	> 300 feet	10	No, insufficient volume
Pioneer/Strauss	> 300 feet	15	No, insufficient volume
Pioneer/Shelley	> 300 feet	30	No, insufficient volume
Pioneer/Hoffman	225 feet	15	No, proximity to signal and insufficient volume
Pioneer/Revenue	> 300 feet	5	No, insufficient volume
Proctor/Beers	> 300 feet	10	No, insufficient volume
Proctor/Scales	> 300 feet	15	No, insufficient volume
Proctor/Bruns	> 300 feet	15	No, insufficient volume
Proctor/Strauss	> 300 feet	20	No, insufficient volume
Proctor/Shelley	> 300 feet	30	No, insufficient volume
Proctor/Smith	250 feet	20	No, proximity to signal and insufficient volume
Proctor/Hoffman	225 feet	15	No, proximity to signal and insufficient volume
Proctor/Revenue	> 300 feet	10	No, insufficient volume

**Adequacy of Signalized Pedestrian Crossings**

Pedestrian crossing times provided at the four signalized intersections in downtown Sandy were examined to determine their adequacy to serve pedestrian movements. All four signals are under the jurisdiction and control of ODOT. ODOT standards for determining pedestrian crossing times are based on the curb-to-curb crossing distance required of the pedestrian. The standards require a minimum time of 5 seconds for the "WALK" sign to be illuminated. The flashing "DON'T WALK" sign must be illuminated for the calculated time it takes an average

pedestrian to cross from curb to curb. These standards assume the crossing speed of the average pedestrian to be 4 feet per second.

Table 2 reveals the measured crossing distance at each intersection in both directions (north-south, east-west), the calculated crossing time, and the existing and required crossing timings. In all cases, the "WALK" time is greater than the required minimum. The numbers shown in **bold** identify those existing timings which do not meet ODOT standards for the flashing "DON'T WALK" timing and include the U.S. 26/Bluff, Pioneer/Meinig, and Proctor/Meinig intersections. A reduction in the provided "WALK" time to accommodate the required flashing "DON'T WALK" time could be facilitated without effecting a change in the overall signal timing at all three intersections.

**Table 2**  
**Downtown Signal Pedestrian Crossing Timings:**  
**Existing and Required**

Intersection: Direction	Crossing Distance	Required			Existing		
		Total	Walk	Don't Walk	Total	Walk	Don't Walk
U.S. 26/Bluff: North-South East-West	84 feet	21	5	21	27	8	<b>19</b>
	55 feet	14	5	14	22	8	14
Pioneer/Meinig: North-South East-West	42 feet	11	5	11	20	10	<b>10</b>
	70 feet	18	5	18	40	20	20
Proctor/Meinig: North-South East-West	52 feet	13	5	13	20	10	<b>10</b>
	40 feet	10	5	10	20	10	10
U.S. 26/Ten Eyck: North-South East West	87 feet	22	5	22	39	16	23
	63 feet	16	5	16	27	8	19

**Bicycle Facilities**

Figure 3 illustrates the existing and proposed bicycle network for all jurisdictions within the study area.

U.S. 26 and Highway 211 are designated as state bike routes; however, only U.S. 26 is equipped with bicycle amenities. Ten foot shoulders are provided on U.S. 26 as the bike lanes from the western extent of the study area to Bluff Road. Although lanes are not currently striped on the couplet streets, ODOT plans to stripe bike lanes on U.S. 26 during the summer of 1995. To the east of Ten Eyck Road, four to six foot shoulders are provided as the bike lanes.

Clackamas County has proposed Highway 211, Bluff Road (north of U.S. 26), and Kelso Road (between Orient Drive and Bluff Road) as rural area bike routes within the study area. Currently, only Bluff Road is striped as a bike route, as indicated in Figure 3.

As indicated, much of the city bicycle network remains in the planning stage of development. City bicycle facilities on the arterial/collector system identified by a windshield survey of the study area were identified at the following locations:

***Dubarko Road:***

From 362nd Drive to the east end of Yocum Loop.

***Dubarko Road:***

From Weber Road to the city limit (off-street facility).

***Meinig Avenue:***

From Sandy Heights Street to Highway 211.

***Bluff Road:***

From U.S. 26 to Kelso Road.

***Strawbridge Parkway:***

The entire length of this facility.

No other on-street bicycle facilities identified in the City's current comprehensive plan have been constructed.

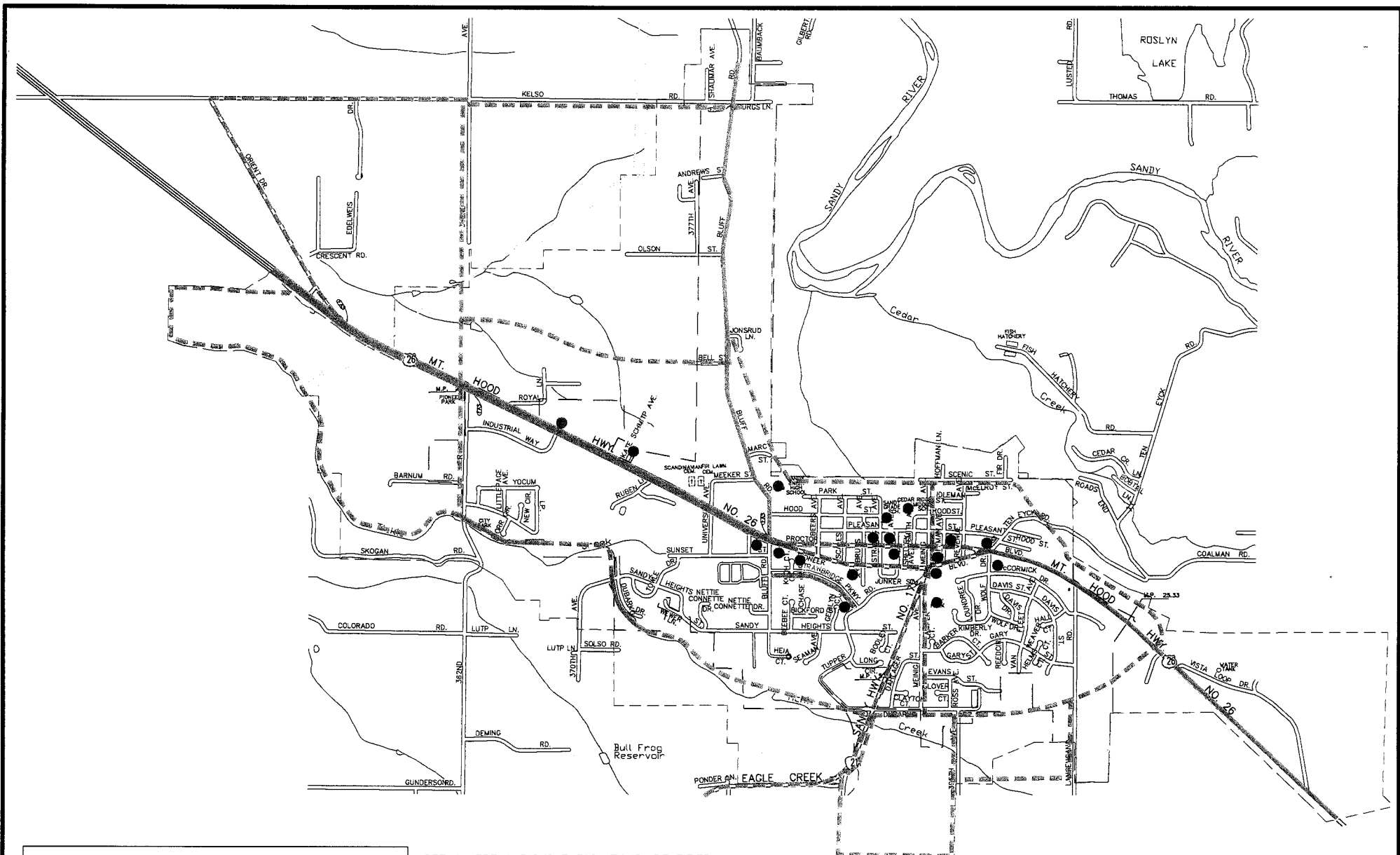
## **Public Transit Service**

### **Commuter Transit**

Tri-Met provides limited transit service between Sandy and the Gresham Transit Center on weekdays during the morning and evening peak hours via **Route 84 (Sandy - Boring)**. From Gresham, passengers are able to connect to Portland via light rail (MAX) and various bus services. Weekday bus frequency serving Sandy is approximately one every 20 minutes with five trips from 5:30 to 7:00 a.m. and similarly there are five trips between 4:35 and 6:40 p.m. There is no service during non-peak times, and no weekend service. The Express (X) route was added to the regular local service in September 1992. A survey of ridership after one year revealed that the addition of express trips failed to produce the desired overall increase in system usage. Current passenger demand (ridership) on the Tri-Met routes revealed that the system is under utilized. However, the City has applied for a change in the bus schedule to add midday service (or shift some of the peak hour service to midday service), in response to requests from local residents.

Existing Park & Ride lots are located at Sentry Market on Meinig Avenue (30 spaces) and at the Sandy Seventh Day Adventist Church on University Avenue (24 spaces); with bus stops located at Alt and Strauss Avenues on Proctor Boulevard. These stops are operating efficiently and no short-term changes are planned.

**Figure 3**  
**Existing Bicycle Facilities**



**LEGEND**

**EXISTING PROPOSED**

- BICYCLE FACILITY -- STATE
- \_\_\_\_\_ BICYCLE FACILITY -- COUNTY
- ..... BICYCLE FACILITY -- CITY
- -- BICYCLE GENERATOR

NOTE: WHERE A BICYCLE FACILITY IS IDENTIFIED IN THE PLAN OF MORE THAN ONE JURISDICTION, THE JURISDICTION HAVING RESPONSIBILITY FOR THAT ROADWAY/BIKE FACILITY IS SHOWN.

BICYCLE FACILITIES ARE SHOWN WITHOUT CLASSIFICATION OF FACILITIES (CLASS I/II/III, i.e. PATHS/LANES/ROUTES) BUT MERELY IF ANY PROVISION FOR BICYCLES IS MADE.

<h2 style="margin: 0;">BICYCLE FACILITIES</h2> <p style="margin: 0;">CITY OF SANDY TRANSPORTATION SYSTEM PLAN DECEMBER 1995</p>		<p>FIGURE</p> <h1 style="margin: 0;">3</h1>	
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Figure 3 (back-side)

### **Local Transit**

It is perceived by some that there is a lack of transportation options for elderly and/or disabled residents of Sandy. Nevertheless, there are a number of service providers offering para-transit or demand-responsive transportation. The Sandy Senior Center coordinates a Dial-a-Ride program which relies on volunteers to provide rides for medical appointments and shopping trips. The Center also has a van and part-time staff person available for use in the program; however, the staff person has other responsibilities which limit the availability of this option. Currently, approximately 12 riders are served on a daily basis by the program. The operating subsidies for this service come from the following sources:

- STP - ODOT (\$10,656 per year)
- Older Americans Act (\$2,037 per year)
- Donations
- Charges for excursion-type trips

The *Legacy Van*, coordinated by the Legacy Mt. Hood Medical Center, serves east Multnomah County and Sandy residents on Mondays and Thursdays. The van is a cooperative project of Legacy Mt. Hood Medical Center, Mt. Hood Community Mental Health Center, and the Elder Safety Coalition. Volunteer drivers take elderly residents to medical appointments and recreational activities. The service is free although a \$1.00 donation is suggested. Currently, the van is able to keep pace with demand, and periodic reviews are conducted to determine if the number of service days provided is sufficient. Funding is provided by federal grants and additional locally raised money (including the fare donations), and co-managed by Volunteer Transportation Inc. and Tri-Met.

The Mt. Hood Taxi Company and Luxury Accommodations Shuttle Service both provide taxi service for Sandy residents. Luxury Accommodations has a 14-seat shuttle, two seven-passenger vans, and a sedan which provide transportation for the elderly and disabled for medical visits in a Medicare/Medicaid funded program coordinated by Tri-Met. The company provides the service to approximately 10 customers per day. The Mt. Hood Cab Co. serves a small number of elderly and disabled clients but is not currently involved in any formal assistance program.

Tri-Met's Lift service provides demand-responsive transportation to elderly and disadvantaged residents of Sandy on a space-available basis; although the agency is not obligated to do so. No ridership information is maintained for service specifically to Sandy area residents.

The para-transit services offered in Sandy are coordinated to some extent by Tri-Met and Volunteer Transportation Inc. who also assist the individual programs with funding applications.

### **Long Distance/Intercity/Recreational Transit**

#### ***Greyhound***

Greyhound Bus Lines serve Sandy on the route between Portland and Bend. The daily Portland-bound service departs Sandy at 1:20 p.m., reaching Portland at 2:15 p.m. The daily route bound for Bend departs Portland at 4:15 p.m. and arrives in Sandy at 5:20 p.m. The Greyhound stop is located at the Police Station between Proctor and Pioneer Boulevards west of Shelley Avenue.

### **Ski-bus**

Mt Hood Meadows, Timberline, and Mt Hood Ski-Bowl organize winter ski buses which transport skiers from the Portland and Hood River areas to the ski resorts. Those buses traveling from Portland pass through Sandy and have a pickup point at the shopping center near the U.S. 26/Industrial Way intersection.

### **Other Transportation Facilities**

The above sections describe existing conditions for all major transportation facilities in the Sandy area. Unlike many other communities in Oregon, Sandy is not directly served by air, rail, water-borne transportation, or by any major pipelines. Rail service for goods and passengers is provided in Portland, approximately 25 miles to the west. Private, corporate, and light aircraft air transportation is provided via the Troutdale Airport which is approximately 14 miles to the west. Regional, national, and international freight cargo and air passenger services are provided at the Portland International Airport. Rich's Airport is located one mile east of the east city limit on the Sandy River; but, is privately owned and accommodates only small planes. Life flight services for mountain rescue operations are based at a facility off of Langensand Road. In addition, the Estacada and Shady Oaks airports are located approximately six miles to the south; but, are also limited to fairly small planes.

### **Roadway Facilities**

#### **State Facilities**

U.S. 26 and Highway 211 are the two state facilities within the study area. Both facilities remain under full control and responsibility of the ODOT. The following provides a brief description of each facility and the nature of the existing traffic served.

#### **U.S. 26**

U.S. 26 is an Access Oregon Highway of Statewide Level of Importance, as described in the *1991 Oregon Highway Plan*, ODOT, June 1991. This facility provides the primary highway access to the study area; and connects Sandy with Portland to the west (the largest urban area in the State of Oregon), and Mount Hood (one of the most heavily used recreational areas in the State of Oregon) and the remaining interstate system to the east. In addition, U.S. 26 acts as an essential intra- and interstate commerce route, with approximately 2.5% of its traffic mix being commercial trucks traveling to and/or through the study area on a daily basis. Finally, this facility is designated as a state bike route in the *1992 Oregon Bicycle Plan*, ODOT, April 1992. Signing is provided for this state bike route within the study area boundaries and facilitated along the shoulder of the highway, except in the couplet section of downtown Sandy.

U.S. 26 enters the study area from the west at approximately mile post 22.73 as a five-lane roadway with limited at-grade intersections (signalized and unsignalized) and private driveway approaches. The posted speed transitions from 45 mph to 40 mph, at the Ruben Lane intersection (mile post 23.46). Sidewalks are virtually nonexistent along this commercial section of U.S. 26 to the intersection with Bluff Road. Signing is provided indicating this facility is a designated bike route.

At approximately mile post 23.88, just east of the Bluff Road intersection, U.S. 26 transitions to a one-way couplet system traversing the urban core of downtown Sandy. The posted speed is 25 mph. The eastbound portion of the couplet is known as Pioneer Boulevard and the westbound portion is known as Proctor Boulevard. Two travel-lanes are provided as well as pedestrian amenities and on-street parking, for the full length of the couplet in each direction. At approximately mile post 23.40 in the couplet, U.S. 26 intersects with Highway 211 at two signalized intersections. Control of and responsibility for Hwy 26 in the couplet section is governed by the March, 1965 agreement between the Oregon State Highway Commission, (now ODOT) and the City.

The couplet ends at approximately mile post 24.61 at the Ten Eyck Road intersection. The posted speed is 40 mph between Ten Eyck Road and Langensand Road (mile post 25.12) and returns to the Basic Rule speed of 55 mph east of Langensand Road. This section of U.S. 26 between Ten Eyck Road and the east city limit (mile post 25.33) is a five-lane roadway with no sidewalk facilities and on-street parking prohibited.

#### **Highway 211**

Highway 211 is a state highway of District Level Importance which begins in Sandy and travels south and west to its terminus in Woodburn. The State designates this highway as a bike route, but provides no signing, striping, or proper shoulder within the study area for such a facility. Clackamas County has designated this highway as a County Bike Route in the *1992 Comprehensive Plan*, Clackamas County, June 1992. This facility is constructed to a rural two-lane highway standard within the boundaries of the study area. Highway 211 serves as a farm-to-market road for much of rural Clackamas County and as an attractive link to Mount Hood for much of the most rapidly urbanizing areas of the County, as well.

The posted speed for Highway 211 as it enters the study area from the south is 55 mph. This speed is reduced to 40 mph between the Bornstedt Road and U.S. 26 intersections. South of the U.S. 26 eastbound intersection, Highway 211 has no sidewalks or signed or striped bike lanes. The one-block section of Highway 211 within the U.S. 26 couplet has a posted speed of 25 mph and provides sidewalks but no on-street parking.

#### **Clackamas County Facilities**

The County's Comprehensive Plan, referred to earlier, includes a Functional Classification System for roadways within the county. This classification system reflects the importance, character, and capacity of each identified facility. The hierarchy of functional classification is listed on the following page with a brief description of the character of each class.

<b>Classification</b>	<b>Description</b>
Freeway/Expressway	High speed, high capacity, limited or no access facility serving intra- and interregional traffic.
Major Arterial	Moderate to high speed, moderate to high capacity, restricted access facility serving local and through traffic.
Minor Arterial	Moderate speed, moderate capacity, partial access controlled facility serving to connect collectors to higher order facilities.
Boulevard	Moderate to high speed, moderate to high capacity, major or minor arterial with improved aesthetics for the traveling public.
Collector	Low to moderate speed and capacity, principal carrier within and between neighborhoods and major activity centers, with access generally allowed.
Local	Provides direct access to abutting properties with connections to collector level and above facilities.

The following facilities (or a portion thereof) within the study area are functionally classified by Clackamas County in its current comprehensive plan:

<b>Roadway</b>	<b>Functional Classification</b>
U.S. 26	Major Arterial
Highway 211	Major Arterial
Ten Eyck Road	Minor Arterial
Bluff Road	Minor Arterial
Kelso Road	Minor Arterial
362nd Drive	Minor Arterial
Dubarko Road	Collector
Sandy Heights Road	Collector
Tupper Road	Collector

The County shares jurisdictional responsibilities for the management, operation, and maintenance of these facilities with the City of Sandy and/or the State of Oregon, depending on the facility. All county-classified Collector and Minor Arterial level facilities in the study area are built to rural two-lane cross section standards and include sidewalk amenities associated only with those facilities constructed in the past five years. Bicycle routes or trails are provided on Bluff Road and Dubarko Road respectively. As noted above, the state highways in the area are classified by the county as Major Arterials and constructed to ODOT standards.

**City of Sandy Facilities**

The City of Sandy’s Street Classification System, shown in Figure 4, is based on the following Comprehensive Plan hierarchy:

**Figure 4**  
**Arterial/Collector Street Network**



figure 4 (back-side)

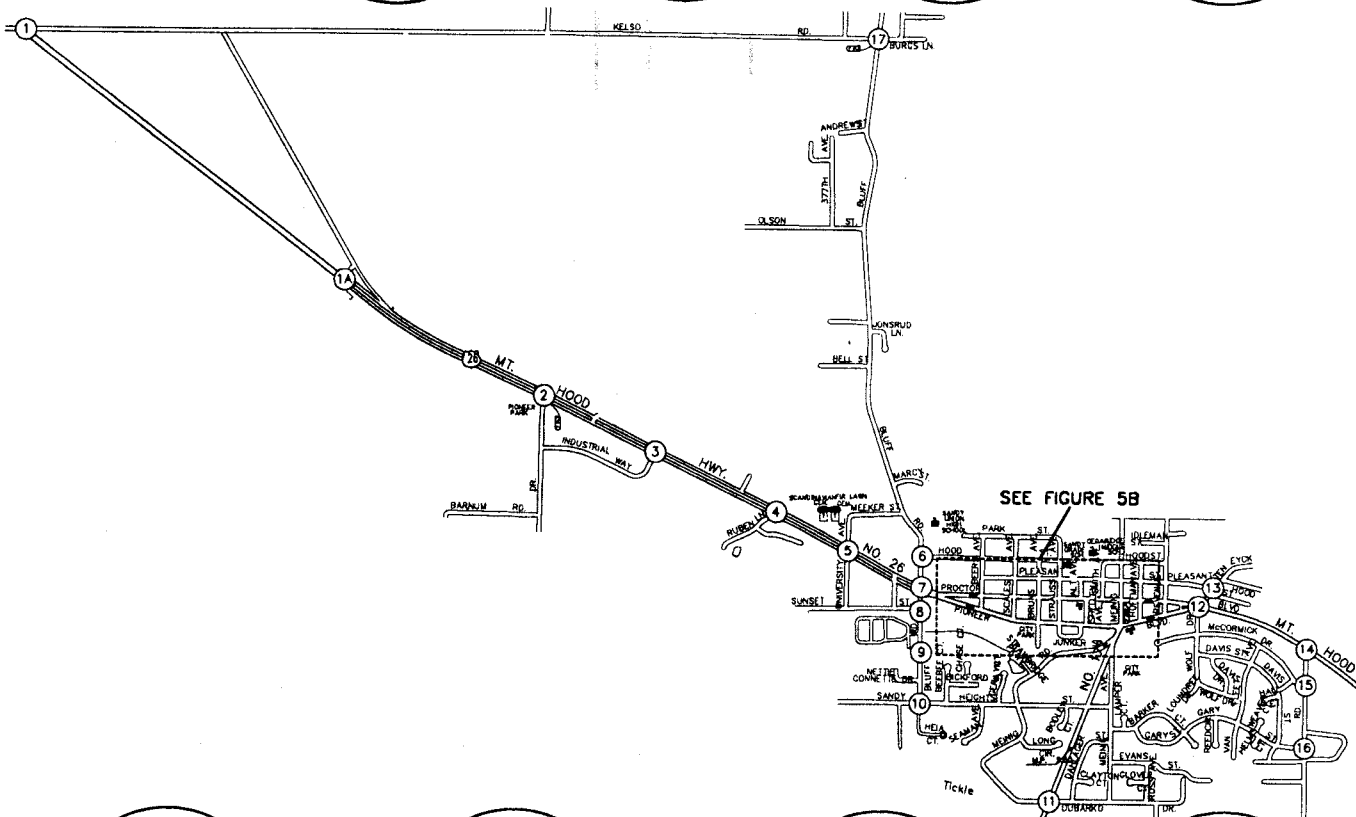
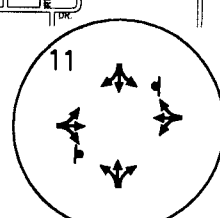
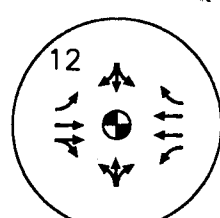
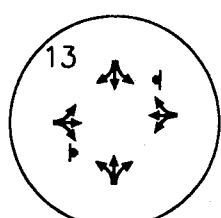
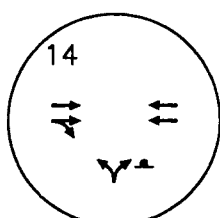
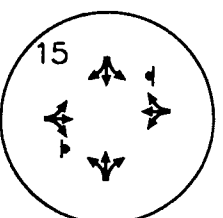
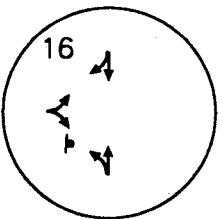
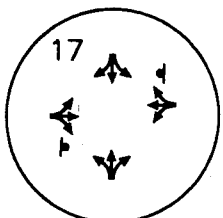
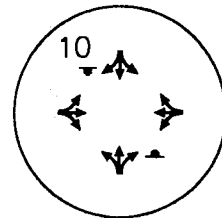
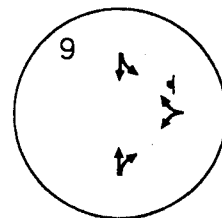
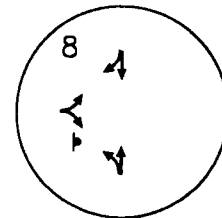
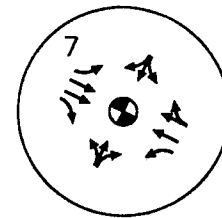
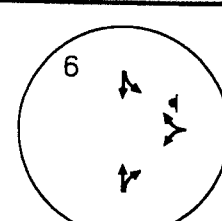
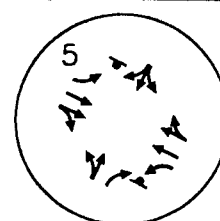
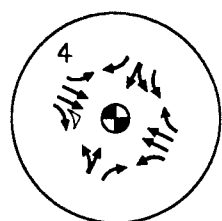
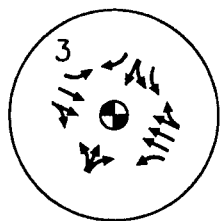
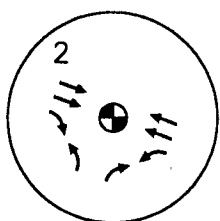
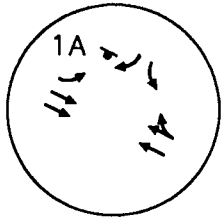
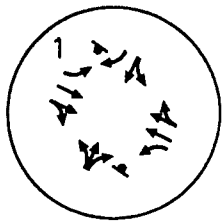


<b>Classification</b>	<b>Description</b>
Major Arterial	A three- to five-lane highway, paved width of 54 feet to 80 feet, operate as a two-way or as a one-way couplet. U.S. 26 would be considered as a fully developed major arterial.
Minor Arterial	High volume, intra-city street, providing connectivity and parallel features, limited access control, paved width of 38 feet to 50 feet, minimum three-lane cross section. The most critical classification for circulation in the urban areas.
Residential Minor Arterial	A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Paved width of 38 feet to 50 feet, minimum three-lane cross section, may include on-street parking.
Industrial Collector	Minimum 48 foot paved width with one travel lane and one parking lane in each direction, carries truck traffic in industrial areas.
Collector	Connector of local street to minor and major arterials, side street of Central Business District, minimum paved width of 36 feet, provides on-street parking.

Table 3 on the following page identifies the functionally classified streets in the City of Sandy, the jurisdictional responsibility, and the physical characteristics of each facility.

**Table 3**  
**Sandy Arterial and Collector Street System**  
**Functional Classification and Physical Characteristics**

Street Name	Functional Classification	Agency	Number of Travel Lanes
U.S. 26	Major Arterial	State	4/5
Pioneer Boulevard	Major Arterial	State	2
Proctor Boulevard	Major Arterial	State	2
Highway 211	Major Arterial	State	2
SE Orient Drive	Minor Arterial	County	2
SE Kelso Road	Minor Arterial	County	2
SE 362nd Drive	Minor Arterial	County	2
Dubarko Road	Minor Arterial	City	2
Bluff Road	Minor Arterial	City	2
Ten Eyck Road	Minor Arterial	County	2
Langensand Road	Minor Arterial	City	2
Industrial Way	Collector	City	2
Bell Street	Minor Arterial	City	2
370th Avenue	Collector	County	2
Sunset Street	Collector	City	2
Sandy Heights Road	Collector	City	2
Meinig Avenue	Collector	City	2
Tupper Road	Collector	City	2
395th Avenue	Collector	County	2
Wolf Drive	Collector	City	2
Davis Street	Collector	City	2
Van Fleet Avenue	Collector	City	2



**LEGEND**

= SIGNAL  
 = STOP SIGN

**EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL**

CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE  
**5A**

## EXISTING TRANSPORTATION OPERATIONS

### Traffic Control Measures

Figures 5A and 5B show the existing lane configurations and traffic control devices at the study area intersections. There are seven signalized intersections within the study area boundaries; they are:

- U.S. 26/S.E. 362nd Drive
- U.S. 26/Industrial Way
- U.S. 26/Ruben Lane
- U.S. 26/Bluff Road
- Pioneer Boulevard (U.S. 26)/Meinig Avenue(Highway 211)
- Proctor Boulevard(U.S. 26)/Meinig Avenue(Highway 211)
- U.S. 26/Ten Eyck Road

These signals are controlled and maintained by ODOT. They are semi-actuated traffic signals of the Singer or Crouse Hinds type. The signals located along the two-way sections of U.S. 26 include protected left-turn phases for those movements from the highway. Permitted left-turn phasing is used at the Meinig Avenue intersections with U.S. 26 for all movements.

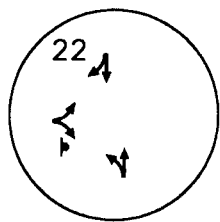
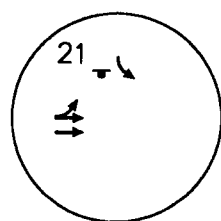
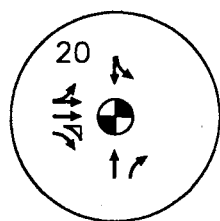
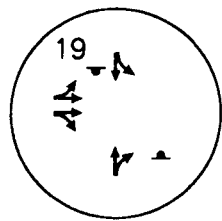
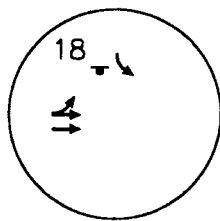
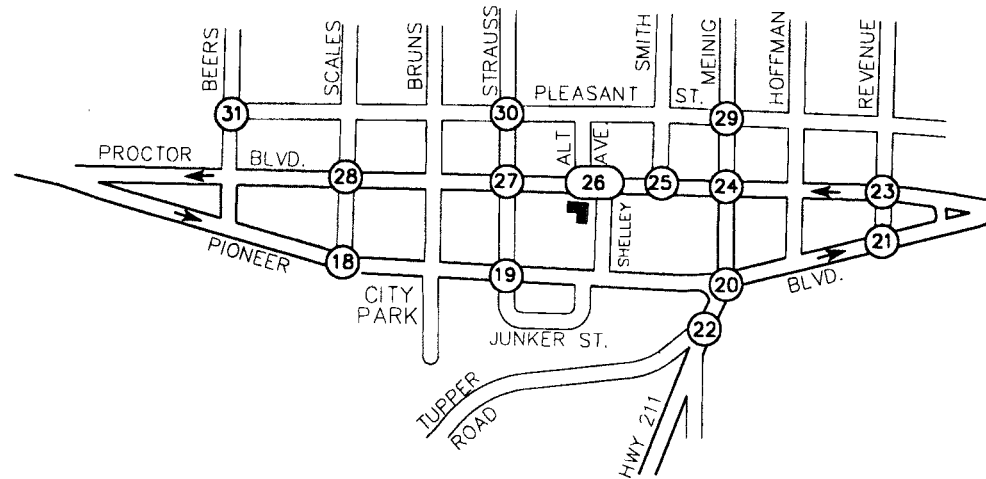
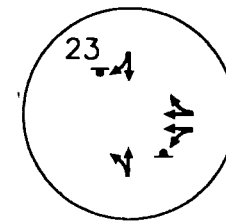
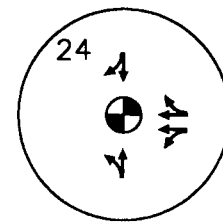
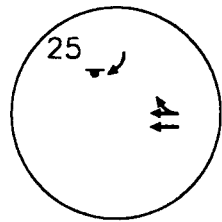
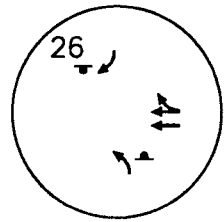
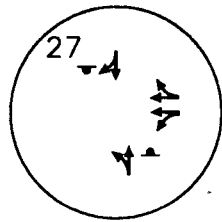
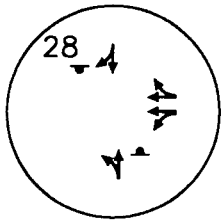
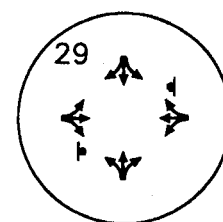
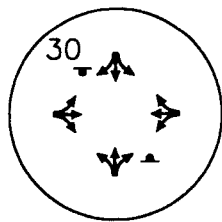
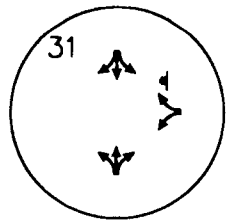
Field reconnaissance revealed that the signal at the U.S. 26/Industrial Way intersection may be malfunctioning. During off-peak conditions observations of the signal operations revealed that U.S. 26 through traffic was being stopped when no side-street activity was present. Discussions with ODOT - Region 1 operations staff revealed that they were aware of the malfunction. Detectors installed in the roadbed on the Industrial Way approaches to the intersection are incorrectly sensing the presence of a vehicle. ODOT has performed repairs for these problems in the past and is aware that the problems continue.

The remainder of the critical study area intersections are stop-controlled on the minor-street approaches to each intersection.

### Traffic Volumes

Manual turning movement counts were conducted for the afternoon (p.m.) peak period at 31 signalized and unsignalized intersections in the study area. These counts were used to determine the peak hour of traffic conditions and evaluate the operational characteristics of the existing transportation network. The counts were obtained from two primary sources: ODOT automatic counts taken at state operated signals on U.S. 26; and counts conducted for the City of Sandy during December 1994 and January 1995. The p.m. peak hour traffic counts were examined for reasonableness, using volumes previously collected by Kittelson & Associates, Inc. as part of recent traffic impact studies conducted in the study area.

Daily and seasonal adjustment factors were developed to convert these off-season counts to peak-season weekday peak hour traffic volumes at the critical intersections in the study area. These adjustment factors were developed based on data from ODOT permanent traffic recorder station number 26-003, Gresham, located on U.S. 26 to the east of Gresham.



**LEGEND**

⊙ = SIGNAL

⊥ = STOP SIGN

**EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROLS**

CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
DECEMBER 1995

FIGURE  
**5B**

Figure 6 shows the average daily traffic volumes on a monthly basis, recorded at station number 26-003 for the most recent 13-month period that data is available (October 1993 through October 1994). This figure shows the peak month for average daily traffic to be August.

**Figure 6**  
**U.S. 26 Monthly Traffic Volume Profile (1993/1994)**

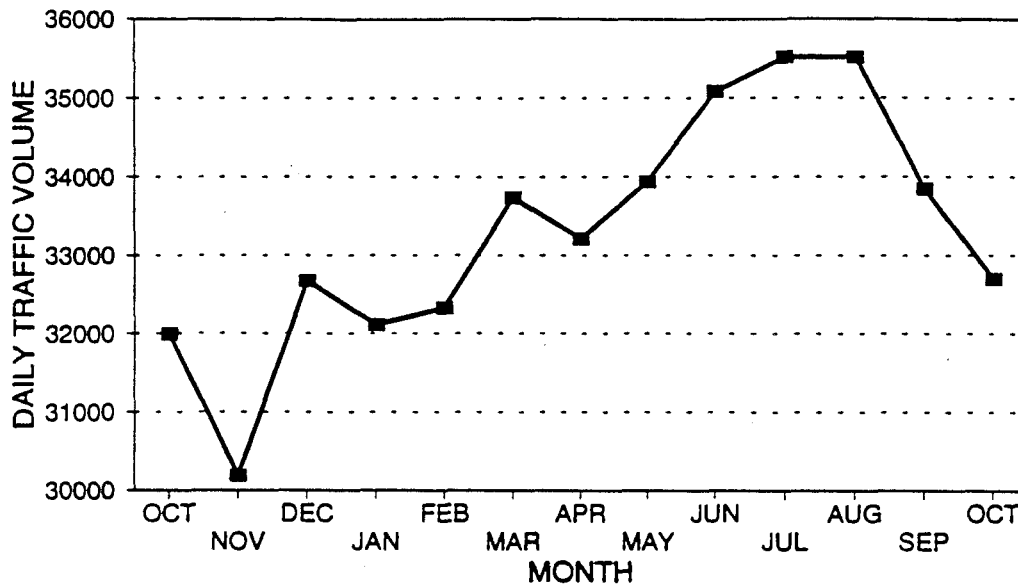
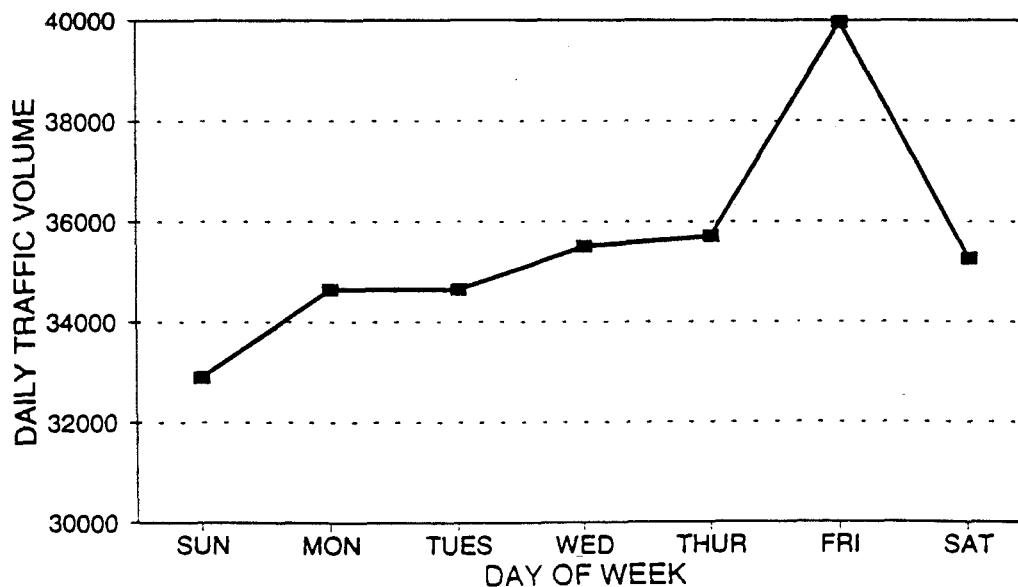


Figure 7 shows the day-of-the-week average daily traffic volumes recorded at station number 26-003 for the month of August 1994. This graph indicates that the peak day for average daily traffic occurs on a Friday.

