

Amador County Long-Range Transit Development Plan



Final Report Prepared for the
Amador County Transportation Commission

Prepared by



LSC Transportation Consultants, Inc.

Amador County Long Range Transit Development Plan

FINAL PLAN

Prepared for the:

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Providing an efficient and effective public transit system requires strategic planning that addresses long-term trends in the region served. It is important to consider conditions 10 to 20 years in the future when making decisions regarding transit operations and capital investments. The Amador County Transportation Commission (ACTC) has initiated a Long Range Transit Plan process in order to consider the long-range impact of the changing community and how these changes will impact the large-scale transit needs within the region in the coming decades. Rather than focusing on short-range operating details, this study takes a long view of changes likely to occur in the community, including planned developments and transportation infrastructure changes, population projections, and employment development prospects, and evaluates the need for transit services and transit infrastructure.

The study provides a thorough, well-documented review of service gaps and future transit demand over a 20-year horizon and includes detailed, financially constrained plans for transit service and capital improvements. While the primary goal is to determine the transit needs and how they can best be addressed over the next twenty years, a number of issues were closely evaluated in this study, including the following:

- **Long Range Ridership Demand Forecast:** The long-range forecast for transit needs and service quantities is determined based on current needs and planned developments, including subdivision developments, and commercial development.
- **Role of Transit:** The appropriate role of transit service in Amador County is considered in this study, identifying how transit can be used to achieve mobility, land use, and air quality goals.
- **Capital and Infrastructure Needs:** As Amador County continues to grow and develop, the infrastructure related to providing transit services needs to be considered. Additionally, the facilities that house transit operations and administration needs to match the size of transit operations. Finally, the fleet size and type needs to grow to be responsive to regional mobility needs while also addressing air quality concerns. A long-term capital and infrastructure plan is included in this study.
- **Coordination of Services:** There are a variety of existing public, non-profit, and private transportation services serving Amador County. Maximizing the coordination of services is a key strategy to make the most of limited funding for passenger transportation services. This study will examine how transit needs and goals can be coordinated with other County planning efforts.

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EXISTING CONDITIONS IN AMADOR COUNTY

AMADOR COUNTY BACKGROUND and SETTING

Amador County is in the heart of California's Gold Country, bordered by Sacramento County and San Joaquin County to the west, El Dorado County to the north, Alpine County to the east, and Calaveras County to the south. The closest major cities are Sacramento and Stockton (each about 45 miles from Amador County). The major north-south road is State Route (SR) 49, and the major east-west road is SR 88. The County is approximately 595 square miles in size, stretches from the Sacramento Valley, through the foothills to the Sierra Nevada mountain range. Elevations range from 200 feet in the west to over 9,000 feet in the east, and there is a large diversity in climate and terrain.

EXISTING LAND USE

Amador County consists of five incorporated cities – Jackson, Amador City, Plymouth, Sutter Creek and Ione – as well as unincorporated communities such as Fiddletown, Pine Grove, and Pioneer. Figure 1 depicts Amador County and its communities. Development within the County is primarily concentrated in the Ione, Jackson, Martell, and Sutter Creek areas. The Jackson Rancheria Casino, located off of SR 88 east of Jackson, serves as a major activity and employment center for residents of the County and surrounding areas.

Major Transit Activity Centers

Activity centers potentially generate transit ridership depending on the clientele served. Social service programs typically generate ridership from low income, elderly and/or disabled residents; shopping centers often generate ridership from all types of residents, but particularly elderly and low income passengers; schools and recreational facilities may generate transit ridership from the youth population. Below are lists of major community activity centers in Amador County which are potential transit ridership generators.

Retail Concentrations

The primary retail-shopping areas in Amador include Plymouth, Sutter Creek, Martell, Jackson, Ione Pine Grove, and Pioneer. These include:

- Downtown on Preston Street in Ione
- K-Mart, Wal-Mart, and Amador Plaza Shopping Center on SR 88 in Martell
- Along AR SR49 and in the historic downtown area of Jackson
- Along Main Street and SR 49 in Plymouth
- Downtown (Old Highway 49), Sutter Hill and Martell Business Park between SR 49, SR 88 and SR 104
- Along SR 88 in Pine Grove and Pioneer

Activity Centers for Seniors, Persons with Disabilities, and Low-Income Persons

Social service and other centers that serve seniors, persons with disabilities and low income persons are generally located in Jackson and Sutter Creek. These include:

Jackson

- Amador County Senior Center
- Common Ground Senior Services, Inc.
- Oak Manor Senior Retirement Home
- Amador Residential Care (assisted living)
- The Arc of Amador and Calaveras
- Jackson Gardens Elder Care Home
- AssistCare (assisted living)
- Community Compass (developmental)
- The Arc Whole Life Services
- Amador – Tuolumne Community Action Agency
- First 5 Amador

Sutter Creek

- Amador County Department of Social Services / Mental Health Services
- WIC Program
- Gold Quartz Inn Senior Retirement Home

Medical Facilities

Medical facilities within Amador County also tend to be concentrated in the Jackson area.

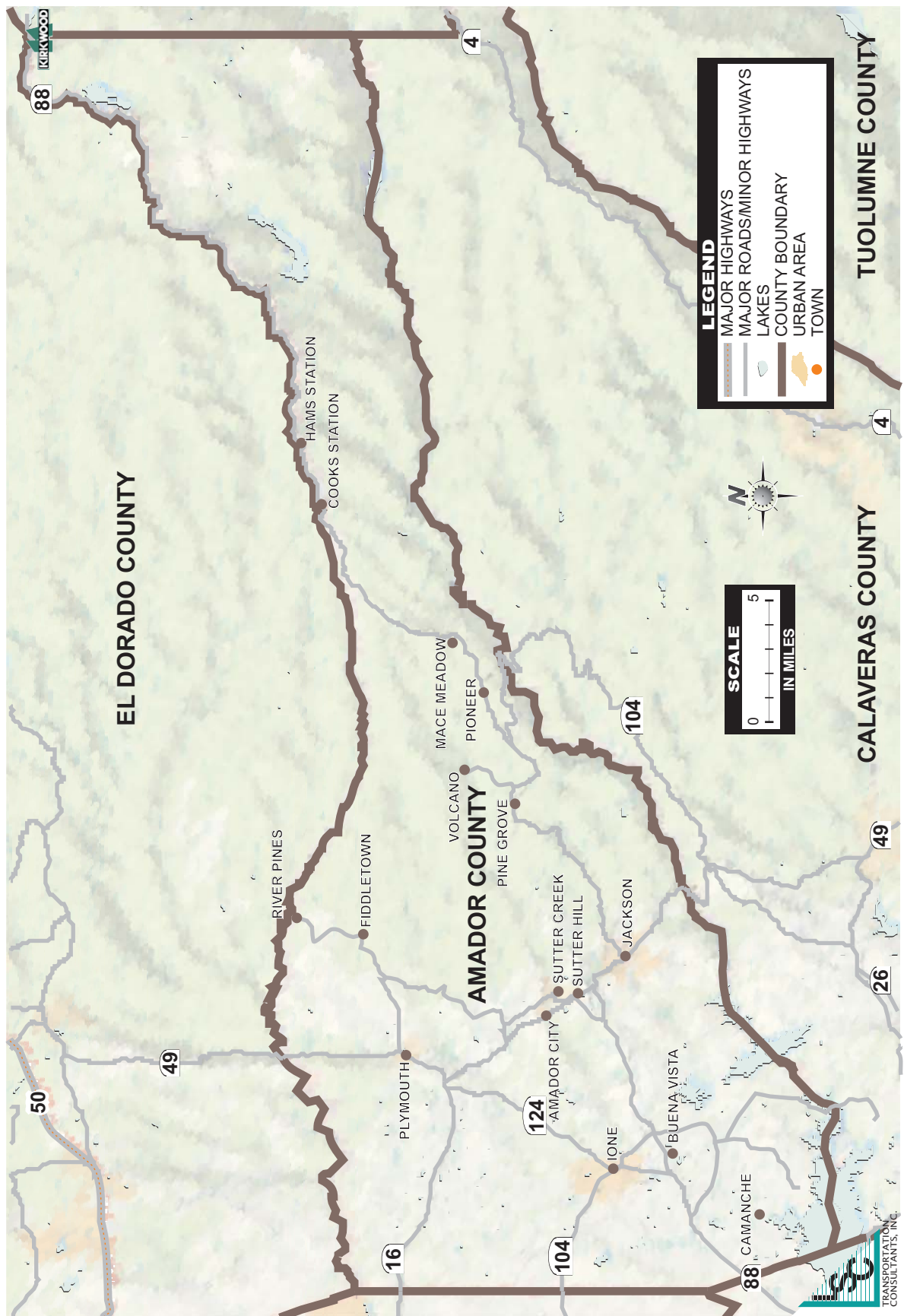
Jackson

- Sutter Amador Hospital
- Kit Carson Nursing and Rehabilitation Center
- Sutter Amador Pediatric
- Sutter Amador Women's Services
- Sutter Amador Family Practice
- Jackson Rancheria Health Complex

Other Areas

- Sutter Amador Health, Plymouth
- Sutter Amador Health Pioneer Center, Pioneer

FIGURE 1
Amador County Site and Location Map



Government

Governmental service offices, such as City Hall and court, are located throughout the County, and includes:

- Jackson City Hall
- Municipal Court and Superior Court, Jackson
- Public Health Department, Sutter Creek
- Sutter Creek City Hall
- Amador City Hall
- Amador County Offices, Jackson
- Ione City Hall
- Plymouth City Hall

-

Recreation & Tourism

Amador County has many recreational and tourism-related opportunities. Within the County there are numerous wineries, hiking opportunities, lakes for water sports / activities, the Kirkwood ski area, Indian gaming, and other popular tourist sites. The following is a list of the major recreation and tourism activity centers:

- Wineries / vineyards in Plymouth, Ione, and Sutter Creek
- Jackson Rancheria Casino, Hotel and Conference Center, Jackson
- Black Chasm Cavern, Pine Grove
- Daffodil Hill, Volcano
- Kirkwood Ski Area, Kirkwood
- Lake Camanche
- Lake Pardee Marina, Ione
- Lake Amador
- Lake Tabeau
- Amador County Fairgrounds
- Amador County Recreation Agency
- Preston Castle, Ione

Education

There are a number of elementary, middle and high schools in the county. As shown in the list below, students from Pine Grove, Pioneer, and Plymouth must travel to other areas of the County for junior high and high school.

Jackson

- Argonaut High School
- Jackson Elementary School
- Jackson Junior High School

Sutter Creek

- Independence High School (alternative and adult education)
- Amador High School
- Sutter Creek Primary School
- Sutter Creek Elementary

Ione

- Ione Elementary School
- Ione Junior High School

Other Areas

- Pine Grove Elementary School, Pine Grove
- Pioneer Elementary School, Pioneer
- Plymouth Elementary School, Plymouth

EMPLOYMENT

Amador County has recorded only small increases in the civilian labor force over the past decade, from an average of 16,600 in 2002 to an average of 16,650 in 2011, with peaks as high as 17,830 in 2009. However, like most of the nation, the county experienced increasing unemployment rates starting in 2008. The unemployment rate soared from 5.8 percent in 2007 to 13.4 percent in 2010, with a slight improvement in 2011 to 12.9 percent, as presented in Table 1.

TABLE 1: Amador County Employment			
Year	Amador County Labor Force ¹	Unemployment Rates	
		Amador County ¹	State of California
2002	16,600	5.8%	6.7%
2003	16,510	6.2%	6.8%
2004	16,970	5.8%	6.2%
2005	17,230	5.6%	5.4%
2006	17,280	5.3%	4.9%
2007	17,740	5.8%	5.3%
2008	17,820	7.6%	7.2%
2009	17,830	11.7%	11.3%
2010	17,480	13.4%	12.4%
2011	16,850	12.9%	10.9%
Note 1: Annual average Civilian Labor Force and unemployment rates. Source: California Department of Finance, retrieved February 2012.			

The top employer in Amador County is the Jackson Rancheria, located outside of Jackson. Other

large employers include Mule Creek State Prison, Kirkwood Mountain Ski Resort, area schools, government agencies, Sutter Amador Hospital and numerous retail businesses.

HISTORIC AND CURRENT POPULATION

Table 2 presents the historical population growth for the county. As indicated, the population increased from 11,821 in 1970 to 35,400 in 2000 to an estimated 38,091 in 2010. Of the total population in 2010, the US Census indicates that 4,315 were in correctional institutions (virtually all in Mule Creek State Prison near Ione). The population excluding prison inmates is approximately 33,776. Between 1990 and 2000, Amador County's population increased by 5,361, or 1.7 percent annually. The growth in Amador County from 2000 to 2010 was considerably less, growing by 0.7 percent per year.

TABLE 2: Amador County Population		
Historical Population		
Year	Countywide Population	Annual Growth Rate
1970	11,821	--
1980	19,314	5.0%
1990	30,039	4.5%
2000	35,400	1.7%
2010	38,091	0.7%
2010 Population by Jurisdiction		
Jurisdiction	Population	Percent of County
Amador City	185	0.5%
Ione ¹	3,758	11.1%
Jackson ¹	4,558	13.5%
Plymouth	1,005	3.0%
Sutter Creek	2,501	7.4%
Unincorporated	26,084	77.2%
Amador County ¹	33,776	100.0%
Note 1: Not including individuals in Correctional Institutions.		
Source: US Census 2010 and prior.		

