Oregon
Theodore R. Kulongoski, Governor

Department of Land Conservation and Development
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NOTICE OF ADOPTED AMENDMENT

April 6, 2007

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

FROM: Mara Ulloa, Plan Amendment Program Specialist

SUBJECT: City of Brookings Plan Amendment
DLCD File Number 002-06

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. This amendment was submitted without a signed ordinance.

Appeal Procedures*

DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: April 23, 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
Matthew Crall, DLCD Transportation Planner
Dianne Morris, City of Brookings

<paa> ya/

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)

Jurisdiction: City of Brookings Local File No.: CP-1-06 (If no number, use none)

Date of Adoption: June 26, 2006 (Must be filled in) Date Mailed: March 30, 2007 (Date mailed or sent to DLCD)

Date the Notice of Proposed Amendment was mailed to DLCD: March 22, 2006

XX Comprehensive Plan Text Amendment
___ Comprehensive Plan Map Amendment
___ Land Use Regulation Amendment
___ Zoning Map Amendment
___ New Land Use Regulation
___ Other: _____ (Please Specify Type of Action)

Summarize the adopted amendment. Do not use technical terms. Do not write see Attached.≅

Amendments to the Comprehensive Plan adopting results of the Brookings Downtown Hwy. 101 Solutions Project into the Transportation System Plan. Primary changes were to Chapter 6 and 7. Other changes were made to Chapters 5 and 8 for internal consistency and updates.

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 AN/A.≅

Same ≅

Plan Map Changed from : N/A to _____

Zone Map Changed from: N/A to _____

Location: City Wide Acres Involved: all

Specify Density: Previous: N/A New: N/A

Applicable Statewide Planning Goals: 1, 12

Was an Exception Adopted? Yes:____ No: XX

DLCD File No.: 002-06 (15106)

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: XX 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: Curry County, Port of Brookings, ODOT, DLCD

Local Contact: Dianne Morris Area Code + Phone Number: (541) 469-1138

Address: 898 Elk Drive City: Brookings

Zip Code+4: 97415 Email Address: dmorris@brookings.or.us

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 this Notice of Adoption must include the text of the amendment plus adopted findings and supplementary information.

5. The deadline to appeal will not 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 ANotice of Adoption≅ is sent to DLCD.

6. In addition to sending the ANotice 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 Mara.Ulloa@state.or.us - ATTENTION: PLAN AMENDMENT SPECIALIST.

IN AND FOR THE CITY OF BROOKINGS
STATE OF OREGON

In the Matter of an Ordinance amending the Transportation Systems Plan of the City of Brookings to incorporate changes in Chapters 5, 6, 7, and 8 to reflect projected changes to the highway system through the city from Carpenterville Rd. to the Chetco River Bridge.	)	*ORDINANCE No. 06-O-576*

Sections:

WHEREAS, the Brookings City Council, at its regularly scheduled meeting of June 12, and June 26, 2006 did conduct a public hearing on this matter, during which hearing testimony and evidence was presented by the applicant's representative, interested parties and recommendations were received from the City Planning Commission and presented by the Planning Director; and

WHEREAS, at the conclusion of said public hearing, after consideration and discussion, the Brookings City Council, upon a motion duly seconded, did vote in the majority to amend the City's Transportation Systems Plan, which is a separately bound document of the city's Comprehensive Plan, as follows:

The city of Brookings ordains as follows:

Section 1. Amendment to the Table of Content.

The Table of Content of the Transportation Systems Plan is hereby amended to read as follows:

CHAPTER 6: IMPROVEMENT OPTIONS ANALYSIS

Section 2. Amendment to Chapter 5.

Chapter 5 is hereby amended to read as shown in Exhibit A.

Section 3. Amendment to Chapter 6.

Chapter 6 is hereby amended to read as shown in Exhibit B.

Section 4. Amendment to Chapter 7.

Chapter 7 is hereby amended to read as shown in Exhibit C.

Section 5. Amendment to Chapter 8.

Chapter 8 is here by amended to read as shown in Exhibit D.

First Reading: June 26, 2006
Second Reading: June 26, 2006
Passage: June 26, 2006
Effective Date: July 1, 2006

Signed by me in authentication of its passage this 26th day of June, 2006.

Pat Sherman

Pat Sherman, Mayor

ATTEST:

Paul Hughes, Finance Director/Recorder

CHAPTER 5: 2017 BASELINE TRAFFIC CONDITIONS

The 2017 traffic projections developed as part of this study are used as the basis for assessing future roadway conditions and likely improvement requirements. These projections have been developed using a simplified travel demand model, which relies on a combination of land use-driven trip generation and distribution, and on a trend analysis, which uses historical experience and anticipated land use development as a basis (including several large future development projects anticipated within the study area).

Twenty-year projections were developed when this study commenced in 1997. Development of the TSP occurred between 1998 and 2000 and adoption is expected to occur in 2001, at which point the forecasts only extend 16 years into the future. Concern was raised that, by the time the plan is adopted, the plan would not truly be a 20-year plan. However, while 20-year time frame is preferred, the TPR allows for planning horizons as short as 15 years. Further, the travel forecasts were not the driving force behind the transportation projects the community wished to pursue. The projects evaluated in the improvement options analysis, and those projects ultimately recommended in the modal plans predominantly address safety, pedestrian and bicycle facilities, access management, emergency routes, and connectivity, rather than capacity issues because in most cases the existing transportation infrastructure could meet the forecast demand. Therefore, the plan serves the intended purpose, and the 15-year forecast does not detract from the plan. Furthermore, it is expected that the TSP will go through periodic review every 8-10 years at which time the travel forecasts will be updated.

In general, an understanding of the underlying land development and demographic growth anticipated within the study area is important to provide a good foundation for understanding future travel demand and the need for improvement projects. The following discussion is intended to provide a general sketch of the assumptions and analysis methodology inherent in developing the year 2017 traffic projections. Included is a description of the population and land use forecasts that form the basis for the traffic projections, as well as a discussion of the travel demand forecasting process and resulting projections.

POPULATION AND LAND USE FORECASTS

The Brookings-Harbor area has been one of the fastest growing areas in Oregon during the past decade. The population increase is mostly a result of in-migration from persons of retirement age, rather than natural increase. To accommodate the rapid increase in population, a substantial increase in land devoted to urban uses will likely be necessary along with an increase in the existing housing stock. Along with the rise in population will come increases in the demand for commercial, industrial and institutional land uses.

The purpose of this sub-section is to identify expected future growth within the Brookings study area including not only the magnitude of that growth but also the spatial distribution of future residential, commercial and industrial land uses. These future land use projections will form the basis of the development of future traffic projections, the analysis of future transportation system deficiencies, and, ultimately, the development of a transportation improvement program.

The beginning of this sub-section presents a thorough explanation of the demographic changes that the Brookings-Harbor area has experienced over the last 20 years, as well as the anticipated growth in population through 2017. The population forecasts were used as a basis for determining future housing demand. In the course of this analysis, it appears that a major constraint in meeting future housing demands is the supply of buildable residential land within the existing Urban Growth Boundary (UGB). The City of Brookings is currently negotiating an expansion in this boundary with the Oregon Department of Land Conservation and Development (DLCD). Technical analyses used as a basis for identifying the need for and extent of a UGB expansion have been used as the basis for the analysis contained in this section and the development of future traffic volume forecasts. These reports include:

- Curry County Population Discussion, David Evans and Associates, Inc., December 3, 1997.
- Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995; and
- Brookings Urban Growth Boundary Exception and Urban Reserve Establishment Study, David Evans and Associates, Inc., July 12, 1993.

Should it be approved by DLCD, the proposed expansion to the UGB would allow the City to provide services and buildable land outside of the current UGB boundaries.

The following paragraphs will consider: 1) historic and projected population growth; 2) future housing needs based on a broad geographic distribution of population growth; and 3) future land use projections for residential, commercial and industrial land uses by general location.

Population Growth and Distribution

Information used in this analysis was from the U.S. Census Bureau and Portland State University's Center for Population Research and Census. The U.S. Census data does not reflect demographic characteristics consistent with the Urban Growth Boundaries (UGB) of Oregon communities, but includes city limits, counties and various tracts or districts within Counties. The U.S. Census Bureau recognizes two separate geographical entities in the Brookings-Harbor area; the incorporated City of Brookings and the Harbor Census Designated Place (CDP). The Census Bureau has kept track of growth for these areas over the years to provide a historic base of information for the region.

For this report, data will address the City of Brookings, the 1980 Harbor CDP, Curry County, and aggregated areas north and south of the Chetco River within the existing and proposed UGB. Forecasts contained in this report are based on current population located within the study area and historic growth trends of the study area.

Historic Population Growth

Population growth in the Brookings-Harbor area has been erratic over the past two decades, growing dramatically in some years, while decreasing in others. A linear graph of historic growth would display a series of peaks and valleys exhibiting the erratic growth experienced by the area. A line drawn between the peaks and valleys would project average growth long term, and would illustrate how population in the area has increased steadily at approximately 2.4 percent per annum for the Brookings city limits and 1.9 percent for the Harbor CDP. The long-term growth rate is critical for establishing a basis to project future growth.

Table 5-1 summarizes population growth between 1970 and 1990 for the study area and Curry County as a whole. From 1970 through 1980, the City of Brookings' population increased from 2,720 to 3,384 at an annual growth rate of 2.21 percent. Curry County grew from 13,006 to 16,992 during that same period at a growth rate of 2.71 percent annually.

TABLE 5-1
BROOKINGS-HARBOR URBAN GROWTH STUDY AREA HISTORIC POPULATION GROWTH TRENDS

	1970	1980	1970-1980 % Change	1990	1980-1990 % Change	Annual Growth Rate 1970-1990
City of Brookings	2,720	3,384	24.41%	4,400	31.21%	2.4%
Harbor CDP				2,143		
Curry County	13,006	16,992	30.65%	19,327	13.74%	1.9%

Source: Brookings Urban Growth Boundary Exception and Urban Reserve Establishment Study, David Evans and Associates, July 12, 1993

Population in the City of Brookings increased from 3,384 to 4,400 during the 1980-1990 period, while Curry County increased from 16,992 to 19,327. Annual average population growth over the 20 year time period from 1970 to 1990 in Brookings was 2.4 percent. The 20-year annualized growth for Curry County was 1.9 percent. The Harbor CDP had not been formed by the Census Bureau until the 1980 Census, and had a significant boundary modification in 1990. Therefore, only data for 1990 is shown for the Harbor CDP, when the population was 2,143.

For the past five years, Curry County and the City of Brookings have led Oregon in population growth rates. Since 1987, Curry County has grown at approximately 4.5 percent per year, while the City of Brookings has grown at 6.3 percent per year, faster than any other coastal city.

Most of this population growth has been the result of in-migration, rather than natural increase. In 1990, approximately 23 percent of Brookings' population exceeded the age of 65, almost 6 percent more than in 1980. Curry County as a whole has also experienced this same in-migration with an increase in senior population of about 12 percent since 1980. The percentage of Brookings residents 55 or older is 50 percent higher than that of the state; for Curry County, it is about 70 percent greater. The data suggests that much of the population growth in the area is a result of in-migration of retirees. Table 5-2 shows the population for Brookings and Curry County by age.

TABLE 5-2
POPULATION BY AGE, 1990

	City of Brookings		Curry County		Oregon	
Age	Number	Percent	Number	Percent	Number	Percent
Under 5	315	7.2	1,084	5.6	201,421	7.1
5-14	632	14.4	2,310	12.0	411,140	14.5
15-24	417	9.5	1,610	8.3	379,097	13.3
25-34	605	13.8	2,211	11.4	451,544	15.9
35-44	622	14.1	2,705	14.0	474,851	16.7
45-54	379	8.6	2,093	10.8	296,595	10.4
55-64	459	10.4	2,600	13.5	236,349	8.3
65+	971	22.1	4,723	24.4	391,324	13.8
Total	4,400	100	19,327	100	2,842,321	100

Source. U.S. Census, 1990

Population Projections

Table 5-3 presents the most recent forecasts of future population growth for the Brookings-Harbor Urban Growth Study Area. The 1993 population for the Brookings-Harbor area was

8,749. This estimate formed the basis for projections of future population growth in the study area, which are documented in the reports prepared for the City and previously identified in the Introduction. These reports were prepared to validate the need for an expansion of the existing Urban Growth Boundary. The population forecasts identified in these reports will form the basis for future travel demand projections, and the development and analysis of transportation system needs.

TABLE 5-3
BROOKINGS-HARBOR URBAN GROWTH STUDY AREA POPULATION FORECASTS

	1993	2015	2017
North of Chetco River	5,821	10,938	11,380
South of Chetco River	2,928	5,502	5,724
Total	8,749	16,440	17,104

Source: Curry County Population Discussion, David Evans and Associates, December 3, 1997.

1993 data from Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995, adjusted by 2.96 percent per year.

As illustrated in Table 5-3, population is estimated to grow to 17,104 in 2017. This equates to an annual average growth rate of 2.83 percent.

Potential Development Impact Analysis

To supplement the demographic analysis and to determine more specific potential growth areas in Curry County, DEA reviewed ODOT's Potential Development Impact Analysis (PDIA). The PDIA, issued in March 1996, provides estimates for a maximum development scenario in rural Curry County. At the time the analysis was completed, the expansion of the Brookings Urban Growth Boundary had not received final approval and, therefore, the analysis does not reflect that change. A detailed summary of the PDIA is contained in Appendix C.

The analysis is based on a number of assumptions, some of which are acknowledged to overstate potential development. Some of the key assumptions include the following:

- No adjustments were made for slopes, bodies of water, riparian areas, or other physical development constraints.
- Development estimates do not account for market factors.
- Where the zoning ordinance does not specify a parking requirement, no adjustment was made for parking.

The analysis concludes that there is potential for development of all land use designations in rural Curry County as shown in the table below.

TABLE 5-4
POTENTIAL DEVELOPMENT IMPACT ANALYSIS SUMMARY

	Acreage		Residential Units		
Designated Use	Net Area	Vacant	Existing	Potential	Maximum
Residential	9,016	1,707	4,038	443	4,442
Commercial	927	586	N.A.	9,790.8[1]	N.A.
Industrial	218	120	N.A.	N.A.	N.A.

[1] *Commercial potential shown as 1,000 square feet of potential development.*

Approximately 9,016 acres of land are zoned for residential uses with 4,038 existing residential units. Of the residential land, approximately 1,707 acres are vacant representing development potential of 443 units. This methodology combines existing units with the potential units to achieve a maximum development potential. This maximum is estimated at 4,442 residential units.

Non-residential uses also have significant development potential. Approximately 927 acres of land are zoned for commercial uses. Of this land, an estimated 586 acres are vacant, yielding 9,790,739 square feet of potential development. Approximately 218 acres of land are zoned for industrial uses. Of this land, an estimated 120 acres are vacant. The PDIA analysis does not provide an estimate of the potential development represented by these 120 acres.

Housing Growth

Historic Housing Supply

Table 5-5 presents a summary of 1990 U.S. Census data which identifies the total housing units by type for Brookings, the Harbor area and Curry County. According to the 1990 census, the City of Brookings and the Harbor area have very different residential mixes. One obvious difference is the higher number of mobile homes in the Harbor Area compared to the City of Brookings, which has a much higher proportion of multiple family residences.

TABLE 5-5
TOTAL HOUSING UNITS BY TYPE, 1990

	City of Brookings		Harbor Area		Curry County	
Housing Type	Number	Average Value[1]	Number	Average Value[1]	Number	Average Value[1]
Single Family	1,388	$110,785	397	NA	5,386	$114,899
Detached	1,267	$110,498	389	NA	5,194	$114,911
Attached	121	$120,093	8	NA	192	$114,180
Multi-Family	570	$145,531	35	NA	1,014	$138,885
Duplex	231	$114,531	10	NA	343	$127,031
3+ units	339	$119,444	25	NA	671	$147,917
Mobile Home	85	$79,952	848	NA	3,324	$46,488
Other	46	$164,773	12	NA	161	$124,041
Total 1990	2,089	$110,326	1,292	$114,200	9,885	$89,338
Total 1980	1,404	NA	1,295	NA	NA	NA
% Change 1980-90	47%	NA	0%	NA	NA	NA
Annualized Growth 1980-90	4.1%	NA	0%	NA	NA	NA

Source: 1990 U.S. Census as cited in Forecast of the Long-Run Demand for Housing in the Brookings-Harbor Area, ECO Northwest, March, 1993

[1] *Owner Occupied Units*

[2] *The increase in housing units for the Harbor area is likely understated because of differences in defining the boundaries on the Harbor area in the 1980 and 1990 Census.*

In 1990, Brookings had about 2,100 housing units, of which approximately 1,400 were single-family. A comparison of the 1980 and 1990 Census data shows that Brookings has experienced a significant amount of growth in both single-family (+400 units) and multi-family units (+225 units) since 1978. In 1990, the Harbor area had about 1,300 housing units, of which approximately 400 were single-family units. There has been little change in the total number of housing units in the Harbor area between 1980 and 1990, but there has been a change in housing mix to more mobile homes and manufactured homes.

Future Housing Needs

For purposes of assessing the need for future housing, the existing Urban Growth Boundary has been divided into two major subareas, north and south of the Chetco River. The separation between the two areas reflects varying topographic, political, and public service constraints in both portions of the UGB.

The area north of the Chetco is composed of the City of Brookings and unincorporated lands north and east of the city. The proposed and existing areas of the UGB are not as steep in topography as some of the areas south of the Chetco. The City of Brookings is the only provider of public sewer and water services north of the Chetco at this time.

The area south of the Chetco River is composed of the unincorporated community of Harbor and other unincorporated lands south and east of Harbor. The areas within the proposed UGB contain developed lands within a flat area extending south to California, and steep topography in the Harbor Hills. The Harbor Sanitary District and Harbor Water Public Utility District are major service providers in this subarea.

Given the demographic changes that have been occurring, and the relative attractiveness and economic value of the Oregon Coast, the demand for housing from people is projected to continue. Table 5-6 summarizes the population forecasts and estimates of future housing needs to

the year 2017 for the areas both north and south of the Chetco River. The number of new dwelling units needed by 2017 is calculated by taking the total projected population and dividing by the average household size, 2.13 for the area north of the Chetco River, and 1.65 for the area south of the Chetco River[1].

TABLE 5-6
PROJECTION OF 2017 HOUSING NEED

	1993	2015	2017
North of Chetco	2,733	5,135	5,343
South of Chetco	1,775	3,335	3,469
TOTAL	4,508	8,470	8,812
Existing Dwelling Units		4,508	4,508
New Dwelling Units Needed		3,962	4,304

Source: Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995.

By the year 2017, the population north of the Chetco River is projected to be 11,380, and the population south of the Chetco is projected to be 5,724. The estimated amount of new housing units needed for both areas north and south of the Chetco by the year 2017 is 4,304.

Future Land Use Projections

As indicated earlier in this report, population growth and business development activities in the Brookings-Harbor study area will fuel future demands for increased urbanization. This includes land devoted to housing, as well as commercial and industrial uses. This section will discuss the need for additional residential, commercial and industrial acres of development through the planning period to 2017 based on the earlier assessment of likely population growth. It will further present an allocation of this development to specific geographic sub-areas within the larger study area. This geographic allocation (including number of dwelling units, as well as gross square footage of commercial and industrial development) will then form the basis for preparing travel demand projections.

Future Residential Land Needs

Residential land needs through 2017 will be a function of the expected mix of housing (i.e., single versus multiple-family dwelling units) and the density of that development. Neither the City of Brookings nor Curry County have conducted a study on future housing needs for the study area. Therefore, the analysis herein will rely on a scenario used in the previously cited report Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995, to determine future residential land needs based on the following housing mix:

- 52 percent traditional single family, including manufactured homes located on single family lots. This is lower than the present City of Brookings, but higher than the Harbor CDP.

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1 Source: "Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis," Linda Davis for Cogan-Owens-Cogan, March 6, 1995.

- 24 percent multiple family (two or more attached units per building). This is lower than the present City of Brookings, but much higher than the Harbor CDP.
- 24 percent mobile homes – both traditional mobile homes and manufactured homes located within parks. This is much higher than the City of Brookings but considerably lower than the Harbor CDP.

This scenario is based on the assumptions that: 1) the proportion of mobile homes will decrease, and be replaced with manufactured homes in parks and single family lots; 2) most of the new home construction will consist of custom single family homes compatible with topographic constraints; and 3) a higher demand for multiple family homes as an affordable housing option, as a result of the increase in single family housing costs. Table 5-7 summarizes the foregoing assumptions and provides an allocation to the geographic areas north and south of the Chetco River. It is important to note that changes the assumed mix of residential land uses would alter the estimate of future acreage needed for residential development.

TABLE 5-7
RESIDENTIAL LAND NEEDS BY HOUSING TYPE 2017

2017 Projected Housing Ratios	1990 Census	2017 Projection	New Units	% North	% South
Single Family	45%	52%	2,582.4	75%	25%
Multiple Family	14%	24%	1,506.4	85%	15%
Mobile Homes	41%	24%	215.2	15%	85%
Total	100%	100%	4,304.0		

Source: Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995.

Table 5-8 highlights the conversion of projected future demand for residential dwelling units by type to acreage by three categories of development density. This summary also includes land requirements for urban infrastructure (i.e., non- residential uses, streets and other rights-of-way typically located in most residential areas). Acreage estimates are subdivided into the geographic areas north and south of the Chetco River.

TABLE 5-8
PROJECTED NEED FOR RESIDENTIAL ACREAGE BY HOUSING DENSITY, 2017

Category	Total	North	South
Single Family (4 dwelling units/acre)	645	484	161
Multiple Family (15 dwelling units /acre)	100	785	15
Mobile Homes (6 dwelling units /acre)	36	5	31
Sub Total	781	574	207
Additional for Streets, Easements, etc. (25%)	195	143	52
Net Residential Need	976	717	259

Source: Abstracted from Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6, 1995.

According to the information summarized in Table 5-8, the projected residential vacant land need for 2017 is 976 acres, which is 383 acres more than what currently is available in the existing UGB. Based on the assumptions previously discussed, the need for more land is almost equal for both areas north and south of the Chetco River. For purposes of the transportation analysis, it will be assumed that additional residential acreage will be available at locations currently outside of the existing UGB but within the proposed UGB extension.

Future Commercial and Industrial Land Needs

The David Evans report[2] projected industrial and commercial land needs to the year 2013. These projections are presented in Table 5-9. These estimated land needs were adjusted by Linda Davis in her report[3] to reflect the spatial requirements of streets, easements and other non-commercial, non-industrial land uses typically found in these areas. Land needs have also been increased slightly to account for growth in demand in commercial and industrial land uses between 2013 and 2017.

TABLE 5-9
COMMERCIAL AND INDUSTRIAL LAND NEEDS

Category	Commercial	Industrial	Total	North	South
Commercial/Industrial	305	180	485	291	194
Additional for Streets, etc. (20%)	61	36	97	58	39
Additional Demand 2017	74	44	118	71	47
Total vacant land need	440	260	700	420	280
Existing vacant land in UGB	68	106	174	104	70
Add'l vacant land need 2017	372	154	526	316	210

Source. Abstracted from Technical Memorandum Brookings Urban Growth Boundary Needs Analysis, Linda Davis for Cogan-Owens-Cogan, March 6,1995.

Based on these projections, a total of 700 acres of commercial and industrial land is needed to accommodate development expectations by the year 2017. As with residential land needs, not all of this future demand can be accommodated within the existing Urban Growth Boundary. For purposes of this report, it has been assumed that a total of 174 acres can be accommodated within the existing UGB and that the additional demand (526 acres) will be accommodated within the proposed UGB expansion.

Summary of Future Land Needs

When the residential and commercial/industrial acreage requirements identified in Tables 5-8 and 5-9 are combined, there would be a total need for additional urban land of 1,676 acres by 2017. After subtracting acres of unbuildable land (i.e.) steep slopes exceeding 30 percent), a net of 640 acres of suitable land is available within the Urban Growth Boundary to meet this need. The proposed expansion to the Urban Growth Boundary would add 2,544 acres of vacant land of which total buildable acreage is estimated to be 1,150 acres. This would equate to a total of 1,790 acres suitable for urban development within the study area.

Table 5-10 illustrates a comparison between vacant land needs by general land use type and the land use supply within the existing UGB and proposed UGB expansion.

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2 "Brookings Urban Growth Boundary Exception and Urban Reserve Establishment Study", David Evans and Associates, July 12, 1993.

