

Chapter 4

Future Transportation System Demand

Background

This chapter describes the development of future traffic forecasts on the rural road system in Josephine County. These forecasts are based on projections of future population and socio-economic growth within the county, with a particular focus on the rural areas. Included in the chapter is a discussion of recent population and employment growth, future population and employment growth expectations to the planning horizon year of 2025, and future estimates of traffic volumes along the major roadways in the rural portion of the county.

Recent Demographic Characteristics and Economic Conditions

Between 1990 and 2000, Josephine County grew by about 20 percent. This is similar to the growth rate for the state as a whole. Of course, growth rates varied by city. They have been highest for the City of Grants Pass, which contains approximately 30 percent of the county’s population. According to studies conducted by the Oregon Employment Department, more than half of all residents in Josephine County live outside of the cities of Grants Pass and Cave Junction.¹¹

Table 4-1
1990-2000 Population Growth
Josephine County and State of Oregon

Area	1990	2000	Percent Growth (1990 – 2000)
Josephine County	62,649	75,726	20.87%
City of Cave Junction	1,126	1,363	21.05%
City of Grants Pass	17,488	23,003	31.54%
Unincorporated Area	44,035	51,360	16.63%
State of Oregon	2,842,321	3,421,399	20.37%

Source: US Department of Census, PL 171 Redistricting Data

Generally, southern Oregon’s population is older than the rest of the state. According to a study conducted for the 2000 Regional Economic Profile from the Oregon Employment Department (OED), the percent of surveyed persons defining themselves as retired is more than twice that of the State of Oregon.

Also notable is that most of the population growth in the Rogue Valley area (Josephine and Jackson Counties) in recent years has been due to in-migration. For Josephine County alone, this accounted for about 85 percent of the population growth. In fact, the number of deaths in Josephine County has exceeded the number of births by about nine percent, meaning that without in-migration, the population would have decreased.

¹¹ Oregon Employment Department, 2000 Regional Economic Profile for Region 8 – Jackson County and Josephine County.

Population and Employment Growth Forecasts

To forecast future travel demand for the TSP, it was first necessary to establish horizon year population and employment forecasts for the rural Josephine County study area. Each county in Oregon receives an allocation from the state economist, who prepares statewide population and employment growth estimates for a 20-year future planning period. The most recent 20-year forecast is for 2020 at which point there is expected to be approximately 93,670 persons in the County. These countywide allocations serve as the foundation for long-term land use and transportation planning activities carried out by local governments. The statewide allocation process considers a wide range of demographic, economic and geographic data, such as historic and projected birth rates and family sizes, exmigration and immigration rates, comprehensive plan and zoning designations, economic diversity, buildable land area, extent and needs of basic infrastructure, etc. After receiving its 20-year allocation, each county then subdivides the future growth allocation based on existing city, urban growth boundaries, and rural area development expectations within the county.

To determine horizon year population and employment for rural Josephine County, it was first necessary to subtract the allocations for Grants Pass and Cave Junction from the overall County allocation, including growth allocated to the urban growth boundaries for each city. The resulting 2020 forecasts for rural Josephine County were then factored to the 2025 horizon year for the TSP by the County Planning Department using an historical 2.1 percent annual population growth rate. The County further allocated growth projections into estimated 5-year increments to make more refined projections of future transportation need and infrastructure requirements. Growth was allocated within rural Josephine County to *travel sheds*, which are geographic areas that can be used as a starting point for more refined transportation analysis. County staff developed a system of nine travel sheds (Figure 4-1), which include over 98 percent of the County's total 2002 rural population. Table 4-1 shows growth by 5-year increment projected for each travel shed.

By 2025, the horizon year for the TSP, total population in rural Josephine County is projected to increase by nearly 11,500 people, a 28 percent increase over 2002 population and equivalent to slightly more than the 2002 population of the Merlin/North Valley area. Projections in Table 4-2 assume no change in the County's existing household population density of 2.6 people per residence.