Transit-Dependent Population

Nationwide, transit system ridership is drawn largely from various groups of persons who make up what is often called the "transit dependent" population. This category includes elderly persons, persons with disabilities, low-income persons, and members of households with no available vehicles. There is considerable overlap among these groups.

Table 3 presents the transit dependent population by community in Amador County from the 2010 U.S. Census, which includes elderly, disabled and low income persons, as well as households without access to a vehicle. As presented in the table, the countywide population in 2010 was 33,776 (per Census data, not including prison inmates). Not including incarcerated individuals, Jackson is the largest city in Amador County (4,558), followed by Lone (3,758) and Sutter Creek (2,501). Over a third of the population lives outside of communities in the County.

There are an estimated 7,825 persons aged 65 or over residing in the study area (or 20.5 percent of the total population, compared to 18.5 percent a decade ago). This percentage is especially high (over 25 percent) in Buckhorn, Jackson and Pioneer, as well as the areas outside of communities in the County. This data is presented graphically in Figure 2.

The number of low-income persons, another likely market for transit services, is measured by the number of persons living below the poverty level. An estimated 2,769 people live below the poverty level within the study area, representing 8.2 percent of the total population (compared with 14.5 percent statewide). The percentage of those persons living below poverty status is highest in Kirkwood and Martell (each nearly 25 percent), though the overall populations in both locations is very small. In terms of the number of individuals living in poverty, Jackson has the highest number (546, which is 12.1 percent of the City's population) followed by Buckhorn (264, or 9.7 percent of the area's population) and Lone (247, or 6.6 percent of the City's population). See Figure 3 for details.

The number of households without access to an available vehicle is estimated at 593, as presented in the Table 4 above. This represents 3.3 percent of the total households in the area (compared with 7.8 percent statewide). A large proportion of households without vehicles available is in Jackson (190, or 8.7 percent of households there). Martell is the community with the highest percentage of zero-vehicle households at 31.6, which represents just 36 households. This is presented graphically in Figure 4.

The Census Bureau defines "mobility limited" as having a health condition lasting more than six months that makes it difficult to go outside alone. No data is available from the 2010 census. In 2000, it was estimated that 855 mobility-limited persons between the ages of 16 and 64 resided in the study area, which comprised 3.5 percent of the County's population. Statewide, the percent of persons who were reported as mobility-limited in this age range in 2000 was 5.1 percent. Jackson and Lone had the highest proportion of mobility-limited residents at 167 and 88, respectively. This data is shown in Figure 5.

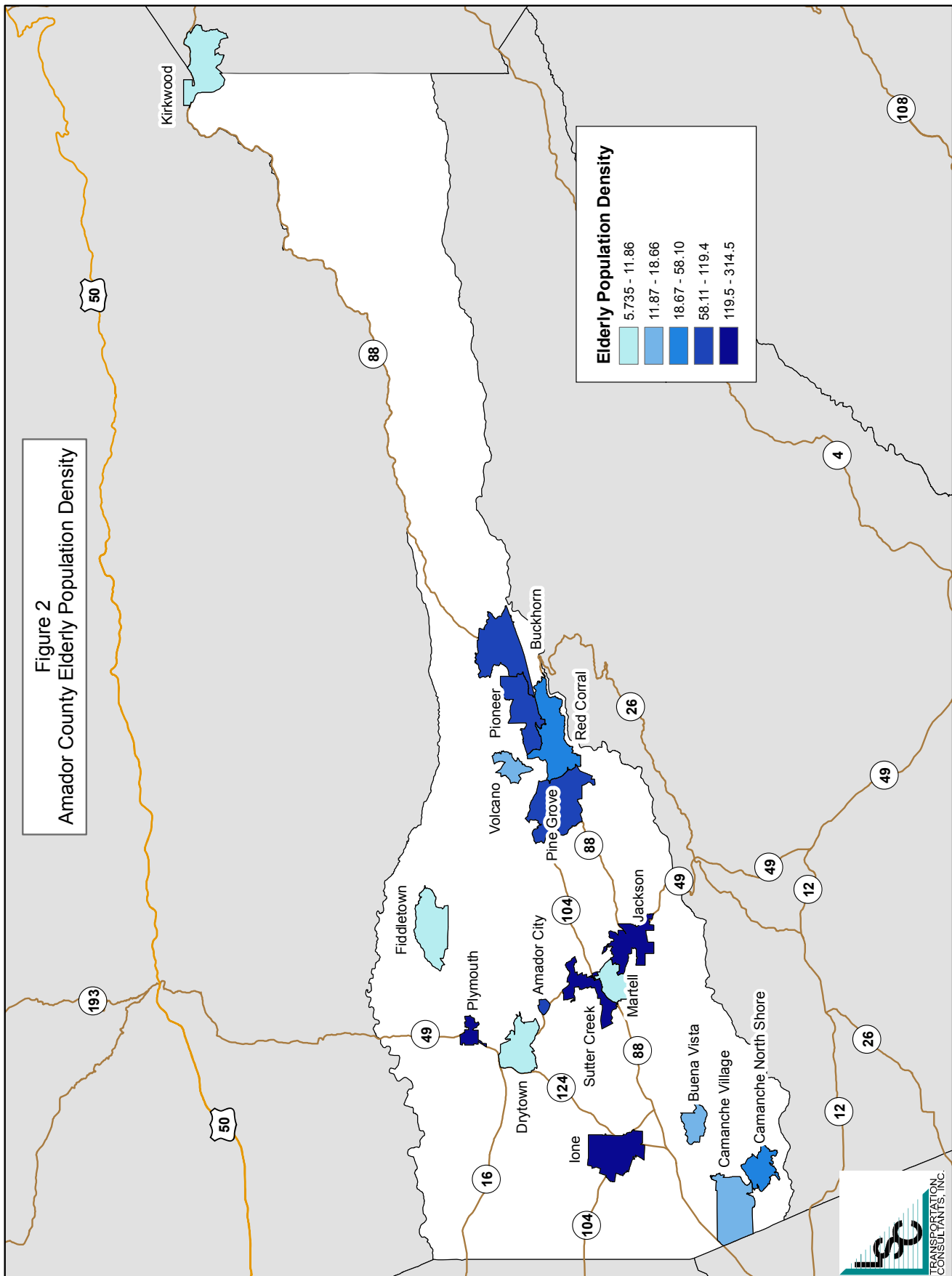
Housing

The housing data from the 2010 US Census, shown in Table 4, reflects the tourist nature of Amador County. There are a total of 18,032 housing units in the County, and nearly 20 percent of them are vacant. Second home ownership is particularly prevalent in Kirkwood and Buckhorn, with 90 percent and 45 percent vacancies and high "occasional" use. Amador City, Volcano and Pioneer also have over 20 percent vacancy due to the prevalence of vacation homes, as shown in Table 5.

TABLE 3: Amador County Transit Dependent Population by Place

Community	Elderly Residents (age 65+)				Persons Living Below Poverty			Households by Number of Vehicles					(2000 Census Data) Mobility-Limited Residents	
	Percent of Community Population		Total		Percent of Community Population		Total	Percent of Community Households		Zero			Age 16 to 64	
	Total	Density	Total	Density	Total	Density	Total	Zero	1	2	3 or more	Percent of Community Population	Age 16 to 64	Percent of Community Population
Amador City	185	108	0	185	0	185	19	0	18	18	18	6	6	3.6%
Buckhorn CDP	2,429	1,662	0	2,429	0	2,429	264	34	268	472	420	--	--	--
Buena Vista CDP	429	218	0	429	0	429	49	0	65	124	0	--	--	--
Camanche North Shore CDP	979	480	0	979	0	979	150	0	49	181	118	--	--	--
Camanche Village CDP	847	344	0	847	0	847	68	30	54	137	55	--	--	--
Drytown CDP	167	80	0	167	0	167	0	0	49	0	30	--	--	--
Fiddletown CDP	235	126	0	235	0	235	0	0	0	0	27	--	--	--
Ione city	7,918	1,635	4,160	3,758	780	163.2	247	86	97	433	584	88	88	4.1%
Jackson city	4,651	2,309	93	4,558	1,173	348.1	546	190	404	697	385	167	167	4.7%
Kirkwood CDP	158	757	0	158	0	158	26	3	24	11	4	--	--	--
Martell CDP	282	114	0	282	0	282	36	36	51	29	0	--	--	--
Pine Grove CDP	2,219	1,140	0	2,219	0	2,219	93	0	176	189	252	--	--	--
Pioneer CDP	1,094	600	0	1,094	0	1,094	39	0	98	134	193	--	--	--
Plymouth city	1,005	493	0	1,005	0	1,005	131	20	59	169	106	25	25	3.7%
Red Corral CDP	1,413	679	62	1,351	0	1,351	104	0	149	514	244	--	--	--
Sutter Creek city	2,501	1,367	0	2,501	0	2,501	221	57	226	0	332	29	29	1.6%
Volcano CDP	115	70	0	115	0	115	0	0	0	60	60	--	--	--
Balance of County	11,464	5,850	0	11,464	0	11,464	776	137	709	2,584	2,022	540	540	3.3%
Amador County	38,091	18,032	4,315	33,776	7,825	13.2	2,769	593	2,496	5,772	4,850	855	855	3.5%
State of California	36,096,954	13,680,081	--	--	4,246,514	11.8%	5,234,050	969,100	3,992,884	4,644,854	1,864,465	1,718,472	1,718,472	5.1%

Source: U.S. Census 2010 (retrieved February 2012) and LSC Transportation Consultants, Inc.



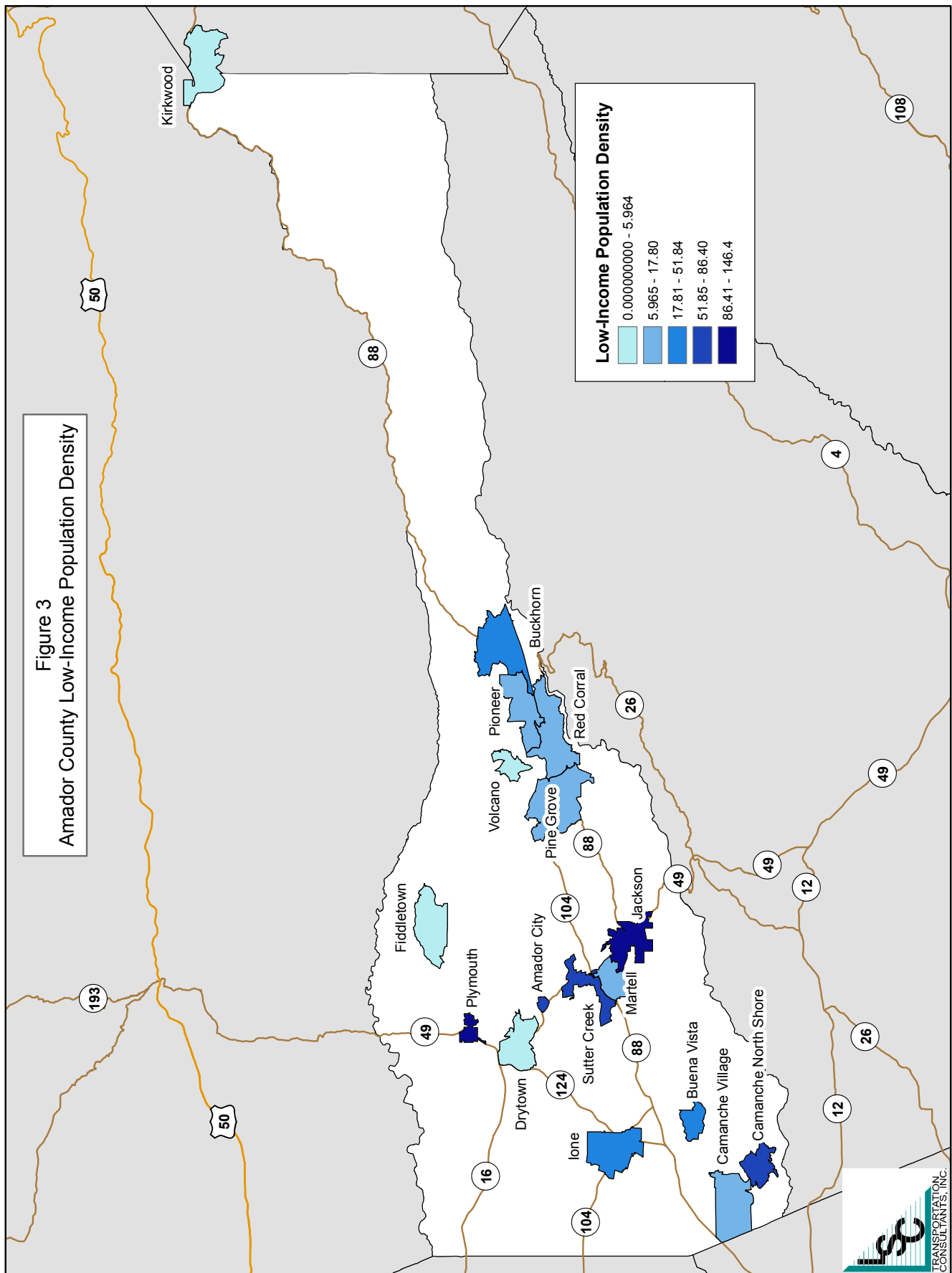


Figure 3
Amador County Low-Income Population Density

TABLE 4: Amador County 2010 Census Housing Data by Place

Area	Total Housing	Occupied Housing Units					Vacant Housing			
		Total	Owner		Renter		Total	For Rent	For Sale	Occasional Use
			Units	Population	Units	Population				
Amador City	108	85	54	111	31	74	23	3	4	11
Buckhorn CDP	1,662	1,138	962	2,001	176	428	524	17	38	430
Buena Vista CDP	218	180	133	289	47	140	38	17	13	0
Camanche North Shore CDP	480	391	305	736	86	243	89	9	14	58
Camanche Village CDP	344	309	274	740	35	107	35	4	10	5
Drytown CDP	80	72	49	122	23	45	8	0	1	4
Fiddletown CDP	126	102	77	174	25	61	24	2	1	17
Ione City	1,635	1,466	1,026	2,574	440	1,172	169	49	45	22
Jackson City	2,309	2,065	1,122	2,305	943	2,118	244	58	58	39
Kirkwood CDP	757	72	45	96	27	38	685	3	3	673
Martell CDP	114	97	53	124	44	93	17	9	0	0
Pine Grove CDP	1,140	984	758	1,668	226	547	156	13	28	65
Pioneer CD{	600	475	394	866	81	228	125	7	18	64
Plymouth City	493	403	259	634	144	362	90	20	11	30
Red Corral CDP	679	573	458	1,060	115	289	106	10	8	55
Sutter Creek City	1,367	1,168	626	1,355	542	1,145	199	93	17	45
Volcano CDP	70	55	37	83	18	32	15	3	0	6
Balance of County	5,850	4,934	4,201	9,721	683	1,759	916	56	86	528
Amador County	18,032	14,569	10,833	24,659	3,686	8,881	3,463	373	355	2,052
Source: US Census 2010 Interactive Map Household Data, retrieved February 2012.										

