



# Oregon

Theodore R. Kulongoski, Governor

**Department of Land Conservation and Development**

635 Capitol Street, Suite 150

Salem, OR 97301-2540

(503) 373-0050

Fax (503) 378-5518

[www.lcd.state.or.us](http://www.lcd.state.or.us)

## NOTICE OF ADOPTED AMENDMENT

December 20, 2006

TO: Subscribers to Notice of Adopted Plan  
or Land Use Regulation Amendments

FROM: Mara Ulloa, Plan Amendment Program Specialist

SUBJECT: City of Bend Plan Amendment  
DLCD File Number 012-06



The Department of Land Conservation and Development (DLCD) received the attached notice of adoption. A copy of the adopted plan amendment is available for review at the DLCD office in Salem and the local government office.

Appeal Procedures\*

**DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: January 2, 2007**

This amendment was submitted to DLCD for review 45 days prior to adoption. Pursuant to ORS 197.830 (2)(b) only persons who participated in the local government proceedings leading to adoption of the amendment are eligible to appeal this decision to the Land Use Board of Appeals (LUBA).

If you wish to appeal, you must file a notice of intent to appeal with the Land Use Board of Appeals (LUBA) no later than 21 days from the date the decision was mailed to you by the local government. If you have questions, check with the local government to determine the appeal deadline. Copies of the notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR Chapter 661, Division 10). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

**\*NOTE: THE APPEAL DEADLINE IS BASED UPON THE DATE THE DECISION WAS MAILED BY LOCAL GOVERNMENT. A DECISION MAY HAVE BEEN MAILED TO YOU ON A DIFFERENT DATE THAN IT WAS MAILED TO DLCD. AS A RESULT YOUR APPEAL DEADLINE MAY BE EARLIER THAN THE ABOVE DATE SPECIFIED.**

Cc: Gloria Gardiner, DLCD Urban Planning Specialist  
Mark Radabaugh, DLCD Regional Representative  
Eric Jacobson, DLCD Transportation Planner  
Wendy Robinson, City of Bend

<paa> ya/ph

FORM 2

D L C D NOTICE OF ADOPTION

This form must be mailed to DLCD within 5 working days after the final decision per ORS 197.610, OAR Chapter 660 - Division 18 (See reverse side for submittal requirements)

DEPT OF

DEC 13 2006

LAND CONSERVATION AND DEVELOPMENT

Jurisdiction: city of Bend Local File No.: 05-547 (If no number, use none)

Date of Adoption: Nov. 15, 2006 Date Mailed: DEC 12, 2006 (Must be filled in) (Date mailed or sent to DLCD)

Date the Notice of Proposed Amendment was mailed to DLCD: 10/29/06

- Comprehensive Plan Text Amendment, Comprehensive Plan Map Amendment, Land Use Regulation Amendment, Zoning Map Amendment, New Land Use Regulation, Other: Refinement Plan Overlay (Please Specify Type of Action)

Summarize the adopted amendment. Do not use technical terms. Do not write "See Attached."

amendments to add a refinement plan overlay district and locate new minor arterial and frontage road alignment. Designate appropriate zoning and implementation standards

Describe how the adopted amendment differs from the proposed amendment. If it is the same, write "Same." If you did not give notice for the proposed amendment, write "N/A."

Same w/ minor wordsmithing

Plan Map Changed from: CH/RL to CG, ME, RS, RM, PF

Zone Map Changed from: CH/RL to CG, ME, RS, RM, PF

Location: SW Bend South of Murphy Rd Acres Involved: ~ 102

Specify Density: Previous: Rural Low Density New: std & medium Density

Applicable Statewide Planning Goals: 1, 2, 5, 8, 9, 10, 11, 12, 14

Was an Exception Adopted? Yes: No: X

DLCD File No.: 012-06 (15351)

Did the Department of Land Conservation and Development receive a notice of Proposed Amendment **FORTY FIVE (45) days prior to the first evidentiary hearing.** Yes:  No:

If no, do the Statewide Planning Goals apply. Yes:  No:

If no, did The Emergency Circumstances Require immediate adoption. Yes:  No:

Affected State or Federal Agencies, Local Governments or Special Districts: \_\_\_\_\_

Local Contact: city, ODOT Wendy Robinson Area Code + Phone Number: 541-388-5598

Address: ~~Wendy Robinson~~ 710 NW WALL ST.

City: Bend, Zip Code+4: ~~Wendy Robinson~~ 97701

### ADOPTION SUBMITTAL REQUIREMENTS

This form **must be mailed** to DLCD **within 5 working days after the final decision** per ORS 197.610, OAR Chapter 660 - Division 18.

1. Send this Form and TWO (2) Copies of the Adopted Amendment to:  
**ATTENTION: PLAN AMENDMENT SPECIALIST  
DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT  
635 CAPITOL STREET NE, SUITE 150  
SALEM, OREGON 97301-2540**
2. Submit **TWO (2) copies** the adopted material, if copies are bounded please submit **TWO (2) complete copies** of documents and maps.
3. Please Note: Adopted materials must be sent to DLCD not later than **FIVE (5) working days** following the date of the final decision on the amendment.
4. Submittal of of this Notice of Adoption must include the text of the amendment plus adopted findings and supplementary information.
5. The deadline to appeal will be extended if you submit this notice of adoption within five working days of the final decision. Appeals to LUBA may be filed within **TWENTY-ONE (21) days** of the date, the "Notice of Adoption" is sent to DLCD.
6. In addition to sending the "Notice of Adoption" to DLCD, you must notify persons who participated in the local hearing and requested notice of the final decision.
7. **Need More Copies?** You can copy this form on to 8-1/2x11 green paper only ; or call the DLCD Office at (503) 373-0050; or Fax your request to:(503) 378-5518; or Email your request to [Larry.French@state.or.us](mailto:Larry.French@state.or.us) - ATTENTION: PLAN AMENDMENT SPECIALIST.

**ORDINANCE NO. NS-2031**

AN ORDINANCE AMENDING THE CITY OF BEND DEVELOPMENT CODE NS-2016 BY ADDING A REFINEMENT PLAN OVERLAY DISTRICT TO CHAPTER 2.7 AND AMENDING THE ZONING MAP, BY CHANGING THE DESIGNATION OF PROPERTY LOCATED WEST OF THE BEND PARKWAY, SOUTH OF PINEBROOK BLVD AND NORTH OF THE CITY'S URBAN GROWTH BOUNDARY.

THE CITY OF BEND ORDAINS AS FOLLOWS:

- Section 1. The Bend City Council has held a public hearing, considered the Planning Commission's findings and record, and has found that there is a public need and benefit for the proposed change. The Bend City Council adopts the Findings and Recommendation dated August 28, 2006, regarding file PZ-05-547.
- Section 2. The City of Bend Development Code NS-2016 is amended by adding Section 2.7.800; Murphy Crossing Refinement Plan as described in "Exhibit E".
- Section 3. The City of Bend Zoning Map is amended by changing the designation of the property shown in "Exhibit A" from Residential Urban Low Density (RL) and General Commercial (CG) to Residential Urban Standard Density (RS), Residential Urban Medium Density (RM), Public Facilities (PF), Mixed Employment (ME) and General Commercial (CG).

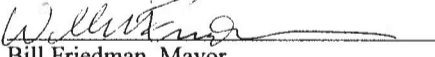
Read for the first time the 1st day of November, 2006.

Read for the second time the 15<sup>th</sup> day of November, 2006.

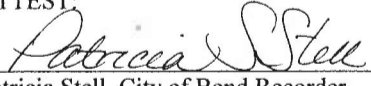
Placed upon its passage the 15<sup>th</sup> day of November, 2006.

YES: 6                      NO: 0

Authenticated by the Mayor the 15<sup>th</sup> day of November, 2006.

  
Bill Friedman, Mayor

ATTEST:

  
Patricia Stell, City of Bend Recorder

**Exhibit E**

2.7.800 Murphy Crossing Refinement Plan

**Sections:**

- 2.7.810 Purposes
- 2.7.820 Districts
- 2.7.830 Murphy Crossing Special Street Standards

**2.7.810 Purpose.**

The purpose of the Murphy Crossing Refinement Plan is to implement the Murphy Crossing Master Development Plan and the Bend Urban Area General Plan policies regarding the Murphy Crossing property, and to create overlay development standards for the residential, commercial and mixed use districts and designated open space within the plan boundaries. The overlay development standards will:

- Provide a variety of employment opportunities and housing types;
- Locate residential uses adjacent to the existing neighborhoods west of the site;
- Create opportunities for large-scale retail uses as well as community commercial and small scale businesses in selected locations to foster a mixed-use district;
- Promote pedestrian and other multi-modal transportation options;
- Ensure compatibility of uses within the development and within the surrounding area;
- Create an interconnected system of streets with standards appropriate to the intensity and type of adjacent use; and
- Create safe and attractive streetscapes that will meet emergency access requirements and enhance pedestrian and bicycle access.

**2.7.820 Districts.**

**A. Applicability.** The standards provided for the Murphy Crossing Refinement Plan area by this section shall supercede the otherwise applicable standards of this Development Code, except where those other standards expressly state they are to supercede the standards of this section.

**B. District Location.** The location of the zoning overlay districts are depicted on the adopted Murphy Crossing Master Development Plan map and as described below.

**Table 2.7.820B**

Zoning Overlay District (Zone)	Location and Characteristics
Park / Open Space (PF)	This area is centrally located within the Refinement Plan area and is intended for Park development by the Bend Metro Park and Recreation District as a neighborhood park.
Park Open Space (RL)	These open space areas serve as a special buffer between more intense development and / or new roadway alignments. The open space area can provide passive pedestrian connections linking existing residential development with the new Murphy Crossing commercial center.
Single Family Residential (RS)	Located along the western boundary of the refinement plan area and predominately north of Romaine Village Way, this area provides a transition between the existing Low Density Residential (RL) housing and the new Murphy Crossing development. The minimum lot size within the RS zone will be 6000 sq ft. with a minimum lot depth of 100 feet when lots abut existing RL development. Homes may be clustered or attached as zero lot line to provide maximum preservation of existing trees.
Multi-family Residential (RM)	The RM overlay located within the central plan area provides a transition between the new standard density single family homes and the more intense commercial development along the easterly portion of the refinement plan area. The density range within the central core

	shall be 10 to 21.7 units per gross acre. RM development is also located at the north and south ends of the plan area along the Parkway. The density range within these areas shall be 7.3 to 15 units per gross acre.
Mixed Use (ME)	The Mixed Use District is applied to areas of Murphy Crossing adjacent to primary commercial streets, to provide opportunities for a variety of smaller-scale, pedestrian-oriented commercial uses located in ground floor street frontages, with residential uses and offices above. Residential units may be located on the ground floor when adjacent to other multi-family housing. The residential density for the residential component of mixed use projects shall not exceed 21.7 units per gross acre.
General Commercial (CG)	Located primarily between the Bend Parkway and the north/south frontage road, the General Commercial District provides for a mix of commercial uses with large site requirements and smaller-scale service commercial uses that can provide a pedestrian-oriented street frontage.

**C. Permitted Land Uses.** Unless otherwise specified in the table below, the land uses listed within the applicable zoning Districts within this Development Code shall be permitted, subject to the provisions of this Code.

**Table 2.7.820C**

Land Use	RS	RM	ME	CG
<b>Residential</b>				
Single Family Detached (as primary use)	P	N	N	N
Single Family Attached (Townhomes or Condominiums)				
• as primary use	P (max. 2 units)	P	N	N
• as secondary use	N	N	P	C
<b>Multi-family</b>				
• Duplex / Triplex	N	P	P	N
• Multi-units	N	P	P	N
<b>Commercial / Mixed-use</b>				
<b>All Commercial / Mixed-use Buildings</b>				
• Building footprint less than 10,000 sq ft.	N	N	P	P
• Building footprint 10,000 – 20,000 sq ft. w/ max building size of 30,000 gross sq ft.	N	N	C	P
• Building footprint 20,000 -50,000 sq ft. w/max building size of 60,000 sq ft.	N	N	N	P
• Building footprint greater than 50,000 sq ft w/max building size of 100,000 sq ft. (location restricted to the north 400 ft of the CG zone)	N	N	N	P
Recreation Facilities	N	N	C	C

**D. Special Development Standards.** In addition to the development standards outlined in the City's Development Code, the following standards shall apply as indicated.

**Table 2.7.820D**

Standard	RS Single Family	RM Multi-family	ME Mixed-Use	CG General Commercial
Density	2.3 -7.3 units/gross acre	7.3 - 21.7 units/gross acre (special location standards for density apply, see Table 2.7.820B)		NA
Lot size	6,000 sq ft min.	2,000 sq ft min.	NA	NA
Setbacks				
• Front	Min. of 6 feet for home, 20 feet for garage	Min. of 6 feet for home, 20 feet for garage. Building entrances shall be	Min. of 5 feet Max. setback shall be 10 feet. Except Forecourt frontage	Min. of 5 feet Max. setback shall be 10 feet. Except Forecourt frontage

Standard	RS Single Family	RM Multi-family	ME Mixed-Use	CG General Commercial
<ul style="list-style-type: none"> <li>• Side</li> <li>• Rear</li> </ul>	<p>Min. of 5 feet for one side and the sum of two side yards shall be 12 ft.</p> <p>Min. 15 ft.</p>	<p>oriented to the street front. Max. setback shall be 10 feet.</p> <p>Min. of 5 feet</p> <p>Min. 10 ft</p>	<p>may be 20 ft.</p> <p>No minimum required, except when abutting an "R" zone see 2.2.500(E)</p> <p>No minimum required, except when abutting an "R" zone see 2.2.500(E)</p>	<p>may be 20 ft.</p> <p>No minimum required, except when abutting an "R" zone see 2.2.500(E)</p> <p>No minimum required, except when abutting an "R" zone see 2.2.500(E)</p>
Lot coverage	35%	40%	50%	NA
Building Height	35 ft	30 ft / two stories for buildings fronting on Murphy Road and the local north/south street bordering the Park. 40 ft / three story buildings are permitted elsewhere. *See Exceptions below	45 ft / three stories	
Lot access	Where new RS lots abut existing RL development, access shall be from the street. All other lots shall access from an alley.	All vehicular access shall be from an alley / private drive or internal parking lot.		
Parking Standards	As required by Chapter 3.3, except for the large box retail uses located in the north 400 ft of the CG zone, those uses may provide a maximum of 6 parking spaces per 1000 gross sq. ft. of building area.			
Frontage types	Not regulated	<ul style="list-style-type: none"> <li>• Front Yard and Porch</li> <li>• Stoop</li> </ul>	<ul style="list-style-type: none"> <li>• Stoop</li> <li>• Forecourt</li> <li>• Storefront</li> </ul>	<ul style="list-style-type: none"> <li>• Forecourt</li> <li>• Storefront</li> <li>• Gallery</li> </ul>
Min. Building Frontage	Not regulated	50%	80%	65%
Special Landscape Setback	<ol style="list-style-type: none"> <li>1. Development along the east side of the north/south local street bordering the Park between Murphy Road and the southern frontage road alignment shall provide an additional 10 foot landscaped pedestrian easement. The easement shall be combined with the street right of way to provide a pleasant pedestrian trail system the length of the Murphy Crossing project area that will easily connect to existing and planned trails, parks and open space. The pedestrian trail replaces the required sidewalk along that street frontage.</li> <li>2. Development along both sides of the frontage road between Murphy Road and the Parkway off ramp / round-about shall provide an additional 4 feet of sidewalk adjacent to the public sidewalk.</li> </ol>			
Architectural Design	As required by Chapters 2.1.900 and 2.2.800			

\*Single family homes on adjoining lots shall share a common wall where it can be shown that tree preservation can be maximized.

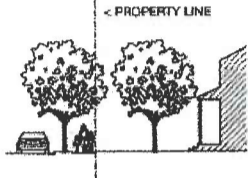
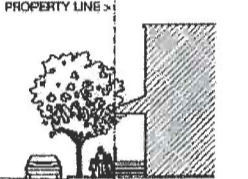
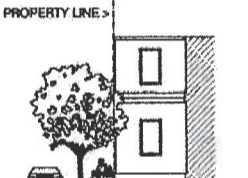
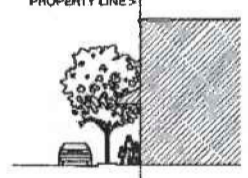
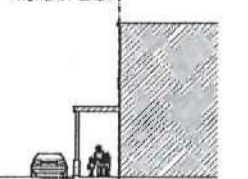
**1. Buffering Standards.** All loading and delivery areas shall be oriented away from residential neighborhoods and screened from view using a combination of vegetation, fences and walls.

**2. Building Height Exceptions:** Buildings in the RM zone that front on Murphy

Road and the local north/south street which borders the park may be 40 feet tall or 3 stories when the portions of the building over 30 feet in height step back a minimum of 30 feet from the front property line.

**E. Frontage Types.** The street facing façade of each proposed building shall be designed as one of the building frontage types allowed by the applicable zoning district as indicated above in Table 2.7.820D. Building frontage placement on the lots shall comply with the setback requirements of the applicable zone. For the purpose of this code, building frontage means the lineal length of façade facing the street.

**Table 2.7.820E**

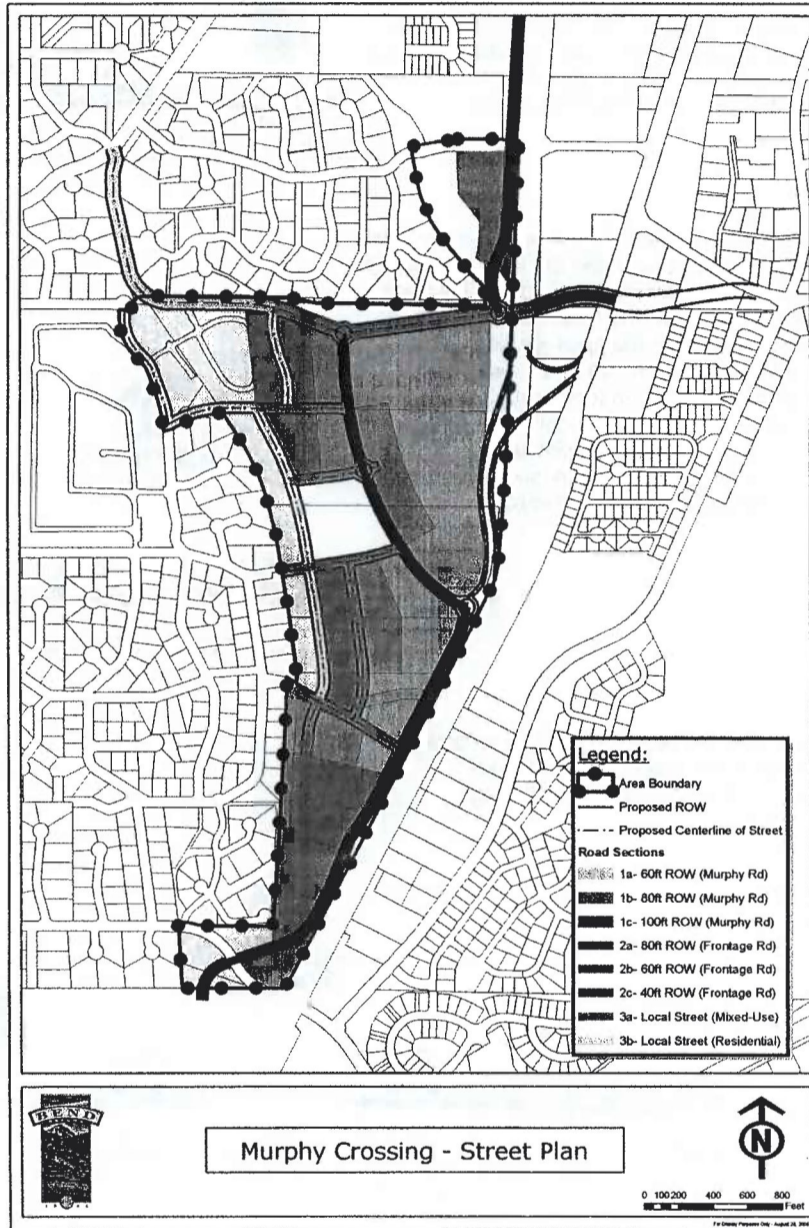
<p>1. <b>Front Yard and Porch.</b> The building façade is set back from the property line (frontage line) as required by the applicable zone, with a front porch providing a covered entry. A fence or wall not more than 36 inches high may define the private space of the yard. Porches shall be at least six feet deep and 12 feet wide and may be elevated no more than 36 inches above the surrounding grade.</p>	
<p>2. <b>Stoop.</b> The building façade is placed close to the property line with the ground floor either elevated a minimum of 24 (but no more than 36 inches) above the sidewalk, or the façade is up to 10 feet from the back of the sidewalk, with an optional low fence not more than 36 inches at the back of the sidewalk. This type is suitable for ground floor residential uses with minimal setbacks.</p>	
<p>3. <b>Forecourt.</b> Most of the building façade is at the property line with a portion of the façade set back. The resulting forecourt is suitable for gardens, restaurant seating, or an entry plaza. This type should be used sparingly and in conjunction with other Frontage Types, as an extensive setback deters pedestrians. Trees within Forecourts should be placed to have their canopies overhang the streets sidewalk. A low wall of fence no greater than 36 inches high may also be placed at the property line.</p>	
<p>4. <b>Storefront.</b> The building façade is placed at or close to the property line with the building entrance (which may be recessed) at sidewalk grade. This Frontage Type is intended for retail uses and is commonly equipped with an awning. An awning extending over the public sidewalk requires City approval. Transparent windows shall occupy at least 65% of the first floor wall area of each storefront.</p>	
<p>5. <b>Gallery.</b> A gallery is a storefront with an attached colonnade that projects over a sidewalk. This Frontage type is intended for retail use, but only when the sidewalk is fully covered by the arcade so that a pedestrian must walk under it. The City must approve any portion of the structure that extends into the public right of way.</p>	

**F. Street Design Types.** The roads within Murphy Crossing will have different designs based on their location and function. The diagram is the key to the different street types. Each street type design will be illustrated in a cross section and described below.

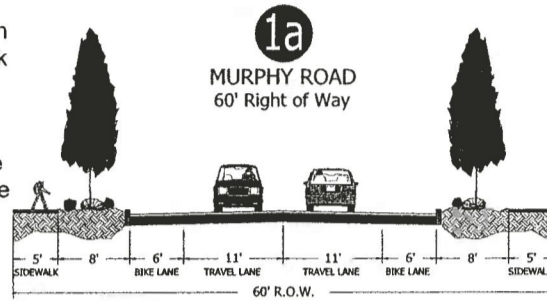
The designated streets within Murphy Crossing are required street elements.