**Table 4-2
Rural Josephine County Growth by Travel Shed, 2002-2025**

People by Travel shed	Population Estimates							Residences		
	2002	2005	2010	2015	2020	2025	Overall Increase	2002	2025	Overall Increase
Cave Junction	5,200	5,501	5,791	6,082	6,358	6,632	1,432	2,000	2,551	551
Fort Vannoy	3,019	3,193	3,362	3,530	3,691	3,850	831	1,161	1,481	320
Jones Creek	1,136	1,202	1,265	1,329	1,389	1,449	313	437	557	120
Merlin	10,132	10,718	11,284	11,850	12,388	12,923	2,791	3,897	4,970	1,073
Murphy	12,438	13,158	13,853	14,547	15,208	15,864	3,426	4,784	6,102	1,318
Selma	2,467	2,610	2,748	2,886	3,017	3,147	680	949	1,210	261
Williams	2,907	3,075	3,237	3,400	3,554	3,707	800	1,118	1,426	308
Wolf Creek/ Sunny Valley	1,456	1,540	1,622	1,703	1,780	1,857	401	560	714	154
Wonder	<u>2,891</u>	<u>3,058</u>	<u>3,220</u>	<u>3,381</u>	<u>3,535</u>	<u>3,687</u>	<u>796</u>	<u>1,112</u>	<u>1,418</u>	<u>360</u>
TOTAL:	41,647	44,056	46,382	48,707	50,921	53,116	11,469	16,018	20,045	4,027

Note: Population figures assume 2.6 people/residence. Estimates do not include persons residing within the urban growth boundaries (UGBs) of Grants Pass and Cave Junction, which are included in the Transportation System Plans of the two cities. Source: Josephine County Planning Department, 2003

Employment growth was estimated for the Merlin area based on forecasts developed for the *Merlin/North Valley Water Master Plan*. This study assumed growth of about 400 employees on the Rendata site, buildout of the North Valley Industrial Park, and small pockets of additional commercial and low-density industrial uses focused primarily near the I-5 interchange and in the Merlin core area. No significant employment growth was assumed elsewhere in the rural portions of the County.

Future Traffic Volume Forecasts

This section presents the methodology and assumptions used to develop future travel demand forecasts, followed by an analysis of the impact of growth on traffic operations at selected intersections and along selected roadway segments.

Background and General Assumptions

The methodology used for the TSP future year travel forecasts is based on procedures in the 2001 Transportation System Planning Guidelines prepared by the Oregon Department of Transportation. These guidelines identify three levels of transportation forecasting and analysis. Selection of the Level 1, 2 or 3 methodology depends on the type of area being analyzed. Level 1 is appropriate for areas with little existing or potential development. Level 2 analysis is used for small or otherwise isolated communities, and Level 3 analysis is used for large urban and suburban communities. Per the ODOT guidelines, separate Level 2 forecasts were prepared for the Murphy and Merlin unincorporated areas based on the anticipated growth in residential and employment land uses as discussed in detail below. The remainder of the County's rural unincorporated area was analyzed based on the Level 1 forecasting method, which relies on historical traffic volume trends.

ODOT is developing a travel demand forecasting model for the Grants Pass area that includes the Merlin and Murphy areas. This model will be completed following completion of the Josephine County TSP, and will be a useful tool to conduct more detailed analyses of the Merlin and Murphy Level 2 areas in the future.

Level 1 Methodology – Trending Forecast

Level 1 trend forecasts account for both historical background traffic growth and local population and employment growth. Separate analysis methods were used for state highways and county roads.

State Highways

For state highways, future traffic volume estimates for highway segments from the ODOT website were used as a starting point. These estimates, which are based on historic trends projected forward from 2000 to 2020, were used to determine average annual growth rates. The average annual rate was then applied to existing traffic data on the state highway to forecast 2025 peak hour volumes. Volumes were adjusted manually at I-5 interchanges or other state highway intersections to ensure continuity in traffic volume forecasts developed from different sources.

Areas along state highways analyzed for the TSP include:

- I-5, from south of the US 199 interchange to north of Wolf Creek interchange.
- US 199 from near the Oregon/California border (at the automatic traffic recorder at O'Brien) north to the Grants Pass Urban Growth Boundary (UGB).
- OR 238 from south of the Grants Pass UGB to 0.1 miles east of Williams Highway (Jackson County line).
- OR 99 from the Grants Pass UGB to the Josephine County/Jackson County line.