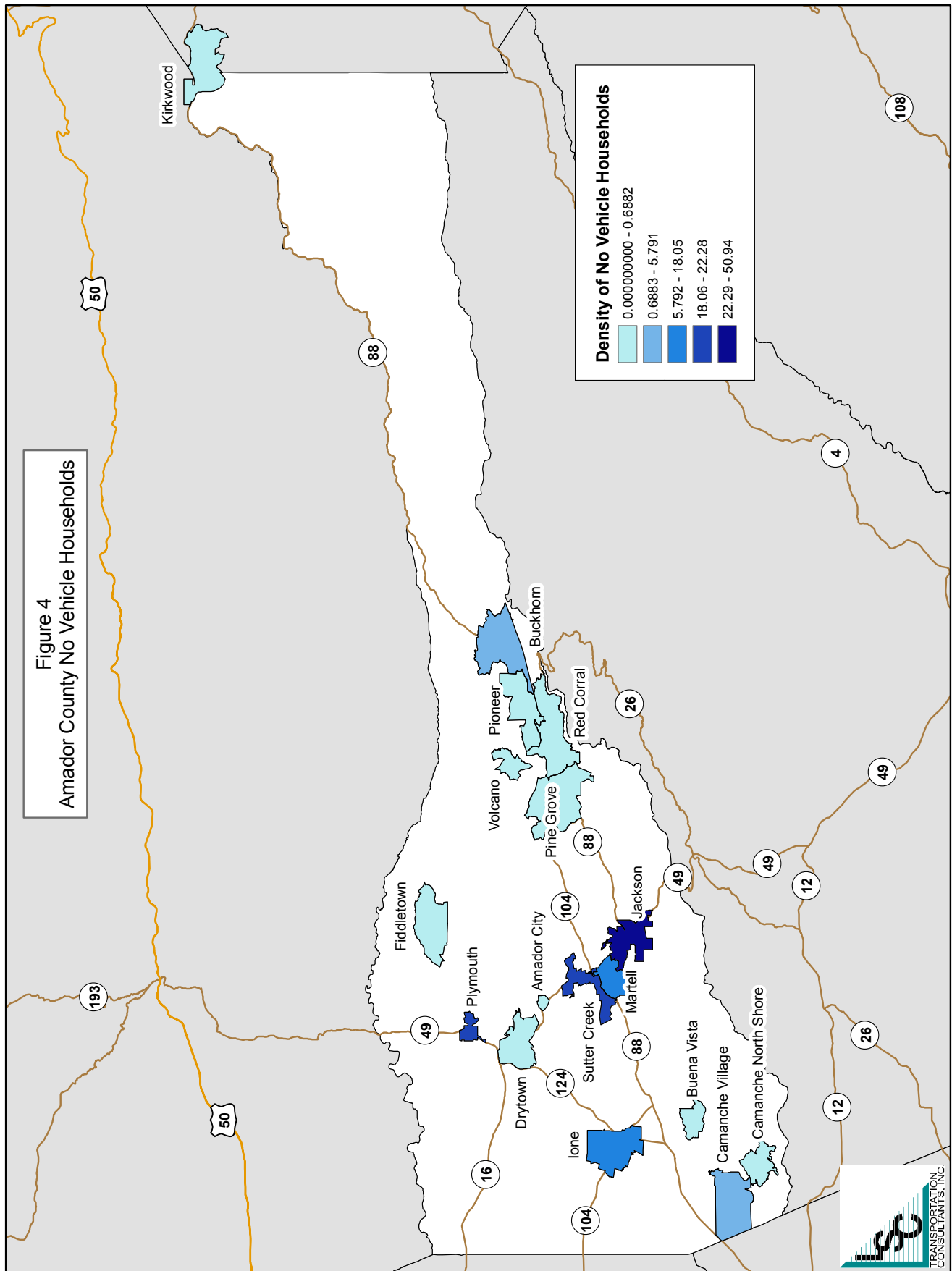
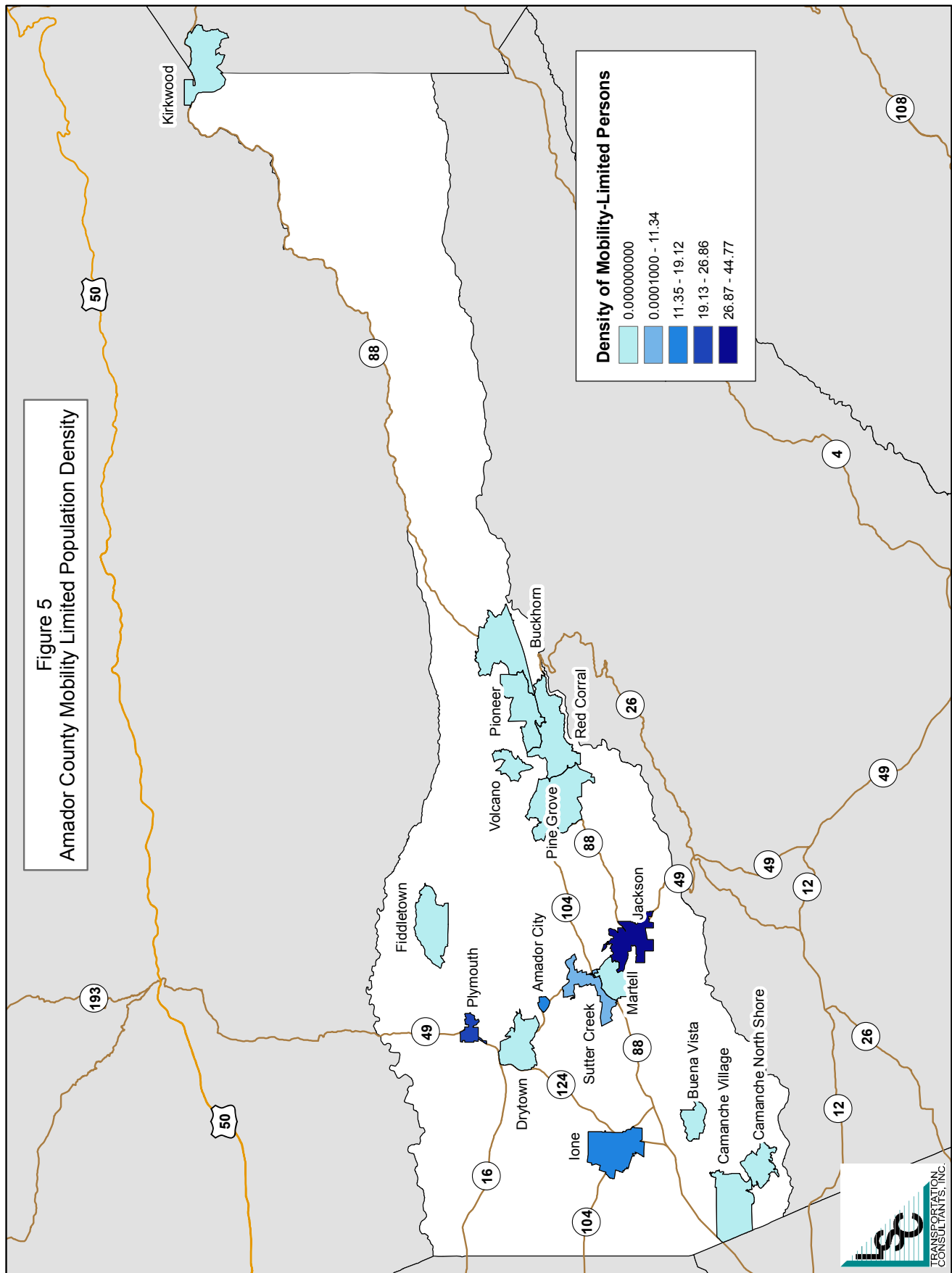


TABLE 5: Amador County Travel Mode to Work								
Community	Car, Truck, or Van			Public Transportation:	Walked	Other Means ¹	Worked at Home	
	Total	Drove Alone	Carpooled					
Amador City	46	44	2	0	0	0	0	
Buckhorn CDP	1070	994	72	0	0	4	0	
Buena Vista CDP	308	207	54	37	0	0	10	
Camanche North Shore CDP	322	287	35	0	0	0	0	
Camanche Village CDP	246	226	6	0	0	10	4	
Drytown CDP	93	46	0	0	36	0	11	
Fiddletown CDP	69	33	12	0	0	12	12	
Lone City	1579	1378	87	31	17	34	32	
Jackson City	2072	1744	244	6	40	0	38	
Kirkwood CDP	49	37	0	0	0	0	12	
Martell CDP	90	39	0	0	36	0	15	
Pine Grove CDP	983	888	21	0	0	0	74	
Pioneer CDP	380	302	54	0	0	0	24	
Plymouth City	347	280	5	0	41	19	2	
Red Corral CDP	452	370	25	0	0	0	57	
Sutter Creek City	1,135	937	100	22	35	34	7	
Volcano CDP	37	37	0	0	0	0	0	
Balance of County	3,424	3,510	405	0	125	110	374	
Amador County	13,802	11,359	1,122	96	330	223	672	
Percent of Countywide Workers ⁽¹⁾	100%	82.3%	8.1%	0.7%	2.4%	1.6%	4.9%	
State of California		15,921,475	11,650,145	1,831,538	820,349	429,786	365,352	824,305
Percent of Statewide Workers			73.2%	11.5%	5.2%	2.7%	2.3%	5.2%
Note 1: Other = Taxicab, Motorcycle, or Bicycle.								
Source: US Census 2010, retrieved February 2012.								

Figure 5
Amador County Mobility Limited Population Density



Means of Transportation to Work

Table 5 presents the means of transportation to work for employed Amador County residents according to the 2010 U.S. Census. Countywide, 82.3 percent of employed residents drove alone, while 8.1 percent carpooled (compared with 73.2 percent and 11.5 percent statewide). In addition, 4.9 percent worked at home, 2.4 percent walked, and 1.6 percent used other means of transportation. Only 0.7 percent used public transportation, but this is up from 0.3 percent a decade ago.

Commute Patterns

Commuting patterns within Amador County are presented in Table 6 and 7. As shown in Table 6, there are 5,087 employees who both work and live in Amador County. There are approximately 9,662 residents who work outside of the County, and approximately 5,307 employees who live outside of the County and commute in for work. In terms of specific work locations, Jackson is the single largest center of employment for Amador County residents, followed by the Sacramento. The next largest centers for employment for Amador County residents are Lone, Stockton and Sutter Creek. The greatest number of employees commuting into Amador County, not including those that live in Amador County, travel from Stockton, Sacramento and Rancho Calaveras.

Commuting by county is shown in Table 7. As indicated, many residents commute to Sacramento County for work (14.3 percent), San Joaquin County (7.0 percent), and Alameda County (5.1 percent). The majority of employees who work in Amador County also reside there (49.0 percent). Employees also commute in from Sacramento County (12.6 percent) and Calaveras County (9.6 percent).

School Enrollment

Students, particularly between the ages of 10 and 16, are another population element with a relatively high potential to use transit services. Table 8 presents school enrollment figures. As indicated, a total of 7,403 students reside in the county, which is a decrease of 706 from a decade earlier. Of these, 1,264 students (3.8 percent of the countywide non-incarcerated population) are in the age range most likely to need transportation to and from school or to after school programs.

The Amador County Unified School District enrollment and projections for enrollment are listed in Table 9. The data show that Kindergarten - 12 school enrollment has steadily decreased and is expected to continue to decrease. The students aged 10 to 16 decreased from 2,219 in 2005 to 1,825 in 2010, and is projected to be 1,683 in 2015. This corresponds to a full 24 percent reduction over ten years in students in the age category most likely to use public transit.