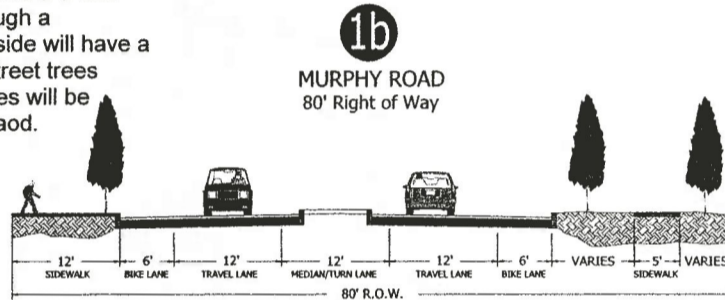
The street alignments depicted are generally located to provide reasonable lot sizes and connectivity within the refinement plan area. During tentative plan development or site plan review, the street alignments proposed streets shall be shown in their general location. The street alignments may move up to 30 feet in one direction without requiring a refinement plan amendment.



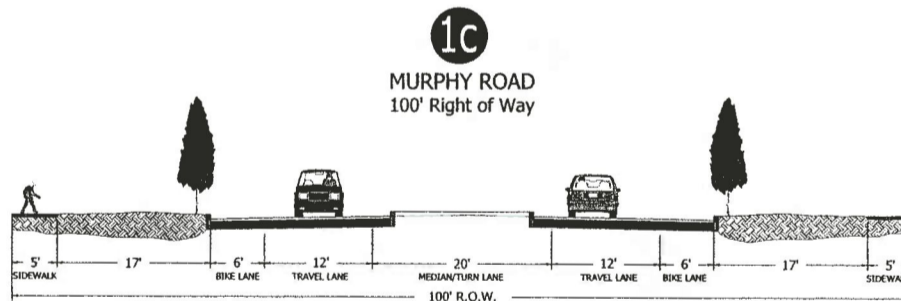
**Murphy Road** - Murphy Road will transition from a 60' right-of-way to 100' feet and back to 60' as the road moves from east to west across the Parkway. The 60' segments will consist of two travel lanes with pedestrian sidewalks along both sides separated by the a landscaped planter strip. Bike lanes will be located on both sides of the street.



The 80' section is located between the west side of the Parkway and the last intersecting street before Brookwood Blvd. This street section will have two travel lanes divided by a 12' partially landscaped median with turn pockets. The northside will have a 5 foot side walk that meanders through a landscaped strip. The south side will have a 12 foot urban sidewalk with street trees placed in tree wells. Bike lanes will be located on both sides of the road.

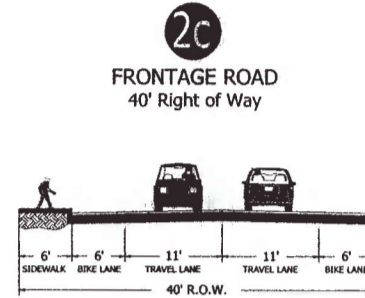


The 100' Section is located on both sides of Third Street and is needed for the intersection turn lanes and through movements.

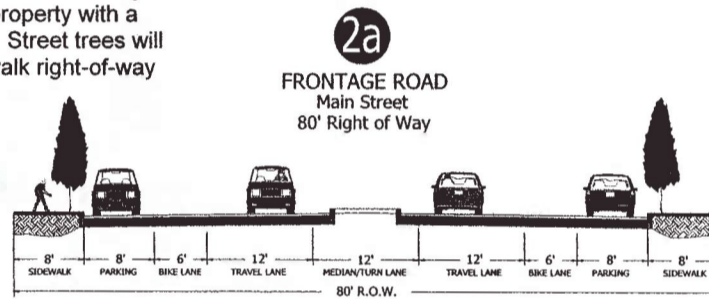


**The Frontage Road** has three distinctly different sections.

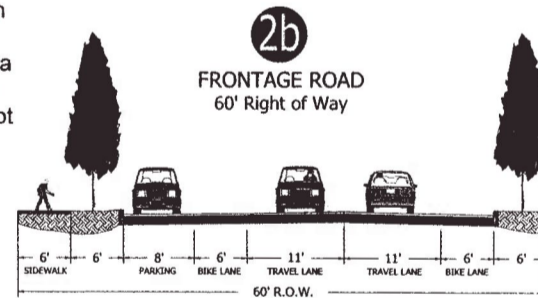
**Frontage Road North** – is a narrow 40' right of way that will provide a link from Murphy Road to Badger Road. The road will have two vehicle travel lanes and bike lanes on both sides. This road runs parallel to the Parkway and therefore only will have a sidewalk on the west side.



**Frontage Road Center** – is the main commercial street section through the Commercial and Mixed-use district. This street will have two travel lanes with a median. The street will allow on street parking and have bike lanes on both sides of the street. Parking will be restricted within the proximity of protected intersections. The sidewalks will be shared between the right-of-way and the adjoining property with a minimum width of 12 feet. Street trees will be placed within the sidewalk right-of-way within tree-wells.

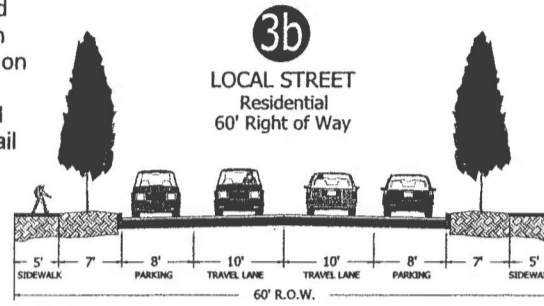


**Frontage Road South** – This street section will have two travel lanes with bike lanes on both sides. Parking will be allowed on the west side of the street. Again this street is a parallel facility next to the Parkway and will have sidewalks only on the west side except where the roadway turn to the west and sidewalks can serve two street frontages.

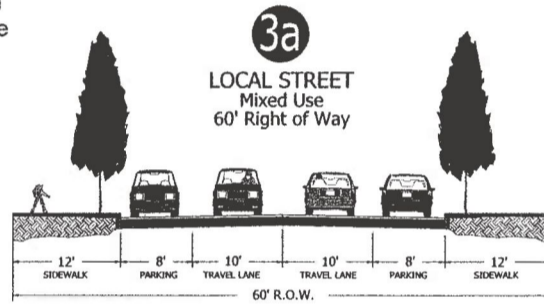


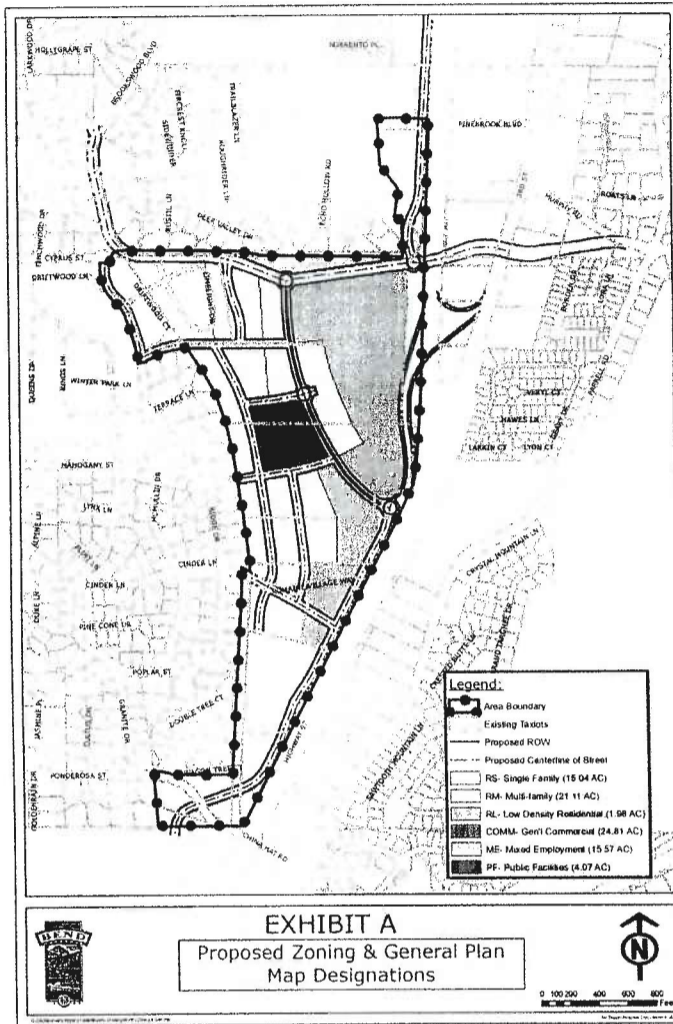
**Local Street** – There are two local street types; Residential and Mixed-Use. Both have 60 feet of right-of-way, two travel lanes and on street parking.

**Residential Local** – Sidewalks are located at the property line and are separated from the street by a planter strip. The sidewalk on the east side of the north/south local residential street which border the park will be replaced by an enhanced pedestrian trail system utilizing a 10 foot easement along the street frontage.



**Mixed-Use Local** – Sidewalks are urban in nature and design with street trees located within tree wells. Along the Park Block, the sidewalks will be designed with the park.





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ORDINANCE NO. NS-2032

AN ORDINANCE AMENDING THE BEND AREA GENERAL PLAN MAP, BY CHANGING THE DESIGNATION OF PROPERTY LOCATED WEST OF THE BEND PARKWAY, SOUTH OF PINEBROOK BLVD AND NORTH OF THE CITY'S URBAN GROWTH BOUNDARY AND AN AMENDMENT TO THE BEND URBAN AREA TRANSPORTATION PLAN TEXT, CHAPTER 6 AND THE APPENDICIES AND THE TRANSPORTATION SYSTEM PLAN MAP.

THE CITY OF BEND ORDAINS AS FOLLOWS:

- Section 1. The Bend City Council has held a public hearing, considered the Planning Commission's findings and record, and has found that there is a public need and benefit for the proposed change. The Bend City Council adopts the Findings and Recommendation dated August 28, 2006, regarding file PZ-05-547.
- Section 2. The City of Bend Zoning Map is amended by changing the designation of the property shown in "Exhibit A" from Residential Urban Low Density (RL) and General Commercial (CG) to Residential Urban Standard Density (RS), Residential Urban Medium Density (RM), Public Facilities (PF), Mixed Employment (ME) and General Commercial (CG).
- Section 3. The City of Bend Urban Area Transportation System Plan Map is amended by changing the designation of Murphy Road west of Parrell Road from a Major Collector to a Minor Arterial and adding the new alignment of Murphy Road west of Parrell Road as shown in "Exhibit B"
- Section 4. To update the Bend Urban Area Transportation System Plan, Chapter 6 and the Appendices Text as described in "Exhibit C" to be consistent with the General Plan Map and the TSP map.

Read for the first time the 1st day of November, 2006.

Read for the second time the 15<sup>th</sup> day of November, 2006.

Placed upon its passage the 15<sup>th</sup> day of November, 2006.

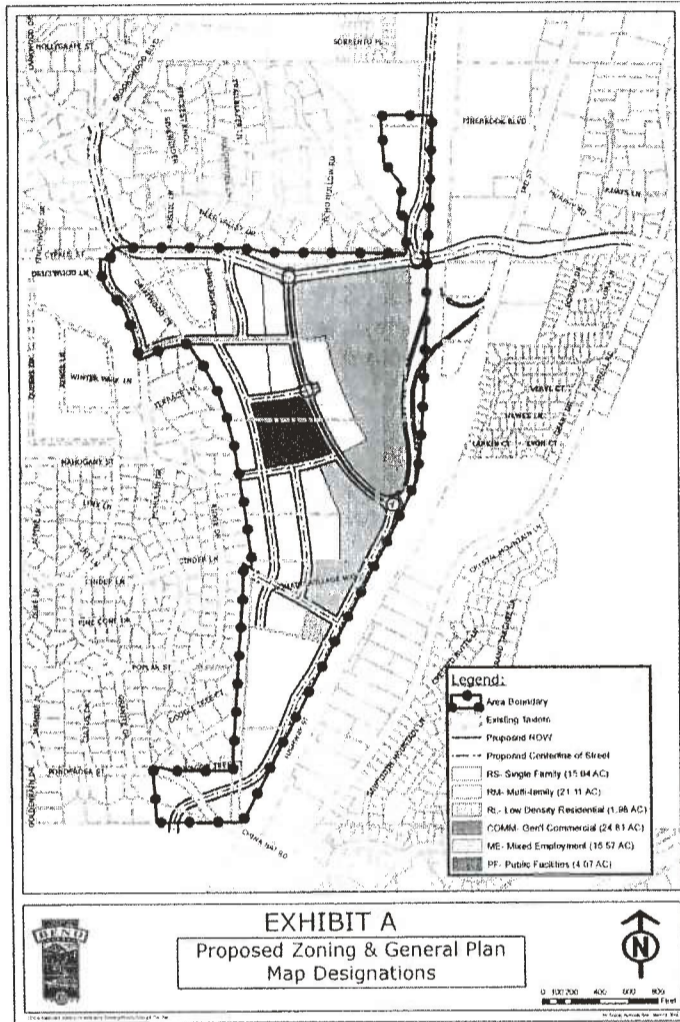
YES: 6                      NO: 0

Authenticated by the Mayor the 15<sup>th</sup> day of November, 2006.

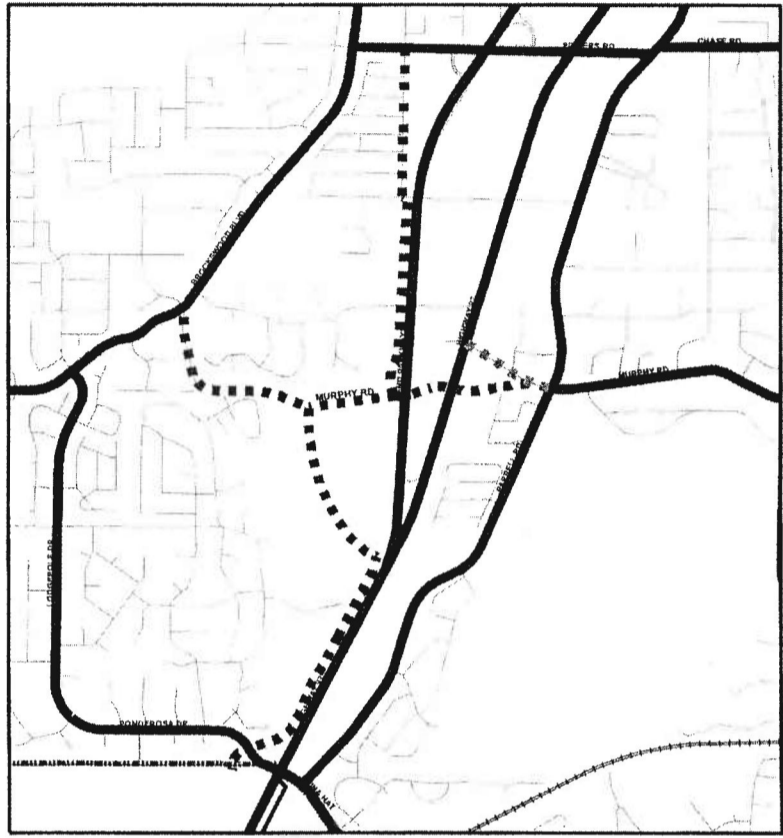
  
Bill Friedman, Mayor

ATTEST:

  
Patricia Stell, City of Bend Recorder







**EXHIBIT B  
PROPOSED BEND URBAN AREA TRANSPORTATION PLAN AMENDMENTS**

Expressway	Proposed Major Collector		FOR DISPLAY PURPOSES		NOT TO SCALE
Principal Arterial	Proposed Local				
Minor Arterial	Railroad				
Proposed Minor Arterial	UGB - Urban Growth Boundary				
Major Collector					

BEND URBAN AREA TRANSPORTATION SYSTEM PLAN

**Exhibit C**

*Adopted: October 11, 2000*

**Bend TSP**

**page 94**

Ordinance NS-2032

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## **BEND URBAN AREA TRANSPORTATION SYSTEM PLAN**

### **6.0 TRANSPORTATION SYSTEM PLAN**

The following sections describe strategies, approaches and standards designed to meet community transportation system needs of the next twenty years. For each respective component, pertinent objectives and policies are included at the end of this chapter.

### **6.1 TRANSPORTATION SYSTEM MANAGEMENT**

Transportation System Management (TSM) improvements are intended to optimize the carrying capacity of roadways. TSM improvements can alleviate congestion and reduce crashes by minimizing the number of access points and turning movements, and by creating separate turning and merging lanes. Other TSM measures include controlling the location of driveways, constructing raised medians, prohibiting on-street parking, timing and synchronizing traffic signals, constructing roundabouts and signals, and improving intersection corners to facilitate easier turning movements for large vehicles.

By focusing improvements on congested intersections or areas that otherwise disrupt the flow of traffic, TSM improvements can provide a lower cost alternative to widening roadways (between intersections) and protect the function of roadways. TSM strategies are easiest to implement where they can be constructed along new or developing transportation corridors (e.g., along the East 27<sup>th</sup> Street corridor). Conversely, creating turn limitations and access control along fully developed transportation corridors requires a significant adjustment by the motoring public and businesses affected by these changes. It is important that public agencies work cooperatively with impacted businesses to fully evaluate access alternatives and to minimize economic hardships that may be created by new circulation patterns. It is important that TSM improvements account for the needs of all modes of travel, particularly that pedestrian, bike and transit movements, and safety are not compromised in exchange for improving roadway capacity.

### **6.2 TRANSPORTATION DEMAND MANAGEMENT**

Transportation Demand Management (TDM) strategies focus on altering driver behavior and mode choice to lower the demand on the street system especially during peak travel times. Common measures to reduce the number or alter the timing of peak hour vehicle trips include: compressed or flexible work schedules, ridesharing, use of transit, bicycle or pedestrian commuting, parking management, or actions that reduce the need to travel, such as working at home and "teleworking."

TDM programs complement other transportation planning strategies and goals that are aimed at preserving livability and reducing single occupant vehicle travel. Successful programs can be measured by an increase in vehicle occupancy rates and reduced vehicle miles traveled.

Demand management strategies often involve an education and promotion effort to encourage changes from single-occupant driving behavior. Local government and other groups can help to educate the public regarding the actual costs of travel on the

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transportation system and encourage TDM programs to reduce system demand. Community-wide events can also encourage employees to participate in TDM efforts by promoting alternatives to driving alone. Together, these efforts can make important strides toward improving public awareness regarding travel alternatives.

Demand management programs work best where there are heavily congested corridors, clear work trip travel patterns, limited parking, and the provision of viable alternatives to driving. Experience from successful demand management programs indicates that other important factors include development of quantifiable goals and periodic evaluation, demand management coordination, industry involvement, parking management, employee and employer incentive programs, and strong public support. Thus, transportation demand management strategies require a concerted community effort and commitment in order to fulfill the greatest trip reduction potential.

### 6.3 PEDESTRIAN AND BICYCLE SYSTEM

Pedestrian and bicycle facilities are integral elements of the transportation system and valuable components in the strategy to reduce reliance on automobiles. The community benefits in many ways from adequate pedestrian and bicycle facilities including reducing traffic congestion, supporting tourism, and providing accessibility to all parts of the community. Further, the segment of the population without access to a car benefits from quality pedestrian and bicycle facilities. The year 2000 US Census data will help to quantify this group of non-drivers.

#### 6.3.0.1 Trip Potential

Travel by bicycle and foot has tremendous potential in the Bend urban area. A large part of this is attributable to Central Oregon's predominantly sunny weather and relatively flat terrain. In addition, the outdoor spirit of the citizenry, the desire to engage in healthy exercise and the interest in alternative modes of travel provide a strong population base for generating non-automobile trips. The visibility of pedestrian and bicycle traffic throughout the year confirms the importance of these travel options.

Bend's relatively small size makes travel by bicycle or foot fairly feasible. Depending on the type of trip, studies indicate a willingness of people to walk between a quarter and a half mile, and bicycle upwards to a few miles. According to the 1990 National Personal Transportation Survey, 27 percent of all trips are one mile or less, 40 percent are two miles or less and 63 percent are five miles or less.

**"... the outdoor spirit of the citizenry, the desire to engage in healthy exercise and the interest in alternative modes of travel provide a strong population base for**

The 1990 census data shows walking and bicycling accounted for about seven-percent of Bend's trips to work. Travel time to work for all trips was less than five minutes for six-percent of the workers, less than ten minutes for 31 percent and less than 15 minutes for

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63 percent. A short trip length and travel time is part of the equation for encouraging non-auto trips. A complete and safe network of trails, sidewalks and bicycle facilities will further encourage these trips.

**Other Benefits:** In addition to reducing traffic, non-motorized trips conserve fossil fuels, reduce noise, protect air and water quality, and reduce the demand for parking spaces. The air quality issue is particularly important to Central Oregonians, as the pristine mountain views and clean air are cherished resources of the community. A concerted effort to reduce automobile trips and the resultant exhaust emissions can be valuable in diminishing the impact on air quality.

**Community and Site Design:** An adequate bike and pedestrian system requires a complete network of walkways and bikeways that connect parks, schools and activity centers. Orienting buildings to the street and providing safe and easy connections from stores to the sidewalk, and providing convenient bike parking all help make bicycling and walking more desirable trip choices.

### **Maintenance and Repair**

Maintenance and repair of the bicycle and pedestrian system are critical to the use of these transportation modes. Timely snow removal, sweeping, cinder removal, patching, surface repair and striping are all necessary to maximize the use of bike lanes and sidewalks as alternative transportation modes. Property-tight sidewalks may require less maintenance than curb-tight sidewalks because the landscape strip provides a place to pile snow and separates the sidewalk from road debris accumulation.

The City currently assigns responsibility for sidewalk maintenance and repair to the adjacent property owners. The current system does not adequately assure timely maintenance and repair of the sidewalk network. The City shall develop a program to ensure timely maintenance and repair of all sidewalks.

The current use of cinders negatively impacts the bicycle lane and pedestrian system. The City should consider alternatives to cinders. The City's elimination of the use of chip sealing has had a positive impact on bicycle safety and chip sealing should not be reinstated.

### **6.3.1 THE PEDESTRIAN SYSTEM**

Walking is the most basic form of transportation, undertaken by virtually every citizen. Sidewalks are an essential element of the transportation system since every trip involves at least one walking segment. Because the primary function of sidewalks is to provide a safe place for pedestrians, facilities need to be designed accordingly.

Since the late 1980s sidewalk construction has been required in all new residential and commercial developments. Sidewalks will normally be located on both sides of the street and separated from the street by a curb and a landscape strip. In steep topography or unusual topography, sidewalks may be allowed on only one side of the street and may be curb-tight. Sidewalks are normally constructed with a concrete material although special

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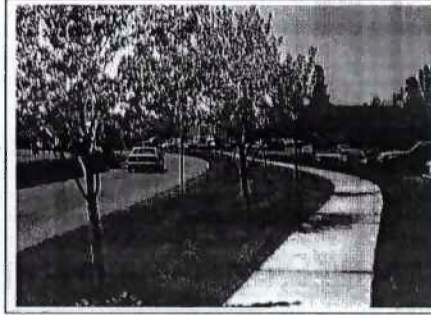
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paver blocks may be utilized in high-use pedestrian areas, such as the downtown, to enhance surface aesthetics. Sidewalks vary in width depending on anticipated pedestrian volumes but have certain minimum widths established to meet Americans with Disabilities Act (ADA) requirements. Minimum sidewalk widths are established in the implementing ordinances of the city.