3 "Technical Memorandum: Brookings Urban Growth Boundary Needs Analysis", Linda Davis for Cogan-Owens-Cogan, March 6, 1995.

TABLE 5-10
VACANT DEVELOPABLE LAND TO MEET FUTURE LAND DEVELOPMENT NEEDS

Land Use	Land Needed by 2017	Vacant Developable Land (Acres)		
		Existing UGB	Proposed Addition to UGB	Total
Residential				
North of Chetco River	717	511	206	717
South of Chetco River	259	82	177	259
Total Residential	976	593	383	976
Commercial/Industrial				
North of Chetco River	420	144	276	420
South of Chetco River	280	30	250	280
Total Commercial	700	174	526	700
Total Need	1,676	767	909	1,676

A significant obstacle for land development within the current UGB in Brookings is the limited amount of large vacant parcels. According to a 1993 inventory, in the City of Brookings, there were 356 vacant residential lots that were dispersed throughout city. Of those lots, only five tracts were larger than ten acres. The remaining majority of undeveloped lots were less than one acre.

In the unincorporated area within the UGB, there exists a similar scattering of vacant residential land. According to the Linda Davis report, only 35 residential parcels remain. Ten are less than one acre in size, sixteen range from one to five acres, six range between five and 20 acres, and only three are larger than 20 acres. The limited amount of large, buildable parcels of land restricts the development potential of the market.

This short supply of buildable parcels also has an affect on commercial and industrial land. The 1993 inventory conducted by the City indicates that only nine commercial parcels ranging from one to nine acres currently exist. Only one industrial parcel of 3.9 acres exists that is suitable for development. This shortage of buildable commercial and industrial parcels could significantly hinder a region that is growing at such a rapid pace. As a result, it is expected that much of the new residential, commercial and industrial development within the study area will take place outside of the existing Urban Growth Boundary in the area proposed for a boundary expansion.

Future Land Use Growth And Distribution

In order to prepare estimates of traffic volumes attributable to new and/or modified land development within the study area (which then form the basis for roadway improvement recommendations), it is necessary to estimate the geographical distribution and magnitude of that development. Table 5-11 presents a summary of the assumed pattern of land development proposed to be used in the transportation study.

This summary is based on several sources of information and the following assumptions:

- Existing vacant buildable land currently within the Urban Growth Boundary will be fully developed for the designated use (i.e. residential, commercial or industrial).
- Development outside of the existing UGB but within the proposed expansion will occur within areas designated as Rural Exception Areas or Master Plan Areas.
  - Within the Rural Exception Areas, current parcelization reviewed in terms of parcel size, location and proximity to other undeveloped parcels. Based on this review, it has

been assumed that each available parcel will be developed to accommodate a single dwelling unit.

- Within the Master Plan Areas, existing available information with respect to developer expectations was used as the basis for estimating the number of dwelling units and future commercial square footage which would be developed Minimum density assumptions are identified in Table 5-11.

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TABLE 5-11
BROOKINGS-HARBOR STUDY AREA ZONAL ALLOCATION OF FUTURE LAND DEVELOPMENT, 2017

Name	Land Use	Total Acres	Total Parcels	Developed Parcels	Vacant Parcels	Vacant Acres	Dwelling Units/Acre	Dwelling Units	Comm. & Indust. Acres/KSF
Lone Ranch Creek Master Plan Area	Residential, commercial	553	--	--	--	--	--	1000	10 KSF
Rainbow Rock Rural Exc. Area	Small rural residential lots, commercial/ industrial	206	79	63	17	--	--	40	--
Shady Cove Rural Exc. Area	Rural resid.(1-6 ac.)	56	24	13	11	--	--	36	--
Pleasant Hills/ Tiderock Rural Exc. Area	#48 - Rural residential (1-14 acres), commercial, public boat ramp	130	46	32	14	--	--	43	--
	#49 - Rural residential (1-20 acres), commercial, RV park, industrial	330	112	66	46	--	--	107	--
Jacks Creek Master Plan Area	Rural residential (<1-4 acres)	66	20	16	4	--	--	4	--
	Exclusive Farm Use, Golf Course	182				182	--	--	--
North Harbor Area	Vacant resource land, PUD if included in UGB	110	--	--	--	110	--	528	--
Harbor Hills Master Plan Area	Single Family (100%)	1213	--	--	--	1124.4	--	1275	--
			--	--	--	48.4	--	--	--
	Multi-family		--	--	--	40.2	--	714	40.2
	Commercial								
Pedrioli/Camelli a Park Rural Exc. Area	Rural residential, rural comm (1-10 ac.)	168	146	114	32	--	--	60	--
Itzen	Residential, Retail	23	--	--	--	23	--	100	4
Oceanview Rural Exc. Area	Rural residential, rural commercial	110	120	93	27	--	--	57	--
Sub-total	UGB Expan. Area							3,964	10 KSF 113.5 Acres
Within City	Residential							498[1]	--
	Commercial							--	45
	Industrial							--	3.9
Within County (inside UGB)	Residential							42	--
Sub-Total	Existing UGB							540	48.9
TOTAL								4,504	10 KSF 162.4

Source: Curry County Planning Department, May 1995.

[1] *Includes previously approved developments not yet built.*

When compared with the earlier summaries of need for future residential, commercial and industrial development, the information contained in Table 5-11 indicates that this future need can be met for housing within the proposed Urban Growth Boundary expansion.

The commercial and industrial acreage identified in Table 5-11 falls far short of the projected need identified in Table 5-9 (162.4 acres allocated versus 640 acres needed). This additional acreage requirement needs to be discussed to determine: 1) the location and size of other commercial/industrial development which could occur; 2) a reduction in the assumption of future need; or 3) a combination of these two adjustments.

2017 Traffic Forecast

The 2017 future traffic volumes were forecasted by assuming the development of certain vacant land in the future, calculating the trip generation potential of that vacant land, developing a trip distribution pattern for the future trips, and assigning the future trips to the roadway network based on the trip distribution pattern.

There are four trip types to consider in the trip generation exercise:

- External to external trips – These trips are trips that originate outside the study and travel through the study area.
- External to internal trips – These trips are trips that are attracted to an origin within the study area from outside the study area.
- Internal to external trips – These trips originate within the study area and are destined somewhere outside the study area.
- Internal to internal trips – These trips originate from within the study area and are destined within the study area.

All of the trip types can be generated from the trip generation rates of assumed future land uses with the exception of the external to external trips. The external to external trips are not related to future land development. These trips only pass through the entire study area to a destination outside the study area.

The external to external trip component within a study area is typically determined by a license plate survey. Since a license plate survey was not part of the scope of this work, the external to external trip component cannot be developed directly. Historical daily traffic volume data was used to determine the external to external growth rate and the external to external trip component was developed from daily traffic trends on US 101. This historical traffic volume data is illustrated, by location, in Table 5-12.

Based on the growth rates shown in Table 5-12, the historical annual traffic growth rates on US 101 north and south of Pacific Avenue are 0 and 0.5 percent, respectively. Also, the historical increase in traffic volumes is low along this segment of US 101. Both the growth rates and actual increase in traffic volumes further north and south of Pacific Avenue are significantly higher. This trend of traffic growth along US 101 indicates that the increase in long trip travel in the study area is limited. Since all of the annual traffic growth rates include an external to external trip component and the change in number of external trips must be constant along the entire US 101 corridor, a conservative estimate of the increase in external to external trip travel would be the lowest increase in traffic growth along the US 101 corridor. The lowest increase in daily traffic along the US 101 corridor is zero just south of Pacific Avenue. Since it is unrealistic to expect zero percent increase in external to external trip travel, a nominal annual growth rate of 0.5 percent was used to estimate the future increase in external to external trip travel.

TABLE 5-12
HISTORICAL ANNUAL TRAFFIC GROWTH RATES ON US 101

Location	Milepost	1982 Daily Count	1993 Daily Count	Annual Growth Rate
Thomas Creek Bridge	347.78	N/A	3,700	-
North of Dawson Road	354.73	3,400	5,200	3.9%
North Brookings City Limits	355.38	5,200	7,700	3.6%
South of Ransom Avenue	356.12	7,900	10,000	2.2%
North of Arnold Lane	356.50	8,900	12,000	2.8%
North of Pacific Avenue	357.07	15,000	15,000	0.0%
South of Pacific Avenue	357.09	15,100	16,000	0.5%
South of Fern Avenue	357.34	13,000	16,000	1.9%
South of Alder Street	357.58	11,800	17,000	3.4%
Chetco River Bridge	357.98	13,600	18,000	2.6%
South of South Bank Chetco River Road	358.14	11,700	15,000	2.3%
North of Hoffeldt Lane	358.73	10,000	13,000	2.4%
South of Hoffeldt Lane	358.77	8,100	12,000	3.6%
South of Benham Lane	359.33	7,400	9,900	2.7%
South of Pedrioli Road	359.57	6,700	8,800	2.5%
Winchuck Automatic Recorder	362.00	4,900	7,700	4.2%
Winchuck River Bridge	362.61	4,500	7,300	4.5%
Oregon-California State Line	363.11	4,700	7,000	3.7%
Weighted Average Annual Historical Growth Rate				2.4%

Source: ODOT, 1982 and 1993 Traffic Volume Summaries

Since a license plate survey was not conducted to determine the number of external to external trips entering and exiting the study area, the existing traffic volume pattern along US 101 was used to estimate the existing external to external trips. As shown in Table 5-12, the daily traffic volumes just outside the study area at the Thomas Creek Bridge is 3,700. A portion of these trips are external to external trips. If all of these trips were external to external trips, the increase in daily external to external trips in 2017 would be approximately 470 assuming the 0.5 percent annual growth rate for external to external trips.

This translates to a worst case increase of external to external trips of 25 AM peak hour trips and 47 PM peak hour trips. Since even the worst case increase in external to external trips are nominal and would have a minimal effect on future traffic volumes, it was assumed that the external to external trips in 2017 would be accounted for from the build out land use assumptions. The 2017 internal to external, external to internal, and internal to internal trips were estimated by assuming the vacant land build out previously identified in Table 5-11. Rates in the Trip Generation Manual, Institute of Transportation Engineers, 1990 were used in estimating the trip generation of the future land development. Table 5-13 summarizes the trip generation rates used. Table 5-14 summarizes the vacant land trip generation assumed to be built out by 2017.

TABLE 5-13
TRIP GENERATION RATES USED IN 2017 TRAFFIC VOLUME FORECAST

	AM Peak Hour Trips			PM Peak Hour Trips			
Land Use	In	Out	Total	In	Out	Total	Daily
Single Family [1]	0.12	0.35	0.48	0.42	0.23	0.65	6.15
Apartment [1]	0.07	0.36	0.43	0.36	0.17	0.54	5.47
Condominium	0.07	0.37	0.44	0.36	0.19	0.55	5.86
Mobile Home Park	0.08	0.32	0.40	0.35	0.21	0.56	4.81
General Light Industrial	6.23	1.28	7.51	0.87	6.39	7.26	51.80
Industrial Park	8.27	1.82	10.09	2.20	8.28	10.48	62.90
Hotel	0.40	0.27	0.67	0.41	0.35	0.76	8.70
Golf Course	2.67	0.55	3.22	1.75	1.61	3.36	37.59
Retail - 40.2 ksf	1.34	1.34	2.68	5.01	5.01	10.01	110.20
Retail - 150 ksf	0.71	0.71	1.42	2.92	2.92	5.83	62.58

[1] *ITE trip generation rates have been reduced to reflect the smaller than typical household size.*

Note: KSF means thousand square feet of gross leasable space.

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TABLE 5-14
TRIP GENERATION SUMMARY - BUILD OUT OF VACANT LAND THROUGH 2017

		AM Peak			PM Peak			
Area/Land Use	Density	In	Out	Total	In	Out	Total	Daily
Lone Ranch Creek								
Retail	10 ksf	74	65	139	134	137	271	2,710
Single Family	560 du	101	304	405	308	185	493	4,930
Multi-Family/Condos	310 du	23	113	136	103	50	153	1,530
Townhomes	150 du	11	19	30	22	17	39	390
Community College	31 ksf	49	11	60	47	33	80	800
Internal/Pass/By Trips		(55)	(77)	(132)	(94)	(103)	(197)	(1,970)
Total		203	435	638	520	319	839	8,390
Rainbow Rock								
Single Family	40 du	5	14	19	17	9	26	246
Shady Cove								
Single Family	36 du	4	13	17	15	8	23	220
Pleasant Hills/Tiderock								
Single Family	43 du	5	15	20	18	10	28	264
Mobile Home	107 du	9	34	43	37	22	59	515
Total		14	49	63	55	32	87	779
Jacks Creek								
Single Family	4 du	0	1	1	2	1	3	25
Golf Course	182 acres	48	10	58	31	29	60	680
Harbor Hills Master Plan Area								
Single Family	528 du	63	185	248	222	121	343	3,248
North Harbor Area								
Retail	40.2ksf	54	54	108	201	201	402	4,430
Single Family	1,275 du	153	446	599	536	293	829	7,841
Apartment	714 du	50	257	307	257	121	378	3,906
Pedrioli/Camellia Park								
Single Family	60 du	7	21	28	25	14	39	368
Itzen								
Mobile Home	100 du	8	32	40	35	21	56	481
Specialty Retail	43.56ksf	26	17	43	49	64	113	1,772
Oceanview								
Single Family	57 du	7	20	27	24	13	37	352
Other Residential								
Within County in UGB	42 du	5	15	20	18	10	28	258
Within City	498 du	60	174	234	209	114	323	3,063
Railroad St. West of 5th								
General Light Industrial	20 acres	125	26	151	17	128	145	1,040
Railroad St - South of Wharf St								
Industrial Park	5 acres	41	9	50	11	41	52	310

The trips shown in Table 5-14 were assigned to the existing roadway network based on several trip distribution pattern. These trip distribution patterns were based on the following: commuting patterns identified from a telephone survey conducted by the Gilmore Research Group; existing traffic patterns; and location of employment centers, residential areas, schools, and retail centers. The resulting 2017 AM peak hour traffic volumes are shown in Figures 5-1 and 5-2. The 2017

PM peak hour traffic volumes are shown in Figures 5-3 and 5-4. Figures 5-5 and 5-6 show the 2017 daily traffic volumes.

Increases in daily traffic volumes are expected along US 101 within the City of Brookings. The largest increases in traffic volumes occur along US 101 north of Carpenterville Road due to the approved Lone Ranch development. Traffic along US 101 from the Lone Ranch project to downtown Brookings increase beyond existing traffic volumes. This increase in traffic volumes from Lone Ranch would still allow Highway 101 to operate within ODOT's mobility standards. The daily traffic volumes on US 101 south of the Chetco River also is expected to have significant increases by the year 2017 due to development of Harbor Hills, North Harbor area, and Westbrook The Forest Service is currently planning an interpretive center, to be constructed some time between the years 2002 and 2005, through some old growth timber areas. The project would consist of elevated walkways though the old growth "canopies" and include visitor information. The exact location of this project is not known, but it would likely be accessed via South Bank Rogue River Road (near Gold Beach) or North Bank Chetco River Road (near Brookings), depending on the chosen location.

Preliminary estimates of attendance are 100,000 visitors per year. Assuming vehicle occupancy of 3 people per vehicle, this would equate to 33,000 vehicles per year, making a round trip from Highway 101, or 66,000 vehicle trips. Assuming the facility will be open approximately 330 days per year, the facility would add approximately 200 vehicle trips per day to the access road. With approximately 10 percent of daily trips occurring during the peak hour, 20 vehicle trips per hour would be added to the access road. This would have a negligible effect on the level of service on the two proposed roads, which are forecast to operate well below their capacity over the next 20 years. Because of the uncertainty of the location of the project, trips generated by the project were not added to the forecasts for the proposed access roads.

2017 Levels Of Service

Level of service analyses were conducted based on the 2017 traffic volumes shown in Figures 5-1, 5-2, 5-3, 5-4, 5-5 and 5-6. The results of the unsignalized intersection level of service analysis is summarized in Table 5-15. Table 5-16 summarizes the signalized intersection level of service analysis. Table 5-17 summarizes conditions at the US 101/Benham Lane intercession. The arterial and local street levels of service are summarized in Tables 5-18 and 5-19, respectively.

In all of the level of service tables, US 101 is considered to be oriented north-south throughout the entire study area although there are several sections oriented east-west. All other roadways are oriented based on these compass directions.

TABLE 5-15
2017 UNSIGNALIZED INTERSECTION LEVELS OF SERVICE

Unsignalized Intersection	AM Peak Hour LOS	AM Peak Hour Average Delay	AM Peak Hour V/C Ratio	PM Peak Hour LOS	PM Peak Hour Average Delay	PM Peak Hour V/C Ratio
US 101/Carpenterville Rd/Dawson Rd						
Northbound Left Turn	A	9.1	0.04	A*	9.2	0.06
Southbound Left Turn	A	9.1	0.03	B*	10.6	0.05
Eastbound Approach	D	33.3	0.49	F*	50.0	0.29
Westbound Approach	F	100.0	1.2	F*	50.0	1.0
US 101-Chetco Avenue/Arnold Lane						
Northbound Left Turn	B	10.1	0.02	B	12.8	0.08
Eastbound Approach	C	18.6	0.14	F	>100.0	1.07
US 101-Chetco Avenue/Mill Beach Road						
Northbound Left Turn	B	10.5	0.05	B	12.6	0.07
Eastbound Approach	D	26.8	0.12	F	67.7	0.62
US 101-Chetco Avenue/Pacific Avenue						
Northbound Left	B	11.0	0.10	C	16.6	0.16
Southbound Left	B	10.3	0.04	B	14.4	0.07
Eastbound Approach	F	>100.0	1.08	F	>100.0	>1.2
Westbound Approach	E	36.4	0.37	F	>100.0	> 1.2
US 101-Chetco Avenue/Fern Avenue						
Northbound Left	B	10.0	0.02	B	14.8	0.04
Southbound Left	B	10.8	0.04	C	15.7	0.13
Eastbound Approach	E	44.5	0.23	F	>100.0	>1.2
Westbound Approach	F	94.6	0.42	F	>100.0	>1.2
US 101-Chetco Avenue/Alder Street						
Northbound Left Turn	B	12.8	0.26	E	39.2	0.68
Eastbound Approach	E	43.3	0.63	F	>100.0	>1.2
US 101-Chetco Ave/Constitution Way						
Southbound Left Turn	B	14.9	0.22	C	22.9	0.38
Westbound Right Turn	C	17.1	0.19	C	22.7	0.25
Westbound Left Turn	F	>100.0	>1.2	F	>100.0	>1.2
Westbound Left Turn	F	>100.0	>1.2	F	>100.0	>1.2

**2018 PM peak hour analysis provided in the Lone Ranch Master Plan Transportatation Impact Study for the PM peak period.*

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TABLE 5-16
2017 SIGNALIZED INTERSECTION LEVELS OF SERVICE

Signalized Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Average Delay	V/C Ratio	LOS	Average Delay	V/C Ratio
US 101-Chetco Ave/5th St						
Northbound Left	D	40.8	0.57	E	70.4	0.83
Northbound Right/Through	B	18.8	0.55	E	69.2	1.06
Southbound Left	D	36.6	0.27	A	7.5	0.41
Southbound Right/Through	B	19.9	0.62	D	41.5	0.95
Eastbound Left	D	35.6	0.25	F	118.1	1.05
Eastbound Right/Through	D	39.2	0.51	F	108.7	1.08
Westbound Left	D	38.7	0.53	F	90.7	0.94
Westbound Right/Through	D	39.1	0.51	D	36.0	0.46
Overall	C	24.1	0.58	E	64.4	1.03
US 101-Chetco Ave/Center St						
Northbound Left/Through	A	3.7	0.43	A	9.1	0.71
Southbound Right/Through	A	3.4	0.39	A	8.2	0.67
Westbound Left/Right	C	24.9	0.17	D	37.9	0.47
Overall	A	3.9	0.39	A	9.8	0.66
US 101-Chetco Ave/Oak St						
Northbound Approach	D	37.7	0.97	C	31.4	0.93
Southbound Approach	C	31.1	0.91	F	81.3	1.11
Eastbound Approach	D	41.9	0.76	F	80.6	0.93
Westbound Approach	D	49.5	0.91	E	69.2	0.92
Overall	D	37.3	0.91	E	60.0	1.03
US 101/Shopping Center Ave						
Northbound Left	C	22.7	0.03	D	39.3	0.13
Northbound Right/Through	A	8.8	0.45	C	21.6	0.68
Southbound Left	C	22.7	0.03	D	38.9	0.06
Southbound Through	A	8.0	0.32	C	22.6	0.72
Southbound Right	A	6.6	0.02	B	16.1	0.25
Eastbound Left/Through	C	23.6	0.19	C	30.4	0.61
Eastbound Right	C	22.7	0.03	C	23.4	0.08
Westbound Left/Through	C	22.8	0.06	C	22.9	0.02
Westbound Right	C	22.7	0.03	C	22.9	0.02
Overall	A	9.2	0.34	C	22.7	0.61
US 101/Hoffeldt Lane						
Northbound Left	C	22.9	0.07	D	37.3	0.36
Northbound Right/Through	A	8.8	0.45	B	13.4	0.57
Southbound Left	C	22.7	0.03	D	35.7	0.15
Southbound Right/Through	A	8.0	0.32	B	14.3	0.63
Eastbound Approach	C	25.5	0.43	D	35.3	0.54
Westbound Approach	C	24.5	0.31	C	30.6	0.13
Overall	B	10.1	0.39	B	16.2	0.57

Benham Lane was not included in the original analysis, but was analyzed later for inclusion in the TSP. Traffic counts were taken in the summer of 2001 and used for the traffic analysis. Development is expected on both sides of US 101 near Benham Lane, including residential

development to the east and commercial and residential development to the west. Details of this development were not available and could not be included in the TSP-level analysis. As a result, the future-year analysis provides only a rough estimate of performance.

The future analysis assumed that Benham Lane would be the primary access for these developments as no alternative, parallel roadway system was identified to serve them. Instead, the overall TSP land use assumptions and traffic growth rate (2.40 percent) used for the other intersection analyses was applied to growth at Benham Lane. Based on this estimate, Benham is expected to operate within V/C standards until full buildout of the UGB. However, more specific information regarding future developments is needed to provide a more complete estimate of future performance. This should also include any development being discussed by the Port of Brookings.

Regardless of the impacts of development on intersection capacity, concerns have been raised regarding its alignment and the potential for safety problems at this intersection. The intersection experienced seven accidents between 1998 and 2000, five of which were non-injury. The overall computed accident rate (accidents per million miles traveled) is not high for a Statewide Highway in an urban setting. Nonetheless, expected increases in traffic both from existing and future development may result in an increase in accidents. Traffic Impact Studies completed in conjunction with development in the area must address how trips will impact intersection safety as well as capacity.

Table 5-15 shows that all of the unsignalized intersections that were studied, with the exception of Mill Beach Road, have at least one leg projected to operate below acceptable V/C ratios (0.85) in 2017. In all cases, the highway approaches are expected to continue to operate within standards, but the local approaches will fall below acceptable limits. The movements at each intersection operating below 0.85 are described below:

- US 101-Carpenterville Road/Dawson Road – Both the east- and westbound approaches.
- US 101-Chetco Avenue/Arnold Lane - The eastbound approach.
- US 101-Chetco Avenue/Pacific Avenue – Both the east- and westbound approaches.
- US 101-Chetco Avenue/Fern Avenue - The eastbound and westbound approaches.
- US 101-Chetco Avenue/Alder Street - The eastbound approach.
- US 101-Chetco Avenue/Constitution Way - The Constitution Way westbound left turn movement.

The poor levels of service at the unsignalized intersections in Table 5-15 are caused by traffic volumes on US 101-Chetco Avenue conflicting with the minor street turning movement volumes. It is also expected that accesses to development in the UGB north of Carpenterville Road will operate below V/C standards in the future. Specific traffic studies will be needed to provide details regarding when and to what extent any capacity problems may occur with new development projects.

As shown in Table 5-16, two signalized intersections in Brookings are expected to exceed the maximum OHP V/C ratio standard for US 101 (0.80). The overall intersection V/C ratio at US 101-Chetco Avenue/5th Street and at US 101-Chetco Avenue/Oak Street are projected to be in excess of 1.00. It is unclear what impacts development will have on the signalized intersection at US 101 and Benham Lane.