TABLE 6: Amador County Commuter Flow by Community

Amador Residents Commuting To...			Amador Employees Commuting From...		
County of Workplace	Number	Percent	County of Residence	Number	Percent
Amador County	5,087	34.5%	Amador County	5,087	48.9%
Outside Amador County	9,662	65.5%	Outside Amador County	5,307	51.1%
Total	14,749	100.0%	Total	10,394	

Amador Residents Commuting To...			Amador Employees Commuting From...		
Place of Employment	Number	Percent	Place of Residence	Number	Percent
Jackson city, CA	2,160	14.6%	Jackson city, CA	819	7.9%
Sacramento city, CA	1,006	6.8%	Ione city, CA	705	6.8%
Ione city, CA	904	6.1%	Sutter Creek city, CA	430	4.1%
Stockton city, CA	470	3.2%	Buckhorn CDP, CA	290	2.8%
Sutter Creek city, CA	458	3.1%	Stockton city, CA	262	2.5%
San Francisco city, CA	306	2.1%	Pine Grove CDP, CA	258	2.5%
San Jose city, CA	292	2.0%	Sacramento city, CA	221	2.1%
Oakland city, CA	225	1.5%	Rancho Calaveras CDP, CA	201	1.9%
Pine Grove CDP, CA	215	1.5%	Red Corral CDP, CA	177	1.7%
Lodi city, CA	209	1.4%	Elk Grove city, CA	147	1.4%
Roseville city, CA	201	1.4%	Lodi city, CA	144	1.4%
Rancho Cordova city, CA	178	1.2%	Pioneer CDP, CA	135	1.3%
Fresno city, CA	154	1.0%	Galt city, CA	132	1.3%
San Andreas CDP, CA	149	1.0%	Camanche North Shore CDP, CA	107	1.0%
Folsom city, CA	142	1.0%	San Andreas CDP, CA	89	0.9%
Arden-Arcade CDP, CA	135	0.9%	Valley Springs CDP, CA	88	0.8%
Modesto city, CA	114	0.8%	El Dorado Hills CDP, CA	87	0.8%
Elk Grove city, CA	110	0.7%	Buena Vista CDP, CA	85	0.8%
El Dorado Hills CDP, CA	105	0.7%	Folsom city, CA	85	0.8%
Placerville city, CA	105	0.7%	Rancho Cordova city, CA	75	0.7%
Vacaville city, CA	100	0.7%	Plymouth city, CA	64	0.6%
Reno city, NV	100	0.7%	Florin CDP, CA	63	0.6%
All Other Locations	6,911	46.9%	All Other Locations	5,730	55.1%
Total	14,749	100%	Total	10,394	100%

Source: US Census On the Map data, 2010 (retrieved February 2012).

TABLE 7: Amador County Commuter Flow: County to County

Amador Residents Commuting To...			Amador Employees Commuting From...		
County of Workplace	Number	Percent	County of Residence	Number	Percent
Amador	5,087	34.5%	Amador	5,087	48.9%
Sacramento	2,108	14.3%	Sacramento	1,314	12.6%
San Joaquin	1,027	7.0%	Calaveras	1,000	9.6%
Alameda	758	5.1%	San Joaquin	774	7.4%
Santa Clara	649	4.4%	El Dorado	590	5.7%
Contra Costa	475	3.2%	Placer	268	2.6%
Placer	389	2.6%	Stanislaus	161	1.5%
El Dorado	387	2.6%	Contra Costa	95	0.9%
Calaveras	316	2.1%	Alameda	94	0.9%
Stanislaus	313	2.1%	Tuolumne	81	0.8%
All Other Locations	3,240	22.0%	All Other Locations	930	8.9%
Total	14,749	100%	Total	10,394	100%

Source: US Census Onthemap, 2010, retrieved March 2012.

TABLE 8: Amador County 2010 School Enrollment by Area

Area	Total Population	Preschool	Kindergarten	Elementary (1-4)	Elementary (5-8)	High School (9-12)	College	Total Population In School	Not in School
Amador City	128	0	0	11	8	0	5	24	104
Buckhorn CDP	2,652	133	0	60	46	72	28	339	2,313
Buena Vista CDP	518	0	0	89	0	0	49	138	380
Camanche North Shore CDP	766	0	0	0	47	56	0	103	663
Camanche Village CDP	589	0	0	43	45	79	0	167	422
Drytown CDP	210	0	0	14	44	21	0	79	131
Fiddletown CDP	83	0	0	0	0	0	0	0	83
Ione city	7,685	123	16	195	277	652	216	1,479	6,206
Jackson city	4,525	36	28	200	153	299	155	871	3,654
Kirkwood CDP	110	0	0	0	0	0	37	37	73
Martell CDP	140	0	0	24	11	0	0	35	105
Pine Grove CDP	2,261	22	29	31	132	234	41	489	1,772
Pioneer CDP	1,087	0	14	14	0	108	0	136	951
Plymouth city	889	28	24	44	67	36	33	232	657
Red Corral CDP	1,639	42	125	151	110	81	29	538	1,101
Sutter Creek city	2,773	5	43	82	152	260	166	708	2,065
Volcano CDP	171	0	0	7	7	5	0	19	152
Balance of County	11,401	7	186	299	590	551	184	2,009	9,392
Amador County	37,627	396	465	1,264	1,689	2,454	943	7,403	30,224

Source: U.S. Census Bureau, 2010.

TABLE 9: Amador County Unified School District Enrollment

Grade	Total Enrollment		
	Actual 2005	Actual 2010	Projected 2015
K	299	303	297
1	311	308	298
2	288	309	285
3	312	301	287
4	327	264	289
5	336	298	288
6	324	294	294
7	362	263	271
8	373	261	247
9	398	355	265
10	426	354	318
11	470	330	274
12	373	410	293
Total	4,599	4,050	3,706
Most Likely Transit Users			
Age Group	2005	2010	2015
Age 10-16	2,219	1,825	1,683
Source: Amador County Unified School District, 2012.			

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Passenger transportation services in Amador County are provided by a variety of public, non-profit, and private services. This chapter first presents a review of existing Amador Transit conditions, followed by a discussion of other providers.

AMADOR TRANSIT

Background

Amador Transit (formerly Amador Regional Transit System or ARTS) has been providing transit services in Amador County since 1976 and operates under direction of the Amador County Transportation Commission (ACTC). Amador Transit was formed as a Joint Powers Agency (JPA) between Amador County and its five incorporated cities (Jackson, Sutter Creek, Lone, Plymouth and Amador City).

In recent years, a number of studies have been completed regarding Amador Transit, including the following:

- *Amador County Transit Development Plan and Design Manual*, June 2008 by LSC Transportation Consultants, Inc. – This “TDP” document is a five-year plan for system operations from Fiscal Years 2008 through 2013, and also included a Design Manual for Passenger Amenities. Subsequent updates of the TDP were developed by LSC in 2009, 2010 and 2011.
- *Amador County Social Service Transportation Inventory and Action Plan*, 2003, by LSC Transportation Consultants, Inc. – This document serves as a follow up to the Amador County Transportation Commission *FY 1996/1997 Social Service Implementation Plan*. It provides an updated inventory of providers and services provided in Amador County, the 2003 social service transportation needs assessment, and updated recommendations concerning coordination actions and services.
- *Coordinated Public Transit Human Services Transportation Plan*, 2008, by Nelson Nygaard and Associates – This document updates and expands on the *Amador County Social Service Transportation Inventory and Action Plan*, as noted above.
- *Prioritization of Bus Stop Facilities for Amador Regional Transit System: Capital Improvement Program*, 2001 by Dokken Engineering – This presents a review and evaluation of the 54 bus stop facilities in Amador County, with recommendations for signage, shelters, benches and access improvements.

Existing Amador Regional Transit System Services

Public transportation within Amador County is provided by Amador Transit through a general public fixed route service and Dial-a-Ride service. The bus service currently operates six routes Monday through Friday between the hours of 5:30 AM and 7:30 PM, with the exception of County holidays. Dial-a-Ride is offered from 6:00 AM to 6:00 PM. No services are provided on weekends. Amador Transit serves the routes presented in Figure 6, and up to three-quarters of a mile from the designated routes not served by Dial-a-Ride. Descriptions of the routes are presented below.

There have been a number of services changes implemented since the 2008 TDP. All routes have been renamed from letters to numbers, and Dial-a-Ride service was added in July, 2011. Services are briefly described below.

Route 1: Sacramento – Formally known as Route X, this commuter route makes one morning and one afternoon round trip to Sacramento. In July, 2011, service was revised to operate as an express service directly to Sacramento, eliminating stops in Amador City and Sutter Creek. Riders board at the Sutter Hill Transit Center and travel via the Highway 49 bypass road. The bus arrives downtown around 7:30 AM and departs around 5:20 PM, allowing passengers approximately a ten-hour day in Sacramento.

Route 2: Upcountry – This route was formerly known as Route M, or the Mace Meadows route. A morning, midday, and afternoon out and back run is made from the Sutter Hill Transit Center to Amador Station in Mace Meadows, serving Jackson, Pine Grove and Pioneer along the way. This service has seen the most significant ridership decline in the past year, along with a significant reduction in service levels.

Route 3: Plymouth – The Plymouth Route, formerly Route P, takes 35 minutes to serve a round trip. There are two round trips daily departing from the Sutter Hill Transit Center at 8:15 AM and at 3:10 PM.

Route 4: Mokelumne Hill – The Mokelumne Hill Route was introduced in 2010 and operates as an out and back service from the Sutter Hill Transit Center to Highway 49 and Highway 25 in Mokelumne Hill. It was implemented to address the decision by Calaveras Transit to drop its route segment connecting Mokelumne Hill with Jackson, thereby preserving a public transit connection between the two counties. In 2012, this service was discontinued, as Calaveras Transit now travels into Jackson directly. For the purposes of the report, data for this route is still included in the existing service analysis.

Route 5: Sutter Creek-Jackson Shuttle – This service, formerly known as the S route, is the core of the local fixed route service. Two shuttles (A and B) are operated. The two shuttles serve the same areas, but Shuttle A operates southbound on Argonaut Road and northbound on Jackson Gate Road while Shuttle B operates northbound on Argonaut Road and southbound on Jackson Gate Road. Six round trips are made daily on Shuttle A at 7:00 AM, 9:00 AM, 10:00 AM, 11:00 AM, 1:00 PM and 3:10 PM. Shuttle B serves seven daily departures at 7:45 AM, 9:45 AM, 10:45 AM, 11:45 AM, 1:45 PM, 2:45 PM and 5:10 PM.

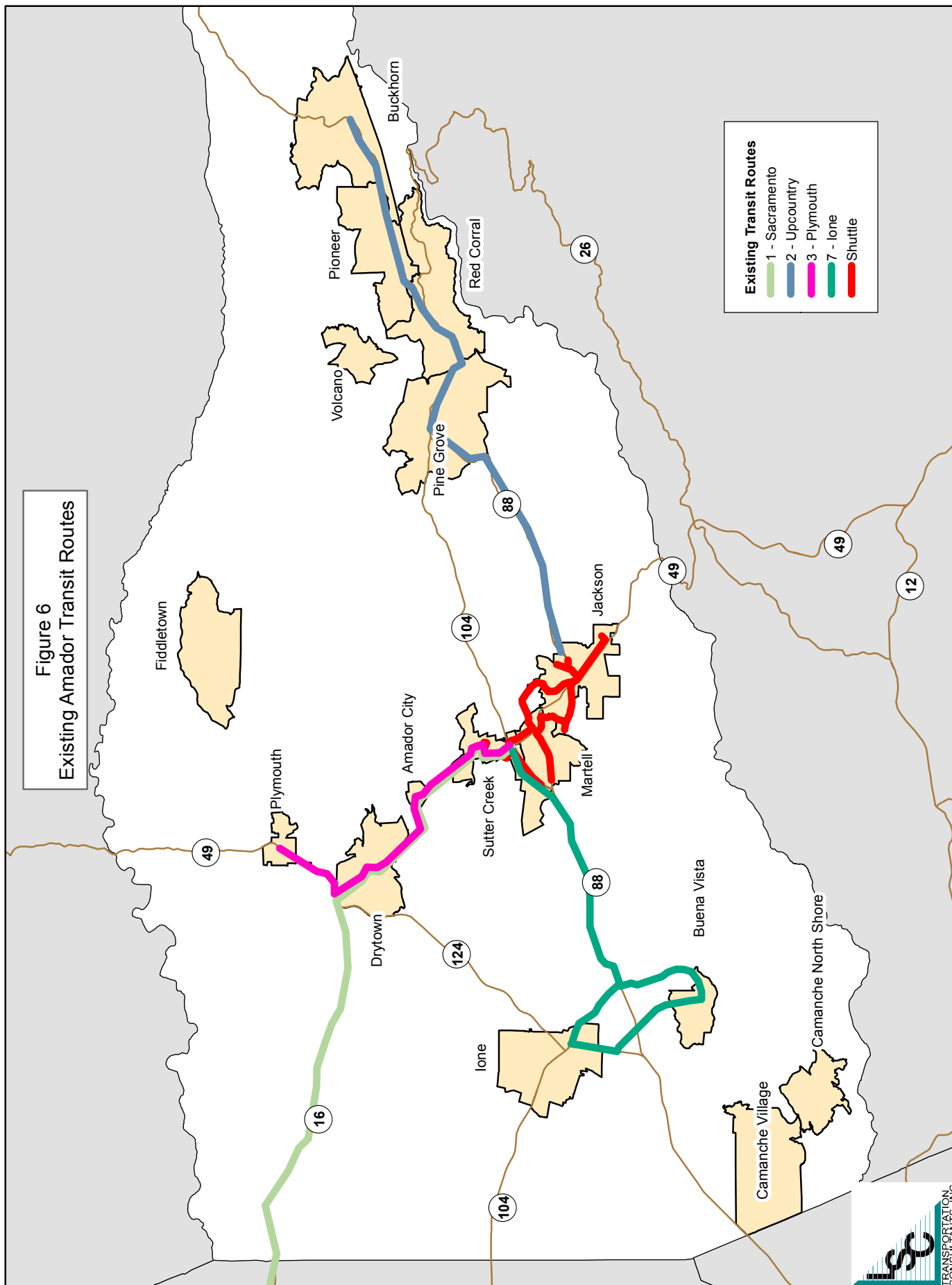


Figure 6
Existing Amador Transit Routes

Route 7: Lone – The Lone Route, formerly the I Route, is just over an hour round trip. The route departs the Sutter Hill Transit Center at 7:45 AM, 10:50 AM and 3:30 PM.