### **6.3.1.1 The Landscape Strip**

The area located between a sidewalk and the curb serves many important functions and is commonly referred to as the planting or landscape strip (Figure 20). The landscape strip creates space for a variety of underground utilities such as telephone, cable television, fiber optic cables, etc. The landscape strip is also beneficial for locating utility poles, fire hydrants, benches, bus shelters and other features that might otherwise block or obstruct pedestrian travel along sidewalks.



*Figure 20. Landscape buffered sidewalk  
On Colorado Avenue  
Photo by: City of Bend*

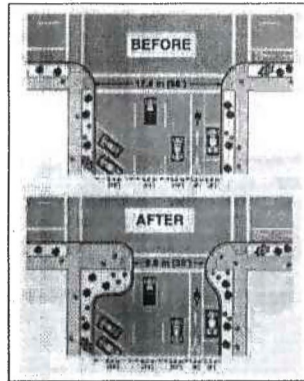
Landscaping helps to soften the hard edge created by pavement and curbs. Large trees can also provide cooling summer shade for parked cars and pedestrians. A canopy of street trees can help to slow traffic and enhance the beauty of the community.

The physical separation from the street also improves the design of sidewalks by maintaining a constant grade without dipping at driveways, and makes American with Disabilities Act compliance easier. During winter months, snow can be plowed into these areas from the street and not block sidewalks. The landscape strip provides a physical separation from the adjacent roadway, providing enhanced pedestrian comfort and improved walking experience.

### **6.3.1.2 Street Crossings**

Crossing local street intersections is normally not difficult because of lower traffic volumes and because the distances are relatively short. Crossing arterial streets is much more challenging because of street widths, high traffic volumes and speeds. Minimizing crossing distances required for pedestrians is important to reduce the psychological barrier created by wide streets and to increase pedestrian safety.

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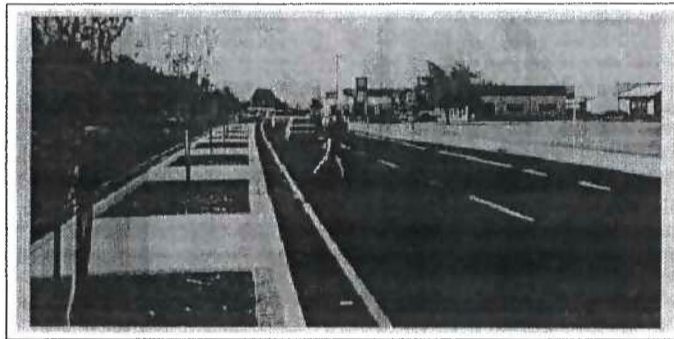


*Figure 21. Examples of curb extension Retrofit*  
Source: Oregon Bicycle & Pedestrian Plan

Construction of **curb extensions** is one method to improve the visibility of pedestrians and reduce the crossing distance of the street (Figure 21). These extended "bulb-outs" add valuable pedestrian space and can help facilitate a quicker movement of pedestrians across busily traveled roadways. The additional space can also provide a location for bike parking or other sidewalk amenities. Downtown Bend is an excellent example of where this type of design has been used very successfully.

Another solution to addressing conditions where traffic volume is high, or roadways are wide, is the **construction of raised medians, islands or refuges**. Medians can significantly improve pedestrian visibility and provide a place to wait for safe gaps in the traffic stream while crossing busy roadways (Figure 22).

Medians can also improve the aesthetics of a community with added landscaping. Islands and refuges are especially important at large intersections to reduce the crossing distance and improve pedestrian comfort by minimizing exposure to motor vehicles.



*Figure 22. Median allows pedestrian to cross one direction of traffic at a time*  
Source: Oregon Bicycle & Pedestrian Program

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One important function of **traffic signals** is providing for the movement of pedestrians across busy intersections. Where large radius corners have been constructed at the intersection to accommodate higher speed turn or truck movements, building a dedicated turn lane with a raised island for pedestrians is important (Figure 23). This significantly improves the comfort of pedestrians by reducing the amount of uninterrupted pavement to cross.

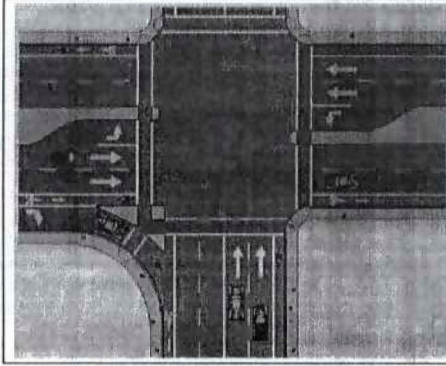


Figure 23. Pedestrian refuges at a signalized intersection  
Source: Oregon Bicycle & Pedestrian Plan

### 6.3.1.3 Multi-Use Trails

Trails provide important transportation connections and shortcuts to destination points that make travel by foot or bicycle safe, pleasant and convenient. Recreational activity is also a common use of the trail system, with scores of residents and tourists using these areas for walking, jogging, bicycling and other activities.

Trails also provide citizens and visitors with links to the natural environment. One special quality of a trail is the opportunity they provide to escape the bustle of the city - while remaining within the city. This is particularly evident along the Deschutes River trail system (Figure 24). Public opinion supports this sentiment, as people cite the ability to depart from traffic congestion, noise and exhaust as a prime factor in their enjoyment of trails.

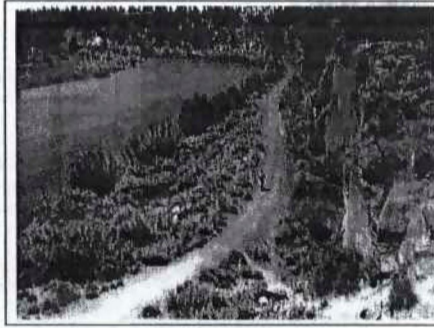


Figure 24. Deschutes River Trail  
Photo by: City of Bend

The first trail plan was established with the adoption of the Bend Area General Plan in 1981. This has been the policy tool that has provided some protection of trail

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corridors and has promoted the construction of the current limited system. In 1995, consultants for the City studied Bend's off road trail network to evaluate the original trail plan<sup>92</sup>. As a result, several additions were adopted by the City and County and incorporated into the General Plan in 1996. The current "primary" trail plan is illustrated on the Bicycle and Trail System Map (Exhibit A.). The City and the Bend Metro Park and Recreation District are working together in the planning and development of a trail system to meet the recreational and transportation needs of the community.

### **6.3.2 THE BICYCLE SYSTEM**

Residents and tourists of all ages enjoy bicycling for both transportation and recreational use. Bend's relatively small size and short distances encourage travel by bicycle. The majority of the current bike system is found on arterial and collector streets as bike lanes. The network of multi-use trails also serves as an important part of the planned bike system.

#### **6.3.2.1 Bike lanes**

A **bike lane** is a space on the road shoulder that is delineated from the adjacent vehicle travel lane by a solid white striped line. Bike lanes are provided on both sides of the street and promote travel in the same direction as the adjacent lane of traffic. This practice provides a safer place for bicycles and requires a cyclist to conform to the laws of motor vehicle travel.

Bike lanes are intended to provide a convenient and safe location for bicycles on collectors and arterials. Bike lanes provide a clear and distinctive location on the road for bikes to travel at their own speed. They improve driver expectation of bike movements and they reduce bike and auto conflicts. Bike lanes provide a benefit to all modes of travel. For pedestrians, they help separate bike movements from the sidewalk and they increase walking comfort due to the increased sidewalk separation from adjacent auto traffic. For motor vehicle traffic, the lanes add buffer space from roadside obstacles, they improve driveway and intersection sight distances and they provide a temporary place for disabled vehicles to pull out of the travel stream.

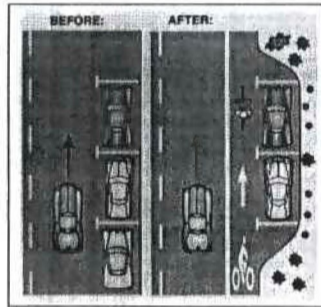


Figure 25. Example of retrofitting street to accommodate bike lanes and on-street parking  
Source: Oregon Bicycle & Pedestrian Plan

It is preferable not to permit on-street parking next to a bike lane due to the hazard of opening car doors and the conflict of cars moving in and out of the parking stalls. However, there may be locations where it is necessary to provide both parking and bike

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lanes. Where space is limited, one design solution is the construction of recessed parking bays to better accommodate the space requirements for both needs (Figure 25). In other cases, such as the commercial downtown core area where a large inventory of on-street parking is essential, the need to provide vehicle parking may take priority over the delineation of bike lanes. In that case, where lower traffic speeds can be maintained, bikes can better mix with traffic without causing significant problems.

### **6.3.2.2 Bike Parking Facilities**

For a bikeway network to be used to its full potential, secure bicycle parking should be provided at likely destination points. Bicycle thefts are common and lack of secure parking is often cited as a reason people hesitate to ride a bicycle to certain destinations. Bicycle parking should also be convenient, easy to access and provide suitable protection from the weather. Bike parking needs to be designed for both short- and long-term use depending on site conditions and demands. The city of Bend has provided a number of short-term bike racks throughout the central business area as part of the city's downtown redevelopment effort. These racks have helped reduce some of the automobile parking demand in this activity center. When public transportation service is provided in the urban area, bike-parking facilities will need to be provided at all park and ride lots, major transit stops and transit center facilities. Adequate bike parking facilities need to be provided where other public facilities such as libraries, parks, recreation centers and schools are constructed.

## **6.4 PUBLIC TRANSPORTATION SYSTEM**

### **6.4.1 TRANSIT FEASIBILITY**

Bend does not currently have a fixed-route transit system in place but does have a Dial-A-Ride system for seniors (60 and older) and eligible disabled persons. The Dial-A-Ride transit provides personalized door to door service but requires call-ahead reservations a day or more in advance of a planned trip.

The feasibility of transit within the Bend urban area has been the subject of two separate studies. In 1994<sup>B.3</sup>, the City studied Bend's demographic, employment, travel and transportation system characteristics in relation to how they might support transit use. In 1996<sup>B.4</sup>, the City hired a transit consultant to further evaluate how transit could be implemented in the community. This study augmented the previous analysis of transit feasibility by analyzing transit systems from similar sized cities, developing system evaluation criteria, conducting a public opinion survey on transit attitudes and financing methods, and evaluating capital needs and financing strategies. In 1997, based on this comprehensive evaluation of transit feasibility, the City Council declared that transit was feasible at build-out for the city of Bend.

In 2000<sup>B.5</sup>, an additional study (discussed in further detail in section 5.5.2) evaluated possible expansions and improvements to the existing Dial-A-Ride system. The report recommended (and BTAC supported) that the City pursue this strategy as an initial method of providing public transportation for the general public. BTAC also recommended that the City pursue seeking voter approval of a transportation funding

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measure that would include operating funds for an expanded Dial-A-Ride system for general public use. The City will forward a funding measure to the voters to fulfill this recommendation in the fall of 2000. (The City is also examining other means of expanding and improving the existing Dial-A-Ride system - although service expansion would be far more limited without obtaining additional operating funds). [See also Sections; 5.5.2 *The Recommended Transit Alternative* and 6.9.5 Public Transportation System – *Policies, Implementation, Benchmarks and Funding*]

### **6.4.2 MULTI-MODAL STRATEGIES**

Public transportation is an important element of multi-modal transportation planning. It provides a valuable transportation alternative for high volume travel corridors. Public transportation can improve the efficiency of arterial streets because fewer vehicles are required on the road to serve the same number of trips. When faced with costly road improvement or construction difficulties, concerted trip reduction programs can add years of life to a roadway's capacity. Improvements to air quality can also be achieved by the net reduction of motor vehicle emissions. Public transportation can also play an important role in reducing congestion and parking requirements in high demand areas such as the downtown.

### **6.4.3 COMMUNITY MOBILITY**

Public transportation improves mobility for a wide range of the traveling public. School age children can use public transportation for trips to school, after-school activities, or recreational pursuits. Likewise, there are many other segments of the population that either don't have a car (many for financial reasons), are unable to drive or would simply prefer to let someone else do the driving. Seniors who need to make unscheduled trips for shopping, medical or other trips have added flexibility to augment their Dial-A-Ride activity. Workers of all ages can get to their jobs without owning or relying on a car. Thus, public transportation is a valuable service that fills a much broader function than solely trip reduction. It provides mobility for those without cars as well as being an alternative to the automobile for many travel needs of the community.

### **6.4.4 PUBLIC TRANSPORTATION FACILITY DESIGN**

#### **6.4.4.1 Transit Centers**

Transit centers are locations where several transit vehicles converge for the purpose of passenger transfer. This creates a very efficient, convenient and safe method of exchanging people between transit vehicles. This also can provide a location and opportunity where several inter- and intracity transportation services can meet to exchange passengers. It is desirable to coordinate public transportation operations such that all vehicles meet at a transit center at close to the same scheduled time. This allows passengers to make easy transfers without a long wait.

A transit center located in the downtown can also provide a convenient connection to the many governmental, banking and shopping activities that are located in this focused business district as well as provide a good location for a central point of operation.

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Thus, a transit center is planned to be located in the downtown area to serve this function. An example of a good location for this facility would be in the proximity of Heritage Square, where institutional uses such as the new Bend Public Library, the Bend-La Pine School District Administrative Offices and City Hall are sited.

In designing a transit center, the location of the facility should provide for orderly circulation and accessibility of all types of transit vehicles, while minimizing the conflict with other traffic flow. The center should be located to minimize the number of pedestrian and vehicle conflicts, and be easy to access by walking or bicycling. Bicycle parking facilities should be designed and located for safe and convenient use, and provided in adequate supply to meet demand. More study will be required to determine the best location(s) and spatial requirements of facilities necessary for this transportation system function.

### **6.4.4.2 Major Transit Stops**

Major transit stops are locations along the transit system where high levels of transit user and bus activity are likely to occur. Additional transit related amenities and pedestrian facilities should be provided to accommodate the differing types of demand. Adjoining developments should be encouraged to provide transit-friendly design elements that facilitate bus movements and convenient pedestrian access to the major transit stop. At the present, the following are proposed as major transit stops; the downtown transit center, St. Charles Medical Center, Central Oregon Community College, Mt. Bachelor shuttle lot and a regional intermodal facility – location to be determined (possibly at the ODOT, Region 4, site off of Empire Blvd. and Hwy 20 - which is currently delineated as a Park and Ride location.). Additional major transit stops may be defined as the system matures and other destinations with high transit ridership potential are identified.

### **6.4.4.3 Transit Friendly Design**

Transit friendly design is an important element in the encouragement of transit trips. Access to transit stops must feel safe and be convenient. The construction of sidewalks and accessways help to assure that the walking link of the transit trip is a safe and pleasant experience. Providing benches, shelters and lighting can also increase the comfort of transit use. As routes are planned and local transit stops are located throughout the system, pullout lanes should be constructed for bus stops to permit buses to pull-out of the traffic flow on heavier traveled arterial streets. Constructing suitable and convenient bike parking and providing buses equipped with bike racks will also encourage longer inter-modal trips to connect with transit.

### **6.4.4.4 Land Use Organization (transit oriented)**

Land use organization that situates high-density residential, mixed-use, entertainment and employment concentrations along transit routes is an important strategy that supports transit use. Additionally, site design elements such as building layout that provides close proximity to the street and convenient pedestrian corridors, will also help to invite transit trip activity. Developing ordinances that support the ease of pedestrian movements to and from transit stops will optimize transit rider potential.

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### **6.4.4.5 Park and Ride Lots**

Park and ride lots, when strategically located, can support both public transportation and rideshare activities. If park and ride lots are located on the edge of the city, they can conveniently serve both directions of travel into and out of town. Park and ride lots also provide a meeting place for car pools and a location for motorists to access a public transportation system. Park and ride lots can either be publicly constructed facilities, or more commonly, a partnership between public and private property interests, typically requiring a cooperative use agreement with the landowner. Shopping centers, churches, or the like, commonly have large parking lots that are underutilized during the day, making park and ride activity complementary with the business demands of the property owner. Van or shuttle systems can also incorporate park and ride lots into a parking management plan by shuttling employees to the work place. This can help to minimize localized parking demand or impacts generated by employee traffic.

Bend currently has one existing designated Park and Ride lot and coordination effort is continuing between the City and the Commute Options Working Group to identify and secure other facilities for this function [See also: Section 3.4.2]. This has been a frustrating effort given property owner concerns over liability issues that have made it very difficult to secure joint use agreements within private parking lots. However, work continues to identify, locate and secure likely park and ride lots through out the Bend area. The highest priority areas are at the north and south entries to the City along or near Highways 97 and 20.

### **6.4.4.6 Transit Trunk Routes and Transitways**

*Trunk routes* are transit routes that normally maintain a higher level of transit service. Greater service levels are achieved by providing more frequent headways (times between buses) either by designating overlapping bus routes down the same street or by running a greater number of, or larger buses along the trunk system. In larger cities, trunk routes also deliver riders from outlying areas where the rider may transfer from a feeder bus that doesn't travel to the core area. Larger cities may also have lessor trunk routes that travel exclusively between these outlying activity centers. Trunk routes typically provide transit service for longer hours of the day and weekend service. Trunk route stops or stations get more use, have greater waiting capacity (i.e., larger shelters) and often have more rider amenities (i.e., pay phones, drinking fountains, route information/maps, ticketing equipment, scheduling monitors, etc.).

*Transitways* are very specialized trunk routes that provide very high levels of transit service. Transit is given a very high priority on transitways to enhance transit service levels by increasing travel speeds and reducing travel delay/times. Typical transitway features are exclusive lanes or a shared use of High Occupancy Vehicle (HOV) lanes with other vehicle traffic (commonly found in large metropolitan areas in conjunction with freeway systems), traffic signal/queue-bus bypass lanes and other transit preferential treatments.

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Trunk route service has not yet been delineated within the Bend system although higher service levels would be most likely on the main east-west route between C.O.C.C. and St. Charles M.C. and possibly a north-south route in the center of the city. No transitways have been deemed necessary in the urban area in the Bend TSP at this time.

### **6.5 STREET SYSTEM**

The street network is the basis of the transportation system. It provides the framework for serving most anticipated modes of transportation and the planned land uses. Bend's transportation system has been planned and developed to meet the goals and objectives of the General Plan.

The street system is composed of a wide range of arterial, collector and local streets. The major street system consists of multi-modal transportation corridors providing space for sidewalks, bike lanes, transit routes, and a wide range of other motorized vehicles. This functional classification system provides a basis for the location and function of roadways shown in the Bend Urban Area Roadway System Plan (Map Exhibit B). This Plan is based on an evaluation of needs for a 20-year planning horizon (*Bend Transportation Model Update*, June 2000, Appendix B). The Plan also accounts for system needs beyond the planning period and the need to preserve certain corridors for the future.

The circulation plan designates a system of major streets that are necessary to move people and goods safely and conveniently within the urban area. The system is depicted on the Roadway System Plan Map as expressways, principal arterials, major and minor arterials, and major collector streets. In many instances, the alignments depict a generalized corridor, and precise alignments of future streets will be determined after further study and engineering analysis, or during the development of vacant properties.

The road system is based generally on a spacing of one mile for arterials and one-half mile for collectors. The precise alignment for new streets must be defined as development occurs. In some areas, additional collector or arterial streets beyond those shown on the plan map may need to be established as the community grows. The City would establish the location of additional streets as part of the land development process and Street System Plan amendments made as necessary. It is extremely important that adequate rights-of-way are secured as development or redevelopment occurs along these designated corridors to protect these future roadways.

### **6.5.1 ROADWAY CLASSIFICATIONS**

#### **6.5.1.1 Expressways**

Expressways are roadways designed to carry large volumes of traffic with limited traffic flow interruption. Direct property access is very limited. In the situation of the sections of Highway 20 and 97 that are designated as expressways, established driveway access points are permitted on a case by case basis until alternative access becomes available.

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The new Parkway facility is being designed with limited roadway access to preserve capacity and provide improved safety, and to accommodate the travel needs of the Bend community. Grade separations, interchanges (at major intersections) and raised medians (along much of its length) are being included in the project to ensure that the capacity and safety of the route is maintained well into the future. Expressways will provide for both through trips and trips within the urban area.

When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial of the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

Expressways in the Bend urban area include U.S. Highway 20 north of the intersection with U.S. Highway 97 (the "wye" on the north end of town), east of 12<sup>th</sup> Street and all of U.S. Highway 97 (including the Parkway). [The "old" portions of Highway 97, (pre-Parkway era) are principal arterials (this includes Highway 20, between the north "wye" and Greenwood, and Third Street, between Greenwood and the south Parkway intersection.)]

### ***Expressway Descriptions:***

***The Bend Parkway*** is a part of the National Highway System and also classified as a Freight Route in the Oregon Highway Plan. The goal of this system is to provide for the economic growth of Oregon by moving traffic safely and efficiently between geographic areas within Oregon and between Oregon and adjacent states. Also, the Parkway is an integral part of the Bend urban area transportation grid.

The Parkway alignment begins northeasterly of the "Sisters" (Highway 20/97) interchange. It extends southward adjacent to the railroad, then crosses East 3rd Street south of Butler Market Road. It then follows Second Street to Thurston Avenue where it crosses over Division Street. South of Revere, the Parkway follows (and will replace) existing Division Street to Cleveland Avenue, where it bears southwesterly and runs to the west of, and parallel to, Highway 97. The Parkway re-connects with Highway 97 south of Murphy Road. Upon completion, the U.S. Highway 97 designation will move from the existing East 3rd Street corridor to the Parkway (3<sup>rd</sup> St. will retain the "U. S. Highway 20" designation south to Greenwood Avenue).

The City, County, and the State have developed an access management agreement and policy for the new corridor. The plan and policy provide for protection of the capacity of the new route, protection for the east-west arterial traffic movements and overall safety of the traveling public.

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Grade separations are planned on the Parkway at all intersections with the arterial street system between the junction of U.S. Highways 97 and 20, on the north, and Reed Market Road on the south. For that portion of the Parkway, only the Revere Avenue and Colorado Avenue interchanges provide Parkway access and egress in all directions. The Revere Avenue-Hill Street route will become the main *north* arterial-street connection to the downtown. An exception to the grade separated design occurs near Greenwood and Franklin avenues. While these arterial streets pass under the Parkway, Lafayette and Hawthorne avenues will serve as the access streets to the downtown and are connected at-grade on the western side of the Parkway. These streets will be limited to right in/out (i.e., no left turns) with the Parkway. If future capacity or safety issues occur, related to these intersections, ODOT may choose to disconnect them from the Parkway. These access streets also serve as connections to Greenwood and Franklin avenues. This deviation from the normal expressway design is due to the limitations created by the Burlington Northern Santa Fe (BNSF) Railroad that is located immediately to the east of the Parkway, as well as to provide access to the downtown.