**Figure 7**  
**U.S. 26 Daily Traffic Volume Profile (August 1994)**



ODOT collected approach volume data using the signal hardware and software capabilities available at the U.S. 26/362nd Avenue intersection to determine the profile of U.S. 26 traffic volumes on an hourly basis. Figure 8 illustrates the profile of measured traffic volumes for both eastbound and westbound traffic flows, as well as showing the cumulative. As can be seen in this graph, the peak hour for each direction of traffic flow and, therefore, the cumulative occurs approximately during the 4:00 p.m. to 5:00 p.m. hour.

Based on the information cited above and coupled with the turn movement counts conducted at study area intersections, the peak hour condition was estimated to occur on a typical Friday afternoon between 4:15 and 5:15 p.m. in August.

Traffic movements considered to be of a local nature were adjusted up by 9 to 15 percent, depending on the day of the week the count was conducted; based on information gathered from ODOT records for daily and seasonal fluctuations of urban area traffic volumes (see Permanent Recorder Number 20-008 and 15-012) and the profiles cited above. Through traffic movements were adjusted up by 15 to 22 percent, depending on the day of the week the count was conducted; based on the information gathered at the Permanent Recorder Station on U.S. 26 (26-003) and the profiles cited above. These adjustments resulted in the development of estimated 1994 seasonal weekday p.m. peak hour traffic volumes for the critical study area intersections. Finally, a balancing of entering and exiting traffic volumes between intersections was verified to ensure the reasonableness of the traffic volumes to be studied.

### **Level of Service Analysis**

Using the factored peak hour turning movement volumes shown in Figures 9A and 9B, an operational analysis was conducted at each study area intersection to determine existing Levels of Service (LOS). All LOS analyses described in this study are in accordance with the *1985 Highway Capacity Manual*, Transportation Research Board. A detailed description of this methodology is provided in Appendix A, along with the thresholds used to establish each LOS grade for both signalized and unsignalized intersections. This is the accepted analysis methodology used by the City of Sandy, based on review of recently accepted traffic impact work submitted to the City for developments proposed within the City Limits. This is the required methodology by ODOT as indicated in the *1991 Oregon Highway Plan (OHP)*.

The City does not specifically indicate in its standards the required methodology or acceptable LOS for either signalized or unsignalized intersections. ODOT's OHP indicates that under current conditions LOS A through D are considered acceptable for signalized intersections and LOS E through F are generally considered unacceptable. Further, for unsignalized intersections ODOT stipulates that LOS A through D are considered acceptable, LOS E is generally considered "marginally acceptable", and LOS F is unacceptable. For the remainder of this technical memorandum the ODOT standards will be cited with reference to operational characteristics of the signalized and unsignalized intersections within the study area.

### **Signalized Intersections**

Table 4 summarizes the LOS analysis results for the signalized intersections in the study area. As Table 4 indicates, all seven signalized intersections currently operate at acceptable levels of service (LOS D or better) during the peak seasonal weekday p.m. peak hour condition.

**Table 4**  
**Signalized Intersection LOS Summary**

No. in Figure	Intersection	LOS	Delay/Vehicle	V/C
2	U.S. 26/SE 362nd Drive	B	10.3	0.74
3	U.S. 26/Industrial Way	C	15.2	0.80
4	U.S. 26/Ruben Lane	B	11.6	0.74
7	U.S. 26/Bluff Road	B	13.9	0.83
12	U.S. 26/Ten Eyck Road	C	16.3	0.74
20	Pioneer Boulevard/Meinig Avenue	B	11.6	0.75
24	Proctor Boulevard/Meinig Avenue	B	11.4	0.69

The intersection of U.S. 26/Bluff Road operates at a volume-to-capacity (V/C) ratio of 0.83 which indicates congested conditions; however, the average delay per vehicle of 13.9 seconds reflects a LOS B which is considered good. The U.S. 26/Industrial Way intersection is operating at a V/C ratio of 0.80, which is considered the threshold for defining congested conditions at a signalized intersection. Here again, the average delay per vehicle is considered good, at 15.2 seconds average delay per vehicle and a LOS C. In these two signalized intersections cited above, the threshold volume-to-capacity ratio and good LOS grades are indicative of well timed traffic signals progressing the main street traffic and adequately serving the side street demand.

**Unsignalized Intersections**

Appendix A, as noted above, provides a description of the methodology used to determine the LOS for unsignalized intersections and the thresholds which define each LOS grade. Appendix B provides a description of the refined methodology used to determine the LOS for those unsignalized intersections within the downtown one-way couplet system which are influenced by the nearby signalized intersections.

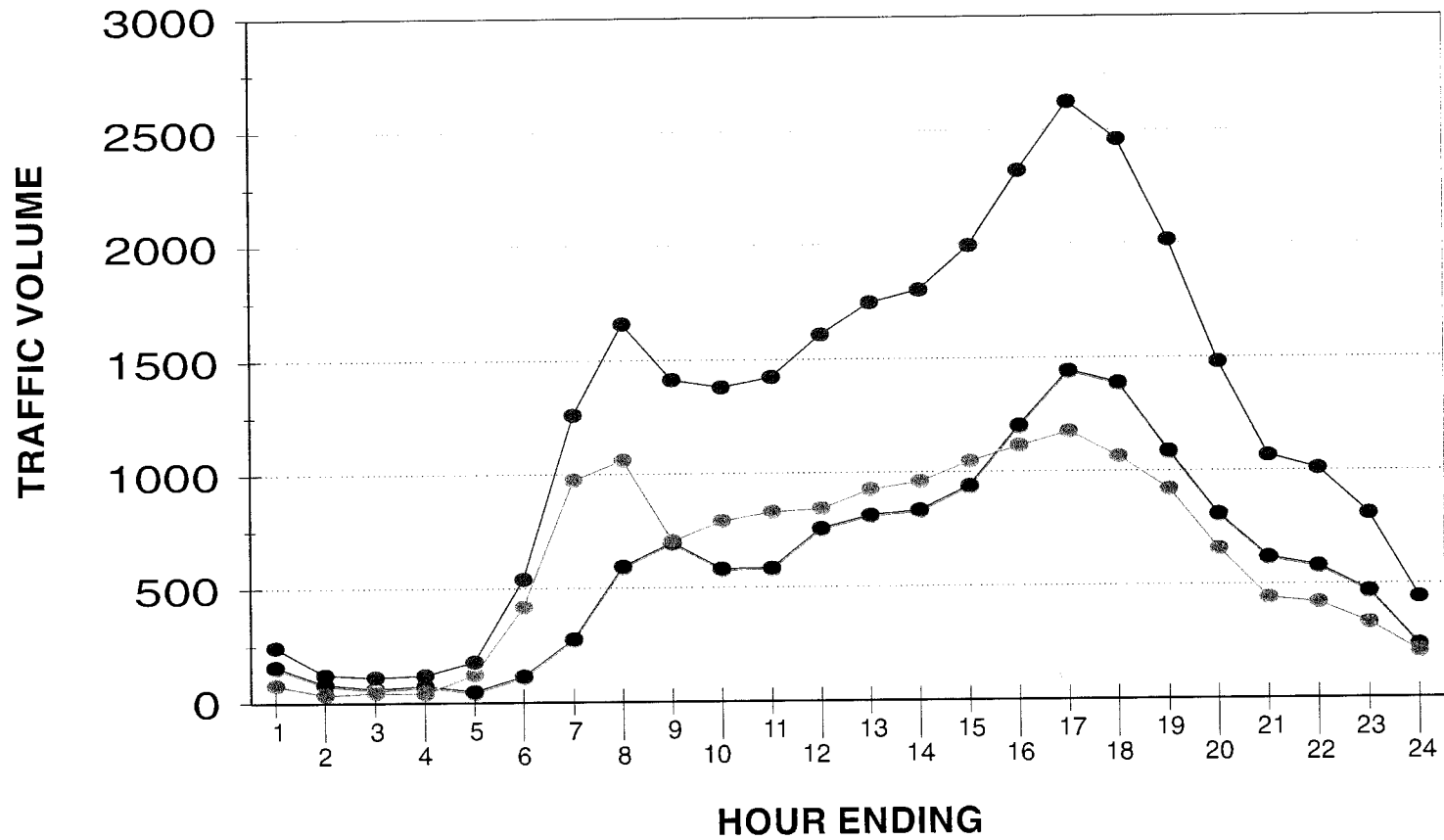
Appendix A indicates LOS for unsignalized intersections is based on the intersection capacity to accommodate the worst movement. Typically, the stop controlled left turn is the most difficult movement to negotiate at an unsignalized intersection. This is due to this movement being exposed to the greatest potential number of conflicting movements at the intersection. Available gaps in the through-traffic flow of the uncontrolled approach(es) are consumed by all other conflicting movements before the side street left turn can be negotiated. Therefore, the number of available gaps for the side street left turn to negotiate its movement safely is likely to be substantially lower than any other movement and result as the worst movement.



**Figure 8**  
**U.S. 26 Hourly Traffic Volume Profile**

# U.S. 26 HOURLY PROFILE

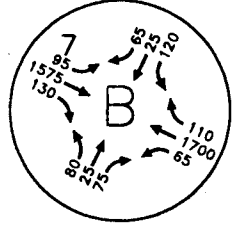
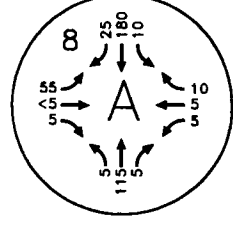
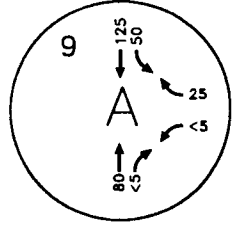
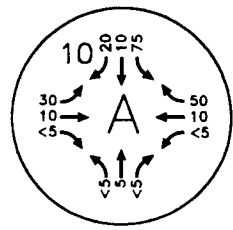
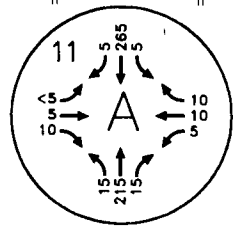
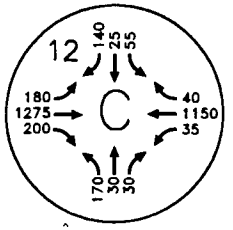
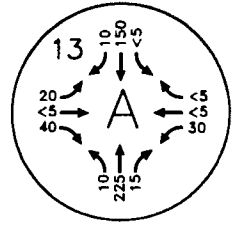
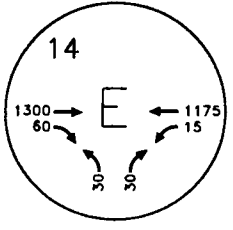
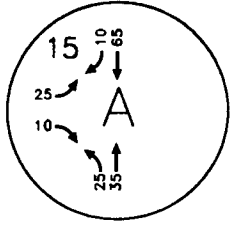
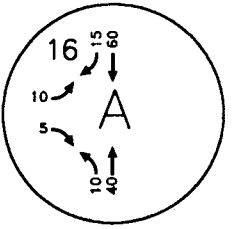
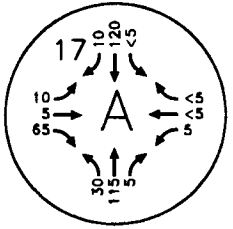
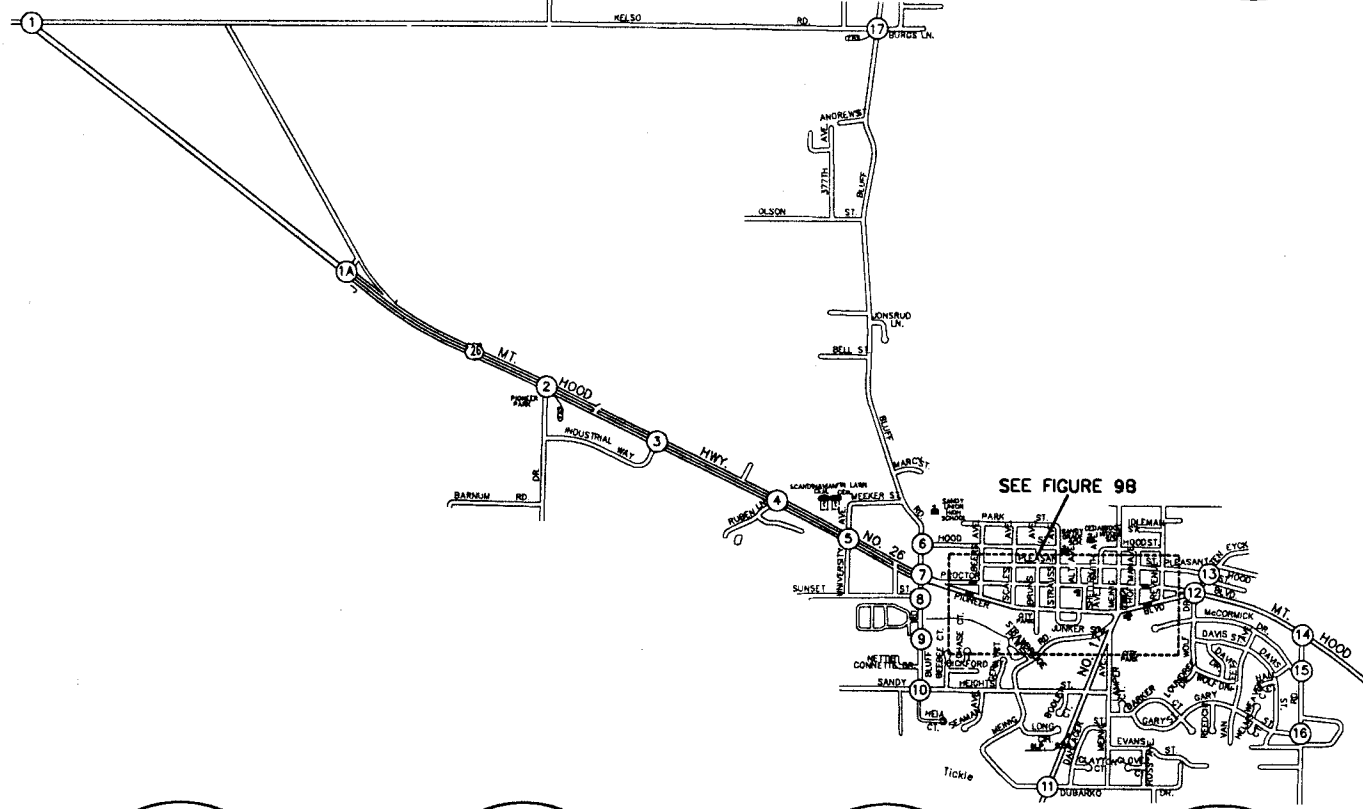
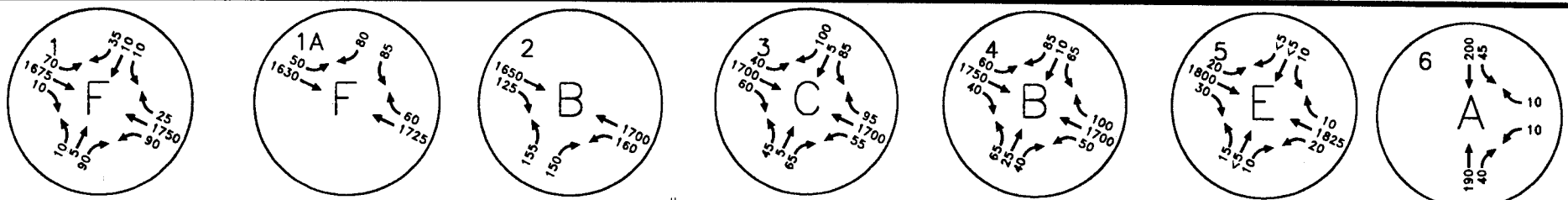
US 26/362nd Ave, Fri, Dec 16 1994



● EASTBOUND   ● WESTBOUND   ● TOTAL

<i>U.S. 26 HOURLY PROFILE</i>	
CITY OF SANDY TRANSPORTATION SYSTEM PLAN DECEMBER 1995	
FIGURE <b>8</b>	

Figure 8 (back-side)

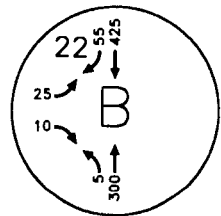
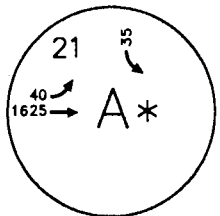
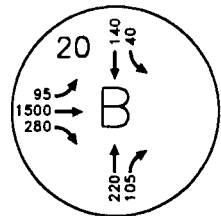
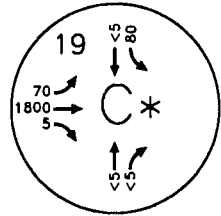
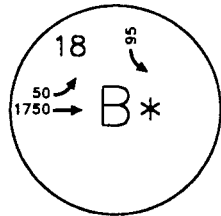
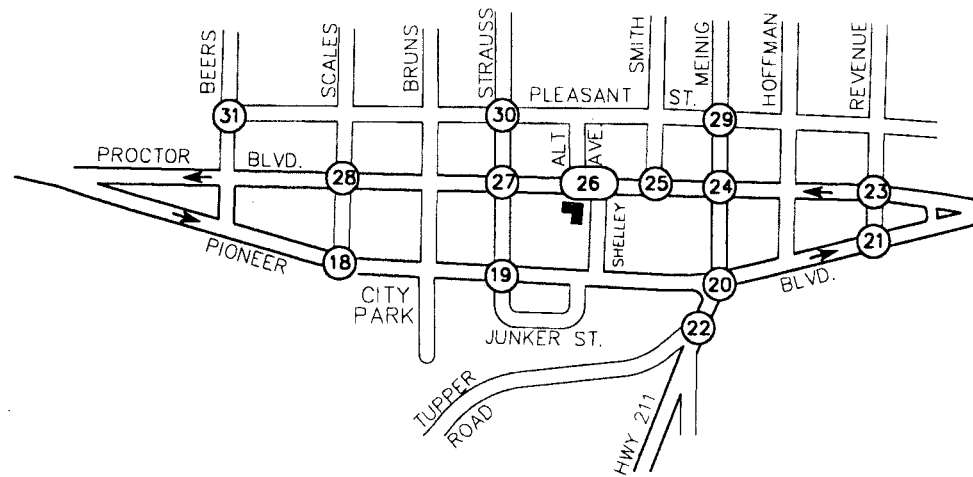
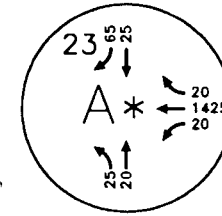
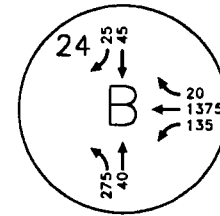
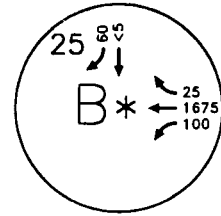
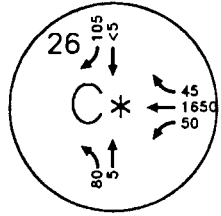
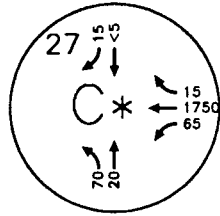
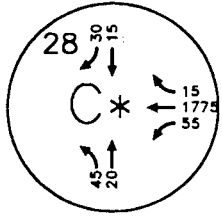
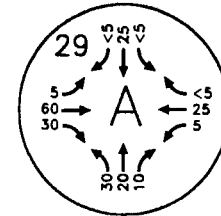
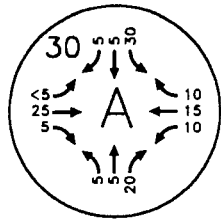
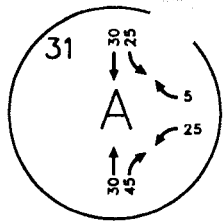


**1994 SUMMER WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES AND LOS**  
 CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE 9



1359VOL1



\* REFINED ANALYSIS USED TO ACCOUNT FOR DOWNSTREAM BENEFIT OF PLATOONED EFFECT OF UPSTREAM SIGNAL

### 1994 SUMMER WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES AND LOS

CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
DECEMBER 1995

FIGURE  
**9B**



1359062

**Downtown Couplet Intersections**

The methodology described in the *1985 Highway Capacity Manual, Chapter 10, Appendix I*, for unsignalized intersection LOS evaluation takes into consideration the benefit down stream unsignalized intersections receive from artificial gaps created by up stream signalized intersections. Traffic signals platoon vehicles in a queue before releasing them down stream. When the platoon is released, it flows with shorter headways and fewer gaps until the queued platoon clears the down stream intersection. After the platoon clears the downstream intersections, main street traffic arrives at a random rate with gaps sufficient to accommodate safe turning movements from the side street. The benefit to the unsignalized intersection side street movement comes when the main street traffic is stopped at the signalized intersection. Main street traffic flows are reduced to the number of vehicles being served from the side street approach at the signalized intersection. These side street movements are turning movements onto the main street and result in larger gaps. The lower number of through vehicles on the main street, spaced at greater gaps, creates greater opportunities for side street movements to be made at the down stream unsignalized intersections.

Table 5 shows existing LOS conditions at the unsignalized (stop-controlled) intersections within the downtown couplet section of U.S. 26. All critical unsignalized intersections within the downtown one-way couplet receive sufficient benefit from the four signalized intersections within the couplet to perform within acceptable levels of service.

**Table 5**  
**Downtown Couplet Unsignalized Intersection LOS Summary**

No. in Figure	Intersection	LOS	Reserve Capacity
18	Pioneer Boulevard/Scales Avenue	B	330
19	Pioneer Boulevard/Strauss Avenue	C	275
21	Pioneer Boulevard/Revenue Avenue	A	490
23	Proctor Boulevard/Revenue Avenue	A	450
25	Proctor Boulevard/Smith Avenue	A	450
26	Proctor Boulevard/Alt-Shelley Avenue	C	280
27	Proctor Boulevard/Strauss Avenue	C	265
28	Proctor Boulevard/Scales Avenue	C	260

**Other Study Area Unsignalized Intersections**

Table 6 shows the summary of LOS results for the remaining critical unsignalized intersections within the study area. Two unsignalized intersections fail to adequately accommodate all traffic movements during the seasonal weekday p.m. peak hour: U.S. 26/Kelso Road and U.S. 26/Orient Drive. Two other intersections are operating at "marginally acceptable" levels during the same peak period: U.S. 26/University Avenue and U.S. 26/Langensand Road. All other critical unsignalized intersections within the study area are operating at acceptable LOS during the peak period.

**Table 6**  
**Non-Couplet Unsignalized Intersection LOS Summary**

No. in Figure	Intersection	LOS	Reserve Capacity
1	U.S. 26/Kelso Road	F	-10
1A	U.S. 26/Orient Drive	F	-70
5	U.S. 26/University Avenue	E	30
6	Hood Street/Bluff Road	A	615
8	Bluff Road/Sunset Street	A	540
9	Strawbridge Parkway/Bluff Road	A	885
10	Sandy Heights Road/Bluff Road	A	730
11	Dubarko Road/Highway 211	A	635
13	Pleasant Street/Ten Eyck Road	A	495
14	U.S. 26/Langensand Road	E	50
15	McCormick Drive/Langensand Road	A	790
16	Gary Street/Langensand Road	A	840
17	Kelso Road/Bluff Road	A	690
22	Tupper Road/Highway 211	B	345
29	Pleasant Street/Meinig Avenue	A	810
30	Pleasant Street/Strauss Avenue	A	790
31	Pleasant Street/Beers Avenue	A	795

**Signal Warrant Analysis**

Unsignalized intersections experiencing failing LOS can be mitigated with signalization to restore operational capacity and acceptable LOS. Level of Service failures do not necessarily require signalization or other mitigation measures. Warrants have been developed to assist in the determination of the appropriateness of signalization at an intersection.

The *Manual on Uniform Traffic Control Devices* provides the nationally accepted methodology for determining the warrants for signalization of intersections. ODOT accepts this methodology and normally uses Warrants 1 and 2 for initial determination of signalization of an intersection. Table 7 reveals the results of the signal warrant analysis at the two study area unsignalized intersections with F LOS. Since both intersections only meet Signal Warrant #2, neither of these intersections would be considered for signalization by ODOT under normal conditions. Exceptional conditions such as high accident rates at an intersection merit further consideration.

**Table 7**  
**Signal Warrant Analysis Summary**

Intersection	# of Approach Lanes		Major St. ADT (70%) <sup>1</sup>	Minor St. ADT (70%) <sup>1</sup>	Warrant Met?	
	Major St.	Minor St.			# 1	# 2
U.S. 26/Kelso Road	2	1	24,600	1,050	NO	YES
U.S. 26/Orient Drive	2	1	25,000	1,650	NO	YES

<sup>1</sup> 70% of the ADT is used because the travel speed of the roadway section is greater than 40 mph and the population of the study area is less than 10,000.

**TRAFFIC SAFETY**

The 45-month accident history for the period of January 1, 1991, through September 30, 1994, was analyzed for all collector-level and above facilities in the study area. A detailed analysis of the reported accidents by type and direction was conducted based upon the accident data supplied by ODOT. The following section describes the results of this analysis. It should be noted that the accident data supplied by ODOT showed no reported accidents on facilities other than the state highway system. Therefore, if there were accidents which occurred on the local street system in Sandy during this period, they were not reported to ODOT.

During the 45-month study period, there was a total of 181 reported accidents within the study area boundary; 173 on U.S. 26 and eight on Highway 211. Approximately 52% of all reported accidents on these facilities occurred at intersections; 90 on U.S. 26 and five on Highway 211. No other accident data was surrendered for analysis and review for roadway facilities in the study area.

The predominant type of accident reported was rear-end type collisions, accounting for a total of 75 accidents or approximately 41% of all reported accidents. Turning movement type accidents accounted for 51 or approximately 28% of the total reported accidents. Sixteen sideswipe type accidents, which occur primarily on straight sections due to passing maneuvers or vehicles turning into or out of driveways, accounted for 9% of the total accidents. Eleven angle type collisions, which occur primarily at intersections or driveways, accounted for 6% of the total. Other type accidents which include head-on, fixed-object, backing, parking, bicycle, and pedestrian-related accidents accounted for 15% of the total accidents.

The accident data was summarized for roadway sections of U.S. 26 with similar operating and traffic volume characteristics in the Sandy area. The accident rate for each section was calculated based on the traffic volume, time period, frequency of accident occurrence, and length of highway section and is summarized in Table 8.

The overall accident rate for the 2.59 mile section of U.S. 26 within the study area was calculated to be 2.35 accidents per million vehicle miles of travel (Acc/MVM); based on an average daily traffic volume (ADT) of 20,800 vehicles. The accident rate reported in the 1993 *State Highway System Accident Rate Tables*, ODOT, January 1995, for the entire U.S. 26 highway was calculated to be 2.28 Acc/MVM. This same report shows an overall accident rate of 3.82 Acc/MVM for all urban sections of U.S. 26.

U.S. 26 is designated as a Primary System, Non-freeway highway in the ODOT Accident Rate Tables and would be considered an Urban Section for that portion of the highway which traverses the study area. The 1993 Accident Rate Tables report a 3.55 Acc/MVM rate for all



including evergreen trees approximately 50 feet tall, and sharp curves on grades are all present in this short section of the highway. These conditions effect maneuverability, visibility, speed control, and driver sight distance. Narrow shoulders, the lack of bike lanes, and the absence of sidewalks also could contribute to increased frequency of accidents or rates between travel modes as volumes increase for any or all modes.

The general safety characteristics determined by this reported accident analysis indicates that the highway sections and intersections of U.S. 26 and Highway 211 in the study area are operating safely, in comparison with similar sections of the same highways in other areas. This does not, however, indicate that there are no geometric deficiencies or topographic conditions which could cause increased accidents rates as traffic volumes increase or variations in traffic mix occurs. Field reconnaissance work has identified potential explanations for certain accident types which presently occur and certain geometric deficiencies or topographic conditions which may result in increased accident rates over time. It can be assumed that the local street system is operating safely due to no accidents being reported to ODOT during the 45-month period studied.

#### **REQUIRED MITIGATIONS FOR CAPACITY RESTORATION OR SAFETY**

Mitigations are considered to restore capacity when signalized and unsignalized intersections exceed operational and/or capacity thresholds. Additional analysis is conducted for unsignalized intersections to determine if signalization is warranted. Improvements to signal timings and progression are analyzed to determine if the required additional capacity can be achieved without intersection improvements.

Both unsignalized intersections experiencing LOS F occur on a State controlled facility (U.S. 26), beyond the study area boundary (Sandy UGB). Signal warrant thresholds are not met for the two warrants ODOT uses under preliminary assessment of intersection signalization. The southbound-to-eastbound left-turn movement is the critical movement at both intersections. The U.S. 26/Bluff Road intersection provides an alternate signalized access for such movements to the highway when peak periods of demand cause long delays for such movements. Therefore, it is recommended that no improvements be made to either of these intersections. It is further recommended that ODOT monitor traffic volumes at both intersections to determine the timing of improvements due to increased traffic volumes. Given that these two intersections are outside the boundaries of the study area and beyond the control of the City of Sandy, these two intersections were **not** considered under Future Conditions.

The U.S. 26/University Avenue and U.S. 26/Langensand Road intersections are both unsignalized intersections experiencing "marginally acceptable" LOS during the seasonal weekday p.m. peak hour. In each circumstance drivers have a nearby signalized alternative to gain access to the highway. During peak conditions Bluff Road could be used as the alternate signalized access for those traveling to/from University Avenue. The U.S. 26/Wolf Drive-Ten Eyck Road signalized intersection offers the alternate access for drivers traveling to/from Langensand Road.

An examination of the signal timing of the U.S. 26/Bluff Road and U.S. 26/Industrial Way intersections revealed that these actuated signals provide sufficient range of signal cycle length to adjust capacity according to peak demands. The range of V/C ratios resulting from the various cycle lengths possible at each intersection, include ratios below the congested threshold

of 0.80 V/C. Therefore, no capacity mitigation is necessary at these intersections even under peak conditions.

The analysis conducted of the pedestrian crossing timings of the four traffic signals in the downtown couplet revealed that minor adjustments are required at the U.S. 26/Bluff Road, Pioneer Boulevard/Meinig Avenue, and Proctor Boulevard/Meinig Avenue intersections. Such adjustments, as determined by ODOT standards, would improve the perceived safety of the pedestrian crossing movements at these intersections. Further, these minor adjustments would not adversely effect the capacity of the intersection to accommodate vehicular traffic. It is therefore recommended that ODOT conduct field observations of the pedestrian crossing timings at the three identified intersections with deficiencies and adjust these timings to comply with their standards.

Field reconnaissance identified the following deficiencies requiring mitigation to restore safety at critical locations on the transportation system:

- Provide an advance signal head for the northbound approach of Bluff Road to U.S. 26.
- Install “Left Turn Yield to Oncoming Traffic” signs on the Bluff Road approaches to U.S. 26, **or**
- Retime the U.S.26/Bluff Road signal to provide split phasing to serve the Bluff Road approaches.
- Close the east Toll Gate Inn driveway nearest the Bluff Road intersection on U.S. 26, **or**
- Construct a median control on U.S. 26 from the west edge of the Bluff Road intersection for a distance of approximately 100 feet to prevent left-in/left-out movements at the Toll Gate Inn driveway nearest the Bluff Road intersection.
- Install “Left Turn Yield to Oncoming Traffic” signs on the southbound Meinig Avenue (Highway 211) approach to Pioneer Boulevard (U.S. 26 eastbound), **or**
- Retime the Meinig Avenue/Pioneer Boulevard signal to provide split phasing to serve the Meinig Avenue approaches.
- Re-establish with striping the northbound right-turn lane on the Meinig Avenue (Highway 211) approach to Pioneer Boulevard (U.S. 26 eastbound).
- Move the south end of the east crosswalk at the Meinig Avenue/Pioneer Boulevard intersection further west, to the corner of the intersection, making the pedestrian more visible to the northbound right-turning vehicle.
- Install “Left Turn Yield to Oncoming Traffic” signs on the Ten Eyck Road-Wolf Drive approaches to U.S. 26, **or**
- Retime the U.S. 26/Ten Eyck Road-Wolf Drive signal to provide split phasing to serve the Ten Eyck Road-Wolf Drive approaches.
- Trim the tree southwest of the Ten Eyck Road/Pleasant Street intersection to restore sufficient sight distance from Pleasant Street to the south.

## EXISTING DOWNTOWN ACCESS CONDITIONS

An inventory of existing curb cuts was made for the downtown streets during February/March 1995. The data obtained were used to create a detailed downtown access facility map - shown in Figures 10A and 10B. It was noted that between Bluff Road and Ten Eyck Road there are currently 26 driveways on the north side of Proctor Boulevard and 25 driveways on the south. There are 21 driveways on the north side of Pioneer Boulevard and 28 driveways on the south. This information is shown in Table 9.

**Table 9**  
**Private Driveway Access Spacing Summary**

Road-Side	Length (feet)	Existing Conditions			OHP Access Management Guidelines	
		# of Driveways	Density (per mile)	Average Spacing (ft)	Density (per mile)	Average Spacing (ft)
Pioneer - North side	3,800	21	29	180	11	500
Pioneer - South side	4,050	28	37	145	11	500
Proctor - North side	3,050	26	45	115	11	500
Proctor - South side	3,050	25	43	120	11	500

Under current (1995) conditions:

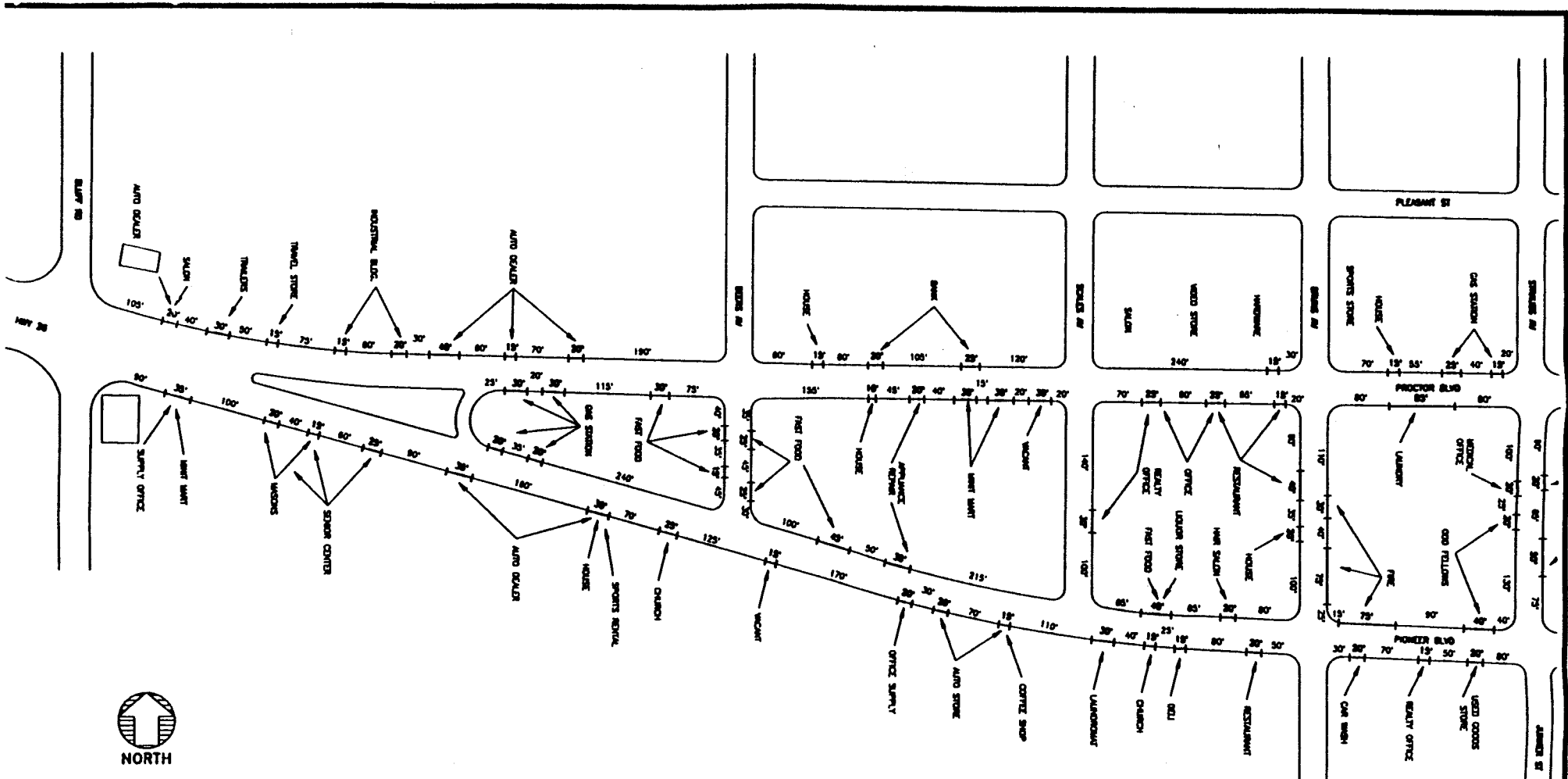
- Public roads are spaced approximately 390 feet apart on average.
- Private driveways are spaced approximately 140 feet apart on average.
- Signals are spaced approximately 2,000 feet apart on average.

The above data show that the downtown couplet area of Sandy is currently not in compliance with the OHP Access Management guidelines for a Category 4-Urban highway. If public road spacing were to be brought into compliance, six roads would have to be closed. If private driveway spacing were to be brought into compliance, between 10 and 17 driveways would have to be closed on each side of Pioneer and Proctor Boulevards. The removal of one traffic signal would also be required for compliance.