Dial-a-Ride (DAR) – Dial-a-Ride currently operates only in the Jackson-Sutter Service area, within three-quarters of a mile of regular fixed route service. Service was initiated on July 18, 2011.

Route Deviations – Outside of the DAR service area, the fixed-routes will deviate up to three-quarters of a mile to pick-up or drop-off an individual who qualifies for door-to-door service under the American with Disabilities Act guidelines. Route deviations are only allowed for ADA eligible passengers with approved applications.

Recent changes to the transit system include the following:

- **The newly constructed Sutter Hill Transit Center** serves as the main hub for all routes within the system. This allows for better transfers between routes and overall consistency within the system for passengers. The Dial-A-Ride service also uses the transit center for passengers transferring to fixed routes, or as a general stop.
- The routes are **no longer operated as deviated fixed routes** in the Jackson / Sutter Creek area as a result of the implementation of an ADA Dial-A-Ride service mentioned above. Doing so not only better serves the needs of the disabled community, but it provides more consistency and reliability on the fixed routes. Further, flag stops are in the process of being eliminated due to potential safety hazards, particularly along highway segments of routes.
- **The Kirkwood Skier Service was eliminated** due to low productivity.
- **Service frequency** (number of runs per day) has been reduced, in order to balance the operating budget in light of reductions in funding.

As a whole, the route structure serves the large majority of developed areas throughout the county, as well as providing service to Sacramento.

Amador Transit Fare Media

Fares for Amador Transit are \$1.00 on the shuttle for all passengers. On the local fixed routes, fares are \$2.00 for the general public, and \$1.00 for elderly, disabled or youths. Dial-a-Ride fares and route deviations, available only to ADA eligible passengers, are \$2.00 per trip.

Discounted monthly passes available to the elderly, disabled or youths can be purchased for \$40.00. Various multi-ticket options are available to all passengers. The Sacramento Express fare is \$5.50 per trip for the general public, or \$3.00 for RT pass-holders. For seniors and individuals with disabilities, the fare is \$3.15 per trip or \$1.75 for RT pass-holders. Student fares are \$4.50 or \$1.75 for RT pass-holders.

Amador Transit Revenues

Amador Transit revenues for FY 2010-11 and 2011-12 are shown in Table 10. As shown, a total of approximately \$1.3 million was collected for operating revenues. The largest single source of funds is the Local Transportation Fund, which totaled \$759,348, or 55 percent of the total operating revenues in 2010-11 and is projected to total \$741,250 in 2011-12. Other major sources of Amador Transit revenue include passenger fares (12 to 16 percent), and FTA Section 5311 grants (11 to 16 percent). State Transit Assistance Funds dropped from \$218,092 in 2010-11 to a projected \$54,400 in 2011-12. Capital revenues totaled \$841,363 in 2010-11 and \$452,525 in 2011-12, with FTA Section 5310 and 5311 as the main sources.

As Local Transportation Fund revenues comprise a large proportion of overall Amador Transit revenues, it is useful to review the recent history of this funding source. These funds are generated by a quarter-cent sales tax imposed statewide, and returned (minus administrative fees) by the State to the ACTC, which in turn allocates funds to specific transportation purposes. As shown in Table 11 and Figure 7, overall LTF revenues received by ACTC grew in the early 2000s, but dropped beginning in 2008-09. LTF available to the transit program dropped a full 37 percent between 2007-08 and 2009-10, but has since had a modest increase of 5 percent over the most recent two years. As of FY 2007-08, the local jurisdictions no longer receive LTF. While the proportion of funds used by ACTC (for purposes such as planning and administration) has increased over this time period, the amount of funds available to Amador Transit is now approximately 80 percent of LTF funds.

Amador Transit Expenses

Amador Transit operating expenses by line item for Fiscal Year 2011-12 are presented in Table 12. Expenses for the fiscal year totaled approximately \$1.2 million. Of this, \$515,796 (42 percent) was expended on operating personnel, and another \$359,069 (29 percent) can be attributed to vehicle costs. Lastly, administrative and facility costs totaled \$355,109 (also 29 percent) of the total expenditures for the fiscal year.

Amador Transit Operating Cost Model

Table 12 also presents a “cost model” for Amador Transit operations. This methodology assigns each cost line item to that service variable – vehicle-hour or vehicle-mile – that most closely determines the associated cost. For instance, fuel costs are largely a function of vehicle-miles operated, while driver salaries are a function of vehicle-hours operated. In addition, some annual operating costs (such as administrative salaries and facility maintenance costs) are “fixed” in that they typically do not vary with changes in service quantities. As shown in the bottom of Table 12, the resulting cost model for FY 2011-12 is as follows:

TABLE 10: Amador Transit Revenues

Operating Revenue	FY 2010-11 Actual	FY 2011-12 Budgeted
<i>Fare-Revenue</i>		
Fixed Route Fares	\$ 83,637	\$ 51,500
Dial-a-Ride Fares	\$ -	\$ 22,000
VMRC ¹ Contract	\$ 7,819	\$ 65,000
Sacramento Contract ²	\$ 77,418	\$ 65,000
<i>Subtotal</i>	<u>\$ 168,873</u>	<u>\$ 203,500</u>
<i>Non-Fare Revenue</i>		
Advertising Contracts	\$ 8,361	\$ 6,000
Local Transportation Fund (LTF)	\$ 759,348	\$ 741,250
Section 5310 Operating	\$ -	\$ 54,900
Section 5311 Operating	\$ 213,383	\$ 144,224
Section 5317 Operating	\$ 3,812	\$ 76,800
State Transit Assistance (STA)	\$ 218,092	\$ 54,400
RTAP	\$ -	\$ 2,000
ACTC Expense Sharing	\$ 3,000	\$ 6,000
Other	\$ -	\$ 5,900
<i>Subtotal</i>	<u>\$ 1,205,996</u>	<u>\$ 1,091,474</u>
Total Operating Revenues	\$ 1,374,870	\$ 1,294,974
Capital Revenue	FY 2010-11	FY 2011-12
Local Transportation Fund (LTF)	\$ 60,000	\$ -
Section 5311 ARRA Grant	\$ 273,363	\$ -
Section 5317 Capital	\$ -	\$ 62,000
Section 5310 Capital	\$ 508,000	\$ 265,000
Prop 1B Cal-EMA	\$ -	\$ 33,000
Capital Reserves	\$ -	\$ 57,525
PTIMSEA Bus Replacement	\$ -	\$ 35,000
Total Capital Revenues	\$ 841,363	\$ 452,525
<p>Note 1: VMRC = Valley Mountain Regional Center</p> <p>Note 2: Categorized as non-fare in 2010-11, and correctly as fare revenue in 2011-12</p> <p>Source: Amador Transit</p>		

TABLE 11: Amador County Local Transportation Fund History

Fiscal Year	LTF (Includes Interest)	Amador Transit	ACTC	Ped/Bike	Local Jurisdictions	Percent of Total		Total Percent Change	
						Percent Available for Amador Transit	Local Jurisdictions	Total	Percent Available for Amador Transit
2004-05	\$1,078,021	\$600,000	\$154,000	\$16,720	\$307,301	56%	29%	--	--
2005-06	\$1,141,479	\$838,000	\$144,000	\$17,120	\$142,359	73%	12%	6%	40%
2006-07	\$1,235,999	\$998,620	\$56,000	\$20,380	\$160,999	81%	13%	8%	19%
2007-08	\$1,220,753	\$1,034,753	\$245,000	\$21,000	\$0	85%	0%	-1%	4%
2008-09	\$1,039,529	\$733,669	\$287,000	\$18,860	\$0	71%	0%	-15%	-29%
2009-10	\$895,171	\$657,000	\$238,171	\$0	\$0	73%	0%	-14%	-10%
2010-11	\$874,258	\$717,558	\$156,700	\$0	\$0	82%	0%	-2%	9%
2011-12	\$900,000	\$741,250	\$158,750	\$0	\$0	82%	0%	3%	3%

Source: ACTC, 2012

**FIGURE 7:
Transportation Development Act Funding History**

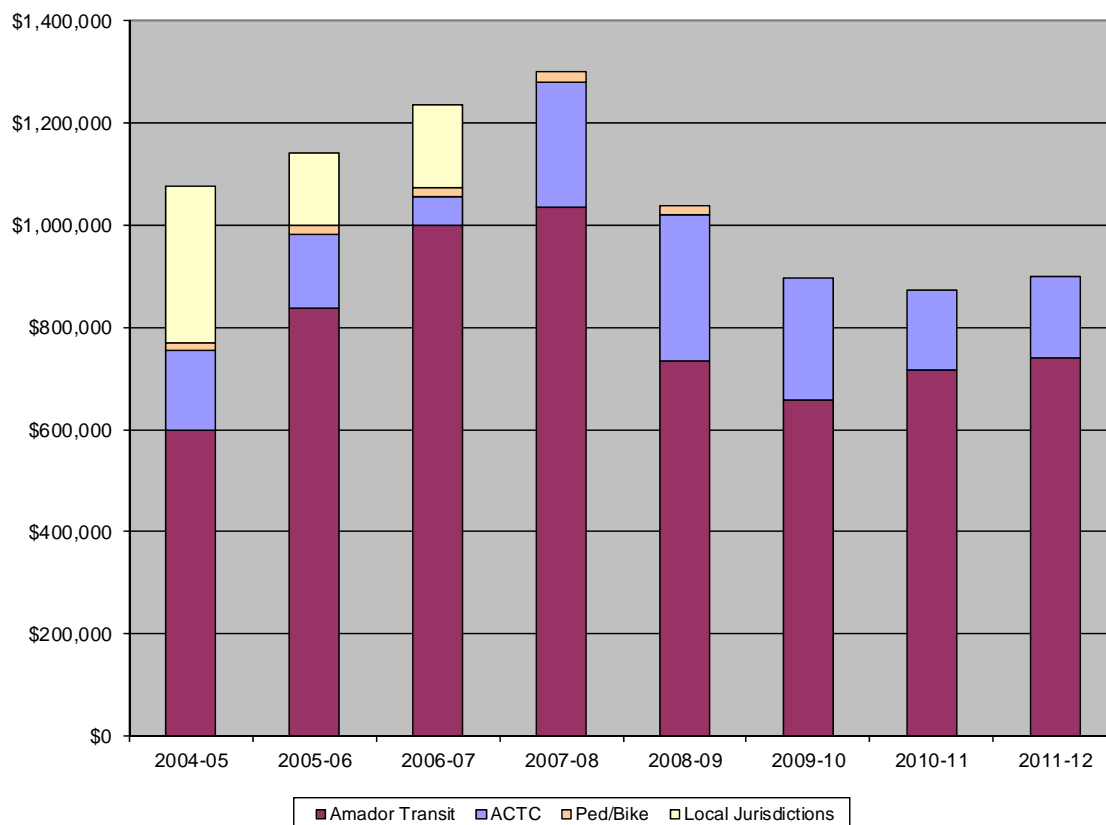


TABLE 12: Amador Transit Fiscal Year 2011-12 Expenses & Cost Allocation

Line Item	Allocation			Total Expense
	Fixed	Hourly	Per Mile	
Operating Personnel Expenses				
Salaries/Wages: Drivers, Maintenance		\$376,700		\$376,700
Benefits		\$139,096		\$139,096
Subtotal: Personnel	\$0	\$515,796	\$0	\$515,796
Administrative Expenses				
Administration Salary	\$156,135			\$156,135
Administration Benefits	\$57,652			\$57,652
Communications	\$10,000			\$10,000
Facility Expenses	\$55,900			\$55,900
Office Expenses	\$11,072			\$11,072
Transit Center Expenses	\$5,800			\$5,800
Contract IT Services, Software	\$1,000			\$1,000
Legal Counsel, Notices	\$9,000			\$9,000
Advertising, Marketing, Print Materials	\$20,000			\$20,000
Driver Training, Safety, etc.	\$8,000			\$8,000
Travel, Meetings, Subscriptions, Misc.	\$5,050			\$5,050
Professional/Specialized Service	\$15,500			\$15,500
Subtotal: Administrative	\$355,109	\$0	\$0	\$355,109
Vehicle Expenses				
Mechanic Salary			\$123,500	\$123,500
Mechanic Benefits			\$45,602	\$45,602
Vehicle Technical Services (outsourced)			\$20,000	\$20,000
Insurance--vehicles		\$800		\$800
Fuel & Lubrication			\$119,500	\$119,500
Tires			\$11,000	\$11,000
Maintenance-Equipment			\$38,667	\$38,667
Subtotal: Vehicles	\$0	\$800	\$358,269	\$359,069
Total Bus Service Expenses	\$355,109	\$516,596	\$358,269	\$1,229,974
Service Factors for FY 2011-12		Vehicle Service Hours	Vehicle Service Miles	
		11,870	215,600	
Vehicle Service Hour Cost Factor	\$43.52			
Vehicle Service Mile Cost Factor	\$1.66			
Annual Fixed Cost	\$355,109			
Note: Costs per service factor are for bus service only and exclude purchased transportation.				
Source: Amador Transit System Budget, LSC Transportation Consultants, Inc				

$$\begin{aligned} \text{Annual Operating Cost} = & \$43.52 \times \text{vehicle-hours of service} + \\ & \$1.66 \times \text{vehicle-miles of service} + \\ & \$355,109 \text{ fixed costs} \end{aligned}$$

This equation can be used both to evaluate the costs associated with service changes, as well as to allocate operating costs to particular routes. It provides a more accurate estimate of costs for a particular service element than a total per-hour or per-mile cost factor.