In the autumn of 2001, the southern section of the Bend parkway opened to traffic. Unlike the northern and central sections, most of the intersections are at-grade instead of interchanges. The original plan for the Bend Parkway assumed that the at-grade connections would either be grade-separated or closed when capacity or safety problems warranted. South of Colorado Avenue, Powers Road, Pinebrook Boulevard, and the south intersection with old Highway 97 intersect the Parkway with at-grade signalized intersections. Other intersections include various combinations of turn restrictions. The west leg of Truman Avenue, the east leg of Reed Lane and Badger Road (on both sides) intersect the Parkway at grade but are limited to right-in and right-out turn conditions (raised medians prohibit lefts). Longer-term strategies include the grade separation and/or elimination of street connections to the Parkway as conditions may warrant and resources are dedicated to the development and implementation of local traffic circulation and as Parkway access alternatives are developed.

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In the summer of 2001, the South Bend Parkway Refinement Study was started to explore future options for replacing the at-grade intersections. The purpose of the refinement study was to help develop a detailed improvement and management plan for the southern section of the Bend Parkway from Powers Road to Bend's southern urban growth boundary. The South Bend Parkway Refinement Study encompassed City of Bend and State of Oregon transportation facilities. The study area extended from just north of Powers Road to just south of the Baker Road interchange with US Highway 97. The study area also extended from Brookswood Boulevard on the west to Parrell Road on the east. A joint ODOT and City of Bend project development team evaluated thirteen long-term alternatives, including a no-build, for the study. Of the twelve build alternatives, three were selected (Alternatives A, H and H-Modified) by the project development team to forward as alternatives to be further analyzed. All of the build alternatives included these features:

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- Construct an interchange at Powers Road;
- Close the Badger Road connection to the Parkway;
- Restrict or close the Pinebrook Boulevard connection;
- Murphy Road realigned to the south and connected to Brookwood Boulevard;
- Ponderosa Avenue / China Hat Road intersection converted to right-in/right-out with acceleration lanes;
- Brookwood Boulevard widened to four lanes through the study area; and
- Powers Road widened to four lanes between Brookwood Boulevard and Third Street.

The recommended alternative was H-Modified with Option 1, and includes the features listed above, plus the following:

- Directional fly-over from southbound Third Street to southbound US Highway 97;
- Southbound off-ramp from the Bend Parkway to the frontage road; and
- Northbound loop on-ramp from Third Street to the Bend Parkway.

The final alternative selected by the Oregon Transportation Commission (OTC) and the Bend City Council will be amended into the City of Bend Transportation System Plan (TSP). It is the desire of the OTC and ODOT that all future projects need to be identified in acknowledged TSPs to begin the traditional project development process. Once the preferred alternative is in Bend's TSP, the project development process can start to fully design and construct the alternative as funding becomes available.

In 2003, following years of public meetings, the OTC and the City of Bend selected Alternative H-Modified with Option 1 for the South Parkway Refinement. Alternative H-Modified with Option 1 is shown in Figure 26A. The selection of this alternative came with several conditions that needed to be satisfied prior to implementing the plan. Below are the conditions:

- Select the alignment for the realigned Murphy Road to extend west to Brookwood Boulevard;
- Select the alignment for the frontage road west of the Parkway to connect Powers Road to Ponderosa Drive;
- Identify the timing of the right-in/right-out configuration for Ponderosa Drive / China Hat Road and US Highway 97;
- Identify the improvements needed on Powers Road between Third Street and Brookwood Boulevard;
- Identify the improvements needed on Brookwood Boulevard from Murphy Road to Powers Road;

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- Identify the improvements needed on Parrell Road between Powers Road and China Hat Road; and
- Select the alignment for the frontage road from Ponderosa Drive south to Baker Road.

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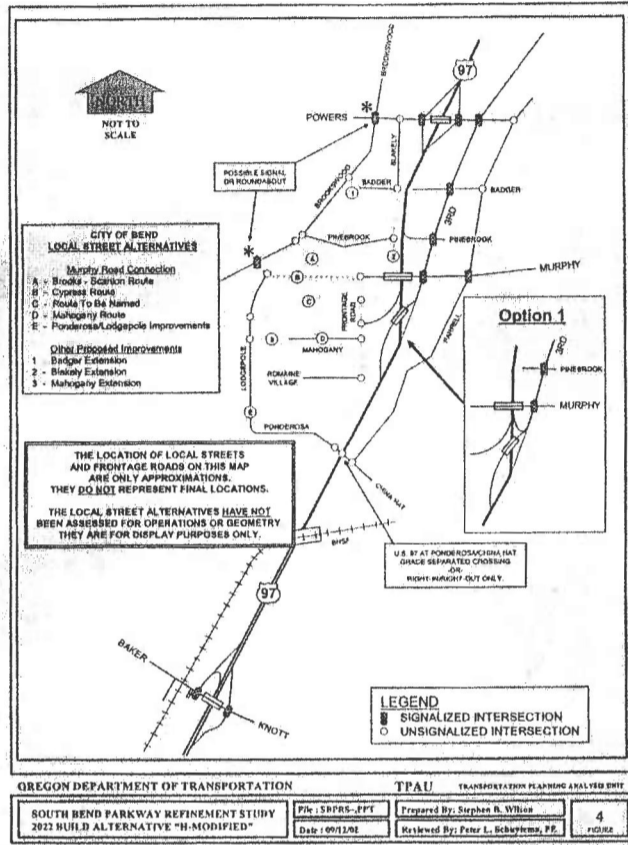
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**Figure 26A**  
**South Bend Parkway Refinement Study**  
**2022 Build Alternative "H-Modified"**



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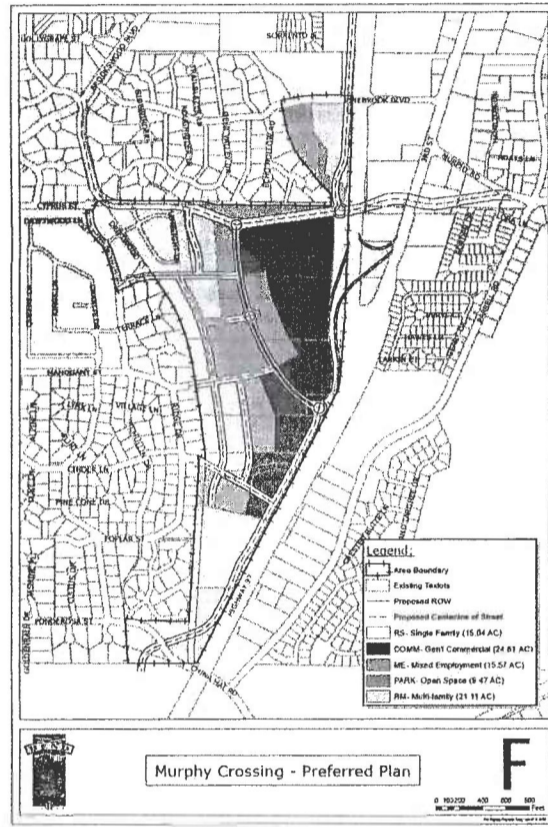
To meet those conditions, in March 2005, the City of Bend initiated the Murphy Crossing Refinement Plan. Over a three month period of time, stakeholder and property owner interviews plus two public meetings took place. From this public process a preferred design alternative emerged. The preferred plan proposes a local street plan consistent with the OTC conditions and a land use plan that will require new zoning designations within the study area. Based on the preferred alternative plan that came out of the Murphy Crossing Refinement Plan, the City Council authorized staff to proceed with the initiation and adoption of a refinement plan for the Murphy Crossing area in August 2005. Several adjoining properties expressed interest in becoming part of the refinement plan area. These properties complement the refinement plan area and have been incorporated into the plan. Staff is proposing to create a refinement plan overlay for approximately 102.75 acres. The plan will include Zoning Map and General Plan Map amendments to re-designate the existing Urban Low Density Residential (RL), Urban Standard Density Residential (RS) and Highway Commercial (CH) zoning to Urban Standard Density Residential (RS), Urban Medium Density Residential (RM), Mixed Employment (ME) and General Commercial (CG). The proposal will also require a Text Amendment to the Zoning Ordinance to add the new Murphy Crossing Refinement Plan, an amendment to the City's Transportation System Plan text and the Transportation System Plan Map to locate the Murphy Road over-crossing alignment and the frontage road alignment.

Staff has continued to meet with the area property owners to refine the preferred plan to address access issues raised by ODOT. The State and local street system in the Murphy Crossing Preferred Plan is shown in Figure 26B.

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Figure 26B  
Murphy Crossing - Preferred Plan



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Concurrent with the Murphy Crossing project is a project lead by ODOT called the Interchange Area Management Plan (IAMP). The State will adopt a management plan for the south end of the Bend Parkway that will incorporate the land use designation identified by the Murphy Crossing Refinement Plan. As part of the IAMP, access within the planned area will be evaluated to determine if capacity and function will affect the level of service of the Bend Parkway. Ultimately the Murphy Crossing plan will be acknowledged by the OTC as part of the IAMP. Formate

The City has also initiated a corridor study for Murphy Road. The corridor study, which extends from 15<sup>th</sup> Street west to Brookwood Boulevard, will occur concurrently with the Murphy Crossing Overlay refinement plan. The corridor study will assist in determining the appropriate road design for future build-out in the area. Formate

One of the decisions made regarding the initial Parkway design was *not* to provide a full interchange with Greenwood Avenue as a direct connection between Highway 97 and Highway 20 East. This was due to a number of considerations that included cost, business displacement, aesthetics and interchange spacing, not to mention the difficulty in meeting the design constraints caused by the proximity of the railroad. Since that time, community discussion has continued that has supported this location as a better connection of the Parkway to Highway 20 – rather than to direct Highway 20 traffic down Third Street per the existing design. In the *Oregon Highway Plan*, “refinement plans” have been identified as a means of studying or resolving issues of this nature. If there is a desire in the future by local officials to pursue a more detailed discussion of highway-to-highway connection alternatives, ODOT has indicated a willingness to address this concern through the refinement plan process.

Several city street segments will be critical to the efficient function of the Parkway and careful review of development proposals and the regulation of access points along these streets is essential to protect the integrity of the expressway. Initial project construction may include the placement of raised medians along the first block of some of these streets to ensure safe and efficient operation of the Parkway. Also, as properties redevelop along these corridors, site access will be sought to re-orient to the adjacent alleys or side streets and not directly to the Parkway access streets, as much as practical.

These sensitive street segments for Parkway access include the following:

1. Empire Avenue between East 3rd Street and Boyd Acres Road,
2. Butler Market Road from East 3rd Street to the Parkway,
3. Revere Avenue from west of the Parkway/Hill St. signal for one block
4. Hill Street between Revere Avenue and Wall Street,
5. Lafayette and Hawthorne avenues between the Parkway and Hill Street\*,
6. Colorado Avenue between Harriman and Hill streets,
7. Truman Avenue between Pelton Place and the Parkway\*.

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- 8. Reed Lane between the Parkway and East 3rd Street\*
- 9. Powers Road between Blakely Road and East 3rd Street\*
- 10. Badger Road between the Parkway and East 3rd Street\*, and
- 11. Pinebrook Boulevard between the Parkway and East 3rd Street\*

\*Note: These access restrictions would be rescinded if the street is disconnected from the Parkway.

Highway 20 - north of the Sisters interchange The portion of Highway 20, that enters the urban area from the northwest (from the town of Sisters), and intersects with U.S. Highway 97 at the northern intersection "wye" (also the location of the Sisters-Parkway interchange).

Highway 20, from the northern UGB to the Sisters interchange, has two Westbound lanes and one Eastbound lane. In addition to the three-lane configuration there are left turn, acceleration and deceleration lanes at intersections. Ultimate roadway improvements will widen most sections of this highway to four and five lanes, as warranted. The only at-grade intersections planned for this section of roadway are at Cooley and Robal roads. New driveway connections will not be permitted along this section of the highway. The two intersections will most likely meet traffic signal warrants during the 20-year planning period, depending upon the amount of growth that occurs within the immediate area. The State has asked that grade separation alternatives also be examined for future design solutions at these intersections. Access management and the consideration of frontage road development is needed on many portions of Highway 20. A frontage road system is currently shown on the transportation (roadway system) plan map between Cooley Road and Empire Avenue to the west of Highway 20.

Highway 20 - 12<sup>th</sup> Street to the "eastern" Urban Growth Boundary

East of 12th Street to the eastern Urban Growth Boundary, Highway 20 is designated as an expressway. The roadway follows an alignment around the south side of Pilot Butte and heads eastward beyond the urban area. From 12th Street eastward, the existing highway is comprised of two lanes around Pilot Butte merging to three, then it widens to a five-lane roadway near 27th Street. The roadway transitions back to a two-lane facility as it heads east outside of the UGB. Additional widening to five lanes, plus the construction of sidewalks, bike lanes and raised medians is planned for the area between 12th and 27th streets. The section of the highway around Pilot Butte will require realigning and a lowering of the roadway grade in order to accommodate the construction of a future intersection with 15th Street (to the south). The intersection at 15th Street would eventually be signalized. No other intersections, between 15th Street and Purcell Boulevard, on Highway 20, are planned to have traffic signals. However, if subsequent refinement plans demonstrate an additional signal would improve the highway's function and safety, then another signal might be added consistent with the requirements in the Oregon Highway Plan for signal spacing. Along portions of Highway 20, in particular east of Pilot Butte, access management and some frontage

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road construction should be sought in conjunction with adjacent land development and redevelopment.

**Highway 97 - north of the Sisters interchange** The section of the highway, north of the Sisters interchange to the UGB, is five lanes with bike lanes. This portion of highway will continue to experience high traffic demands and TSM measures such as the construction of raised medians will be necessary to assure the carrying capacity and safe operation of the highway. The Cooley Road intersection will need to be developed as a grade-separated interchange in the future. The city of Bend will work with ODOT to prepare an Interchange Area Management Plan (IAMP) prior to construction of the interchange.

A frontage road is planned along the eastern side of the highway between Cooley Road and Robal Road. This frontage road will connect with Cooley and Robal roads at intersecting points to be located a sufficient distance east of Highway 97 adequate to minimize impacts to highway intersection operation. Currently, ODOT is evaluating a variety of frontage road designs, including an alternative "backage road" (with no direct connection to Cooley Road) and possibly completion of this road as a part of the (state funded) Highway 97 median project. A frontage road is also planned to serve the area on the western side of the highway, within the UGB, to be located north of Cooley Road. This frontage road is planned to connect to the Hunnel Road collector and not tie directly to Cooley Road (see: Bend Urban Area Transportation Map Exhibit B). In order to maintain capacity and safety for this highway segment, a raised median is planned between the Parkway and the north UGB. The construction of a raised median will likely take place concurrent with the final phase of the northern Parkway improvements.

**Highway 97 - south of the Parkway** The portion of Highway 97 south of the Parkway is a five-lane improvement with wide shoulders. This portion of highway will experience increased traffic volumes and TSM measures may be necessary to assure the carrying capacity and safe operation of the highway in the future. These TSM measures may include the construction of a raised median with channelization breaks (for left turns) to address these concerns. ~~Land development adjacent to the highway should dedicate right of way, develop and direct access to an adjacent roadway or a frontage road system. As noted in the description of the Bend Parkway, ODOT and the City of Bend have evaluated alternatives that would extend Murphy Road to a point west of the Parkway (including grade separation) to meet a future frontage road (on the west side of the Parkway). Once this system is in place (see Figures 26A and 26B), the Parkway traffic signals at Pinebrook Blvd. and the south Highway 97 intersection should be removed. As a part of these system changes, the former street intersections should also be disconnected from the Parkway. Also, a grade separation of China Hat at Highway 97 may eventually be warranted. Development along this part of the highway should be monitored as it occurs. Further study of appropriate transportation system solutions should be conducted concurrent with new land development to ensure that the safety and~~

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capacity of the facility is maintained. Sidewalks will also need to be constructed along this section of highway as adjacent properties develop.

### **6.5.1.2 Principal Arterials**

The principal arterials in the Bend urban area include all the non-expressway portions of the state highway system, except Century Drive (a minor arterial). The principal arterial roadways include 3rd Street and Highway 20 south of the Highway 97 and 20 intersection "wye" to 12<sup>th</sup> Street. These are primary highways, in addition to the expressways, that provide important roadway transportation linkages to (and through) the Bend area. The principal arterial system also carries high levels of truck traffic. Most of the trips (motorist and trucks from outside of the area) on the principal arterial system are destined to, or have stopovers in Bend. However, a small portion of the trips traveling these corridors has a regional or statewide destination and may pass through the community on these arterials without stopping.

The principal arterial system serves a statewide role and there are specific design, access management, and level of service requirements established by the Oregon Department of Transportation. These requirements are articulated in the *Oregon Highway Plan*.<sup>B.17</sup> The Plan emphasizes the need to meet the functional criteria of the state system and the principal arterial system will also need to fulfill the city's need to maintain a functional street grid network for the urban area.

When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial or the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

#### ***Principal Arterial Street Descriptions:***

The principal arterial section of Highway 20 begins at, and is south of, the Sisters interchange. It currently runs coincident with Highway 97 to Greenwood Avenue and turns east, following Greenwood Avenue to 12<sup>th</sup> Street. Upon completion, the Parkway will be designated as *Highway 97* south of the Sisters interchange, and the existing route (following Third Street) will remain *Highway 20*.

Highway 20, from the Sisters interchange to Greenwood Avenue, is a four- and five-lane facility. This portion of highway currently carries the highest traffic volumes within the urban area near the Mt. Washington Drive/Butler Market Road intersection. The most common type of future roadway improvement along this section of Highway 20 will be the construction of turn lanes at intersections, or raised medians and acceleration/deceleration lanes at major driveways. This section of highway also has large gaps in the sidewalk system. Bike lanes are also absent and are needed along many roadway segments.

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Highway 20 has traffic signals controlling most of the major intersections along its length. An additional traffic signal is planned at the intersection of Olney Avenue to improve local east-west traffic circulation. Also, transportation modeling of the intersection of Butler Market Road/Mt. Washington Drive at Highway 20 indicates that this intersection may continue to be a source of congestion problems into the future, particularly as traffic volumes continue to grow over the next 20-years. Some improvements are planned on the west (the Mt. Washington Drive approach) of the intersection including a reconstructed bridge over the Deschutes River. In addition, *The Rivers Edge* development has been required to provide a corridor for a future local street bridge crossing below the irrigation diversion dam, in conjunction with future site development, but this exact location has not been determined. The location of this future bridge should be examined as a part of a comprehensive evaluation of traffic circulation solutions necessary to address the longer-term capacity needs for this section of the highway. From East 3rd eastward to 12<sup>th</sup> Street, Highway 20 is a five-lane facility. No specific capacity improvements are planned along this section of highway except the possible signalization of the intersection at NE Fourth Street and the implementation of other TSM strategies.

Access management and the consideration of frontage road development is needed on many portions of Highway 20. However, on most portions along the length of Highway 20, the opportunity to construct frontage roads is extremely limited due to the existing development patterns and limited available public right-of-way. The potential of restricting or closing individual accesses along the more urbanized portions of the highway, due to the abundance of existing driveways, is limited, too. Over the longer term, redevelopment of properties will provide opportunities to close and combine driveways, or to provide access via adjacent side streets. A raised median should be considered for installation on a principal arterial when any of the following occur (per ODOT recommendations):

1. Daily traffic counts exceed 28,000 vehicles per day,
2. In conjunction with reconstruction or modification projects, or
3. When operational, safety, or pedestrian needs warrant it.

**East 3rd Street - south of Greenwood Avenue** The section of East 3rd Street Avenue (also commonly known as: "South" 3<sup>rd</sup> Street), south of Greenwood, will remain a principal arterial after the Parkway is constructed. The jurisdiction of this street may be transferred to the City by the State - although more discussion is necessary to determine "how and when" this would occur. Third Street will remain a major business corridor within the urban area and traffic growth is expected to continue along the length of this principal arterial street.

The BNSF Railroad underpass on 3<sup>rd</sup> Street, located south of Bumside Street, is currently limited to two travel lanes. With the completion of the Parkway, the new roadway will provide immediate traffic congestion relief to this portion of 3rd Street. However, future traffic loading and the need for bike and pedestrian improvements to

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this section of 3<sup>rd</sup> Street will likely generate the need to provide other underpass improvements.

Third Street, south of Greenwood also has numerous gaps in the sidewalk and bike lane system, which will need to be completed. Furthermore, all of 3rd Street has been contemplated for other beautification and TSM improvements, after the Parkway is completed, to improve the appearance and performance of the roadway.

### ***Principal Arterial - Transportation System Management Strategies***

**Highway access** Access management, specifically the type that restricts driveway access points, is a technique that can bolster system capacity and improve highway safety. However, the construction of improvements that will limit left turn movements must be sensitive to existing development that relies on the convenience of roadway system access. Thus, the City and State should work cooperatively with businesses along the principal arterial street corridors to develop access management plans that will achieve the desired transportation system results and still fulfill business needs.

**Signal Spacing** Traffic signals and coordinated timing plans can improve or optimize traffic flow by providing a better grouping or "platooning" of traffic along arterial street corridors. Traffic signals can also improve gaps in traffic flow that facilitate access to the arterial system at intersecting streets and driveways between the signalized locations. It is therefore important that the location of traffic signals follow consistent spacing standards in order to fulfill the greatest system benefit. Traffic signals should not be utilized as a tool to facilitate access to selected land uses, such as high-volume, commercial land use trip generators, but as a part of an overall coordinated transportation system planning tool. In most cases, this will limit the location of traffic signals to intersecting arterial and collector streets.

### **6.5.1.3 Major Arterials**

Major arterials are intended to serve as routes for travel between areas of major traffic generation and major activity centers, and residential and commercial areas. Trip lengths are commonly longer in nature along the major arterial street system. To fulfill this function, major arterial streets are normally spaced at 1-2 mile intervals. A greater emphasis on access control, than along minor arterials, will be sought on these facilities. Effort will be made to limit left turn movements on these roadways to controlled locations through the construction of raised medians.

Some segments of the major arterial street system may be constructed to four- or five-lane street widths, particularly at intersections to provide dedicated turn lanes, and sufficient right-of-way corridors (i.e., 100 feet wide) should be acquired to ensure that this type of future street design is feasible. Major arterials in the Bend urban area system include the following: Reed Market Road (east of Blakely Road), Empire Avenue (east of Highway 20/97) and East 27th Street (north of Reed Market Road).

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When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial of the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

### **Major Arterial Street Descriptions**

**Reed Market Road**, between Silver Lake Boulevard and East 3rd Street, will be improved in coordination with the Parkway project. This improvement will construct a new arterial roadway from Silver Lake Boulevard to the Parkway (depending on other timing circumstances with private development, this roadway improvement could be extended farther west to meet the Bond/Blakely Road corridor). Between East 3rd and 27th streets, Reed Market Road will ultimately be improved as a three to five-lane arterial with limited driveway access. Currently, there are some turn lane and bike lane improvements between East 3rd and 15th streets, but sidewalks are missing and are needed throughout most of this two-mile section of roadway. [Reed Market Road, east of 27<sup>th</sup> Street is designated as a major collector, for both the future and existing sections.]