Tables 5-18 and 5-19 show that the following arterial, collector, and local street segments are projected to operate at unacceptable V/C ratios and below LOS D in the 2017 condition. The entire length of US 101 from north of Carpenterville Road to south of Hoeffeldt Road is expected to exceed the maximum 1999 OHP V/C ratio standards in the 2017 condition due to significant local reliance on the local highway. In addition, Pioneer Road north of Pacific Avenue and E. Benham Lane east of US 101 are expected to operate below the acceptable city standard of LOS D in the 2017 condition.

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TABLE 5-17A
2017 ARTERIAL/COLLECTOR ROADWAY LEVEL OF SERVICE SUMMARY

Roadway	Section	AADT	Capacity	LOS	V/C Ratio
US 101	North of Parkview Drive	23,800	16,000	F	1.49
	South of Ransom Avenue	26,000	16,000	F	1.63
	South of Easy Street	26,500	24,000	F	1.10
	North of Pacific Avenue	29,100	24,000	F	1.21
	South of Pacific Avenue	29,500	24,000	F	1.23
	North of Oak Street	31,300	24,000	F	1.30
	South of Alder Street	33,100	24,000	F	1.38
	Chetco River Bridge	33,800	37,000	E	0.91
	South of & Bank Chetco River Road	25,100	29,000	D	0.87
	North of Hoffeldt Lane	23,300	29,000	C	0.80
	South of Hoffeldt Lane	22,300	26,000	D	0.86
	North of Benham Lane	16,200	26,000	B	0.62
	North of Oceanview Drive	12,900	16,000	D	0.81
	Winchuck River Bridge	12,200	16,000	C	0.76
	North of OR-CA Border	11,900	16,000	C	0.74
Carpenterville Road	East of US 101	4,500	10,000	A	0.45
N. Bank Chetco River Rd	North of US 101	4,600	10,000	A	0.46
S. Bank Chetco River Rd	North of US 101	10,800	14,500	C	0.74
Easy Street	West of 5th Street	4,400	6,000	C	0.73
	East of 5th Street	4,000	6,000	B	0.67
	West of Pioneer Road	4,500	6,000	C	0.75
Lower Harbor Road	West of US 101	6,600	10,000	B	0.66
Benham Lane	West of US 101	4,200	6,000	B	0.70
Oceanview Drive	West of US 101	1,100	6,000	A	0.18
Winchuck River Road	East of US 101	2,800	10,000	A	0.28
Pacific Avenue	East of Fern Avenue	3,400	6,000	A	0.57
Old County Road	South of Marine	2,100	6,000	A	0.35
Constitution Way	North of US 101-Chetco Avenue	5,700	10,000	A	0.57
Railroad Street	North of Wharf Street	5,900	10,000	A	0.59
	South of Wharf Street	4,700	10,000	A	0.47
	North of Pacific Avenue	5,700	10,000	A	0.57
	South of Pacific Avenue	7,900	10,000	C	0.79
Pioneer Road	North of Pacific Avenue	5,800	6,000	E	0.97
Oak Street	South of Pacific Avenue	4,400	10,000	A	0.44
	North of US 101-Chetco Avenue	5,800	10,000	A	0.58
	South of US 101-Chetco Avenue	3,700	10,000	A	0.37

Based on the 2018 projected traffic volumes from the *Lone Ranch Master Plan Transportation Impact Study*, HCM Two Lane Highway analysis was conducted to determine long-range operating performance of Highway 101 from the Lone Ranch project frontage to Ransom Avenue in downtown Brookings. The statewide highway classification adjacent to the Lone Ranch site corresponds to a mobility standard during peak hour volume to capacity of 0.75 for speeds >45 MPH and 0.80 for speeds <45 MPH.[4] With the revised project traffic from the Lone Ranch master

[4] *Oregon Highway Plan*, ODOT, 1999, Table 6, Non-MPO outside of STA's but inside UGB.

plan and background traffic from the ODOT Brookings Model, Highway 101 would meet the ODOT operating volume to capacity standard. Highway 101 analysis is summarized in Table 5-17B.

TABLE 5-17B
2018 30TH HIGHEST HOUR OPERATING CONDITIONS ON HIGHWAY 101

Highway 101 Segment	Posted Speed	Segment Two-Way Volume	ODOT Operating V/C Standard	Segment HCM Volume to Capacity
Lone Ranch Property to Carpenterville Road	55 MPH	1650 Vehicles	0.75	0.52
Carpenterville Road to Ransom Avenue	45 MPH	1900 Vehicles	0.75	0.59

TABLE 5-18
2017 LOCAL STREET LEVEL OF SERVICE SUMMARY

Roadway	Section	AADT	Capacity	V/C Ratio	LOS
5th Street	North of Easy Street	2,500	6,000	0.42	A
	South of Easy Street	4,100	6,000	0.70	B
Alder Street	South of US 101-Chetco Avenue	4,500	6,000	0.72	C
Arnold Way	South of US 101-Chetco Avenue	1,600	6,000	0.27	A
Benham Lane	East of US 101	9,000	6,000	1.72	F
Dawson Road	West of US 101	1,900	5,000	0.38	A
Fern Avenue	North of US 101-Chetco Avenue	1,100	6,000	0.20	A
Hoffeldt Lane	East of US 101	1,800	6,000	0.30	A
	West of US 101	2,800	6,000	0.47	A
Mill Beach Road	West of US 101-Chetco Avenue	1,600	6,000	0.27	A
Pacific Avenue	East of Pioneer Road	2,700	6,000	0.45	A
	North of US 101-Chetco Avenue	1,500	6,000	0.15	A
Parkview Drive	East of US 101-Chetco Avenue	1,500	6,000	0.25	A
Pedrioli Drive	West of US 101	1,600	5,000	0.32	A
Pelican Bay Drive	East of US 101	200	500	0.40	A
Pioneer Road	South of Hasset Street	1,900	6,000	0.32	A
Ransom Avenue	East of US 101-Chetco Avenue	1,400	6,000	0.23	A
	West of Pioneer Road	1,300	6,000	0.22	A
Raymond Lane	East of US 101	200	500	0.40	A
Redwood Street	East of Fern Avenue	700	6,000	0.12	A
Wharf Street	South of US 101-Chetco Avenue	2,200	6,000	0.37	A

2017 DEFICIENCIES

Future Level of Service Standard

To define the future deficiencies of the study area transportation system, a level of service standard for roadway and intersection level of service must be adopted. The level of service standard defines the minimum acceptable facility performance and will be the threshold determining the need for improvements. If a roadway or intersection functions below the adopted standard, then improvements to mitigate the level of service to the standard or better need to be defined and implemented.

Different levels of service standards can be adopted for different types of local facilities. For example, a jurisdiction can set a different level of service standard for roadway sections, signalized intersections, and unsignalized intersections. Level of service for state facilities is established in the Oregon Highway Plan.

It may be desirable to set a lower level of service standard for unsignalized intersections since there are limited cost effective solutions for improving an unsignalized intersection short of signalization. Separate turn lane channelization at the side street approaches of an unsignalized intersections is one of the limited cost effective improvements that can be made; however, this improvement will not improve the side street left turn performance which is usually the problem at unsignalized intersections. Also, an unsignalized intersection is unlikely to meet Manual of Uniform Traffic Control Devices (MUTCD) signal warrants unless the level of service is in the LOS E-F range.

The adopted level of service standard should reflect community values and views of acceptable delays and congestion levels. However, these values must be balanced by the community's ability to fund the needed improvements defined by the level of service standard. If the level of service standard is set too high, then it will be too costly to maintain the level of service standard. If the level of service standard is set too low, then substantial congestion problems result.

To define the future 2017 transportation deficiencies, LOS D was assumed to be the lowest acceptable level of service standard for all City of Brookings and Curry County transportation facilities. As stated above, performance on State roadways and intersections must be measured and evaluated using the volume to capacity ratio and not the associated LOS letter as established in the current version of the Oregon Highway Plan. Table 4-5 above summarizes those standards as applicable at the time of adoption of this TSP. Should those standards be amended subsequent to the adoption of this plan, the new or revised Highway Plan standards will be in effect.

If an intersection on the State system is operating below acceptable performance standards and a land use action is proposed which will cause the performance to worsen (i.e., V/C ratio increases), the action causing the worsening of conditions will be mitigated based on findings provided by the applicant and reviewed by ODOT. The applicant shall work with the City and ODOT ~~will~~ to work through the local land use process to determine appropriate mitigation measures and cost sharing basis as needed.

2017 Transportation System Deficiencies

Local Roadway System

The following level of service deficiencies are projected to exist in 2017 on the roadway system within the study area:

- With the exception of US 101/Mill Beach Road, all of the unsignalized intersections that were analyzed have at least one approach that is projected to operate below acceptable V/C ratios in the 2017 condition. The poor level of service condition is caused primarily by the minor street traffic conflicting with heavy traffic volumes on US 101. Also, increased minor street volumes at the following unsignalized intersections also contribute to the poor level of service condition: US 101/Carpenterville Road/Dawson Road, US 101-Chetco Avenue/Pacific Avenue, US 101-Chetco Avenue/Alder Street.
- US 101 from Ransom Avenue to south of Alder Street is projected to operate below the acceptable V/C ratio of 0.85 in the 2017 condition. This condition will result from US 101 being the only arterial through the study area, serving both through and local traffic. The majority of traffic generated by new developments will use US 101 in the future for both longer regional trips and shorter local trips thereby further degrading performance on the highway.
- The LOS E condition on Pioneer Road north of Pacific Avenue would be caused primarily by infill single family development north of Ransom Avenue and additional future trips generated by the schools.

- East. Benham Lane east of US 101 is projected to operate at LOS F in the 2017 condition. This condition is primarily caused by the additional trips generated by developments in the Harbor Hills. E. Benham Lane is one of the logical access points to these future developments, although others may be constructed that might reduced capacity problems on Benham.
- Development proposed for both the east and west sides of US 101 near Benham Lane may cause the US 101/Benham Lane intersection to fall below acceptable capacity and safety performance standards. Additional study in conjunction with specific development is needed to determine the aggregate effects of area development on the intersection. Distribution of trips on a network of local streets may decrease the impacts to US 101/Benham Lane.

Figures 5-7 and 5-8 illustrate the 2017 future transportation deficiencies based on the 2017 traffic volume forecast and existing transportation system.

Non-Motorized Facilities

There is currently limited transit service in the study area. As the retirement population in the Brookings-Harbor area increases, additional transit service will be needed to serve the retirement community. Comments pertaining to bicycle and pedestrian facility deficiencies under existing conditions would also pertain to future conditions in the absence of improvements.

Sources

South Coast Transportation Study, Parametrix, Inc., May 1996.

Brookings Comprehensive Plan, September 1981.

Brookings Comprehensive Plan Inventory, September 1981.

CHAPTER 6 --IMPROVEMENT OPTIONS ANALYSIS

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

Each of the transportation system improvement options was developed to address specific deficiencies, land use issues, traffic operations, safety issues, or access concerns. The following list includes all of the potential transportation system improvements considered. Improvement Options 2 through 10 are illustrated in Figure 6-1.

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

1. Revise Zoning and Development Codes to Encourage Proximity of Compatible Uses
2. Improve the intersection of Constitution Way and US 101.
3. Improve the intersection of Carpenterville Road and US 101.
4. Improve US 101 between Carpenterville Road and Alder Ave.
5. Construct the US 101 in the City of Brookings pursuant to Alternative 5 of the Downtown Brookings – Highway 101 Transportation Solutions Project.
6. Improve the intersection of US 101 and Benham Lane/Create Harbor Hills Connections
7. Improve the intersection of Benham Lane and Ocean View Drive in Harbor.
8. Improve Parkview Drive to the Brookings Airport.
9. Improve the unsignalized intersections which are projected to operate at sub-standard levels-of-service.
10. Improve the signalized intersections which are projected to operate at sub-standard levels-of-service.
11. Improve the arterial and collector street segments which are projected to operate at sub-standard levels-of-service.
12. Improve the intersection of Lower Harbor Road and Shopping Center Road at the entrance to the Port of Brookings.
13. Construct a third lane on US 101 south of Harbor.
14. Improved east-west connection between the South Coast and I-5.
15. Develop an alternative route to US 101 for when the highway is closed.
16. Implement transportation demand management strategies.

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

"Inclusion of an improvement project in the TSP does not commit the City or ODOT to allow, construct, or participate in funding the specific improvement. Projects on the State Highway System that are contained in the TSP are not considered "planned" projects until they are programmed into the Statewide Transportation Improvement Program (STIP). As such, projects proposed in the TSP that are located on a State highway cannot be considered mitigation for future development or land use actions until they are programmed into the STIP. Unanticipated issues related to project funding, as well as the environment, land use, the economy, changes in use of the transportation system, or other concerns may be cause for re-evaluation of the alternatives discussed below and possible removal of a project from consideration for funding or construction. Highway projects that are programmed to be constructed may have to be altered or canceled at a later time to meet changing budgets or unanticipated conditions."

EVALUATION CRITERIA

The evaluation of the potential transportation improvements was based on an analysis of traffic projections, a qualitative review of safety, environmental, socioeconomic, and land use impacts, as well as estimated cost. The potential improvements were analyzed to determine if they could reduce congestion and delay, as well as vehicle miles traveled, because of the beneficial effects of those reductions.

In addition to the quantitative traffic analysis, three factors were evaluated qualitatively: 1) safety; 2) environmental factors, such as air quality, noise, and water quality; and 3) socioeconomic and land use impacts, such as right-of-way requirements and impacts on adjacent lands.

The final factor in the evaluation of the potential transportation improvements was cost. Costs were estimated in 1998 dollars based on preliminary alignments for each potential transportation system improvement.

IMPROVEMENT OPTIONS EVALUATION

Through the transportation analysis and input provided from the public involvement program, several improvement projects were identified. These options included reconstructing existing intersections and providing improved vehicular traffic flow.

Option 1. Revise Zoning and Development Codes to Encourage Proximity of Compatible Uses

Overview: One of the goals of the Oregon Transportation Planning Rule (TPR) is to reduce reliance on the single-occupant automobile. One method of reducing reliance on automobiles is to amend zoning and development codes to allow mixed-use developments and increased density in certain areas. Specific amendments include allowing neighborhood commercial uses within residential zones and allowing residential uses within commercial zones. Such code amendments can result in shorter travel distances between land uses, thereby encouraging residents to use alternative modes of transportation, such as walking and cycling throughout the community.

These code revisions are more effective in medium- to large-sized cities (with over 25,000 residents), than in cities such as Brookings, where they may not be as appropriate. Because of Brookings' relatively small size, the decision of what mode of transportation to use when making a trip inside the city is not as influenced by distance as in a larger city. The longest distance between city limit boundaries in Brookings is around two miles, meaning that many amenities are within walking distance of residents. Five percent of the population walks to work.

Increasing density may have some effect on development in Brookings. Projected population growth of 47 percent (approximately 7,640 additional residents) over the next 20 years is anticipated to be accommodated by infill development inside the city limits or by development of vacant land within the new UGB. Therefore, as city limits are expected to expand to include portions of the UGB, the provision of commercial uses close to or within these areas could become more important in reducing the need for automobile trips.

Impacts: The primary goal of these measures is to reduce the number of vehicle trips made within the city, especially during peak periods. However, changing land use codes to encourage some level of mixed uses to bring compatible uses closer together can keep the demand for vehicle capacity on the streets from becoming and issue, and can be beneficial for retailers and residents. Mixed uses can reduce the need for people to use their cars to go to work, or to run errands. In addition, more people walking and biking to work or for errands enhances the sense of community, local vitality, and security. With more emphasis on walking or biking in the city, conditions such as air quality and noise levels would be improved as well.

Cost Estimate: No direct costs are associated with making the zoning code amendments.

Recommendation: Because of the small size of the city, the relationship between land uses is already similar to the mixed use zoning patterns that are recommended in larger urban areas. It is desirable for this development pattern continue as the city grows (the population is forecast to increase by 47 percent,

or 7,640 additional residents in the next 20 years). Increasing density requirements would have a positive effect on the way land is developed in Brookings by preventing urban sprawl. Therefore, revisions to zoning and development codes to allow for increased density are recommended.

Option 2. Improve the intersection of Constitution Way and US 101

Overview: The intersection of Constitution Way and US 101 was identified as a hazardous location due confusing and conflicting turn movements which occur along the entire length of Constitution Way between US 101 and the intersection of Old County Road and North Bank Chetco River Road. This street segment serves approximately 4,000 vehicles per day. Figure 6-2 shows the existing street configuration.

Constitution Way intersects US 101 directly across from Bridge Street. A left turn lane is provided for southbound US 101 and a channelized right turn is provided for northbound US 101 at the intersection. The right turn channel is separated from the rest of the intersection by a large section of painted pavement. A truck Weigh Station, which weighs northbound truck traffic is located on the highway just west of the intersection. Two truck access lanes are located on Constitution Way such that trucks traveling northbound on US 101 exit at Constitution Way to access the Weigh Station, and trucks coming from Old County Road or North Bank Chetco River Road and going to northbound US 101 also access the Weigh Station via Constitution Way. The two truck access lanes are separated by a large section of painted pavement. The intersection of Constitution Way is a four-leg intersection, controlled on three legs by STOP signs; the fourth leg is one of the truck access lanes and is one-way, away from the intersection.

Constitution Way was identified as a safety issue because of the many turning movements which occur on this short street segment, the high volumes of slow moving trucks access the Weigh Station, and the vast stretches of pavement at the intersections. The most problematic part of the intersection is where trucks leaving northbound US 101 via the channelized right turn lane cross two lanes of Constitution Way to access the Weigh Station. Although accident records for the three-year period from 1994 to 1996 indicated one accident occurred during that period, the intersection was identified as hazardous by community members. Sight distance is the problem at the intersection of Constitution Way with North Bank Chetco River Road and Old County Road due to the skewed angle at which these roads meet. In addition, the wide expanses of pavement make pedestrian crossings unsafe. Although observed pedestrian volumes were low, there is potential for higher pedestrian volumes, due to the proximity of Azalea Park.

Three geometric improvement options were developed for this intersection which, to varying degrees, minimizes the conflicting turning movements, reduce the expansive pavement widths, and separate the mix of auto and truck traffic.

Option 1: This option consists of eliminating the channelized right turn lane for northbound US 101 and replacing it with a right turn deceleration lane. The existing traffic would volumes warrant a right turn deceleration lane based on the National Cooperative Highway Research Program Report 279 Intersection Channelization Design Guide, Transportation Research Board. This is the simplest and lowest cost, of the improvement options. It addresses trucks leaving northbound US 101 via the channelized right turn lane and crossing two lanes of Constitution Way to access the Weigh Station. This option is shown in Figure 6-3.

Advantages of this option are that trucks would no longer cross both lanes on Constitution Way. Instead they would be in the northbound lane of Constitution Way and only cross the southbound lane. With this configuration, northbound traffic on US 101 turning onto Constitution Way would access the street at the same place as southbound traffic on US 101, so this option eliminates the merge point on Constitution Way for all traffic. In addition, this option reduces the width of the highway access, an ODOT objective for state highways.

The disadvantages of this option are that it does nothing to reduce the expanse of pavement between the two truck access lanes and it does not improve the sight distance at the intersection with Old County Road and North Bank Chetco River Road.

The cost of this improvement would be approximately $50,000. This would cover the cost of a construction survey, removal and disposal of asphalt and temporary traffic control.

Option 2: This option consists of eliminating the channelized right turn lane for northbound US 101 and eliminating the southernmost truck access lane to the Weigh Station. This option addresses replacing it with a right-turn deceleration lane, trucks leaving northbound US 101 via the channelized right turn lane and crossing two lanes of Constitution Way to access the Weigh Station. This option also eliminates mid-block left turns into the weigh station. This option is shown in Figure 6-4.

Advantages of this option are that trucks would no longer cross Constitution Way mid-block to access the Weigh Station. Instead they would make this turn at the STOP-controlled intersection of Constitution Way with Old County Road and North Bank Chetco River Road. With this configuration, northbound traffic on US 101 turning onto Constitution Way would access the street at the same place as southbound traffic on US 101, so this option eliminates the merge point on Constitution Way for all traffic. Another advantage of this option is that it eliminates both large areas of painted pavement that make pedestrian crossings difficult. In addition, this option reduces the width of the highway access, an ODOT objective for state highways.

Construction of Option 2 could be phased, first correcting the intersection of Constitution Way and US 101 and later closing the south truck access lane to the Weigh Station. The latter part can be done with concrete Jersey barriers, a quick, low cost improvement which would not require the cost of pavement removal and can even be done on a trial basis. If the community is unhappy with the way the intersection operated after the change, it could easily be changed back to the configuration shown in Option 1 by removing the Jersey barriers. If the community likes the way the new configuration functions, but is unhappy with the look of the Jersey barriers, the pavement could be removed, a curb constructed, and the area replanted.

The disadvantage of this option is that it does nothing to improve the sight distance at the intersection with Old County Road and North Bank Chetco River Road.

The cost of this improvement would be approximately $100,000. This would cover the cost of a construction survey, removal and disposal of asphalt, construction of new curbs, replanting and temporary traffic control.

Option 3: This option consists of eliminating the channelized right turn lane for northbound US 101, realigning Constitution Way such that it intersects Old County Road and North Bank Chetco River Road at a 90° angle, and relocating the Weigh Station to US 101. This option addresses all of the safety issues identified with this intersection: trucks leaving northbound US 101 via the channelized right turn lane and crossing two lanes of Constitution Way to access the Weigh Station, conflicts between auto and truck traffic on Constitution Way and large areas of pavement making pedestrian crossings difficult. This option is shown in Figure 6-5.

Advantages of this option are that trucks would no longer cross Constitution Way mid-block to access the Weigh Station. The Weigh Station would be accessed directly from US 101. With this configuration, northbound traffic on US 101 turning onto Constitution Way would access the street at the same place as southbound traffic on US 101, so this option eliminates the merge point on Constitution Way for all traffic. This option also improves sight distance at the intersection of Constitution Way with Old County Road and North Bank Chetco River Road, and eliminates one leg of the intersection. Another advantage of this option is that it eliminates both large areas of painted pavement, which make pedestrian crossings difficult. In addition, this option reduces the width of the highway access, an ODOT objective for state highways. The disadvantage of this option is that it is the highest cost option.

The cost of this improvement would be approximately $340,000. This assumes a cost of $140,000 for a construction survey, removal and disposal of asphalt, new asphalt, curbs and striping, and temporary traffic control on Constitution Way, and $200,000 to relocate the Weigh Station.

Recommendation: Option 1 is recommended because it addresses: conflicting turning movements, merge points, and pedestrian safety and has the lowest estimated cost. It also reduces the width of the highway access. It does not, however, come with the high cost of relocating the weigh station and completely realigning Constitution Way as shown in Option 3.

In addition to the geometric improvements at this intersection, members of the Transportation Advisory Committee identified the need for a traffic signal at the intersection of Constitution Way and Highway 101 to reduce delays and improve safety for vehicles turning from Constitution Way (and Bridge Street, on the other side of the highway). Examination of p.m. peak hour traffic volumes (existing peak hour volumes are shown in Figure 4-4, 20-year forecast volumes are shown in Figure 5-4) indicated that this intersection would meet the peak hour traffic volume warrant for a traffic signal even in the existing condition. (Other traffic signal warrants were not examined due to a lack of four-hour and eight-hour traffic volumes.) Because the peak hour traffic volume warrant is already met, and the four-hour and eight-hour volume warrants will likely be met in the near future (if not met already), based on the 20-year traffic forecasts, a traffic signal is recommended for this intersection in addition to the geometric improvements shown in Option 1. The cost of a traffic signal is approximately $120,000, bringing the total cost of constructing Option 1 and a traffic signal to $170,000.

Option 3. Improve the intersection of Carpenterville Road and US 101.

Overview: The intersection of Carpenterville Road and US 101 was found to not meet mobility standards with the addition of future traffic. This finding was consistent with findings in the *Lone Ranch Master Plan Transportation Impact Study.* This is a four-leg intersection with a Stop control on Dawson and Carpenterville Roads. The *Lone Ranch Master Plan Transportation Impact Study* found that the minor street left turn movements at this intersection would operate above the ODOT mobility standard[1] of 0.80.

A series of improvements to the US 101/Carpenterville Road intersection have been identified to allow this intersection to meet mobility standards. These improvements include interim measures as well as the potential long term plan of a traffic signal as follows:

- Interim measures, such as left turn/right turn lane improvements on all intersection legs, acceleration and deceleration lanes on US 101, raised median on US 101, channelization on US 101, no parking on Carpenterville Road at the intersection.
- At the point at which interim measures can no longer allow the US 101/Carpenterville Road intersection to meet mobility standards or the interim measure is infeasible to implement, a traffic signal should be considered for this intersection. It should be noted that it is ODOT's policy that all interim measures be exhausted before a traffic signal can be constructed. A traffic signal can not be relied by the city or developer as a planned transportation improvement to mitigate traffic impacts until programmed in the city's Capital Improvement Program (CIP), or state Transportation Improvement Program (STIP) and approved by the State Traffic Engineer.