Amador Transit Operating Characteristics

While the hours of service and ridership have declined dramatically since the 2008 TDP and the beginning of the recession, services have stabilized and are beginning to show an increase in ridership. In 2011, ridership increased from 3,788 passenger-trips in July to 5,212 passenger-trips in November, dropping slightly in December to 4,992 passenger-trips (probably a reflection of the holiday period). The following presents a more detailed look at the ridership and operating characteristics for Amador Transit.

Annual Ridership and Operating Quantities

Amador Transit annual ridership characteristics systemwide for Fiscal Year 2010-2011 is presented in Table 13. As shown, total annual fixed route ridership was 76,371 one-way passenger-trips during the Fiscal Year. Since then, service changes have included the introduction of demand response service as well as elimination of services to address funding reductions. In Fiscal Year 2010-2011, the Shuttle route carried the greatest number of passengers, with 34,935 passenger-trips. This figure represents roughly 46 percent of the systemwide ridership, indicating that the route is serving a popular activity centers that attract substantial ridership, and is thus important to meeting the needs of the area residents. The Lone route carried roughly 13,186 passengers, followed by the commuter route (Sacramento County Express) with 11,431 passenger-trips and Mace Meadows with 10,332 passenger-trips. The Mokelumne Hill and Plymouth routes both carried significantly fewer passengers, with 3,120 and 3,367 passenger-trips, respectively.

As also presented in the table, annual vehicle service miles totaled 234,350, and 11,706 vehicle service hours were operated during the 2010-2011 Fiscal Year. During the year, the greatest amount of service was provided on the Shuttle service (5,633 hours and 65,262 miles), followed by the Sacramento Express route (1,374 hours and 58,691 miles). Other local fixed routes with higher levels of service included the Lone route (1,571 hours and 41,410 miles) and the Mace Meadows route (1,796 hours and 40,048 miles).

Ridership by Type of Fare Paid

Table 14 presents the total ridership by type of fare paid during Fiscal Year 2010-2011. As presented, elderly and disabled fares comprised the majority of fares paid (36,379 one-way

TABLE 13: Annual Operating Data By Route - Fiscal Year 2010 - 2011

	Route						Total
	lone	Mace Meadows	Mokelumne Hill	Plymouth	Shuttle	Sac County Express	
Passenger Trips	13,186	10,332	3,120	3,367	34,935	11,431	76,371
Vehicle Service Hours	1,571	1,796	738	592	5,633	1,374	11,706
Vehicle Service Miles	41,410	40,048	13,786	15,154	65,262	58,691	234,350
Passenger Trips per....							
Vehicle Service Hour	8.39	5.75	4.22	5.68	6.20	8.32	6.52
Vehicle Service Mile	0.32	0.26	0.23	0.22	0.54	0.19	0.33

Source: Amador Transit Services, 2012

TABLE 14: Amador Transit Ridership by Fare Type - Fiscal Year 2010 / 2011

	General	Elderly / Disabled	Wheelchair Passenger	ARC Contract	Student	Non-Revenue	Day Pass	Total Trips
lone	839	7,957	121	0	2,760	1,041	468	13,186
Mace Meadows	1,708	2,280	2	0	4,403	123	1,816	10,332
Mokelumne Hill	336	1,156	23	0	1,361	99	145	3,120
Plymouth	229	1,466	1	1,230	28	8	405	3,367
Shuttle	4,161	20,386	2,499	0	2,909	2,755	2,225	34,935
Sac County Express	7,336	3,134	6	0	875	80	0	11,431
Total Trips	14,609	36,379	2,652	1,230	12,336	4,106	5,059	76,371

Source: Amador Transit Services, 2012

fares or 47.6 percent), followed by general fares (14,609 one-way fares or 19.1 percent) and students (12,336 one-way fares or 16.2 percent). Note these figures include monthly passes and transfers. The ARC contract passengers totaled 2,652 one-way fares, which were exclusive on the Plymouth route. A total of 2,652 passengers used wheelchairs, with the greatest number riding the Shuttle route (2,499 passengers).

This information is useful in evaluating the type of passengers using the various Amador Transit services. Interestingly, a relatively high proportion of overall ridership on Amador Transit is made up of elderly and disabled residents. However, these proportions vary substantially between routes; for example 58.3 percent of the passengers on the Shuttle route were elderly and disabled, while in contrast, only 27 percent of the Mokelumne Hill route passengers were elderly and disabled. The general public, not surprisingly, generated the majority of riders on the Sacramento County Express route (64.2 percent). Students generate the majority of riders on the Mace Meadows route (42.6 percent) and the Mokelumne Hill route (43.6 percent). Overall, this data reflects the many functions that Amador Transit fulfills for area residents.

Amador Transit Service Performance

The ridership and financial data can be used to conduct a “route performance analysis” to gain further insight into the efficiency and effectiveness of Amador Transit’s service. Ridership and operating statistics for July to December 2011 were reviewed to identify average passenger activity, fares and operating quantities. While a full year of analysis is preferable, due to service changes and changes in record-keeping, this provides the most accurate picture of current service performance. The best performance measure regarding the *effectiveness* of each route is the passenger-trips per vehicle-hour of service. The best measure of the *efficiency* of each service is the operating subsidy per passenger-trip. Ridership from July to December 2011 is presented in Table 15.

TABLE 15: Amador Transit Ridership, July to December, 2011

Routes	Ridership						Total
	July	Aug	Sept	Oct	Nov	Dec	
Ione	372	370	408	620	665	460	2,895
Upcountry	336	355	375	468	432	406	2,372
Mokelumne Hill	94	131	95	128	123	139	710
Plymouth	156	47	288	249	211	227	1,178
Shuttle	1,351	1,876	1,580	1,635	1,581	1,710	9,733
Sac County Express	872	1,001	916	822	726	677	5,014
DAR	607	810	882	928	1,474	1,373	6,074
Systemwide	3,788	4,590	4,544	4,850	5,212	4,992	27,976

Source: Amador Transit and LSC Transportation Consultants Inc.

A strong indicator of the transit system’s effectiveness is the number of passengers carried per hour of service, presented in Table 16. Most of the services show strong trends toward improved effectiveness, particularly the Ione service (from 3.8 passengers per hour in July, to 7.5 in December and as high as 11.4 in November) and the Dial-a-Ride service (from 3.8 passengers per hour in July, to 7.5 in December and as high as 11.4 in November). Despite a large shift of passengers from the Shuttle to the Dial-a-Ride in July of 2011, the Shuttle ridership showed steady improvement as well, from 2.2 passengers per hour in July to 4.6 in December.

A strong indicator of the transit system’s efficiency is the subsidy per passenger trip. Using the cost allocation formula presented above, and adding in the fixed costs divided by hours of service, the per-hour cost is estimated at \$73.44 and the per-mile cost is estimated at \$1.66. By subtracting out the fares paid on each service, this cost allocation can be used to estimate the subsidy per passenger trip for data from July 2011 to December 2011, which provides the most accurate route-level data available to date. This data is shown in Table 17.

TABLE 16: Amador Transit Passengers per Hour of Service

Routes	Passengers per Hour						Average
	July	Aug	Sept	Oct	Nov	Dec	
Ione	3.8	5.2	6.3	10.1	11.4	7.5	7.4
Upcountry	2.7	2.3	2.7	3.6	3.5	3.1	3.0
Mokelumne Hill	3.1	3.6	2.9	4.1	4.1	4.4	3.7
Plymouth	10.3	2.6	17.1	15.6	13.9	14.2	12.3
Shuttle	2.2	4.4	4.1	4.4	4.5	4.6	4.0
Sac County Express	8.3	7.8	7.8	7.4	6.9	6.1	7.4
DAR	3.0	3.4	4.0	4.7	7.8	7.3	5.0
Systemwide	3.2	4.3	4.6	5.3	6.0	5.5	4.8
80% of Systemwide Average							3.8

Source: Amador Transit and LSC Transportation Consultants Inc.

TABLE 17: Amador Transit Subsidy per Passenger Trip

Routes	Subsidy Per Passenger Trip (July-December, 2011)						Average
	July	Aug	Sept	Oct	Nov	Dec	
Ione	\$29.66	\$21.56	\$16.73	\$9.90	\$8.54	\$13.75	\$16.69
Upcountry	\$42.43	\$48.07	\$41.22	\$31.00	\$31.83	\$35.91	\$38.41
Mokelumne Hill	\$35.76	\$31.16	\$39.82	\$28.08	\$28.06	\$25.80	\$31.44
Plymouth	\$15.96	\$56.65	\$8.02	\$8.95	\$10.07	\$9.83	\$18.25
Shuttle	\$40.01	\$22.57	\$24.49	\$22.43	\$21.96	\$21.26	\$25.45
Sac County Express	\$13.45	\$13.80	\$13.81	\$14.96	\$16.21	\$18.53	\$15.13
DAR	\$27.16	\$24.52	\$20.44	\$16.85	\$10.87	\$12.17	\$18.67
Systemwide	\$29.94	\$23.49	\$21.51	\$18.78	\$16.79	\$18.49	\$21.50

Note: Based on fixed and hourly costs divided by service hours (\$73.44) and per mile cost (\$1.66).

Source: Amador Transit and LSC Transportation Consultants Inc.

In terms of subsidy per passenger trip, the best performing routes currently are the Sac County Express, Ione, Plymouth and the Dial-a-Ride services. The poorest performers are the Upcountry Service, Mokelumne Hill, and the Shuttle. It should be noted that the trend on all of the services except the Sacramento County route shows that the subsidy per passenger trip is decreasing in general due to continued improvements in reducing operating costs and an increase in fare revenue as ridership grows.

Amador Transit System Capital Assets

Amador Transit Vehicle Fleet

As shown in Table 18, Amador Transit has a total vehicle fleet of eighteen vehicles, two of which are out of service. One vehicle, a staff support vehicle, is not equipped with wheelchair tie downs, while two additional staff support vehicles have capacity for 2 wheelchair users. The transit service fleet includes two commuter vehicles that can carry up to 32 passengers and two wheelchair users, two 30 passenger vehicles with capacity for two wheelchair users, eight vehicles that carry 20 passengers and either 2 or 4 wheelchair users, and one 16 passenger capacity vehicle with capacity for 2 wheelchairs.

Amador Transit's fleet consists of diesel and gasoline-fueled vehicles, and have been retrofitted to comply with CARB requirements. As shown in the table, many of the vehicles have reached or exceeded their useful life and are planned for replacement in the short-term. Later in the report, alternatives regarding appropriate fuel types will be discussed for Amador County.

Amador Transit Passenger Facilities

Along the Amador Transit bus routes, there are a total of 18 stops with amenities, as shown in Table 19. These include:

- *Sutter Hill*: Two shelters are located at SR 49 and Ridge Road – one at the northeast corner and the other at the southwest corner. A bench is located at Academy Drive and Bowers Lane.
- *Jackson*: Four shelters are located in Jackson – Argonaut Lane and Westview Drive, New York Ranch Road and Rollingwood, Court Street and Placer Drive, and Petkovich Park. One bench is located at 150 Main Street.
- *Pine Grove*: Four shelters are located in Pine Grove – Pine Acres Resort, Gayla Manor, Ranch House Estates and Pine Grove Town Hall.
- *Pioneer*: There are three shelters located in Pioneer: Highway 88 and Silver Drive, Mace Meadows, and Amador Station. There is also a shelter located in the Buckhorn area, at the Payless IGA Market. Additionally, there is a bench at Highway 88 and Pioneer Creek Road.
- *Ione*: One formal bus shelter is located at the Ione Park-n-Ride on Main Street.

In 2012, the new Amador Transit passenger facility, the Sutter Hill Transit Center, was completed and began functioning as the main transit hub for the county. The site is located on Valley View Way and Bowers Road in Sutter Hill. The facility has space for six vehicles, as well as automobile parking. Passenger amenities include indoor and outdoor waiting areas with seating, restrooms and transit service information. In addition, the Amador Tourism Council operates out of this space, providing information on activities in the county for passengers and the general public.