- The Rogue River Loop Highway along the entirety of the facility, from Upper River Road to US 199 west of the Grants Pass UGB.
- OR 46 from Cave Junction to Oregon Caves National Monument. Minimal growth was assumed east of the Cave Junction city limits, and no growth projected past MP 3.74 where OR 46 enters the National Monument. At Cave Junction, volumes from the City's TSP were used to estimate the growth rate to apply to gateways and intersections in the immediate vicinity for the analysis.

County Roads

On County roads outside the Level 2 analysis areas and not on state highways, future traffic volumes were estimated for each county roadway segment by applying historical traffic growth rates from the rural portions of lower order state highways in Josephine County (Jacksonville Highway and Rogue River Loop Highway). Based on input from ODOT staff, the 1.9 percent annual traffic growth rate experienced on these highways was used to estimate potential traffic growth on county roads in rural portions of unincorporated Josephine County outside of Merlin and Murphy. When compounded to 2025, the 1.9 percent annual rate translates to an increase of approximately 54 percent over existing volumes. This growth is reasonably consistent with the anticipated 2.1 percent annual population growth rate.

Level 2 Methodology – Cumulative Land Use/Trip Generation Analysis

A Level 2 analysis was conducted in the Murphy and Merlin travel sheds, consistent with ODOT requirements and based on a multi-step process as described below.

- First, forecasted population and employment growth was allocated to individual analysis zones within the Murphy and Merlin travel sheds based on the amount of vacant, available and appropriately zoned land in each zone.
- Second, traffic generated by residential, commercial and industrial land development was estimated.
- Third, this traffic was distributed and assigned to the street system in each travel shed. It was assumed that the majority of traffic in both Murphy and, to a lesser extent, Merlin would be attracted to school, shopping and employment opportunities within the Grants Pass (or Medford) UGBs with a lesser, but still significant, amount remaining internal to these communities. Existing traffic volumes were used to determine trip distribution percentages and assign volumes to the street system.
- Forecasted traffic volumes were then analyzed at selected intersections and along selected roadway segments (similar to the locations analyzed in the Existing Conditions Chapter) to determine how well traffic would operate. Analysis was conducted using standard methodologies from the 2000 *Highway Capacity Manual* (HCM).
- The results of the traffic operations analysis were compared to applicable ODOT and County volume-to-capacity (v/c) and level of service standards, and deficiencies were identified.

A more detailed discussion of this analysis process is presented in the following pages.

Level 2 Land Use

Existing zoning and County tax assessor parcel data was analyzed to identify the amount of appropriately zoned, vacant and available land in each travel shed. In most instances a parcel with structures valued at less than \$5,000 was assumed to be vacant. Data was developed for three general land use categories based on existing zoning: residential (assumed to be single family dwellings), commercial (assumed to be

smaller retail), and industrial (either low density mini-warehouse or repair shop-type development, or light industrial/business park). Low-density industrial uses are assumed to develop where there is no municipal water service. Light industrial or business park uses similar to the North Valley Industrial Park are assumed to develop where municipal water is provided. Both options were evaluated in the Merlin area. Figures 4-2 and 4-3 illustrate the general location of vacant lands included in the Level 2 analysis for Merlin and Murphy, respectively. Lightly shaded areas in these figures are areas represented by uses and zoning other than residential, commercial or industrial – primarily agricultural lands, forest lands and other resource areas that are not planned to accommodate additional housing or employment.

The specific approach for estimating future development on each land use type is provided below.

- Residential – Forecast residential dwelling units were allocated uniformly across all vacant residential property in the Merlin and Murphy study areas. A total of 1,073 new residences were forecast to develop in Merlin, and 1,318 new residences were added in Murphy.
- Commercial – No commercial growth is anticipated in Murphy. In Merlin, commercial growth consistent with the assumptions in the *Merlin/North Valley Water Master Plan* was assigned primarily in the Merlin “downtown” and near the I-5 interchange. A total of 51 parcels were assumed to develop.
- Industrial – No industrial growth is expected in Murphy. In Merlin, two scenarios were developed. Both assume the same acreage for industrial use, with two alternatives for the type of industrial development based on whether or not municipal water service would be available.