Cost Estimate: $850,000 with primary responsibility of the developer(s) who contribute to the traffic impacts. Developers are eligible for partial reimbursement, the details to be negotiated at the time improvements are required.

Recommendation: The city has approved the Master Plan of Development for Lone Ranch project with the identified traffic mitigation measures. The lone ranch master plan traffic impact study (TIS) traffic mitigation measures will be used for identifying the city's planned transportation improvements for transportation facilities serving future development, upon approval by ODOT and the city. The following planned transportation improvements establish city policy for guiding future city decisions for managing and improving the intersection.

US 101/Carpenterville Road intersection improvements include, but are not limited to:

- Interim measures, such as left turn/right turn lane improvements on all intersection legs, acceleration and deceleration lanes on US 101, raised median on US 101, channelization on us 101, no parking on Carpenterville road at the intersection.

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[1] *Oregon Highway Plan*, 1999, Table 6, District/Local Interest Road.

- At the point at which interim measures can no longer allow the US 101/Carpenterville Road intersection to meet mobility standards or the interim measure is infeasible to implement, a traffic signal should be considered for this intersection. It should be noted that it is ODOT's policy that all interim measures be exhausted before a traffic signal can be constructed. A traffic signal can not be relied by the city or developer as a planned transportation improvement to mitigate traffic impacts until programmed in the State Transportation Improvement Program (STIP) and approved by the State Traffic Engineer.

Option 4: ***Construction of improvements to US 101 in the City of Brookings pursuant to Alternative 5 of the Downtown Brookings – Highway 101 Transportation Solutions Project***

Overview: The considerable amount of population and economic growth in Brookings has added demand to US 101. The highway serves both commercial and recreational travel as the city's only arterial extending through the center of the city. The operational analysis shows US 101 between Ransom Ave. and Alder Street is expected to fall below acceptable performance standards by the year 2017. This increase in demand has led to the Downtown Brookings – Highway 101 Transportation Solutions Project.

The Environmental Assessment resulting from this process studied several alternative solutions and presented three project alternatives as follows:

- No Build Alternative. This alternative would maintain the existing roadway configuration.
- Alternative 4. This alternative constructs a one-way couplet using Chetco Avenue with three lanes for north bound traffic and constructing Railroad Street between Mill Beach Road on the north and Alder Street on the south with three lanes for south bound traffic.
- Alternative 5. This alternative maintains the current alignment of the highway with two travel lanes in each direction, left turn pockets with a raised median and the elimination of parking on both sides of the street.

US 101/Chetco Avenue is a three- to five-lane road with parking on both sides in many sections. Chetco Avenue is located within an 80 to 100 foot right-of-way, which is sufficient for establishing the northbound leg of a couplet system. Railroad Avenue varies from 70 and 100 feet of right-of-way, with two travel lanes. Right-of-way acquisition would be necessary on the northern and southern connections between Railroad Street and Chetco Avenue. Approximately 4.4 acres of right-of-way will be required to develop alternative 4.

With the understanding that the "No Build" alternative, although required in the Environmental Assessment, does not provide a solution for projected future traffic congestion, ODOT, working with a stakeholders committee, presented the City Council with the three alternatives. The Council in turn placed the issue on a ballot for a vote of the citizens of Brookings. Reflecting the result of the election, Council selected Alternative 5.

Parking in the downtown area is a key issue for both business owners and patrons. Working with ODOT, the city has undertaken a study of parking needs for the downtown area.

Cost Estimate: Cost associated with improvements will be determined in conjunction with more detailed study and refinement of the project.

Option 5. ***Improve the intersection of Benham Lane and US 101 in Harbor***

Overview: Benham Lane intersects US 101 at a skew and is controlled by a traffic signal. West Benham Lane is a secondary access to the Port of Brookings. With some exceptions, lands in the Port area are developed, although a new convention center and motel have been discussed for the area, as well as additional commercial and residential development.

East Benham Lane leads to lands currently under consideration for residential development and was initially identified as the likely primary access. However, additional connections to the development may be considered, based on preliminary access information obtained from the developers of North Harbor Hills and Harbor Hills. These additional connections may draw traffic from Benham and distribute it to

other intersections along the highway. However, more complete traffic study of the impacts of the developments, including future year impacts and likely trip distribution is needed to estimate likely performance of the intersection. This analysis may also need to consider a north-south collector parallel to US 101 to help trip distribution and reduce impacts to the highway.

Impacts: The TSP analysis did not allow for sufficient modeling of all of these potential developments, particularly when taken in aggregate. Initial analysis of these developments indicates that traffic generated by the Harbor Hills developments could be distributed through a number of access points along US 101. However, completion of the traffic impact study for the area is required to determine the appropriate transportation network for the area. Initial discussions of additional connections include four access points to South Bank Chetco Road are planned at Payne, Salmonberry, a new road between Salmonberry and Campbell, and Campbell. Additional access points to US 101 may be utilized depending on the outcome of the final traffic impact study. These may include Hoffeldt Lane, Behnam Lane, Museum Road, McVay Lane, and Foral Hill.

Recommendation: The city will require completion of the traffic impact study and approval by ODOT prior to approval of the development master plans and/or zone changes. The study should include a discussion of trip distribution, including a collector street parallel to the highway. Any connections to the highway should be built to city collector standard, allowing for modifications for topography.

Cost: No costs for improvements at the intersection have been developed. Any traffic impact study completed in conjunction with development in the area should include mitigation cost estimates and a discussion of cost-sharing responsibilities.

Recommendation: The city will require a traffic impact study in conjunction with any development proposed to impact the US 101/Benham Lane intersection. The study should include a discussion of trip distribution, including a collector street parallel to the highway, and future year analysis in order to accurately estimate future performance of the intersection.

Option 6. Improve the intersection of Benham Lane and Ocean View Drive in Harbor

Overview: Ocean View Drive intersects Benham Lane at a "T" intersection controlled by a STOP sign. Intersection sight distance on Ocean View Drive is extremely poor to the left (to the west). This is due to the skewed angle at which the two roads intersect and the grades on both roads. Ocean View Drive slopes down to the north at a grade, which is over five percent where it intersects Benham Lane. The grade on Benham Lane is smaller, and this road slopes down from the east to the west (from US 101 to the ocean). A two-foot high concrete wall on the southwest corner contributes to the poor sight distance.

Two improvement options were evaluated for this intersection. The first is a low cost option that improves sight distance without realigning the roadways. The second improves sight distance by realigning Ocean View Drive. These short-term improvements are considered with the understanding that this intersection will be included in any larger study conducted in conjunction with alternatives for the US 101/Benham Lane intersection.

Option 1: The first option consists of removing the two-foot high concrete wall which lies along the west side of Ocean View Drive. This concrete wall contributes to the poor sight distance for vehicles on the Ocean View Drive approach. The wall supports a chain link fence that was installed for pedestrian safety. It prevents pedestrians on Ocean View Drive from falling down the embankment to Benham Lane. The chain link fence should be reinstalled, at ground level, once the concrete wall is removed. The chain link fence would not result in the same visual barrier as the concrete wall and will make traffic on Benham Lane more visible to drivers stopped on Ocean View Drive, and vise versa. In addition, a convex mirror should be installed on Benham Lane, directly across from, and facing, Ocean View Drive. This is a typical treatment used on blind corners. The cost for these improvements would be approximately $10,000.

The advantage of this improvement is that it improves sight distance without costly road reconstruction. The disadvantage of this improvement is that it does not improve the horizontal and vertical curves on the two roads, the primary reason for the poor sight distance.

Option 2: The second option consists of realigning the northbound approach lane on Ocean View Drive to the east such that it effectively becomes a channelized right turn lane eventually paralleling Benham Lane before merging with it, much like an acceleration lane. The cost of this improvement would be approximately $50,000.

The advantage of this improvement is that it makes vehicles on Ocean View Drive more visible to drivers traveling east on Benham Lane. The disadvantages of this improvement are that it does not significantly improve sight distance to the west for drivers on Ocean View Drive, it would displace the sidewalk and bike lane on the south side of Benham Lane, and it involves costly road reconstruction.

Recommendation: Option 1 is recommended for this intersection, primarily based on the lower cost, and because it improves sight distance for both traffic on Benham Lane and Ocean View Drive and because the improvements all lie off-road, it would not disrupt traffic during construction or permanently disrupt the sidewalks and bike lane on Benham Lane.

This intersection will be included any study that investigates impacts to the US 101/Benham Lane intersection.

Option 7. Improve Parkview Drive to the Brookings Airport

Overview: Parkview Drive serves as the primary access to the Brookings Airport. The road is narrow, winding, and requires low speeds. To improve access to the airport, Parkview will require significant realignment and improvement or an alternative access route must be developed. For the 20-year planning period Parkview Drive is inadequate to accommodate the future development.

Land use along Parkview Drive is mostly residential with some commercial development on the east side of the airport. There are some large lots available for development and as development increase the roadway will need to be upgraded.

Parkview Drive is two miles in length extending from US 101 to the Brookings Airport. The road extends mostly through residential areas and serves as the primary access to the Brookings Airport. The existing roadway is a two lane, approximately 22 feet in width with shoulder. Parkview Drive is currently identified as a collector by the City of Brookings and Curry County. Most of the roadway is in Curry County's jurisdiction. Ideally, the desired improvements along the roadway are to bring the road to collector standards and construct continuous sidewalk along the roadway. The standard for collectors consists of two 11-foot travel lanes and seven-foot parking strips on both sides of the roadway. The resulting paved width would be 36 feet. The standard also includes five-foot sidewalks, adjacent to the curbs. This option fits within the city's required right-of-way of 50 feet.

The intersection of Parkview Drive and US 101 will become more and more important to the transportation network of the city as future development proceeds. US 101 is the only arterial and serves as the "Main Street" through the downtown. As development along Parkview Drive continues, the traffic along this collector will increase. Improvements to the intersection will be required to accommodate the future travel demand. Currently, a connection between Parkview and either 3rd or 5th Street may have some benefit, but is not justified in terms of the likely cost. However, future development between Carpenterville Road and the airport will likely impact the highway to the extent that such a parallel connection is needed. Any traffic impact study completed in conjunction with such development will need to investigate the affects of a parallel connection between the downtown and Parkview.

Impacts: Some property owners may perceive the widening as losing the rural character of the roadway. In actuality the roadway is made safer and more efficient by upgrading the roadway to standards set by the city and the county. This can be accomplished within the city's right-of-way and will improve the safety and sight distance on the roadway. Widening the roadway increases vehicles ability to share the roadway with no impediments to two-way traffic. Sidewalks create a safer environment for pedestrians. Upgrading Parkview Drive improves the level-of-service and safety of the roadway with no negative impacts to surrounding land uses.

Costs: To upgrade this roadway to collector standards, a unit cost of $300,000 per mile was used. The total estimated cost is $600,000. Costs associated with the creation of a connection between Parkview and either 3rd or 5th Street were not developed because of the deep Ransom Creek ravine separating the two areas but further study should be considered to determine the feasibility of a connection.

Recommendations: Parkview Drive should be improved and upgraded to the standards set by the city and the county. Improvements to the intersection of Parkview Drive and US 101 will be necessary as future travel demand grows. As traffic to the airport and the surrounding area increases, improvements to Parkview Drive are going to be more important. The city and the county alike see this improvement as an important element in the future planning of the roadway.

Option 8: Improve the unsignalized intersections which are projected to operate at sub-standard levels-of-service

Overview: US 101 is the only arterial within the study area. Although the side streets along US 101 do not contribute a significant amount of traffic to the highway, the traffic along the highway is high enough to cause delay on the side streets, causing a poor level-of-service at these intersections. Delays are primarily due to heavy traffic volumes on US 101/ Chetco Avenue conflicting with the minor streets turning movements on and US 101 left-turning volumes. All of the unsignalized intersections analyzed are projected to operate below acceptable V/C standards in the 2017 condition. These include:

- US 101-Carpenterville Road/Dawson Road
- US 101-Chetco Avenue/Arnold Lane
- US 101-Chetco Avenue/Pacific Avenue
- US 101-Chetco Avenue/Fern Avenue
- US 101-Chetco Avenue/Alder Street

The unsignalized intersection of US 101 and Constitution Ave. also functions below acceptable standards, but is discussed separately in Option 2 above.

It may be desirable to set a lower level-of-service standard for unsignalized intersections since cost-effective solutions are limited. However, alternative standards must be justified as the only alternative and approved by the Oregon Transportation Commission. Separate turn-lane channelization at the side street approaches of an unsignalized intersection is one cost effective improvement that can be made; however, this will not improve the side street left turn performance, which is usually the problem at unsignalized intersections. Also, an unsignalized intersection is unlikely to meet the Manual of Uniform Traffic Control Devices (MUTCD) signal warrants unless the level of service is above 0.85.

The adopted level-of-service standard for state highways is determined by the Oregon Highway Plan (OHP). The adopted level-of-service standard for city streets should reflect community values and views of acceptable delays and congestion levels. However, these values must be balanced by the community's ability to fund the needed improvements defined by the level of service standard. If the level of service standard is set too high, then it will be too costly to maintain the level of service standard. If the level of service standard is set too low, then substantial congestion problems result.

All of the options developed for the following intersections are based on the idea that US 101 will remain as is and not developed as a one-way couplet.

The traffic engineering software package UNSIG was used to analyze the level of service for unsignalized intersections. UNSIG calculates level-of-service at unsignalized intersections based on the 1985 Highway Capacity Manual. This methodology relates level-of-service to reserve, or unused, roadway capacity (measured in passenger cars per hour). Reserve capacity is evaluated for all vehicles entering or crossing the major roadway traffic flow from side streets, as well as those making left turns on the major roadway. Each of these intersections was analyzed for traffic signal warrant using the MUTCD. For communities with a population under 10,000 the minimum volume to warrant a signal is 70 percent of that required in the MUTCD.

Signalization is not always the best improvement for unsignalized intersections that are operating at sub-standard levels-of-service. Other alternatives could be considered including channelization, lane use controls, sight distance improvements, and multi-way STOP control.

US 101/Chetco Avenue and Arnold Lane – Arnold Lane intersections US 101 from the west at a "T" intersection. At the intersection of US 101 and Arnold Lane, the eastbound approach is predicted to operate at a V/C of 1.07 in the year 2017. The other movements of the intersection will operate at acceptable V/C. The intersection as a whole would operate at a V/C of 0.56 if signalized. Further, the intersection meets the required warrant for Peak Hour Volumes according to the MUTCD (Warrant 11). The side street volumes at this intersection meet the 70 percent requirement for the Warrant 11 for the Peak Hour Traffic Volume for a traffic signal. However, other signal warrants are not met and would have to be reached before a signal could be installed. Therefore, while this intersection could be improved to meet level-of-standards, it does not meet signal warrants and cannot be signalized at this time. The city should continue to work with ODOT on monitoring signal warrants to determine if this is an acceptable solution. In any case, a signal will have to be approved by the State Traffic Engineer before being allowed. Cost would be approximately $150,00.

Another option would be to widen Arnold Lane so that the left turning vehicles and the right turning vehicles have exclusive lanes. Widening of Arnold Lane would improve the right turn movement on the eastbound approach to a LOS C, but the left-turn movement would remain at LOS F. The other movements at the intersection operate at LOS C or better in both the existing configuration and with the widening of Arnold Lane.

The volumes along Arnold Lane are not very high compared to the high volumes on US 101. It is the high volumes on US 101 that impede the traffic from the side streets. The cost for the right-turn lane would be approximately $160,000 just for the additional lane. The level-of-service for the side street approaches would improve for the right-turning vehicles, but there would be no improvement to the left turning or through moving vehicles. The costs outweigh the benefits. Any additional lanes are not going to prove to be cost-effective. Improving the mobility along US 101 so that the side streets have more opportunities to access or cross the highway should be developed.

US 101/Chetco Avenue and Pacific Avenue – US 101 and Pacific Avenue is a four-leg intersection with a STOP control on the eastbound and westbound legs of Pacific Avenue. At the intersection of US 101 and Pacific Avenue, the eastbound and westbound approaches on Pacific Avenue are predicted to operate at a V/C ratio greater than 1.0 in the year 2017. The intersection meets Warrant 2 for Interruption of Continuous Traffic of the MUTCD. The side street volumes at this intersection meet the 70 percent criteria of that requirement for the Peak Hour Traffic Volume Warrant. Other required signal warrants are not met.

With a traffic signal, the intersection would operate at a V/C of 0.63. This intersection is located approximately 742 feet north of the signalized intersection of US 101 and Center Street and 797 feet south of the signalized intersection of US 101 and 5th Street. The spacing of the intersections does not meet signal spacing standards of 1,300 feet. While signals may be spaced more closely in some cases, the distance between Pacific and Mill to the north would preclude deviation at this location. In addition, while a signal at this location would improve performance for turns from the local street, capacity on the highway would worsen. The cost for a new signal at this intersection would be approximately $150,000.

Simply adding a left-turn lane on US 101 would improve the mobility of the traffic on the mainline, however, the eastbound and westbound approaches would still operate at a sub-standard level-of-service. Possible improvements to the side streets are to construct an exclusive left-turn lane on eastbound Pacific Avenue and an exclusive right-turn lane on westbound Pacific Avenue. However, this would not improve the operation of the side streets. This intersection is too close to other signalized intersections to recommend that a signal be installed and the additional lanes will not improve the operation of the intersection.

US 101/Chetco Avenue and Fern Avenue – The eastbound and westbound approaches on Fern Avenue are projected to operate at V/C greater than 1.2 by the year 2017. The intersection does not meet any of the Traffic Signal Warrants in the MUTCD. The eastbound and westbound approaches experience poor levels-of-service because the high volumes on US 101 restrict access from the side streets, whose volumes are relatively low. As mentioned earlier, there are other options to improving the intersections other than signalization. In general, the highest volumes on Fern Avenue are right-turning vehicles, therefore an exclusive right-turn lane may improve the operation of the intersection.

An exclusive right-turn only lane on the east and westbound approaches would operate at LOS A in both the AM and PM peak period. This means the right-turning vehicles would experience very short delays. During the AM peak period the eastbound and westbound shared through and left-turn lane would still fall below acceptable standards and would continue experience long delays.

Fern Avenue does not have very high volumes and the problem results from the high volumes along US 101. The cost for the right-turn lane would cost approximately $160,000 just for the additional lane. The level-of-service for the side street approaches would improve for the right-turning vehicles, but there would be no improvement to the left-turning or through moving vehicles. The costs outweigh the benefits. Any additional lanes are not going to prove to be cost-effective. Improving the mobility along US 101 so that the side streets have more opportunities to access or cross the highway should be developed.

US 101/Chetco Avenue and Alder Street – Alder Street intersects US 101 at a "T" intersection from the west side of US 101. The intersection consists of two travel lanes in each direction along US 101 with one shared right-turn and through lane and one shared left-turn and through lane. There are two turning lanes on Alder, an exclusive right turn lane and an exclusive left-turn lane. The Alder Street leg of this intersection is projected to operate at a V/C greater than 1.2 by 2017. The volumes at this intersection do not meet Warrant 1, or Warrant 2 for Traffic Signal Installation in the MUTCD. Improvement to the intersection will be needed to reduce delay.

Another option is to construct an exclusive left-turn lane along northbound US 101. This would allow the through traffic to proceed through the intersection without interference from the left turning vehicles. However, this change will not significantly improve the overall operation of the intersection. A traffic signal would cost approximately $120,000 and an additional lane would cost about $160,000 per lane. These improvements are expensive and the resulted improvement will not be significant.

Recommendation: No additional signals or other improvements are recommended along US 101 at this time.

Option 9. Improve the signalized intersections which are projected to operate at sub-standard levels-of-service

Overview: The signalized intersections that were analyzed and are projected to operate at LOS E or F in the 2017 condition include:

- US 101-Oak Street
- US 101-Chetco Avenue/5th Street

To define the future transportation deficiencies, performance on state highways is defined in the Oregon Highway Plan and is LOS D for city streets. However as noted earlier, a community must balance the level-of-service against the ability to fund the needed improvements defined by the level of service standard.

Consideration of changes to the signalized intersections was completed prior to the adoption of the V/C ratio performance standard and is discussed in terms of LOS letters. ODOT has reviewed the analysis and concurs with the recommendation that no changes be made to these intersections. However, the use of LOS letters in the description below was allowed to remain until the next periodic review update of the TSP at which time they will be updated to reflect V/C ratios rather than LOS letters.

In the future, these intersections may be reanalyzed in response to development or other changes to traffic conditions. Specifically, as the proposed by the Alternative 5 of the Downtown Brookings – Highway 101 Transportation Solutions Project. At that time, the city and ODOT will cooperate in modeling potential alternatives. In all cases, subsequent signal warrant analysis must consider and be reported in terms of V/C ratios rather than LOS letters. Further, before any changes can be recommended to the signals, the proposal must be reviewed and approved by the State Traffic Engineer.

The traffic engineering software package SIGCAP was used to analyze signalized intersection level-of-service. SIGCAP correlates level-of-service with saturation values. The saturation value is a measure of congestion levels, where the higher the saturation value the higher the level of congestion.

?US 101 and 5th Street. This is a four-legged intersection located in downtown Brookings. There are two travel lanes in each direction on US 101 and one travel lane in each direction along 5th Street. At the intersection, there is a shared right-turn and through lane and an exclusive left-turn lane on southbound and northbound US 101. On 5th Street, there is a shared right and through and exclusive left-turn lanes in both the westbound and eastbound directions.

This intersection is projected to operate at LOS B in the AM and LOS D or LOS E in the PM by the year 2017. The eastbound and westbound left-turns would operate at LOS D or E causing substantial delay for vehicles turning left onto US 101 during the PM peak period. In the northbound and southbound direction all movements are projected to operate at LOS D or E. There are several options to improve the level-of-service for an intersection such as variations in the phasing or cycle lengths or adding turning lanes for high volume movements.

On the eastbound approach the highest volume movement is the right-turn onto southbound US 101. In this instance a right-turn only lane could be implemented. During the PM peak period, if an exclusive right-turn only lane was added to the eastbound approach on 5th Street, the intersection would operate at LOS D and the northbound and southbound would operate at LOS D or better. All left turning movements would operate at LOS D and the eastbound and westbound through and right would operate at LOS B or better.

Improvements along US 101 are most desirable and could benefit the operation of the intersection of a whole. If exclusive left-turns are constructed the level-of-service would operate at LOS D, during the PM peak period. The southbound exclusive left would operate at LOS D while the other southbound movements operate at LOS A. The northbound exclusive left would operate at LOS C while the other northbound movements operate at LOS B.

Although these different options resulted in an improvement in level-of-service for the side street approaches, the improvement was not that significant. Adding an additional lane would cost approximately $160,000 per lane. For two left-turn lanes along US 101 would cost about $320,000 and vehicles at the intersection would still experience the same amount of delay, with the exception of the eastbound approach. An analysis of the signal timing and phasing should be considered. Optimizing the phasing and timing of a traffic signal could improve the intersection level-of-service and the level-of-service on the approaches.

US 101 and Oak Street. This is a four-legged intersection located in the downtown area of Brookings. There are two travel lanes in each direction on US 101 and one travel lane in each direction on Oak Street. At the intersection, there is a shared right-turn and through lane and a shared left-turn and through lane on southbound and northbound US 101. On Oak Street, there is a shared right, through and left in both the westbound and eastbound direction.

This intersection is projected to operate at LOS C in the AM and LOS F in the PM by the year 2017. During, the PM peak period, however, the westbound approach is projected to operate at LOS E, while all other approaches operate at LOS F. This means all vehicles at this intersection will experience an average of 60 seconds of delay during the PM peak period. There are several options that may improve the level-of-service for an intersection such as variations in the phasing or cycle lengths or adding turning lanes for high volume movements.

During the PM peak period, the intersection would operate at LOS D during a two phase 60 second cycle. The highest volumes are on the through movements along US 101. When the through volumes are high, the gaps for left-turning vehicles decrease causing congestion on the highway. If left-turn lanes were constructed on US 101 the intersection would operate at LOS D and all approaches would operate at LOS D or better. If widening on US 101 is not an option, additional left-turn lanes on Oak Street would improve the intersection level-of-service. With this configuration the intersection could operate at LOS D.