## CONCLUSION

Sandy's transportation system is comprised of bicycle, pedestrian, roadway, and transit facilities located within the UGB. This system experiences its peak demand between 4:15 and 5:15 p.m., on a typical Friday afternoon in August. This is likely due to the combination of commuter traffic returning home from work, weekend recreational trips being begun, and commercial traffic using the U.S. 26 corridor. During this peak period the transportation system operates sufficiently well to accommodate the peak demand.

The City's bicycle system developed to date in the study area is dependent upon the State facilities provided along U.S. 26, the County facilities along Bluff Road, and new private developments along Dubarko Road and Strawbridge Parkway. The State plans to provide



<b>DOWNTOWN ACCESS MAP</b>	
CITY OF SANDY TRANSPORTATION SYSTEM PLAN	
DECEMBER 1995	FIGURE <b>10A</b>

K



striped bike lanes on U.S. 26 through the downtown couplet of Sandy. This will complete a critical east-west bicycle corridor through the study area. The planned bicycle routes shown in the comprehensive plan provide for a network of routes serving the study area and connecting with the existing and planned regional bikeways.

Sandy has a well developed pedestrian system in its downtown core area and associated with more recently developed residential areas. Minor sections of sidewalk are substandard, in disrepair, or missing altogether. Most key pedestrian generators are adequately served by the existing network. As areas develop or redevelop, the City should require the installation, replacement, or improvement of sidewalks as needed.

All four traffic signals in the downtown area of Sandy are adequately serving the pedestrian mode. No unsignalized intersection in the downtown area meets warrants under current conditions for a pedestrian signal. Minor pedestrian timing improvements to the U.S. 26/Bluff Road, Pioneer Boulevard/Meinig Avenue, and Proctor Boulevard/Meinig Avenue signals should be made to improve the existing service.

Two unsignalized intersections immediately west of the study area boundary on U.S. 26 experience failing levels of service during this peak demand. Nearby signalized access to U.S. 26 is available as an alternative for the critical movements at these intersections.

All signalized intersections within the study area are operating at acceptable levels of service during the peak period of demand and are adequately serving all travel modes. Sufficient reserve capacity exists at all signalized intersections to accommodate additional traffic volumes. ODOT staff is aware of hardware problems at the U.S. 26/Industrial Way intersection which effects off-peak conditions only. Recommendations for additional signing of side street approaches to several signalized intersections are made to improve the safety of left-turning movements.

Intercity transit service provided by Tri-Met is on a very limited basis. Transit service demand is being met during the limited hours of operation (commuter peak) currently provided by Tri-Met. However, latent demand outside these hours of operation exists and has no other reasonable means of service. Intracity transit service is provided through a dial-a-ride program and is adequate for the current demand.

The traffic accident analysis revealed that roadway safety conditions were comparable with similar facilities in the State, with no severe safety problems; however, a number of locations were identified where geometric and grade improvements would lead to greater safety.

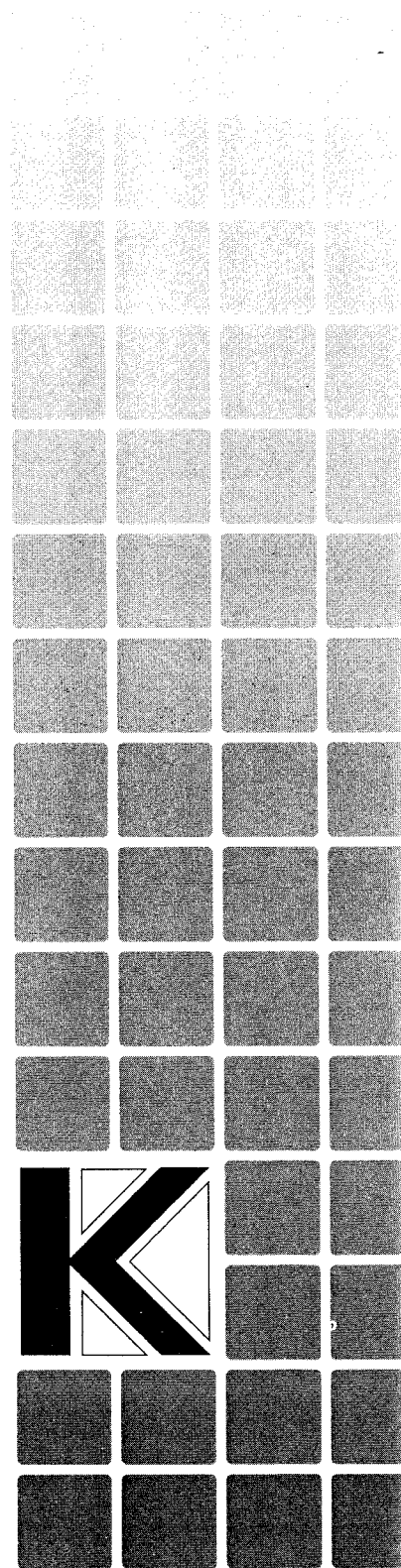
A driveway and public road access inventory indicated that conditions within downtown Sandy are not in compliance with ODOT access standards for U.S. 26 in this section and that both driveway and roadway closures would be required for compliance with these standards.



**Section 3**

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Future Conditions





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## Future Conditions

### INTRODUCTION

This section discusses the 20-year future and the transportation demand forecast to occur, based on estimates of population and employment increases in the study area. Multi-modal alternatives for addressing future travel demand are presented for evaluation as to their effectiveness in adequately serving the demand and satisfying the study goals and objectives.

This section summarizes future conditions experienced on the transportation system through discussion on the following topics:

- **Future Transportation Demand**
  - Town Plan (proposed comprehensive land use plan)
  - Population
  - Employment
  - Mode Split
  - Traffic Assignment
  
- **Future Traffic Operations**
  - No-Build Roadway Network
  - Operating Level of Service
  - Operations Analysis
  - Mitigations Required
  
- **Future Conditions Summary**

Long term future transportation needs for the City of Sandy were examined based on extensive discussion with citizens and City staff, review of the proposed roadway network within the Town Plan, results from the operational analyses of the existing street system (*See Section 2*), and future travel demand estimates based on the proposed Town Plan. Future alternative mode plans were developed to ensure provision for pedestrians, bicyclists, and transit users. These alternative mode plans were used as the backdrop in development of four roadway system alternatives to be assessed for their effectiveness in adequately serving demand and satisfying the study goals and objectives.

### FUTURE TRANSPORTATION DEMAND

Future travel demand for the City of Sandy was estimated based on the expected growth in study area population and employment and traffic traveling through the study area for the horizon year 2015. The unique trip making characteristics of residential as well as employment based activities were considered in the development of the future travel demand estimates. The land use mix proposed in the Town Plan (locating village retail centers within dense residential areas) was taken into consideration during the development of these trip making estimates.

**Future Land Use/Demographics**

Year 2015 traffic volumes on Sandy’s arterial/collector system were estimated based on population and employment forecasts developed by City staff for the Town Plan. The 20-year forecast planning horizon was chosen to ensure compliance with the Transportation Planning Rule. The following section summarizes the development of future population and employment projections that were used to develop travel demand estimates for the Sandy urban area.

**Population**

City staff has set the year 2015 target population for the City of Sandy at 15,000, based on the adoption and implementation of the Town Plan. This population forecast represents a 232 percent increase in population over the 1994 population of approximately 4,520. This would result in an annual compounded growth rate of 5.88 percent for the 20-year period, or an annual straight-line growth rate of 11.6 percent. This would be considered a high growth rate for a sustained 20-year period. Several cities in Oregon have experienced a comparable compounded rate of growth or greater over a thirty year period; they are shown in Table 10.

**Table 10**  
**30-Year Population Growth in Selected Oregon Communities**

City	1960 Population	1990 Population	Annual Compounded Growth Rate
Hillsboro	8,232	37,520	5.19%
Cornelius	1,146	6,148	5.76%
Beaverton	5,937	53,310	7.59%
Troutdale	522	7,852	9.46%
Gresham	3,944	68,237	9.97%

By comparison, the City of Sandy increased from a population of 1,147 in 1960 to 4,152 in 1990. This equated to an annual straight line growth rate of approximately 8.73 percent, or an annual compounded growth rate of approximately 4.38 percent.

The average household size in Sandy is expected to change somewhat over the 20-year planning horizon. There were approximately 2.80 persons per dwelling unit in 1990 in the Sandy area. The Town Plan assumes there would be 2.63 persons per dwelling unit in the year 2015. Therefore, this lower household density would likely result in fewer total daily trips being generated per household in the future.

## Employment

Implementation of the Town Plan also provides for a significant increase in employment by the year 2015. The employment base is estimated to grow from approximately 2,340 jobs in 1994 to 8,675 jobs by 2015. This represents an increase of 271 percent over the 20-year period. Employment was estimated using the following assumptions provided by City staff:

- Retail employment density: 20 employees per gross acre except in downtown;
- Office employment density: 30 people per gross acre except in downtown;
- Downtown employment density: 40 people per gross acre; and
- Industrial employment density: 18 people per gross acre.

The result of this employment estimate is an overall increase in the jobs-to-housing ratio for the year 2015 over what currently exists in 1994. The current jobs-to-housing ratio in the Sandy area is approximately 1.45; while a 1.52 jobs-to-housing ratio would result for the year 2015, based on the estimates provided by the City. It is expected that by attaining this level of employment and this increased jobs-to-housing ratio, the Town Plan may accomplish an improved internalization of trips and increased non-auto mode split. The result would likely be a lower average number of work-related auto trips generated per household. Further, it can be expected that average trip-lengths would be reduced due to residents working closer to home.

## Changing Demand for Transportation Options

Travel demand 20 years from now is likely to consist of an increasing component of non-automobile traffic; and the Town Plan has been developed specifically to be supportive of non-auto modes of travel in the future. The 2015 Sandy Town Plan includes specific provision for the pedestrian, bicycle, and transit modes as well as the auto mode. In addition, such components as telecommuting and other "information super highway" technology will comprise an increasing part of the future transportation demand by the year 2015. Remote offices in centers such as Sandy's downtown will allow employees to work via modems and other electronic links with offices any distance away; thus reducing the need to commute.

It is generally understood that as smaller rural communities grow in population and employment they become more self sufficient entities; better able to serve the full needs of their population. Citizens are able to find the employment and services desired within the community, instead of having to travel to larger urban areas located nearby. The benefit to the transportation system is in the potential for some of these trips (now local, not long distance) to be made via modes other than the automobile; thus reducing overall demand on the roadway network.

The Town Plan carries this concept one important step further. By locating neighborhood commercial centers and schools near dense residential areas, trips which would have otherwise been made via automobile (to the bank, dry cleaners, grocery store, video rental, etc.) are now eligible to be made via some non-auto mode.

Generating quantitative future travel demand estimates for these "modes" is a challenging task. Traditional methods of "extrapolation of trends" require a basis in substantial historic data. Such data is not readily available for the Sandy area. Therefore, a qualitative approach was taken in estimating future demand and in developing alternatives which would address the expected demand.

In an attempt to reflect the benefit of the Town Plan concepts and other transportation options listed above, it was determined that mode splits found to occur in larger urban areas would be used. The mode split assumptions provided in the Metro model for the Portland metropolitan area were incorporated into the future travel demand forecasts for Sandy. The resulting mode split for Sandy was approximately 25 to 35 percent of all daily trips generated by the home would be via some non-auto oriented mode. This mode split is comparable to those found in cities of 50,000 population, as indicated in the "Quick-Response Urban Travel Estimation Techniques and Transferable Parameters" User's Guide, published by the Transportation Research Board of the National Research Council, (National Cooperative Highway Research Program Report #187).

### **Future Automobile Traffic Forecasting Methodology**

To enable a quantitative comparison of a number of future roadway system alternatives, future weekday traffic volumes estimated to occur on the City's arterial and collector streets for the year 2015 were required. The method used to estimate future traffic volumes involved a manual assignment of daily trips based on the population and employment estimates cited earlier.

Forecasts of future traffic volumes can be provided at varying levels of detail. It was determined by the Management Team, overseeing the technical direction of this study, that the estimates of future trips in the Sandy area be provided as *daily volume* estimates. Such daily estimates may be used to identify the size of future roadway facilities and/or the need for additional facilities to be included in the future transportation network over time.

Future *peak hour volume* estimates would be required to reflect the impact of a variety of alternatives generally considered in such studies as this, including:

- Increases/decreases in mode splits between auto and non-auto modes.
- The implementation of Access Management, Transportation System Management, and Transportation Demand Management alternatives.
- The benefits/dis-benefits of signalization and/or coordination of signals to the overall operation of the transportation system.
- The effect of peak hour spreading (longer commute periods) on the overall demand experienced, due to congestion.
- Intersection-level improvements which would forestall or eliminate the need for signalization.

It would be imprudent to attempt to identify more refined needs or deficiencies (such as those listed above) based on these *daily volume* estimates alone. Further, it would be beyond the ability of the daily estimates to reflect refinements in assumptions for improved mode splits or the effects of study area trip internalization due to modifications to the Town Plan land uses.

Twenty-year planning level manual traffic assignments are typically insufficient to produce accurate estimates of *peak hour* traffic volumes for use in the identification of deficiencies and evaluation of alternatives. Therefore, *average weekday daily* traffic volumes were developed from the manual assignments for the year 2015 to determine the sizing of roadway facilities necessary to accommodate future demand.

### **Development of "Travel Basins"**

To facilitate the development of future vehicular travel demand estimates for the Town Plan, Kittelson & Associates, Inc., identified a total of 14 unique "travel basins" or catchment areas of residential and/or commercial development within the existing Urban Growth Boundary (UGB) for the City. Each basin would be served by an existing collector or arterial street giving access to U.S. 26 in Sandy. City staff provided estimates of population and employment expected to occur in each of the travel basins by the year 2015, based on implementation of the Town Plan.

### **Vehicular Trip Generation**

#### ***Internally Generated Trips***

Trip generation rates were obtained from equations used by Metro in the Portland metropolitan area travel forecasting model (EMME/2) to estimate the total number of vehicle trips generated by land uses within Sandy (referred to as "local trips"). These trip generation rates result in estimates for trips made within and between the travel basins as well as trips made between the basins and external zones (such as Gresham, Estacada, Mt. Hood, etc.).

An internal or local trip is defined as one which starts or ends in Sandy. An example would be a Sandy resident who travels from home to the Sandy City Hall. Another example would be a Portland resident who travels from home to Mt. Hood and stops in Sandy for gas on the way (this motorist would have generated two local trips, one from Portland to the gas station, the second from the gas station to Mt. Hood).

#### ***Through-Trips***

Through-trips are described as trips which neither begin nor end in Sandy. An example would be a commercial truck traveling from Portland to Bend via U.S. 26 through Sandy. As long as the driver does not stop in Sandy (for services including food, gas, delivery or pick up, etc.), the trip would be considered a through trip.

A license plate survey was conducted to determine the proportion of trips entering the Sandy area which are destined for points outside of Sandy, as opposed to those trips which stop in Sandy for some purpose. A platoon of vehicles entering Sandy's city limits on U.S. 26 was followed by a surveyor in a vehicle. The surveyor noted how many of the original platoon traveled through the City as distinct from those which turned off U.S. 26 within the City; either to Highway 211, another side road, or to a business or residence. The survey was conducted from 11:45 a.m. to 6:45 p.m. on a Tuesday in May.

The survey determined that the existing number of trips traveling through the Sandy area on U.S. 26 is approximately 10,000 (or approximately 50 percent of the 1994 ADT at the east end of Sandy). These through-trips were then grown for the 20 year period using information obtained from ODOT, including the 10-year historical growth trend found on U.S. 26 (1981 to 1991). It was estimated that there would be an additional 6,600 through-trips on U.S. 26 by 2015. This additional through-trip volume is toward the high end of the range established by ODOT (3,700 to 7,400 ADT) in the "Mt. Hood Corridor Study" prepared by BRW, Inc., and dated July 1994.

The Highway 211 through volume (i.e. not destined for Sandy) was found to be approximately 2,500 vehicles per day in 1990; using ODOT annual traffic counts, and comparing volumes within and beyond the City. Traffic growth from historical data (the same 10-year historical growth period used for U.S. 26) indicated that there would be a growth of approximately 40 vehicles per year, or an increase of approximately 1,000 ADT in the 25-year period from 1990 to 2015.

**Trip Distribution**

Trips produced by the population and employment located within Sandy were distributed to areas within and outside of Sandy, based on the “attractiveness” of an area for the type of trip being made. Examination of census journey-to-work data revealed that trips by Sandy residents for work are attracted to employment areas outside of Sandy more often than within Sandy. Trips for local services such as groceries, banking, and retail were assumed to be attracted to areas within Sandy as often as outside of Sandy. Finally, many trips were assumed to be attracted to Sandy from outlying rural areas due to the services (employment, commercial, retail, etc.) that are provided within Sandy.

Local trips within the City of Sandy were distributed between travel basins in proportion to the population and employment estimates for each basin. For example; basins with higher proportions of population would distribute more trips than basins with lower population proportions, and basins with higher proportions of employment would have more trips distributed to them than basins with lower employment proportions.

Internal trips (i.e. trips which remain internal to the Sandy urban area) were assumed to account for 25 percent of home-based work trips, 50 percent of home-based non-work trips (trips from home to the bank, grocery store, gas station, etc.) and 50 percent of non-home based trips (trips which neither begin nor end at home).

Internal-to-external and external-to-internal trips were distributed based on the compliment of the above distribution. Therefore, 75 percent of home-based work trips, 50 percent of home-based non-work trips, and 50 percent of non-home based trips were distributed between Sandy and some external station. These trips between Sandy and the outlying areas were distributed in direct proportion to the population and employment represented by each external station and in inverse proportion to the travel distance to be overcome. However, this distribution was tempered by a comparison to existing traffic volume counts on U.S. 26 and Highway 211 and other external stations to ensure a reasonable distribution. The eventual distribution of these trips is represented in Table 11.

**Table 11**  
**External Trip Distribution**

Trip Generation Component	Percent of Internal to External Trips Assigned to Each External Gate		
	Highway 26 (West)	Highway 211	Highway 26 (East)
Work-Based Productions	85	5	10
Non-Work Based Productions	85	5	10
Work-Based Attractions	40	10	50
Non-Work Based Attractions	42	2	56

### **Mode Split**

As described earlier, the mode split assumptions for the future travel demand estimates were developed based on the Metro demand model mode split assumptions. This resulted in an assumed mode split of approximately 25 to 35 percent non-auto oriented trips in the year 2015 in Sandy.

### **Traffic Assignment**

Total future daily traffic volumes were assigned to U.S. 26 and those arterials and collectors assumed to intersect with the highway in Sandy under each of the scenarios, using the shortest path method. Simply stated, the shortest path method assigns the trip to the route with the shortest length between beginning and end. For selected scenarios, the shortest path assignment was tempered by a daily capacity constraint. For example, once the capacity of the 2-lane couplet on U.S. 26 was reached, all other trips had to be routed via parallel facilities (i.e. Dubarko Road, Pleasant Street, etc.) to traverse that east/west corridor. The use of these parallel facilities for some trips would result in a longer distance trip being made.

## **FUTURE TRAFFIC OPERATIONS CONDITIONS**

### **No-Build Scenario**

Future conditions on U.S. 26 and the existing arterial/collector network were considered under a "No-Build" condition (i.e. no new roadways would be considered to be constructed in the 20-year horizon). The roadway network is shown in Figure 11. The Level of Service (LOS) which would be experienced on the No-Build system was analyzed and the number of travel lanes on each critical facility required to restore the system to within operational levels (LOS "E" or above) was determined.

### **Operating Level of Service Standards**

The City and the State have identified the Level of Service threshold each has established for 20-year planning level work such as this. In consultation with City staff an interim threshold has been established for this project, as none currently is identified in the adopted comprehensive plan. The City's objective is to ensure that its facilities over time are maintained and improved to provide a minimum LOS "D" on all arterial/collector streets. During planning and/or operational stages, circumstances may arise under which the City would likely vary from this standard (i.e. financial constraints which preclude a capacity improvement from being made when it is deemed necessary).

The planning standards applicable to State highway facilities are controlled by the recommendations laid out in the Oregon Highway Plan (OHP). The State has classified its facilities in terms of "Level of Importance" (LOI); from **Statewide LOI** as the highest to **District LOI** as the lowest level of designation. Table 12, which is reproduced from the OHP, shows operating levels of service for highways of different levels of importance for a 20-year planning horizon. U.S. 26 is designated as a highway of Statewide LOI, and Highway 211 a District LOI highway within the study area.

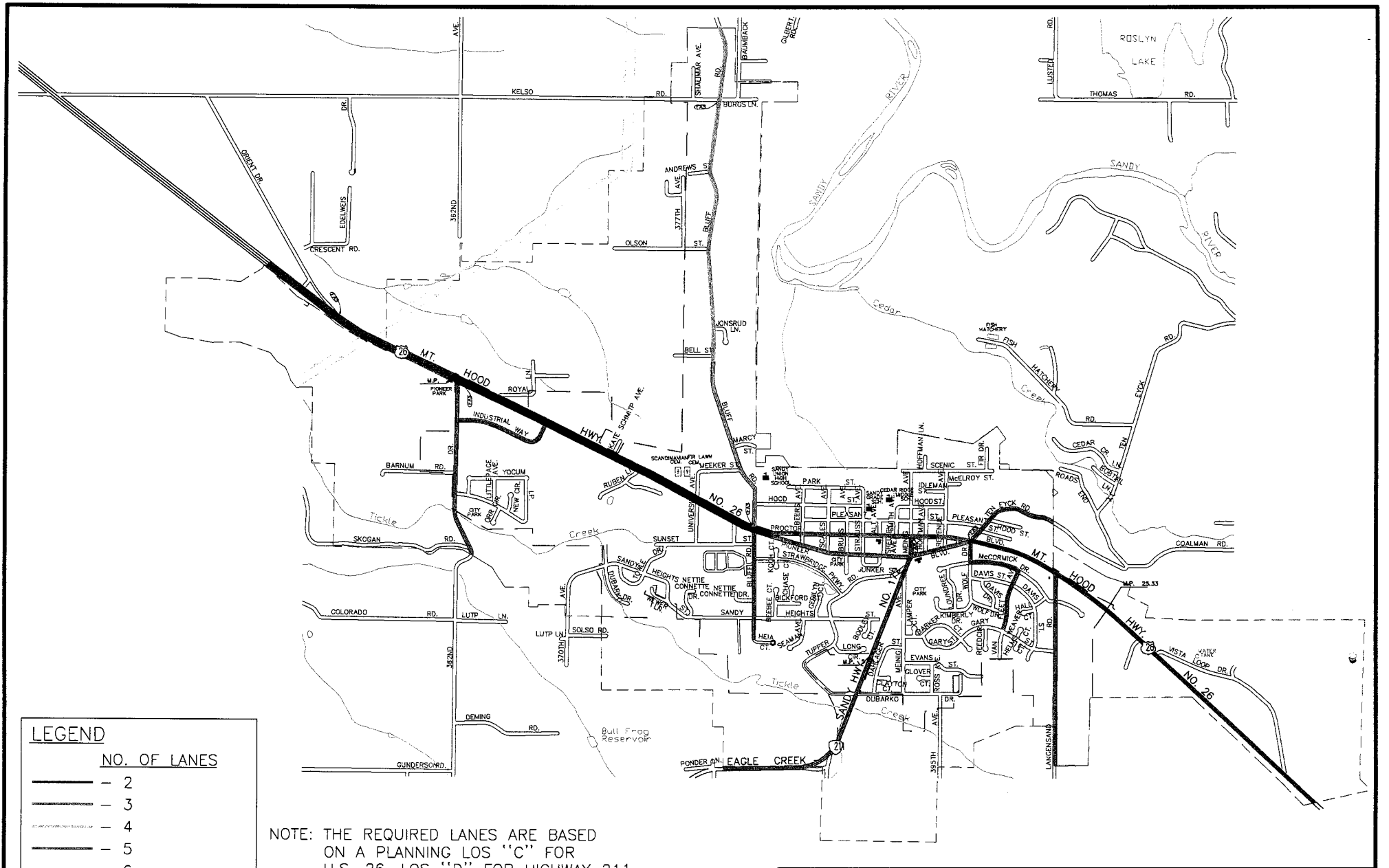
**Table 12**  
**Level of Service for Design Hour Operation Conditions**  
**Through a 20-year Horizon<sup>1</sup>**

Level of Importance	Type of Area Highway Is In				Special Considerations	
	Urban <sup>2</sup> Parts of Metropolitan Areas <sup>3</sup>	Urban Parts of Other Cities	Urbanizing <sup>4</sup> Areas and Rural Development Centers <sup>5</sup>	Rural Areas <sup>6</sup>	Special Transportation Areas <sup>7</sup>	Within Exclusive Transit Corridor <sup>8</sup>
Interstate	D	C	C	B	NA	D/E <sup>9</sup>
Statewide	D	C	C	B	E	E
Regional	D	D	C	C	E	E
District	E	D	D	C	E	E

- <sup>1</sup> Operating standards are not design standards. Operating standards are used by ODOT when making operating decisions, such as access management decisions. Design standards, which are used to guide the design of highway improvements, are often higher to provide acceptable operating conditions in the future.
- <sup>2</sup> Urban areas are those areas within an urban growth boundary that are generally developed at urban intensities as allowed by the comprehensive plan.
- <sup>3</sup> Metropolitan areas include Portland, Salem, Eugene, Medford, Rainier (part of Longview-Kelso) urban areas.
- <sup>4</sup> Urbanizing areas are those within an urban growth boundary that are undeveloped or are developing. They may include vacant lands and areas developed well below urban intensities as allowed by the local comprehensive plan.
- <sup>5</sup> Rural development centers are concentrations of development outside of urban growth boundaries. Included are rural unincorporated communities.
- <sup>6</sup> Rural areas are areas outside of urban growth boundaries but not including rural development centers.
- <sup>7</sup> Special Transportation Areas (STAs) are compact areas in which growth management considerations outweigh this policy. STAs include central business districts, transit-oriented development areas and other activity or business centers oriented to non-auto (principally pedestrian) travel. They do not apply to whole cities or strip development areas along individual highway corridors.
- <sup>8</sup> Exclusive transit corridors are corridors within which the highway runs generally parallel to an exclusive transit way, such as a light rail line or exclusive bus way.
- <sup>9</sup> LOS "D" applies when the facility is located in an urbanizing area. LOS "E" applies in an urbanized area.



**Figure 11**  
**Alternative 1: "No-Build" Roadway Network**



**LEGEND**

NO. OF LANES	
	2
	3
	4
	5
	6
	7
	8*
	CITY LIMITS
	URBAN GROWTH BOUNDARY

NOTE: THE REQUIRED LANES ARE BASED ON A PLANNING LOS "C" FOR U.S. 26, LOS "D" FOR HIGHWAY 211 AND LOS "D" FOR CITY STREETS.

\* THIS CROSS SECTION WOULD NOT BE BUILT DUE TO DESIGN AND OPERATIONAL CONSTRAINTS.

**ALTERNATIVE 1:**  
**"NO-BUILD" ROADWAY NETWORK**

CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE  
**11**

Figure 11 (back)

According to the OHP, LOS requirements for a 20-year planning horizon for U.S. 26 are LOS C, while for Highway 211, LOS D is applicable. The State uses these guidelines in developing such long-range plans as corridor plans and jurisdictional transportation system plans. During the planning process, circumstances can be identified under which the State would elect to vary from this policy by accepting a different LOS threshold or modifying the class or category assigned to a particular section of the facility.

Tables B1 and B2 of Appendix B show the daily volume thresholds applicable for each LOS used in determining the required number of travel lanes for existing and future arterial and collector streets. Table B3 shows the 1994 Average Daily Traffic Volumes on the arterial/collector system in Sandy, the current number of lanes on each facility, and the current LOS experienced.

### **Future Conditions Analysis and Mitigation**

The future conditions analysis identifies the expected LOS on the No-Build arterial/collector transportation system assuming no new roads and no capacity improvements to the existing system, as shown in Table 13. Table 13 shows the current number of lanes on the existing facilities, the future level of service assuming no change in lanes provided on the existing facilities, and the required number of lanes to restore capacity to the guidelines established by each jurisdiction for the 20-year forecast. Figure 11 depicts the "mitigated" existing transportation network and displays the necessary lane requirements of each facility.

The analysis showed that without additional east-west arterial/collector street capacity provided to serve local and through-traffic, widening on U.S. 26 to seven lanes west of 362nd Avenue, eight lanes between 362nd Avenue and Bluff Road, five lanes in each direction through the couplet, and seven lanes east of Ten Eyck Road would be required to maintain the LOS "C" guideline established for U.S. 26. Design, safety, and operational constraints would prevent the State from ever constructing U.S. 26 to an eight-lane facility or a five-lane one-way couplet facility. Therefore, the No-Build alternative could not be carried forward for further consideration or evaluation.

**Table 13**  
**Alternative 1: "No-Build" Roadway Network**  
**Level of Service and Lane Requirements for Year 2015**

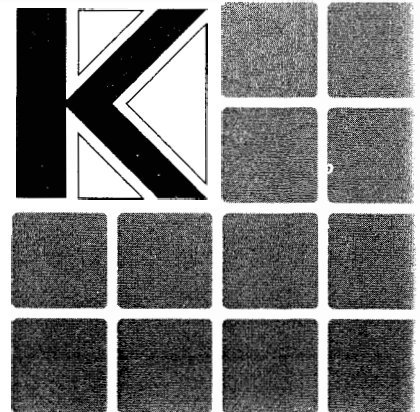
Facility	Existing Lanes	Future LOS with Existing Lanes	Number of Lanes Required for Level of Service		
			C	D	E
U.S. 26: West of 362nd Drive	5	F	7*	7*	6
362nd Drive - Bluff Road	5	F	8*	8*	7*
Couplet (each direction)	2	F	5*	5*	4
East of Ten Eyck Road	4/5	F	7	6	6
Highway 211	2	D	3	2	2
362nd Drive South of U.S. 26	2	B	2	2	2
Industrial Way	2	A	2	2	2
Bluff Rd.:					
North of U.S. 26	2	F	4	3	3
South of U.S. 26	2	B	2	2	2
Ten Eyck Road	2	A	2	2	2
Wolf Drive	2	A	2	2	2
Langensand Road	2	A	2	2	2

\* This cross section would not be built due to design and operational constraints.

**Section**

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Future Transportation System  
Alternatives



# Future Transportation System Alternatives

## INTRODUCTION

Increases in population and employment envisioned by the City and facilitated by the proposed Comprehensive Plan (Town Plan) will result in demands on the existing transportation system which will far exceed its capacity; as demonstrated by the "No-Build" alternative presented in the previous section. The failure of the "No-Build" transportation system to accommodate the future demand required the development of alternatives which would mitigate the identified deficiencies while satisfying the goals and objectives of the City and the community for its future transportation system.

This section describes the alternatives developed and the methodology employed to evaluate and select the Preferred Alternative by presenting the following topics:

- **Transportation System Alternatives**
  - Roadway System Alternatives
  - Specific "Downtown" Alternatives
  
- **Evaluation of Alternatives**
  - Evaluation Methodology
  - Measures of Effectiveness
  - Preferred Alternative Selection

## ALTERNATIVE TRANSPORTATION OPTIONS

Due to the simplicity of the demand forecasting methodology used for this planning effort, only roadway system alternatives were developed for evaluation. Modal plans (pedestrian, bicycle, and transit in particular) were developed, refined through committee review, and used as a backdrop during development and evaluation of the roadway alternatives. This was done in recognition of the fact that mode choice and mode split assumptions could not be reasonably tested with this methodology.

The modal plans will be presented in Section 5 as a part of the Preferred Alternative. The implementation of these plans, as indicated in Section 3, in conjunction with the Town Plan land use plan was assumed to result in a 25 to 35 percent non-auto mode split. These non-auto mode split assumptions were held constant across all roadway system alternatives.

National research (NCHRP #187, cited in Section 3) revealed that for communities of approximately 50,000 in population during the decade of the 1970s, the mode split was approximately 30 percent non-auto trips. This was the smallest population size for which data was available. Therefore, the range of 25 to 35 percent for a community of approximately 15,000 could be considered somewhat aggressive. However, this range is supported conceptually by the neo-traditional land use form which the Town Plan is attempting to implement. Further, the characteristics of trip making and sensitivity to the impacts of mode choice have improved since the 1970s and are expected to continue into the next century.

## FUTURE ROADWAY SYSTEM ALTERNATIVES

### Description of Alternatives

Four roadway system alternatives were developed in preparation for preliminary evaluation of the future roadway transportation system. They are described below:

#### Alternative 1 - "No-Build" Roadway Network

This alternative was described in Section 3 and illustrated in Figure 11.

#### Alternative 2 - "Bypass" Roadway Network

This alternative considered the option of constructing a bypass wholly outside the Sandy UGB, to carry all through-traffic around Sandy; and estimated the off-loading effect this would have on the operations of U.S. 26 within Sandy. In addition, the lane requirements for the bypass and the remaining "No-Build" transportation network were estimated.

#### Alternative 3 - "Dubarko Road" Roadway Network

This alternative examined the potential benefit of Dubarko Road as a parallel arterial to U.S. 26, from 362nd Avenue to a connection with U.S. 26 east of Langensand Road. This was the only roadway improvement considered under this scenario. Therefore, the balance of the transportation system would be the "No-Build" network. The travel demand generated by the area which Dubarko Road would serve was assumed to be off-loaded directly from one or more critical sections of U.S. 26. The lane requirements for Dubarko Road and the remaining "No-Build" transportation network necessary to comply with the jurisdictional LOS guidelines were determined.

#### Alternative 4 - "Town Plan" Roadway Network

This alternative was based on the conceived roadway network for the Town Plan. This roadway network was developed in combination with City staff and the consulting firm of Otak, Inc., which assisted the City with the development of the Town Plan land use map. This roadway network included the following improvements, extensions, and new roadways:

- Complete Dubarko Road east from 362nd Avenue to the west end of Vista Loop Drive.
- Extend 362nd Avenue north to connect with Kelso Road.
- Extend Bell Street west to connect with 362nd Avenue.
- Extend Meeker Street west and north to connect with Bell Street.
- Extend Olson Street or Agnes Street west to connect with 362nd Avenue.
- Construct a new north/south collector west of Bluff Road, connecting Bell Street to Olson Street or Agnes Street and Kelso Road.
- Extend Bluff Road south to connect with Highway 211 (assuming a reasonable alignment can be located, given significant topographic constraints).



- Extend Ruben Lane north to connect with Meeker Street and south to connect with Dubarko Road.
- Improve the Pleasant Street-to-Beers Street-to-Hood Street-to-Bluff Road connection.
- Extend Van Fleet Avenue south to connect with Dubarko Road.
- Extend Industrial Way west to connect with Jarl Road and east to connect with Ruben Lane and Sunset Street.
- Extend Sandy Heights Street east to Gary Street, via an over crossing of Highway 211.
- Construct a new north/south street connecting the east end of McCormick Drive with Dubarko Road east of Langensand Road.
- Extend Gary Street east to connect with the north/south street described above.

A "fatal flaw" analysis of the Town Plan roadway network was conducted to identify any existing unsignalized arterial/collector intersections with U.S. 26 which would require signalization in the future, verify proposed arterial/collector connections with U.S. 26 would comply with current ODOT spacing standards for signalized intersections, and confirm the adequacy of the network to accommodate the implementation of the Town Plan without significant reliance on U.S. 26.

### **Capacity Analysis of Roadway Alternatives**

#### **Alternative 1: No-Build**

The LOS results of the alternative were described in Section 3 and summarized in Table 13. Due to design, safety, and operational constraints, this alternative was not determined not to be viable and was not carried forward for further consideration.

#### **Alternative 2: Bypass**

In this alternative a bypass beginning and ending outside the Sandy City limits was assumed to serve the forecast element of through-trips for the year 2015; directly off-loading these volumes from U.S. 26, including the couplet through Sandy. The existing arterial/collector transportation network was otherwise assumed to be unaltered for local traffic within the Sandy area. Table 14 shows the current number of lanes on the existing facilities, the future level of service assuming no change in lanes provided, and the required number of lanes to restore capacity to the LOS guidelines established by each jurisdiction for 20-year forecasts. Figure 12 depicts the Bypass alternative with the remaining "No-Build" transportation network and displays the lane requirements of each facility necessary to restore capacity to the guidelines established by each jurisdiction.