TABLE 18: Amador Transit Vehicle Fleet and Replacement Plan

#	Year	Make/Model	Mileage	Seating	Wheel- Chair Tie Downs	Fuel	Service Used For	End of Useful Life ¹	Planned Replacement	Funding Source		
										Year Funded	Primary Source	Match Fund
1	2004	Chevy Suburban 4x4	97,071	8	0	Gas	Staff	--	--			--
2	2002	Freightliner Glaval	268,416	32	2	Diesel	Commuter	2009	2014	2013/14	PTMISEA	100% funded
14	1998	Ford El Dorado Aerotech 240	382,667	20	2	Diesel	Fixed Route	2005	2012 ³	2011/12	5310	100% funded
15	1998	Ford El Dorado Aerotech 240	408,541	20	2	Diesel	Fixed Route	2005	2012 ³	2009/10	5310	PTMISEA
16	1998	Ford El Dorado Aerotech 240	335,417	20	2	Diesel	Fixed Route	2005	2012 ³	2011/12	5310	100% funded
17	1998	Ford El Dorado Aerotech 240	440,204	20	2	Diesel	Fixed Route	2005	2012 ³	2009/10	5310	PTMISEA
18	1999	Ford El Dorado Aerotech	333,067	20	2	Diesel	Fixed Route	2006	2012 ³	2009/10	5310	PTMISEA
19	1999	Ford El Dorado Aerotech	336,518	20	2	Diesel	Fixed Route	2006	2012 ³	2011/12	5310	100% funded
27	2002	Ford Goshen GC2	206,849	20	4	Diesel	DAR	2009	2013	2011/12	PTMISEA	100% funded
28	2002	Ford Goshen GC2	241,235	20	4	Diesel	DAR	2009	2013	2011/12	PTMISEA	100% funded
29	2006	Chevy EL Elite 320 C5500	118,811	30	2	Gas	Fixed Route	2013	2013	2011/12	PTMISEA	100% funded
30	2006	Chevy EL Elite 320 C5500	127,007	30	2	Gas	Fixed Route	2013	2014	2013/14	PTMISEA	100% funded
31	2009	Ford Glaval E-450	56,311	16	2	Gas	Fixed Route	2016	2016	2016/17	Seek Funds	Seek Funds
32	1997	Dodge Caravan	105,710	6	2	Gas	Staff	--	--			--
33	1997	Dodge Caravan	133,697	6	2	Gas	Staff	--	--			--
34	2009	GMC Glaval C5500	70,848	32	2	Diesel	Commuter	2016	RT Vehicle			RT Vehicle
35	2004	Freightliner Trolley	220,455	32	2	Dual Fuel ²	Out of Service	--	--			--
36	2004	Freightliner Trolley	227,995	32	2	Dual Fuel ²	Out of Service	--	--			--

Note 1: Per Caltrans recommendations: 7 years or 200,000 miles (medium-sized, medium-duty transit buses, approximately 30 feet) or 5 years or 150,000 miles (medium-sized, light duty transit buses approximately 25 to 35 feet).

Note 2: Dual Fuel = Diesel/CNG

Note 3: Funding received; to be ordered soon.

Source: Amador Transit, 2012

TABLE 19: Existing Amador Transit Bus Stop Facilities

Location	Amenities	Routes Served
Sutter Hill Transit Center, Sutter Hill	Office, Restroom, Waiting Area	All
150 Main Street, Jackson	Bench	2, 5
Academy Drive and Bowers Lane, Sutter Hill	Bench	5
Highway 49 and Ridge Road, Sutter Hill (NE Corner)	Shelter	5
Highway 49 and Ridge Road, Sutter Hill (SW Corner)	Shelter	5
Argonaut Lane and Westview Drive, Jackson	Shelter	2, 5
New York Ranch Road and Rollingwood, Jackson	Shelter	5
Court Street and Placer Drive, Jackson	Shelter	5
Pine Acres Resort, Pine Grove	Shelter	2
Gayla Manor, Pine Grove	Shelter	2
Ranch House Estates, Pine Grove	Shelter	2
Highway 88 and Pioneer Creek Road	Bench	2
Payless IGA Market, Buckhorn	Shelter	2
Highway 88 and Silver Drive, Pioneer	Shelter	2
Mace Meadows, Pioneer	Shelter	2
Amador Station, Pioneer	Shelter	2
Pine Grove Town Hall, Pine Grove	Shelter	2
lone Park-n-Ride, Main Street, lone	Bench	7
Petkovich Park, Jackson	Shelter	2, 5
<i>Source: Amador Transit, 2012</i>		

Operations and Maintenance Facility

Operations and administration functions for Amador Transit are conducted at the old Amador Transit Terminal, located at 11400b American Legion Drive. While the mailing address is in Jackson, the physical location is considered Martell, and the schedule identifies the location as Sutter Hill. The Amador Transit operations offices are located in the main building. While the Amador County Transportation Commission staff was also housed at this location until recently, they now operate out of a new facility located adjacent to the new Transit Center.

The maintenance facility includes four bays with the capacity for four small vehicles. Currently, due to constraints on office space, there are mobile office facilities located to the rear which does not allow for vehicles to pull through the facility – vehicles must access on the south side only. Most vehicle maintenance activities are performed on-site, with the exception of tire changing, transmission rebuilds, and body work.

OTHER TRANSPORTATION SERVICES IN AMADOR COUNTY

A number of other transportation services operate in Amador County besides Amador Transit. From taxicab companies, to the school district and a number of social service providers, each is described in the following pages.

Visitor Tour Buses

There are numerous tour companies that operate tour bus activities in Amador County. Tours include trips to local casinos, mines, farms, wineries, ghost towns, cemeteries and to the snow country. The largest of the tour companies is Gold Country Wine Tours, which operates out of Amador County.

Blue Mountain Transit

Blue Mountain Transit is a private van service, based in San Andreas, which contracts with VMRC to provide transportation to The Arc program in Sutter Hill. The vehicles pick up developmentally disabled clients at their homes in the morning and bring them to the site, returning them in the afternoon. In addition, Blue Mountain is available for charter service on weekends.

Amador Unified School District Transportation

The school district in Amador County serves approximately 2,000 students daily, or 720,000 passenger-trips annually. In previous years, the service was suspended for several weeks due to safety issues. During this period, Amador Transit used every available vehicle throughout the day to accommodate the increased ridership.

Taxicab Companies

Amador Pioneer Cab Company, located in Jackson, is one of two taxicab companies operating in Amador County. Pioneer operates two vehicles during peak periods. Fares are \$2.50 per pick up plus \$2.00 per mile traveled.

Delta Sierra Cab, located in Lone, operates 24 hours per day. Current passenger fares are \$2.75 per mile traveled, with no pick-up fee.

Vanpool Programs

The Foothill Rideshare program was developed in response to increased population in Amador, Calaveras and Tuolumne Counties and the long commutes that are associated with the residents, particularly due to a low job to housing ratio in these areas. The program was a collaborative effort between the three counties and made possible through grants including Valley Clean Air Now and Caltrans. As of 2011, Amador County withdrew from this program.

Calaveras Transit

Calaveras Transit provides service to Mokelumne Hill three times per day. Timed transfers are available in Jackson with Amador Transit; departures at Raley's are at 9:07 AM, 12:00 PM and 3:08 PM.

Other Social Service Transportation Providers

Amador Support, Transportation and Resource Services (STARS)

Amador STARS oversees cancer patient transportation services to radiation and chemotherapy treatments in Sacramento, Stockton, Lodi and Amador County. There are three vans provided, one for each of the above locations, which leave the STARS office at a designated time. Pick up from Lodi and Plymouth may be arranged as well. All drivers are volunteers and there are no costs to clients associated with this service.

Area 12 Agency on Aging

The Agency on Aging utilizes Title IIIB funds to provide transportation services for adults over 60 years of age. AAA provided funds for a wheelchair accessible van to Common Ground Senior Services. The agency, through contracted service providers, is responsible for transportation to and from medical appointments within the County on an as needed and as available basis.

Amador County Social Services

The Amador County Mental Health Department provides door to door transportation for clients in order to meet appointments with therapists and doctors on-site. The program is partially funded through Cal Works and Proposition 36. The Social Services department also provides transportation for job programs and classes in the mornings and afternoons, depending on the program.

The Arc of Amador and Calaveras County

The Arc serves developmentally disabled persons in Amador and Calaveras counties. Transportation is part of their overall program, which includes a day program in Sutter Hill, a job program and an after-hours recreation program. The Arc has six vans in Amador County, two of which are wheelchair lift-equipped. In addition to the transportation The Arc provides in-house, the VMRC purchases transportation services for The Arc through both Blue Mountain Transit and Amador Transit.

Mother Lode Job Training Agency

Mother Lode Job Training offers employment and training to residents of Amador County. They provide clients with either Amador Transit passes or mileage reimbursement. Transportation needs vary greatly depending on client load and whether or not clients have operable vehicles.

Senior Services, Inc.

Senior Services assists seniors throughout the County, including a transportation program called "Common Grounds," which uses volunteers with private cars to transport clients (over the age of 60, disabled persons and low income residents) locally for medical trips. A lift-equipped van is available to provide trips (with advance notice), but most of the trips are provided with volunteer vehicles. The transportation is funded through an Area 12 Agency on Aging grant and operates Monday through Friday, 8:00 A.M. to 5:00 PM.

According to information discussed at SSTAC meetings, there is an increasing demand for senior transportation as elderly people struggle to maintain their independence in the face of an insufficient number of skilled nursing facilities in Amador County. In addition, oncology or dialysis services are no longer available in Amador County, which dictates the need for non-emergency medical transportation to Stockton and Sacramento.

Community Compass

The Community Compass is a behavioral management program, offering services to developmentally disabled residents of Amador County. Programs and services include social skills development, public transportation training, personal management, recreation/leisure skills and vocational assessment and training. During the program hours of 8:00 A.M. and 3:00 P.M., Community Compass provides transportation free of charge to their clients. The transportation, provided by staff drivers, is available for rides to and from work, activities, and pick up/drop off at the client's residence.

American Legion

The American Legion Post 108 provides ambulance services for a fee to residents of Amador and Calaveras Counties. Trips must originate or terminate in either of these locations, and ambulance trips are limited to a maximum length of 60 miles. Sacramento, Stockton, and Modesto, where a number of medical facilities are located, are within the 60-mile range.

LAND USE, DEMOGRAPHIC AND TRAFFIC FORECASTS

This chapter presents a review of various forecasts of future conditions in Amador County, focusing on factors that pertain to potential transit needs. These forecasts of development, population and travel demand are used in the subsequent chapter as basis for an assessment of transit demand and ridership.

LONG RANGE PLANS AND FORECASTS

Planned Land Use and Developments

Amador County has experienced rapid growth over the past decade, with a focus on residential and commercial developments. The county, which is heavily dependent on tourism, is slowly developing other industries as well. Major casinos, such as the Jackson Rancheria, have been developed, with the potential for other casinos in the Lone and Plymouth areas. In the past decade, major commercial developments have been constructed in the Martell area, creating more need for services between Sutter Creek and Jackson. However, like many other areas in California, development has declined in recent years as a result of the economic downturn. The following is a summary of the more prominent and large-scale development projects that are in review or have been recently approved:

- Golden Vale: The Golden Vale subdivision includes 607 single- and multi-family residential units and commercial space on 383 acres in Martell. This project has not yet been submitted for formal action, and has only been presented in concept.
- Creekside at Jackson: Located in Jackson along the South Jackson SR 49 corridor, this project proposes 400 residential units on 277 acres. The project has been presented in concept and is awaiting formal submittal.
- Zinfandel: The Zinfandel proposal, located in Plymouth along the SR 49/SR 16 corridor, includes 350 residential units on 365 acres. The land for the project has been annexed and the tentative map, development plan design guidelines and development agreements have been approved.
- Gold Rush: The largest of the currently proposed or approved projects, this proposal would include 1,334 new residential units on 945 acres, 300 timeshare units at the Golf Course and a 60-room hotel, along the Ridge and SR 88 corridor in the Sutter Creek/Sutter Hill area. This project has been approved but has yet to be constructed.
- Gold Country Plaza at Sutter Hill: This commercial project located in Sutter Hill at the SR 49 and SR 104 intersection proposes 139,430 square feet of commercial space on 11.6 acres. The project has been approved.

- Shenandoah Ridge: This residential project consists of 137 single-family residential units, primarily semi-custom homes, on 148 acres. The site has been annexed into the City of Plymouth, and has received approval for the tentative map, development plan design guidelines and development agreement.
- Pine Acres North: This mixed-use development includes single-family and multi-family residences totaling 106 units on 44.2 acres in the community of Pine Grove. The project has received approval for the tentative map.

Additional projects are currently in process in the County. Amador County has identified a total of 408 residential units planned for development (beyond the major projects identified above), including 241 single-family residences and one 67-unit condo development. The majority of this development is occurring in the Pine Grove / Pioneer / Buckhorn area. Additionally, a condominium development and a single-family residential project (with 21 units) are planned for the Kirkwood resort area of the County. The recent purchase of the ski area by the Vail Corporation may also spur additional development in the Kirkwood area.

Demographic and Development Forecasts

The California Department of Finance has projected the population for Amador County in ten-year increments, as presented in Table 20. The countywide population growth rate is expected to remain relatively steady through 2020, averaging approximately 1.5 percent growth per year. According to the Department of Finance, the population in Amador County will increase by approximately 53 percent by the year 2040 from 2010 levels.

Table 20 also presents population projections by age. These forecasts are useful in considering future trends in demand for transit services:

- Countywide total population is forecast to increase by 14,451 or 36 percent between 2010 and 2030. This represents an annual growth rate of 1.5 percent.
- Over a third (37 percent) of this future growth in population by 2030 will consist of elderly residents (defined by age 60 and above), which are forecast to increase by a full 7,024 persons. Within this elderly population increase, more than half (57 percent) will consist of older seniors age 75 and above that are more likely to need “door to door” transportation services.
- Reflecting the aging of the Baby Boom generation, the greatest increase in younger seniors will occur between 2010 and 2020, followed by the greatest increase in older seniors between 2020 and 2030.
- The number of children (less than 10 years of age) and youth (age 10 to 19) is forecast to increase very slowly in the next decade, followed by a consistent increase. Any appreciable increase in youth population (a group with a relatively high demand for transit service) does not occur until after 2020.