An analysis of the signal timing and phasing should be considered. Optimizing the phasing and timing of a traffic signal could improve the intersection level-of-service and the level-of-service on the approaches. This option is the only one that resulted in a significant improvement in the level-of-service. Adding an additional lane would cost approximately $160,000 per lane. For two left-turn lanes on US 101 would cost about $320,000 and vehicles at the intersection would still experience the same amount of delay, with the exception of the eastbound approach.

Recommendation: Changing the phasing and the timing of the signal would be the most cost-effective improvement for both intersections. This would have to joint effort between the City of Brookings and ODOT to coordinate signal timings with the other signalized intersections on US 101.

Option 10. Improve the arterial and collector street segments which are projected to operate at sub-standard levels-of service

Overview: Through traffic on US 101 is required to operate at a V/C ratio of 0.80 or better through Brookings. The city has established LOS D as the acceptable standard for city streets. The following arterial and collector streets are projected to operate below acceptable performance standards in 2017:

- ~~US 101 from north of Carpenterville Road to Ransom Ave.~~
- US 101 from Ransom Ave. to south of Alder Street
- Pioneer Road east of Pacific Avenue
- Benham Lane

US 101 from Ransom Ave. to south of Alder Street – This segment of roadway is predicted to operate at a V/C ratio of greater than 1.2 by the year 2017. The sub-standard level-of-service is a primarily a result of US 101 functioning as the only arterial in the study area. US 101 serves as the city's main street. If allowed most future traffic from new development will use US 101 for both longer regional trips and shorter local trips.

Pioneer Road north of Pacific Avenue – Pioneer Road is currently two travel lanes, one in each direction, approximately 22 feet in width and is identified as a collector.

Pioneer Road is projected to carry as much as 5,600 vehicles daily and operate at LOS E by the year 2017. The capacity for this roadway is identified as an average of 6,000 vehicles daily, and by the 2017 it will almost reach capacity. With a LOS E, vehicles traveling on Pioneer Road will experience very long delays and substantial congestion. This condition would primarily be caused by single family infill development north of Ransom Avenue and additional future trips generated by the schools.

It is important that the transportation facilities are able to accommodate future growth. The additional traffic caused by future development may warrant an additional travel lane in each direction or perhaps a third lane to allow refuge for left turning vehicles. Where left-turn volumes are high, a three-lane cross section can function better than a four-lane cross section because turning vehicles do not interfere with the flow of through movements. In addition, a three-lane cross section provides more right-of-way for bicycle lanes, parking, and sidewalk than a four-lane cross section.

Benham Lane east of US 101 –Benham Lane is a County road within the UGB and currently has two travel lanes, one in each direction, and is approximately 24 feet in width.

East Benham Lane is projected to carry an average of 9,000 vehicles daily exceeding its capacity of 6,000 vehicles a day. This segment is predicted to operate at LOS F by the year 2017, primarily due to the additional trips generated by the Harbor Hills, Westbrook/Reservation Ranch, and North Harbor area

developments. East Benham Lane is one of the logical access points to these future developments. However, East Benham Lane will not be able to accommodate the projected traffic.

As future development is constructed, the travel demand on the roadways will increase. Additional lanes will be needed to accommodate the additional traffic in the future or alternative access points will be required. Benham and any other connections to the developments should be built to city collector standards, allowing for modifications due to topography. Depending upon the traffic patterns of the roadway and the future land uses a center turn lane is also an option to consider. A three-lane cross section can function better than a four-lane cross section when left turn volumes are high because turning vehicles do not interfere with the through traffic. This allows more right-of-way for bicycle lanes, and sidewalk as compared to a four-lane cross section.

An alternative that should be considered in conjunction with a traffic impact study for the area is local streets that parallel US 101 which carry some of the traffic load away form Benham Lane and the intersection at US 101. This alternative is not recommended at this time, but the city and county will require consideration of this alternative in conjunction with future development that may impact Benham Lane.

Cost Estimate: Pioneer Road is approximately 2,000 feet in length from Pacific Avenue to Hassett Street. For a three-lane cross section along Pioneer Road at $200 a linear foot, the cost would be about $400,000. East Benham Lane is approximately 1,000 feet in length and the cost would about $200,000.

Recommendation: The city will require the completion of the traffic impact study to determine appropriate safety and capacity improvements needed in conjunction with proposed development.

The result of the Downtown Brookings – Highway 101 Transportation Solutions Project and the associated Environmental Assessment is the selection of Alternative 5, which provides for construction of the highway from approximately Mill Beach Rd. to Constitution Way with two 12 foot travel lanes in each direction, left turn pockets at Fifth St., Pacific Ave., Mill St., Center St., Wharf St., Fern St., Oak St., and Alder St. Parking would be removed from both sides of the street under this configuration and a raised median would be place in the center of the street.

Pioneer Road should be upgraded to a three-lane cross section would improve the function of the roadway to accommodate the future growth. A three-lane cross section would allow vehicles to turn without interfering with the through moving vehicles.

Benham Lane is projected to experience an increase in traffic by the year 2017. The existing roadway is not designed to accommodate such a substantial increase in travel demand. Improvements to the roadway will be needed to accommodate future growth. Additional travel lanes are worth considering, although the developers of properties in the area have proposed other connections to US 101. At the time of TSP adoption, the impact of these developments was under study. The city will require completion of this study prior to approval of any master plan or zone changes for the developments. This study should include potential development on both sides of the highway and include participation by all developers currently proposing activity that will affect the road network in this area.

Option 11. Improve the intersection of Lower Harbor Road and Shopping Center Road at the entrance to the Port of Brookings

Overview: Lower Harbor Road and Shopping Center Road are classified as collectors by Curry County and City of Brookings, respectively. Lower Harbor Road connects the Port of Brookings/Harbor with US 101. Shopping Center Road lies parallel to US 101 between Lower Harbor Road and Hoffeldt Lane. The two roads intersect at a "T" intersection, with the entrance to the port located directly across from Shopping Center Road. The intersection is two-way STOP controlled, with Lower Harbor Road being the through street.

At various times, community concern was raised in favor or changing the existing two-way STOP control to signalized control. ODOT Region 3 analyzed this intersection to determine whether the intersection

met the warrants for signalization; it did not. The intersection also did not meet the warrants for all-way STOP control.

The cost to install a traffic signal at a typical intersection is over $100,000. Traffic control signals should not be installed unless one or more of the signal warrants in the Manual on Uniform Traffic Control Devices is met. Warrants for traffic signals are based on minimum traffic and pedestrian volumes, hours of delay, need for gaps in continuous traffic and accident history. In addition to meeting one or more warrants for a signal, installation of a traffic signal must improve the overall safety and/or operation of the intersection. When a traffic signal is not warranted, STOP sign control is an appropriate traffic control measure. As stated above, this intersection did not meet the warrants for a traffic control signal.

All-way STOP control is ordinarily used only where the volume of traffic on the intersecting roads is approximately equal. All-way STOP control is warranted where traffic signals are warranted and the all-way STOP is an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation, and where accident history and traffic volume warrants are met. As stated above, this intersection did not meet the warrants for all-way STOP control.

Impacts: If a traffic signal or all-way STOP control is installed at an intersection with low volumes on the minor street, they cause unnecessary delays for vehicles on the major street. Safety can be compromised if an all-way stop is installed at an intersection where traffic volumes on the minor street do not warrant stopping the major street, because if drivers on the major street become accustomed to not seeing traffic approaching on the minor street they may only come to a "rolling stop" or ignore the STOP sign altogether.

Recommendation: It is recommended that the existing two-way stop control be maintained at the intersection of Lower Harbor Road and Shopping Center Road. The traffic volumes and accident history do not warrant the high cost of installing a traffic signal or even changing the control to an all-way STOP. If a study of conditions at Benham Lane and the Port area also include this location it may show other improvements that are warranted. If so, results from that study will take precedence over the short-term improvements discussed here.

Option 12. Construct a Center Turn Lane on US 101 in Harbor

Overview: Property owners along US 101 south of Harbor have identified a need for a center turn lane on US 101 from Harbor to the California State Line. They have expressed a safety concern for vehicles turning left into their properties. The property owners recently circulated a petition signed by more than 300 residents of Curry County. The petition requests that ODOT extend the center turn lane on US 101 in Harbor from its present terminus south of Pedroli Lane to the Oregon-California State Line. A copy of the petition is included in Appendix D.

Impacts: Center turn lanes primarily address two traffic issues: traffic level of service and safety. When left turns are made from a four-lane highway, vehicles stopped to make turns block the left lane, causing through-moving vehicles behind them to stop also, or change lanes to pass. This can cause delays for through vehicles, reducing their average speeds and corresponding levels of service. Center turn lanes can improve safety by reducing the chances of rear-end accidents which result when vehicles stop in the through travel lanes and are hit by the vehicles behind them.

Center turn lanes do not necessarily reduce the number of accidents through a highway segment, but often change the type of accidents that are experienced. When a vehicle stops to make a left turn, it blocks the use of that lane for other vehicles. As a result, drivers behind the stopped vehicle change to the right lane to go around it. This lane change may cause unsafe conditions as vehicles on either the main roadway or a side street may not be expecting the lane change, which could result in an accident. At the same time, the addition of a continuous turn lane may increase the number of head-on collisions as cars waiting to turn left are struck by on-coming vehicles. This situation is made worse when drivers use the turn lane as an acceleration or deceleration lane and do not see vehicles facing them in the same lane.

A three-lane cross section provides two through travel lanes. Typical two-lane highways in Oregon can accommodate average daily traffic volumes of 10,000 vehicles per day (vpd), and are not considered for

widening to four lanes until traffic volumes exceed 10,000 vpd. Existing traffic volumes on this segment of highway range between 7,000 and 10,000 vpd and are expected to increase to 12,000 to 32,000 vpd by the end of the 20-year planning period. More specific study will be required before the segment can be stripped for either 3 or 4 lanes, including consideration of closing or consolidating accesses to reduce the number of turning conflicts. If this section of highway is restriped to a three-lane cross section, traffic operations should be monitored to determine whether the highway still operates at an acceptable level of service.

Restriping a four-lane highway to a three-lane highway constitutes a very low cost improvement and it does not change the physical roadway width, therefore, it may be repainted as a four-lane section relatively cheaply. However, making significant changes to the highway such as adding or removing lanes often meets with opposition from the traveling public

In the case of US 101 between Harbor and California, it is not a three-lane section, but a five-lane section which the community desires. The highway currently has a ten-foot asphalt median and can be restriped to include a 14-foot center turn lane with minimal pavement widening along the edges. A five-lane cross section would both increase the capacity of the highway, and the safety as described above.

Recommendation: As stated above, ODOT has analyzed traffic conditions and the State Traffic Engineer has opposed the request for a center turn lane. A review of turning volumes and accident reports has not indicated a current problem with left turns. In addition, providing a center turn lane on this highway segment is contrary to current design and operation policies. As a result, a center turn lane is not recommended for this highway segment at this time, although continued discussion with ODOT is recommended. Any such change will have to be approved by the State Traffic Engineer before being implemented.

Option 13. Improved East-West Connection between the South Coast and I-5

Overview: An east-west arterial highway from US 101 to I-5 in the county is needed to reduce the relative isolation of the area from the rest of the state. This was identified as a policy in the Curry County Comprehensive Plan and as a goal in the Oregon Coast Highway Corridor Master Plan.

The City of Brookings is less isolated than the Cities of Port Orford and Gold Beach, and the northern part of the County due to its proximity to US 199. US 199 intersects US 101 in California, approximately 17 miles south of the Oregon-California State Line (approximately 22 miles south of Brookings). US 199 crosses the coastal range in California, reenters Oregon approximately 40 miles northeast of its connection to US 101, and continues approximately 45 miles north to I-5 in Grants Pass. Using California State Highway 197 between US 101 and US 199 reduces the trip by four miles.

ODOT prepared a study in 1974 for an improved east-west corridor between US 101 and I-5. ODOT studied 14 different alignments and identified one alignment, the Shasta Costa corridor, as the preferred alignment. The study determined that the cost of such a project (estimated at $41 to $95 million in 1974 dollars) would far outweigh any economic benefits to the area.

The existing road that connects US 101 in Gold Beach to I-5 just north of Grants Pass consists of a paved county road from the junction with Highway 101 and Lobster Creek Campground, approximately 10 miles. At that point, the paved road continues up river as Forest Service Road 33, approximately 19 miles to the junction with Forest Service Road 23 is a single lane, paved road for approximately 22.5 miles before entering Bureau of Land Management (BLM) lands. The road continues as an extra wide paved road for approximately 12.5 miles to Galice and County Road 2400. From there it is approximately 15 miles to I-5. The length is over 70 miles. Improving this road would require the cooperation of at least four jurisdictions: Curry County, Josephine County, US Forest Service, and BLM. The State of Oregon would also probably be involved.

None of these jurisdictions has the ability to fund a major improvement to this road (improve the road to state highway standards). Congress has cut the Forest Service's operating and maintenance budget every year since 1990 and the Forest Service, which itself is not a road department, has been constructing few new roads on Forest Service land. At the State level, the governor recently issued a moratorium on all

new state highway projects, except for preservation projects on the existing state highway system. The cost to improve this road is far in excess of the County Road Department's budget.

A second alternative was identified that consisted of t raveling one-way utilizing Forest Service Road 23, Bear Camp and traveling the opposite direction utilizing Forest Service Road 2308, Snout Creek. Both of the roads are single lane with turnouts and could stay that way, however one is currently paved and the other is aggregate surfaced. This alternative was not considered viable due to factors including current usage, which includes recreational, commercial, administrative and general public travel and the need to pave and maintain an additional 20 mils of road (Forest Service Road 2308).

The Transportation Advisory Committee (TAC) agreed that constructing a paved two-lane highway in the corridor is still infeasible in the 20-year planning period. The TAC recommended that the existing road, some of which is a one-lane gravel road, remain as is, but the road should stay open year-round for emergency access.

Improving maintenance on the one-lane gravel Forest Service Road through Agness is less important to the residents of Brookings than other residents of Curry County, because the two-lane paved Highways 197 and 199 already provide a more viable east-west connection. However, members of the Brookings TAC identified the need for better maintenance on US 199. Responsibility for maintenance on US 199 lies with the states of California and Oregon, for their respective sections. Members of the Brookings TAC indicated that the California Transportation Department (CalTrans) is currently preparing a corridor study on US 199. It was suggested that ODOT cooperate with CalTrans to prepare a bi-state corridor study for US 199 between US 101 and I-5.

Cost Estimate: No cost estimate was prepared for this option. The recommendation is for a bi-state corridor study of the US 199 corridor. The corridor study will identify specific needs for the highway as well as capital improvements and maintenance improvements to address those needs. Cost estimates should be prepared as part of the corridor study, when specific projects are recommended.

Recommendation: The recommendation for an improved east-west connection between US 101 and I-5 which serves the Brookings area is an improved US 199 corridor (which could include California State Highway 197). Jurisdiction over US 199 lies with the states of California and Oregon. CalTrans is already preparing a corridor study for the section of the highway located in California. A study of the entire corridor between US 101 and I-5 should be a cooperative effort between ODOT and CalTrans. Oregon Revised Statute (ORS) Chapter 197 provides for State Agency Coordination Agreements whereby state agencies agree to work within the confines of local jurisdictions' Comprehensive Land Use Plans. The program is administered by the Oregon Department of Land Conservation and Development (DLCD). To begin the process, ODOT should enter into an intergovernmental agreement to work together with CalTrans on the US 199 corridor study.

Option 14. Develop an alternative route to US 101 for when the highway is closed

Overview: The need for an alternative north-south route to US 101 was identified because mud and rock slides on US 101 have closed the highway recently (at Humbug Mountain, Arizona Beach, and Hooskanaten), at times isolating the Cities of Port Orford, Gold Beach and Brookings from the rest of the county.

Several State, County and Forest Service roads, including Elk River Road, Euchre Creek Road, Meyers Creek Road, Cape View Road and Carpenterville Road were identified as possible alternatives.

Elk River Road – Elk River Road begins at US 101 approximately three miles north of Port Orford as a 2-lane, paved County Road for seven miles to the Elk River Fish Hatchery and the National Forest Boundary. From there, the road becomes a Forest Service Road, maintained at Maintenance Level 4 (moderate speed, moderate degree of user comfort) to milepost 11.3. Elk River Road and Euchre Creek Road, connected by Forest Service Road 5502, provide an alternative route to US 101, bypassing Humbug Mountain State Park and Arizona Beach. The paved section of the road is approximately 24 feet wide and can accommodate trucks.

Euchre Creek Road – Euchre Creek Road begins at US 101 approximately 10 miles north of Gold Beach as a two-lane, paved County/Forest Service Road, maintained at Maintenance Level 4 for the first two miles. From there, the road is maintained at Maintenance Level 3 (low speed, single lane) approximately 12 miles to Forest Service Road 5502. Euchre Creek Road and Elk River Road, connected by Forest Service Road 5502, provide an alternative route to US 101, bypassing Humbug Mountain State Park and Arizona Beach. The paved section of the road is approximately 20 to 22 feet wide.

Meyers Creek Road – Meyers Creek Road is a two2-lane, paved loop road which was part of the Old Coast Highway. The road is approximately three miles long and it parallels US 101. Both ends of this road tie in to US 101 in the vicinity of Cape Sebastion State Park.

Cape View Road – Cape View Road is a two-lane, paved road which parallels US 101. The road begins at the bridge over the Pistol River, extends approximately two miles north and connects with US 101. South of the bridge over the Pistol River, Cape View Road connects with Carpenterville Road. Cape View Road and Carpenterville Road provide a parallel, alternative route to US 101, bypassing the Hooskanaten slide area.

Carpenterville Road – Carpenterville Road is a 2-lane, paved road which was part of the Old Coast Highway. The road is still under state jurisdiction, although it is considered a frontage road to US 101, and is designated a District-level highway. The road is approximately 24 miles long and it parallels US 101. At the south end, Carpenterville Road connects with US 101 just north of the City of Brookings. At the north end, it connects with Cape View Road at the bridge over the Pistol River. Carpenterville Road and Cape View Road provide a parallel, alternative route to US 101, bypassing the Hooskanaten slide area.

There are several other two-lane, paved County Roads which parallel US 101 and can be used as alternative routes to the highway: Ophir Road, North Bank Rogue River Road and Edson Creek Road, and North Bank Rogue River Road and Squaw Valley Road. These roads are shown on Figure 6-9. Ophir Road lies adjacent to, and parallel to, US 101 from Ophir to Geisel Monument State Park, five miles to the south. In all likelihood, a slide which closed US 101 in this area would also close Ophir Road; however, Ophir Road could be used as a detour during minor construction on the highway. North Bank Rogue River Road and Edson Creek Road provide a viable alternative to a five-mile section of US 101 just north of Gold Beach. North Bank Rogue River Road and Squaw Valley Road could be used to bypass a 10-mile segment of US 101 just north of Gold Beach. These roads do not need improvements to be used as alternatives to the highway.

Impacts: When US 101 is closed due to a mud or rock slide, travel restrictions result in economic impacts to the Cities of Port Orford, Gold Beach and Brookings, as well as the County itself. When the highway is closed, and trucks are prohibited from using the parallel, alternative routes, agricultural products grown in Curry County are delayed in reaching their market destinations. At the same time, other goods from outside the county are delayed in reaching the local consumers. In addition, there is also an impact to passenger car trips. Some trips, such as work trips, will be made on long, circuitous routes, sometimes on one-lane, poorly maintained roads. Travel on such roads increases travel time, fuel consumption and the possibility of having an accident. Many leisure trips may not be made at all, thus impacting businesses that rely on tourist dollars.

A system of good, parallel, alternative routes to US 101 would address the impacts realized when the highway is closed. Developing this system comes at a cost. Some of the roads identified as possible alternatives to the highway require substantial capital improvements such as widening and paving to make them viable, safe alternatives. Others may require only a higher level of maintenance such as grading and snow removal, but this too comes at a cost. The following paragraphs describe the improvements needed on the roads that were identified as possible alternatives.

Elk River Road and Euchre Creek Road – Elk River Road, in combination with Euchre Creek Road and Forest Service Road 5502 provide an alternative route to US 101, bypassing Humbug Mountain State Park and Arizona Beach. Approximately 18 miles of this route (six miles on Road 5502 and 12 miles on

Euchre Creek Road) are maintained at Forest Service Maintenance Level 3. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. User comfort and convenience are not considered priorities. Traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users. To make this route a viable alternative to US 101 during emergencies, it is recommended that these roads be maintained at Maintenance Level 4. At Level 4, most roads are double lane and aggregate surfaced. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage."

Changing a Forest Service Road's Maintenance Level requires road reconstruction. Road reconstruction consists of the investment in construction activities that result in the betterment (raised traffic service level, safety, or operating efficiency), restoration (rebuilding a road to its approved traffic service level), or in the realignment (new location of an existing road or portions thereof) of a road. The process begins with the reviewing of the Road Management Objectives that define the intended purpose of an individual road based on design, operation and maintenance criteria.

It was estimated that a one-time capital cost of $100,000 per mile would be required to bring these roads from Maintenance Level 3 to Level 4. To improve 18 miles of Euchre Creek Road and Road 5502 would cost $1.8 million. After that, annual maintenance costs would increase as well. Average annual maintenance costs in western Curry County are $400 per mile for Level 3 roads and $1,000 per mile for Level 4 roads. The difference between these two, $600 per mile, represents the increase in maintenance costs that would be realized each year. The average annual cost to maintain an additional 18 miles of Forest Service roads at the higher maintenance level would be $10,800.

Meyers Creek Road – Meyers Creek Road was identified as a viable, parallel alternative route to US 101, although it does not bypass a known slide area on the highway. Nonetheless, this road does not need improvements to be used as an alternative to the highway and could be used as a detour during minor construction on the parallel three-mile section of US 101.

Cape View Road – Cape View Road was also identified as a viable, parallel alternative route to US 101, although it does not bypass a known slide area on the highway. Nonetheless, this road does not need improvements to be used as an alternative to the highway and could be used as a detour during minor construction on the parallel four mile section of US 101.

Carpenterville Road – According to the local community, mud and rock slides at Hooskanaten close US 101 for two to three weeks approximately every 15 to 20 years. The last time a slide occurred here, Carpenterville Road remained open as a way to bypass the slide area for passenger car traffic; however, trucks were prohibited from using the road. Normally trucks are not prohibited from using Carpenterville Road, but because US 101 provides a much faster and safer route for trucks, through trucks do not use the road. When US 101 is open, only the occasional logging truck accessing adjacent forest land uses Carpenterville Road. The pavement width is only about 20 feet, and the road has some very tight, narrow curves. The substandard road conditions do not pose a problem under normal conditions, when the road only serves local land access; however, a significant safety problem arises when the road is used as a detour for US 101. With the additional passenger car traffic during the highway closure, the road was deemed unsafe for truck traffic, and trucks were prohibited from using the road.

The truck restriction on Carpenterville Road caused an undue economic hardship on the City of Brookings. A local lumber company was under contract to deliver wood products to a ship in Coos Bay. On US 101, the trip between Brookings and Coos Bay is approximately 100 miles. When US 101 was closed by the Hooskanaten slide, and trucks were prohibited from Carpenterville Road, the only alternative for the lumber trucks was to divert south on US 101 to California, travel north back into Oregon on US 199 to Grants Pass, travel north on I-5 to Roseburg, and travel west on OR 42 to reach US 101 south of Coos Bay, a 250-mile detour.

During the public involvement process, community members identified the need to keep Carpenterville Road open to truck traffic when US 101 is closed. The cost to improve the road to a level where it could safely be used by two-way traffic is quite high. It was assumed that the road would have to be widened

from its current 20-foot width to 32 feet, to accommodate two 12-foot travel lanes and four foot paved shoulders. The cost to make this improvement was estimated at $500,000 per mile for the eight miles at the south end and the eight miles at the north end, and at $ 1 million per mile for the middle eight miles, resulting in a total project cost of $16 million. This cost would be borne by the State (ODOT).

An option to a major widening project would be to keep the road in its existing condition, and simply restrict truck use to certain hours of the day during an emergency. For example, the road use could be dedicated to northbound trucks for one hour in the morning and one hour in the evening, followed by one hour dedicated to southbound trucks in the morning and one hour in the evening. During the other 20 hours of the day the road would remain open for two-way passenger car traffic. This option would have no capital costs; the only costs incurred would be those resulting from vehicular enforcement at the north and south ends of the road.