The **East 27th Avenue** corridor, between Reed Market and Butler Market roads, is the north-south component of the major arterial system on the eastern side of town. The roadway is currently improved with two travel lanes, and some additional five-lane widening near Highway 20. There are discontinuous sections of sidewalk and bike lane improvements constructed between Neff and Butler Market roads. Additional roadway capacity, and the completion of pedestrian and bikeway improvements will be needed to fulfill the transportation system needs along the corridor. Significant portions of the "major arterial" segment of the 27th Street corridor will ultimately be improved to a five-lane roadway section. A final determination of the number of lanes required (and for what segments) will be determined during the roadway design process.

The extension of **NE Empire Avenue**, between Boyd Acres Road and East 27th Street, will help to complete the arterial street system on the eastern side of Bend and provide a valuable east-west roadway connection to the Parkway. The Empire Avenue grade separation, over the Parkway, has been built to accommodate a future five-lane roadway. Other sections of Empire Avenue, east of Highway 97, are currently improved with two and three-lane roadway sections. This includes the short segment of Empire Avenue that has recently been constructed between NE 18th Street and Yeoman Avenue. Sidewalks and bike lanes are also missing and needed along most of this corridor. Significant portions of the "major arterial" segment of the Empire Avenue corridor will ultimately be improved to a five-lane roadway section. A final determination of the number of lanes required (and for what segments) will be determined during the roadway design process.

### **6.5.1.4 Minor Arterials**

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The minor arterial street linkages planned for the urban area are illustrated on the Roadway System Plan Map (and are also listed in Table 11). As the community grows beyond the planning period or there are other changes in land use, additional arterial streets may be determined necessary. The alignments of new arterial streets on the Plan map are general in nature and refinements may occur through the land development process, or as otherwise determined by the City.

The minor arterial street network interconnects and augments the principal and major arterial street system. Trip lengths are normally of moderate distances. Minor arterials often border and establish the edge of neighborhoods. Minor arterials often support local or neighborhood commercial areas. Pedestrian and bicycle traffic is frequent on these streets. Minor arterials are generally spaced at about one-mile intervals, although in the more dense areas of the community minor arterials are commonly located at a greater frequency. Under ideal circumstances, access to the minor arterial street should be limited to prescribed spacing intervals and direct driveway access points should be limited as much as practical.

The minor arterial street system will need to be improved to address a wide range of transportation system demands, including pedestrians, bikes, transit vehicles and motor vehicles. Minor arterial streets range in width from two to four-travel lane roadways. New or reconstructed minor arterial street widths will be based on the determination of the improvement needs of all modes of travel.

Because minor arterial streets usually serve neighborhoods and support high levels of pedestrian and bicycle traffic, the addition of lanes to serve motor vehicles must be carefully balanced against the impacts to other forms of travel and the environment that they pass through. In the event that alternatives to street widening have been exhausted and additional lanes are necessary, all appropriate measures should be taken to consider design alternatives and solutions to mitigate the impacts created on the adjoining neighborhood or the abutting businesses. Landscaped center medians, access management, pedestrian refuges, and the provision of street trees, among others, are examples of measures that can be taken to mitigate the impacts of road widening.

When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial of the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

### Central City - Minor Arterial Street Widening Limitation

Recent transportation and land use studies and reports, such as; the *Newport Avenue Corridor Study*, 2000, and the *Use of Land for Transportation Alternatives (ULTRA)*, 2003, [although

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neither have been officially adopted by the City] have supported the concept of minimizing roadway widening in exchange for preserving specific community qualities. Thus, the studies have advocated the development of transportation corridor improvements that emphasize community and streetscape design that will continue to foster and enable non automobile modes of travel. Simply stated, these studies have concluded that this alternative transportation/land use development scenario may be a more prudent strategy and may actually help reduce the demand on roadway capacity and therefore overcome a need to widen these particular arterial street corridors.

Widening arterial streets, although it may provide important added roadway capacity to serve automobile demand, can have too detrimental of an impact on the neighborhoods that are impacted by the roadway widening. One result of street widening is that it can develop an environment that may be counterproductive to fully developing and realizing the benefits of non automobile alternatives for a specific corridor. Many citizens that have actively participated in public workshops, related to these previously mentioned studies, have indicated that they prefer placing a higher value on preserving the existing character of these neighborhoods and are, for the most part, willing to endure higher roadway congestion levels and travel delay in exchange for preservation of the affected neighborhoods.

For these reasons, the Bend Transportation System Plan (TSP) seeks to acknowledge specific corridors within unique areas of the central city where the combination of existing land uses; residential, commercial and institutional, and the presence of a well-connected system of local streets and accessways, that provide a diverse range of travel options and mode choices, may make minor arterial roadway widening unnecessary and/or less desirable. Thus, the following minor arterial corridors are identified by the Plan as "not being authorized for lane expansion" (unless subsequent study has been supported by an amendment to the Plan to permit the roadway widening, an existing safety issue has been identified and approved by the City Council that will be resolved by a widening project, or the improvement is otherwise exempted by TSP Street Policy 21):

### *West Central City:*

- NW 14<sup>th</sup> Street, between Newport and Galveston avenues
- NW Newport Avenue, between 14<sup>th</sup> Street and Wall Street
- NW Galveston Avenue, between 14<sup>th</sup> Street and Riverside Avenue

### *Downtown Central City:*

- NW Greenwood Avenue, between Wall Street and the Parkway
- NW Riverside Avenue, between Tumalo and Franklin avenues & NW Franklin Avenue, between Wall Street and the Parkway
- NW Wall Street, between Greenwood and Franklin avenues & NW Bond Street, between Greenwood and Franklin avenues

### *East Central City:*

- NE 8<sup>th</sup> Street, between Olney/Penn and Franklin avenues
- NE Olney Avenue, between 4<sup>th</sup> and 8<sup>th</sup> streets
- NE Franklin Avenue, between 4<sup>th</sup> and 11<sup>th</sup> streets & NE Bear Creek Road (including the 11<sup>th</sup> St. extension), between Franklin Avenue and 15<sup>th</sup> Street

### *Minor Arterial Street Descriptions*

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**Southern River Crossing** Reed Market Road, between Century Drive and Brookwood Blvd/Bond Avenue is designated as a minor arterial street. The alignment generally extends along the old log deck extending westerly to a narrow point on the river and continues along an old logging road grade to the intersection of Mt. Washington and Century drives.

The concept of extending a new arterial street across the Deschutes River, south of the mill, can be traced back to the 1950s. This alignment appears on the early City zoning plans of the 1960s and was later incorporated in the Bend Urban Area General Plan, in the late 1970s. The historic selection of the Reed Market Road alignment as the planned southern river crossing was based on a number of factors:

1. The alignment skirted the area occupied by Bend's last lumber mill. This was the edge of the industrial zoned properties where large equipment generated loud noise and dust impacts.
2. The alignment was a continuation of the major roadway system serving the entire urban area, and the bridge would complete this east-west roadway linkage across the river.
3. Ease of roadway construction. This is attributed to the narrow river crossing width, the fact that it follows preexisting roadway grades to Century Drive on the western side of the river, and it crossed an already disturbed log deck area on the eastern side.
4. The alignment was largely undeveloped except for the mill activities.

Over the course of the preparation of the General Plan update, City Council held extensive discussions on the subject of alternative river crossing locations and designs. In 1998, in response to these deliberations on a bridge location, Council made a decision that the extension of Reed Market Road should remain as shown on the plan. Stating further that it should be constructed as a two-lane roadway (i.e., the roadway should provide one travel lane in each direction, plus bike lanes and sidewalks, with raised medians and turn lanes permitted where necessary).

City Council's direction also supported the development of another "local" street bridge to be constructed within the Old Mill site at a location further downstream from the planned arterial bridge. The intent of this local bridge was to accommodate the traffic generated by the Old Mill development and to reduce the burden on adjoining arterial river crossings. The City shall involve the public, the Park District and other governmental agencies in developing a roadway design for the southern river crossing that complements the natural features of the river area.

**Cooley Road** will provide east-west circulation from Highway 20 east to Deschutes Market Road. The Cooley Road/Highway 97 intersection will need to be developed as a grade separated interchange in the near future to accommodate on-going development in the vicinity, as well as future industrial uses on UGB expansion sites. It will eventually become a major access route to the City's industrial park reserve area. The existing road now terminates at the southern boundary of the industrial reserve property (City owned)

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and will need to be extended to the east as future development occurs. Sidewalk and bike lane facilities are missing along most portions of Cooley Road and will be needed as other roadway improvements are made. Development along this part of Cooley Road should be carefully managed to ensure that the function of the Cooley/Highway 97 intersection is not compromised.

Located immediately north of the Mountain View Mall, Robal Road will provide an arterial connection between Highway 20 and Highway 97. In addition, Hunnel Road is planned to extend north from Robal Road to Cooley Road. The combination of the two arterials will provide a grid of streets that will help reduce demands on the two state highways. These arterial streets will serve as frontage roads for the developing commercial properties situated between Cooley Road and the two highways.

Empire Avenue, between O.B. Riley Road and Highway 20, is a minor arterial. This roadway will be improved to a three-lane road width with some additional turn lane improvements necessary; at Highway 20, to accommodate vehicle turn movement demand. The close proximity of the Jamison Street (i.e., the frontage road paralleling Highway 20, to the west) intersection to the Highway 20/Empire Avenue intersection could be the source of future safety or capacity issues. If these problems materialize, then a raised median on Empire Avenue may be needed to eliminate problem vehicle turns to/from Jamison Street.

Butler Market Road has been improved with three lanes from Highway 97 to East 27th Street. The improvements include bike lanes, but sidewalks are missing and needed along many segments. Portions of Butler Market Road may need to be widened to five lanes in the future.

Revere Avenue, between Hill and 8th streets, will experience significant traffic increases due to the fact it will be one of the few full access interchanges to the Parkway. Widening improvements are needed to complete the arterial to a five-lane road width and to provide sidewalk and bike-lane facilities. Another future issue on Revere is the at-grade crossing of the BNSF Railroad. Revere is one of the few remaining at-grade railroad crossings in Bend and the close proximity of the Parkway, Division and 3rd streets will make a future grade separation very difficult. This problem location is further compounded by the recent merger of the Burlington Northern and Santa Fe railroads, which reportedly will result eventually in more trains being routed through the Central Oregon area. This will likely create a greater incidence of train-induced traffic delays. The combined impact of increased train and traffic loads will likely generate capacity problems for this crossing in the future.

Hill and Wall streets, from Revere to Lafayette, will also see significant traffic impact after the Parkway is completed. This will be a major northern entry into the downtown from the Parkway. There will be a need for additional road capacity, bikeway and pedestrian improvements. The route passes by Pioneer Park and impacts on the park must be minimized.

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The Portland/Olney/Penn/Neff corridor will provide an improved east-west route across the entire community and will enhance access to St. Charles Medical Center from the west side of town. This route passes by Pilot Butte Middle School and near Juniper Elementary schools. Sidewalk and bike lane improvements are needed on many portions of the corridor.

Franklin Avenue needs to be improved to four and five lanes from the railroad underpass to NE Fourth or Fifth streets. Some sections of sidewalk are also missing. Franklin Avenue is also proposed to connect to a (future) southern extension of NE 11th Street. This new road extension would follow along the west edge of the cemetery to Bear Creek Road. This new roadway would replace the current use of 10th Street as an arterial roadway between Franklin Avenue and Bear Creek Road.

The need to widen the Franklin Avenue underpass of the Parkway/BNSF Railroad should be monitored as traffic growth occurs in the City. Provided other east-west transportation improvements occur in the City, widening this under crossing may not be necessary within the 20-year planning horizon. However, alternatives should be evaluated for improving bicycle travel through this area. Hawthorne Avenue, between Hill and East 3rd streets, is included within the Plan as an under crossing route alternative to the widening of the Franklin Avenue under crossing and effort should be made to preserve this corridor for this purpose. Due to the expense to construct grade separations and the disruption that this type of construction causes, the Hawthorne Avenue alternative may be economically and practically a more achievable improvement than widening the Franklin Avenue/Parkway/RR structure. A comprehensive study should be conducted of the under crossing and alternatives to determine the timing and need for these potential future improvements, and to resolve any conflicts with the existing downtown connection to the Parkway (via Hawthorne).

Newport Avenue is currently improved with two travel lanes and a center median (turn lane) between College Way and West 3rd Street. Bike lanes are striped from College Way to Awbrey Road. Concrete sidewalks are missing west of NW 12th Street on Newport Avenue. Future improvements to the Newport bridge crossing should provide adequate bike, pedestrian and trail (i.e., a trail under crossing on the eastern side of the river) improvements. Future improvements to Newport Avenue, from Wall Street to College Way, should consider the specific design recommendations included in the Newport Avenue Corridor Study, dated March 2000. West of College Way, Shevlin Park Road is improved with two lanes, wide shoulders, and no curbs or sidewalks. Sidewalks, bike lanes and turn lanes need to be constructed considering the same design recommendations as the area continues to develop and needs increase.

Galveston Avenue is currently improved with two travel lanes and bike lanes from NW 14th Street to Riverside Avenue. Some sidewalks have been improved along this segment of roadway. West of NW 14th Avenue, Galveston Avenue is a curbed, two-lane roadway with no sidewalks or bike lanes. Sidewalks will be constructed and bike

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lanes striped as the area develops and these needs are identified. West of Lindsay Court, Skyliners Road is improved with two travel lanes, no curbs, sidewalks or bike lanes. Sidewalks, curbs, bike lanes and turn lanes will be completed with future development along this section of Skyliners Road.

Greenwood Avenue, from Newport Avenue to Third Street, is currently improved with two travel lanes, in each direction. Separate left-turn pockets are currently located on the eastbound approach to Third Street and between Wall and Bond streets for both directions of traffic, otherwise an exclusive center turn lane is absent and needed along the rest of this section of Greenwood. A raised median has been constructed to prevent left-turn movements at NE 2<sup>nd</sup> Street. This was constructed to optimize traffic flows, improve arterial efficiency and as a safety improvement measure. Sidewalks have been completed along this arterial street but bike lanes are absent. In 1994, Greenwood Avenue between Wall and the Parkway, was the subject of a lengthy community discussion and evaluation of possible bike lane improvements<sup>B6</sup>. One of the issues, with adjacent businesses, was the possibility of losing on-street parking in order to accommodate the bike lane. There were a number of travel lane reconfiguration alternatives discussed, but City Council chose to wait until the TSP was completed and the Parkway was opened before taking up this matter again. [The portion of Greenwood east of Third Street is designated as a principal arterial and an expressway and is part of the state's highway system.]

A substantial amount of residential and commercial growth is planned on the west side of Bend. This will increase the traffic demand on Portland, Newport and Galveston avenues. It is important to note that the traveling public will seek solutions to the capacity problems that will result along these corridors. This will include alternatives to widen these roadways and their respective bridges as this new development pressure materializes. This need and desire to widen these roadways may be accentuated if alternatives are not in place to reduce this longer-term system demand.

Colorado Avenue extends from Division Street to West 14th Street. It is a part of the Oregon Department of Transportation's (ODOT) Century Drive corridor. This ODOT *district highway* provides the key connection between the Mt. Bachelor ski area and the Bend community. This district highway classification is quite similar to the City's minor arterial classification, and as such the administration of access points will be treated according to the General Plan minor arterial design criteria. When the new Reed Market Road extension (southern river crossing) is completed across the river, it is recommended that the City and State evaluate designation of the new linkage between Colorado Avenue and the Parkway as a part of the Century Drive corridor.

Arizona/Colorado one way pair (couplet) system: The conversion of Arizona and Colorado streets to a one way pair "couplet" system, between Broadway and the Parkway, is planned as a method of increasing arterial road capacity without the need to widen existing Colorado Avenue. This is also planned as a strategy to improve downtown access to and from the Parkway. Both roadways would be designated as

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minor arterials, with Colorado carrying the westbound traffic and bike lane, and Arizona Avenue the respective eastbound movements. The City will develop a street design, including turn lanes, landscaping and access control that will fit the specifics of this project. Wall and Bond streets, between Colorado Avenue and Industrial Way, will serve as major collectors. See, Figure 18. Wall and Bond streets will connect, via Industrial Way to Bond Street South, as shown on Figure 18 through the Old Mill site, to meet and connect to Brookwood Boulevard. The City has acquired right-of-way to extend Wall and Bond streets from Arizona to Industrial Way. This extension will link downtown Bend with the Old Mill District mixed use development zone. As previously mentioned in the "Proposed Roadway System Changes" section of this TSP, the City will also be studying an additional connection, the use of Lava Road in combination with Bond and Wall Streets for this street connection.

Century Drive, south of West 14th Avenue, is a *district highway* under ODOT's classification of roadways. This district highway classification is quite similar to the City's minor arterial classification, and as such the administration of access points will be treated according to the General Plan minor arterial design criteria. A *roundabout* has been constructed at the intersection of 14<sup>th</sup> Street and other intersection improvements (to be designed) are contemplated at, or near, the Mt. Washington Drive intersection.

Wilson Avenue, between Bond Street and East 3<sup>rd</sup> Street, is designated as a minor arterial roadway. This section of Wilson Avenue will need roadway capacity, sidewalk and bike lane improvements. Some of these improvements have been completed as a part of the grade separation construction over the Parkway. However, completion of the full street standard (sidewalks, bike lanes and turn lanes) will still be necessary from 2<sup>nd</sup> to 3<sup>rd</sup> streets. [Wilson Avenue is designated as a *major collector* roadway east of East 3<sup>rd</sup> Street but completion of sidewalk and bike lane facilities will still be necessary along this section of roadway.]

Knott Road is the southernmost east-west arterial in the urban area. It provides a connection between Highway 97 and East 27th Street south of the Burlington Northern-Santa Fe Railroad at the Baker Road interchange. This arterial will not experience as heavy a traffic demand as other arterial streets in the community, but intersection improvements such as left turn lanes at the major intersections will likely be warranted to enhance safety and to ensure satisfactory roadway operation. Bike lanes are needed along many sections of the roadway and sidewalk construction should be provided as pedestrian activity along the roadway warrants the improvements.

Mt. Washington Drive currently begins, on the north, at its intersection with Highway 20/97. It extends around the northern side of Awbrey Butte wrapping around the mountain until it heads south near the Valhalla Subdivision. It is planned to extend south of Shevlin Park Road in conjunction with the development of the new grade and high schools and other property development between Shevlin and Skyliners roads. It

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will continue southerly, crossing Skyliners Road and will be extended to connect to the existing roadway that now terminates at the intersection of Century Drive. Mt. Washington Drive will provide an important arterial street on the western side of Bend. This will provide a continuation of the companion Reed Market/East 27th/Empire loop that serves a similar function on the eastern side of the river. Mt. Washington Drive, for most of its length, will be improved to a two and three-lane wide roadway, with bike lanes and sidewalks (although variances have been granted in the steep slope areas to construct a sidewalk on only one side). Also, portions of Mt. Washington, south of Shevlin Park Road, may need to be widened to five lanes in the future. Special design treatments may be considered through the planned west side commercial and industrial areas north of Skyliners Road that includes roundabouts at key intersections.

Division Street currently extends from Highway 20/97 (just south of the Butler Market Road intersection with the highway) on the north, to Brosterhous Road on the south. Division Street is a major north-south route that parallels Highway 97 and has provided significant relief for East 3rd Street/Highway 97 traffic. After the Parkway is built, the remaining north segment of Division Street, from Highway 20 south to Revere Street, will continue to serve as a minor arterial. The short segment of Division Street between Cleveland Avenue and Reed Market Road will become a local street and provide northbound access to the Parkway. Division Street currently has bike lanes the full length although some sections will continue to need sidewalk improvements.

West 14th Street south of Newport Avenue, is a minor arterial street in the Plan. Bike lane improvements have been striped along its length but some sections of this arterial are missing sidewalks. The need for additional turn lanes should be evaluated at major intersections as traffic volumes increase on Bend's western side.

In northeast Bend, north-south minor arterial streets include; 4th Street (north of Franklin), Boyd Acres Road and the 8th/9th street corridor. Bike lane improvements are provided on the 8th/9th street corridor but are missing on most of Boyd Acres Road and 4th Street. Sidewalks are also missing and needed along all of these arterials.

North-south arterials, in the southern part of Bend, include Brookwood/Blakely Boulevard, which extends from Wilson Avenue (on the north) and parallels Highway 97 south to Baker Road. Brookwood Boulevard is planned to extend north of Powers Road, across the canals, and join Blakely Road near McClellan Avenue. It will then follow an old Brooks-Scanlon logging road, west of Blakely Road, down into the Old Mill site where it will intersect the Blakely/Bond street extension. Improvements will include construction of a two and three-lane wide roadway, with bike lanes and sidewalks.

Another north-south arterial is 15th Street, which currently extends from Bear Creek to Knott roads. Fifteenth Street is planned to extend between Highway 20 and Bear Creek Road with a redesigned (Highway 20) intersection on the south flank of Pilot Butte. The grade on Highway 20 will need to be lowered to accommodate this future intersection.

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Bike lanes are currently striped on 15th Street south of Bear Creek Road but many sections of the roadway are missing sidewalks.

*NE 18th Street*, between Cooley Road and Empire Avenue, is currently improved with a two and three-lane roadway, bike lanes and a sidewalk (along most of the west side of the road). Other sidewalk improvements will be completed with future development in the area. The section of NE 18th Street, between Brinson Road and Empire Avenue, will be completed with future area development as an industrial collector street.