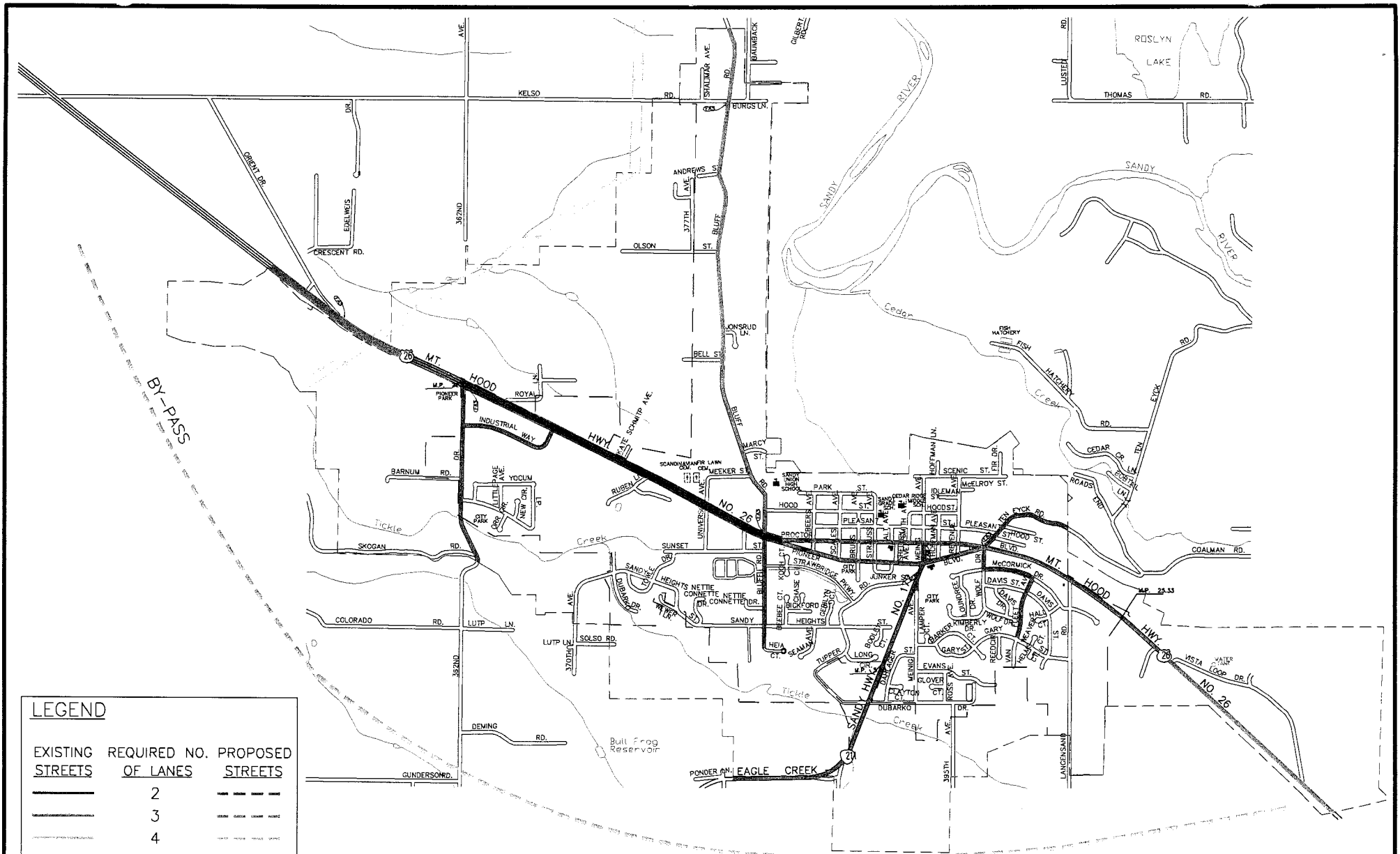
As shown in Table 14, this alternative would require no additional lanes on U.S. 26 west of 362nd Avenue. U.S. 26 would require widening to six travel lanes between 362nd and Bluff Road and three travel lanes in each direction through the couplet in order to maintain LOS C. No widening of U.S. 26 would be required east of Ten Eyck Road. The removal of one lane

**Table 14**  
**Alternative 2: "Bypass" Roadway Network**  
**Level of Service Lane Requirements for Year 2015**

Facility	Existing Lanes	Future LOS with Existing Lanes	Number of Lanes Required for Level of Service		
			C	D	E
U.S. 26: West of 362nd Drive	5	C	5	5	NA
362nd Drive - Bluff Road	5	E	6*	6*	5
Couplet (each direction)	2	F	3	3	3
East of Ten Eyck Road	4/5	D	5	4	4
Highway 211	2	D	3	2	2
362nd Drive South of U.S. 26	2	A	2	2	2
Industrial Way	2	A	2	2	2
Bluff Rd.:					
North of U.S. 26	2	F	4	3	3
South of U.S. 26	2	B	2	2	2
Ten Eyck Road	2	A	2	2	2
Wolf Drive	2	A	2	2	2
Langensand Road	2	A	2	2	2
<b>BYPASS</b>	NA	NA	4	4	3

\* A six-lane section would require a median barrier to be constructed with breaks provided only at signalized intersections. Widening at signalized intersections to provide turn lanes would also likely be required. It is unlikely that ODOT would construct such a facility.

**Figure 12**  
**Alternative 2: "Bypass" Roadway Network**



**LEGEND**

EXISTING STREETS	REQUIRED NO. OF LANES	PROPOSED STREETS
	2	
	3	
	4	
	5	
	6	
	7	
	8	

- CITY LIMITS  
 - URBAN GROWTH BOUNDARY

BY-PASS: THIS ROUTE IS REPRESENTATIONAL IN NATURE. NO ALIGNMENT IS INTENDED TO BE INFERRED.

NOTE: THE REQUIRED LANES ARE BASED ON A PLANNING LOS "C" FOR U.S. 26, LOS "D" FOR HIGHWAY 211 AND LOS "D" FOR CITY STREETS.

**ALTERNATIVE 2:**  
**"BYPASS" ROADWAY NETWORK**

CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE  
**12**

Figure 12 (back-side)

of parking would likely be required to provide the additional travel lane in each direction on the couplet.

The Bypass would be required to be four lanes for LOS C and is assumed to be a limited access facility with at most one connection, located at Highway 211. Bluff Road north of U.S. 26 would require a three-lane section to maintain LOS D. No other widening of existing facilities would be required; however, substantial new local street construction would be necessary to accommodate the intended development of the Town Plan and provide connections to the existing arterial/collector system.

### **Alternative 3: Dubarko Road**

This scenario considered the potential off-loading effect of constructing Dubarko Road as a through connection from 362nd Avenue to an intersection with U.S. 26, at the west end of Vista Loop Road. The purpose was to determine if Dubarko could attract enough east/west trips from the U.S. 26 corridor to maintain the couplet as a two-lane facility. No other arterial/collector level facilities were assumed to be constructed or improved during the 20-year horizon.

The manual forecast assignment revealed that Dubarko Road would not capture a sufficient number of trips to prevent the downtown couplet from requiring expansion to additional travel lanes to serve the forecast demand. To maintain a LOS C standard for U.S. 26 through the downtown couplet, the facility would require widening to three travel lanes in each direction. This would be required even under the circumstance where Dubarko Road was built to a four-lane cross section, posted with a speed of 40 mph, and signalized only at 362nd Avenue and the U.S. 26/Vista Loop Drive intersection. These findings indicated that areas beyond the reach of Dubarko Road contribute sufficient trip-making activity to, within, and through the downtown couplet to trigger the need for expanded capacity within the couplet.

Table 15 shows the current number of lanes on the existing facilities, the future level of service assuming no change in lanes provided, and the required number of lanes to restore capacity to the LOS guidelines established by each jurisdiction for 20-year forecasts. Figure 13 shows Dubarko Road with its connections to 362nd Avenue and Vista Loop Road, along with the remaining "No-Build" transportation network. The roadways considered under this alternative are color coded to represent the lane requirements necessary to achieve the LOS threshold established by each jurisdiction for the pertinent facilities.

Volume estimates indicated that Dubarko Road would have to be constructed to a four-lane section, 362nd be widened to a three-lane section, and Bluff Road (north of U.S. 26) be widened to a three-lane cross section in order to maintain LOS D on these city streets. U.S. 26 would need to be upgraded to seven lanes west of 362nd Avenue, six lanes west of Bluff Road, three lanes in each direction in the couplet, six lanes east of Ten Eyck Road, and seven lanes east of Dubarko Road to maintain LOS C on this state facility. The remaining arterial/collector streets and Highway 211 would not require widening.

It should be noted that substantial new local street construction would be required to accomplish the level of development planned under the Town Plan. These new local streets would be required to provide connections to the existing arterial/collector system.

**Table 15**  
**Alternative 3: "Dubarko Road" Roadway Network**  
**Level of Service and Lane Requirements for Year 2015**

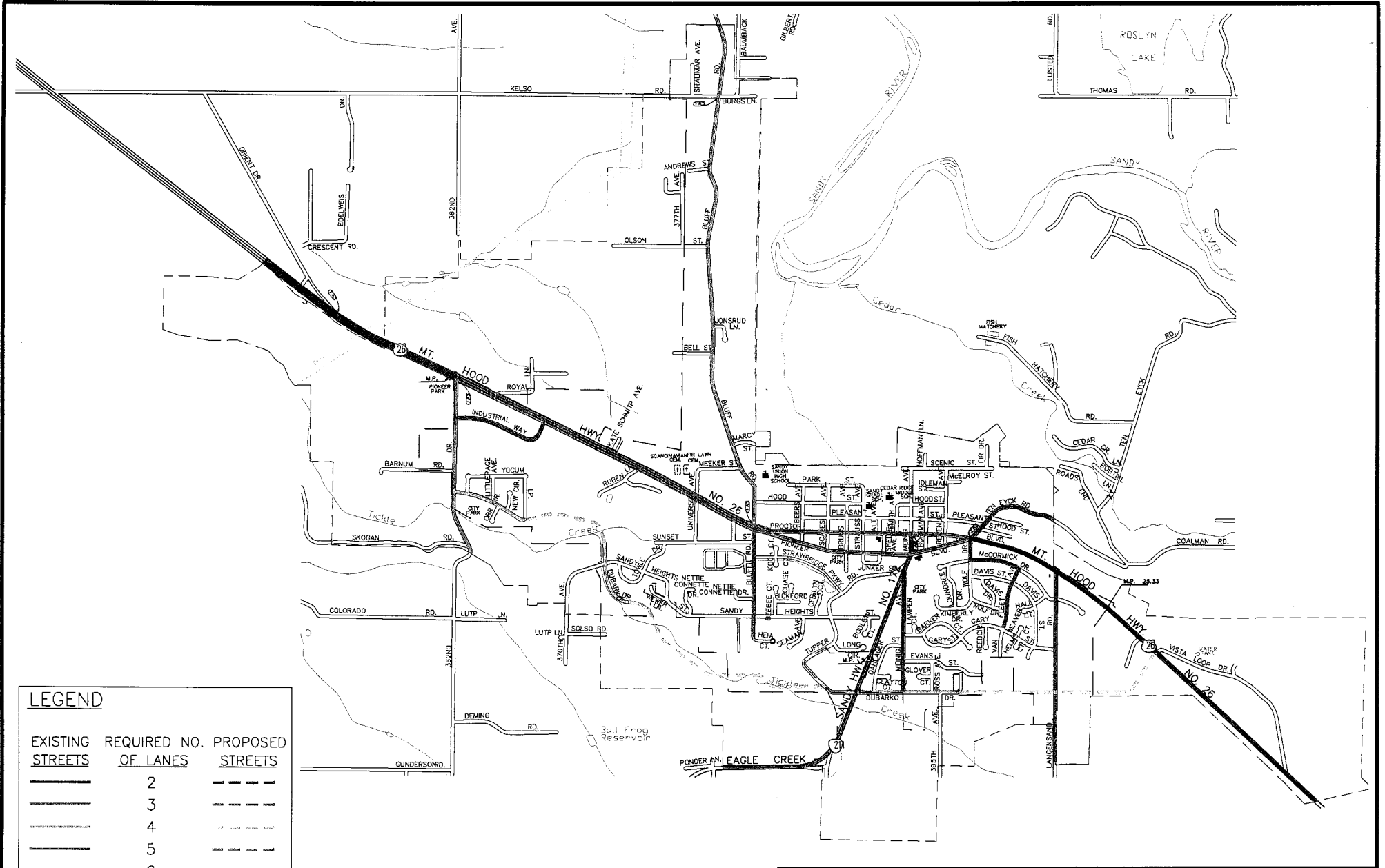
Facility	Existing Lanes	Future LOS with Existing Lanes	Number of Lanes Required for Level of Service		
			C	D	E
U.S. 26:					
West of 362nd Drive	5	F	7*	7*	6*
362nd Drive - Bluff Road	5	D	6*	5	5
Couplet (each direction)	2	E	3	3	2
Ten Eyck Road-Dubarko Road	4/5	F	6*	6*	5
East of Dubarko Road	4/5	F	7*	7*	6*
Highway 211	2	D	3	2	2
362nd Drive South of U.S. 26	2	F	4	3	3
Industrial Way	2	A	2	2	2
Bluff Rd.:					
North of U.S. 26	2	E	3	3	2
South of U.S. 26	2	B	2	2	2
Ten Eyck Road	2	A	2	2	2
Wolf Drive	2	A	2	2	2
Langensand Road	2	A	2	2	2
Dubarko Road:					
362nd Drive - Bluff Road	NA	NA	4	4	3
Bluff Road - Highway 211	NA	NA	4	4	4
East of Highway 211	NA	NA	4	4	4

\* A six-lane cross section would require a median barrier to be constructed with breaks provided only at signalized intersections only. Significant design and operational constraints exist with a seven-lane cross section which would, therefore, limit the likelihood of this being built.

**Figure 13**

**Alternative 3: "Dubarko Road" Roadway Network**





**LEGEND**

EXISTING STREETS	REQUIRED NO. OF LANES	PROPOSED STREETS
—————	2	-----
—————	3	-----
—————	4	-----
—————	5	-----
—————	6	-----
—————	7	-----
—————	8	-----
— — — —		— — — —
— — — —		— — — —

— — — — — CITY LIMITS  
 — — — — — URBAN GROWTH BOUNDARY

NOTE: THE REQUIRED LANES ARE BASED ON A PLANNING LOS "C" FOR U.S. 26, LOS "D" FOR HIGHWAY 211 AND LOS "D" FOR CITY STREETS.

**ALTERNATIVE 3:**  
**"DUBARKO ROAD" ROADWAY NETWORK**

CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE  
**13**

Figure 13 (back)

#### Alternative 4: Town Plan Transportation System

This scenario, also referred to as the "fatal flaw" analysis of the Town Plan, considered all critical roadway connections (collector/arterial) depicted in the Town Plan, as shown in Figure 14. These connections included additional east/west and north/south roads to complete an effective grid system for the City, over time. Such a system would allow the full development of the Town Plan to the horizon year 2015 and facilitate the best possible dispersion of traffic throughout the City; avoiding traffic concentrations and the associated congestion, wherever possible.

Important elements considered in this fatal flaw analysis were the sizing and spacing of future facilities; as well as their appropriateness to adequately accommodate the planned development of the City without undue reliance on U.S. 26. In addition, it was critical to determine whether the Town Plan roadway network would comply with the current ODOT spacing standards for signalized intersections on U.S. 26. Finally, any existing unsignalized arterial/collector street connection which may require signalization over time was identified.

Table 16 shows the current number of lanes on the existing facilities, the future level of service assuming no change in lanes provided on those facilities, and the required number of lanes on each facility to restore capacity to the LOS guidelines established by each jurisdiction for 20-year forecasts. The lane requirements necessary to meet the LOS guidelines established by each jurisdiction for each facility (existing and proposed) are shown for this scenario in Figure 14.

The critical new and extended roadways shown in the Town Plan which would provide good east/west routes and the corresponding relief to pressures on U.S. 26 include the following:

- The extension of Meeker Street to Ruben Lane.
- The extension of Bell Street to 362nd Avenue.
- The extension of Olson Street or Agness Street to 362nd Avenue.
- The extension of Industrial Way, east to Ruben Lane and west to Jarl Road.
- The completion of Dubarko Road from 362nd Avenue to Vista Loop Drive.
- The extension of Sandy Heights Street to Gary Street.
- The enhancement of the Pleasant-to-Beers-to-Hood-to-Bluff connection.
- The reclassification of both Strawbridge Parkway and Gary Street.

New and/or improved north/south connections were equally critical to the Town Plan transportation network. These facilities (listed below) take full advantage of the existing U.S. 26 exit/entrance/crossing opportunities and enhance the possibility of traveling within and between areas of Sandy without using the U.S. 26 corridor.

- The extension of 362nd Avenue north to Kelso Road.
- The extension of Ruben Lane to the Meeker Street extension.
- The extension of Meeker Street to Bell Street.
- The extension of Ruben Lane to Industrial Way and Dubarko Road.
- The extension of Bluff Road to Highway 211.

**Table 16**  
**Alternative 4: "Town Plan" Roadway Network**  
**Level of Service Lane Requirements for Year 2015**

Facility	Existing Lanes	Future LOS with Existing Lanes	Number of Lanes Required for Level of Service		
			C	D	E
U.S. 26:					
West of 362nd Drive	5	F	6*	6*	6*
362nd Drive - Bluff Road	5	C	5	5	NA
Couplet (each direction)	2	E	3	2	2
Ten Eyck Road - Dubarko Road	4/5	F	6*	5	5
East of Dubarko Road	4/5	F	7*	6*	6*
Highway 211	2	B	2	2	2
362nd Drive:					
North of U.S. 26	NA	NA	2	2	2
South of U.S. 26	2	B	2	2	2
Industrial Way	2	A	2	2	2
Bluff Rd.:					
North of U.S. 26	2	B	2	2	2
South of U.S. 26	2	B	2	2	2
Ten Eyck Road	2	A	2	2	2
Wolf Drive	2	A	2	2	2
Langensand Road	2	A	2	2	2
Dubarko Rd.:					
362nd Drive - Bluff Road	NA	NA	3	2	2
Bluff Road - Highway 211	NA	NA	3	3	2
East of Highway 211	NA	NA	3	2	2

\* A six-lane cross section would require the construction of a median barrier with breaks provided at signalized intersections only. Significant design and operational constraints exist with a seven-lane cross section which would, therefore, limit the likelihood of this being built.

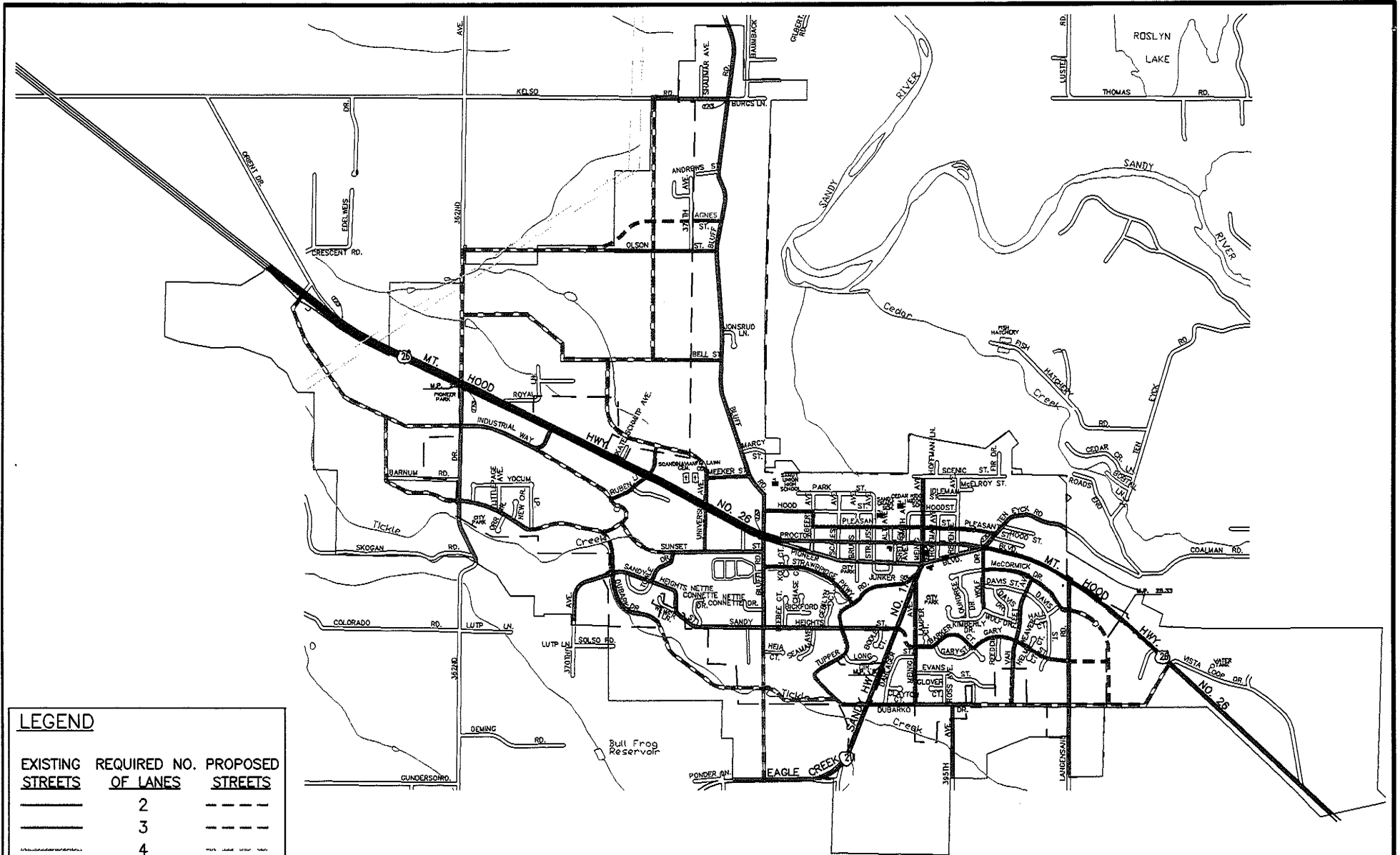
Note: In addition to the roadways shown above, all other proposed new arterial and collector streets in the Town Plan will require a two-lane section (i.e. one travel lane in each direction), to maintain the City's LOS "D" standards.

- The extension of VanFleet Avenue to Dubarko Road.
- The connection of Dubarko Road to Industrial Way and Jarl Road.

It should be recognized that significant environmental, topographical and right-of-way constraints may make some of these new and extended roadways impractical.

The result of implementing the Town Plan roadway network would be that U.S. 26 would require widening to six lanes west of 362nd Avenue, remain as a five-lane cross section between 362nd Avenue and Bluff Road, require three lanes in each direction through the couplet, require six lanes between Ten Eyck Road and Dubarko Road, and require seven lanes east of Dubarko Road to comply with the State's LOS guideline for this facility. Highway 211 would not require widening for capacity purposes. The U.S. 26/Langensand Road intersection (the only existing unsignalized arterial/collector street intersection with U.S. 26) would meet daily volume warrants for signalization, based on future volumes.

**Figure 14**  
**Alternative 4: "Town Plan" Roadway Network**



**LEGEND**

EXISTING STREETS	REQUIRED NO. OF LANES	PROPOSED STREETS
————	2	-----
————	3	-----
-----	4	-----
————	5	-----
————	6	-----
————	7	-----
————	8	-----
-----		-----
-----		-----

----- CITY LIMITS  
 ----- URBAN GROWTH BOUNDARY

NOTES: SOME EXISTING STREETS WHICH WOULD BE RECLASSIFIED MAY REQUIRE RECONSTRUCTION TO BRING TO STANDARD.  
  
 THE REQUIRED LANES ARE BASED ON A PLANNING LOS "C" FOR U.S. 26, LOS "D" FOR HIGHWAY 211 AND LOS "D" FOR CITY STREETS.

**ALTERNATIVE 4:  
"TOWN PLAN" ROADWAY NETWORK**

CITY OF SANDY  
 TRANSPORTATION SYSTEM PLAN  
 DECEMBER 1995

FIGURE

14



Figure 14 (back)

No existing city arterial/collector streets would require widening. The section of Dubarko Road between Bluff Road and Highway 211 would require a three-lane cross section. All new or extended arterial/collector streets could be constructed to a two-lane cross section.

The spacing of future Town Plan arterial/collector intersections with U.S. 26 would comply with current ODOT spacing standards for this facility. The Town Plan proposes no new connections to U.S. 26. However, several existing intersections would be expanded to include a fourth leg (362nd Avenue, Ruben Lane, and Dubarko Road/Vista Loop Drive). Other existing street connections with U.S. 26 which are currently classified as Local would be upgraded to Collector (Jarl Road and University Avenue). Although the Town Plan roadway network does not eliminate the likelihood of roadway expansion on U.S. 26, it does limit the necessary expansion and in every other way meets the fatal flaw analysis. Finally, it is evident that the expansion necessary on U.S. 26 under the Town Plan can be attributed to the growth in through traffic as well as local traffic.

### **SPECIFIC "DOWNTOWN" ALTERNATIVES**

The City of Sandy developed three alternative design scenarios for the downtown couplet area bounded by Pleasant Street on the north, Pioneer Boulevard on the south, Bluff Road on the west, and Ten Eyck Road on the east as a part of planning work being done concurrent to this project. These alternatives provided the refinement necessary to the roadway system alternatives to satisfy specific study goals and objectives for the downtown Sandy area. The recommended downtown alternative will become an important element of the overall recommended roadway system plan. The specific downtown alternatives are described below.

#### **Alternative A:**

Maintain the downtown one-way couplet configuration by providing two travel lanes and one bike lane on Proctor and Pioneer. Continue to provide parking on both sides of these streets. Maintain all other downtown streets as two-way streets with one lane in each direction and parking on both sides. Construct and/or reconstruct all sidewalks in the commercial area to eight feet in width and provide street trees spaced approximately every 30 feet on both sides of the street. Finally, provide traffic signals on Proctor and Pioneer at the following intersections:

- Bluff Road
- Scales Avenue (new signals)
- Bruns Avenue (new signals)
- Strauss Avenue (new signals)
- Shelley - Alt Avenues (new signals)
- Smith Avenue (new signal at Proctor only)
- Meinig Avenue
- Revenue Avenue (new signals)
- Ten Eyck Road



All signalized intersections within the couplet would be provided with pedestrian amenities to include crosswalks, curb extensions, and special surface treatments (e.g. scored concrete, pavers) to emphasize the pedestrian-orientation of the downtown area.

**Alternative B:**

This alternative differs from Alternative A by providing three travel lanes on both Proctor and Pioneer through removal of one parking lane from both facilities. All other features of these two alternatives remain the same.

**Alternative C:**

This alternative would replace Proctor Boulevard with Pleasant Street as the westbound portion of the one-way couplet with Pioneer Boulevard. Proctor would be converted to a two-way street with a standard five-lane cross section and no parking. Pioneer and Pleasant would each provide two travel lanes, bike lanes, and parking on both sides. All sidewalks in the commercial areas would be constructed to eight feet in width and provide street trees spaced approximately every 30 feet on both sides of the street, with the exception of Proctor. No street trees would be provided on Proctor and sidewalks may be less than eight feet in width. Finally, provide traffic signals on Pleasant, Proctor, and Pioneer at the following intersections:

- Scales Avenue
- Strauss Avenue
- Shelley - Alt Avenue
- Meinig Avenue

The signalized intersections on Pioneer and Pleasant would have crosswalks, curb extensions, and special surface treatments (e.g. scored concrete, pavers) to emphasize their pedestrian orientation. Proctor would have crosswalks and special treatments, excluding curb extensions.

**Evaluation of Downtown Alternatives**

A preliminary evaluation was made of the likely traffic and transportation related impacts associated with each of these scenarios. This evaluation considered impacts to pedestrians, bicyclists, parking, traffic flow/capacity, the commercial environment, signalization costs, and expected impacts to surrounding streets and neighborhoods.

**Alternative A:**

This alternative would require the installation of 11 new signals at the locations described above, at an estimated cost of \$1.3 million. There would then be a total of eight signals on Proctor Boulevard and seven signals on Pioneer Boulevard within the couplet; resulting in an average signal spacing of approximately 500 feet, or ten signals per mile. The OHP access guideline for this facility is two signals per mile.

Two travel lanes in each direction are proposed for the couplet streets. The traffic analysis performed using projected 2015 traffic volumes indicated that two lanes could provide sufficient capacity (at LOS D) for the anticipated volumes; assuming that Dubarko Road and the other critical arterial and collector streets shown in the Town Plan were constructed. The only proviso is in regard to the OHP policy requiring LOS C or better for U.S. 26 in the 20-year planning horizon. A waiver of this policy or the redesignation of U.S. 26 to a Statewide LOI highway in a Special Transportation Area (see Table 12) would be required of the State to maintain a two-lane cross section on the couplet streets.

#### **Sub-Alternatives Developed and Considered**

Two sub-alternatives were developed and considered in light of the significant difference between the proposed signal spacings of Alternative A and the guidelines of ODOT for this facility. Each sub-alternative strived to reduce the number of proposed signals while maintaining reasonably spaced pedestrian crossing opportunities along the couplet. The only change each sub-alternative proposes is in the number and location of traffic signals within the couplet. These sub-alternatives are described below:

##### **Sub-Alternative A-1**

Traffic signals would be located at the following intersections with Proctor and Pioneer:

- Alt-Shelley Avenues
- Beers Avenue
- Bruns Avenue

The signal located at Alt-Shelley would provide a direct pedestrian crossing link from the schools north of the couplet to the downtown core. In order to provide every-other-block signal spacing to the west of Alt-Shelley, signals would then be located at Bruns and Beers Avenues. These new signals, in addition to the existing signal locations within the couplet, would result in a signal spacing of approximately 6.9 per mile, or one approximately every 750 feet. The cost of these new signals would be approximately \$720,000.

##### **Sub-Alternative A-2**

Traffic signals would be located at the following intersections with Proctor and Pioneer:

- Scales
- Strauss

These signal locations in addition to the existing signal locations within the couplet would result in a signal spacing of 5.6 per mile, or one approximately every 950 feet. The cost of these new signals would be approximately \$480,000. Fewer signals and protected pedestrian crossing opportunities would, therefore, be provided under this alternative. However, the block lengths in Sandy's downtown are such that pedestrians would have to walk no further than 400 feet to a protected crossing location, which is an acceptable distance by general urban standards.

The identified advantages of Sub-Alternative A-2 over Sub-Alternative A-1 included:

- better traffic signal spacing;
- lower cost of signals (capital, operations, and maintenance);
- better signal progression opportunities; and,
- fewer potential queuing problems.

The disadvantages identified included:

- fewer protected pedestrian crossing opportunities and
- less direct pedestrian crossing opportunity between schools and downtown core.

Either of the above alternatives could be implemented, depending on the weight given to the advantages and disadvantages of each.

#### **Alternative B:**

The signal implications of this alternative are the same as for Alternative A. However, the conversion of one parking lane on the couplet streets to a travel lane has significant impacts. Approximately 95 parking spaces would be removed from each couplet street and would require replacement in off-street lots to ensure downtown parking capacity is maintained. This would require approximately 1 to 1¼ city blocks being converted to surface parking.

The provision of three travel lanes would prevent curb extensions from being built on one side of the street; altering the "urban form" of the Town Plan and increasing the crossing distance for pedestrians by the additional travel lane width. This would increase pedestrian crossing time and therefore the signal green time allotted for pedestrians. The result would be a reduction in the available time for traffic on U.S. 26 to proceed and, therefore, a reduction in the available capacity on U.S. 26 through the couplet.

#### **Alternative C:**

The return of two-way traffic to Proctor Boulevard to carry the majority of through-traffic would likely create a major barrier through the center of the downtown area. Pedestrian crossing time for a five-lane section would be greater than twice that for the one-way couplet alternative (Alternative A). Should this street be built without street trees and with narrower sidewalks and no on-street parking, the businesses situated along it would likely orient their accesses away from Proctor Boulevard onto the side streets. The result could be an unattractive "main street" to local inhabitants as well as passersby who would not perceive Sandy as a pleasant place to stop. This alternative would require the installation of 10 new signals at a cost of approximately \$1.2 million; and require other improvements or modifications which would make it the costliest alternative.

Under Alternative C, Pioneer and Pleasant would operate as one-way streets from Bluff Road to Ten Eyck Road. This would not be necessary or advisable. One-way streets maximize capacity and traffic flow at the expense of accessibility and circulation options. By removing the through traffic from these streets to Proctor, these streets would have only local traffic.

Therefore, they should strive to maximize accessibility to the adjacent land uses they serve. This would better be accomplished by maintaining them as two-way streets.

The likely result of this alternative would be the severing of the downtown core into two one-block strips. The opportunity for a pedestrian-oriented and friendly downtown would be drastically curtailed under this alternative. Finally, the cost to implement the alternative would be the greatest of those considered.

#### **Additional Alternative:**

It was proposed that an alternative of one-way north-south streets in the downtown be considered. The advantages of this would be the reduction of turning conflicts at intersections on the couplet, particularly non-signalized intersections. However, the traffic volumes on these side streets both now and in the future are relatively low and capacity at the intersections of these streets is not a critical factor.

It was therefore recommended that this alternative not be carried forward for further consideration. The reduction in intersection conflicts would be off-set by the increased need for round-the-block circulation made necessary by this alternative; resulting in increased VMT and vehicle emissions.

#### **Summary**

It was recommended that Alternative A-1 be carried forward for inclusion as a part of the Transportation System Plan for the City of Sandy. Further, it was recommended that the City work with ODOT to obtain either the waiver or reclassification necessary to maintain the downtown couplet as a two-lane facility to a LOS D threshold for capacity in the 20-year planning horizon.

The selection of this scenario as a component of the Preferred Alternative will enable the downtown area to develop and redevelop as a pedestrian-oriented and friendly environment. These specific elements will promote the balance of service sought for all travel modes and assist in achieving the goal of reducing auto-oriented dependence and travel in this critical area of the City.

Concerns regarding the installation of signals within the couplet remain and include signal spacing, traffic progression, travel speeds, queue spill back, and vehicular capacity. The following comments are provided to address some of these concerns:

- Good traffic progression can be accomplished on a one-way couplet with signals spaced at approximately 500 feet. New technologies in driver information systems will likely facilitate greater efficiencies in use of the roadway network by providing drivers with information to move them through the system more effectively.
- The installation of traffic signals which provide protected pedestrian crossings usually has a negative impact on vehicular capacity. In the case of Sandy's downtown couplet, the capacity constraints are set at either end of the couplet at Ten Eyck Road and Bluff Road. The traffic volumes to/from these side streets are much greater than in the downtown couplet and would result in less green-time given to the highway traffic. The use of curb extensions at the existing and proposed downtown couplet

signalized intersections will reduce the crossing distance for the pedestrian and the impact of the crossing on the green-time given to the highway traffic.

- Travel speeds can be used as a determining factor in the development of signal timing plans to progress traffic through the couplet thereby minimizing the impact of the additional signals on the movement of through traffic.
- Signalizing intersections at spacings greater than 350 feet will likely ensure that queue spill back will not occur under horizon year conditions. Further, by the inclusion of an unsignalized intersection between each signalized intersection it is expected that safer and more efficient operations will occur at the unsignalized intersections. This is due to the inherent benefit of the one-way couplet system in limiting and isolating conflicting movements. This is likely to be true for pedestrian movements at these unsignalized intersections, as well.

## **EVALUATION OF ALTERNATIVES**

### **Evaluation Methodology**

The process of evaluating alternatives and selecting the Preferred Alternative involved reviewing the study goals and objectives and developing "measures of effectiveness" (MOE) which would provide a methodology for subjectively rating each alternative. This enabled the committees to evaluate the alternatives against a common set of standards, as opposed to simply comparing them against each other. This guaranteed a process which would not only identify the best alternative of those evaluated, but would also identify any particular short-comings which would need to be addressed in order to carry an alternative forward as the Preferred Alternative. This process also enhanced the public's understanding of the trade-offs necessary to develop a transportation system which serves the variety of needs within and beyond the community.

### **Measures of Effectiveness**

Discussions with both committees resulted in the development of a matrix (Appendix C, Table C-1) which listed the MOEs and provided a space to rate each alternative. Each committee member scored the alternatives against the MOEs and Table C-1 shows the summary of those scores. More than one alternative could satisfy a MOE and, therefore, the sum of scores across any particular pair of rows will not necessarily match.

Each roadway network alternative was evaluated with the proposed Pedestrian, Bicycle, and Transit Plans as a backdrop. The objective was to identify the roadway system alternative or group of alternatives which best satisfied the study goals and objectives. The grading system shown below was used for each alternative:

- Satisfaction of a MOE by an alternative would be worth one point.
- An alternative which did not satisfy a MOE would receive no points.

### **Selection of a Preferred Alternative**

Twelve Citizens Advisory Group committee members participated in evaluating the alternatives. The raw scores were then tallied at the completion of the evaluation and a comparison of the totals was made. Alternative 4 - "Town Plan" scored the highest number of points by a wide margin (333 versus 203 for Alternative 2 - "By-Pass", the next highest alternative). Had a clear differentiation not been obtained through this process, a more refined grading system would have been incorporated to assist with the identification of the preferred alternative. Alternative 4, with the inclusion of the Specific Downtown Alternative A-1, was selected as the preferred alternative with the addition of a by-pass being included as a long-term (**beyond 20 years**) roadway network alternative which must continue to be considered. No other deficiency was identified in Alternative 4.

The Management Team committee gave approval of the Preferred Alternative after its selection by the Citizen Advisory Committee.

### **SUMMARY**

The City of Sandy is expected to experience a significant rate of growth in population and employment over the next 20 years. The existing transportation system will likely be unable to accommodate the growth in demand. Specific plans were developed which addressed the modal demands assumed as a result of the implementation of the proposed Town Plan comprehensive plan. These modal plans were used as a backdrop for the development of roadway alternatives to accommodate the future auto demand.

Measures of effectiveness were developed in relation to the study goals and objectives and used to identify the alternative which best fit the future plans of the community. The committees overseeing this project evaluated the four roadway alternatives against the measures of effectiveness and selected Alternative 4 - Town Plan, with Subalternative A-1, as the Preferred Alternative. This alternative was modified to include a recommendation that an U.S. 26 by-pass of the Sandy urban area be considered for further study beyond the 20-year horizon.

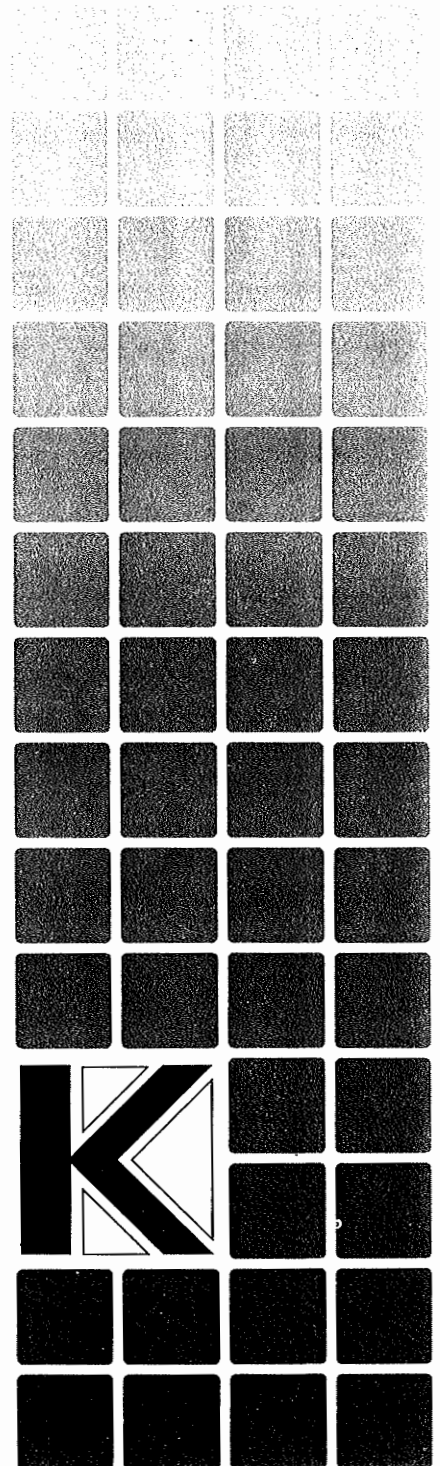
The fatal flaw analysis performed on the Preferred Alternative roadway network indicated that the network would provide adequately spaced arterial/collector street intersections in compliance with current ODOT spacing standards for signalized intersections. In addition, the existing unsignalized U.S. 26/Langensand Road intersection would meet daily volume warrants for signalization, under future conditions. Finally, the network of proposed streets would provide an adequate grid system of classified streets, with good interconnection to the proposed Pedestrian, Bicycle, and Transit Plan elements.