Recommendation: It is recommended that Elk River Road, along with Euchre Creek Road and Forest Service Road 5502 be developed as a parallel, alternative route to US 101 for emergencies. This can be accomplished by raising the maintenance level from Level 3 to Level 4. The cost for this project is estimated at $1.8 million, with annually occurring maintenance costs of $10,800. This was identified by the community as a high priority project.

Deferred maintenance, which is maintenance activities that can be delayed without critical loss of facility serviceability until such time as the work can be economically or efficiently performed, also needs to be recognized. Deferred maintenance cost for Level 3 roads are $5,400 per mile and Level 4 roads are $35,300 per mile. Deferred maintenance work items could include seal coats, surface replacement, bridge painting, and culvert replacement.

All of the per mile rates are average rates for typical roads. The Euchre Creek Roads is not a typical road in that it normally experiences damage during the winter months ranging from slides on the roadway to slumping roadway and total roads failures. The Forest Service could easily plan to send, on average and additional $25,000/year. Some years such as 1996 and 1998, repair costs (not maintenance) will exceed $300,00.

There are two private landowners, South Coast Lumber Company and John Hancock Company, who are cooperators with the Forest Service in maintaining most Eurchre Creek Road. They would need to be in agreement with any changes to that road.

Something that has not been factored in is traffic volume. Forest Service roads are not designed nor constructed for heavy traffic volume. The highest maintenance level road is a Level 5. It is a double lane, paved road with average daily traffic for the past 6 years of only 225 vehicles. A sudden increase in heavy commercial use was experienced when US 101 went out at the Arizona slide. The pavement aggregate rapidly began to deteriorate. The maintenance costs are for typical Forest Service Roads that have been designed and constructed for low traffic volumes and reduced speeds. The average daily traffic from emergency use has not been determined at this time.

It is recommended that Carpenterville Road be kept in its existing condition, rather pursue an expensive widening project (estimated to cost $16 million). During emergency situations, where sections of US 101 which can be bypassed by Carpenterville Road are closed, trucks should not be unconditionally prohibited from using the road. Instead, trucks should be restricted to certain hours of the day during an emergency. This recommendation would have no capital costs; the only costs incurred would be those resulting from vehicular enforcement at the north and south ends of the road.

Meyers Creek Road, Cape View Road, Ophir Road, North Bank Rogue River Road and Edson Creek Road, and North Bank Rogue River Road and Squaw Valley Road can all be used as alternates to US 101 without any physical improvements. These roads are all identified as such in this Plan.

Option 15. Implement Transportation Demand Management Strategies

Overview: Transportation demand management (TDM) strategies change the demand on the transportation system by providing facilities for modes of transportation other than single occupant

passenger vehicles, such as implementing carpooling programs, altering work shift schedules, and applying other transportation measures within the community. The State Transportation Planning Rule recommends that cities should evaluate TDM measures as part of their Transportation System Plans.

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

Impacts: Although the primary goal of these measures is to reduce the number of vehicle trips made within the city, especially during peak periods, street capacity for automobiles and trucks is generally not an issue in Brookings. However, improvements to connect sidewalks that are currently disconnected or the provision of new pedestrian and bicycle facilities increases the livability of a city, and improves traffic and pedestrian safety. With more emphasis on walking or biking in the city, conditions such as air quality and noise levels would be improved as well.

Cost Estimate: Unit costs for typical TDM projects are as follows:

- Concrete Sidewalks – The estimated cost to install new sidewalks on one side of an existing street is approximately $15 per linear foot. This assumes a five-foot wide walkway is composed of 4 inches of concrete over two inches of aggregate.
- Multi-use Paths – A multi-use path 10 feet wide would cost approximately $16 per linear foot. This assumes the path is constructed of two inches of asphalt over four inches of aggregate.
- Paved Shoulders – Shoulders that are four feet wide constructed along both sides of a road would cost approximately $25 per linear foot. This is based on four inches of asphalt over nine inches of aggregate.
- Bike Lanes – The cost to install bike lanes on both sides of an existing road is approximately $45 per linear foot. This cost includes widening the roadway by five feet on both sides, installing curbs, four inches of asphalt over nine inches of aggregate, and placement of an eight-inch painted stripe.
- Striping – The cost to strip a typical crosswalk is $3 per linear foot; the cost to paint an eight-inch stripe for a bike lane is approximately $0.70 per linear foot.
- Rideshare program – A rideshare program could be operated for a cost of approximately $20,000 per year. For comparison purposes, a rideshare program located in Central Oregon, covering a larger geographic area and serving a larger population, has an annual operating budget of approximately $50,000. ODOT participates in this program by providing approximately 60 percent of the funding.

Recommendation: Brookings can implement TDM strategies by requiring all future street improvement projects to include the addition of some sort of pedestrian facility, such as new sidewalks or walkways, which will effectively separate pedestrians from motorized traffic. Connecting sidewalks that are not currently connected on some streets can increase the effectiveness of the pedestrian facilities.

Implementing a local carpool program in Brookings alone is not necessary because of Brookings' geographical size; however, a county-wide carpool program is possible. Residents who live in Brookings and residents who live in other cities and rural areas should be encouraged to carpool with a fellow coworker or someone who works in the same area. Carpooling can take advantage of excess parking at larger retail areas, or parking unused during the week, such as at churches. Costs are typically limited to those needed for a part-time to full-time program administrator to provide public education, advertising, and coordinate park and ride lots and signs.

SUMMARY

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

TABLE 6-1
TRANSPORTATION IMPROVEMENT OPTIONS: RECOMMENDATION SUMMARY

Option	Recommendation
1. Revise zoning and development codes	Implement
2. Improve intersection of Constitution Way and US 101	Implement
3. Improve the intersection of Carpenterville Road and US 101	Implement interim measures and evaluate future needs.
4. Construct the US 101 from Mill Beach Rd. to Constitution Way	[redacted]
5. Improve intersection of Benham Lane and US 101 Intersection/ Create Harbor Hills Connections	Complete traffic impact study for development and work with ODOT on development of incremental mitigation improvements
6. Improve intersection of Benham Lane and Ocean View Drive	Implement
7. Improve Parkview Drive	Implement
8. Improve unsignalized intersections	Do not implement
9. Improve signalized intersections	Do not Implement
10. Improve arterial and collector street segments	Implement
11. Improve the intersection of Lower Harbor Road and Shopping Center Road	Do not implement
12. Construct third lane on US 101	Do not implement
13. Improved east-west connection to I-5	Do not implement; maintain existing road
14. Develop an alternative route to US 101	Implement
15. Implement transportation demand strategies	Implement as needed

Ordinance 06-O-576 EXHIBIT C

CHAPTER 7 TRANSPORTATION SYSTEM PLAN

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

Street Design Standards

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

Existing Street Standards

Existing street standards for the City of Brookings are outlined in the City of Brookings Land Development Code, adopted in April 1989. This document states that unless otherwise indicated in the transportation element of the Comprehensive Plan, approved as part of a master plan, or in an adopted neighborhood circulation plan, the street right-of-way and roadway widths shall not be less than the minimums shown in Table 7-1.

TABLE 7-1
EXISTING RIGHT-OF-WAY AND ROADWAY WIDTH STANDARDS

Type of Street	Minimum Right-of-Way Width (feet)*	Minimum Roadway (Curb face to face) Width (feet)
Major Arterial (US 101)		
(a) With median and curbside	100	90
(b) Without median and curbside	100	70
Arterial	80	44
Residential (Collector)	50	36
Residential (Upon which a maximum of 20 dwelling units front and take access)	45	30
Cul-de-sac Radius	45	36
Commercial /Industrial	60-80	44
Alley	20	20

Sidewalks are required, in most cases, along all roads and shall be a minimum of six feet in width, not including the curb width. Bicycle facilities may be required within, or adjacent to, streets if they are appropriate to the extension of existing or planned bicycle route(s). Requirements for integrating pedestrian and bicycle facilities into the existing roadway standards are somewhat vague. State law is clear on requirements for pedestrian and bicycle facilities. Oregon Revised Statute (ORS) 366.514 Use of Highway Fund for Footpaths and Bicycle Trails requires the inclusion of bikeways and walkways whenever highways, roads, and streets are constructed, reconstructed or relocated, with three exceptions (where there is no need or probable use, where safety would be jeopardized, or where the cost is excessively disproportionate to the need or probable use). Oregon Administrative Rule (OAR) 660-12 The Transportation Planning

Rule requires bike lanes along arterials and major collectors and requires sidewalks along arterials, collectors, and most local streets in urban areas, except that sidewalks are not required along controlled access roadways, such as freeways.

Recommended Street Standards

The development of the Brookings Transportation System Plan provides the city with an opportunity to review and revise street design standards to more closely fit with the functional street classification, and the goals and objectives of the Transportation System Plan. Street standards for US 101 and local streets are adopted by the City of Brookings and are shown in Table 7-2, unless alternative standards are approved as part of a master plan. Standards for US 101 are approximations only. Highway standards are contained in the ODOT Highway Design Manual and are occasionally revised. The standards shown in the TSP are recommendations rather than adopted standards and therefore may be altered during the development of highway construction or reconstruction projects.

TABLE 7-2
ADOPTED STREET DESIGN STANDARDS (In feet)

Type of Street	ROW	Road Way Curb to Curb	Sidewalk Improvements
State Highway Arterial	80	70	5 feet both sides[1]
Residential Collector	50	36	5 feet both sides
Residential (Local) Maximum of 20 dwelling units taking access.	45	30	5 feet both sides
Residential One Way Street	36	20	5 feet both sides[7]
Half Street	25/22 1/2	18/15	5 feet one side [2,6]
Cul-de-Sac Bulb for all streets[8]	45 foot radius from center of bulb	36 foot radius from center of bulb.	5 feet–both sides 4 feet paved on one side with hillside street
Commercial/Industrial	60	44	5 feet–both sides[3]
Commercial One Way Street	50	33	8 feet both sides[3]
Hillside Street	50	24	4' paved shoulder one side[2, 4, 5]
Hillside One Way Street	35 to 50	15	4' paved shoulder one side[2, 4, 5]
Alley	20	20	None

[1] *Where the existing ROW allows, sidewalks should be at least 6 feet wide on both side or as existing through town.*
[2] *No parking on either side.*
[3] *Sidewalks in Downtown Master Plan area are pursuant to the underlying zone.*
[4] *Requires documentation that topographical constraints warrant use of Hillside streets. Site Plan committee approval required.*
[5] *Alternative engineered designed standards may be considered and right-of-way width may vary depending on topography..*
[6] *Only used when easement for second half width is secured on adjacent property. Must be approved by Planning Commission.*
[7] *Parking on one side only.*
[8] *Alternative turn arounds as found in Figure170.060 of the Land Development Code.*

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

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

Residential Streets

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

<u>Standard for Local Residential Streets</u>

Cul-de-sac or residential streets serving 20 homes or less are intended to serve only the adjacent land in residential neighborhoods. These streets should be short (less than 400 feet long) and serve a maximum of 20 single-family houses. Because the streets are short and the traffic volumes relatively low, the street width can be narrower than a standard residential street, allowing for the passage of two lanes of traffic when no vehicles are parked at the curb and one lane of traffic when vehicles are parked at the curb. Because cul-de-sac streets limit street and neighborhood connectivity, they should only be used where topographical or other environmental constraints prevent street connections. Where cul-de-sacs must be used, pedestrian and bicycle connections to adjacent cul-de-sacs or through streets should be included.

Local residential streets have property access as their main priority; through traffic movement is not encouraged. The majority of streets in Brookings are local residential streets. The recommended standard for residential streets is described below, and fits within the city's existing required minimum pavement width of 30 feet and the required minimum right-of-way of 45 feet. It also includes sidewalks, as required by law, and on-street parking on both sides, however, if vehicles are parked on both sides of the road, only one moving lane will fit between the two parked cars, and on-coming traffic will have to yield. This is usually not a problem on low-volume residential streets. This standard is intended for streets, which serve a maximum of 20 dwelling units. This cross section is shown in Figure 7-2.

Residential Collector/Residential Streets consists of two 10-foot travel lanes and an 8-foot parking strip on both sides of the roadway. The resulting paved width is 36 feet. The standard also includes 5-foot sidewalks, adjacent to the curbs. These standards are within a right-of-way of 50 feet. A Residential One Way Street option is also available as shown in Table 2 above.

The Hillside Street standard shall be applied to areas with hillside slopes greater than 15 percent

with two 12 foot travel lanes and a four foot paved walking shoulder on one side all within a 50 foot wider right-of-way. A Hillside One Way Street option is also available as shown in Table 2 above.

Recommended Standards for Commercial/Industrial Streets

Commercial/industrial streets serve short trips, provide access to each adjacent parcel and serve high volumes of truck traffic. The recommended standard for commercial/industrial Streets meets the existing minimum pavement and right-of-way widths. The recommended standard for commercial/industrial streets consists of one 14-foot travel lane in each direction with an 8-foot parking strip on both sides of the street. The wide lanes are warranted to accommodate the high volume of large trucks using these streets. The resulting paved width is 44 feet. Six-foot sidewalks are included on both sides of the street, and the roadway cross section fits within the existing street standards for commercial and industrial streets (see Figure 7-2).

Recommended Standard for Alleys

Alleys can be a useful way to diminish street width by providing rear access and parking to residential areas. Including alleys in a subdivision design allows homes to be placed closer to the street and eliminates the need for garages to be the dominant architectural feature. This pattern, once common, has been recently revived as a way to build better neighborhoods. In addition, alleys can be useful in commercial and industrial areas, allowing rear access for delivery trucks. Alleys should be encouraged in the urban area of Brookings. The recommended standard for alleys includes two 10-foot paved travel lanes within a 20-foot right-of-way. This standard is the same as the existing standard for alleys (see Figure 7-2).

Recommended Standard for Arterial Streets/US 101.

Arterials connect cities and other major traffic generators; they serve both through traffic and trips of moderate length and access is usually controlled. Arterial streets form the primary roadway network within and through a region. They provide a continuous roadway system that distributes traffic between different neighborhoods and districts. Generally, arterial streets are high capacity roadways that carry high traffic volumes with minimal localized activity. Design speeds should be between 25 and 45 mph. The only street classified as an arterial in the City of Brookings is US 101. Standards for state highways are contained in ODOT's Highway Design Manual (HDM). The city has developed recommended standards for US 101 which are similar to those in the HDM. As sections of US 101 are built or reconstructed, the city recommends ODOT consider these standards in the design. Pursuant to Alternative 5 of the Downtown Brookings Traffic Solutions project, starting at approximately Mill Beach Rd., US 101 will have two 12 foot travel lanes in each direction with left turn pockets at Fifth St., Pacific Ave., Mill St., Center St., Wharf St., Fern Ave., Oak St., and Alder St. The street section would also include a concrete center divider and removal of all parking on both side of the street. Traffic signals would be placed at Fifth St., Center St., Oak St., and possibly at Constitution Way. Sidewalks along this section of the highway will vary in width.

US Highway 101 South of the City Limits

It is important to note that there is strong support in the community for extending the center turn lane on US 101 south for approximately five miles to the Oregon-California border. David Scott presented the consultant with a petition signed by over 300 citizens in favor of this improvement.

Their understanding is that ODOT currently has sufficient right-of-way for a five-lane segment, and that no land acquisition would be required.

Bike Lanes

In cases where a bikeway is proposed within the street right-of-way, 12 feet of roadway pavement (between curbs) should be provided for a six-foot bikeway on each side of the street, as shown on the cross sections in Figure 7-3. The striping should be done in conformance with the State Bicycle and Pedestrian Plan (1995). In cases where curb parking will exist with a bike lane, the bike lane will be located between the parking and travel lanes. In some situations, curb parking may have to be removed to permit a bike lane.
The bikeways on new streets, or streets to be improved as part of the street system plan, should be added when the improvements are made. The implementation program identifies an approximate schedule for these improvements.

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

Sidewalks

A complete pedestrian system should be implemented in the urban portion of Brookings. Every urban street should have sidewalks on both sides of the roadway as shown on the cross sections in Figure 7-1 through Figure 7-3. Sidewalks should have a ~~six~~ five-foot wide paved width. In addition, pedestrian and bicycle connections should be provided between any cul-de-sac or other dead-end streets.

Another essential component of the sidewalk system is street crossings. Intersections must be designed to provide safe and comfortable crossing opportunities. This includes not only signal timing (to ensure adequate crossing time) and crosswalks, but also such enhancements as curb extensions as traffic calming measures and to decrease pedestrian crossing distance.

Curb Parking Restrictions

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

Street Connectivity

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

ACCESS MANAGEMENT

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

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

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

Access Management Techniques

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

- Restricting spacing between access points based on the type of development and the speed along the arterial.
- Sharing of access points between adjacent properties.
- Providing access via collector or local streets where possible.
- Constructing frontage roads to separate local traffic from through traffic.
- Providing service drives to prevent spill-over of vehicle queues onto the adjoining roadways.
- Providing acceleration, deceleration, and right-turn only lanes.
- Installing median barriers to control conflicts associated with left-turn movements.
- Installing side barriers to the property along the arterial to restrict access width to a minimum.

Access Management Standards

Access management is hierarchical, ranging from complete access control on freeways to increasing use of streets for access purposes at the local level. Tables 7-3 and 7-4 describe recommended access management guidelines by roadway functional classification unless otherwise approved through adoption of a master plan.. Table 7-3 presents access standards for US 101 as shown in the Oregon Highway Plan at the time of TSP adoption. The standards contained in the Highway Plan take precedence over those shown below if different.

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TABLE 7-3

ACCESS MANAGEMENT STANDARDS for Statewide Highways (US 101)

Posted Speed	General	UBA [1]	STA [2]
>=55 MPH	1320	—	—
50 MPH	1100	—	—
40 & 45 MPH	990	—	—
30 & 35 MPH	770	720	—
<=25 MPH	550	520	See Note 3

[1] Urban Business Area
[2] Special Transportation Area
[3] Minimum spacing standards for public road approaches is either the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways, and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, spacing for driveways is less than 350 feet.

TABLE 7-4

RECOMMENDED ACCESS MANAGEMENT STANDARDS FOR LOCAL STREETS

	Intersections			
	Public Road		Private Drive[(2)]	
Functional Classification	Type[(1)]	Spacing	Type	Spacing
Arterial (See Table 7-3) [3]				
Collector	at-grade	250 ft.	L/R Turns	Access to Each Lot
Residential Street	at-grade	250 ft.	L/R Turns	Access to Each Lot
Alley (Urban)	at-grade	100 ft.	L/R Turns	Access to Each Lot

[1] For most roadways, at-grade crossings are appropriate.
[2] Allowed moves and spacing requirements may be more restrictive than those shown to optimize capacity and safety. Any access to a state highway requires a permit from the ODOT District Office. Access will generally not be granted where there is a reasonable alternative access.
[3] Access spacing standards for State facilities are presented in the Oregon Highway Plan which, if different, takes precedence over those shown above.

Application

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

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

State Highways

Access management is important to promoting safe and efficient travel for both local and long distance users along US 101 in Brookings. The Oregon Highway Plan specifies access spacing standards for all state highways. This section of the Transportation System Plan describes the state highway access categories and specific roadway segments where special access areas may apply.

General

US 101 through Brookings is designated in the Oregon Highway Plan as a Statewide Highway on the National Highway System (NHS). Within the Brookings UGB, OHP spacing standards vary based on the posted speed limit. Refer to Table 7-3 above or Appendix C of the Highway Plan for specific spacing standards on US 101.

Special Transportation Area

As in many cities with a State Highway serving as the primary arterial, road approach spacing does not meet existing spacing standards. In some cases, local street intersections are as close as 250' apart. Shorter block lengths and a well-developed grid system are important to a downtown area, along with convenient and safe pedestrian facilities. In general, downtown commercial arterial streets typically have blocks 200 to 400 feet long, driveways sometimes spaced at intervals as frequent as every 100 feet and, occasionally, signals spaced as closely as every 400 feet. The streets in downtown areas must have sidewalks and crosswalks, along with on-street parking. The need to maintain these typical downtown characteristics must be carefully considered along with the need to maintain the safe and efficient movement of through traffic.

To address this issue and to protect the downtown function of this section of highway, a Special Transportation Area (STA) is recommended from Pacific Avenue to just south of Alder on US 101 and extending to the west to include properties fronting the south side of Railroad Ave. Specific boundaries will be determined when the STA management plan is developed. The city will develop a management plan for the STA area in consultation with ODOT. The required management plan will address capacity, safety, needed improvements, recommended land use changes, and vehicle and pedestrian access issues. To accommodate existing public roadway spacing and allow reasonable access spacing for private driveways, less restrictive access and capacity standards will be allowed within the STA. Within the STA, access standards shall allow intersection spacing at a minimum of 250 feet. As specified in the OHP, driveways will be discouraged within the STA. (See Table 7-3).

Modal Plans

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

Street System Plan

The street system plan outlines a series of improvements that are recommended for construction within the City of Brookings during the next 20 years. These options have been discussed in Chapter 6 (Improvement Options Analysis). The proposed street system plan is summarized in Table 7-5 and shown in Figure 7-3. The projects are listed as high priority (construction expected in the next 0 to 5 years), medium priority (construction expected in the next 5 to 10 years), and low priority (construction expected in the next 10 to 20 years).

Collectors

Several roadways in the city have sub-standard lane widths. The transportation system throughout the city would benefit from upgrading collectors that have lanes 10 feet wide or narrower and include bicycle and pedestrian facilities. The standards for collectors with adjacent rural land uses would include 12-foot travel lanes, with 4-foot paved shoulders for bicycle and

pedestrian uses on both sides of the roadway. The standards for collectors located in urban areas would include 11-foot lanes, and 7-foot parking strips and 6-foot sidewalks on both sides of the roadway. The following roadways would benefit from upgrading to collector standards:

- Old County Road through the study area;
- Carpenterville Road between US 101 and Cape Ferrelo Road;
- Easy Street between US 101 and Fern Avenue;
- Pelican Bay Drive (an existing private road) for its entire length; and
- Parkview Drive to the Brookings Airport.
-

Statewide Transportation Improvement Program (STIP) Projects

The Oregon Department of Transportation has a comprehensive transportation improvement and maintenance program encompassing the entire state highway system. The Statewide Transportation Improvement Program (STIP) is adopted by the Oregon Transportation Commission (OTC) every two years and identifies all funding for highway improvement projects in the state for a four-year period. The draft 2002-2005 STIP, to be adopted by the OTC in early 2002, identifies no highway projects scheduled within the City of Brookings.

Bridge Projects

Within the City of Brookings, there is one state-owned and maintained bridge that is part of ODOT's inventory system. The bridge (ODOT bridge No. 01143D) is located along US 101 (MP 357.96) crossing the Chetco River at the south city limits. According to the ODOT bridge inventory data, this bridge is currently rated as functionally obsolete. Bridges that fall into this category usually need to be repaired or replaced some time in the next 20 years. Functionally obsolete bridges are structurally sound, but have some other design deficiency such as being too narrow for today's standards, having poor approach roads, or having guardrails which do not meet today's standards. According to the ODOT Bridge inventory data, this bridge is currently rated as functionally obsolete because it does not meet the minimum lateral under clearance recommended. This means that the columns supporting the bridge are located less than 20 feet from the edge of the pavement of the roadway underneath (the desired minimum horizontal clearance).

Conversations with staff in ODOT's Bridge Section indicated that in all likelihood, during the next bridge inspection, the functionally obsolete classification would be removed from this bridge. Nonetheless, ODOT prepared a cost estimate of $12.5 million in 1995 to bring the lateral under clearance to today's standards. The bridge is not listed for repair or replacement in the current STIP, and considering that the bridge is structurally sound and its functionally obsolete classification may be reconsidered, it is not listed as a recommended improvement in this plan.

Safety Improvement Projects

Several safety improvement projects have been identified in this Transportation System Plan to address specific safety issues within the City of Brookings. These include the improvements to:

- Intersection of Constitution Way and US 101 – This intersection has been identified as a hazardous location due to confusing and conflicting turn movements. The improvements for this intersection reduce conflicting movements and merge points and improve pedestrian safety by eliminating the right-turn channelization for northbound US 101 and the southern most truck access lane to the weigh station.

- Intersection of Benham Lane and Ocean View Drive – The improvements address the poor sight distance due to the skewed angle of the intersection and the grades on both the roads. The recommended improvement realigns the northbound approach lane on Ocean View Drive to the east such that it effectively becomes a channelized right turn lane eventually paralleling Benham Lane before merging.