**Table 11**  
**Minor Arterials within the Urban Area**

Minor Arterial Streets	From	To
Arizona (future: <i>eastbound</i> only)	Colorado (near Broadway)	Parkway
Bear Creek Rd. (also: 11 <sup>th</sup> St. ext.)	Franklin Avenue	27 <sup>th</sup> Street
Blakely Road	Brookwood Blvd.	Wilson Avenue
Bond Street	Wall Street	Franklin Avenue
Boyd Acres Road	Empire Avenue	Butler Market Road
Brookwood Blvd.	(Beyond) South UGB	Blakely Road
Butler Market Road	Highway 97	(Beyond) East UGB
Century Drive	(Beyond) South UGB	Colorado Avenue
Colorado Avenue (2-way)	Century Drive	Arizona
Colorado (future: <i>westbound</i> only)	Arizona	Parkway
Cooley Road	Highway 20	Deschutes Market Road
Division Street	Highway 97 (north)	Revere Avenue
East 15 <sup>th</sup> Street	Highway 20	Knott Road
East 18 <sup>th</sup> Street	Cooley Road	Empire Avenue
East 27 <sup>th</sup> Street	Reed Market Road	Knott Road
East 4 <sup>th</sup> Street	Butler Market Road	Franklin Avenue
East 8 <sup>th</sup> / <sup>9</sup> <sup>th</sup> streets	Butler Market Road	Reed Market Road
Empire Avenue	O.B. Riley Road	Highway 20
Franklin Avenue	Wall Street	Bear Creek Rd. ext. (11 <sup>th</sup> St.)
Galveston Avenue	Skyliners Road	Riverside/Tumalo
Greenwood Avenue	Newport Avenue	East 3 <sup>rd</sup> Street
Hill Street	Revere Avenue	Wall Street
Hunnel Road	Robal Lane	Cooley Road
Knott Road	Beyond south UGB	Beyond east UGB
Mt. Washington Drive	Century Drive	Highway 97 (Butler Mkt.Rd)
Murphy Road	Brookwood Boulevard	Parrell Road
Neff Road	8 <sup>th</sup> Street	Beyond east UGB
Newport Avenue	Shevlin Park Market Rd.	Greenwood Avenue
Olney Avenue	Hill Street	8 <sup>th</sup> Street
Reed Market Road	Century Drive	Blakely Road
Revere Avenue	Hill Street	8 <sup>th</sup> Street
Riverside Blvd.	Galveston Avenue	Wall Street
Robal Lane	Highway 20	Highway 97
Shevlin Park Mkt. Road	West UGB	Newport Avenue
Simpson Avenue	Mt. Washington Drive	Colorado Avenue
Skyliners Road	West City limits	Galveston Avenue
Wall Street	Hill St./Portland Ave.	Franklin Avenue
West 14 <sup>th</sup> Street	Newport Avenue	Colorado Avenue
Wilson Avenue	Blakely/Bond	East 3 <sup>rd</sup> Street

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Murphy Road is proposed as a new Minor Arterial between Brookwood Boulevard and Parrell Road at the south end of the city. This project was a recommendation in both the South Bend Parkway Refinement Study and the Murphy Crossing Refinement Plan (see Figures 26A and 26B). Murphy Road between Business 97 and Parrell Road will be realigned slightly to the south and reclassified from a Major Collector to a Minor Arterial. The traffic signal at the intersection of the existing Murphy Road and Business 97 will be relocated to the new intersection of Murphy Road and Business 97. Murphy Road will then cross over the Bend Parkway with no direct access to the highway. Special roadway cross section standards for Murphy Road were developed in the Murphy Crossing Refinement Plan. From Parrell Road west to the new frontage road west of the Parkway, Murphy Road will have a three-lane cross section with raised center medians and center turn lanes within a 100-foot right-of-way. The wide right-of-way is needed to accommodate auxiliary turn lanes at the intersection of Business 97. West of the frontage road and through the commercial zones, Murphy Road will have a three-lane cross section with raised center medians and center turn lanes within an 80-foot right-of-way. Murphy Road will then transition to a two-lane cross section within a 60-foot right-of-way in the residential zones to where it intersects Brookwood Boulevard. This new section of Murphy Road between Brookwood Boulevard and Parrell Road will have bicycle lanes and sidewalks on both sides of the roadway. The intersections of Murphy Road with Brookwood Boulevard, the south frontage road and the north frontage road and the intersection of the southbound Parkway off-ramp and the south frontage road will be controlled by roundabouts. The intersection of Murphy Road and Parrell Road will be controlled by a traffic signal. All other new intersections will be controlled by stop signs. See Chapter 2.7 of the Bend Development Code for schematics of these special roadway cross section standards.

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### 6.5.1.5 Arterial - Frontage Roads

In some areas along the arterial street system, it will be desirable to construct frontage roads. A number of frontage roads have been predetermined and are illustrated on the Roadway System Plan (Map Exhibit B.). Frontage roads may be located, as determined necessary, by the State and City, as properties develop along other arterial corridors. The intent of a frontage road is to collect traffic from properties that abut the arterial roadway and channel this traffic to an intersecting street or controlled intersection with the arterial. The objective of this design is to control the random turning movements that would otherwise compromise the safety or diminish the capacity of the arterial street. In many cases, the frontage road may parallel the arterial for some distance before it makes a connection. The design of frontage roads shall be treated like any other public street, in terms of the location of sidewalks, planter strips and the structural section of the pavement. The width of the frontage road should be based on the forecast traffic

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expected to use the facility. For example, frontage roads anticipated to handle truck traffic should be built to the minimum Industrial Street Standard.

When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial or the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

### **6.5.1.6 Major Collectors**

The major collector street linkages planned for the urban area are illustrated on the Roadway System Plan (Map Exhibit B.). Collector streets are normally located at about every half mile. Additional collector streets may be determined necessary as vacant lands are developed or there are other changes in land use. The alignments of new collector streets on the Plan Map are general in nature and refinements may occur through the land development process, or as otherwise determined by the City.

The major collector street system provides both land access service and traffic circulation between the higher order arterial streets. The collector street system provides a connection between neighborhoods and the arterial street system. The majority of collector traffic is normally generated from the area that it passes through, but additional through trips can be anticipated in the collector volume totals.

The collector street system, like the arterial system, places a greater emphasis on mobility over access to land use. As such, access control measures should be maintained along major collector streets. Driveways should be combined and alternative connections to side streets or alleys should be provided.

Major collector street function and design is a careful balance between the movement of vehicles and minimizing impacts caused by traffic volume, speed and noise. Major collectors may include three-lane street sections to accommodate high turning-movement activity. "Traffic calming" devices may be considered where traffic impacts become adverse to residential livability and community walkability. The City's on-street bike lane system includes use of major collectors. When bike lanes are striped, adjacent parking should be discouraged (as discussed in Section 6.3 of this chapter).

### **6.5.1.7 Residential Local Streets**

A residential local street provides the basic function of direct access to abutting residential properties. Thus, each parcel is normally permitted driveway access to the local street. Through traffic movements should be discouraged, although some traffic from other local streets in the same neighborhood may be expected. The overall objective is to minimize the traffic volumes on each local street by distributing the

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neighborhood traffic to several local streets. To achieve this end, local streets should be developed in a grid-like street pattern with a distance of about 300-600 feet between blocks.

Trip lengths on local streets are normally short and traffic volumes are lower, and the collected traffic from local streets is directed to major collectors. Street standards should be developed to provide adequate space that will accommodate parking on both sides, provide for sufficient room for the passage of cars, emergency vehicles and snow plowing equipment.

Local streets are a strong element in the character and quality of residential areas. They should recognize the character of the natural landscape through which they pass through, and modification of the design standards should be possible when necessary to preserve this character. In addition, variations to a standard residential street should be considered as a means of relieving visual monotony in residential areas. However, any design modification must accomplish the same result, as would a standard street design. Changes in design standards should not be permitted simply as a means of reducing right-of-way or paving requirements.

The Subdivision Ordinance update will provide flexibility in street design while accommodating emergency service access. It has been recognized that skinnier streets may reduce traffic speeds and thereby improve livability. The State (DLCD) has been working on guidelines that also seek to improve livability through the use of narrower streets. The City's Subdivision Ordinance is consistent with that objective however the City will continue to explore methods to balance this goal with public safety needs and addressing the unique characteristics of the Bend urban area.

The location of residential streets will largely be identified through the development review process and streets shall be located according to the standards established by the functional classification system and City Ordinances. The City may assist in this street location effort with the development of circulation concept plans to assure that an acceptable frequency of residential street grids is achieved within developing neighborhoods.

### **6.5.1.8 Industrial Streets**

Industrial areas are located near the arterial and state highway street system, and as a result of this proximity, local industrial streets provide a fairly direct transportation system linkage from the arterial streets to industrial zoned properties. This provides a convenient connection to industrial areas that generate a substantial number of truck trips in the movement of products and raw materials. Historically, the high truck volume has required that industrial streets be constructed with extra pavement and base rock and wide enough to accommodate the large vehicle turning, backing and maneuvering activities. On-street parking is sometimes restricted to further facilitate turn movements and to permit trucks to occasionally queue up on the street. Thus, these roadways are



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built to a specific roadway design to accommodate the needs of this type of vehicle movement, including broad curb radii and wider curb-to-curb widths.

In recent years, due to changes in technology and a dramatic turn away from lumber products in this community, use of industrial areas has changed in some areas. In those examples, use of the industrial lands has taken on more of a business or office park image and truck traffic volumes are significantly lighter. In these instances, there is less of a demand for expansive street widths to accommodate truck traffic. With this in mind, a smaller street standard can be considered to handle this lower truck freight demand in those less intensive types of industrial development. Parking restrictions are less of a concern, but may be necessary to accommodate some nominal truck activity. Thus, a narrower street standard can accommodate the lighter industrial area needs of the business park type environment. New industrial developments should match the appropriate street width requirements associated with the truck movements that are anticipated with the build-out of these areas.

Industrial streets are normally not striped with turn lanes, except at major intersections, and occasionally they may be striped with a centerline to improve lane delineation. Bike lanes are not necessary on these types of streets, unless they are a part of a major collector, arterial street or otherwise part of the on-street bikeway system.

### **6.5.1.9 Alleys**

Alleys are a street design element that has been utilized in the Bend urban area for many decades. While their use was far more common in street construction and land development prior to the mid-1940s, the concept has come in vogue as a part of the "traditional neighborhood design" (TND) movement. Use of alleyways, as a rear property access point, has always been a means of reducing scattered turning movements along public streets and an advantageous way of making sidewalks more "friendly" and safer for pedestrians. Alleys also provide additional options for utilities.

## **6.5.2 OTHER ROADWAY ELEMENTS**

### **6.5.2.1 Intersections**

Where arterial streets intersect other arterials, or in some cases where they intersect some of the more significant major collector streets, installation of traffic signals will, in most cases, be warranted. Another intersection treatment, now gaining greater acceptance in this country, is the use of a roundabout. Roundabouts have shown promising results in other communities, including reduced intersection improvement costs, improved capacities, reductions in roadway widening needs, and have proven to be a suitable alternative to some traffic signal installations. It is important that the City develop standards for the location and design of traffic signals, roundabouts and other transportation system management techniques to provide guidance and consistency in the application of these improvements.

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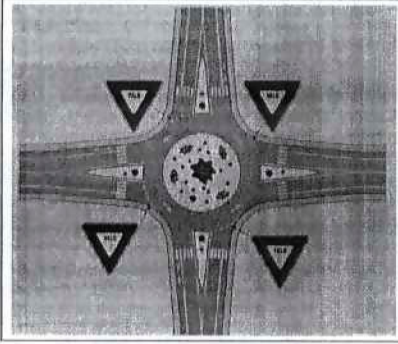
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At all major intersections, where streets classified as a major collector or arterial meet, additional right-of-way needs to be preserved to accommodate turn lanes or alternative design treatments such as roundabout construction. This additional right-of-way, plus transition from the normal street section, should be delineated in the street standards.

### ***Modern urban roundabouts:***

The modern urban roundabout (Figure 27) provides intersection control by circulating traffic movements counter-clockwise around a central intersection island. Vehicles entering the roundabout yield to pedestrians at approach crosswalks and to other vehicles that have already entered the central circulating lane. For pedestrians, roundabouts reduce the amount of pavement required to cross, reduce wait times and minimize auto conflicts to a single direction of travel. There are also fewer vehicle accidents in roundabouts due to slower speeds and the elimination of cross turning movements.



*Figure 27. A typical Modern Urban Roundabout*  
Source: Oregon Bicycle & Pedestrian Plan

### **6.5.2.2 Access Management (Median Control)**

Access management along arterial streets is an important system management tool that can enhance roadway carrying capacity by minimizing conflicts caused by vehicle turning movements. The most common technique of access control is the management of private driveway locations. The higher the functional classification - the more restrictive the access control. The City, County and ODOT have adopted management agreements to the Parkway and have adopted policies that control access on all types of arterials within the urban planning area.

Another technique of providing access control is the construction of raised medians. The City has a policy of installing medians in new construction or modernization of arterials and collectors. Where raised medians are constructed for the full length of a street, driveways and intersections are precluded from left-turn movements. A less restrictive condition to full median control is the construction of partial medians. In this case, breaks are permitted in the median at predefined intervals to accommodate left turn movements. Breaks in the median may be allowed where the City determines that no deterioration in the roadway operation will occur.

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### **6.5.2.3 Community Appearance**

Roads should complement the environment that they pass through and should be attractive as well as safe for all modes. This will require good street design as well as control of access wherever possible, and development should be designed to minimize unnecessary intersections and other turning movements. The installation of landscape medians and traffic islands on new and existing arterials can provide both safety and beauty, and can improve the function of the street (Figure 28). As an example, a landscaped median within East 3rd Street and Greenwood Avenue could considerably improve the appearance of both these facilities and of the City of Bend. This technique should be considered wherever a continuous left turn lane exists along an arterial street.

### **6.5.2.4 Steep Slope Areas**

Hillside areas require special consideration in street design. Arterial or collector streets with controlled access can reduce the number of lanes and parking areas required, and thereby reduce the width of the street that must be constructed on the hillside. Small one-way loop streets providing service to a limited number of houses will also minimize cuts and fills on hillsides. Awbrey Butte represents a major topographic feature in the community. Due to the uniqueness of this hill, several master plans for the development of Awbrey Butte have been approved that have reduced street standard requirements.\*

{\* Special street standards for portions of Awbrey Butte have been approved by City of Bend Resolution numbers 1679 and 2067 <sup>A4</sup>.}

### **6.5.2.5 Traffic Calming**

The volume or speed of traffic that travels on residential streets can often be a source of discomfort to residents. In some cases, high volume or speeding traffic can erode neighborhood livability. Where traffic conditions are excessive, there are a number of techniques that can be used to "calm" driving behavior. These include: narrowing the street, constructing neighborhood traffic circles, speed humps, curb extensions, islands, turn restrictions, street chicanes (i.e., converting a straight street to a meandering road with curb extensions), and combinations of these devices. Traffic calming strategies often require an area wide treatment to ensure that the solution to one street does not shift the problem to an adjacent street or neighborhood. Also, proper initial street design can minimize the need for future traffic calming. Narrower roadways can also help to reduce neighborhood traffic speeds, and the combination of reduced road width and smaller corner curb return radii can improve crossing conditions for pedestrians. The street standards of the Ordinance will be modified to account for this design philosophy and to better balance pedestrian needs with the needs of automobiles.

### **6.5.2.6 Truck Routes**

Truck traffic in the urban area is largely confined to roadways adjacent to industrial, commercial and surface mining zoned properties. Most of this traffic uses the nearest

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adjoining arterial street for access to and from its destinations. The Bend urban area also experiences a large volume of through trucks on the state highway system.

The state highway system serves the major flow of truck traffic in the Bend urban area. These facilities should continue to be designated as the desired through truck routes in the community (i.e., Highways 97 and 20, Century Drive and the Parkway). No other designated truck routes are delineated on the Bend urban area plan.

Citizens have voiced issues about rock and cement trucks that travel the Newport Avenue corridor. This truck traffic is more local in nature and addressing this situation is difficult, due to the lack of alternative routes. Also citizens have expressed concern of the potential for the Empire Avenue/East 27<sup>th</sup> Street and Knott Road/27<sup>th</sup> Street corridors becoming Highway 20 truck bypass routes after the completion of those roadway connections and/or improvements. **These facilities** will be designed as local arterials, and as such, **they are** not intended to carry *through* truck traffic. The need to place truck restrictions on arterial streets and to establish other designated routes in the urban area will be monitored as truck volume or noise issues change.

### **6.5.2.7 Eastside Bypass**

The discussion regarding the need for an "eastside bypass" can be traced as far back as the 1950s. This idea was also incorporated into the first draft of the General Plan in the mid 1970s. In that early draft of the Plan, an expressway facility was described that would skirt the southern and eastern edge of the urban area as a possibility for meeting the future transportation needs of the community. While the document acknowledged that the need for the facility might not be achieved within the time frame of the plan, it did urge that the corridor be preserved for some type of future facility. In subsequent drafts of the General Plan, and in the adopted Plan approved by the state, the eastside bypass was eliminated from the circulation element of the plan and hence no right-of-way was preserved for this expressway.

In the study of the Bend Parkway, one of several alternatives considered was another version of the eastside bypass. This one deviated from the original plan by connecting to Highway 97 on the north, near Cooley Road. One key issue that led to the rejection of the Eastside Bypass alternative was the traffic data forecasts. The bypass was projected to pull away only 10,200 of the 75,000+ vehicles expected to travel Bend's central corridor by the year 2015. In addition, other traffic impact and land use issues were related to a bypass. Many of the landowners on the eastern side objected to the intrusion of a major roadway into a rural area. This applied not only to the bypass itself, but also to the east-west arterials that would have to be upgraded to connect to the bypass. Another concern was the potential of the bypass to foster development pressures outside of the Urban Growth Boundary. This would have been inconsistent with the road planning requirements recently defined by the State Transportation Planning Rule.

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

In 2000, the citizens' advisory committee (BTAC) was approached by citizens of the 27<sup>th</sup> Street corridor with the suggestion of connecting Deschutes Market Road to Powell Butte Highway – as a proposal to alleviate Highway 20 through trip traffic (Salem to points east of Bend). However, the suggested new street connection falls outside of the jurisdiction of the city of Bend and examination and implementation of this new roadway alternative would require the support of, and action by Deschutes County.

### **6.5.2.8 Safety**

One goal of the Plan is to enhance travel safety for all modes on the transportation system. To meet this goal, there are a variety of strategies that include focusing on travel behavior and improving transportation system design. Educating the traveling public regarding potential travel hazards and reinforcing the need to travel cautiously is one valuable accident countermeasure. Another technique involves evaluating transportation system deficiencies and implementing corrective measures to reduce travel hazards. Constructing new transportation facilities with sound design principles will also help to maximize travel safety.

It is important that public agencies monitor the transportation system as it relates to travel safety. One important step is the periodic review of crash locations and the development of projects to correct these problems. These projects need to be further prioritized to ensure that resources can be directed to problem locations in a timely fashion.

### **6.5.2.9 Railroad Grade Crossings**

Historically, train delays at road/railroad crossings have not been a major traffic problem in Bend. However since the merger of the Burlington Northern and Santa Fe railroads, it is anticipated that train crossing caused traffic interruptions may increase over time. If this does materialize in the future, the city of Bend should contact the appropriate railroad authorities and discuss possible solutions. A first choice should be making possible changes in train schedules to limit crossings during peak driving periods. If train schedule changes prove impractical or impossible, then the City should evaluate other solutions including grade separation.

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There are ten, existing at-grade road/railroad crossings in Bend. Major Collector crossings are located at China Hat, Country Club and Brosterhous roads, Scott/2<sup>nd</sup> Street and Wilson Avenue. Arterial street intersections with the railroad are located at Cooley, Butler Market and Reed Market roads, and Revere and Olney avenues. The at-grade crossing at Cooley Road will be eliminated when the grade-separated interchange is constructed at the intersection of Cooley Road and US Highway 97. One future crossing, proposed in the plan, is an eastward extension of Murphy Road (a collector) to 15<sup>th</sup> Street. This new road/railroad crossing should be grade separated. Another proposed railroad "under crossing" is shown on the Plan at Hawthorne Avenue. A detailed analysis (for the future need of the Hawthorne connection) should be evaluated when it is necessary to improve east-west capacity in the downtown to Third St. transportation corridors. The decision to construct this connection should be made as a part of a study of Franklin/RR/Parkway under crossing (widening) alternatives (see: section 6.5.1.4 text under "Franklin Boulevard").

If the Reed Market Road/railroad crossing is contemplated for grade separation, consideration should be given to improving the (direct) connection between 9<sup>th</sup> Street (to the north) and American Lane (to the south). This may include a system of frontage roads.

### **6.5.2.10 Freight System**

US Highway 97 and US Highway 20 will continue to serve as the freight truck routes through Bend. Improvement access controls along Highway 20 and widening to five lanes along the parts of Highway 20 that have currently two or three lanes will improve both through and local truck movement on this route.

The completion of the City's arterial street system will improve the local movement of goods to retail firms in the City and provide an efficient system of roads to ship products from Bend. The completion of Empire Avenue and planned improvements to the Reed Market Road and Colorado/Arizona couplet will particularly benefit the major industrial areas in the City.

## **6.6 AIRPORT PLAN**

**6.6.1 Local Air Service:** The Bend Municipal Airport is located approximately five miles northeast of the Bend urban area. The airport is owned and operated by the City of Bend and is located in an unincorporated portion of Deschutes County. Development of the Bend Airport dates back to 1942 when the land was deeded to the City in an effort to establish a municipally owned and operated landing strip in the Bend area. The airport is classified as a General Aviation/General Utility airport. There is no regular scheduled commercial passenger service at this airport. Due to the location of this airport outside of the UGB area of Bend, Deschutes County regulations and County TSP policy govern land use issues that are associated with the use and operation of this airport.

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**6.6.2 Regional Air Service:** Daily air passenger service is provided to the Central Oregon area at the Redmond Municipal Airport, which is located approximately sixteen miles north of Bend. The Redmond airport is classified as a Primary Service/Transport Airport. It provides scheduled passenger service, and it accommodates larger and higher performance aircraft than the Bend facility. The Redmond airport is currently occupied by two commercial carriers, Horizon Air and United Express. This airport is outside the jurisdiction of Bend.

### **6.7 RAIL PLAN**

**6.7.1 Freight Rail Service:** There is no planned change to the existing pattern of short spur rail lines that serve local rail users. Changes required as part of the Parkway construction have been completed.

The main purpose of the Burlington Northern Santa Fe Railroad line in town will continue to be to haul freight through the area. The existing railroad switching yard, depot, weigh station and sidings are expected to remain unchanged during the 20-year planning period.

**6.7.2 Passenger Rail Service:** There is currently no passenger rail service in Bend. The feasibility of extending AMTRAK service to the Bend area was analyzed during the development of the 1992 Oregon Rail Passenger Policy Plan. The study concluded it would be impractical to provide passenger service to Bend. As an alternative to extending AMTRAK service, ODOT in 2000, funded two "throughway" bus connections with AMTRAK that will pass through Bend. One will travel from Portland to Boise, Idaho, and the other will connect the Chemult rail station with the Bend area.

### **6.8 TRANSMISSION PIPELINE PLAN**

Two major natural gas transmission lines, operated by PG&E Gas Transmission-Northwest, serve Bend. These transmission pipelines extend north-south through the state and are located approximately 1 to 2 miles east of the Bend urban area. Cascade Natural Gas provides the natural gas service to the city of Bend. No other major utility pipelines serve, pass or are currently planned through the Bend urban area.

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### **6.9 TRANSPORTATION SYSTEM PLAN OBJECTIVES, POLICIES, BENCHMARKS AND IMPLEMENTATION**

#### **6.9.1 TRANSPORTATION AND LAND USE**

##### **Objectives:**

- To promote land use patterns that support fewer vehicle trips and shorter trip lengths
- To ensure that future development, including re-development will not interfere with the completion of Bend's transportation system

##### **Policies:**

1. Medium and high-density residential development shall be located where they have good access to arterial streets and be near commercial services, employment and public open space to provide the maximum convenience to high concentrations of population.