**Section 5**

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Draft Transportation System Plan





# Draft Transportation System Plan

## INTRODUCTION

This section describes the individual elements which comprise the Draft Transportation System Plan for the City of Sandy. Projects associated with each plan element have been identified, costed at a planning level, timed for the date of implementation, and prioritized within the 10-year time frame. Specific recommendations are also provided for street design standards and access standards. This information is presented in the following manner:

- **Draft Transportation System Plan Elements**
  - Pedestrian Plan
  - Bicycle Plan
  - Transit Plan
  - Street Plan
  - Air/Rail/Water/Pipeline Plan
- **Access Management Plan**
  - U.S. 26 Classification
  - Access Management Recommendations
- **Implementation Plan**

## DESCRIPTION OF PREFERRED ALTERNATIVE

The preferred alternative, referred to as the Town Plan alternative, is comprised generally of transportation improvements necessary to support the *proposed* Comprehensive Land Use Plan. There are a number of elements to this plan including pedestrian, bicycle, transit, and roadway facilities as well as a rail/water/pipeline element. In this section, new and improved facilities required for each of the plan elements are described in detail together with planning level cost estimates.

### Pedestrian Plan

Sidewalk improvements were identified as part of the future transportation network for Sandy to ensure a balanced transportation system that offers as many alternatives for trip making as possible. Providing safe and convenient foot travel is an essential part of creating a vibrant neighborhood, commercial area and/or downtown district; particularly for children and the elderly. Figure 15 presents the recommended pedestrian plan element of the transportation network for Sandy.

Specific to the plan are recommendations for a continuous sidewalk system in good repair which will connect all existing and proposed future pedestrian and transit traffic generators; with emphasis given to the pedestrian/transit interface. Pedestrian and transit traffic generators are also shown in Figure 15 and include all schools, parks, civic centers, and most shopping areas. Also, a critical part of the pedestrian plan is the support it provides the proposed

Downtown Plan (discussed later); which strives to create a pedestrian friendly civic and commercial area in the historic downtown blocks of the City.

Existing sidewalks will be upgraded on Pioneer and Proctor Boulevards and the inter-connecting north/south streets in the downtown area. A network of new sidewalks is proposed for Park Street and Hood Street to the north of the couplet, and for the north/south connecting streets. This system will be supportive of travel to the schools located in this area, as well as between civic, commercial, and retail activities located in the downtown area.

A continuous system of sidewalks is proposed along U.S. 26 and Highway 211 within the Sandy UGB to ensure safety for pedestrians and be supportive of pedestrian/transit links. These sidewalks would be a minimum of six feet in width, in compliance with ODOT design standards.

The current Design Standards for the City of Sandy require sidewalks to be provided along all local, collector, and arterial streets. All proposed future arterial and collector streets will be built with minimum five foot wide sidewalks. The pedestrian plan shown in Figure 15 will include the upgrading of all existing collectors and arterials to include sidewalks where they are presently missing, substandard, or in disrepair.

Planning level cost estimates (shown in Table 17 and Table 18) have been prepared for projects needed to:

- Provide sidewalks where they do not currently exist on streets that will be part of the future arterial/collector network.
- Provide continuous sidewalks on downtown streets.
- Construct new sidewalks to replace those which are in disrepair and/or widen existing sidewalks which are of insufficient width.

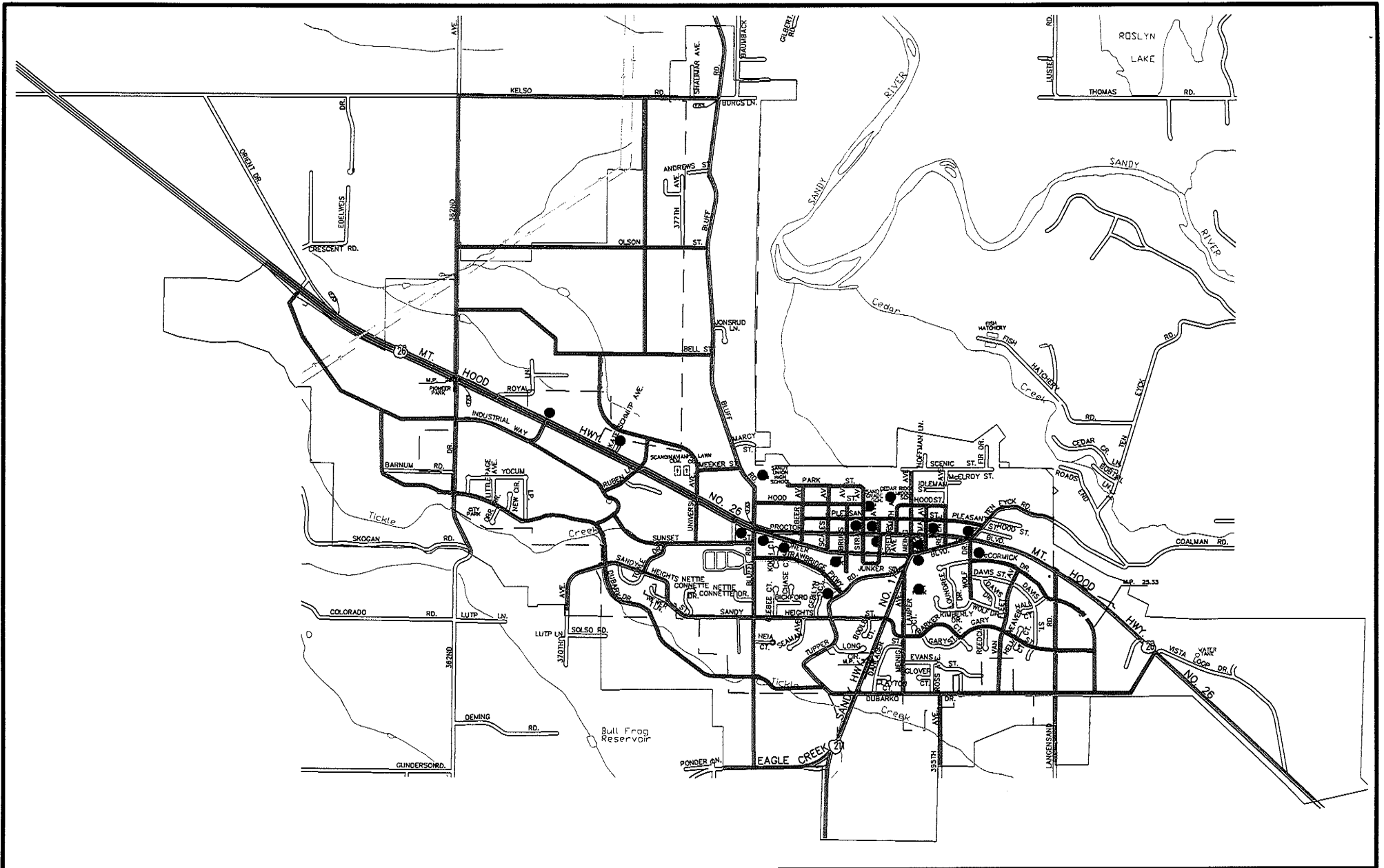
The provision of sidewalks on new streets is included in the cost estimates of the new roadway. The total cost of pedestrian plan projects is estimated at \$ 2,367,000 (\$2,283,000 for new sidewalks and \$84,000 for widening/upgrading existing sidewalks).

### **Bicycle Plan**

Figure 16 presents the recommended bicycle plan for the City of Sandy. The figure includes State, County, and City designated facilities through the urban area and differentiates between off-street facilities (e.g. bike trails) and on-street facilities; including bike lanes and designated bike routes. The proposed bicycle plan has been developed in coordination with City staff to closely support the Town Plan. The system of bicycle facilities has been designed to connect all major generators of bicycle traffic with residential neighborhoods. These generators include schools, parks, civic centers, and commercial activities.

The majority of proposed future arterial and collector streets are planned for inclusion in the Bicycle Plan, with 5-foot wide on street bicycle lanes to be provided on City streets and 6-foot wide facilities on State highways. Unlike pedestrian facilities, bicycle facilities are not being recommended as required amenities on all arterial/collector streets. Instead, where local streets which provide good parallel facilities and carry less vehicular traffic are available, they have been identified as the preferred bicycle route. Such flexibility enables the best and safest routes to be provided without unnecessary redundancy. Where traffic volumes on collector streets are

**Figure 15**  
**Recommended Pedestrian Plan**



**LEGEND**

— PEDESTRIAN FACILITY

● - PEDESTRIAN GENERATOR

**RECOMMENDED PEDESTRIAN PLAN**

CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
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FIGURE  
**15**

Figure 14 (back)

15

**Table 17**  
**Pedestrian Improvement Projects - New Sidewalks**

Roadway	Sidewalk Width	Project Length	Estimated Cost
<b>NEW SIDEWALKS</b>			
U.S. 26	6	33,200	\$664,000
Highway 211	6	7,800	\$156,000
362nd Drive	5	6,000	\$120,000
Bluff Road (N)	5	17,400	\$348,000
Bluff Road (S)	5	900	\$18,000
Ten Eyck Road	5	3,400	\$68,000
Hood Street	5	6,400	\$130,000
Park Street	8	2,800	\$56,000
Pleasant Street	5	3,900	\$78,000
Beers Avenue	5	1,000	\$20,000
Industrial Way	5	3,400	\$68,000
370th Avenue	5	2,000	\$40,000
Sandy Heights Street	5	5,300	\$106,000
Meinig Avenue	5	1,100	\$22,000
Tupper Road	5	5,200	\$104,000
Dubarko Road	5	2,800	\$56,000
Wolf Drive	5	200	\$4,000
<b>DOWNTOWN STREETS</b>			
Beers Avenue	8	1,300	\$42,000
Scales Avenue	8	1,700	\$54,000
Bruns Avenue	8	900	\$27,000
Strauss Avenue	8	1,200	\$38,000
Alt Avenue	8	200	\$6,000
Smith Avenue	8	600	\$19,000
Hoffman Avenue	8	800	\$26,000
Revenue Avenue	8	400	\$13,000
<b>TOTAL</b>			<b>\$2,283,000</b>

**Table 18**  
**Pedestrian Improvement Projects -**  
**Sidewalk Widening/Upgrading**

Roadway	Sidewalk Width	Project Length	Estimated Cost
Bluff Road (S)	5	2,300	\$18,000
Ten Eyck Road	5	200	\$2,000
Proctor Boulevard (U.S. 26)	8	1,000	\$32,000
Pioneer Boulevard (U.S. 26)	8	1,000	\$32,000
<b>TOTAL</b>			<b>\$84,000</b>

low (generally below 3,000 vehicles per day) separate striped facilities have not been recommended; therefore, the bicycles will share the vehicle travel lane.

The methodology undertaken in bicycle planning for Sandy was to develop designated bicycle routes which enable safe and efficient travel along corridors between logically determined origins and destinations. This included a desire to provide travel routes parallel to U.S. 26 but on less heavily traveled roads. The primary routes of the bicycle plan are shown in Table 19. A signed, striped, and/or symbolized on-street bicycle lane was recommended for a designated bicycle route if the subject street was:

- an arterial street,
- a street providing a parallel bicycle route to U.S. 26 or Highway 211,
- a collector/arterial street with an anticipated volume of over 3,000 cars per day, or
- a key connection between a residential neighborhood and a bicycle generator.

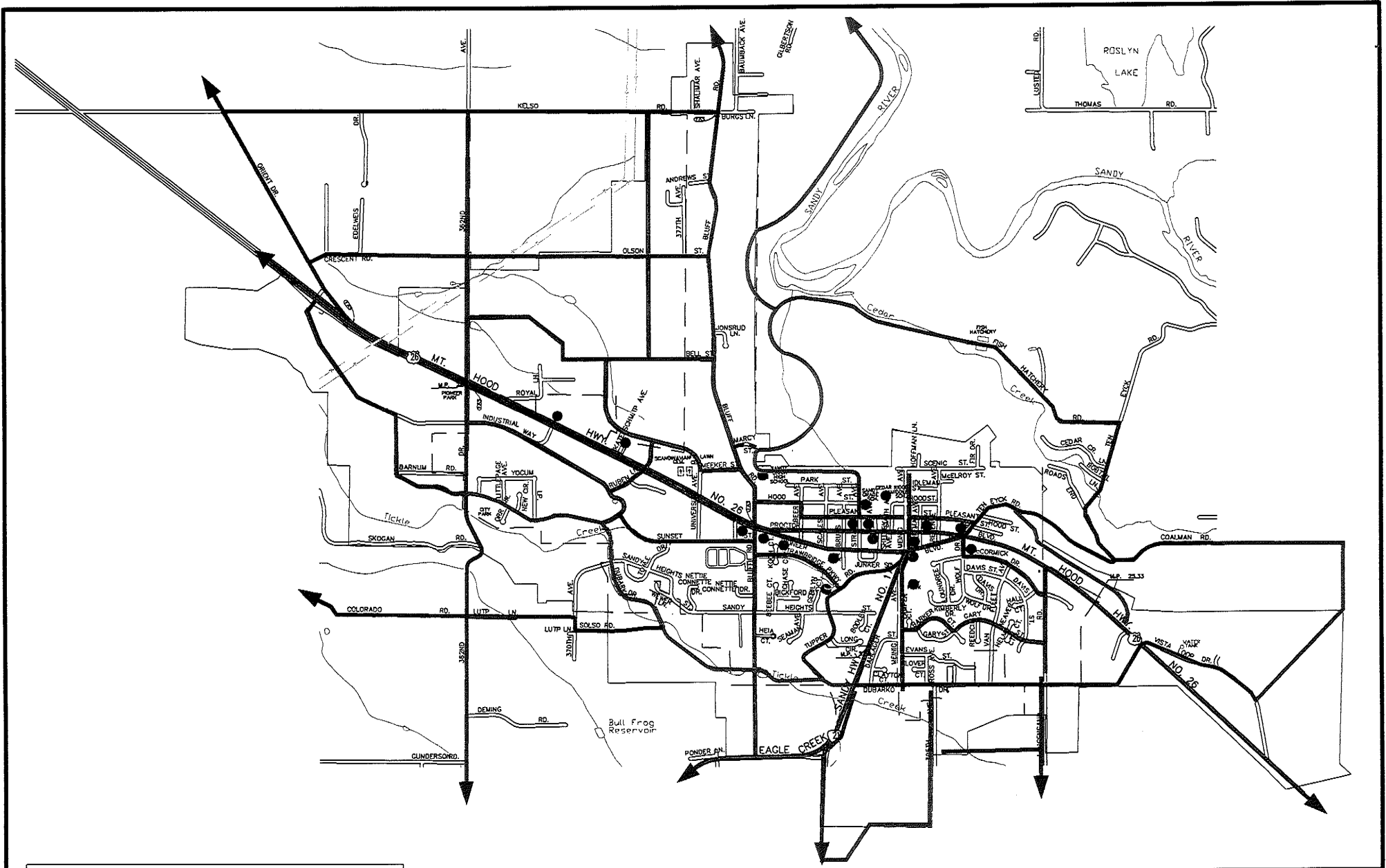
Figure 16 also shows a recreational bicycle trail following along the UGB to the east and north of Sandy; providing connection to the Sandy River gorge and other State and County bicycle routes. Planning level cost estimates have been prepared for both the widening of existing streets to provide striped bicycle lanes as a part of the bicycle network and for the construction of entirely new off-street bicycle trails within Sandy's UGB.

Bicycle travel route connectivity within the community as well as to neighboring communities support alternative travel need for employees. One critical route for connection to the Portland/Metro area is the linkage from Dubarko Road to Colorado Road then through a series of connections in south Boring to the Springwater Trail. A second is a link to Estacada from Dubarko Road via Bornsted Road and Wildcat Mountain Road.





The cost estimates for bicycle facilities on new roadways have been included in the roadway construction cost estimates. The cost estimates for upgrading existing roads to include bicycle lanes have been prepared for each "route" or series of routes and are described in Table 19. In addition to the street upgrading projects, the costs of construction for new bicycle trails which fall within the City's UGB are detailed in Table 20. The total estimated cost of implementation of the Bicycle Plan is \$ 1,586,000 (\$1,121,000 for route upgrading and \$465,000 for trails).

**Figure 16**  
**Recommended Bicycle Plan**






**LEGEND**

-  - ON-STREET FACILITY
-  - OFF-STREET FACILITY
-  - COMBINATION ON-STREET AND OFF-STREET FACILITY
-  - BICYCLE GENERATOR

NOTE: BICYCLE FACILITIES ARE SHOWN CLASSIFIED AS EITHER OFF-STREET OR ON-STREET FACILITIES.

**RECOMMENDED BICYCLE PLAN**

CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
DECEMBER 1995

FIGURE	
16	

1359BIK2

Figure 16 (back)

**Table 19**  
**Bicycle Route Improvement Projects -**  
**Bicycle Route Roadway Upgrading Costs**

Route	Road to Upgrade	Length	Estimated Cost
Parallel to U.S. 26 - north side	Pleasant	3,100	\$248,000
	Ten Eyck	1,200	\$96,000
North/south routes	362nd Drive (south of U.S. 26)	2,300	\$184,000
	Langensand	3,400	\$272,000
East/west routes	Industrial	1,400	\$67,000
	Strawbridge Parkway	1,700	\$54,000
Key neighborhood connectors	Tupper	2,500	\$200,000
<b>TOTAL</b>		<b>15,600</b>	<b>\$1,121,000</b>

**Table 20**  
**Bicycle Improvement Projects -**  
**New Bicycle Trails**

Name	Approximate Length (feet)	Approximate Cost
High School Trail	2,000	\$96,000
395th Avenue	2,300	\$110,000
Vista Loop Trail	2,400	\$115,000
Ten Eyck Trail	3,000	\$144,000
<b>TOTAL</b>	<b>9,700</b>	<b>\$465,000</b>

**Transit Plan**

Future public transportation (transit) improvements were identified as part of the Sandy Transportation System Plan for commuter, local, and long-distance service over the next twenty years.

The *Oregon Transportation Plan (Multi-modal System Element)*, adopted by the Oregon Transportation Commission (September 15, 1992), identifies statewide policy and a long-range plan for a coordinated transportation system. The plan is intended to meet requirements set forth by the Land Conservation and Development Commission (LCDC) in the Transportation Planning Rule (Goal 12) and the federal Intermodal Surface Transportation Efficiency Act (ISTEA). This policy plan includes a network of facilities and service for air, rail, highways, public transit, pipeline, marine transport, bikeways, pedestrian, and other modes to be developed over the next 20 years. Transit goals and strategies in the State plan which are specific to the City of Sandy and/or local transit service include the following:

- Urban areas of 2,500 population or more within 20 miles of a major metropolitan area central city should have at least peak hour transit service to the metropolitan area (includes Sandy which already has peak hour commuter service connection to the Portland area provided by Tri-Met).

- Local public transit services and elderly and disadvantaged service providers should connect to intercity passenger terminals.

#### **Commuter Transit**

The City has applied for a change in the existing Tri-Met peak-hour-only bus schedule (Routes 84 and 84X) to add midday service (or shift some of the peak hour service to midday service), in response to requests from local residents. As Sandy's population grows and the Town Plan development takes place, increased transit use per capita is expected over time and expanded commuter service may be required.

No changes are planned in existing Park and Ride lots or transit stops apart from the possible location of a transit stop at the intersection of Orient Drive/U.S. 26.

Discussions with Tri-Met staff revealed that the 2015 Transit Plan for Portland (part of the Interim Federal Regional Transportation Plan) shows no changes to the existing 84 and 84X routes. However, Tri-Met policy is to expand the hours of service provided to Sandy residents to cover midday, evening, and weekend service. This expansion of service will take place as funding becomes available.

It is recommended that service between Sandy and Gresham be expanded into midday, evening, and weekend service and that the City work with Tri-Met to ensure the timely implementation of this expansion as soon as resources allow. Also, the addition of transit stops at U.S. 26/Orient Drive (associated with a potential future park and ride lot) and U.S. 26/Industrial Way (associated with the shopping center) is recommended. Peak hour service should be reviewed periodically to ensure that, as ridership increases in the future, level of service provided to peak hour commuters be improved by means of shorter travel times.

In addition to the service connecting Sandy to the Gresham Transit Center, the development of the Sunrise Corridor (along Highway 212/224 corridors) over the next twenty years will quite likely give rise to a demand for direct transit service between Sandy and the Clackamas Town Center area via the Sunrise Corridor, Highway 212/224, and/or Sunnyside Road. This connection will provide an alternative route to downtown Portland via the proposed South\North light rail transit project. It is recommended that the City begin formulating plans for this additional service to ensure Tri-Met's cooperation as early as possible.

#### **Local Transit**

##### ***Para-Transit***

The para-transit services offered in Sandy are coordinated to some extent by Tri-Met and Volunteer Transportation, Inc., who also assist the individual programs with funding applications. It is recommended that this coordination effort be continued and that a clear information dissemination effort be made by the City and Tri-Met to ensure that all potential users of the programs are aware of their options and to avoid unnecessary redundancy in the system.

It is recommended that the City work with Tri-Met and Volunteer Transportation, Inc., to evaluate the need for further service and develop a service plan for the future. It is anticipated that the City will be required to assist in program development that will include the purchase

of a wheelchair equipped van and the employment of a full-time driver. The cost of such a van is approximately \$25,000 with an annual operating cost of approximately \$30,000. The level of assistance available from various sources will determine the City's share of these costs.

#### **Fixed-Route Local Service**

The City has indicated a desire and a potential need for community feeder transit service in the future. It is acknowledged that the role of transit in a small urban area is primarily a policy issue and is not likely to be economically self sustaining. Tri-Met would likely not provide such a service as Sandy lies outside the Portland Metro Area UGB; however, opportunities may be developed through the Neighboring Cities concept to facilitate the provision of this service by Tri-Met. Should this prove infeasible, the provision of such a service would be up to the City.

A population of 15,000 (2015 Town Plan population) would generally be considered too small to justify a fixed-route transit system. However, the City of Woodburn currently operates a single route service for a population of approximately 15,000 and has plans to expand service in the future. The success of such a service hinges on the population density of the service area and economic and demographic characteristics of the market. Transit riders generally come from lower income residents and those under 16 and over 60 years of age. While under many circumstances a local transit service may not be considered for a community such as Sandy, in light of the urban densities and neo-traditional concepts addressed in the Town Plan, Sandy is a likely candidate for a study of the feasibility of local transit. Sandy's local service would act primarily as a feeder to the Tri-Met service connecting Sandy with the Gresham Transit Center. The link would enable Sandy residents to connect to downtown Portland via the MAX station in Gresham; which provides service every 15 minutes during peak hours.

The fixed-route transit system concept shown in Figure 17 shows two separate one-way routes; one serving the area north of U.S. 26 primarily via Bluff Road and the other serving the area south of U.S. 26 primarily via Dubarko Road. Each route has a length of approximately 6 miles and would be served every 30 minutes with a common service area (Transit Center) at a yet-to-be determined point; probably on U.S. 26 either at Meinig Road or Bluff Road. Assuming an average travel speed of 13 miles per hour, each route could be covered in approximately 26 minutes, enabling one bus to cover a route twice each hour. Two buses would therefore be required, with a third bus as a standby. Bus costs were assumed to be \$105,000 per vehicle with a five-year life.

Preliminary operating cost calculations indicated that annual operating costs including amortization would be approximately \$210,000. Assuming 20 percent of operating cost could be recovered at the farebox (a reasonable estimate), the residual cost to the City would be approximately \$170,000 per annum; or approximately \$11.00 per resident if the population was assumed to be 15,000. Funding for such transit programs is available from varied sources. Woodburn currently funds 90 percent of their program through local taxes, with ten percent provided through a state grant.

#### **Long Distance/Intercity/Recreational Transit**

The service provided by Greyhound is regarded as a benefit to the community and should be supported by the City.

As Sandy's population grows, the market for skier trips can be expected to grow, eventually reaching a level where it may support a bus service of its own. The benefits of providing such a service are numerous and include: reduced parking requirements; minimized icy-road accidents; and reduced air pollution in a sensitive environment.

This plan recommends the close coordination between the ski resorts and the City to ensure that future ski bus operations provide the most attractive service reasonably possible to residents; thereby minimizing the use of private vehicles for Mt. Hood ski trips.

## **STREET PLAN**

The street plan identifies those arterial and collector streets (existing and future) which will be required to safely and efficiently serve the vehicular capacity needs of the City of Sandy over the next 20 years. The recommended street plan is shown in Figure 18. This street system has been developed to utilize and enhance existing facilities wherever possible, promote the full development of the Town Plan land use concept, and strike a balance among all travel modes. Every reasonable effort to provide and promote parallel facilities to U.S. 26 were pursued in the development of this plan. New streets as well as improvements to existing roadways will be required to implement and accomplish this plan. The necessary improvements are described below and include planning level cost estimates for each project.

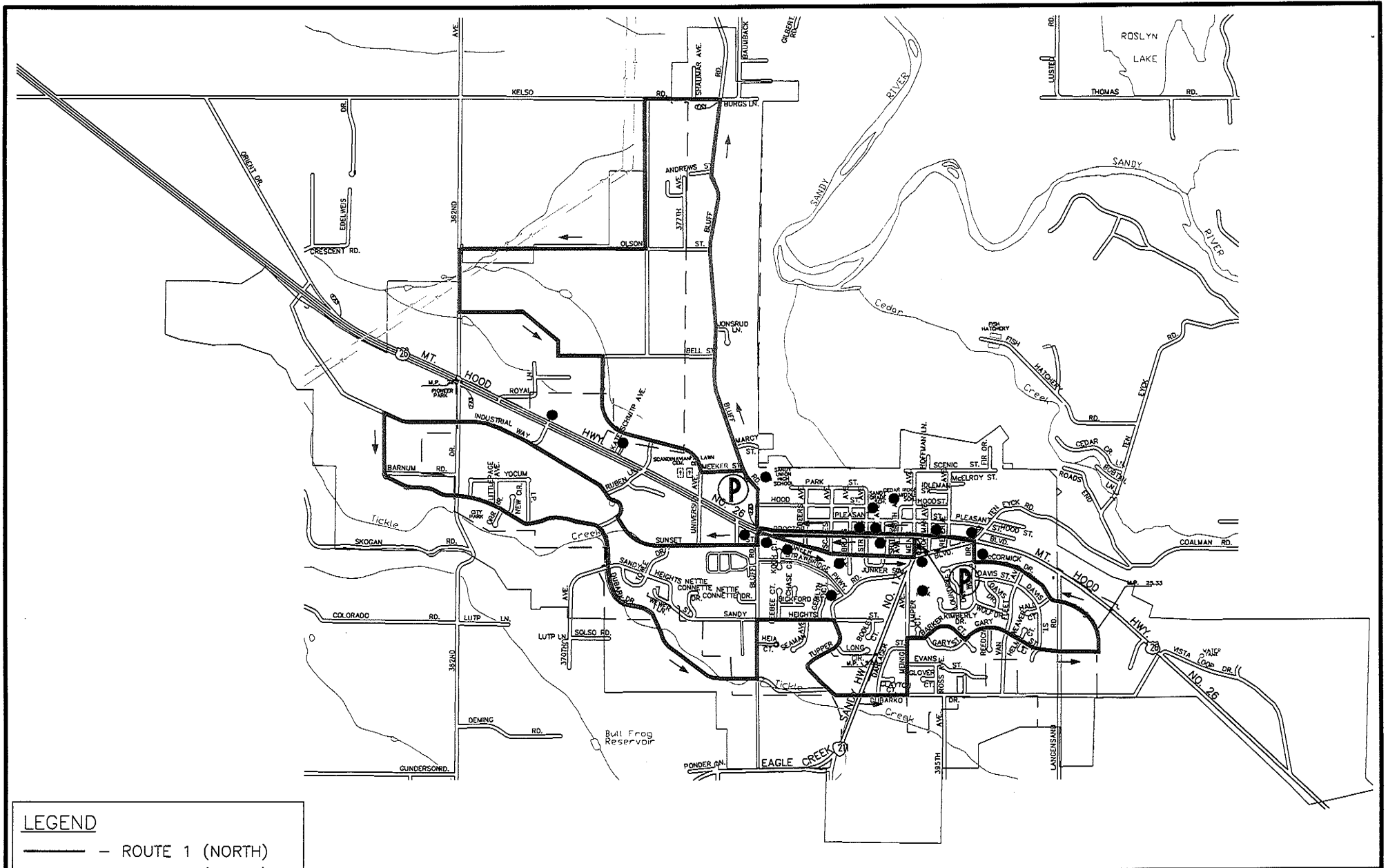
### **New Roadways:**

The following new roadway improvement projects are recommended to provide an effective transportation network to serve the Sandy 2015 Town Plan and include a planning level cost estimate for construction. Figure 19 shows the new roads to be built as part of the Sandy Town Plan. Table 21 summarizes these new roadway projects with estimated costs. *The actual feasibility and alignment of each new roadway must be determined by survey; therefore, the lines representing such roadways in Figure 19 are representational and should not be construed to convey the final alignment.*

### **Arterial Streets:**

1. Construct 362nd Avenue as a Minor Arterial north from U.S. 26 to connect with Kelso Road, a distance of approximately 4,800 feet. Construct to a three-lane cross section with five-foot bike lanes, seven-foot sidewalks, and five-foot planting strips on each side. Prohibit on-street parking. Purchase or reserve right-of-way for future reclassification and widening to a Major Arterial.
2. Construct Dubarko Road as a Minor Arterial street from 362nd Avenue eastwards to the west end of the U.S. 26/Vista Loop Drive intersection, with a two-lane cross section, providing turn pockets at intersections. Provide five-foot bike lanes, five-foot sidewalks, and seven-foot planter strips on both sides and parking on one side of the street. Right-of-Way should be reserved for an ultimate five-lane section with bike lanes, no on-street parking, and left-turn pockets at intersections. The length of new construction is approximately 9,000 feet.

**Figure 17**  
**Future Fixed-Route Transit Concept**



**LEGEND**

- ROUTE 1 (NORTH)
- ROUTE 2 (SOUTH)
- ACTIVITY CENTERS
- (P) PARK AND RIDE LOT
- CITY LIMITS
- URBAN GROWTH BOUNDARY

**FUTURE FIXED-ROUTE  
TRANSIT SYSTEM CONCEPT**

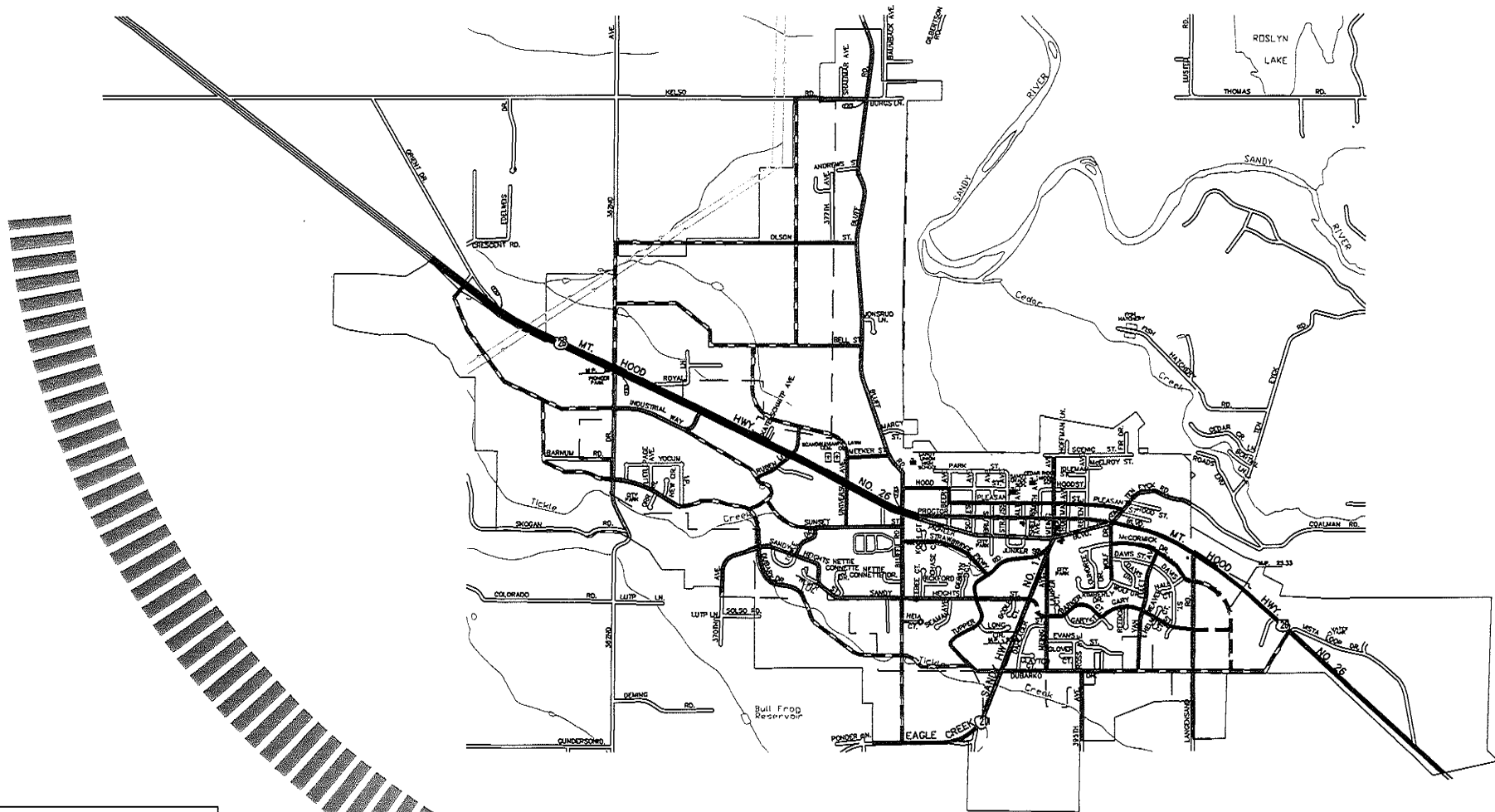
CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
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FIGURE	<b>17</b>	
NO. 26		



Figure 17 (back)

**Figure 18**  
**Future Roadway Projects**



**LEGEND**

EXISTING STREETS	REQUIRED NO. OF LANES	PROPOSED STREETS
	2	
	3	
	4	
	5	
	6	
	7	
	8	

- CITY LIMITS
- URBAN GROWTH BOUNDARY

NOTES: SOME EXISTING STREETS WHICH WOULD BE RECLASSIFIED MAY REQUIRE RECONSTRUCTION TO BRING TO STANDARD.

THE REQUIRED LANES ARE BASED ON A PLANNING LOS "C" FOR U.S. 26, LOS "D" FOR HIGHWAY 211 AND LOS "D" FOR CITY STREETS.

A U.S. 26 BYPASS CORRIDOR SHOULD BE IDENTIFIED OUTSIDE THE URBAN GROWTH BOUNDARY AND URBAN RESERVE AREAS OF SANDY FOR PRESERVATION AND FURTHER FEASIBILITY ANALYSIS.