Oregon Coast Highway Corridor Master Plan Projects

The Oregon Coast Highway Corridor Master Plan was prepared in 1995 to coordinate land use patterns and transportation system improvements in the US 101 corridors. The plan was developed in partnership with local, state, and federal jurisdictions, and the public and communities that the Plan is designed to serve. Because of the Plan's date and the changes that have occurred within ODOT's corridor planning system, the Plan is considered to be advisory in purpose. The projects recommended in the Plan should be investigated further, but will not be amended into the STIP as is.

The Oregon Coast Highway Corridor Master Plan's focus in Curry County is to enhance and protect the scenic beauty of the corridor while increasing capacity and reliability on the transportation system. Although the plan does not list specific transportation improvements on US 101, several Plan Activities were identified for the section of highway in Brookings. The jurisdiction or agency that has primary responsibility for implementation of the plan activities was not identified. In most cases, implementation will require coordination among a number of jurisdictions and agencies. The Plan Activities for the highway section in Brookings include:

- Investigate the potential for improving the local circulation system in an effort to reduce reliance on US 101 for local traffic.
- Investigate options to accommodate the high growth anticipated and additional travel demand including: developing an access management plan and parking strategy consistent with the State Access Management Category and allowing adequate commercial access; coordinating traffic signal operation; incorporating the City's bicycle/pedestrian circulation strategy to improve safety and accessibility; implementing Alternative 5 of the Downtown Brookings Traffic Solutions project identifying ways to improve transit/para-transit service and implement TDM strategies; and identifying the feasibility of and locations for passing lanes north of the city.
- Develop a community design program for Brookings that incorporates the following elements: a parking strategy for both on-street and off-street parking; gateway/visitor center improvements at the entrances to Brookings; pedestrian and landscape improvements; informational and directional signage; utilities relocated outside of ocean views.
- Identify a process for developing an emergency route plan.

Each of the planned activities has been addressed in this transportation system plan. TDM measures include facilities for modes of transportation other than single-occupancy vehicles, such as sidewalks, bicycle lanes, and carpooling programs. Developing an emergency route plan has been addressed by the improvements to the east-west connection between US 101 and I-5, and developing an alternative route to US 101 for when the highway is closed.

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TABLE 7-5
RECOMMENDED STREET SYSTEM PROJECTS

Location	Project	Priority	Cost
US 101	Improve Intersection of US 101 and Constitution Way	High	$170,000
US 101	Construct the US 101 pursuant to Alternative 5 of the Downtown Brookings Traffic Solutions Project	High	$13,000,000
US 101	Develop an alternative route to US 101 for emergency purposes.	High	$1,800,000
US 101	Improve Intersection of Benham Lane and US 101 Intersection/Construct Harbor Hills Connections	High	Not Available at this time–to be determined through Traffic Impact Studies
US 101	Improve US 101 north of Ransom Avenue to Arnold Lane	High	Not Available at this time–to be determined through Traffic Impact Studies
Benham Lane	Improve the intersection of Benham Lane and Ocean View Drive in Harbor	High	$50,000
US 101 to I-5	Improve east-west connection	High	Not Available at this time
US 101/Carpenterville Road	Construct interim and future intersection improvements	Medium	$850,000
Parkview Drive	Improve Parkview Drive to the Brookings Airport	Medium	$600,000
E. Benham Lane	Construct to collector standards	Medium	$200,000
Pioneer Road	Construct a third lane	Medium	$400,000
Old County Road	Upgrade collectors to standard width	Medium	$700,000
Carpenterville Road	Upgrade collectors to standard width	Medium	$360,000
Pelican Bay Drive (Private Street)	Upgrade collectors to standard width	Medium	$300,000
Easy Street	Upgrade collectors to standard width	Low	$530,000
Subtotal High Priority Projects			$15,020,000
Subtotal Medium Priority Projects			$3,410,000
Subtotal Low Priority Projects			$530,000
TOTAL COST			$18,960,000*

** Total does not include improvements on US 101 north of Ransom Ave. or near Benham Lane or to improve the connection between US 101 and I-5*

Pedestrian System Plan

A complete pedestrian system should be implemented in the city. Every paved street shall have sidewalks on both sides of the roadway, except where topography, existing development, or other circumstances prevents them. Pedestrian access on walkways shall be provided between all buildings including shopping centers and abutting streets and adjacent neighborhoods. (Ordinances specifying these requirements are included in Chapter 9.)

A sidewalk inventory revealed that sidewalks are generally provided throughout downtown Brookings, although they are frequently not continuous. Many of the existing roadways outside of the downtown area do not have sidewalks, or sidewalks are segmented and curb cuts are lacking.

The city's sidewalk system should be expanded to include, at a minimum, sidewalks along both sides of US 101 along developed lands. Other blocks within the city's grid system that have a significant amount of pedestrian activity, such as in front of stores or schools, etc., should also have sidewalks. The existing sidewalk network is generally disjointed, with missing connections between sidewalks, which may discourage pedestrian travel, particularly where connections between neighborhoods and schools are lacking. Street segments where new sidewalks are recommended to complete the sidewalk system include:

- Ransom Avenue, both sides, from Pioneer Road to west of 5th Street;
- Pioneer Road, west side between Easy Street and Ransom Avenue and east side between Pacific Avenue and Ransom Avenue;
- Easy Street, both sides between Pioneer Road and Fern Avenue, to serve Kalmiopsis School; and
- US 101, north side between Alder Street and the Chetco River Bridge.

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

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

Table 7-6 contains a list of specific pedestrian improvements that will be needed over the next 20 years. (Figure 7-5 also shows these projects). Sidewalks should be added as new streets are constructed and existing streets reconstructed. The implementation program identifies an approximate schedule for these improvements.

TABLE 7-6
RECOMMENDED PEDESTRIAN PROJECTS

Location	Project	Priority	Length (ft)	Cost
Ransom Avenue	New sidewalk on both sides of the road from Pioneer Road to west of 5th Street	High	4,948	$148,000
Pioneer Road	New sidewalk on west side between Easy Street and Ransom Avenue	High	650	$20,000
Pioneer Road	New sidewalk on east side between Pacific Avenue and Ransom Avenue	High	1,293	$39,000
US 101	New sidewalk on north side between Alder Street and the Chetco River Bridge	High	1,641	$49,000
Easy Street	New sidewalk on both sides between Pioneer Road and Fern Avenue, to serve Kalmiopsis School	Low	2,404	$72,000
TOTAL FOR HIGH PRIORITY PROJECTS				$256,000
TOTAL FOR LOW PRIORITY PROJECTS				$72,000
TOTAL COST				$328,000

The on-street pedestrian improvements only include sidewalk projects. Although shoulder additions serve pedestrians, they are not ideal because they are not separated from the roadway; however, in rural areas where development may not occur quickly, the addition of shoulders is often the most practical improvement that can be implemented. Generally, shoulders are more of a benefit to cyclists than to pedestrians; therefore, proposed shoulder-widening or additions are discussed in the Bicycle System Plan section of this chapter.

Bicycle System Plan

The goals and objectives of the city's bicycle plan include reducing conflicts between bicyclists and motorized vehicle traffic, developing a system dedicated to bicycles, and providing opportunities for recreational bicycle use.

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

US 101 functions as an arterial street through Brookings, which means that it should have bike lanes on both sides of the street as specified in the recommended street standards and as required by the TPR. Accident statistics on the highway do not indicate that there are frequent conflicts between bicyclists and motorized vehicles. To install bicycle lanes along US 101 would involve removing on-street parking through downtown Brookings and shoulders would need widening on sections where no on-street parking exists. Improvements could be expensive or controversial, or both. At this time, no specific bikeway improvements are recommended for US 101.

Currently, only Lower Harbor Road, Shopping Center Avenue, W. Benham Lane, and Oceanview Drive have designated bicycle lanes. Bicycle paths exist parallel to US 101 from Harris Beach to Crissey Circle and along Railroad Street from Wharf Street to Oak Street. Although there are no designated bicycle lanes on US 101 in Brookings, the entire segment of US 101 in Curry County is classified as a bicycle route in ODOT's Oregon coast Bike Route Map. Generally, sufficient shoulder space is available for cyclists to travel safely on US 101.

However, in high traffic volume conditions with a significant number of trucks in the traffic stream, safety becomes a concern for bicyclists.

Bicycle parking is generally lacking in Brookings. Bike racks should be installed in front of downtown businesses and all public facilities (schools, post office, library, city hall, and parks). Typical rack designs cost about $50 per bike plus installation. An annual budget of approximately $1,500 to $2,000 should be established so that Brookings can begin to place racks where needs are identified and to respond to requests for racks at specific locations. Bicycle parking requirements are further addressed in Chapter 9 (Policies and Ordinances).

Transportation Demand Management Plan

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

In Brookings, where traffic volumes are low and the population and employment is small, implementing TDM strategies is not practical in most cases. However, the sidewalk improvements recommended earlier in this chapter are also considered TDM strategies. By providing these facilities, the City of Brookings is encouraging people to travel by other modes than the automobile. In rural communities, TDM strategies include providing mobility options. Because intercity commuting is a factor in Curry County, residents who live in Brookings and work in other cities should be encouraged to carpool with a fellow coworker or someone who works in the same area. Implementing a local carpool program in Brookings alone is not practical because of the city's small size; however, a county-wide carpool program is possible. The City of Brookings should support state and county carpooling and vanpooling programs that could further boost carpooling ridership.

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

Public Transportation Plan

Currently, Greyhound operates the only inter-city bus service to the south. Greyhound provides two northbound and two southbound buses along US 101 between Portland, Oregon and San Francisco, California. This service stops in Port Orford, Gold Beach and Brookings. Local inter-city service is also available connecting Brookings with Gold Beach, Port Orford, and Bandon in Coos County. Connections are available in Bandon to Coos Bay. Local para-transit service is available through the senior citizen centers in Brookings, Port Orford and Gold Beach. Although the service is open to the general public, it predominantly transports elderly and disabled people. In FY 1997 the Brookings Senior Center provided 17,556 trips of which about 74 percent were for elderly and disabled people. As the retirement population in the Brookings-Harbor area increases, additional transit service will be needed to serve the retirement community.

Transit providers indicate there is excess capacity; drivers and vehicles are idle at times. Service could be expanded to serve the general population and to provide some inter-city service without the acquisition of new vehicles. Transit providers are already transporting about two handicapped people a week between Brookings and Gold Beach or Crescent City, California.

They report that when other people who are not handicapped hear about the service, they express interest.

The Curry County transit advisory board, consisting of nine members who either use existing service, or represent clients who use the service, has completed a transit feasibility study and transit plan. According to the plan, about 90 percent of all County residents live within one or two miles of US 101 and can easily access service that travels between communities in the county and Bandon on this highway. The Plan calls for this service to be expanded to include two or three round-trips a day between the two counties. If this service is to be successful, it is important that it be widely marketed and scheduled to meet the demands of the general public which might be different from those of the elderly and disabled. Marketing should include partnerships with local businesses to advertise both bus service and business services. Also key to a successful program is consistency; people must be able to count on this service so that they may make plans with certainty.

To be successful, this service will require about 20 bus shelters placed several miles apart along US 101. Ideally these bus shelters should be placed near a public use such as a shop, restaurant, or church and have available parking. Currently, no plan exists for exact placement of these shelters or for funding. Curry County transit will continue to seek state and Federal funds for such facility improvements as well as for some operational costs. The City of Brookings currently does not contribute financially to the operation or improvement of the county transit system. Further, the city does not intend on contributing to the system over the 20-year life of this plan.

Rail Service Plan

Brookings has no rail service.

Air Service Plan

The Brookings Airport is located north of the City of Brookings and east of US 101. An update of the Brookings Airport Master Plan was prepared by Reid Middleton for the Oregon Aeronautics Division of the Oregon Department of Transportation in August 1991.

The report reviews existing facilities, predicts future demands on those facilities, establishes a phased schedule (to 2010) and discusses funding for capital projects that will be needed to meet the projected demand.

The state Continuous Aviation System Plan recommends development of a nonprecision GPS approach at the airport. Other recommendations include an Automatic Surface Observation Station (ASOS) to improve weather reporting capabilities, and a runway extension. The current runway measures 2,900 feet long by 60 feet wide.

There are several projects listed in the FAA's Capital Improvement program (CIP) for Brookings Airport. These include overlaying the existing apron, installing Precision Approval Path Indicators (PAPIs) and Runway End Identifier Lights (REILs), constructing an apron, acquiring aviation easements in the Runway Protection Zone (RPZ), constructing a taxiway to T-hangars, acquiring land for terminal development, installing apron lighting, installing taxiway reflectors, acquiring land for approach, and installing perimeter fencing. These are summarized in Table 7-7 below.

TABLE 7-7
RECOMMENDED AIRPORT PROJECTS

Fiscal Year	Project Description	Priority	Total Costs
2000	Overlay Existing Apron	High	$56,000
2000	Construct Taxiway to T-Hangars	High	$25,000
2000	Acquire Land for Terminal Development	High	$100,000
2000	Install Apron Lighting	High	$6,000
2000	Construct T-Hangars Taxiways	High	$37,000
2000	Install taxiway reflectors	High	$2,000
2000	Acquire Aviation Easement	High	$23,000
2000	Install REIL	High	$11,000
2000	Construct Apron (25 aircraft-9500SY)/Revise Airport Layout Plan	High	$160,000
2000	Install PAPI	High	$35,000
2000	Acquire Land for Approach (RPZ)	High	$23,000
TOTAL COSTS			$478,000

The major potential conflict between continued airport use and off-airport development centers on noise impact. Human reaction to the intrusion of aviation noise is complex and subjective. Several indices have been developed in an attempt to rate the annoyance associated with living and working with aviation noise. In general, these indicators attempt to measure quantitatively the acoustic energy of the sound and relate this to the subjective feelings of loudness, noisiness or annoyance. Measures of the noise environment alone cannot provide accurate prediction of the degree of annoyance that ma be associated with a given level of noise intrusion.

The guidelines established by the Oregon Aeronautics Department for areas of "moderate noise impact" (55 – 65 Dbl) state that most uses in such areas are compatible or conditionally compatible. They do, however, recommend that noise sensitive uses such as schools, hospitals, nursing homes, theater, auditoriums and residential development should have noise insulation installed. However, outside of urban areas, lower background noise levels may result, and airport noise within the 55 Dbl noise contour may be perceived as a problem.

The Brookings Airport is located in an area where there is an only low-density residential use so that noise is not a significant problem.

Pipeline Service Plan

There are currently no pipelines serving Brookings.

Water Transportation Plan

The Port of Brookings is encompasses approximately 42 acres of waterfront property at the mouth of the Chetco River. The Port of Brookings Master Plan (1991) focuses on commercial development, community facilities, sport and commercial fishing, and support services, and identifies major improvements to occur in four phases as funds become available.

Phase One includes the improvement to the central section of the Spine Road, the development of the Harbor Walkway, Central Plaza, an observation area, Beach Loop Road, and commercial site preparation. Phase Two consists of Spine Road development and access reconfiguration,

parking lot improvements (including boat launch and sport fishing lot), a pedestrian plaza and walkway, and retail/commercial site preparation. Phase Three includes Spine Road development and parking improvements on the east-side of the Commercial Basin. Phase Four consists of improving and expanding facilities for recreational vehicles (RVs). The following Table 7-8 lists projects and approximate cost estimates associated with the proposed improvements.

TABLE 7-8
RECOMMENDED PORT OF BROOKINGS PROJECTS

Projects	Priority	Local Costs	Total Costs
Public Launch Ramp Redevelopment	High	$400,000	$400,000
Basin II Facility Rehabilitation	High	$374,000	$374,000
Basin I Replacement	High	$2,356,000	$2,356,000
Service and Repair Dock	High	$115,000	$115,000
Total Costs		$3,245,000	$3,245,000

Transportation System Plan Implementation Program

Implementation of the Brookings Transportation System Plan will require both changes to the city comprehensive plan and zoning code and preparation of a 20-Year Capital Improvement Plan. These actions will enable Brookings to address both existing and emerging transportation issues throughout the urban area in a timely and cost effective manner.

One part of the implementation program is the formulation of a 20-Year Capital Improvement Plan (CIP). The purpose of the CIP is to detail what transportation system improvements will be needed as Brookings grows and provide a process to fund and schedule the identified transportation system improvements. It is expected that the Transportation System Plan Capital Improvement Plan can be integrated into the existing city CIP and, as appropriate, the ODOT STIP. This integration is important since the Transportation System Plan proposes that both governmental agencies will fund some of the transportation improvement projects.

"Inclusion of an improvement project in the TSP does not commit the City or ODOT to allow, construct, or participate in funding the specific improvement. Projects on the State Highway System that are contained in the TSP are not considered "planned" projects until they are programmed into the Statewide Transportation Improvement Program (STIP). As such, projects proposed in the TSP that are located on a State highway cannot be considered mitigation for future development or land use actions until they are programmed into the STIP. Unanticipated issues related to project funding, as well as the environment, land use, the economy, changes in use of the transportation system, or other concerns may be cause for re-evaluation of the alternatives discussed below and possible removal of a project from consideration for funding or construction. Highway projects that are programmed to be constructed may have to be altered or canceled at a later time to meet changing budgets or unanticipated conditions."

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

The CIP is shown with the following priorities:

- High Priority (0 to 5 years)

- Medium Priority (5 to 10 years)
- Low Priority (10 to 20 years)

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

Table 7-9 summarizes the CIP projects and Figure 7-4 shows the CIP projects. It lists the projects by type, prioritizes them, and provides cost information. The cost estimates for all the projects listed on the CIP were prepared on the basis of 1998 dollars. These costs include design, construction, and some contingency costs. They are preliminary estimates and generally do not include right-of-way acquisition, water or sewer facilities, adding or relocating public utilities, or detailed intersection design.

Brookings has identified a total of 34 projects in its CIP with a cost of $22,162,000. Twenty-five high priority projects have been identified with a cost of about $19,072,000. However, costs associated with improvements related to developments affecting US 101, both north and couth of the current city limits are not known at this time and are not reflected in the High Priority costs. Six medium priority projects have been identified with a cost of about $260,000. Finally, one low priority project has been identified, with a cost of about $530,000.

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TABLE 7-9

PRIOITIZED CAPITOL IMPROVEMENT PROGRAM (1998 Dollars)

Project Description	Local Cost	State Cost	Federal Costs	Total Cost
High Priority				
Construct US 101 through town	$0	$13,000,000	$0	$13,000,000
Improve intersection of Constitution Way and US 101	$0	$170,000	$0	$170,000
Develop an Alternative Route to US 101	$0	$1,800,000	$0	$1,800,000
Improve Intersection of Benham Lane and Ocean View Drive	$50,000	$0	$0	$50,000
Improve US 101 between Ransom and Alder Ave	Unknown	Unknown	Unknown	Unknown
Improve US 101/Benham Lane Intersection	Unknown	Unknown	Unknown	Unknown
Improve East-West Connection to I-5	Unknown	Unknown	Unknown	Unknown
Overlay Existing Apron	$0	$0	$56,000	$56,000
Construct taxiway to T-Hangars	$0	$0	$25,000	$25,000
Acquire Land for Terminal Development	$0	$0	$100,000	$100,000
Install Apron Lighting	$0	$0	$6,000	$6,000
Construct T-Hangars Taxiways	$0	$0	$37,000	$37,000
Install taxiway reflectors	$0	$0	$2,000	$2,000
Acquire Aviation Easement	$0	$0	$23,000	$23,000
Install REIL	$0	$0	$11,000	$11,000
Construct Apron/Revise Airport Layout Plan	$0	$0	$160,000	$160,000
Install PAPI	$0	$0	$35,000	$35,000
Acquire Land for Approach (RPZ)	$0	$0	$23,000	$23,000
Public Launch Ramp Redevelopment	$400,000	$0	$0	$400,000
Basin II Facility Rehabilitation	$374,000	$0	$0	$374,000
Basin I Replacement	$2,356,000	$0	$0	$2,356,000
Service and Repair Dock	$115,000	$0	$0	$115,000
Sidewalk on both sides of Ransom Avenue	$149,000	$0	$0	$149,000
Sidewalk on west side of Pioneer Road	$20,000	$0	$0	$20,000
Sidewalk on east side of Pioneer Road	$39,000	$0	$0	$39,000
Sidewalk on both sides of Easy Street	$72,000	$0	$0	$72,000
Sidewalk on north side of US 101	$0	$49,000	$0	$49,000
Medium Priority				
Improve US 101/Carpenterville Road intersection	$850,000	$0	$0	$850,000
Improve Parkview Drive	$600,000	$0	$0	$600,000
Improve Pioneer Road	$400,000	$0	$0	$400,000
Improve East Benham Lane	$200,000	$0	$0	$200,000
Upgrade Old County Road	$700,000	$0	$0	$700,000
Upgrade Carpenterville Road	$360,000	$0	$0	$360,000
Upgrade Pelican Bay Drive	$300,000	$0	$0	$300,000
Low Priority				
Upgrade Easy Street	$530,000	$0	$0	$530,000
Subtotal High Priority	$3,575,000	$15,019,000	$478,000	$19,072,000
Subtotal Medium Priority	$3,410,000	$0	$0	$3,410,000
Subtotal Low Priority	$530,000	$0	$0	$530,000
Total	$7,515,000	$15,019,000	$478,000	$23,012,000

Curry County, the City of Brookings, the Siskiyou National Forest, and ODOT District 7 expressed interest in a cooperative maintenance agreement concurrent with development of the Transportation System Plan. This is of particular importance in Curry County because a majority of the land area is managed by the US Forest Service and most access into and out of the county is dependent on the state highway system. There was also a realization that forest management activities, such as timber sales, have an impact on the county road system.

CHAPTER 8: FUNDING OPTIONS AND FINANCIAL PLAN

The Transportation Planning Rule requires Transportation System Plans to evaluate the funding environment for recommended improvements. This evaluation must include a listing of all recommended improvements, estimated costs to implement those improvements, a review of potential funding mechanisms, and an analysis of existing sources' ability to fund proposed transportation improvement projects. Brookings' TSP identifies 32 specific recommendations that address deficiencies, safety issues, or access concerns in addition to revisions to the development ordinance and the development transportation demand management strategies. This section of the TSP provides an overview of Brookings' revenue outlook and a review of some funding and financing options that may be available to the City of Brookings to fund the improvements.

Pressures from increasing growth throughout much of Oregon have created an environment of estimated improvements that remain unfunded. Brookings will need to work with Curry County and ODOT to finance the alternative route and other potential new transportation projects over the 20-year planning horizon. The actual timing of these projects will be determined by the rate of population and employment growth actually experienced by the community. This TSP assumes Brookings will grow at an annual rate of 3.0 percent. If population growth exceeds this rate, the improvements may need to be accelerated. Slower than expected growth will relax the improvement schedule.

HISTORICAL STREET IMPROVEMENT FUNDING SOURCES

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

Table 8-1 shows the distribution of road revenues for the different levels of government within the state by jurisdiction level. Although these numbers were collected and tallied in 1991, ODOT estimates that these figures accurately represent the current revenue structure for transportation-related needs. (Source: ODOT 1993 Oregon Road Finance Study).

TABLE 8-1
SOURCES OF ROAD REVENUES BY JURISDICTION LEVEL

	Jurisdiction Level			All
Revenue Source	State	County	City	Funds
State Road Trust	58%	38%	41%	48%
Local	0%	22%	55%	17%
Federal Road	34%	40%	4%	30%
Other	9%	0%	0%	4%
Total	100%	100%	100%	100%

Source: ODOT 1993 Oregon Road Finance Study.

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

As a state, Oregon generates 94 percent of its highway revenues from user fees, compared to an average of 78 percent among all states. This fee system, including fuel taxes, weight distance charges, and registration fees, is regarded as equitable because it places the greatest financial burden upon those who create the greatest need for road maintenance and improvements. Unlike many states that have indexed user fees to inflation, Oregon has static road-revenue sources. For example, rather than assessing fuel taxes as a percentage of price per gallon, Oregon's fuel tax is a fixed amount (currently 24 cents) per gallon.

Transportation Funding in Curry County

Historically, sources of road revenues for Curry County have included federal grants, state revenues, intergovernmental transfers, interest from the working fund balance, and other sources. Transportation revenues and expenditures for Curry County are shown in Table 8-2 and Table 8-3. These tables present receipts and disbursements for road and street purposes as reported by counties to ODOT.