2. The City shall continue to use and develop performance standards and guidelines that can reduce vehicle trip lengths and/or promote non-vehicle transportation modes.

3. The City shall consider potential land needs for long-range transportation system corridor improvements and related facilities including transit during the review of subdivisions, partitions, and individual site applications.

4. Developments at the edge of the urban area shall be designed to provide connectivity to existing and future development adjacent to the urban area.

5. The Zoning Ordinance shall be revised so that building design, building orientation and site plans for commercial and public facilities promote pedestrian and bicycle access to and from nearby neighborhoods.

6. The City shall continue to explore mixed use zoning as one of the land use patterns that will promote fewer vehicle trips and shorter trip lengths.

7. The City should be receptive to innovative development proposals, including zone changes, plan amendments, and text changes that promote alternatives to vehicular traffic thus reducing vehicle trips and reduced trip lengths.

8. The City shall explore incentives for re-development of existing commercial strips in order to help reduce the need to expand the Urban Growth Boundary.

##### **Implementation:**

1. In general, implementation of these objectives and policies will occur during the review and processing of individual land use applications.

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2. Policies 1, 3, 4, and 5 will be implemented by reviewing and updating the standards in the General Plan, subdivision code and zoning code.
3. City staff shall review and update the General Plan amendment criteria and zone change criteria to encourage innovative developments that reduce motor vehicle trips or trip lengths and to encourage mixed-use development.
4. City staff will study the impact of new mixed-use developments in Oregon on reducing motor vehicle trip numbers and length of trips.
5. City staff will review development codes from other cities for examples of performance standards that continue to improve the transportation system.

### **Benchmarks:**

1. Separate from the current zoning ordinance update process, complete a draft proposal modifying the plan amendment and zone change criteria as soon as possible after TSP adoption. After the required public involvement and planning commission process it is anticipated that the recommended modifications be considered for Council action no later than the close of FY 01/02.
2. Concurrent with the current zoning ordinance update process, develop proposals, code changes or other measures that implement the TSP land use policies described above, no later than the close of FY 02/03.
3. Review and report to the Planning Commission on the effectiveness of new mixed-use centers in reducing motor vehicle trips/trip lengths. This task is required as part of the DLCD prescribed periodic review process.

### **Funding:**

Evaluate the cost to meet the above benchmarks and add resources to the Development Services budget to address the needs. The first year cost (FY 00/01) is estimated to be \$75,000 to \$100,000 for developing ordinance changes and the new regulations necessary to facilitate the implementation of the land use policies described above.

## **6.9.2 TRANSPORTATION SYSTEM MANAGEMENT**

### **Objective:**

- Provide cost effective transportation improvements and implement strategies that will improve the efficiency and function of existing roadways

### **Policies:**

1. The City shall adopt land use regulations to limit the location and number of driveways and access points, and other access management strategies on all major collector and arterial streets.

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2. The City shall ensure that land use actions support the access management policies of the Oregon Department of Transportation along the state highways located in the urban area.

3. The City and State shall implement transportation system management measures to increase safety, reduce traffic congestion to improve the function of arterial and collector streets, and protect the function of all travel modes.

### **Implementation:**

The City shall develop access management standards for all arterials and collector streets. Access Standards developed for principal arterials and expressways shall consider ODOT access management policies along state highways.

### **Benchmarks:**

Develop or revise and implement access management standards and regulations within six months of adoption of the Bend TSP by the City Council.

### **Funding:**

The City shall allocate or budget sufficient staff resources, within the next budget year (2000-2001), to develop City ordinances and/or standards that will establish and implement TSM supportive land use regulations.

## **6.9.3 TRANSPORTATION DEMAND MANAGEMENT**

### **Objectives:**

- To reduce peak hour traffic loading on the roadway system
- To reduce single occupant vehicle travel
- Implementation of a TDM Plan (Central Oregon Commute Options Program) for the city of Bend

### **Policies:**

1. The City shall develop and implement a transportation demand management plan for its employees. This plan should be designed to serve as a model for the community.

2. The City shall work with businesses, especially those with more than 25 employees, to develop and implement a transportation demand management plan. These plans shall be designed to reduce peak hour traffic volumes by establishing trip reduction targets over five years.

3. The City and County shall work with business groups, schools, the Park District and other governmental agencies to develop and implement transportation demand management programs.

4. The City shall manage and regulate parking by:

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- a) Establishing programs to lower parking demand in commercial and business districts citywide by providing preferential parking for carpoolers, encouraging mass transit use, encouraging shuttle systems from external parking lots, and maintaining an adequate supply of strategically placed bike parking facilities.
  - b) Requiring business groups and employers to develop parking management strategies that support reduced roadway system demand during the peak motor vehicle travel times.
5. The City, County and State shall participate in the Central Oregon Commute Options Program by assisting in:
- a) Development of park and ride facilities; and
  - b) Establishment of educational programs particularly those that will inform the public regarding the full costs of single occupant vehicle travel.
6. The City shall develop and utilize teleworking strategies as part of their business plan that will facilitate the movement of information and data rather than people.
7. The City shall implement the measures outlined in the Central Oregon Commute Options Program and adopt ordinances as appropriate.

### **Implementation:**

Transportation demand management is aimed at altering driver behavior and more efficient use of the entire transportation system. This could be accomplished either by using alternative modes of transportation or lowering the demand during peak travel times. An important aspect of altering driver behavior is education. Several governmental and private jurisdictions cooperatively formulated *the Central Oregon Commute Options Program*. This program is a comprehensive plan to reduce traffic congestion and enhance the transportation choices in the city of Bend. The goals include:

- Less roadway congestion,
- Reduced pollution,
- More parking management strategies,
- Less money needed for development, maintenance and construction of roads and parking,
- Higher quality of life,
- Safer and more efficient travel while providing transportation options for all citizens.

Broader mobility needs are also addressed through TDM measures. Much of the unmet mobility need in Bend comes from people who are currently not contributing to reduced road capacity. These are people who are "transportation disadvantaged". Many citizens of Bend are physically challenged, without a drivers' license, elderly, or too young to drive. The city of Bend would benefit from a balanced transportation system by getting

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the transportation disadvantaged to and from work, conducting personal business around town or participating in community activities independently. The TDM measures discussed in this chapter are a good step in that direction. However, no amount of TDM measures will succeed unless other modes of transportation are developed to be as safe and practical as driving alone. The Central Oregon Commute Options Program is divided into three levels. These levels differ in the complexity and funding commitments.

### **Level A**

The steps associated with Level "A" are considered to be of little cost and can be implemented quickly. Steps or projects to be taken include:

1. The City's Web site should include TDM information, a link to the Commute Options site and develop a more informational link to area TDM strategies (e.g., Dial-A-Ride, and park and ride lots).
2. Work with the Clean Air Committee to promote TDM including use of their newsletter.
3. Develop and implement a strategy for ensuring full compliance to bicycle ordinances and the Bicycle Parking guidelines.
4. Designate a TDM coordinator to work with Commute Options to encourage City employees to bicycle, walk, carpool or telework. This coordinator should establish a TDM program for City employees, which would serve as a model for the community. The City should:
  - Lead by example, which in turn could free up available parking in the downtown district and assist in educating the general public
  - Include Commute Options news in the City Newsletter
  - Offer TDM incentives to employees
  - Support flexible work schedules and teleworking
  - Support and participate in Commute Options Week
5. Implement TDM measures before or in conjunction with street widening and construction projects. Develop measures to determine TDM impact and cost-benefit analysis and consider businesses and other trip generators that are specific to the proposed project.
6. Work with the Bicycle and Pedestrian Advisory Committee to identify intersections, roadways and other facilities that can be developed for improved bicycle and pedestrian uses on a yearly basis.

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7. Review other communities' responses to the same problems that Bend faces and discuss options for Bend. Host a TDM presentation for City staff, council and public.

### **Level B**

The second level of the program is Level "B". This level requires a medium to moderate financial commitment by the City. The steps in the level are as follows:

1. Hire a Transportation Demand Management Coordinator.
2. Continue all Level "A" efforts.
3. Print coupon books as business incentives or contribute to Commute Options for this purpose. Coupon book incentives for leaving the car at home would help accomplish the trip reduction goals.
4. Coordinate efforts and provide educational opportunities with the Bend-LaPine School District to reduce student and staff trips. This could be accomplished by:
  - Providing trail access to schools and top-flight bicycle parking for students and staff
  - Work with the schools on student parking management plan
  - Work with administrators and students to develop incentives and disincentives
  - Encourage that new schools are sited convenient for walking and bicycling within the neighborhood and that the schools contribute to land cost for locating adjacent paths
  - Work with the school district and developers to identify school bus stops and reasonable amenities including, shelters or road enhancements to make the stops safer for children. (These stops designed as potential local transit bus stops.)
5. Work with developers to create more bicycle and pedestrian friendly developments by:
  - Encouraging bicycle and pedestrian friendly developments (e.g. property tight sidewalks on both sides of neighborhood streets, narrow streets, grid system, trails and accessways).
  - Providing standards for storefronts close to the sidewalk with easy pedestrian access.
  - Providing standards for those developers who do develop these community friendly features (e.g. parking reductions).
  - Encouraging urban mixed-use development).
  - Redeveloping existing streets with a streetscape that is more attractive to pedestrians, transit and bicyclists (e.g., the redevelopment of Third Street).
  - Separating sidewalks from roadways with appropriate landscaping.
6. Coordinate efforts with the Bend Downtowners to reduce employee trips and develop parking guidelines to promote TDM strategies.

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7. Assist with development and promotion of area Park and Ride lots and encourage City and other employees to "park and ride" into downtown Bend.
8. Continue to partner with Commute Options.
9. Encourage removal of pedestrian barriers (e.g. cinder and snow removal from road shoulders and sidewalks, installation of handicapped ramps).
10. Work with the Parks and Recreation District to plan and implement a trail system.
11. Provide staff with TDM training.

### **Level C**

Continue all efforts in Levels "A and B" and in addition the City shall:

1. Support and coordinate with shuttle services to and from Bend
2. Support and coordinate with shuttle systems within the City of Bend
3. The coordinator will support funding for sidewalks, bicycles, trails and transit by advocating for their inclusion in the Capital Improvement Program (CIP).
4. Ensure that the design of street intersections accommodates all travel modes
5. Develop a prioritized list of bicycle and pedestrian projects for the Capital Improvement Program:
  - Work with the Bicycle and Pedestrian Advisory Committee
  - Seek input from other groups
  - Allocate adequate funds to tackle several projects each year
6. Improve efficiency of Dial-A-Ride services. It is envisioned that with improved efficiency the Dial-A-Ride service would be expanded into an operating and functional public transit system.

### **Benchmarks:**

- A measurable reduction in single occupant vehicle miles traveled. This is to be measured by the efforts of the TDM Coordinator each year.
- Develop a TDM plan for city of Bend employees, that shows a reduction in single occupant vehicle miles traveled by June of 2002.
- At least 10 businesses will develop TDM programs for their employees, which shows a reduction in single occupant vehicle miles traveled by June of 2003.
- All businesses with 100 or more employees will be given a TDM presentation by June of 2004.
- All business with 25-100 employees will be contacted by June of 2005.

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- TDM Coordinator will make a yearly presentation to the City Council.

### **Funding:**

#### **Year 2001**

- \$55,000
  - \$5,000 is the projected program cost to implement all of Level A by June 2001.
  - \$50,000 is the projected cost to hire a TDM coordinator by June 2001 and have the City to continue to implement Level A. This will also allow the City to get started on implementing Level B.

#### **Year 2002**

- \$75,000
  - \$55,000 to maintain the program at level described above.
  - \$20,000 is the projected program cost to implement all of Level B by June 2002.

#### **Year 2003**

- \$100,000
  - \$75,000 to maintain program at level described above.
  - \$25,000 is the projected program cost to implement all of Level C by June 2003.

#### **Year 2004-2020**

- \$100,000 per year to be increased as needed.
  - There needs to be a finding amount per year that will allow the City to efficiently maintain the efforts of this program.

### **6.9.4 PEDESTRIAN AND BICYCLE SYSTEMS**

#### **Objectives:**

- To support and encourage increased levels of bicycling and walking as an alternative to the automobile
- To provide safe, accessible and convenient bicycling and walking facilities

#### **Policies:**

1. The City, County, State, Forest Service, Park District and public agencies shall work together to acquire, develop and maintain a series of trails along the Deschutes River, Tumalo Creek, and the canal system so that these features can be retained as a community asset. Connections between the Bend Urban Area Bicycle and Trails System should be made to the USFS trail system.

2. The City and Park District shall work together to acquire, develop and maintain the *primary* trails designated on the Bend Urban Area - Bicycle and Primary Trail System

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Plan Map (Exhibit A). These trails, and future trail additions, shall support the need for non-motorized travel in the community.

3. The City and Park District shall adopt standards for trail system right-of-ways and trail improvement that are based on the type of planned trail use.

4. The City shall develop safe and convenient bicycle and pedestrian circulation to major activity centers, including the downtown, schools, shopping areas and parks. East-west access to the downtown area needs particular emphasis across major obstacles, such as 3<sup>rd</sup> Street, the Bend Parkway and the railroad.

5. The City shall facilitate easy and safe bicycle and pedestrian crossings of major collector and arterial streets. Intersections shall be designed to include pedestrian refuges or islands, curb extensions and other elements where needed for pedestrian safety. Also, bike lanes shall be extended to meet intersection crosswalks.

6. Bike lanes shall be included on all new and reconstructed arterials and major collectors, except where bikeways are authorized by the TSP. Bike lanes shall also be provided when practical on local streets within commercial and industrial areas. Bike lanes shall be added to existing arterial and major collector streets on a prioritized schedule. Specific effort shall be made to fill the gaps in the on-street bikeway system. An appropriate means of pedestrian and bicyclist signal actuation should be provided at all new or upgraded traffic signal installations.

7. Property-tight sidewalks shall be included on both sides of all new streets except where extreme slopes, severe topographical constraints, or special circumstances exist. Landscape strips shall separate curbs and sidewalks on new and reconstructed roads. Sidewalks shall be added to all existing arterial and collector streets to fill the gaps in the pedestrian system.

8. The City shall develop a program to ensure timely maintenance and repair of all sidewalks, including but not limited to assigning responsibility for maintenance and repair. The City shall also include removing sidewalk obstructions or barriers that might otherwise not comply with Americans with Disabilities Act (ADA).

9. The City's top priorities for pedestrian improvements are:

- a) Sidewalks and trail system in-fill and school walking routes,
- b) Retro fitting existing sidewalks along select collectors and arterials into property tight sidewalks and
- c) The construction of pedestrian-oriented improvements (other than regular sidewalks, e.g., curb extensions) and elimination of pedestrian barriers.

These projects will be identified and prioritized in the CIP.

10. Bicycle and pedestrian facilities shall be designed and constructed to minimize conflicts between transportation modes.

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11. Bicycle and pedestrian facilities shall be maintained in a manner that promotes use and safety. The City shall analyze the impacts of the use of cinders and consider alternatives to mitigate the impacts. Street repair and maintenance shall be performed in a manner that does not negatively impact bicycle and pedestrian facilities and their use.

12. The City shall repair and maintain, including but not limited to striping, snow plowing, sweeping, stenciling and signing, all bike lanes in a timely manner.

13. Bicycle parking facilities shall be provided at all new multifamily residential, commercial, industrial, recreational, and institutional facilities, major transit stops, all transit stations and park and ride lots. The City shall support a "Bikes on Transit" program and work to increase the number of bicyclists using transit when the transit system is established.

14. Establishing or maintaining accessways, paths, or trails must be considered prior to vacating any public easement or right-of-way.

15. The City, school and park districts shall work together to inventory, designate and protect access corridors and connector trails. City standards will be developed for such trail corridors.

16. The City shall develop local standards for the construction of bicycle and pedestrian facilities. The state of Oregon - Bicycle and Pedestrian Plan shall serve in the interim as a guide in development of these facilities and standards.

17. The City shall refer to the Park District, for its review and recommendation, all development proposals that include or are adjacent to existing or proposed parks or trails.

18. The City should support bicycle and pedestrian education and safety programs. The City shall establish and promote a comprehensive program for the reporting of and responding to bicycle and pedestrian hazards.

### **Implementation:**

1. The City shall implement the TSP trail policies in cooperation with the Bend Metro Parks and Recreation District (BMPRD) as described in the joint agency intergovernmental agreement, dated October 1997, and subsequent amendments. The City and BMPRD shall meet to review the intergovernmental agreement and make appropriate amendments to allocate responsibility for trail construction and maintenance.

2. The Bend Urban Trails Plan, or subsequent updates, shall be implemented as a part of the Bend Urban Area TSP.

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3. New trails shall be built generally following the priority of trails listed in the Bend Urban Trails Plan, or subsequent updates.
4. The City shall consider amendments to the appropriate ordinances in order to facilitate trail right-of-way acquisition and improvements, and trail connections in new development that contain a Primary Trail as shown on the Bend Urban Area Bicycle and Primary Trail System Plan Map.
5. The City shall identify funding options for right-of-way acquisition, design, construction and maintenance of priority trails (e.g., The Deschutes River and Larkspur trail systems).
6. New and existing trails shall be created and maintained following the design standards described in the Bend Urban Trails Plan, or subsequent updates.
7. The City shall meet with BMPRD and the school district to establish a process to inventory, designate and protect access corridors and connector trails which will create a network of trails for safe access to schools, parks and other activity centers.
8. The City shall update inventories of existing bike lanes and sidewalks, and identify gaps and missing system segments, and, in conjunction with the Deschutes County Pedestrian and Bicycle Advisory Committee, prioritize these for completion.
9. The City shall identify hazardous, potentially hazardous, and substandard bicycle and pedestrian facilities and intersections, and prioritize needed repairs and improvements, and implement repairs and improvements in order of priority.
10. The City shall establish a timely and regular maintenance and repair program for all bicycle and pedestrian facilities, which may include enforcement of the responsibility for sidewalk maintenance by adjacent property owners and/or the City assuming the responsibility for sidewalk maintenance.
11. The City shall educate builders, architects and developers concerning city design regulations for bicycle and pedestrian facilities (including bicycle-parking facilities). The City shall require a specific inspection of bicycle and pedestrian facilities (i.e., bicycle racks) as a part of the commercial building construction inspection process.
12. The City shall adopt a methodology for prioritizing new bicycle and pedestrian facilities for construction, and build new bicycle and pedestrian facilities according to the priority plan. This shall include the provision of bike parking facilities at public transportation facilities or other activity centers as described in Policy 6.9.4 (13).

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13. The City shall construct, stripe and stencil bike lanes as a part of street overlays and widening, and simultaneously adjust all catch basin grates to grade that are located within bike lanes.

### **Benchmarks:**

1. Develop a plan, in coordination with BMPRD, to identify funding for and implementation of Primary Trail system projects within six months after adoption of the TSP by the Bend City Council.
2. Update sidewalk, trail and bike lane systems inventories and identify gaps and missing system segments and prioritize these for completion, within six months after adoption of the TSP by the Bend City Council.
3. Remediate the needs of prioritized bicycle and pedestrian facilities as follows:
  - a) Hazards – immediately
  - b) Potential hazards – as soon as practicable
  - c) Substandard conditions – at the rate of 20 percent per year for the next five years
4. Add four miles of in-fill sidewalks per year.
5. Add designated bike lanes to roads with substandard shoulders at the rate of 20 percent per year for the next five years.
6. Public right-of-ways or easements for trails shall be secured and trails constructed at a rate of at least 2 miles each year (on average), starting with the trail priority list depicted in the Bend Urban Trails Plan, or subsequent updates.
7. Incorporate the specific inspection of bicycle and pedestrian facilities (including bicycle-parking facilities) as a part of the commercial building construction inspection process within six months after adoption of the TSP by the Bend City Council.
8. Develop a detailed bicycle and pedestrian facility maintenance program within twelve months after adoption of the TSP by the Bend City Council.
9. Update the City bicycle and pedestrian facility hazard reporting and responding system within twelve months after adoption of the TSP by the Bend City Council.
10. Fund a coordinator to implement the City's bicycle and pedestrian programs within six months after adoption of the TSP by the Bend City Council.

## **BEND URBAN AREA TRANSPORTATION SYSTEM PLAN**

### **6.9.5 PUBLIC TRANSPORTATION SYSTEM**

#### **Objectives:**

- Continue to develop public transportation services for the transportation disadvantaged
- Reduce reliance on automobiles and develop public transportation facilities
- Increase mobility and accessibility throughout the urban area
- Continue to provide infrastructure and land use planning to support transit

#### **Policies:**

1. The City shall preserve and improve the existing Dial-A-Ride service (efficiency, expanded ridership and routes, zone destination) and develop a strategic plan for its future expansion that results in the initiation of a citywide public transportation system.
2. The City shall develop a public transportation system that accommodates the needs of Bend residents and visitors in order to reduce reliance on the automobile.
3. The City shall coordinate with the State and other jurisdictions to evaluate funding alternatives and seek appropriate resources to support a public transportation system. Effort should be made to evaluate creative funding techniques that may include the combination of public and private transportation resources in coordination with other agencies and transportation providers.
4. The City shall work together with Central Oregon communities and the State to develop inter-urban public transportation services. Priority shall be given to high load ridership corridors.
5. To accommodate a fixed-route transit system, land use ordinances and other regulations shall be implemented that establish pedestrian and transit-friendly design along potential or existing transit routes.
6. The City shall work with other governmental agencies to develop a 20-year transit master plan. The plan shall include but is not limited to routing maps, the type and location of required infrastructure, marketing/public education plan, development/redevelopment requirements for transit, and funding mechanisms. Ordinances shall be adopted that implement the Master Plan.

#### **Implementation:**

1. Develop a strategic plan for public transportation that results in the initiation of a citywide public transportation system.
2. Develop an improved public transportation system for the urban area by:
  - a) Forming a Transit Advisory Group
  - b) Expanding the existing Dial-A-Ride system for the general public using existing funding resources,

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- c) Expanding the existing Dial-A-Ride system and implementing a fixed-route bus system\* for the general public using additional funding resources. (\*To be developed as ridership increases along corridors; a fixed-route service would provide a more efficient transit rider service).
3. The City shall actively participate in and support regional discussions and efforts to develop and improve countywide public transportation services (e.g., City participation in Central Oregon Area Commission on Transportation – COACT and Central Oregon Intergovernmental Council – COIC, discussions on public transportation). Discussion to include the development of a countywide transit district and evaluation and implementation of creative public/private sector funding techniques to accomplish this task.
4. Work with other Central Oregon communities to improve inter-urban transportation services.
- a) Priority shall be given to high load ridership corridors within the Deschutes County area (i.e., Bend to Redmond, Bend to LaPine, etc.).
  - b) Development of other inter-city services outside of the Deschutes County area (i.e., Bend connections to the Willamette Valley, other destinations outside of Deschutes County).
5. The City shall establish land use ordinances and other regulations that support the development of pedestrian and transit-friendly design along all arterial and collector roadways.
6. Develop a 20-year transit master plan and implement a phased fixed-route transit system serving the Bend urban area:
- a) Develop a fixed-route master plan to include a basic transit system and incremental improvements to the system, such as:
    - i) The 5-bus (6-route) transit system, illustrated on Figure 13, shall serve as an example of a basic start-up transit network.
    - ii) The 9-bus (7-route) transit system, illustrated on Figure 14, shall serve as an example of a more comprehensive transit network.
  - b) Acquire properties (or secure joint use agreements) for Park-n-Ride lots at strategically located sites (see also item "d.") throughout the urban area.
  - c) Plan, acquire and develop a site in the downtown area for a transit center.
  - d) Plan, acquire and develop at least four major transit stops including the Central Oregon Community College, the St. Charles Medical Center, and sites on the north and south reaches of Bend.
  - e) Implement a phased, fixed-route transit system, focusing initially on high transit ridership corridors.
7. To supplement City funds, seek additional public transportation funding resources for Bend urban area that will support a public transportation system by seeking.