Alternative 1 assumes that no municipal water service is provided to the Merlin area and that vacant industrial land outside of the North Valley Industrial Park would develop with low intensity uses such as mini-warehouses, RV or truck sales, and/or repair shops (similar to existing low-density industrial development). New industrial growth within the North Valley Industrial Park was assumed to be light industrial and/or business park, consistent with existing development in that area.

Alternative 2 assumes that municipal water service is provided and that most vacant industrial property (including Rendata) is developed with light industrial and/or business park uses similar to those that currently exist in the North Valley Industrial Park. Alternative 2 would generate a higher volume of traffic and would be more likely to require improvement projects. This alternative was analyzed in greater detail, while a sensitivity analysis was conducted for Alternative 1 to compare likely differences in traffic impacts and roadway improvement needs.

The amount of development forecast for each vacant residential, commercial or industrial parcel was aggregated into traffic analysis zones for analysis purposes as discussed below. No traffic growth was assumed on forest lands or in other portions of the rural area not encompassed by residential, commercial or industrial land use types.

Level 2 Trip Generation Estimates

The land use forecasts for the traffic analysis zones (TAZs) were used as the basis for the trip generation estimates. Typical planning level ratios of net buildable area to gross area were applied to total vacant lands by zoning category, and then trip generation rates were applied to the resulting estimate of net buildable area.

Estimated number of residential dwelling units, estimated industrial acreage, and estimated commercial square footage were used to generate trips that were added to the existing street network.

Data published in *Trip Generation* (Institute of Transportation Engineers, 1997) and the *1996 Oregon Travel Behavior Survey* provided the source for trip generation rates. Trips generated for each TAZ were distributed to the study locations based on engineering judgment, characteristics of the existing transportation system and knowledge of land uses in the area. Trips were assigned to turning movements at the study locations based on existing travel patterns and the location of the TAZ centroid in relation to the analysis location. (The centroid is the point representing the focal point of the TAZ.)

An internal capture rate was estimated to account for trips with origins and destinations within the Level 2 area travel shed. A 40 percent internal capture rate was used in Merlin, reflecting the presence of a variety of land uses that could accommodate PM peak hour trips made to various destinations like home, work, shopping, dining, school, etc. In Murphy, which is primarily residential and is not expected to have any new commercial or employment uses by 2025, no p.m. peak hour internal travel was assumed. Given these considerations and the locations of TAZs and study locations, trip generation rates and trip assignment percentages were input into master spreadsheets to develop traffic volume forecasts for 2025 conditions at each analysis location.

A total of 51 TAZs in the Merlin area (Figure 4-4) and 38 TAZs in the Murphy area (Figure 4-5) were developed for analysis of the Level 2 areas. White areas in the Murphy TAZ map (Figure 4-5) represent areas that were not assigned any future growth. These areas – generally agricultural, forest or resource extraction areas – were used in traffic analysis only to the extent that they generate or attract travel today. TAZ boundaries were developed to aggregate vacant land and assign land use growth in a manner that allowed trips to be loaded onto selected roadway segments consistent with existing traffic patterns. Assigned traffic increases were added to existing volumes to represent 2025 weekday PM peak hour conditions. Analysis focused on collector road segments and intersections where existing data could be used as a baseline for future year forecasts. External trips (100 percent of Murphy trip generation and 60 percent of Merlin trip generation) were assigned to travel sheds throughout the County shown in Figure 4-1 above. A small portion of trips was assigned to destinations in the Medford area and further south. Locations north of the County were assumed to generate only a token number of new trips.

Table 4-3 lists the estimated buildable land quantities, trip generation rates and the estimated 2025 PM peak hour trip generation for each Level 2 area.