**RECOMMENDED STREET PLAN**

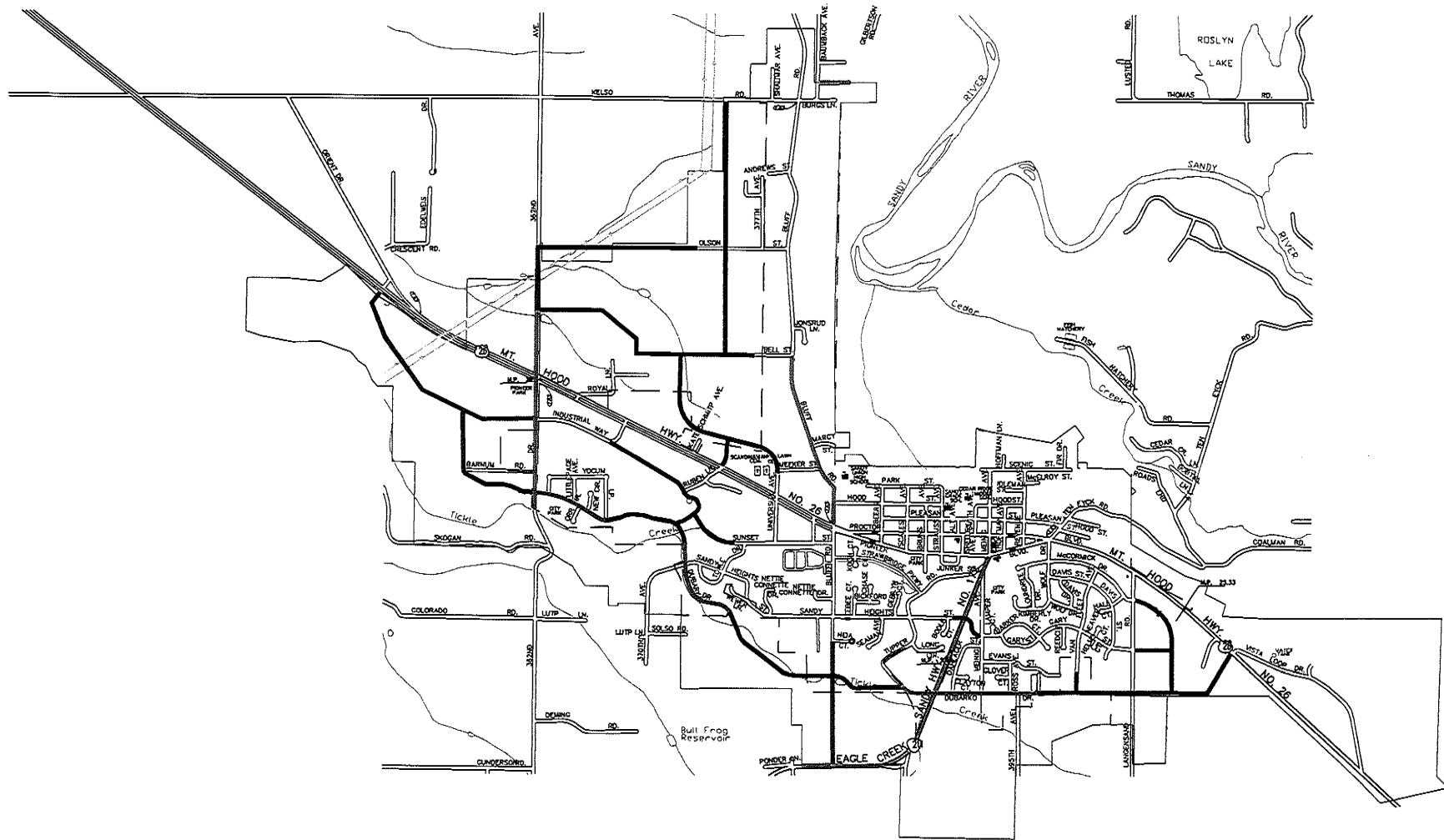
CITY OF SANDY  
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FIGURE  
 18







Figure 18 (back)

**Figure 19**  
**Future Roadway Projects**



LEGEND

-  NEW ROADWAYS
-  ROADWAY UPGRADING
-  CITY LIMITS
-  URBAN GROWTH BOUNDARY

FUTURE ROADWAY PROJECTS

CITY OF SANDY  
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FIGURE  
 19



Figure 19 (back)

**Table 21**  
**Roadway Improvement Projects -**  
**New Roadways**

Facility	R.O.W.	Travel Lanes	Median Lane	Bike Lanes	Sidewalk	Plant Strip	Parking	Estimated Cost
<b>ARTERIAL STREETS</b>								
362nd Avenue	72	2	1	Yes	5	7	None	\$2,030,000
Dubarko Road	80	2	1*	Yes	5	7	One	\$4,666,000
Bell Street	66	2	No	Yes	5	7	One	\$1,900,000
Bluff Road	66	2	No	Yes	5	7	One	\$887,000
<b>COLLECTOR STREETS</b>								
University Avenue	74	2	No	Yes	5	7	Both	\$1,390,000
Olson Street or Agness Street	74	2	No	Yes	5	7	Both	\$1,050,000
Bell Street-Kelso Road Connection	74	2	No	Yes	5	7	Both	\$1,900,000
Ruben Lane	80	2	No	Yes	5-8	7	Both	\$690,000
Van Fleet Avenue	64	2	No	No	5	7	Both	\$200,000
Industrial Way	74	2	No	Yes	5	7	Both	\$1,840,000
Sandy Heights Street	64	2	No	No	5	7	Both	\$800,000
McCormick Drive-Dubarko Road Connection	64	2	No	No	5	7	Both	\$535,000
Gary Street	74	2	No	Yes	5	7	Both	\$295,000
Dubarko Road Extension West	74	2	No	Yes	5	7	Both	\$970,000
Sunset Street	74	2	No	Yes	5	7	Both	\$505,000
<b>TOTAL</b>								<b>\$19,658,000</b>

\* Turn-lanes in landscaped median

3. Extend Bell Street as a Residential Minor Arterial west from Bluff Road to 362nd Avenue with a two-lane section, providing turn pockets at intersections. Provide five-foot bicycle lanes, seven-foot sidewalks, and five-foot planter strips on both sides and parking on one side. The length of new construction is approximately 4,500 feet.
4. Extend Bluff Road south as a Minor Arterial street to connect ultimately with Highway 211. Construct to a two-lane section providing turn pockets at intersections, with five-foot bicycle lanes, five-foot sidewalks, and seven-foot planter strips on both sides and parking on one side. This project will require approximately 2,200 feet of new construction (75 feet right-of-way) and 1,900 feet of street reconstruction.



### Collector Streets

1. Extend University Avenue north from Meeker Street to connect with Bell Street. Construct two travel lanes and provide five-foot bicycle lanes, five-foot sidewalks, five-foot planter strips, and parking on both sides. Seventy-five feet of right-of-way is required. Length of construction is approximately 3,300 feet.
2. Extend Olson Street or Agnes Street 2,500 feet west of its current terminus to connect with 362nd Avenue. Construct as a two-lane Collector with five-foot bicycle lanes, five-foot sidewalks, seven-foot planter strips, and parking on both sides; in a 70 foot right-of-way.
3. Construct a new north/south street parallel to and west of Bluff Road, connecting Bell Street to Kelso Road, a distance of approximately 4,500 feet. Construct with two travel lanes, five-foot bicycle lanes, five-foot sidewalks, seven-foot planter strips, and parking on both sides.
4. Extend Ruben Lane north of U.S. 26 to connect with Meeker Street and south to connect with Dubarko Road. Construct to a two-lane section with five-foot bicycle lanes, seven-foot planter strips, and parking both sides. Sidewalks on both sides should be constructed eight feet wide through commercial zones and four feet wide in residential zones. The length of construction is approximately 1,500 feet.
5. Extend Van Fleet Avenue south from its current terminus to connect with Dubarko Road, approximately 600 feet. Construct as a two-lane road with five-foot sidewalks, seven-foot planter strips, and parking both sides; but no bicycle lanes. Right-of-way requirement is 60 feet.
6. Extend Industrial Way west from 362nd Avenue to connect with Jarl Road and east to connect with Ruben Lane and Sunset Street. Construct two travel lanes initially (with a center left-turn lane in the future), with five-foot bicycle lanes, five-foot sidewalks, seven-foot planter strips, and parking on both sides. The length of new construction is approximately 5,500 feet.
7. Extend Sandy Heights Street east to Gary Street, via an over crossing of Highway 211. Construct two-lane cross section with parking, seven-foot planter strips, and five-foot sidewalks on both sides. The length of new construction is approximately 650 feet (500 feet in new roadway and a 150 foot bridge span); but, the crossing of Highway 211 will require a major bridge structure.
8. Construct a new north/south street to connect the east end of McCormick Drive southwards to Dubarko Road at a point east of Langensand Road. The length of new construction is approximately 1,600 feet. Construct two travel lanes with parking both sides, five-foot sidewalks, and seven-foot planting strips.
9. Extend Gary Street east from Langensand Road to connect with the north/south extension of McCormick described above. Construct two travel lanes with five-foot bicycle lanes, five-foot sidewalks, seven-foot planter strips, and parking both sides. The length of the new street is approximately 700 feet.
10. Construct "Dubarko Extension west", a new street west of 362nd Avenue from the Dubarko intersection running west then north to intersect with the westerly extension of Industrial Way. This street should have a two-lane section with five-foot bicycle lanes, five-foot sidewalks, seven-foot planter strips, and parking on both sides. The length of construction is approximately 2,300 feet.

11. Extend Sunset Street west from its current terminus to join with the extension of Industrial Way and Ruben Lane. Construct to a two-lane section with parking, five-foot bike lanes, seven-foot planter strips, and five-foot sidewalks on both sides. The length of construction is approximately 1,100 feet.

The total cost for new roadway construction projects is estimated at \$19,658,000.

**Improvements to Existing Roadways**

The following improvements to existing facilities (all classified as arterials) are recommended for capacity, consistency, and/or safety reasons. The costs associated with these improvements are exclusive of any pedestrian or bicycle improvements to these facilities.

1. Upgrade Highway 211 to Major Arterial standard, including the provision of a three-lane section with six-foot bicycle lanes, a design speed of 40 mph, and no on-street parking. The length of this project is approximately 12,000 feet.
2. Upgrade 362nd Avenue to Minor Arterial standard between U.S. 26 and Dubarko road, a distance of approximately 2,000 feet. The cross-section will include a 14 foot wide center left-turn lane as well as on-street bicycle lanes. No on-street parking will be provided.
3. Improve the existing sections of Dubarko Road to provide curb and sidewalk and sufficient width for Minor Arterial street standard. The south side of the street needs improvement east of Highway 211. The cross section will include two travel lanes, a center left-turn lane at intersections, bike lanes in places (where the bicycle route follows an on-street route) and parking on one side of the street.
4. Construct Bluff Road to Minor Arterial standard north of U.S. 26 with a three-lane section as far as Bell Street - approximately 4,000 feet. Provide five-foot bicycle lanes and sidewalks from U.S. 26 to the UGB - approximately 6,300 feet.

The total cost for the recommended existing roadway improvements is estimated at \$3,930,000. The recommended projects and their associated amenities are summarized in Table 22.

**Table 22**  
**Roadway Improvement Projects -**  
**Roadway Upgrading**

Facility	R.O.W.	Travel Lanes	Median Lane	Parking	Bike Lanes	Width to Add	Length	Estimated Cost
<b>ARTERIAL STREETS</b>								
Highway 211	70	2	14	No	Yes	24	12,000	\$2,305,000
362nd Drive	70	2	14	No	Yes	22	2,000	\$385,000
Dubarko Road	70	2	12	one side	Yes/No <sup>1</sup>	4	4,000	\$130,000
Bluff Road (N)	66	2	12	No	Yes	22	6,300	\$1,110,000
<b>TOTAL</b>								<b>\$3,930,000</b>

<sup>1</sup> On-street bike facilities to be provided in those sections where no off-street path is provided.

## New Traffic Signals

Listed below are the locations which will likely require new traffic signals, outside the downtown couplet (discussed later), as traffic volumes increase. The proposed location and spacing of new traffic signals on State facilities would comply with existing plans and policies, as indicated in the *1991 Oregon Highway Plan*. These intersections should be monitored to determine the point in time when signalization is warranted and justified; with installation being funded and facilitated in a timely manner. The estimated cost for installation of these traffic signals is \$120,000 each; totaling \$1,080,000 for nine signals.

1. U.S. 26/Orient Drive/Jarl Road
2. U.S. 26/Langensand Road
3. Highway 211/362nd Avenue
4. Highway 211/Bluff Road
5. Highway 211/Dubarko Road
6. 362nd Avenue/Dubarko Road
7. 362nd Avenue/Bell Street
8. Bluff Road/Dubarko Road
9. Dubarko Road/Sandy Heights Street

The following intersections will likely require signal upgrading due to new roadway or improvements to existing roadway connections at the intersection. The cost is estimated to total \$120,000 for these upgrades:

1. U.S. 26/362nd Avenue
2. U.S. 26/Ruben Lane
3. U.S. 26/Bluff Road

The selected downtown alternative recommended new signals be located on Proctor and Pioneer Boulevards at:

1. Scales Avenue
2. Strauss Avenue

Finally, it is recommended that the resulting series of traffic signals on U.S. 26 through the Sandy area be coordinated into an optimized signal system; providing safe and efficient progression of traffic on U.S. 26. Timing plans should be developed and implemented to address hourly, daily, and seasonal peak conditions. The estimated cost for the timing and implementation plans for the resulting signal system is \$25,000.

The total cost for the recommended upgrading of existing signals, installation of potential new signals, and timing and implementation plans is estimated to be \$1,705,000.

**Roadway Standards**

Roadway design standards are based on the functional and operational characteristics of streets; including traffic volume, capacity, and operating speed. Standards are necessary to ensure consistency of facilities as the City develops. Figure 20 shows proposed typical roadway cross sections for Major Arterial, Minor Arterial, Residential Minor Arterial, and Collector streets for Sandy. Table 23 lists the recommended roadway standards for Sandy. These recommended standards have been developed in keeping with the proposed new Comprehensive Land Use Plan; which is intended to promote the use of all transportation modes, rather than relying primarily on the automobile. The result is some reduction in travel lane width, overall pavement width, and right-of-way width as compared with existing street standards in some cases. It should be noted that on State controlled roadways within the City, the State's roadway design standards are to be applied.

**Table 23**  
**Roadway Design Standards**  
 (All measurements in feet)

Class	ADT Volume	Speed	Travel Lane Width	# of Travel Lanes	Median Turn Lane	Bike Lanes ?	Parking ?	Paved Width	R.O.W.	Private Access Spacing
Major Arterial	>16,000	40-55	12	2/4*	14	5**	no	48-72	72-96	300-500
Minor Arterial	10,000 - 16,000	30-45	12	2/4*	14*	5**	1	42-78	66-102	200-400
Residential Minor Arterial	10,000 - 16,000	30-40	11	2/4*	12*	5**	1/2*	40-74	64-98	150-300
Collector	4,000 - 10,000	25-35	11	2	12*	5**	1/2*	40-60	64-84	75-150

- \* Optional, not required.
- \*\* Optional only if not included in Bicycle Plan

The suggested roadway design standards are to be used as a guideline for the development of future roadway facilities and land uses within Sandy. As Sandy continues to develop, there may be the need to provide some flexibility in the City's roadway design standards. The purpose of a flexible design standard is to accommodate development needs within the City of Sandy in a consistent manner, but also allow for individual consideration of unique issues such as, but not limited to, land access, non-auto travel modes, right-of-way constraints, terrain, vegetation, and building orientation.

**Sidewalks**

Sidewalks should generally be constructed to a five-foot minimum width on arterial and collector streets except in commercial areas where they should be a minimum of eight feet where a planting strip is provided between the sidewalk and the street, or twelve feet if no planting strip is provided. On culs-de-sac, five-foot wide sidewalks may be provided on one side of the street only.

### **Air/Rail/Water/Pipeline Plan**

Other elements of the Sandy Transportation System Plan include 20-year strategic plans for air, rail, water and pipeline travel.

#### **Air Travel**

The Sandy Transportation System Plan acknowledges the increasing usage and importance of air transportation in the future and encourages the continued use of the existing facilities available to Sandy residents and businesses.

#### **Water Transportation**

The Plan supports the continued use of the Port of Portland facilities for water-borne transportation of large, heavy, and bulky commodities suited to this mode, via the Columbia and Willamette Rivers.

#### **Rail Transportation**

Railroad transportation is provided primarily via the Union Pacific Railroad which runs along the south side of the Columbia River. Goods handling and passenger operations are handled primarily through Union Station in Portland, approximately 30 miles away. The Plan recognizes that rail transportation should remain an available option to the City, and in the absence of railroad facilities in close proximity to Sandy (and the small likelihood that they will be provided within the next twenty years), promotes the continued use of facilities in the Portland Metropolitan area.

#### **Pipeline Transportation**

Current pipeline service includes transmission lines for electricity, cable television, and telephone service; and pipeline transport of water, sewer, and natural gas. The Sandy Transportation System Plan encourages the continued use of these services for the movement of these commodities through the City.

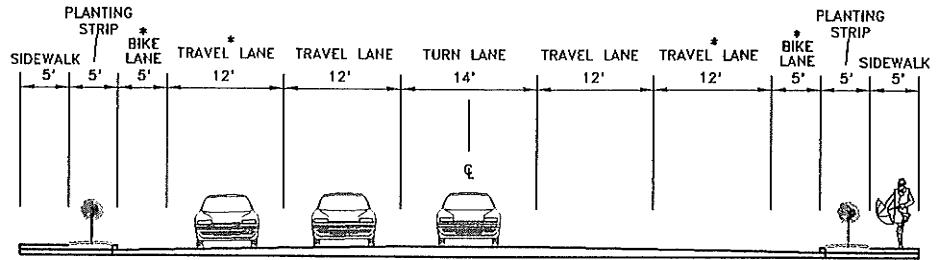
The Plan also recognizes the increasing likelihood of telecommuting and other "super-highway" technologies becoming viable alternatives to physical commuting; thus reducing and possibly even eliminating some auto and transit trips during the peak hours. These commuting alternatives have the potential to reduce the need for expansion of the conventional transportation system infrastructure. As such, the use of telecommuting and other similar technologies should be encouraged through land use policy and plans.

### **ACCESS MANAGEMENT PLAN**

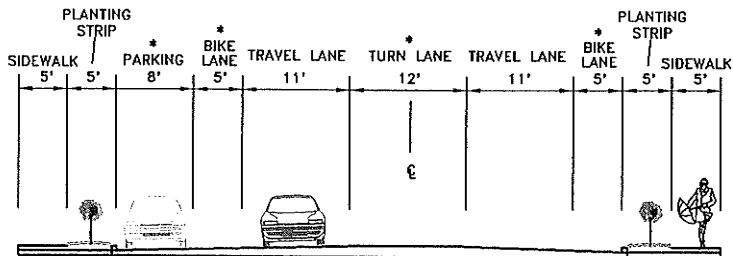
Section 2 presented the summary of an inventory of existing public road and private drive accesses onto the U.S. 26 couplet - Proctor and Pioneer Boulevards. As described in that section, these segments are in non-compliance with ODOT standards for both public street and private driveway spacing.

**Figure 20**  
**Recommended Roadway Standards**

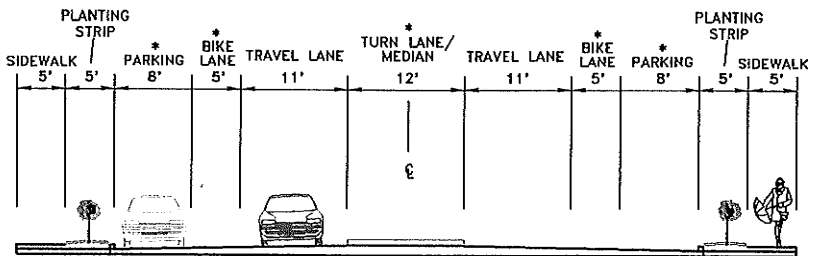
# MAJOR ARTERIAL



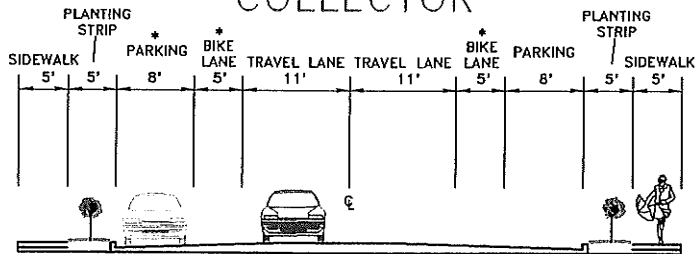
# MINOR ARTERIAL



# RESIDENTIAL MINOR ARTERIAL



# COLLECTOR



\* OPTIONAL

### LEGEND



PARKED CARS



MOVING CARS



SHRUB



PEDESTRIAN

**SANDY RECOMMENDED  
ROADWAY STANDARDS**

TRANSPORTATION SYSTEM PLAN  
CITY OF SANDY  
DECEMBER 1995

FIGURE  
**20**



1359XSC2

Figure 20 (back)



**Classification of U.S. 26 through Sandy**

U.S. 26 is currently classified as a Statewide LOI highway, according to the OHP. ODOT staff have confirmed that U.S. 26 is classified as Category 4 in the downtown couplet section and Category 3 in the sections outside of downtown. These categories are described below and detailed in Table 24, as excerpted from the OHP.

**Table 24**  
**OHP Access Management Classification System**

Category	Access Management	LOI <sup>1</sup>	Urban/Rural	Intersection				Signal Spacing <sup>2</sup>	Median Control
				Public Road		Private Drive <sup>3</sup>			
				Type <sup>4</sup>	Spacing	Type	Spacing		
1	Full Control (Freeway)	Interstate/Statewide	U	interchange	2-3 miles	None	NA	None	Full
			R	interchange	3-8 miles	None	NA	None	Full
2	Full Control (Expressway)	Statewide	U	At grade/Inch	1/2-2 miles	None	NA	1/2-2 miles	Full
			R	At grade/Inch	1-5 miles	None	NA	None <sup>5</sup>	Full
3	Limited Control (Expressway)	Statewide	U	At grade/Inch	1/2-1 mile	Rt Turns	800 feet	1/2-1 mile	Partial
			R	At grade/Inch	1-3 miles	Rt Turns	1,200 feet	None <sup>5</sup>	Partial <sup>6</sup>
4	Limited Control	Statewide/Regional	U	At grade/Inch	1/4 mile	LV/Rt Turns	500 feet	1/2 mile	Partial/None <sup>7</sup>
			R	At grade/Inch	1 mile	LV/Rt Turns	1,200 feet	None <sup>5</sup>	Partial/None <sup>7</sup>
5	Partial Control	Regional	U	At grade	1/4 mile	LV/Rt Turns	300 feet	1/4 mile	None
			R	At grade	1/2 mile	LV/Rt Turns	500 feet	1/2 mile	None
6	Partial Control	Regional	U	At grade	500 feet	LV/Rt Turns	150 feet	1/4 mile	None
			R	At grade	1/4 mile	LV/Rt Turns	300 feet	1/2 mile	None

- 1 The Level of Importance (LOI) to which the Access Category will generally correspond. In cases where the access category is higher than the LOI calls for, existing levels of access control will not be reduced.
- 2 Generally, signals should be spaced to minimize delay and disruptions to through traffic. Signals may be spaced at intervals closer than those shown to optimize capacity the safety.
- 3 Generally, no signals will be allowed at private access points on statewide and regional highways. If warrants are met, alternatives to signals should be investigated, including median closing. Spacing between private access points is to be determined by acceleration needs to achieve 70% of facility operating speed. Allowed moves and spacing requirements may be more restrictive than those shown to optimize capacity and safety.
- 4 The basic intersection design options are as listed. Special treatments may be considered in other than Category 1. These include partial interchanges, jughandles, etc. The decision on the design should be based on function of the highway, traffic engineering, cost-effectiveness and need to protect the highway. Interchanges must conform to the interchange policy.
- 5 In some instances, signals may need to be installed. Prior to deciding on a signal, other alternatives should be examined. the design should minimize the effect of the signal on through traffic by establishing spacing to optimize progression. Long-range plans for the facility should be directed at ways to eliminate the need for the signal in the future.
- 6 Partial median control will allow some well-defined and channelized breaks in the physical median barrier. These can be allowed between intersections if no deterioration of highway operation will result.
- 7 Use of physical median barrier can be interspersed with segments of continuous left-turn lane or, if demand is light, no median at all.

**Category 3:**

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

**Category 4:**

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

In the downtown section, the following guidelines therefore apply:

- Public roads spacing should be at least 1/4 mile (1,320 feet).
- Private drives should be spaced at least 500 feet apart (10.5/mi).
- Signal spacing should be at least 1/2 mile (2,640 feet).

It is recommended that the State maintain these classifications of U.S. 26 through the Sandy area without modification.

**State Access Management Implementation**

The ODOT District office for the Sandy area is enforcing the current access management policy by reducing the number of driveways onto the highway whenever possible - generally as properties redevelop. Two examples are the new gas stations on Proctor Boulevard; the B.P. Oil service station at Revenue, and the Chevron station at Meinig. Each of these sites previously had two direct accesses onto the highway and in the future will have only one, with one additional access on the side street. According to the District Manager, this process will continue as land parcels in the downtown develop or redevelop. Any property which does not specifically need access to/from the highway will lose any existing driveways if they redevelop, and sites of new development will not be granted unnecessary new access points.

As properties redevelop and/or major transportation projects are implemented on U.S. 26, ODOT will review current U.S. 26 access permits. Based on their review, access to U.S. 26 will be permitted (to the extent feasible) according to the Access Management Policy guidelines of the Oregon Highway Plan.

This access review will not take place until either:

- A property changes use, or
- A major transportation improvement project is implemented on U.S. 26, or
- A safety problem associated with private access to U.S. 26 is identified at a specific location.

In all cases, ODOT will ensure that each property has access to a public roadway.

It is recommended that the City of Sandy implement a process for working toward providing primary access via City streets and the consolidation of private accesses to U.S. 26, in place of relying on the application of the OHP Access Management Policy guidelines.

**Proposed Action**

Table 25 shows the existing driveway spacing for each side of the couplet streets, the recommended spacing according to the OHP guidelines, and the spacing resulting from the driveway consolidations and closures which would likely be achieved during this planning period. These closures are based on the driveway inventory, the land-use inventory, and the likely changes to the downtown core due to the implementation of the proposed Comprehensive Plan.

**Table 25**  
**Future Private Driveway Access Spacing Summary**

Road - Side	Existing Conditions			OHP Access Management Guidelines		Resulting Average Spacing (ft) After Closures
	# of Driveways	Density (per mile)	Average Spacing (ft)	Density (per mile)	Average Spacing (ft)	
Pioneer - North side	21	29	180	11	500	345
Pioneer - South side	28	37	145	11	500	225
Proctor - North side	26	45	115	11	500	305
Proctor - South side	25	43	120	11	500	255

**Summary**

The number of private accesses onto the highway could be significantly reduced along the couplet streets in downtown Sandy; but, it is unlikely that this reduction would be sufficient to meet the OHP Access Management Policy guidelines due to the historic and built-up nature of downtown Sandy. However, the City should strive to support ODOT and its access policies for U.S. 26 by coordinating its urban planning efforts with ODOT, and by continuing to communicate information on adjacent land use activities to ODOT.

**IMPLEMENTATION PLAN**

The implementation of the transportation system improvements was planned with consideration for the Infrastructure Investment Sequence Plan which has been developed by the City for inclusion in the City's proposed Comprehensive Plan. This sequencing plan developed by the City is not detailed to the point of a schedule showing year periods when infrastructure will be built, but rather ranks areas to be developed according to a four-level priority scale. The construction of roads, water, sewer, and electrical facilities and the construction of homes must obviously be coordinated if Sandy is to develop in an orderly and efficient way. Therefore, the plan proposed here should be considered in light of developing infrastructure sequencing plans, and may need to be modified accordingly. Figure 21 is a graphical representation of the new roadways implementation plan.

Implementation of the pedestrian plan, bicycle plan, and roadway improvements has been staged to spread investment in this infrastructure over the twenty year life of the plan.

**First Decade**

**Pedestrian Plan Projects:**

- U.S. 26
- Highway 211
- 362nd Avenue
- Bluff Road
- Ten Eyck Road
- Hood Street
- Pleasant Street
- Beers Avenue
- Industrial Way
- Dubarko Road
- Total:                      \$ 1,788,000

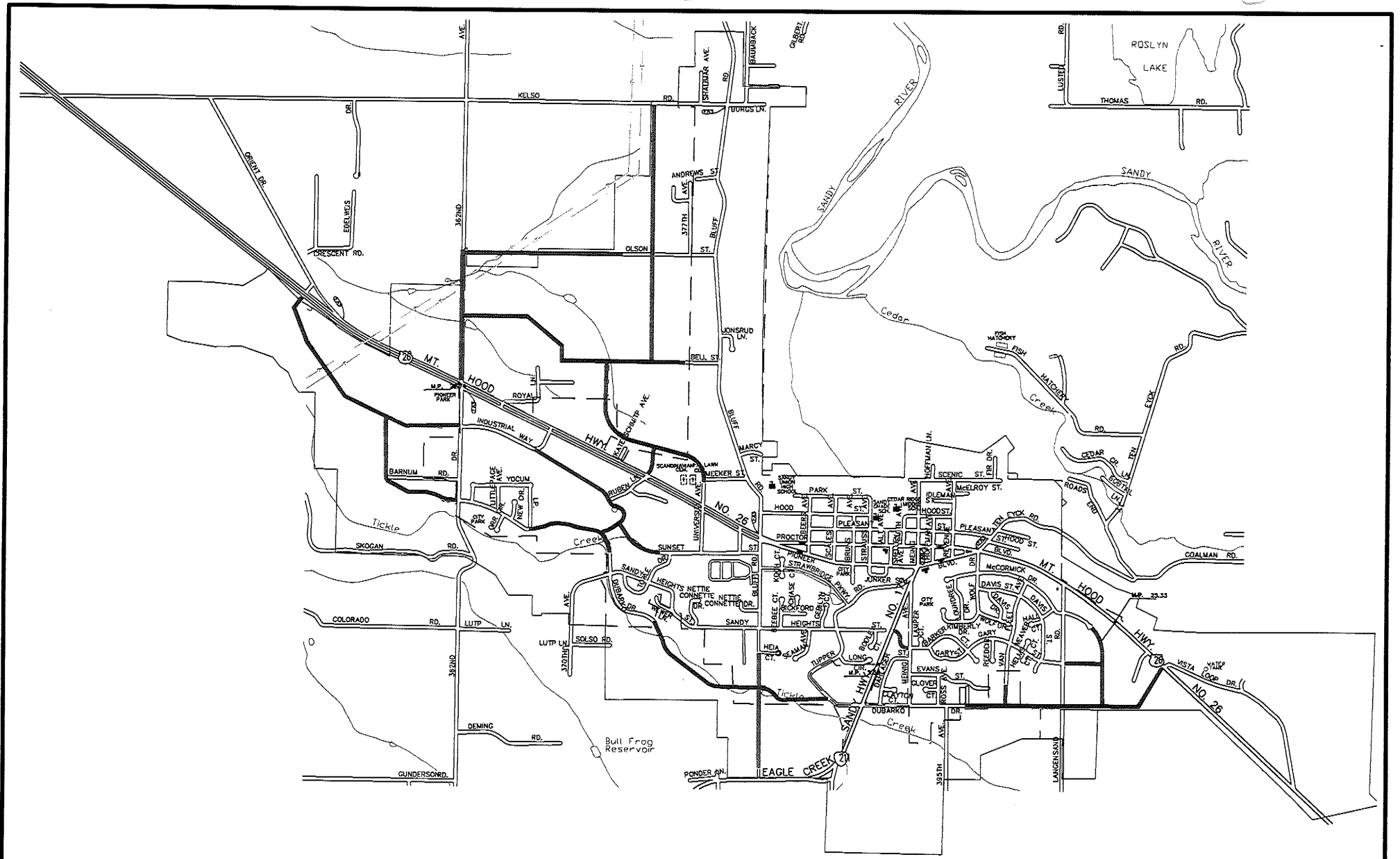
**Bicycle Plan Projects:**

- 362nd Avenue (South of U.S. 26)
- Industrial Way
- Tupper Road
- Ten Eyck Road
- Pleasant Street
- Total:                      \$ 795,000

**New Roadway Projects:**

- Industrial Way west of 362nd Avenue to Jarl Road
- W. Dubarko Road extension
- 362nd Avenue north of U.S. 26
- Dubarko Road extended east from 362nd Avenue to U.S. 26 connecting existing segments
- Bell Street between 362nd Avenue and Bluff Road
- University Avenue extended north from U.S. 26 to Bell Street
- Industrial Way extension east to Ruben Lane
- Ruben Lane extended south to Dubarko Road

**Figure 21**  
**New Roadway Projects Implementation Plan**



LEGEND	
	1-10 YEAR PERIOD
	11-20 YEAR PERIOD
	CITY LIMITS
	URBAN GROWTH BOUNDARY

## NEW ROADWAY PROJECTS IMPLEMENTATION PLAN

CITY OF SANDY  
TRANSPORTATION SYSTEM PLAN  
DECEMBER 1995

FIGURE  
**21**



Figure 21 (back)

- West Industrial Way
- West Dubarko Road Ext.
- Total: \$13,486,000

**Roadway Upgrading Projects:**

- Dubarko Road
- Total: \$130,000

**Total First Decade Projects: \$16,199,000**

**Second Decade**

**Pedestrian Plan Projects**

- 370th Avenue/Sandy Heights Road
- Sandy Heights Road
- Meinig Avenue
- Tupper Road
- Park Street
- Wolf Drive
- Proctor Boulevard
- Pioneer Boulevard
- Scales Avenue
- Bruns Avenue
- Strauss Avenue
- Alt Avenue
- Smith Avenue
- Hoffman Avenue
- Revenue Avenue
- Total: \$ 579,000

**Bicycle Plan Projects**

- Langensand Road
- Strawbridge Parkway
- High School Trail
- 395th Avenue Trail



## Funding Alternatives Study

### Introduction

As part of the Sandy Transportation Plan, a list of transportation projects have been identified as transportation system needs within the area transportation network. This list includes those major projects initially identified in the transportation systems planning effort as well improvements associated with the Sandy Downtown Plan.

Funding for transportation improvement projects typically comes from three sources: Federal, State, and Local governments. A description of the funding sources from each of those three categories follows. In some cases, funds may come from one level of government (such as Federal) to be spent by another level of government (i.e., State).

For each of the funding alternatives listed below, there will be a brief description, a listing of the existing application (i.e., who is presently using this method), and a short discussion of the potential for implementing the alternative in Sandy. No effort has been made to screen the list based upon their political feasibility. The intent is to provide an overview of a number of alternative revenue sources. It may also be that some of the funding mechanisms have been or are more typically dedicated to maintenance or street repair rather than capital improvements. The decision on how the funds are spent is ultimately a policy issue to be decided by the City Council.

### Federal Funding Mechanisms

#### Intermodal Surface Transportation Efficiency Act (ISTEA)

**Description:** In 1991 Congress passed and the President signed the Intermodal Surface Transportation Efficiency Act (ISTEA). The act emphasizes flexibility in funding transportation solutions and establishes a series of funding categories for implementation. Funding through the ISTEA Act is targeted to improvements which demonstrate beneficial impacts towards implementing a region's transportation systems plan, enhance the multi-modal nature of the transportation system, and meet local land use, economic, and environmental goals. Previously, federal aid funding was targeted to highways based upon their function or classification (i.e., Federal Aid Primary and Secondary funds were targeted to those roads on designated FAP or FAS routes).

Funding categories created by ISTEA are intended to provide an area with more discretion in allocating federal transportation funds to projects from highway improvements to transit improvements, management systems, and non-vehicular modes such as bicycle and pedestrian improvements.

**Existing Application:** Transportation improvement projects within Sandy are potentially eligible for funding through a number of categories under the ISTEA Act. These categories include:

1. National Highway System (NHS): Highways in this category include all Interstate routes and major urban and rural principal arterials. U.S. 26 is identified on the National Highway System.

2. **Surface Transportation Program (STP):** Funding through this category may be used on any roads (including NHS) that are not functionally classified as local or rural minor collectors. These roads are now collectively referred to as Federal-aid routes. Transit capital improvement projects are also eligible for funding through this category.
3. **Congestion Management and Air Quality Improvement Program:** The Portland area is designated as an air quality “non-attainment” area for ozone and carbon monoxide, and some projects could be funded through this program.
4. **National Scenic Byways Program:** A National Scenic Byways Program was established in ISTEA to provide assistance to states in preserving and enhancing the scenic, cultural, historic, archaeological and recreational resources of selected corridors. Priority funding will go to projects that protect the corridor as well as increase tourism, demonstrate strong local commitment to implementing plans, serve as models to other states, and which are in multi-state corridors where states submit joint applications.

**Community Development Block Grants (CDBG)**

**Description:** The Federal Department of Housing and Urban Development has a program known as the Community Development Block Grant Program (CDBG). Cities receive funds based upon a formula which includes their size and other demographics including income levels and housing standards.

**Existing Application:** Through intergovernmental agreements, the cities have combined their populations with the population in the unincorporated area to make Clackamas County an “entitlement” county. Funds are received by the county on a formula basis, and projects are funded on a competitive basis. Sandy has used CDBG funds to improve streets such as Tupper, Meinig, and Sunset.

**Potential:** In practice, this program is limited to older streets in sections of the city with low to moderate income residents. It may continue to be an important source of street reconstruction funds. It will not be a factor in new road construction for capacity building.

**State Funding Mechanisms**

**State Motor Vehicle Fund**

**Description:** The State of Oregon collects the following fuel and vehicle fees for the State Motor Vehicle Fund:

State Gas Tax	\$ 0.24 per gallon
Vehicle Registration Fee	\$15.00 per year

In addition, a weight mile tax is assessed on freight carriers to reflect their use of state highways. The revenue from the fund is used by ODOT and distributed to cities and counties throughout the state with each city’s distribution based on a city’s share of statewide population, and the county distribution based on a county’s share of statewide vehicle registration.

**Existing Application:** Both ODOT Region 1 and Clackamas County receive funds from the State Motor Vehicle Fund. The City of Sandy has budgeted \$210,000 for FY 95/96.

ODOT uses their allocation from the State Motor Vehicle Fund for maintenance and capital purpose. The State Transportation Improvement Program (STIP) describes the capital projects to be funded by ODOT. Clackamas County uses their allocation primarily for maintenance purpose. Sandy has typically used its allocation for street maintenance, including street lighting and sweeping.

The state distributes the State Motor Vehicle Fund local share to cities and counties based on a per capita rate (cities) and share of vehicle registration (counties).

**Potential:** As population and vehicle registration grow, the total revenue from the State Motor Vehicle Fund will rise. However, if the fees (tax per gallon) stay at current levels, there will be a reduction in buying power due to inflation. The last two legislatures considered, but did not pass, recommendations for increases in both the state gas tax and vehicle registration fees.

The current policies on how Sandy uses its share of State Motor Vehicle Fund for street maintenance programs could be changed and the funds could be used for capital improvements. However, unless those maintenance dollars were replaced with funds from another source, this would be a classic case of "robbing Peter to pay Paul" and would seriously undermine the city's program of perpetual maintenance on city streets.

#### **Special Public Works Funds (SPWF) - Lottery Program**

**Description:** The State of Oregon through the Economic Development Department provides grants and loans to local government to construct, improve and repair public infrastructure in order to support local economic development and create new jobs.

**Existing Application:** SPWF funds have been used in a number of cities for the construction of water, sewer, and limited street improvements. Sandy is currently pursuing a SPWF grant/loan package for the extension of Industrial Way.