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- a) State and federal grants that support expanding public transportation for general public services
- b) Voter approval of a funding measure to expand Dial-A-Ride system to support general public services
- c) Voter approval of a funding measure to develop a fixed-route system to support general public services

### **Benchmarks:**

1. Obtain funding for Dial-A-Ride expansion, and begin operation of this improved system by July 2001.
2. Meet 100% of the work and medical trip demands of the general public, and 70% of shopping trip demand by July 2002.
3. Determine candidate fixed-route transit corridors and implement, as appropriate, by July 2003
4. Provide 175,000 transit rides per year by July 2003.
5. Develop a "countywide" transit master plan in coordination with other public agencies and private transit providers by July 2003.

### **Funding:**

1. Explore the use of System Development Charges (SDCs) for a portion of local share of transit system capital improvements.
2. Seek other stable local funding opportunities for public transportation to support operating needs on a long-term basis that may include levies, special districts and other funding strategies.
3. Lobby the state of Oregon Legislature to consider bills that could result in increased public transportation funding.
4. Pursue multi-year funding with major employers and/or other public/private organizations (e.g. transit service contracts).
5. Seek voter approval of a transit funding measure to operate and support an expansion of local Dial-A-Ride service, to include the general public, and establish scheduled, fixed routes open to the general public as demand dictates and funding permits.
6. Seek additional funding to establish a countywide transit district and improve other inter-city transportation services.

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7. Seek state and federal grants to support:
  - a) Urban area transit planning;
  - b) Dial-A-Ride expansion;
  - c) Acquisition of buses for a fixed-route transit system; and
  - d) Development of a downtown transit center, park and ride lots and other transit use amenities.

### **6.9.6 STREET SYSTEM**

#### **Objectives:**

- To provide a practical and convenient means of moving people and goods within the urban area that accommodates various transportation modes
- To provide a safe and efficient means to access all parts of the community
- To provide an attractive, tree-lined, pedestrian friendly streetscape sensitive to protecting the livability of the community

#### **Policies:**

##### **General:**

1. Streets shall be located, designed and constructed to meet their planned function and provide space for adequate planting strips, sidewalks, motor vehicle travel and bike lanes (where appropriate). Specific effort should be made to improve and enhance east-west circulation patterns for all modes of travel throughout the community.
2. Where a subdivision or partition is adjacent to land likely to be divided in the future, streets, bicycle paths, and accessways shall continue through to the boundary line of the subdivision or partition in order to achieve connectivity within the grid system.
3. Streets shall be classified and generally located according to the Bend Urban Area - Roadway System Plan (Map Exhibit B), the Street Functional Classification (Table 12), and the Street Grid System (Figure 29). Street right-of-ways and improvements standards shall be developed to meet the needs of the Transportation Plan and Functional Classification System.
4. In order to reduce vehicle speed, avoid construction of excessive pavement, and create livable neighborhoods, the City shall adopt standards that allow for narrower streets and lane standards, on-street parking, and other pedestrian friendly design elements.
5. The City shall manage the development process to obtain adequate street right-of-way and improvements commensurate with the level and impact of development. New development shall be supported by traffic impact analysis(es) to assess these impacts and to help determine transportation system needs.
6. Access control shall be part of the design standards for major collectors, arterials, principal arterials and expressways to ensure that adequate public safety and future

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traffic carrying capacity are maintained while at the same time preserving appropriate access to existing development and providing for appropriate access for future development. The city of Bend *Arterial Access Policy* (Street Policy No. 2) and the *Access Management Policy* (Street Policy No. 4) shall be reviewed and revised, and new street policies shall be adopted if necessary, to:

- a) Conform street designations and other terminology to that which is used in this TSP;
  - b) Adopt written policies and procedures for access control on new and reconstructed major collectors, minor arterials and major arterials;
  - c) Provide that raised medians that eliminate left turn movements to existing streets or improved properties will only be installed after notice to affected property owners and an opportunity to be heard;
  - d) Require that in the case of new access control measures that will restrict existing turn movements into or out of existing homes, businesses or streets, the least restrictive measure (such as shared driveways, elimination of curb-cuts or "no left turn" signs) that is effective to achieve the purposes of the policy will be evaluated prior to installation of raised medians;
  - e) Require that the cost of installation and maintenance of raised medians, and in particular those with landscaping, be evaluated and alternatives be considered before raised medians are approved or required;
  - f) Replace any mandatory requirements for raised medians on streets other than new principal arterials and expressways with an analysis of the factors set forth above, and any other factors that are identified in the policy;
  - g) Provide that where commercial or industrial land uses abut residential areas, access shall not be directed to local residential streets.
7. City and state transportation system improvements shall comply with the Americans with Disabilities Act requirements.
8. Traffic signals or roundabouts shall be constructed in accordance with the design, spacing and standards adopted by the City and State.
9. The City Council shall involve the public, where appropriate, in the development and redevelopment of street designs prior to their construction.
10. The City shall consider the impact of improvements to or completion of existing facilities when considering the need for constructing new facilities.
11. The City shall place a high priority on providing adequate funding for street maintenance.
12. Traffic calming devices may be considered anywhere traffic impacts are adverse to residential livability.

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### *Residential Streets:*

13. Residential block lengths shall not exceed 600 feet without a connecting cross street. When existing conditions or topography prevent a cross street, a pedestrian accessway to connect the streets shall be required.

14. A grid-like pattern of residential local streets shall be developed whenever practical in order to increase street connectivity within a neighborhood.

15. The City may require adjustment to the street pattern or installation of traffic calming devices in order to discourage high speed and volume vehicular traffic on local residential streets.

16. Street widths on public residential local streets may vary depending on topography, anticipated traffic volume, natural features that warrant protection, and existing street patterns in the neighborhood. Right of way shall be a minimum of sixty (60) feet except in special circumstances. Narrower streets may have limited on-street parking to ensure emergency vehicle access.

17. New alleys should be developed to City standards and shall be maintained by the property owners.

18. Cul-de-sac or "hammer-head" residential streets may be allowed only where existing development, steep slopes, open space, or natural features prevent through street connections, or when the objectives of connectivity are met within the neighborhood.

### *Arterial Streets:*

19. Due to the sensitive nature of the Deschutes River corridor, the extension of Reed Market Road, between Blakely Road and Century Drive, shall be limited to a two-travel lane roadway.

20. Appropriate facilities for bike, pedestrian and transit use shall be included in any road-widening project.

21. The City shall evaluate the effect of transportation demand management (TDM) and transportation system management (TSM) measures that would successfully eliminate or delay the need for minor arterial street widening beyond the existing travel lanes within the twenty-year design life of a proposed roadway project. Transportation system computer modeling is one acceptable evaluation method that can be used to assist in the assessment of forecast travel demand and the associated vehicle travel lane needs.

TDM/TSM measures as an alternative to roadway widening: The TDM and TSM measures incorporated into this analysis, as an alternative to roadway widening, shall be capable of funding and fulfillment within a reasonable time period such that the subject arterial level-of-service shall not diminish below an acceptable adopted City standard.

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**TDM/TSM measures AND roadway widening:** If the implementation of TDM and TSM measures from the previous analysis are determined to be insufficient in meeting the transportation system needs along the subject roadway corridor, the City shall undertake an evaluation of the consequences that additional roadway widening may have on adjoining neighborhoods as well as the benefits gained by additional street construction.

This evaluation shall include an assessment of the design features and construction options for the road widening project. The design analysis of roadway widening shall consider the impacts on all modes of travel, adjacent affected travel corridors and the impact on properties immediately adjacent to the contemplated road widening. The most effective and appropriate TDM and TSM measures recommended by the evaluation, as selected by the City Council, be implemented either in conjunction with, or before, the road widening project. The City Council after providing notice and opportunity to be heard at a public hearing shall decide whether to authorize the street widening based upon this policy and the evaluation report. Written notice shall be provided to property owners within 250 feet of the proposed widening and to affected neighborhood associations. In addition, notice of the hearing shall be posted in conspicuous locations along the proposed widening and published at least ten days prior to the hearing.

The City Council shall receive this evaluation report that makes the aforementioned analysis of TDM and TSM measures, and the evaluation of roadway widening design options, prior to considering authorization of proceeding with the road widening project.

Minor arterial street corridors shall be designated by City Council as falling into one of three classifications:

- a. "Not authorized for lane expansion". These minor arterial corridors are described in the TSP, in Section 6.5.1.4 requiring a TSP amendment before being categorized as "b" or "c" as described below.
- b. "Possible lane expansion". These minor arterial corridors are listed in the City's annual Capital Improvement Plan as corridors where additional travel lanes may be necessary within the 20-year planning period. Street corridors in this category may not be programmed for lane expansion in the CIP without City Council authorization.
- c. "Probable lane expansion". These minor arterial corridors are listed in the City's annual Capital Improvement Plan as corridors where additional travel lanes are probably going to be necessary within the 20-year planning horizon. Street corridors in this category may not be programmed for lane expansion in the CIP without City Council authorization.

Intersection widening and improvements, that are necessary for vehicle turning lanes or pedestrian safety, are exempt from this policy.

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Notwithstanding a street's categorization as "possible lane expansion" or "probable lane expansion", the City Council must comply with paragraphs 3 and 4 of Transportation System Plan Arterial Street Policy 21 prior to authorizing a road widening project.

22. The City shall involve the public, the Park District and other governmental agencies in developing a roadway design for the southern river crossing that complements the natural features of the river area.

23. The City and State shall develop and implement a plan to improve the appearance, safety and function of East 3rd Street, portions of Highway 20 and old Highway 97 when the Parkway is completed.

24. The City shall work with the State to line the entrance to the city of Bend along Highways 97, Highway 20, Century Drive and the Parkway, with large stature trees.

25. Landscaped medians should be included on all arterial streets, except where right-of-way acquisition is not possible, that incorporate left-turn refuge lanes at controlled intervals to improve community appearance, maintain system mobility and to reduce the adverse affects of wide street widths to all types of travel (Figure 28). On streets with multiple vehicle lanes and wide curb radii, pedestrian refuge islands shall be constructed to minimize street crossing distances.

26. Frontage roads shall be provided parallel to arterial streets, as illustrated on the Bend Urban Area Roadway System Plan Map, or as determined necessary by the City or State, to maintain an acceptable level of safety and carrying capacity on the arterial street system.

27. The state highway system (i.e., Highways 97 and 20, Century Drive and the Parkway) shall be designated as the through truck route system. Trucks shall be permitted on the City and County arterial street system for local trip activity, unless otherwise restricted.

28. The city of Bend shall work with ODOT to prepare an Interchange Area Management Plan (IAMP) prior to construction of a grade-separated interchange at the intersection of Cooley Road and US Highway 97.

29. When a final land use or limited land use decision determines that a right-turn lane will improve, maintain or prevent further degradation of an applicable performance standard for the intersection of an arterial with another arterial of the intersection of an arterial with an expressway, the right-turn lane shall be considered allowed by the TSP at the appropriate location, provided that if the need for the right-turn lane is caused by a specific application, the applicant shall be responsible for full payment of the costs associated with construction of the right-turn lane.

### **Parkway:**

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30. The Bend Parkway will be planned, constructed, and managed to limit direct access to the facility to meet the objectives of the Access Oregon Highway (AOH) system, to protect the integrity of the route's through capacity, and to promote public safety.

31. To maintain the viability of the existing East 3rd Street and downtown business districts, the Bend Parkway will provide convenient access to these areas in so far as this does not compromise the function of the Parkway.

32. The Bend Parkway shall, to the greatest extent possible, include landscaping, medians, separated sidewalks, and bike lanes.

### **Safety:**

33. The City and State shall improve transportation safety for all modes through approved design practice, sound engineering principles and regulation of vehicle speeds.

34. The City shall explore with the State and implement appropriate "Intelligent Transportation System Devices".

35. The City shall take measures to ensure that traffic speeds are appropriately designated throughout the City.

36. As a part of the development process, right-of-way shall be acquired as necessary for the correction of street intersections, excessively sharp curves, or as otherwise necessary to improve the safety of a road alignment.

37. The City and State shall support efforts to educate the public regarding travel on the transportation system.

38. The City and State shall monitor transportation crash and safety issue locations, and develop and implement corrective improvement projects.

### **Implementation:**

1. Update, expand background justification, priorities, categories and weightings in the Transportation CIP, and monitor it on a regular basis.

2. Study alternatives to improve the street grid system and east/west street connectivity in order to address future transportation needs:

- a) Evaluate the need for more through routes and grid connections in the northeast section of Bend in order to preserve capacity on the 27<sup>th</sup> Street corridor - this will require the City to coordinate street extensions with the County.
- b) Study the completion of the Purcell corridor and determine placement in the CIP.
- c) Study the American Lane/9<sup>th</sup> Street offset intersection reconstruction.

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- d) Study options for the future extension of Cooley Road in the northwest quadrant of the City.
  - e) Study the Blakely/Brookwood connection and determine the priority in light of the Southern Bridge Crossing project.
  - f) Regarding the study of the Lava Road connection alternatives between Arizona and Industrial Way:
    - i) Before extending Lava Road between Industrial Way/Bond Street and the Colorado/Arizona couplet, the City shall conduct a study (which may be done in conjunction with a refinement plan), with public involvement from the affected neighborhood and other interested parties. This study shall include evaluating the adequacy of the street system to handle anticipated traffic loads, impacts on the affected neighborhood (located between downtown and the Old Mill District) and how those impacts could be mitigated.
    - ii) If the study shows that using the Lava Road extension will operate at a more acceptable level of service, minimize neighborhood cut-through traffic and that neighborhood access will be adequately accommodated, the City shall proceed with an amendment to the BUATSP (which may be done in conjunction with a refinement plan) followed by the completion of the roadway improvements and traffic mitigation measures. It is important that the study demonstrate that adverse traffic impacts on the neighborhood can be mitigated without unduly compromising the residents' ability to enter and leave the neighborhood. Consequently, the study shall include the following elements:
      - (1) A mitigation plan that combines traffic control and traffic calming measures that will minimize cut-through traffic through the adjacent neighborhoods while allowing neighborhood residents reasonable ingress and egress to streets adjoining the neighborhood;
      - (2) Analyzing the level of service at nearby intersections and making any changes that may be necessary to attain at least an acceptable level of service so long as those improvements can be accomplished within the existing pavement.
3. Install interim signals where warranted for traffic safety and enhancement of traffic flow. Complete a list of interim signalization projects and monitor on an annual basis.
4. Monitor completion of Bend Parkway impacts on local intersections and determine if additional improvements are needed.
5. Complete the current study to evaluate and produce appropriate roundabout construction and performance standards. Give special consideration to the needs of the disabled community.

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6. Produce preliminary topographical and engineering alignments for future road extensions prior to acquiring right-of-way.

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**6.9.7 RAIL SYSTEM**

**Policy:**

1. When railroad rights-of-way are considered for abandonment or vacation, the City, County and State shall seek the preservation of these corridors for other transportation services.

2. The City shall work with Burlington Northern Santa Fe Railway to develop and implement a plan for train scheduling to ensure that the current needs of the transportation system in the City are minimally affected.

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**Table 12**  
**Street Functional Classification System**  
*Typical Characteristics*

Functional Classification	Projected Daily Traffic (Typical)	F.C. Spacing (Typical)	Trip Length (Typical)	Vehicle Lanes (Typical)	Bike Lanes	Sidewalks	Parking Permitted (Typical)
<b>Arterial:</b>							
Expressway	20,000 - 45,000+	5+ Miles	Over 5 miles	5	Yes	Yes Both sides	No
Principal Arterial	15,000 - 40,000	2+ Miles	Over 2 miles	5	Yes	Yes Both sides	No
Major Arterial	10,000 - 30,000	1-2 Miles	Over 1 mile	3-5	Yes	Yes Both sides	No
Minor Arterial	5,000 - 18,000	1/2-1 Miles	Over 1 mile	2-5	Yes	Yes Both sides	No*
Major Collector	1,500 - 9,000	1/2 Mile	Under 1 mile	2-3	Yes	Yes Both sides	No*
Industrial Streets	500 - 3,000	Not applicable	Varies	2	Not required	Yes Both sides	Yes
Local Street	< 1,500	300-600 feet	Under 1/2 mile	2	Not required	Yes Both sides	Yes
Frontage Road	Varies	Not applicable	Varies	2	Not required	Yes Both sides	Yes** if adequate width provided
Alley	< 400	Not applicable	Not applicable	1 1/2	Not applicable	Not applicable	Yes** if adequate width provided

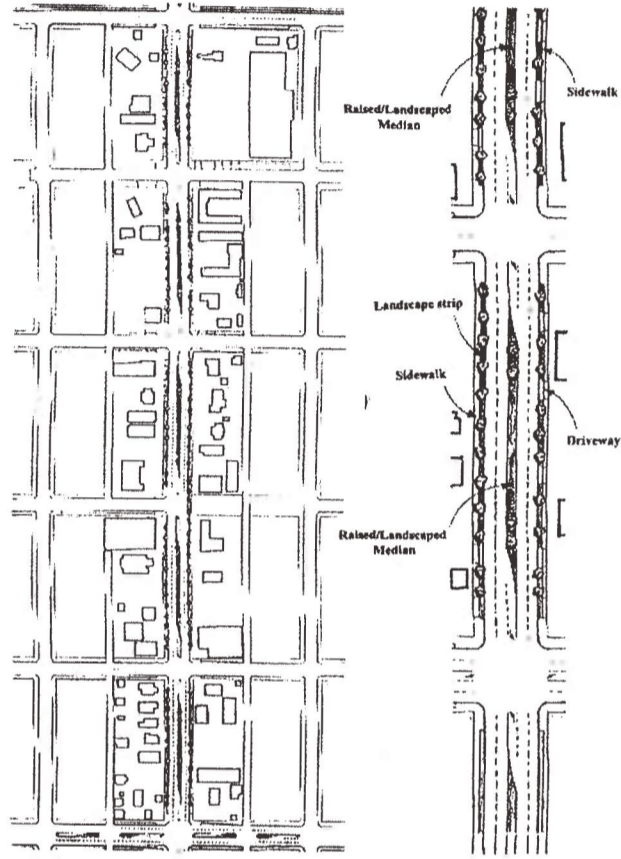
\* Parking permitted if approved by local jurisdiction

\*\* Parking permitted adjacent to the facility but NOT obstructing the travelway



**BEND URBAN AREA TRANSPORTATION SYSTEM PLAN**

**Figure 28**  
**Arterial Streetscape**  
*Typicals*



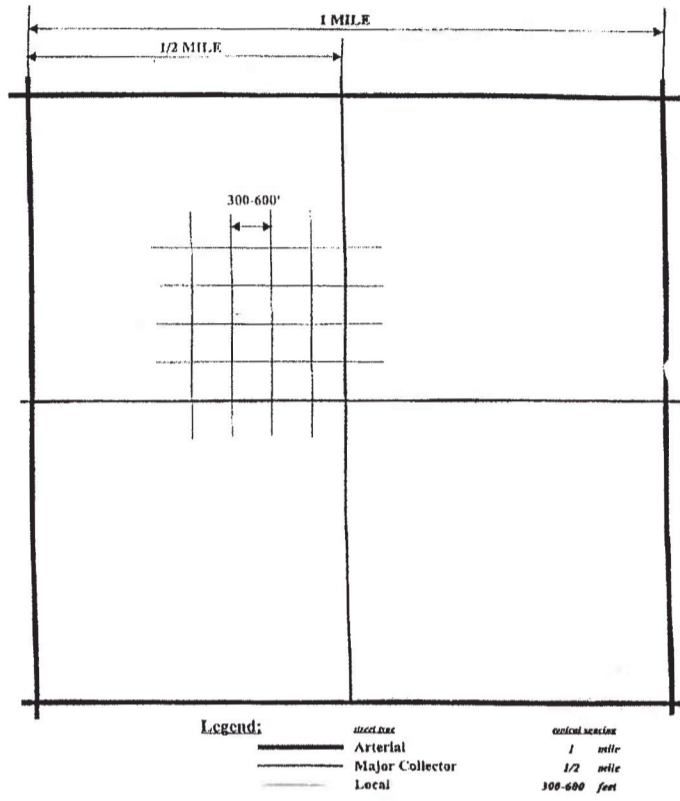
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**BEND URBAN AREA TRANSPORTATION SYSTEM PLAN**

**Figure 29**  
**Street Grid System**  
*Typical Street Spacing*



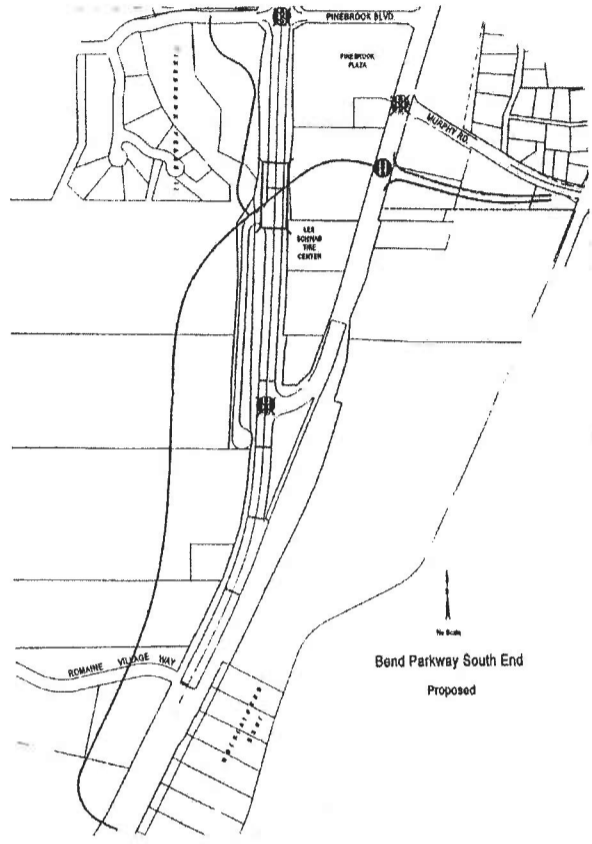
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Figure 26

**Bend Parkway - South End  
Proposed Frontage Road System and Extension of Murphy Road**



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