Table 4-3
Merlin and Murphy Level 2 Study Areas
Buildable Land Use/Trip Generation Estimates

Land Use	Units	PM Peak Hour Trip Rate/Unit	PM Peak Trip Ends	Pass-By Trip Rate (%)	Net New Trips (PM Peak Hour)	Percent Internal to Level 2 Area
<i>Merlin Level 2 Analysis Area</i>						
Industrial	118 acres	10.47 trips/acre	1,235	n/a	1,235	40%
Residential	1,073 units	0.79 trips/unit	845	n/a	845	40%
Commercial	198 ksf	12.0 trips/ksf	<u>2,375</u>	41%	<u>1,400</u>	40%
<i>Merlin Area Subtotals:</i>			4,455	41%	3,480	40%
<i>Murphy Level 2 Analysis Area</i>						
Residential	1,318 units	0.79 trips/unit	1,040	n/a	1,040	0%
TOTAL TRIPS, BOTH AREAS:			5,495		4,520	

Note: ksf = 1,000 gross square feet of commercial floor space

Sources: Josephine County Planning Department; *Merlin/North Valley Water Master Plan*; Institute of Transportation Engineers *Trip Generation, 6th Edition*, 1999; Oregon Department of Transportation *1996 Oregon Travel Behavior Survey*, 1996.

About 4,500 net new PM peak hour trips would be generated by the land uses assumed in the Merlin and Murphy areas, including about 1,000 in Murphy and about 3,500 in Merlin/North Valley area. These trips were then distributed to the County roadway system. As noted previously, 1,400 trips or forty percent of traffic generated by potential future development in the Merlin area was assumed to remain within the overall travel shed boundary. The remaining 2,100 trips were distributed throughout the broader area – primarily Grants Pass, with a portion assigned to Cave Junction and Medford. A spreadsheet detailing the land use, trip generation and trip distribution assumptions for each TAZ is included in the Appendix C.

Network Assumptions for 2025 Traffic Analysis

The analysis of future roadway system operational deficiencies was based on projected 2025 travel demand volumes that were loaded on the future roadway network. This network includes existing roads, as well as programmed roadway improvements that are expected to be constructed before the planning horizon year (2025).

Josephine County Improvements

While it does not have a traditional Capital Improvement Program outlining programmed transportation system improvements over a given period, the County manages an ambitious roadway maintenance program that targets 7-10 percent of the total County roadway system (40-60 miles annually) to receive chip seal treatment each summer. At that rate the entire County roadway system can be chip sealed over a 10 to 15 year cycle. Chip seals extend the useful life of asphalt roadways and shoulders at much lower cost than pavement overlays, consistent with the County focus on maintenance of existing structures due to limited capital resources.

State Transportation Improvement Program (STIP) Improvements

The State of Oregon approved 2002-2005 and draft 2004-2007 State Transportation Improvement Programs (STIP) include 23 projects in Josephine County. Listed in the STIP are major maintenance activities, operational and capacity improvements, bridge improvements and various highway amenities. None of the STIP projects in the County are expected to add capacity to or otherwise affect the assignment of future traffic volumes to the County's rural area street network. STIP projects within the rural Josephine County TSP planning area scheduled for 2003 or later are listed below for information purposes.

- Applegate River Bridge #1985 replacement on OR 238 (STIP project #2887, scheduled for 2003)
- Grave Creek Bridge #144005 replacement, a federal Highway Bridge Rehabilitation and Replacement (HBRR) project on Beecher Road (STIP project # 12201, 2005)
- Grave Creek Bridge #06493 replacement (STIP project #12365, 2003)
- OR 238 inlay/overlay from Murphy to MP 16 (STIP project #10825, 2003)
- Northbound variable message sign (VMS) on I-5 at Hugo and Glendale Roads (STIP project #10855, 2004)
- US 199 Bridge #01077A and #01108A replacements at the East and West Forks of the Illinois River (STIP project #11816, 2005)
- Lower River Road/Rogue River Loop Highway drainage improvements (STIP #12705, 2006)

Other Potential Improvements

The TSPs for Grants Pass and Cave Junction also include recommended improvements within the UGBs of the two cities. None of these improvements is expected to have a noticeable effect on traffic patterns in rural Josephine County. One, a proposed fourth Rogue River Bridge connecting Lincoln Road and Allen Creek Road/Flower Lane, would provide a new travel route, but the new facility is expected to be used more for travel between central and southwest Grants Pass than to or from the Merlin area.