**Potential:** SPWF funds are limited to those situations in which it can be documented that the project will contribute to economic development of a community and the creation of family wage jobs. The potential must be evaluated on a case by case basis to determine if a particular project might be eligible for funding under this program. From a practical standpoint, these funding requirements make it fairly limited in its potential.

#### **Toll Roads or Bridges**

**Description:** Certain streets or bridges could be built as toll facilities charging a fee per use.

**Existing Application:** There are presently in Oregon, several ferries crossing the Willamette River that charge a toll (e.g., the bridge over the Columbia River at Hood River is a toll bridge). The bridge over the Columbia River at Astoria was a toll bridge until recently when bonds to pay for the bridge were paid off and the tolls were discontinued. The Oregon Revised Statutes provide the opportunity for ODOT to build toll bridges to connect state highways and improve safety and capacity. The statutes also provide the opportunity for the development of "private" toll bridges. Recent legislation has enabled toll roads on a limited basis (including the "Newberg bypass").

**Potential:** A future U.S. 26 bypass might be a candidate for a toll road. Within the 20+ year time frame for a bypass, new electronic tolling technology may be in place to make this source of funding practical.

#### **Transportation Equity Fund**

In a special 1995 session, the legislature passed a bill, SB 1156, that provided for state funding of Portland's South/North light rail project. It also created a \$375 million "Transportation Equity Fund" that can be used for "essential transportation projects" outside the metro area. The monies will be distributed 60% to counties and 40% to cities. Appropriations from the fund will be distributed to local jurisdictions beginning in 1999, when the metro area begins to draw down its lottery money for the light rail project.

Sandy's share of the Transportation Equity Fund is estimated to amount to \$630,000, distributed over several years.

#### **Local Funding Mechanisms**

The following programs are used by cities in the funding of transportation improvements.

##### **General Obligation Bonds (G.O. Bonds)**

**Description:** Bonds are sold by a municipal government to fund transportation (or other types of) improvements, and are repaid with property tax revenue generated by that local government. Voters must approve G.O. Bond sales.

**Existing Application:** Cities all over the state use this method to finance the construction of transportation improvements. For smaller jurisdictions, the cost of issuing bonds vs. the amount which they can reasonably issue creates a problem. Underwriting costs can become a high percentage of the total cost for smaller issues. According to a representative of the League of Oregon Cities, the State is considering developing a Bond Pool for smaller jurisdictions. By pooling together several small bond issues, they will be able to achieve an economy of scale and lower costs.

G.O. bonds fall outside of the limitations of Ballot Measure 5 but require voter approval.

**Potential:** Within the limitations outlined above, G.O. bonding will be an alternative for funding transportation improvements.

##### **Property Taxes Within the Limit of Ballot Measure 5**

**Description:** Local property tax revenue (city or county) could be used to fund transportation improvements.

**Existing Application:** Revenue from property taxes ends up in the local government general fund where it is used for a variety of uses. Precedents for the use of property taxes as a source of funding for transportation capital improvements can be found throughout the state. However, with the limitations resulting from Measure 5, use of property taxes for transportation capital improvements will continue to compete with other general government services under the

funding limitation set by Measure 5 for general government services (i.e., within the \$10.00 limitation).

**Potential:** The potential for increased funding from property tax revenue is limited by Ballot Measure 5 and by competition from other users who draw funds from the general fund; it is not a practical source for financing major street improvements.

#### **Revenue Bonds**

**Description:** Revenue Bonds are those bonds sold by a city and repaid with "revenue" from an enterprise fund which has a steady revenue stream such as a water or sewer fund. The bonds are typically sold to fund improvements in the system which is producing the revenue.

**Existing Application:** Revenue bonds are a common means to fund large high cost capital improvements which have a long useful life. A sewage treatment plant is a good example where the high construction cost over a short period makes it difficult to pay for from operating funds, yet a long term revenue stream from sewer revenues makes the sale of bonds a viable alternative which spreads the cost of the facility improvement over a long period of time.

In 1989 the City of Independence sold revenue bonds to fund street improvements with vehicle fuel tax revenues pledged as the method of repayment.

**Potential:** The City could sell revenue bonds with any one of several revenue streams (none of which are in place now) pledged to repay the bonds. The bond underwriters will look at the reliability of the revenue stream when rating the bonds and assigning an interest rate.

#### **Transportation System Development Charges (SDC)**

**Description:** A transportation system development charge (SDC) is a sliding scale fee which is charged all new development to pay for transportation improvements which will be needed as a result of the development. The fee is normally based upon the number of vehicle trips generated by the development. Credits are often given for "qualified" improvements made by a developer to an adjacent arterial or collector street which would reduce the SDC charge.

**Existing Application:** Most cities and counties within the Portland metropolitan area (including Sandy) now use transportation system development charges.

ORS 223.297 to 223.314 prescribes specific requirements which a SDC must meet to be considered legal. It specifies that a SDC may be used only for capital improvements and defines the range of eligible capital facility improvements (i.e., water, sewer, drainage, transportation, or parks). ORS also defines the method of determining the amount which may be charged by a SDC, the types of eligible projects for funding, and annual review provisions.

The following items are some typical features of a SDC.

- They are collected based upon a development's impact on the transportation system.
- The proceeds from the collection of the fees are used to fund a portion of the projects needed to increase the transportation system capacity.
- The fee should be reasonable and affordable so as to not prohibit or displace future development to an area without the fee.

- Where possible, the fee should be implemented on an area wide basis to avoid variances in the costs associated with development within a community.
- Projects eligible for funding by a SDC are a part of an adopted Capital Improvements Program.

**Potential:** The use of the transportation SDC is a major source of funding for growth-related transportation improvements. It helps match the availability with funds with the need for funding as new development places additional burdens on street capacity. The current transportation SDC in Sandy applies to residential development only, so it would not be an appropriate source for street improvements that primarily benefit commercial or industrial development.

**Local Gas Tax**

**Description:** The City of Sandy or Clackamas County could implement a local gas tax that would be in addition to the state gas tax it currently receives.

**Existing Application:** Five jurisdictions within Oregon have a local gas tax - the City of Woodburn (\$0.01/gallon), Washington Co. (\$0.01/gallon), Tillamook (\$0.015/gallon), The Dalles (\$0.01/gallon), and Multnomah Co. (\$0.03/gallon). The local gas taxes have raised the following amounts:

Woodburn	One Cent/Gallon	\$ 112,490	(1993)
Tillamook	One & A Half Cents/Gallon	\$ 98,000	(1991)
The Dalles	One Cent/Gallon	\$ 291,000	(1991)
Multnomah County	Three Cents/Gallon	\$7,466,643	(1993)
Washington County	One Cent/Gallon	\$1,602,209	(1993)

The Washington County gas tax is shared with cities within the County on a per capita basis. The cities of Tillamook and The Dalles are responsible for collection of their local gas tax. The remaining jurisdictions rely upon the State Department of Motor Vehicles for collection and distribution. The State charges an administrative fee for collection.

A 2 cent fuel tax was adopted by the City of Sandy in 1992, but it was overturned by voters in a referendum. Clackamas County has placed a 3 cent tax on the November, 1995, ballot.

**Potential:** A 1 cent per gallon fuel tax within the City of Sandy would generate an estimated \$50,000 per year based on rough estimates of fuel sales. The proposed county tax will yield roughly \$65,000/year for the city.

The existing fuel tax revenue received from the State Motor Vehicle Fund is used for street maintenance. If a local tax were added, the first priority for funding would be the pavement management system, which stresses preventive maintenance of street surfaces.

### **Local Vehicle Registration Fee**

**Description:** Like a local gas tax, the City of Sandy or Clackamas County could implement a local vehicle registration fee. This would operate similar to the existing statewide vehicle registration fee.

**Existing Application:** There are presently no cities or counties in Oregon that charge a local registration fee. This option has been discussed by Marion County in the past with the decision made not to pursue it. The Portland Metropolitan region is discussing this option as a potential source of funding for an Arterials Streets Program.

**Potential:** Statewide, the number of vehicles registered is 2,558,000, vs a Statewide population of 2,979,000. This yields a ratio of .86 vehicles per person. If this ratio is applied to Sandy, the estimated number of vehicles in the City would be 3,800. Based upon that number of vehicles, a registration fee of \$5.00 would generate \$19,400 on an annual basis.

Collection of a local vehicle registration fee might be accomplished through the State of Oregon Department of Motor Vehicles. It is likely that the state would charge an administrative fee to recover the administrative costs of collecting and distributing a local fee.

### **Street Utility Fee**

**Description:** The principal behind a street utility fee is that a street is a utility used by the citizens and businesses of a city just like a water pipe or a sewer that supplies a connection to a home or business. A fee would be assessed to all businesses and households by the city for use of city streets based upon the amount of use typically generated by that particular use. As an example, a single family home typically generates 10 trips per day so the fee is based upon that amount of use. A small retail/commercial use typically generates 130 trips per day per 1000 sq. ft. of size, so the fee for the retail/commercial use is significantly greater than the single family residence.

**Existing Application:** This fee is being used in Medford, where it is raising approximately \$1.3 million dollars a year. The amount of the fee is based upon the land use classification which relates to trip generation. A single family residence (generating 10 trips per day) pays \$2.00 per month. The street utility fee was implemented in 1991 in Medford and has been challenged in court and sustained on two occasions. The revenue generated by the fee is used for operations and maintenance of the street system. The City of Roseburg has contemplating such a fee. Roseburg presently has a similar fee for storm water charges which they use for operations and maintenance as well as capital construction of storm drainage facilities. The Roseburg storm drainage utility fee has also been challenged and sustained by the courts.

**Potential:** Adjusting the amount of revenue generated by the fee in Medford for the smaller population and business base in the City of Sandy, a similar fee program would generate an estimated \$130,000 annually in revenue.

### **Local Improvement District (LID)**

**Description:** Through a local improvement district (LID), a street or other transportation improvement is built and the adjacent benefited (i.e., local) properties are assessed a fee to pay for the improvement.

**Existing Application:** LID programs have wide application, including in the City of Sandy. The LID method is used primarily for local or collector roads, although arterials have been built using LID funds in certain jurisdictions.

**Potential:** Changes to the former "Bancroft Bond" process caused by Measure 5 have made LID financing more difficult. It does, however, continue to offer a good mechanism for funding projects, whether related to new development or for improvements that benefit already-developed areas.

#### **Business License Fee**

**Description:** Sandy currently charges a Business License Fee of all businesses in the community. The fee is on a sliding scale based upon the number of employees a firm has and generates approximately \$20,000 per year that goes into the city's general fund. Other cities around the state charge license fees based upon any one of a number of measures of business activity including gross sales, net sales, gross payroll, net income, or number of employees as is done in Sandy.

**Existing Application:** The Tri-Met Transit District in the Portland area charges a .0006% tax to all businesses based upon their gross payroll. The funds are used as part of Tri-Met's operating budget where it raises over \$76 million.

The City of Portland has a business license fee of 2.2% of adjusted net income which generates over \$21 million per year which goes into the city general fund.

Multnomah County has a business income tax of 1.45% of gross revenue which generates over \$25 million dollars per year.

**Potential:** Given that the city currently has a Business License Fee, adjustments could be made in the existing fee to increase or decrease the amount of revenue collected through this mechanism and the distribution of the revenues. From an equity standpoint, this kind of fee would be most logical for street improvements that benefit the city's commercial areas, rather than for neighborhood street improvements.



## **TRANSPORTATION NEEDS PROJECT LIST**

As part of the Sandy Transportation Plan, a list of major transportation projects have been identified as needs within the area transportation network. A summary of the projects can be found below.

### **New Roadways**

#### **362nd Avenue from U.S. 26 to Kelso Road**

Construct 362nd Avenue as a minor arterial north from U.S. 26 to connect with Kelso Road, a distance of approximately 4,800 feet. Construct to a three-lane cross section with five-foot bike lanes, five-foot sidewalks, and five-foot planting strips on each side. Prohibit on-street parking. Purchase or reserve right-of-way for future reclassification to a major arterial. The estimated cost is \$2,030,000.

#### **Dubarko Road**

Extend Dubarko Road as a minor residential arterial from 362nd Avenue to west end of the U.S. 26/Vista Loop Drive intersection with a two-lane cross section with a center turn lane in selected segments. Provide five foot bike lanes, five foot sidewalks and five foot planter strips where possible. Where Dubarko Road is immediately adjacent to Tickle Creek, a separate bicycle/pedestrian path can be provided and parking can be limited to one side. The length of new construction is approximately 9,000 feet. Sections are already under construction as part of the Tickle Creek LID and the Nicholas Glen subdivision. The estimated cost is \$4,660,000.

#### **Bell Street, Bluff Road to 362nd Avenue**

Extend Bell Street as a residential minor arterial west from Bluff Road to 362nd Avenue with a two-lane section. Provide five-foot bicycle lanes, five-foot sidewalks, and five-foot planter strips and parking on both sides. The length of new construction is approximately 4,500 feet. The estimated cost is \$1,900,000.

#### **Bluff Road, U.S. 26 to Highway 211**

Extend Bluff Road south as a minor arterial street to connect ultimately with Highway 211, with the alignment to be decided following a survey of the terrain. Construct to a two-lane section with five-foot bicycle lanes, five-foot sidewalks, and five-foot planters and parking on both sides. This project will require approximately 2,200 feet of new construction (75 feet right-of-way) and 1,900 feet of street reconstruction. The estimated cost is \$887,000.

#### **Olson Street or Agnes Street, Bluff Road to 362nd Avenue**

Construct as a two-lane collector with five-foot bicycle lanes, four-foot sidewalks, five-foot planter strips and parking on both sides; in a 70-foot right-of-way. The estimated cost is \$1,050,000.

**Un-named Road, Bell Street to Kelso Road**

Construct a new north/south street parallel to and west of Bluff Road, connecting Bell Street to Kelso Road, a distance of approximately 4,500 feet. Construct with two travel lanes, five-foot bicycle lanes, four-foot sidewalks, five-foot planter strips, and parking on both sides. The estimated cost is \$1,900,000.

**Ruben Lane/Kate Schmitz, Dubarko Road to Bell Street**

Extend Ruben Lane or Kate Schmitz St. north to connect with Bell St. and Ruben Lane south to connect with Dubarko Road. Construct to a two-lane section with five-foot bicycle lanes, five-foot planter strips, and parking on both sides. Sidewalks on both sides should be constructed eight feet wide through commercial zones and four feet wide in residential zones. The length of construction is approximately 1,500 feet. The extension of Ruben Lane north is preferable to avoid an offset intersection, but right-of-way and cost issues may make Kate Schmitz a feasible alternative. A major portion of the segment from U.S. 26 to Dubarko Road will be done as part of phase 2 of the Double Creek planned development. Estimated cost is \$690,000.

**Van Fleet Avenue, Gary Street to Dubarko Road**

Extend Van Fleet Avenue south from its current terminus to connect with Dubarko Road, approximately 600 feet, based on collector street standards. With a sixty foot right-of-way, the estimated cost is \$200,000.

**Industrial Way, Ruben Lane to Jarl Road**

Extend Industrial Way west from 362nd Avenue to connect with Jarl Road and east to connect with Ruben Lane. Construct two travel lanes initially (with a center left-turn lane in the future), with five-foot bicycle lanes, five-foot sidewalks, five-foot planter strips, and parking on both sides. The length of new construction is approximately 5,500 feet with an estimated cost of \$1,840,000.

**McCormick Drive to Dubarko Road**

Construct a new north/south street to connect the east end of McCormick Drive southwards to Dubarko Road at a point east of Langensand Road. The length of new construction is approximately 1,600 feet. Construct to collector street standards. The estimated cost is \$535,000.

**Gary Street, Langensand Road to McCormick Drive**

Extend Gary Street east from Langensand Road to connect with the north/south extension of McCormick described above. Construct to collector standards with a length of approximately 700 feet and estimated cost of \$295,000.

**Dubarko Road, 362nd Avenue to Industrial Way**

Extend Dubarko west from the 362nd intersection, then north to intersect with the westerly extension of Industrial Way. Construct to collector, rather than minor residential arterial standards. The length is approximately 2,300 feet with an estimated cost of \$970,000.

**Sunset Street Extension to Ruben Lane/Dubarko Road**

Extend Sunset Street west from its current terminus to join with the extension of Ruben Lane at Dubarko. Construct to collector standards with a length of approximately 1,100 feet and estimated cost of \$505,000.

**Sandy Bypass Corridor Study**

Identify an alignment for a future U.S. 26 limited-access bypass on the southern edge of the Sandy UGB. The bypass itself will probably not be constructed within the 20-year scope of this Capital Improvement Plan.

**Sandy Heights Street Bridge**

Extend Sandy Heights Street east to Gary Street, via a bridge over Highway 211. Construct two-lane cross section with parking, five-foot planter strips, and four-foot sidewalks on both sides. The length of new construction is approximately 650 feet (500 feet in new roadway and a 150-foot bridge span). This project will require a major bridge structure to cross Highway 211 and the acquisition of several homes as part of the right-of-way, and is therefore a low priority. The cost of the new roadway (not including home acquisition/condemnation costs) is estimated at \$185,000 while the structure will cost approximately \$615,000.

**University Avenue, Meeker Street to Ruben Lane/Kate Schmitz**

Extend University Avenue north and west from Meeker Street to connect with Ruben Lane or Kate Schmitz Street. Construct two travel lanes and provide five-foot bicycle lanes, four-foot sidewalks, five-foot planter strips, and parking on both sides. Seventy-five feet of right-of-way is required. Length of construction is approximately 1,600 feet. Because the high cost of right-of-way and/or challenging engineering of the segment between Meeker and Ruben Lane, as well as little if any new development that would be directly benefitted by this project, this segment is a low priority. The estimated cost is \$1,390,000, including the cost of acquiring right-of-way and building a road between Safeway and the High School football stadium.

**Upgrade Roadways**

**Highway 211**

Upgrade Highway 211 to a major arterial standard, including the provision of a three-lane section with six-foot bicycle lanes, a design speed of 40 mph, and no on-street parking. The length of this project is approximately 12,000 feet. The estimated cost is \$2,305,000.

**362nd Avenue, Dubarko Road to US 26**

Upgrade 362nd Avenue to a minor arterial standard between U.S. 26 and Dubarko Road, a distance of approximately 2,000 feet. The cross-section will include a 12 foot wide center left-turn lane as well as on-street bicycle lanes. No on-street parking will be provided. The estimated cost is \$385,000.

**Dubarko Road, east of Highway 211**

Upgrade the south side of Dubarko Road east of Highway 211 to minor residential arterial standard. The cost estimate is \$130,000.

**Bluff Road, north of U.S. 26**

Construct Bluff Road to a minor arterial standard north of U.S. 26 with a three-lane section as far as Bell Street—approximately 4,000 feet. Provide five-foot bicycle lanes and sidewalks from U.S. 26 to the UGB—approximately 6,300 feet. The estimated cost is \$1,110,000.

**Traffic Signals**

Listed below are the locations which will likely require new traffic signals, outside the downtown couplet, as traffic volumes increase. The estimated cost is \$120,000 per signalized intersection.

**New and Upgraded Signals, U.S. 26**

U.S. 26/Orient Drive/Jarl Road

U.S. 26/Dubarko Road

The following intersections will likely require signal upgrading due to new roadway or improvements to existing roadway connections at the intersection. The cost is estimated to total \$120,000 for these upgrades:

U.S. 26/362nd Avenue

U.S. 26/Ruben Lane

U.S. 26/Bluff Road

**New Signals, US 26, downtown couplet**

Add four new signals on Pioneer/Proctor Boulevards at Scales and Strauss Avenues. This would result in signal spacing of approximately 950 feet, providing for more protected pedestrian crossings. Estimated cost is \$480,000, not including related sidewalk and crosswalk improvements.

### **Time Signals**

Coordinate the series of traffic signals on U.S. 26 through Sandy into an optimized signal system, providing safe and efficient progression of traffic on U.S. 26. Timing plans should be developed and implemented to address hourly, daily, and seasonal peak conditions. The estimated cost for the timing and implementation plans for the resulting signal system is \$25,000, excluding the cost of upgraded signal controllers.

### **New Signals, Highway 211**

Highway 211/362nd Avenue

Highway 211/Bluff Road

Highway 211/Dubarko Road

### **New Signals, City Streets**

362nd Avenue/Dubarko Road

362nd Avenue/Industrial Way

362nd Avenue/Bell Street

### **Pedestrian Facility Improvements**

The Transportation System Plan identifies existing and proposed sidewalks (referred to as the "pedestrian network"). Costs are broken down in the capital improvement plan according to the responsible jurisdiction. Sidewalks for new roadways are included in the cost of the new roadway and are not shown separately in the CIP.

### **Sidewalks, US 26**

Add sidewalks to missing segments on U.S. 26 within Sandy. Estimated cost: \$644,000.

### **Downtown Pedestrian Improvements, Curb Extensions and Crosswalks**

Construct curb extensions and crosswalks (e.g., brick or pavers) at the signalized intersections as well as Proctor at Hoffman, Alt, Bruns, Scales, and Beers, and Pioneer at Hoffman, Shelley, Bruns, Scales, and Beers. Estimated cost is \$30,000 per intersection, or \$420,000 for 14 intersections.

### **Underground Utilities**

A major impediment to a pedestrian-oriented downtown is the tangle of utility wires within the U.S. 26 right-of-way in downtown Sandy. Portland General Electric will cover half the cost of moving electric wires underground. The estimated cost is \$2,000,000.

**Sidewalks, Highway 211**

Add sidewalks on Highway 211 in Sandy. Estimated cost: \$156,000.

**Sidewalks, Sandy Streets**

Add sidewalks where missing on a variety of Sandy streets. Estimated cost: \$1,394,000.

**Downtown Streets**

Add and upgrade sidewalks on downtown cross-streets (i.e., excluding US 26). Estimated cost: \$225,000.

**Bicycle Facility Improvements**

The Transportation System Plan identifies new and proposed bike routes and paths. The costs shown in the CIP are for upgrading existing roadways to accommodate bike lanes; bike lane costs for new roadways are included in the roadway cost estimates.

Bicycle paths or trails that are separated from the street are included in these cost estimates. The Tickle Creek greenway from 362nd Avenue to Highway 211 includes a bike route that is a combination of on-street and separated bike paths. These paths may be included in the parks master plan.

**Bicycle Route Roadway Upgrades**

Upgrade roads to provide for bike lanes on Pleasant, Ten Eyck, 362nd (south of U.S. 26), Langensand, Industrial Way, and Tupper. Estimated cost: \$1,121,000.

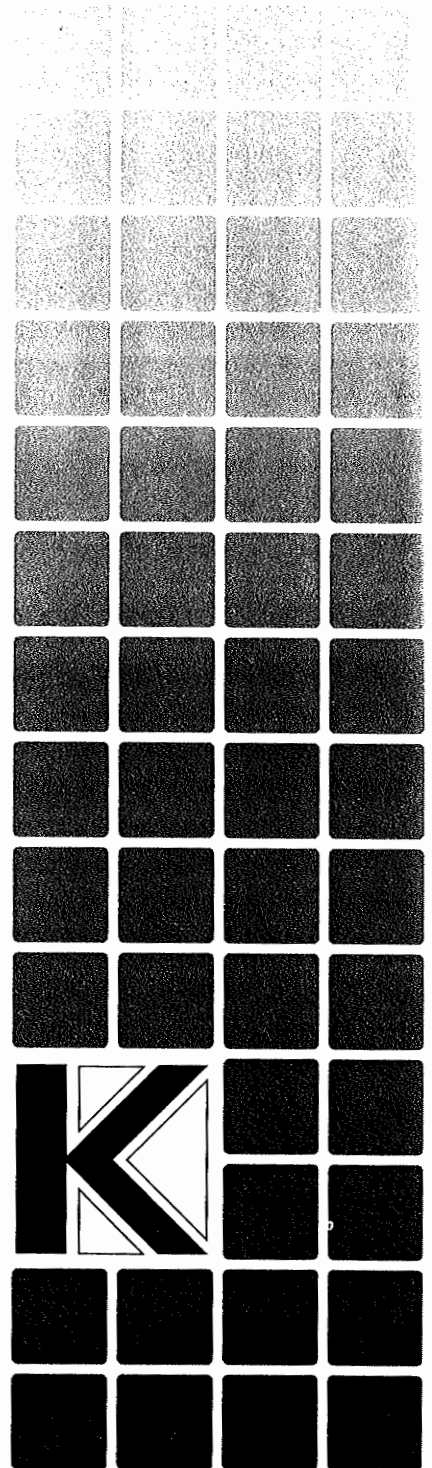
**Bicycle Trails**

Construct bicycle or bike/pedestrian trails that are separate from roadways. These trails will link bike routes in the Tickle Creek greenway and connect to the Sandy River and to the Springwater Trail. Estimated cost: \$465,000.

**Section 7**

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**Land Use Ordinance  
Modifications**



# Land Use Ordinance Modifications

## 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 and to reduce reliance on the automobile. 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 revised to update and clarify the rule's provisions for local streets, connectivity, and building orientation.

This section introduces proposed land use ordinance concepts designed to bring the City of Sandy into compliance with the Rule. Sources used to prepare this section 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 handbook.

This section outlines the State-mandated land use regulations to implement the Sandy Transportation System Plan, and recommends methods for satisfying those requirements. Specific recommendations for plan and ordinance amendments are in Appendix E.

## 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 multi-family, 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 (not applicable to Sandy), 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.

## **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 stipulated 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 Sandy to address street widths, sidewalks, connections between buildings and developments and other related design concepts. These concepts are implemented through the review of land use and development permit applications governed by various sections of the Sandy Municipal Code.

## **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 Design Standards, or other amendments as deemed necessary.

### **Issue: Incorporation of New Standards in Zoning and Land Division Ordinances**

**Background/Options:** The Sandy Zoning Ordinance needs to incorporate the development standards that are currently outlined in the Sandy Draft Transportation System Plan. Other related standards, notably those pertaining to culs-de-sac, block widths, block lengths, and street connectivity requirements need to be updated.

**Recommendation:** Amend the zoning ordinance modifying the Sandy Municipal Code as recommended in Appendix E.

## **Recommendations - Access Management**

### **Issues: Access Control Measures and Standards to Protect System Operation**

**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) has authority for access control on State Highways 26 and 211 through Sandy. 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 Sandy also has authority for access control through the Sandy Municipal Code. The city requires 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 Design Standards Chapter of the code.

**Recommendation:** Add a section to the code which clarifies the notice and coordination procedures between the city and ODOT. Include in the new section ODOT's Access Manage-

ment Guidelines as cited in the Sandy TSP, Section 5, Table 24. See Appendix E: Section 16.28.207 (New Section) Access Control Standards Guidelines and Coordination.

## Recommendations - Land Use and Subdivision Regulations

### Regulations

#### Issue: Bicycle Parking for Multi-family, Commercial, and Institutional Development

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

**Background/options:** The Rule requires bicycle parking for multi-family, commercial and institutional uses. The parking section of the Sandy code does currently have requirements for bicycle parking. These requirements need slight modification to meet the TPR.

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 residential buildings containing four units or more. Exemptions or adjustments should be provided for uses which can demonstrate that they will not have bicycle traffic.

2. *Number and Type*

Some jurisdictions provide standards for both short and long term bicycle parking.

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; and,
- 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 percent, if more that 10 spaces are required.

**Recommendation:** Add a bicycle parking subsection to the parking section of the Sandy code. See Appendix E: Section 17.42.120 (New Section), Bicycle Parking.

**Issue: Sidewalks and Bikeways that Provide Safe and Convenient Access Within and From New Development 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*

The current Sandy standard width for sidewalks is five feet, with four feet allowed on local streets. The Downtown Design Plan calls for sidewalks of 8-12 feet depending on available right-of-way width. Though not currently included in the working draft code, wider sidewalks (12 feet) are appropriate for the Village Commercial district in Sandy. 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.

2. *Bikeways*

The Rule requires bikeways on Arterials and Collectors. Bikeways should meet minimum American Association of State Highway and Transportation Officials (AASHTO) standards and the standards of the 1992 Oregon Bicycle Plan. The City is to provide bike lanes that range in widths from four-feet to six-feet, providing wider lanes on roads with increased vehicular speed and congestion. Right-of-way standards need to be adjusted where on street parking is desired.

3. *Connections/Accessways*

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

The Sandy working draft code complies with the Rule by requiring:

- a limit on or prevention of the use of culs-de-sac and a restriction on cul-de-sac length; and,
- a provision for pedestrian accessways at a minimum of 600-foot intervals.

Changes in the Sandy Design Standards are needed to include:

- a requirement to submit a future street plan, which includes all land located within 400 feet of the subdivision; and,
- a requirement that pedestrian accessways 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. Block lengths generally vary

from commercial areas to residential areas to help define different uses. The block length in the downtown currently varies from 200 feet to 400 feet, generally. This equates to block perimeters of 800 feet to 1,200 feet. The current block length (perimeter) cited in section 16.28.610 is 1,800 feet. This is an old standard that needs to be updated to comply with the Town Plan and the TPR. The APA Working Group recommends that block perimeters not exceed 1,500 feet (i.e. 550 foot block length 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:** Extend the requirement for wider sidewalks to all commercial districts, with exceptions for sidewalks on Highway 26 that are separated from buildings by parking lots. Add a requirement for future street plans. Increase pedway standards to be 10 feet of paved surface and 15 feet of right-of-way or tract width. Local streets are to be placed at 8-10 per mile. Update block length standards to as follows:

- Residential - 600 foot blocks
- Commercial/Office - 400 foot blocks

**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 help improve the performance of transportation facilities and reduce 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 requirements 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 Sandy, carpool programs are a possibility, but likely will not be needed until larger employers begin to locate there. Even so, the City should consider a program to encourage businesses with more than 50 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. Alternatively, parking for single-occupancy vehicle travelers could be reduced in number of percentage or made to be more inaccessible to buildings.

The working draft code includes provisions for shared parking. Up to 30% of a uses parking requirement may be met through shared spaces.

**Recommendations:** Provide policy to encourage carpooling, vanpooling, and code standards for reduced parking requirements. See Appendix E: New Comprehensive Plan Policies and Appendix E: Section 17.42 of the Municipal Code: Parking Reductions.

## **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. Sandy's working draft code requires paved street widths of 28-34 feet. Typical widths for narrower pedestrian friendly streets range from 24 to 28 feet. The fire district requires 20 feet of travel lane width. They are willing to accept 28 foot wide streets with parking on one-side and 20 foot wide streets with no on-street parking.

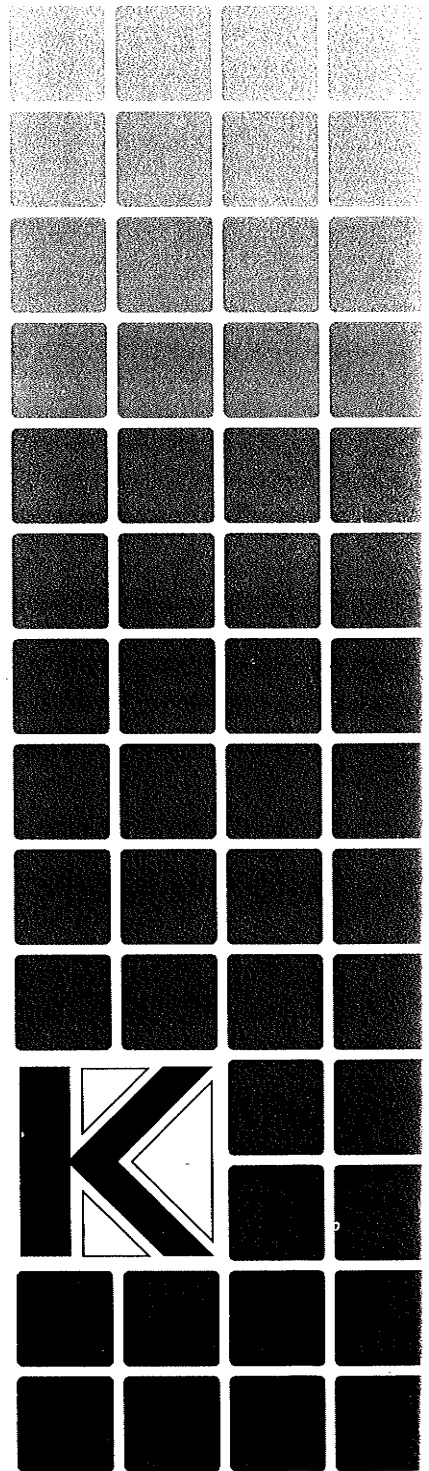
**Recommendation:** Include the improvements as part of the City's Transportation Systems Plan. See Appendix E: Section 16.28.210.250 of the Design Standards.



**Section 8**

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Transportation Planning Rule  
Compliance





## Transportation Planning Rule Compliance

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. Outlined below is a list of recommendations (designated by italics) and requirements for a TSP for an Urban Area with a population between 2,500 and 25,000, and how each of those were addressed in the Sandy TSP.

### DEVELOPMENT OF A TRANSPORTATION SYSTEM PLAN

#### TPR Recommendations/Requirements      Sandy TSP Compliance

##### Public and Interagency Involvement

- Establish Advisory Committees. 

A project management team and an advisory committee was established at the outset of the project. Membership on the management team included members of the City and ODOT staff. Membership on the advisory committee included representatives from the public, City of Sandy staff and ODOT staff.
- Develop informational material. 

A newsletter was developed as a communication tool for use throughout the planning process. Three newsletter issues were published and 2,400 copies of each issue were distributed via direct mail to all property owners within the UGB and those adjacent to it, and by placing them at strategic locations within the community (such as the library, schools, and various retail establishments).
- Schedule informational meetings, review meetings and public hearings throughout the planning process. Involve the community. 

A total of nine public informational meetings and two open houses were held throughout the planning process. The meetings were advertised by direct mail to interested parties, distribution of the newsletter, and through the local newspaper.

- Coordinate Plan with other agencies.

Coordination with local government agencies was accomplished by adding them to the project mailing list, individual project briefings/meetings, and participation on the project management team and advisory committee.

#### Review Existing Plans, Policies, Standards, and Laws

- *Review and evaluate existing comprehensive plan.*

The following plans were reviewed as part of the development of the TSP: *1991 Oregon Highway Plan*, (June, 1991); *Clackamas County Comprehensive Plan*, (December, 1992); *City of Sandy Comprehensive Plan*, (June, 1980); *Statewide Transportation Improvement Program (1993 - 1996)*; *Clackamas County Capital Improvement Program*, ; *City of Sandy Capital Improvement Plan (1990 - 1995)*; *City of Sandy Municipal Code (1975)*:

- *Land use analysis - existing land use/vacant lands inventory.*

Development of the forecast of transportation needs was based on population and employment numbers obtained from the *proposed Comprehensive Land Use Plan for Sandy*.

- *Review existing ordinances - zoning, subdivision, engineering standards.*

Existing City Subdivision Ordinances (Title 16 of the *Sandy Municipal Code* - chapter 16.12 and 16.20), Zoning Ordinances (Title 17), and Comprehensive Plan engineering standards (Chapter 16.28) were reviewed for adequacy in the development of the Sandy TSP.

- *Review existing significant transportation studies.*

Significant transportation studies reviewed as part of the Sandy TSP include the above mentioned comprehensive plans and their associated transportation elements, the *Oregon Transportation Plan*, (September, 1992), *Oregon Bicycle Plan*, (April, 1992), *Oregon Rail Passenger Policy and Plan*, (1993) as well as those documents previously listed.

- *Review existing capital improvements programs/public facilities plans.*
- Americans with Disabilities Act requirements.

The Sandy, Clackamas County, and the State of Oregon CIP's were reviewed as part of Sandy TSP development.

The ADA requirements were reviewed and acknowledged as part of the Sandy TSP development.

### **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*).
- Bicycle ways (type, location, width, condition, *ownership/jurisdiction*).
- Pedestrian ways (location, width, condition, *ownership/jurisdiction*).
- Public Transportation Services (transit ridership, routes, frequency, stops, fleet, intercity bus, special transit services).
- Intermodal and private connections.
- Air transportation.
- Freight rail transportation.
- Water transportation.
- Pipeline transportation.

An inventory of the existing street network, traffic volumes, traffic control devices, accident history, and levels of service is provided in Section 2 of the TSP.

A summary of the existing bicycle route system is given in Section 2.

An inventory of existing sidewalks along Collector and Arterial streets in Sandy is listed in Section 2.

A summary of the existing public transportation services is presented in Section 2.

No significant intermodal and private carrier transportation services and/or connections are found within the Sandy UGB.

A summary of existing air (passenger and cargo) is provided in Section 2.

A summary of freight rail transportation services is provided in Section 2.

A summary of water transportation services is provided in Section 2.

A summary of pipeline transportation services is provided in Section 2.

- *Environmental constraints*  
Within the Sandy UGB there are no significant environmental constraints affecting the development and general conclusions of the Sandy TSP.
- Existing population and employment.  
As outlined in Section 3 of the TSP, the current population in the City of Sandy is approximately 4,520 (1994) while the employment is approximately 2,340.

#### **Determine Transportation Needs**

- Forecast population and employment  
Population and employment forecasts were developed by City of Sandy staff based on the Draft Comprehensive Land Use Plan, and were reviewed by the Management Team.
- Determination of transportation capacity needs (cumulative analysis, *transportation gravity model*).  
Future daily traffic assignments were developed manually based on population and employment forecasts spatially distributed within the study area in a discreet number of "travel basins". Operational analyses were conducted on critical roadway segments using daily level of service volume thresholds to determine the levels of service, deficiencies and improvements needs under future conditions.
- Other roadway needs (safety, bridges, reconstruction, operation/maintenance).  
Non-capacity related transportation needs are not identified as part of this study.
- Freight transportation needs.  
The recommended TSP in Section 5 will provide for adequate freight movement by rail and highway.
- Public transportation needs (special transportation needs, general public transit needs).  
The transit plan recommended Section 5 will provide adequate public transit facilities and services.

- Bikeway needs.

Future bicycle and pedestrian improvements are to be made within the UGB, both as part of the roadway network and as separate facilities, to provide cyclists and pedestrians with full accessibility to Sandy's Collector/Arterial street system. The proposed pedestrian and bicycle plans are illustrated in Figures 15 and 16.