TABLE 8-2
CURRY COUNTY TRANSPORTATION-RELATED REVENUES

	1993-1994 Actual	1994-1995 Actual	1995-1996 Actual	1996-1997 Actual	1997-1998 Budget
Working Capital	$3,010,002	$2,679,024	$2,101,003	$1,890,500	$2,437,000
Federal Apportionments	$2,164,549	$3,017,444	$2,914,134	$2,810,840	$2,690,000
State Apportionments	$1,204,633	$1,232,304	$1,264,269	$1,211,264	$1,245,000
Local Receipts	$111,995	$182,640	$192,277	$175,930	$156,000
Misc.	$19,737		$13,744	$107,071	$220,000
Misc. Reimbursement	$71,382				$258,000
Fund Transfers	$35,592	$29,789	$62,141	$152,584	$71,288
Sale of Equipment	$23,683		$355		$2,000
Revenue Subtotal	$3,631,571	$4,462,177	$4,446,920	$6,348,189	$4,642,288

Source: Curry County

As shown in Table 8-2, revenues have increased from $3.6 million in 1993-1994 to over $6.3 million in 1996-1997. Approximately $3 million of the annual revenues come from Federal apportionments (mostly Federal Forest receipts). Twenty-five percent of Federal Forest revenue (the 25 percent fund) is returned to the counties based on their share of the total acreage of Federal Forests. Westside forests are subject to the "Owl Guarantee." Intended to protect Spotted Owl habitat, the guarantee also protects the revenue streams from these forests to a maximum three-percent decline annually. The forest in Curry County is the Siskiyou Forest, which is subject to the Owl Guarantee. Another $1.2 million in revenues is from the state highway fund. With a healthy working capital balance, the county has also been able to generate over $100,000 annually in interest and other miscellaneous local receipts. As working capital is the amount carried over from previous years, it is typically reported separately from revenues, which represents the amount of new revenue to the fund each budget year.

TABLE 8-3
CURRY COUNTY TRANSPORTATION-RELATED EXPENDITURES

	1993-1994 Actual	1994-1995 Actual	1995-1996 Actual	1996-1997 Actual	1997-1998 Budget
Personal Services	$1,154,062	$1,124,785	$1,136,899	$1,180,297	$1,263,249
Materials and Services	$1,195,697	$1,062,897	$1,063,999	$1,119,027	$1,246,813
Capital Outlay	$1,484,896	$1,587,206	$880,597	$1,051,041	$1,656,500
Transfers	$127,904	$1,265,310	$829,796	$570,656	$1,688,198
Operating Contingency					$300,000
Expenditure Subtotal	$3,962,559	$5,040,198	$3,911,291	$3,921,021	$6,154,760

Source: Curry County.

As shown in Table 8-3, Curry County has spent between $0.9 million and $1.6 million annually in capital improvements. The county also transfers money to a reserve fund for larger-scale capital improvements. Some transfers are to the general fund to pay for a portion of general overhead attributed to the street fund.

Historical Revenues and Expenditures in the City of Brookings

The City of Brookings accounts for its road-related revenues and expenditures in two separate accounts: the Street Fund and the Street System Replacement Fund. The Street Fund is used to account for the City's State Highway Fund monies, grant funds, and other related revenue. Expenditures against this fund are categorized as personal services, materials and services, and capital outlay. The capital outlay category is desegregated into the sub-categories of equipment and street construction/repair. The amount expended annually for street construction/repair has ranged between a very negligible amount ($91 in 1995/96) to over $74,000 in the year that Brookings benefited from a $34,000 Small Cities Allocation (SCA) grant (in 1994/95). Excluding the SCA grant, the amount spent on street construction/repair from this fund has averaged $16,800 over three fiscal years (1994/95 to 1996/97).

The Street System Replacement Fund is a special fund set up to account for materials and labor relating to specific construction projects. Its revenues are generated by a $2.50 charge on each household's water bill. It has successfully generated revenue in the amount of $80,000 to $88,000 annually for the last several years, and is expected to continue providing stable revenues.

Transportation Revenue Outlook in the City of Brookings

ODOT's policy section recommends certain assumptions in the preparation of transportation plans. In its Financial Assumptions document prepared in May 1998, ODOT projected the revenue of the State Highway Fund through year 2020. The estimates are based on not only the political climate, but also the economic structure and conditions, population and demographics, and patterns of land use. The latter is particularly important for state-imposed fees because of the goals in place under Oregon's Transportation Planning Rule (TPR) requiring a 10-percent reduction in per-capita vehicle miles of travel (VMT) in Metropolitan Planning Organization (MPO) areas by year 2015, and a 20-percent reduction by year 2025.

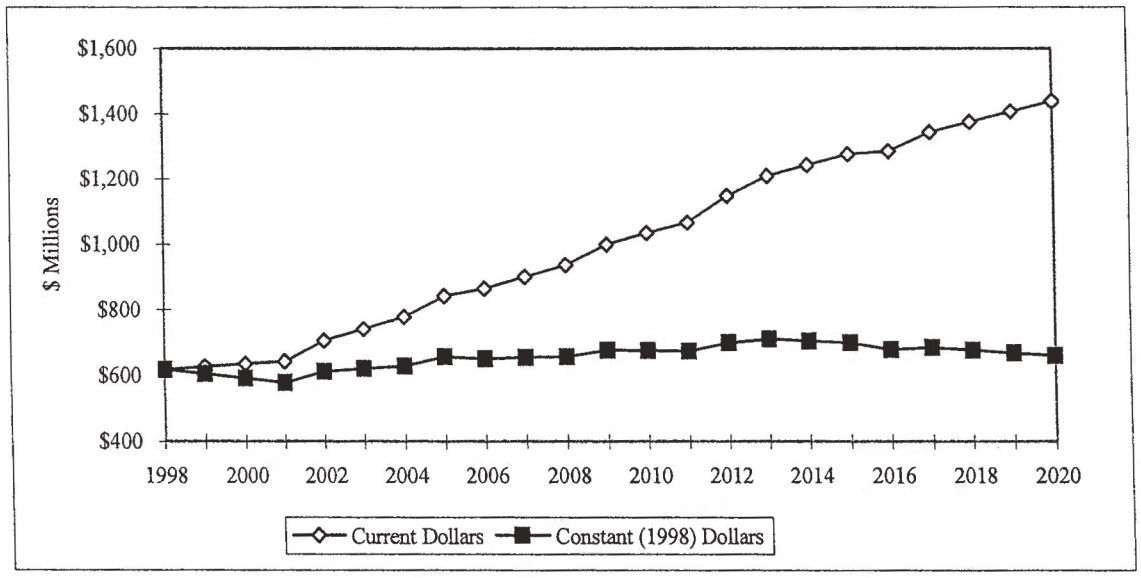
This requirement will affect the 20-year revenue forecast from the fuel tax. ODOT recommends the following assumptions:

- Fuel tax increases of one cent per gallon per year (beginning in year 2002), with an additional one cent per gallon every fourth year;
- Vehicle registration fees would be increased by $10 per year in 2002, and by $15 per year in year 2012;

- Revenues will fall halfway between the revenue-level generated without TPR and the revenue level if TPR goals were fully met;
- Revenues will be shared among the state, counties, and cities on a "50-30-20 percent" basis rather than the previous "60.05-24.38-15.17 percent" basis; and
- Inflation occurs at an average annual rate of 3.6 percent (as assumed by ODOT).

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

FIGURE 8-1
STATE HIGHWAY FUND FORECAST



Source: ODOT Financial Assumptions.

As the State Highway Fund is expected to remain a significant source of funding for Brookings' street operations, the city is highly susceptible to changes in the Fund. In recent years, the State Highway Fund has supplied the majority of Brookings' total street fund revenue.

In order to analyze the City's ability to fund the recommended improvements from current sources, DEA applied the following assumptions:

- The State Highway Fund will continue to account for the majority of the City's Street Fund;
- Interest, the Street Replacement Fund, and other local sources continue to provide stable revenue streams; and
- The proportion of revenues available for capital expenditures for street improvements will be a small, but stable, proportion of overall street expenditures.

Applying these assumptions to the estimated level of the State Highway Fund resources, as recommended by ODOT, resources available to Brookings for all operations, maintenance, and capital outlay purposes are estimated at between $220,000 and $280,000 annually (in current 1998 dollars), as shown in Table 8-4.

TABLE 8-4
ESTIMATED RESOURCES AVAILABLE TO CITY OF BROOKINGS
FROM STATE HIGHWAY FUND, 1998 DOLLARS

Year	Total Estimated Resources from State Highway Fund	Estimated Funds Available for Capital Outlay
1999	$240,000	$99,000
2000	$230,000	$97,000
2001	$220,000	$95,000
2002	$240,000	$100,000
2003	$240,000	$102,000
2004	$240,000	$103,000
2005	$260,000	$107,000
2006	$250,000	$107,000
2007	$250,000	$107,000
2008	$260,000	$108,000
2009	$260,000	$111,000
2010	$260,000	$111,000
2011	$260,000	$110,000
2012	$270,000	$114,000
2013	$280,000	$116,000
2014	$270,000	$115,000
2015	$270,000	$114,000
2016	$260,000	$111,000
2017	$270,000	$112,000
2018	$260,000	$111,000
2019	$260,000	$109,000

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

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

Based on the amount of resources historically available to fund capital improvements this analysis suggests that the City of Brookings will have between $95,000 and $116,000 available annually for capitol improvement.

REVENUE SOURCES

In order to finance the recommended transportation system improvements requiring expenditure of capital resources, it will be important to consider a range of funding sources. Although the property tax has traditionally served as the primary revenue source for local governments, property tax revenue goes into general fund operations, and is typically not available for street improvements or maintenance. Despite this limitation, the use of alternative revenue funding has been a trend throughout Oregon as the full implementation of Measures 5 and 47 have significantly reduced property tax revenues (see below). The alternative revenue sources described in this section may not all be appropriate in Brookings; however,

this overview is being provided to illustrate the range of options currently available to finance transportation improvements during the next 20 years.

Property Taxes

Property taxes have historically been the primary revenue source for local governments. However, property tax revenue goes into general fund operations, and is not typically available for street improvements or maintenance. The dependence of local governments on this revenue source is due, in large part, to the fact that property taxes are easy to implement and enforce. Property taxes are based on real property (i.e., land and buildings) which has a predictable value and appreciation to base taxes upon. This is as opposed to income or sales taxes that can fluctuate with economic trends or unforeseen events.

Property taxes can be levied through: 1) tax base levies, 2) serial levies, and 3) bond levies. The most common method uses tax base levies that do not expire and are allowed to increase by six percent per annum. Serial levies are limited by amount and time they can be imposed. Bond levies are for specific projects and are limited by time based on the debt load of the local government or the project.

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

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

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

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

Measure 50 adds another layer of restrictions to those which govern the adoption of tax bases and levies outside the tax base, as well as Measure 5's tax rate limits for schools and non-schools and tax rate exceptions for voter approved debt. Each new levy and the imposition of a property tax must be tested against a longer series of criteria before the collectible tax amount on a parcel of property can be determined.

System Development Charges

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

Local governments have the legal authority to charge property owners and/or developers fees for improving the local public works infrastructure based on projected demand resulting from their development. The charges are most often targeted towards improving community water, sewer, or transportation systems. Systems Development Charges must be established through an ordinance or resolution, supported by a capital improvement plan, public facility plan, master plan, or other comparable plan documenting the projects eligible for SDCs and establishing the methodology for calculating the proportionate share.

SDCs are collected when new building permits are issued. Transportation SDCs are based on expected trip generation of the proposed development. Residential calculations would be based on the assumption that a typical household will generate a given number of vehicle trips per day. Nonresidential use calculations are based on employee ratios for the type of business or industrial uses. As a fast-growing community, Brookings currently utilizes transportation SDCs to help fund the infrastructure required to support new development.

State Highway Fund

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

Local Gas Taxes

The Oregon Constitution permits counties and incorporated cities to levy additional local gas taxes with the stipulation that the moneys generated from the taxes will be dedicated to street-related improvements and maintenance within the jurisdiction. At present, only a few local governments (including the cities of Woodburn and The Dalles and Multnomah and Washington Counties) levy a local gas tax. The City of Brookings may consider implementing a local gas tax as a way to generate additional street improvement funds. However, with relatively few jurisdictions exercising this tax, an increase in the cost differential between gas purchased in Brookings and gas purchased in neighboring communities may encourage drivers to seek less expensive fuel elsewhere. Any action will need to be supported by careful analysis to minimize the unintended consequences of such an action.

Vehicle Registration Fees

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

Local Improvement Districts

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

owners typically have the option of paying the assessment in cash or applying for assessment financing through the city. Since the passage of Ballot Measure 5, cities have most often funded local improvement districts through the sale of special assessment bonds.

GRANTS AND LOANS

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

Bike-Pedestrian Grants

By law (ORS 366.514), all road, street or highway construction or reconstruction projects must include facilities for pedestrians and bicyclists, with some exceptions. ODOT's Bike and Pedestrian Program administers two programs to assist in the development of walking and bicycling improvements: local grants, and Small-Scale Urban Projects. Cities and counties with projects on local streets are eligible for local grant funds. An 80 percent state/20 percent local match ratio is required. Eligible projects include curb extensions, pedestrian crossing and intersection improvements, shoulder widening and restriping for bike lanes. Projects on urban state highways with little or no right-of-way taking and few environmental impacts are eligible for Small-Scale Urban Project Funds. Both programs are limited to projects costing up to $100,000. Projects that cost more than $100,000, require the acquisition of ROW, or have environmental impacts should be submitted to ODOT for inclusion in the STIP.

The ODOT Bike and Pedestrian Program can be reached at (503) 986-3555.

Enhancement Program

This federally-funded program earmarks $8 million annually for projects in Oregon. Projects must demonstrate a link to the intermodal transportation system, compatibility with approved plans, and local financial support. A 10.27 percent local match is required for eligibility. Each proposed project is evaluated against all other proposed projects in its region. Within the five Oregon regions, the funds are distributed on a formula based on population, vehicle miles traveled, number of vehicles registered and other transportation-related criteria. The solicitation for applications was mailed to cities and counties the last week of October 1998. Local jurisdictions have until January 1999 to complete and file their applications for funding available during the 2000-2003 fiscal years, which begin October 1999.

The ODOT Enhancement Program can be reached at (503) 986-3528.

Highway Bridge Rehabilitation or Replacement Program

The Highway Bridge Rehabilitation or Replacement Program (HBRR) provides federal funding for the replacement and rehabilitation of bridges of all functional classifications. A portion of the HBRR funding is allocated for the improvement of bridges under local jurisdiction. A quantitative ranking system is applied to the proposed projects based on sufficiency rating, cost factor, and load capacity. They are ranked against other projects statewide, and require state and local matches of 10 percent each. It includes the Local Bridge Inspection Program and the Bridge Load Rating Program.

The ODOT Highway Bridge Rehabilitation or Replacement Program can be reached at (503) 986-3344.

Transportation Safety Grant Program

Managed by ODOT's Transportation Safety Section (TSS), this program's objective is to reduce the number of transportation-related accidents and fatalities by coordination a number of statewide programs. These funds are intended to be used as seed money, funding a program for three years. Eligible programs include programs in impaired driving, occupant protection, youth, pedestrian, speed, enforcement, bicycle

and motorcycle safety. Every year, TSS produces a Highway Safety Plan that identifies the major safety programs, suggests countermeasures to existing safety problems, and lists successful projects selected for funding, rather than granting funds through an application process.

The ODOT Transportation Safety Grant Program can be reached at 986-4192.

Special Transportation Fund

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

The ODOT Special Transportation Fund can be reached at (503) 986-3885.

Special Small City Allotment Program

The Special Small City Allotment Program (SCA) is restricted to cities with populations under 5,000 residents. Unlike some other grant programs, no locally funded match is required for participation. Grant amounts are limited to $25,000 and must be earmarked for surface projects (drainage, curbs, sidewalks, etc.). However, the program does allow jurisdictions to use the grants to leverage local funds on non-surface projects if the grant is used specifically to repair the affected area. Criteria for the $1 million in total annual grant funds include traffic volume, the five-year rate of population growth, surface wear of the road, and the time since the last SCA grant. In Curry County, Port Orford has benefited from a grant from this program in 1995-96. Although Brookings received a grant under this program in 1994-95, Brookings' population was most recently estimated at 5,440 (1997), making Brookings too large to remain eligible for this program.

The ODOT Special City Allotment Program can be reached at (503) 986-3893.

Immediate Opportunity Grant Program

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

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

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

The ODOT Immediate Opportunity Fund program can be reached at (503) 986-3463.

Oregon Special Public Works Fund

Table 5-17B: The Special Public Works Fund (SPWF) program was created by the 1995 State Legislature as one of several programs for the distribution of funds from the Oregon Lottery to economic development projects in communities throughout the State. The program provides grant and loan assistance to eligible municipalities primarily for the construction of public infrastructure which support commercial and industrial development that result in permanent job creation or job retention. To be awarded funds, each infrastructure project must support businesses wishing to locate, expand, or remain in Oregon. SPWF awards can be used for improvement, expansion, and new construction of public sewage treatment plants, water supply works, public roads, and transportation facilities.

While SPWF program assistance is provided in the form of both loans and grants, the program emphasizes loans in order to assure that funds will return to the State over time for reinvestment in local economic development infrastructure projects. Jurisdictions that have received SPWF funding for projects that include some type of transportation-related improvement include the Cities of Baker City, Bend, Cornelius, Forest Grove, Madras, Portland, Redmond, Reedsport, Toledo, Wilsonville, Woodburn, and Douglas County.

The Oregon Special Public Works Fund can be reached at (503) 986-0136.

Oregon Transportation Infrastructure Bank

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

The Oregon Transportation Infrastructure Bank can be reached at (503) 986-3922.

Oregon Ports Division, Oregon Economic Development Department

The Oregon Ports Division provides technical, financial, and intergovernmental coordination assistance to ports to help them develop facilities that aid the efficient shipping of products and improve the local economy. It includes three financial assistance programs to finance port infrastructure development and port-related business development projects, planning for business operations and facilities development, marketing port facilities and services, and navigation projects.

The Oregon Ports Division can be reached at (503) 986-0243.

ODOT FUNDING OPTIONS

The State of Oregon provides funding for all highway related transportation projects through the Statewide Transportation Improvement Program (STIP) which is adopted by the OTC and administered by ODOT. The STIP outlines funding and schedules for ODOT projects throughout the State. The STIP, which identifies projects for a four-year funding cycle, is updated every two years. In developing this funding program, ODOT must verify that the identified projects comply with the Oregon Transportation Plan (OTP), ODOT Modal Plans, Corridor Plans, local comprehensive plans, and TEA-21 planning requirements. The STIP must fulfill federal planning requirements for a staged, multi-year, statewide, intermodal program of transportation projects. Specific transportation projects are prioritized based on federal planning requirements and the different State plans. ODOT consults with local jurisdictions before highway related projects are added to the STIP. Further, all projects to be forwarded to the OTC for consideration for the STIP must first be recommended by the Southwest Area Commission on Transportation (SWACT), a body commissioned by the OTC to provide regional support for transportation improvement projects.

The highway-related projects identified in Brookings' TSP will be considered for future inclusion on the STIP. The timing of including specific projects will be determined by ODOT and the SWACT based on an analysis of all the project needs within Region 3. The City of Brookings, Curry County, and ODOT will need to communicate on an annual basis to review the status of the STIP and the prioritization of individual projects within the project area. Ongoing communication will be important for the City, County, and ODOT to coordinate the construction of both local and state transportation projects. In addition, the city's active participation in the SWACT process is essential for advancement of local projects to the STIP.

ODOT also has the option of making some highway improvements as part of their ongoing highway maintenance program. Types of road construction projects that can be included within the ODOT maintenance programs are intersection realignments, additional turn lanes, and striping for bike lanes. Maintenance related construction projects are usually done by ODOT field crews using State equipment.

The maintenance crews do not have the staff or specialized road equipment needed for large construction projects.

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

FINANCING TOOLS

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

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

General Obligation Bonds

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

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

Limited Tax Bonds

Limited tax general obligation bonds (LTGOs) are similar to general obligation bonds in that they represent an obligation of the municipality. However, a municipality's obligation is limited to its current revenue sources and is not secured by the public entity's ability to raise taxes. As a result, LTGOs do not require voter approval. However, since the LTGOs are not secured by the full taxing power of the issuer, the limited tax bond represents a higher borrowing cost than general obligation bonds. The municipality must pledge to levy the maximum amount under constitutional and statutory limits, but not the unlimited taxing authority pledged with GO bonds. Because LTGOs are not voter approved, they are subject to the limitations of Ballot Measures 5, 47, and 50.

Bancroft Bonds

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

Funding Requirements

Brookings' TSP identifies both capital improvements and strategic efforts recommended during the next 20 years to address safety and access problems and to expand the transportation system to support a growing population and economy. They have been classified within three priority levels:

- Short-Range: within the next five years;
- Intermediate-Range: between year six and year 10; and
- Long-Range: after year 10.

The projects include 26 high-priority projects, totaling an estimated $19.1 million, seven medium-priority projects estimated to total about $3.4 million, and one low-priority project, estimated to cost $530,000 million. Total estimated costs, listed by financial leader and priority level, are shown in Table 8-5.

TABLE 8-5
RECOMMENDED PROJECTS AND FINANCIAL RESPONSIBILITY

	Local Cost	State Cost	Federal Cost	Total Cost
Subtotal High Priority	$3,575,000	$15,019,000	$478,000	$19,072,000
Subtotal Medium Priority	$3,410,000	$0	$0	$3,410,000
Subtotal Low Priority	$530,000	$0	$0	$530,000
Total	$7,515,000	$15,019,000	$478,000	$23,012,000

Although this preliminary analysis shows a potential revenue surplus, this surplus is based on a review of existing funding sources and projects identified at this time. It is likely that new projects requiring additional resources will arise during this TSP's 20-year planning horizon.

The projects have been categorized by their intended financial leader. As noted in Table 8-5, the city will be responsible for projects totaling just over $6.6 million in estimated cost, with nine projects totaling over $3.5 million in the first five years, six projects estimated to cost just over $2.5 million in the next five years, and one project estimated to cost $530,000 in the next 10 years. Based on the resources available as estimated in Table 8-4, the City of Brookings is expected to experience a budget deficit, as shown in Table 8-6.

TABLE 8-6
ESTIMATED CAPITAL FUNDING BALANCE

	Years 0-5	Years 6-10	Years 11-20
Available	$492,000	$526,000	$1,342,000
Needed for city-funded projects	$3,575,000	$3,410,000	$530,000
Surplus (Deficit)	($3,083,000)	($2,884,000)	$812,000
Cumulative Surplus (Deficit)	($3,083,000)	($5,967,000)	($5,155,000)

Of the nearly $3.6 million in city-funded projects classified as high-priority projects, over $3.2 million are Port of Brookings projects. The City of Brookings will need to work with the Port and the Oregon Ports Division to finance these port infrastructure projects. As described earlier in this chapter, the Oregon Ports Division of OEDD manages three financial assistance programs to finance port infrastructure development and port-related business development projects, planning for business operations and facilities development, marketing port facilities and services, and navigation projects. The other projects classified as high-priority are primarily sidewalk projects, which may be eligible for bike and pedestrian funds, described earlier in this chapter.

The six projects classified as medium-priority projects include improving Parkview Drive, adding lanes to Pioneer Road and East Benham Lane, and upgrading Old County Road, Carpenterville Road, Easy Street, and Pelican Bay Drive to collector status. Adding lanes increases the capacity of roadways, making such improvements eligible for SDC funding. At this time, the City of Brookings is looking to SDCs to fund approximately 45 percent of SDC-eligible projects. In addition, the improvements to Parkview Drive may be eligible for OEDD funding, as this roadway serves as the primary access to the airport.

This TSP identifies 34 projects recommended for Brookings' planning area over the 20-year planning horizon. The City of Brookings is expected to experience a budget deficit between the projects planned and the projects for which the City has a financial role. This budget deficit begins in the first five years of the planning horizon, increases in the second five years, and then decreases over the last ten years of the planning horizon. The City of Brookings will need to work with Curry County, ODOT, and OEDD to fund the other projects identified in this transportation system plan.

In addition, cost for improvements that are needed to mitigate new development which impacts the roadway system must be shared between jurisdictions responsible for the roadway and the developer causing a degradation of service along that roadway. To address this issue, any Traffic Impact Study required to determine the impacts of land use changes will include estimated costs for the required mitigation, as well as a determination of the equitable sharing of costs among all responsible parties.

The City or developers cannot rely on state funding sources to mitigate traffic impacts unless a transportation improvement project is programmed in the STIP or ODOT submits a letter to the City verifying that a transportation improvement project is "Reasonably Likely" to be funded by the end of the 20 year planning period.