#### **Develop and Evaluate Alternatives**

- Update community goals and objectives.
- Establish evaluation criteria.
- Develop and evaluate alternatives (no-build system, all build alternatives, transportation system management, transit alternative/feasibility, improvements/additions to roadway system, land use alternatives, combination alternatives).
- Select recommended alternative.

Goals were established as part of the TSP development (see Section 1).

Evaluation criteria was established as part of the TSP development (see Section 4).

Section 4 identified four transportation system alternatives to assess the long-term transportation needs including: 1) No-Build Alternative, 2) Bypass Alternative, 3) Dubarko Road Alternative, and 4) Town Plan Transportation System Alternative.

The Town Plan Alternative (see Section 4) was chosen to mitigate the capacity deficiencies in the future. VMT reduction requirement is not applicable to Sandy (see OAR 660-12-020). However, the recommended transportation system improvements will very likely result in less reliance on the auto and a net reduction in VMT/capita by providing more direct connections within the community and relying less on U.S. 26 for circulation.

#### **Produce a Transportation System Plan**

- Transportation goals, objectives and policies.

Specific recommendations regarding transportation goals and policies are outlined in Section 5.

- 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 5, and shown in Figure 18. The design standard are summarized in Section 5, Table 23 and Figure 20.
- Public transportation element (transit route service, transit facilities, special transit services, intercity bus and passenger rail).  
The public transportation element is outlined in Section 5.
- Bikeway system element.  
The bicycle plan is outlined in Section 5.
- Pedestrian system element.  
The pedestrian plan is outlined in Section 5.
- Airport element (land use compatibility, future improvements, accessibility/connections/conflicts with other modes).  
The airport element is outlined in Section 5.
- Freight rail element (terminals, safety).  
Rail service for Sandy is provided within the City of Portland.
- Water transportation element (terminals).  
Water transportation service for Sandy is provided within the City of Portland.
- Transportation System Management element (TSM).  
TSM element not applicable per OAR 660-12-020(2)(f) and (g). Access Management Strategies for U.S. 26 are outlined in Section 5.
- Transportation Demand Management element (TDM).  
TDM element not applicable per OAR 660-12-020(2)(f) and (g).

## IMPLEMENTATION OF A TRANSPORTATION SYSTEM PLAN

### Plan Review and Coordination

- Consistent with ODOT and other applicable plans. To follow.

### Adoption

- Is it adopted? To follow.

### Implementation

- Ordinances (facilities, services and improvements; land use or subdivision regulations).
- Transportation financing/capital improvements program.

See Appendix D.

The transportation finance plan is summarized in Section 6.

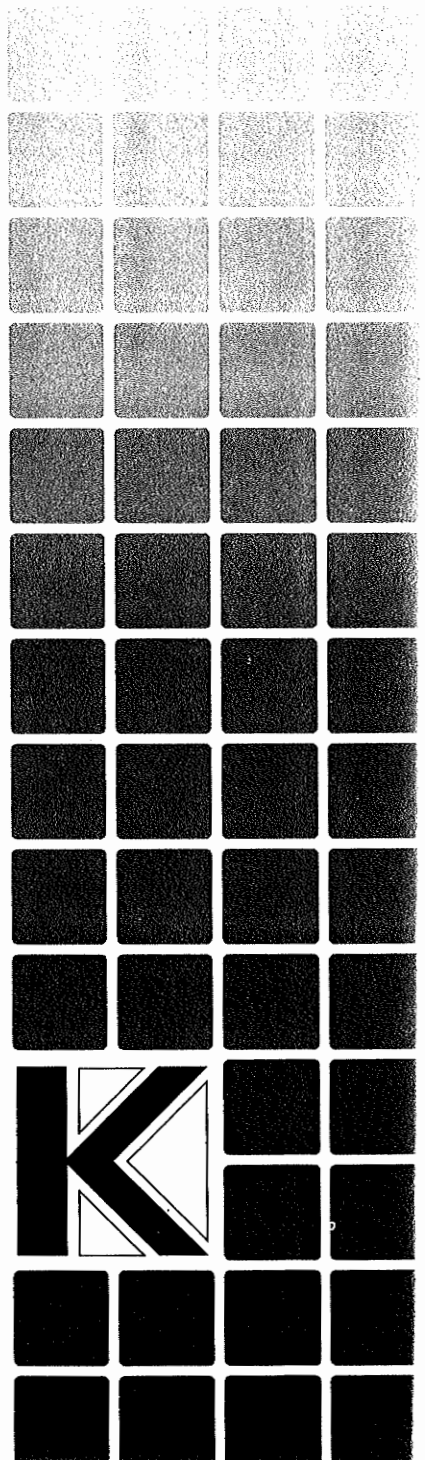




**Appendix A**

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Level of Service Concept



## 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.<sup>1</sup>

### 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.

<sup>1</sup> 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 definition 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**

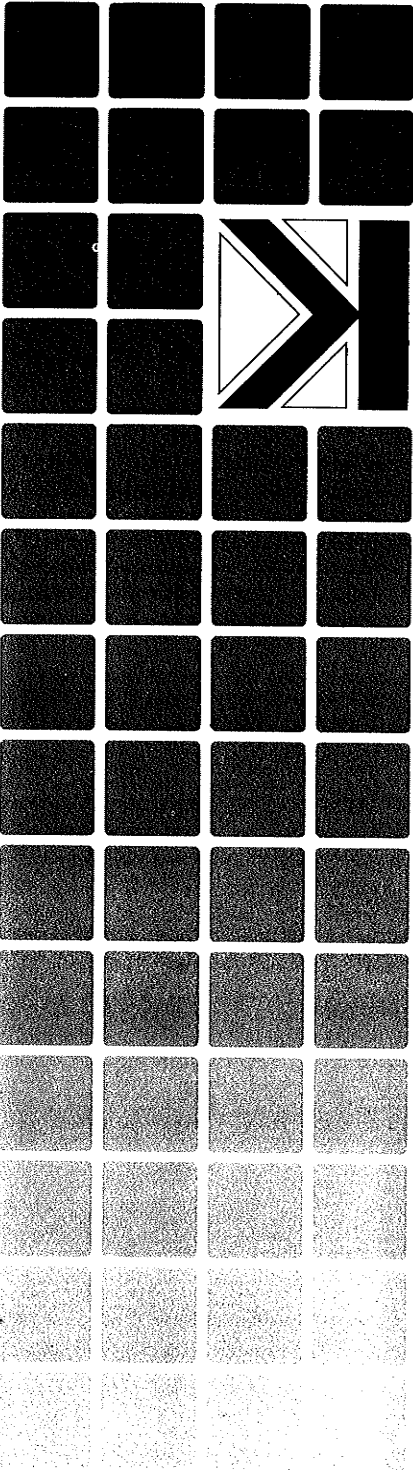
Level of Service	Average Delay per Vehicle to Minor Street
A	<ul style="list-style-type: none"> <li>Nearly all drivers find freedom of operation.</li> <li>Very seldom is there more than one vehicle in the queue.</li> </ul>
B	<ul style="list-style-type: none"> <li>Some drivers begin to consider the delay an inconvenience.</li> <li>Occasionally there is more than one vehicle in the queue.</li> </ul>
C	<ul style="list-style-type: none"> <li>Many times there is more than one vehicle in the queue.</li> <li>Most drivers feel restricted, but not objectionably so.</li> </ul>
D	<ul style="list-style-type: none"> <li>Often there is more than one vehicle in the queue.</li> <li>Drivers feel quite restricted.</li> </ul>
E	<ul style="list-style-type: none"> <li>Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement.</li> <li>There is almost always more than one vehicle in the queue.</li> <li>Drivers find the delays approaching intolerable levels.</li> </ul>
F	<ul style="list-style-type: none"> <li>Forced flow.</li> <li>Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.</li> </ul>

**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).





Daily Level of Service

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**Appendix B**

## Appendix B

### DAILY LEVEL OF SERVICE

Table B-1  
Daily Level of Service Criteria  
Sandy Two-Way Arterial Streets

Facility Type	# Lanes	A	B	C	D	E
Arterial, moderate access control	2	10,800	12,600	14,400	16,200	18,000
	3	14,000	16,400	18,700	21,000	23,000
	4	21,600	25,200	28,800	32,400	36,000
	5	27,000	31,500	36,000	40,500	45,000
	6	32,400	37,800	43,200	48,600	54,000
	7	38,900	45,400	51,800	58,300	64,800
Facility Type		Stops/Mile	Driveways	Speed		
Arterial, low access control		4+	High	25 - 35 mph		
Arterial, moderate access control		2 - 4	Limited	35 - 45 mph		
Arterial, high access control		1 - 2	None	45 - 55 mph		

Table B-2  
Daily Level of Service Criteria  
Sandy One-Way Couplet Streets

Signalized Intersections per Mile	Lanes	Daily Service Level				
		A	B	C	D	E
Less than 3.6	2	-	9,800	14,800	16,900	18,000
	3	-	14,900	22,700	25,600	27,200
	4	-	19,900	30,800	34,300	36,300
3.6 - 4.5	2	-	-	13,300	16,200	17,600
	3	-	-	20,300	24,800	26,600
	4	-	-	27,100	33,300	35,600

Source: Florida Department of Transportation, January 1989.

Key Assumptions:

Design Hour Factor	=	0.106
Directional Split	=	1.0
Progression Arrival	=	Type 5
Effective Green	=	0.51 to 0.54
Cycle Length	=	120 seconds

**Table B-3**  
**Existing Lanes and Level of Service**

1994 Conditions	1994 Volume	Number of Lanes	Existing Daily LOS
U.S. 26:			
West of 362nd Drive	28,300	5	B
362nd Drive - Bluff Road	36,500	5	D
Couplet (each direction)	15,400	2	D
East City Limit	20,300	4	A
Highway 211	6,400	2	A
362nd Drive	6,600*	2	A
Industrial Way	1,700*	2	A
Bluff Road:			
North of U.S. 26	3,500*	2	A
South of U.S. 26	2,800*	2	A
Ten Eyck Road	3,400*	2	A
Wolf Drive	3,700*	2	A
Langensand Road	1,000*	2	A

\* Estimated based on measured peak hour volumes.

Assumptions:

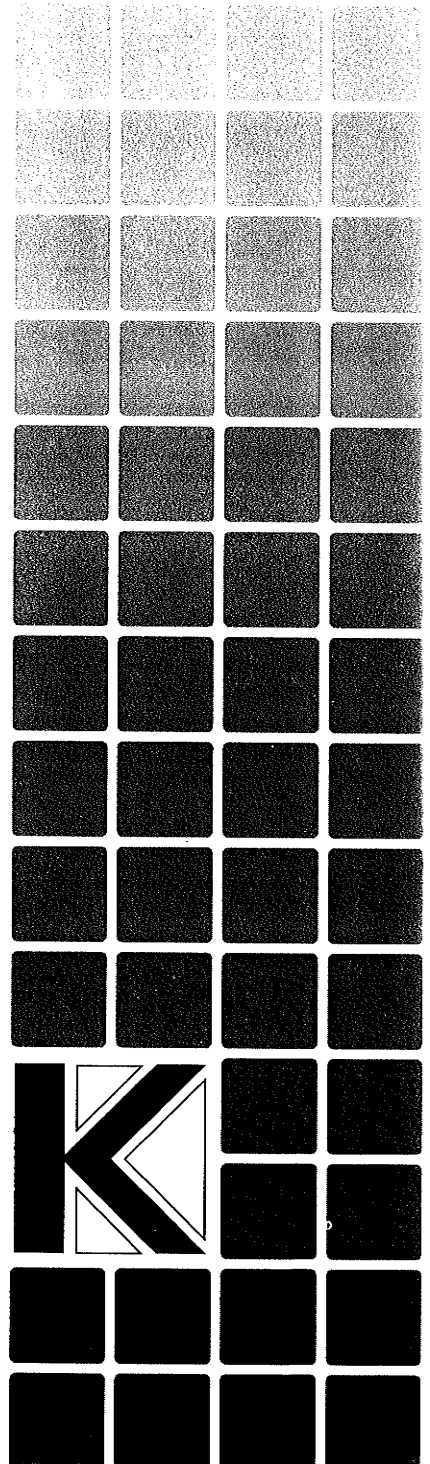
U.S. 26 has moderate access control (<3.6 signalized intersections/mile for one-way).  
Intersecting streets including Bluff Road and Highway 211 have low access control.



**Appendix C**

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**Measures of Effectiveness**



# Appendix C

## MEASURES OF EFFECTIVENESS

Table C-1

City of Sandy Transportation System Plan  
Alternatives Analysis

Measures of Effectiveness	Alternative 1: No-Build	Alternative 2: By-Pass	Alternative 3: Dubarko Road	Alternative 4: Town Plan
Improves safety for:				
Pedestrians?	0	2	0	11
Bicycles?	0	3	0	7
Automobiles?	0	7	1	7
Commercial Trucks?	0	11	0	0
Bus Transit?	0	2	0	11
Accommodates all travel modes:				
Pedestrians?	0	2	1	8
Bicycles?	0	3	2	8
Automobiles?	0	9	0	0
Commercial Trucks?	0	10	3	8
Bus Transit?	0	4	4	10
Improves local circulation for:				
Pedestrians?	0	9	0	0
Bicycles?	0	9	4	10
Automobiles?	0	4	10	10
Commercial Trucks?	0	10	5	8
Bus Transit?	0	0	0	0
Maintains acceptable LOS for:				
Local Streets?	0	8	0	10
Highway 211?	0	5	1	7
U.S. 26?	0	10	2	8
Provides freedom of movement across modes?	0	3	2	9
Offers circulation alternatives?	0	10	0	0
Maintains the function of U.S. 26?	0	12	0	7

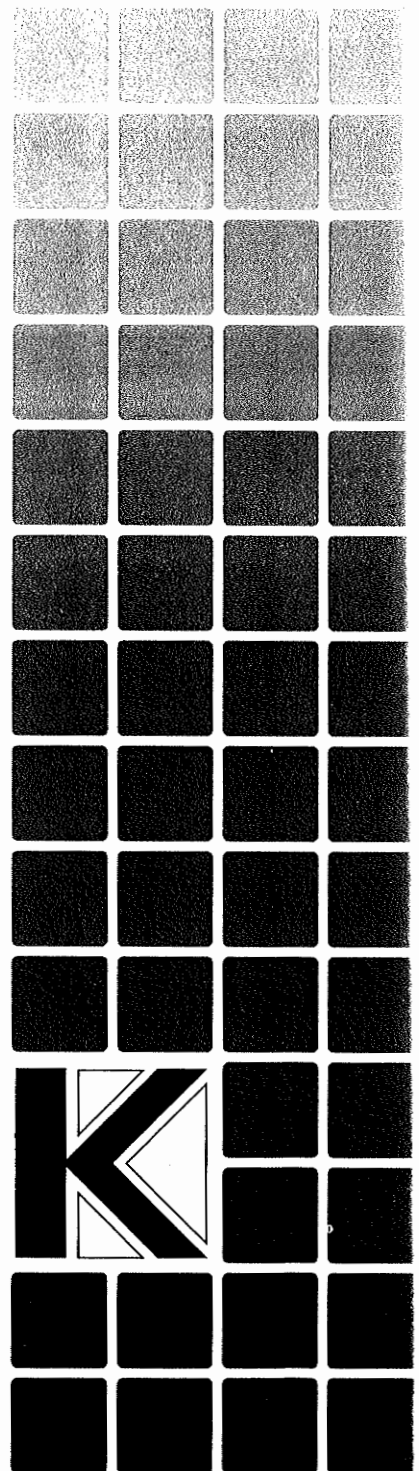
**Table C-1 (continued)**  
**City of Sandy Transportation System Plan**  
**Alternatives Analysis**

Measures of Effectiveness	Alternative 1: No-Build	Alternative 2: By-Pass	Alternative 3: Dubarko Road	Alternative 4: Town Plan
Balances all travel modes:				
Pedestrians?	0	1	0	9
Bicycles?	0	3	0	8
Automobiles?	0	8	4	7
Commercial Trucks?	0	12	2	5
Bus Transit?	0	3	4	9
Facilitates the development of a pedestrian oriented downtown?	0	5	3	7
Provides for mobility of the transportation disadvantaged?	0	0	1	11
Maximizes the useful life of existing facilities?	2	0	6	10
Maximizes the cost effectiveness of improvements?	0	3	1	10
Protects business accessibility?	1	4	2	10
Preserves and promotes economic viability?	0	3	1	11
Preserves scenic resources?	0	3	1	7
Relies on and/or upgrades existing facilities where appropriate?	0	0	9	10
Preserves the natural and historic character of Sandy?	0	9	2	8
Provides a safe and attractive bicycle network in the urban area?	0	2	3	11
Provides connectivity for bicycle users to County/State routes and to the downtown?	0	1	3	10
Preserves/improves emergency vehicle access?	0	3	6	11
<b>TOTAL</b>	<b>3</b>	<b>203</b>	<b>100</b>	<b>333</b>

**Appendix D**

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**Evaluating Local Funding  
Sources**



## Appendix D

### EVALUATING LOCAL FUNDING SOURCES

#### INTRODUCTION

Some of the major capital improvements proposed by the Transportation Systems Plan are on the State highway system. Funding from the State sources are to cover some or all of these items. Most of the projects, however, are local (non-state) and require local funding.

The purpose of this appendix is to provide the public and the City decision makers with information to help answer the question of "who pays?" for transportation systems improvements. The best answer to this question is "who should pay?". The end result will be both political and pragmatic given the funding options available. It is hoped that this appendix will provide the background necessary the public and the decision makers to have a discussion about the best source of local funding.

#### Is Funding also Financing?

Funding is distinguished separately from financing in this document. Funding is a term used to describe any mechanism that generates revenue for transportation projects. The variety of ways the government can collect money are funding mechanisms. These include funds from business that are selling goods, services, or labor.

Financing is more narrowly defined and refers to ways to spread out the impact of collecting funds through the issuance of debt obligations that are repaid over time, with interest. All transportation projects are funded (hopefully) by some means; some funding is financed by borrowing money to pay for the projects. Funding also occurs on a pay-as-you-go basis.

#### Consideration of "Who Pays" Critical to Local Funding Decisions

The State pays for improvements to their right-of-way to improve traffic flows for drivers, pedestrians, and bicyclist. Such funds come from indirect sources such as taxes, registration, and federal appropriations. The City supports State funded projects where the ends promote the livelihood of the community. The City also typically ties as many projects as possible to State and federal funding sources to reduce the impact of improvement costs on the local residents.

We assume that federal and State funds are fully tapped, or close to it. Federal funds are being funneled through the State Department of Transportation and despite the increased flexibility of ISTEA, are still earmarked for specific types of projects. Also, assume that planners and decision makers in the Sandy area have pursued all grants that are available in the area. It comes down to the question of "Who Pays?" from the residents, businesses, or tourists within the city.

There must be some relationship between the charge and use, but that relationship can be indirect. In the case of local road improvements, any funds that are tied to use of the roads directly (e.g. tolls), indirectly (e.g. gasoline taxes), or very indirectly (e.g. sales tax, since

people travel through the area of commerce) are possible. From a local jurisdictions perspective, for any given revenue requirement, funding by charging for use will cost users less (in the aggregate) because non-local users are also paying.

Another question important to decision makers besides use is who in particular is paying. This question is typically cut in several different ways: business verses resident; high income or property value verses low income or property value.

### Funding Packages Aimed At Tapping Different Groups

The following hierarchy of programs and target groups can be analyzed in several ways. One approach is to match funding sources to target groups such as in a SDC. Another approach is to match target groups with funding sources as in a gas tax.

A third approach is to match funding sources and target groups to identify what maintenance and improvements are required and then determine who benefits (or uses the improvements), and match that to funding resources that target who benefits most. An example of this is a street utility fee. Such a fee could be structured using trip generation averaged by type of land use where a higher burden would be placed on land uses that generate more vehicle trips.

### Potential Local Funding Sources and Target Groups

It is not the purpose of this report to recommend a specific funding strategy. Any recommendations must be conditional: "If you think that these groups should pay, then this funding source will burden them most heavily". The following table identifies possible allocation of funding burden.

Potential Local Source	Target Groups
<ul style="list-style-type: none"><li>• General Obligation Bonds</li><li>• Property Taxes</li><li>• Revenue Bonds</li><li>• Transportation SDC</li><li>• Local Gas Tax</li><li>• Local Vehicle Registration Fee</li><li>• Street Utility Fee</li><li>• Local Improvement District</li><li>• Business License Fee</li><li>• Franchise Fee</li></ul>	<ul style="list-style-type: none"><li>• Businesses</li><li>• Residents</li><li>• Future Businesses or Residents</li><li>• Tourists</li></ul>

## Funding Source Burden on Specific Groups

### Target Group / Funding Source

- **Business**
  - Business License Fee
  - Franchise Fees
- **Current Resident**
  - Property Tax
  - Local Vehicle Registration Fee
  - Street Utility Fee
- **Future Residents**
  - Systems Development Charge
  - Local Improvement District
  - General Obligation Bonds
  - Revenue Bonds
- **Tourists**
  - Gas Tax
  - Sales Tax

## Conclusion

Most local governments are finding that local taxes and user charges are inadequate to fund all of the needed infrastructure projects in a timely manner. The Transportation Planning Rule requires municipal TSPs to identify planned transportation facilities and improvements and provide an estimate of the timing and costs of proposed projects.

This report provides an analysis of capital improvement priorities and funding in the City of Sandy. The City's ability to ultimately implement its transportation plan will depend on funding and its ability to enact an effective financing plan.

*Note: Information for this report was obtained from the Reedsport Technical Report: Priorities and Funding, June 1994, published by Terry Moore.*

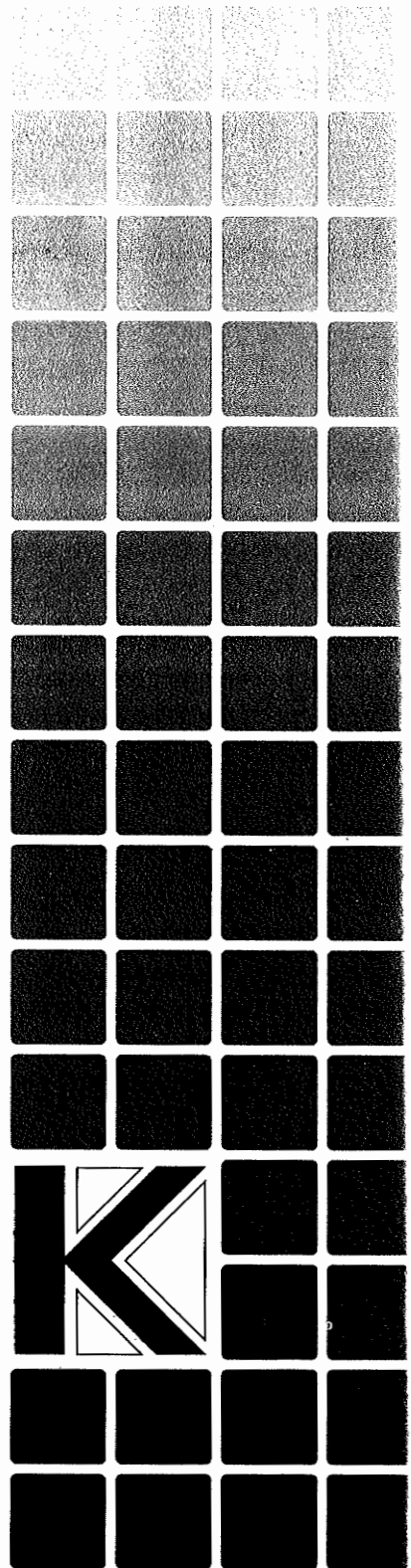




**Appendix E**

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Recommended Amendments to  
the Sandy Municipiple Code



## Appendix E

### RECOMMENDED AMENDMENTS TO THE SANDY MUNICIPAL CODE

The following amendments to Sections 16.28.010 to .250 are recommended for the "Working Draft" of the Sandy Municipal Code, dated June 30, 1995. The amendments to Sections 16.28.390-620 are recommended to the adopted language of the Sandy Municipal Code.

The recommendations below provide "detailed direction" for the code amendments - final language will be developed by city staff. Suggested language is provided in a few cases. "TSP" refers to the Sandy Transportation System Plan. "TPR" refers to the Transportation Planning Rule.

### CHAPTER 16.28

#### Design Standards

##### **16.28.010 Design Standards and Principles of Acceptability**

This section requires conformity with applicable plans and laws, and cites applicability of the chapter to subdivisions, the creation of streets and partitioning.

For clarity, 16.28.010 should be limited to the conformity provisions. A new section, 16.28.011 (titled "Applicability") is recommended. The new section would state that the Design Standards chapter may be applied to all development permits. This will provide clear legal authority to apply the standards to all types of development permits.

##### **16.28.100 Street - Generally**

A sentence should be added (probably the second sentence in the first paragraph) to reference the street connectivity "principle" that was used for development of the Sandy town plan. Suggested language is as follows:

"...The pattern of streets should be connected to: (1) provide safe and convenient options for cars, bikes and pedestrians; (2) create a logical, recognizable pattern of circulation; and (3) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened..."

**16.28.205 Transportation Impact Studies Required - Modification of Design Standards (New Section)**

A new section is recommended to provide the city with authority to require transportation impact studies in order to determine impacts, improvements and modifications to the design standards.

Suggested language is:

- A. Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements, and justify modifications to the design standards of this chapter. Such studies will be prepared in accordance with the following:
  - 1. A proposal establishing the scope of the transportation impact study shall be coordinated with, and agreed to, by city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. Such studies shall be prepared by a licensed professional civil or traffic engineer.
  - 2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.”

(Source: Corvallis Land Development Code, Section 4.0.70(a), edited.)

**16.28.207 Access Control Guidelines and Coordination (New Section)**

A new section should be created to require coordination with ODOT, and list access management guidelines that apply to Highway 26 and Highway 211. The provisions of the section would be as follows:

- A. Coordination with ODOT required - Language should be developed to clearly state that the city will notify and coordinate with ODOT regarding all proposals for new or modified public and private accesses on to Highways 26 and 211. The notice and coordination procedures would also apply to all developments requiring hearings, regardless of whether there was a new or modified access.
- B. Access management guidelines - Language should be developed to clearly state it is city policy to, over time, reduce non-compliance with state standards for access spacing, specifically the Oregon Highway Plan Access Management Policy guidelines. A table should be provided to cite the guidelines using excerpts for Section 5 Table 24. The table will list the OHP guidelines for the Downtown Area (Bluff Road to Ten Eyck) per Category 3 and the OHP guideline for the remainder of U.S. 26 through Sandy as Category 4. Note: Table 24 is all of the State categories and standards. Only clearly labeled excerpts should be put into the Sandy code so there is no question what the standards are that apply to a particular section of street.
- C. Methods to reduce non-complying accesses - Language should be developed to state that “reduction of non-compliance with the cited State standards” means that all reasonable alternatives to reduce the number of accesses and avoid new non-complying

accesses will be explored during development review. The methods to be explored include but are not limited to: closure, relocation, and consolidation of access; right-in/right out driveways; cross-over easements; and, use of local streets, alleys, and frontage roads.

**16.28.210-230 Design Standards [for Arterials and Collectors]**

These sections need to be updated to be consistent with Table 23 and Figure 20 in Section 5 of the Sandy TSP. It is also recommended that recurrent sections (e.g. landscaping) be consolidated in a topical sections like 16.28.260-.400. The subsections of 16.28.210, .220, and .230 are all similar in the current code. The following recommendations apply to each of those subsections:

- A. *Function:* Consolidate the functional definitions of each street type to a single section. A definition for "Major Arterial" is needed. Suggestion language is: "To carry high volumes of through traffic, mixed with some unavoidable local traffic, through or around the city."
- B1-6 *Standards:* Table 23 and Figure 20 of the Sandy TSP should be used to replace the text currently in subsections B(1)-(6) of sections .210-.230.
- B7 *Landscaping:* Consolidate to a single topical section.
- B8 *Land uses:* Delete this subsection. The land uses served are highly variable and are adequately covered by the zone district provisions.
- B9 *Spacing:* Add to Table 23 (or create a new table) to define the general spacing of the street types. Recommended spacing is:
  - Major and Minor Arterials - 1 mile
  - Collectors - ½ mile
  - Locals - 8-10 streets per mile (see also block length standards of 16.28.610)
- B10 *Parking:* Covered in Table 23
- B11 *Intersections:* Intersection standards are already covered in 16.28.290. Additional language should be added to .290 to give the city engineer the authority to require left turn lanes, signals, special crosswalks, curb extensions and other intersection design elements justified by a traffic study or necessary to comply with the comprehensive plan and zoning code.
- B12 *Street lights:* Consolidate to a single topical section.
- B13 *Bus/trucks:* Consolidate to a single topical section.
- B14 *Bike lanes:* Covered in Table 23.
- B15 *Sidewalks:* Covered in Table 23. Table 23 needs to be amended to cite 8-12' sidewalks are required in all commercial zones, except where adjusted to a lesser standard by the planning director.
- B16 *Slopes:* Consolidate in a topical section, as recommended above in the suggested text for section 16.28.200

B17 *Curves*: Consolidate in a topical section, as recommended above in the suggested text for section 16.28.200.

**16.28.240-.250 Design Standards for Local Streets and Culs-de-sac**

The standards for these types of streets should be revised in the same manner as recommended above for arterials and collectors. The three types of local streets (see Appendix E) allowed by the city should be added to Table 23- all the information needed to fill in the table is within the current text in .240-.250. In addition, section illustration should be prepared.

A topical section addressing when culs-de-sac and dead end streets are allowed should be created. The information currently in 16.28.250(C)(1-2) complies with the TPR - this language should simply be moved to a topic section titled: "Cul-de-sac Limitations".

**16.28.275 Future Street Plans Required (New Section)**

Future street plans are conceptual plans, street extensions, and connections on acreage adjacent to a land division. They assure access for future development and promote a logical, connected pattern of streets. It is recommend that Sandy require future street plans for all land division applications.

The new section would:

- State that it is in the interest of the City of Sandy to promote a logical, connected pattern of streets;
- Require all applications for land divisions to provide a plan for extension of streets to adjacent parcels within a 400 foot radius of the study area.

**16.28.390 Streets - Access to Arterials**

The Town Plan and TPR generally discourage culs-de-sac. Subsection B of .390 should be revised to delete reference to culs-de-sac.

**16.28.610 Blocks - Size**

This section should be updated to say: "Blocks located in the Residential Districts shall not generally exceed 600 feet in length. Blocks located in the Commercial and Office Districts shall not generally exceed 400 feet in length..." The second sentence should be deleted - street spacing on Arterials is covered by Table 23.

**16.28.620 Blocks - Easements**

Subsection C should be amended to require a 10 foot pedestrian and bicycle path in a minimum 15 foot right-of-way or tract. These dimensions provided enough width for pedestrians to feel safe in mid-block crossings.

**17.42.111 Parking Reductions (New Section)**

Suggested language to govern parking reductions is:

The number of vehicular spaces required in Section 17.42.110 may be reduced by up to 10% if any of the following are demonstrated to the satisfaction of the Planning Director:

- Residential densities greater than 9 units per gross acre.
- Pedestrian facilities not strictly required by the code are provided (e.g. wide sidewalks, plazas, benches).
- The site is within the Civic Overlay district.

The shared parking standard of the City (up to 30 percent if the criteria are met) should be duplicated in this section. Commercial uses only may use on street parking adjacent to the property in the required spaces for a proposed use. Exception: State Highway right-of-way, Highway 26 and Highway 211, cannot be used for required parking.

**17.42.136 Bicycle Parking (New Section)**

Sandy currently does not require bicycle parking. Revisions to this section are recommended to require parking for commercial and institutional uses. The following are provisions of this section:

Amount of bicycle parking spaces required:

- A. Single family detached, duplex, triplex - None.
- B. Multi-family residential (4 units or more) - 1 space per unit.
- C. Commercial uses - 10 percent of required vehicle parking.
- D. Civic uses (e.g., library, city hall) - 20 percent of required vehicle parking.
- E. Pre-school/Kindergarten - 10 percent of required vehicle parking Elementary, Middle, and High School - 8 spaces per classroom College - 8 spaces per classroom plus 10 percent of vehicular parking.
- F. Industrial Uses - 5 percent of required vehicular parking.

**Bicycle Parking Design Standards**

Bicycle parking design standards should also be included as a new section of the Sandy codes. Suggested standards are as follows:

- A. Safe, convenient pedestrian access shall connect the bicycle parking to the main entrance of the principle use on the site. Bike racks shall be reasonably close to the main entrance of the building.
- B. If located within parking lots, streets, or driveways, bike racks shall be separated by curbs or other barriers.
- C. Curb cuts are required to provide safe and convenient access.
- D. At least 50 percent of required bicycle parking shall be covered, except for in parks and the downtown area.

## **RECOMMENDED ADDITIONS TO THE SANDY COMPREHENSIVE PLAN POLICIES DRAFT - SEPTEMBER 16, 1995**

The following policies are recommended to support the code provisions cited in Appendix E.

### **Street Connectivity**

The City of Sandy supports a pattern of connected streets to: (1) provide safe and convenient options for cars, bikes, and pedestrians; (2) create a logical, recognizable pattern of circulation; and, (3) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

### **Street Pattern**

To promote a connected pattern, the City may require applicants to prepare future street plans showing how their properties will fit into a logical, connected pattern. Safe and convenient routes will be provided from all residential areas to nearby activity centers such as parks, schools and commercial centers.

### **Transportation Impacts**

The City may require some development proposals to prepare transportation impact studies in order to determine impacts, determine the reasonableness and proportionality of needed improvements, and/or justify modifications to City street standards. The City may require that the full cost of such studies be borne by the applicant.

### **Access Management on Highways 26 and 211**

The City's Transportation System Plan establishes that there are far more accesses on Highways 26 and 211 than desired by State access management guidelines. It is the city's policy to work cooperatively with the state and applicants to, over time, reduce the number of access on these highways. The City will require applicants to explore all reasonable ways to limit or reduce access on these highways. The State may require accesses be closed or consolidated, and other means to reduce access and turning movements on the State highways. This policy also applies to City streets.

### **Bicycle Parking**

The city supports bicycling. Bicycle parking will be required of multi-family, commercial, and institutional developments. The City may waive or reduce the bike parking requirements if it is conclusively demonstrated that full application of the standard is not warranted.

**ORDINANCE NO. 12 -97**

**AN ORDINANCE ADOPTING THE SANDY TRANSPORTATION SYSTEM PLAN.**

**WHEREAS**, the City of Sandy is currently in the Department of Land Conservation and Development (DLCD) Periodic Review process; and

**WHEREAS**, the Transportation Planning Rule requires that each city and county in Oregon adopt a detailed Transportation System Plan (TSP) to address existing and future transportation needs of the community; and

**WHEREAS**, Sandy's Comprehensive Plan contains several general policy statements relating to transportation but the City does not have a plan which addresses transportation issues in a comprehensive manner, and

**WHEREAS**, it is important for the City to have a plan that satisfies state requirements for transportation planning and which responds to the transportation needs of the community's growing population; and

**WHEREAS**, a special citizen task force assisted in the preparation of the Transportation System Plan to guide future transportation facility improvements within the City of Sandy; and

**WHEREAS**, the proposed Transportation System Plan is an amendment to the Comprehensive Plan and must be adopted pursuant to a proscribed land use process including adoption by an ordinance; and

**WHEREAS**, the Planning Commission conducted a public hearing to take public testimony on the proposed Transportation System Plan on September 8, 1997 and forwarded the matter to the City Council with a recommendation for adoption on September 8, 1997; and

**WHEREAS**, the City Council conducted public hearings concerning the proposed Transportation System Plan to provide opportunity for public comment on September 15, 1997, September 22, 1997, and October 6, 1997; and

**WHEREAS**, the City Council is satisfied that this matter has been adequately considered:

**NOW THEREFORE BE IT ORDAINED BY THE COMMON COUNCIL AND APPROVED BY THE MAYOR THAT:**

**Section 1.** Findings of fact supporting adoption of the proposed Transportation System Plan (TSP) are as follows:

- a) The proposed Transportation System Plan complies with requirements of the State Transportation Planning Rule, which requires local governments to adopt a detailed Plan that addresses all modes of transportation.
- b) As a capital facilities plan, the proposed Transportation System Plan serves as a support document to, and an element of, the City's Comprehensive Plan and will guide future decisions pertaining to transportation facilities.

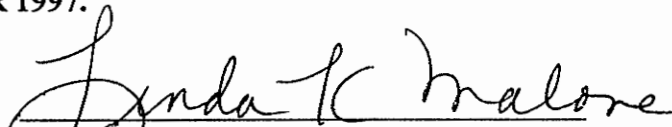


- c) The proposed Transportation System Plan recommends transportation improvement projects that will benefit the community as a whole because they will either accommodate higher traffic volumes resulting from increased population growth, or they will improve circulation and neighborhood connectivity for all modes of transportation.
- d) Revisions (Addendum 9/29/97) to the proposed Transportation System Plan as forwarded to the City Council by the Planning Commission are desirable and necessary in order to clarify ambiguities or to correct errors in the proposed Transportation System Plan text and maps.
- e) The proposed Transportation System Plan is consistent with the goals and policies of the Sandy Comprehensive Plan and with all applicable Statewide Planning Goals.
- f) The proposed Transportation System Plan will contribute to the public health, safety and welfare of Sandy citizens.
- g) Adoption of the proposed Transportation System Plan involves a legislative action, which is being processed in accordance with the Sandy Municipal Code.

**Section 2.** Findings of fact supporting adoption of the proposed Transportation System Plan and the Addendum to the City of Sandy Transportation System Plan dated September 29, 1997 are listed in Section 1 (above) and additional findings are attached hereto as Exhibit B and incorporated herein by reference.

**Section 3.** All remaining provisions of the Sandy Municipal Code are reaffirmed in their entirety.

**THIS ORDINANCE IS ADOPTED BY THE COMMON COUNCIL AND APPROVED BY THE MAYOR THIS 20<sup>th</sup> DAY OF OCTOBER 1997.**

  
Linda K. Malone  
Mayor

ATTEST:

  
Carol A. James  
City Recorder