TABLE 20: Amador County Population Forecast

	2000	2010	2020	2030	2040	2050	Change 2010 - 2040	% Change 2010 - 2040
<u>Total Population</u>	35,357	40,337	47,593	54,788	61,550	68,487	21,213	53%
<u>Subtotal by Age</u>								
Children (0 to 9 yrs)	3,308	3,082	4,309	4,477	5,104	5,888	2,022	61%
Youth (10 to 19 yrs)	4,855	4,765	4,818	6,168	6,336	6,963	1,571	32%
Adult (20 to 64 yrs)	20,780	24,017	26,357	28,646	32,787	35,986	8,770	42%
Younger Senior (65 to 74 yrs)	3,480	4,746	6,922	7,780	7,431	8,602	2,685	77%
Older Senior (75+ yrs)	2,934	3,727	5,187	7,717	9,892	11,048	6,165	210%
<u>Change by Decade</u>								
Total Population	--	4,980	7,256	7,195	6,762	6,937		
Children (0 to 9 yrs)	--	-226	1,227	168	168	784		
Youth (10 to 19 yrs)	--	-90	53	1,350	4,141	627		
Adult (20 to 64 yrs)	--	3,237	2,340	2,289	-349	3,199		
Younger Senior (65 to 74 yrs)	--	1,266	2,176	858	-349	1,171		
Older Senior (75+ yrs)	--	793	1,460	2,530	2,175	1,156		
<u>Percent of Total</u>								
Children (0 to 9yrs)	9%	8%	9%	8%	8%	9%		
Youth (10 to 19yrs)	14%	12%	10%	11%	10%	10%		
Adult (20 to 65 yrs)	59%	60%	55%	52%	53%	53%		
Younger Senior (65 to 74 yrs)	10%	12%	15%	14%	12%	13%		
Older Senior (75+ yrs)	8%	9%	11%	14%	16%	16%		

Source: California Department of Finance, Demographic Research Unit

Overall, these forecasts indicate substantial shifts in the demand for public transportation services over the long term, particularly towards increasing needs for seniors.

Traffic Model Forecasts

Given that a preponderance of travel (particularly for longer trips) in Amador County is via private vehicles, the Amador County traffic model (as presented in the Amador County Regional Transportation Plan) is a very good source of forecasts for overall travel demand both between areas of Amador County as well as external to the county.

Traffic Volume Forecasts

Table 21 presents a summary of 2010 and 2030 Daily Traffic volume estimates on major roadways, as well as Level of Service. A review of this table indicates the following:

- The greatest increase in absolute traffic activity is forecast to occur on the SR 49 corridor between Jackson and Martell. The location with the single greatest increase in daily traffic volumes is the segment between SR 49-88 in Martell and Argonaut Lane in Jackson, with an increase in 7,960 vehicles.
- On a *percentage* basis, the greatest increases are forecast on SR 88 north of Pioneer, where volumes are forecast to increase from 1,500 to 8,610 vehicles, or 474 percent, and on Camanche Parkway southwest of Lone between the San Joaquin County line and Buena Vista Road where volumes increase from 1,280 to 2,950, or 130 percent. Hoffman Road in Jackson between SR 88 and Argonaut Lane is forecast to have a relatively high proportionate increase, with 123 percent greater traffic volumes.
- Traffic volumes on SR 49 over the Amador/Calaveras county line are forecast to increase by 41 percent, as well as by 35 percent on SR 26, inferring a corresponding substantial increase in demand for transit services between the two counties.
- As a basis for evaluating future need for commuter services to the Central Valley, it is worthwhile to review traffic volume forecasts crossing Amador County's western boundary. The greatest growth is forecast on SR 88 into San Joaquin County (2,580 additional daily vehicle-trips), followed by 1,670 additional vehicles on Camanche Parkway and 590 additional daily vehicles via SR 104. In comparison, growth in daily traffic at the Sacramento County line is not as significant, with a 1,520 increase in daily traffic via SR 16 and only a 460 increase in daily traffic on Michigan Bar Road. This indicates a relatively high growth in demand for commuter transit services into San Joaquin County (Stockton) versus Sacramento County.
- Traffic volumes on Latrobe Road are forecast to see relatively minimal increases, indicating relatively low increase in demand for commuter services to El Dorado Hills employers. Between the El Dorado County Line and Old Sacramento Road, daily traffic is expected to increase from 3,250 vehicles per day to 4,090, or just 26 percent.

Assuming that the locations identified in Table 21 are representative of the countywide roadway network as a whole, the total traffic volumes throughout the county are forecast to increase by 28 percent by 2030.

Level of Service Forecasts

In Amador County, a LOS of D is considered acceptable, however the goal is to maintain a LOS of C on roadways within the County. With the forecast traffic volumes, the LOS is anticipated to decline to a LOS E or F in eight locations, primarily along SR 49 and SR 88, with an additional location maintaining the existing LOS F (New York Ranch Road at the Jackson Rancheria).

Traffic Origin/Destination Pattern Forecasts

A good source of information regarding overall travel patterns can be obtained from the Amador County traffic model. Table 22 presents total travel data for the County summarized into the key areas, and represents new daily one-way trips. Appendix A provides detailed tables for each of the trip types. The model provides information regarding trip patterns, including home-based work, home-based other, non-home based, recreational, and internal-external.

Based on future land use scenarios, Jackson and Martell are anticipated to generate substantially greater traffic for all trip types than other areas in the County, as shown in Table 22. Roughly 9,059 additional daily one-way trips will be generated from Martell, while 7,572 additional one-way trips will be generated in Jackson. Increased development in Plymouth will result in 3,430 more daily-one trips than existing; similarly, additional daily one-way trips in Lone will total 3,380 due to greater development activity.

The data reveals that within the areas with the most growth (Jackson, Lone, Plymouth and Martell), the greatest number of new trips tend to be internal to specific communities. For example, future trips with an origin and destination of the City of Jackson will generate the highest number (2,687 trips) for any given location, according to the model. Other internal trip patterns with a high number of future trips include those internal to Martell (2,003 trips), Plymouth (1,354 trips) or Lone (1,049 trips). Overall, these internal patterns suggest that developments in each community will provide needed services and amenities for residents, resulting in a reduced need to travel outside their home community for services, work and other trip purposes.

Trips to other communities within the County overall tend to be more evenly distributed. However, there are two patterns that are expected to generate a substantial amount of new trips based on future development: trips between Martell and Jackson are expected to increase with 3,914 additional trips, and trips between Martell and Lone with 2,140 trips.

Looking in more detail at the trip types, "home based other" trips comprised the greatest number of total trips (25 percent), followed by "home based work" (23 percent), while "home based shopping" and "home based school" trips comprised the fewest number (6 percent and 5 percent, respectively). "Home based other" trips are defined as those where either the origin or destination of the trip was a residence, and dining, appointments, recreation, social engagements or other errands are the main purpose of the trip. Trips from Amador County to external locations generate a fairly significant number of trips (a total of 27 percent exiting or entering the county).

TABLE 22: Amador County Origin / Destination Trip Growth

Destination																				
Origin	Amador City	Comanche	Ione	Jackson	Martell	NW County	Pine Grove / Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total	
	1	2	33	97	280	2	-6	99	-1	111	39	58	27	94	6	34	35	47	957	
	2	24	91	149	313	1	3	14	1	44	85	5	37	9	5	6	65	208	1062	
	33	91	1049	336	1070	91	-14	112	8	79	21	12	201	21	3	9	26	239	3386	
	97	149	336	2687	1957	88	294	196	80	598	195	13	34	24	86	5	629	105	7572	
	280	313	1070	1957	2003	195	212	663	150	953	130	88	114	136	55	64	372	304	9059	
	2	1	91	88	195	1	2	112	1	47	33	80	60	101	2	21	10	47	894	
	-6	3	-14	294	212	2	323	-18	-5	56	34	-12	-13	-19	176	-11	-8	-22	971	
	99	14	112	196	663	112	-18	1354	98	272	15	107	24	139	2	192	15	33	3430	
	-1	1	8	80	150	1	-5	98	54	38	27	2	1	5	3	31	2	2	499	
	111	44	79	598	953	47	56	272	38	353	50	42	30	70	22	33	117	85	2999	
	39	85	21	195	130	33	34	15	27	50	800	-8	-11	-14	-1	-10	-5	26	1405	
	58	5	12	13	88	80	-12	107	2	42	-8	0	0	0	0	0	0	30	418	
	27	37	201	34	114	60	-13	24	1	30	-11	0	0	0	0	0	16	0	520	
	94	9	21	24	136	101	-19	139	5	70	-14	0	0	0	0	104	88	0	758	
	6	5	3	86	55	2	176	2	3	22	-1	0	0	0	0	0	0	30	388	
	34	6	9	5	64	21	-11	192	31	33	-10	0	0	0	104	0	0	65	8	551
	35	65	26	629	372	10	-8	15	2	117	-5	0	16	88	0	65	0	148	1576	
	47	208	239	105	304	47	-22	33	2	85	26	30	0	0	0	30	8	148	0	1290
	Total	957	1062	3386	7572	9059	894	971	3430	499	2999	1405	418	520	758	388	551	1576	1290	37734

Source: ACTC TransCAD model, 2012

external locations generate a fairly significant number of trips (a total of 27 percent exiting or entering the county).

As there are areas that are expected to generate significantly more trips than other areas of the County, it is beneficial to understand the trip purposes behind these. The following is a summary of each trip type included in the model.

- “Home Based Other” – The greatest number of new “Home Based Other” (HBO) trips occurs between Martell and Jackson, representing 13.7 percent of total HBO trips. This is followed by internal trips in Jackson (11.7 percent), trips between Martell and Lone (9.9 percent), trips between Sutter Creek and Martell (7.2 percent), internal Plymouth trips (6.9 percent), internal Martell trips (6.6 percent) and trips between Plymouth and Martell (6.2 percent).
- “Home Based Work” – Not surprisingly, new “Home Based Work” (HBW) trips are primarily concentrated in trips between Martell and Jackson, comprising roughly 15.2 percent of the total HBW trips. Roughly 10.0 percent of the additional HBW trips are between Martell and Lone, while 7.3 percent are between Martell and Sutter Creek. Another 6.2 percent of additional HBW trips will occur between Plymouth and Martell, 5.7 percent internal within Martell, and 5.5 percent between Pine Grove / Pioneer and Martell. These trip patterns reveal a common denominator – Martell as either a trip origin or destination – suggesting that employment will be concentrated in this area, based on future development patterns.
- “Non-Home Based” – “Non-Home Based” (NHB) trips are those that do not originate from a residence, and are most likely linked with other trips in the area or to / from work. The model shows that the majority of trip growth in NHB trips will occur in Martell and Jackson, while the remaining areas of the County will see little growth in NHB trips. Looking at specific trip patterns, trips between Jackson and Martell comprise 27.6 percent of the NHB trip growth. Trips internal to Martell will amount to 21.6 percent of the additional trips, while trips internal to Jackson will comprise 12.9 percent. Another 11.3 percent of new NHB trips will occur between Sutter Creek and Martell. As commercial and employment centers will mostly be located in Jackson and Martell, the trip data indicates linkages between work and various daily midday trips, including errands or appointments.
- “Home Based Shopping” – The greatest increase in “Home Based Shopping” (HBS) is expected to occur in travel between Martell and Lone, representing 9.9 percent of the total HBS trips. Additional HBS trips internal to Jackson total 9.0 percent, followed by trips between Jackson and Martell with 7.3 percent, between Plymouth and Martell (5.3 percent) and between Sutter Creek and Jackson (5.0 percent). More moderate growth is shown through additional HBS trips between Sutter Creek and Martell (4.9 percent), trips internal to Plymouth (4.2 percent) and internal to Martell (3.4 percent).
- “Home Based School” – Trips between the home and school (HBSC) account for only 5 percent of the total trips according to the model. Trip growth internal to Lone is expected to be highest for HBSC trips, with 15 percent of the total trips, followed by trips internal to Jackson (14.5 percent). Roughly 6.8 percent of the additional HBSC trips will occur between Sutter Creek and Jackson, 5.9 percent between Martell and Jackson, 5.5 percent between Plymouth and Sutter Creek, and 5.4 percent between Pine Grove / Pioneer and Jackson.

- “Internal – External” and “External – Internal” – These trip types are those with one end outside Amador County and one trip end within Amador County, and give insight into longer-range travel patterns. The travel pattern with the greatest increase in trips is between Jackson and 49 South / Pardee Reservoir area, with 12.4 percent of the total new trips. This is followed by trips between Martell and 49 South / Pardee Reservoir area (7.3 percent) and Martell and 88 West (6.0 percent). This data suggests that Martell and Jackson have regional amenities that are in demand from nearby outlying areas. These areas currently house the majority of the large retail developments, a trend that is expected to continue out into the future, further increasing travel demand to these areas.

FUTURE TRANSIT NEEDS AND DEMAND ANALYSIS

A key step in developing and evaluating transit plans is a careful analysis of the mobility needs of various segments of the population and the potential demand for transit services. At the outset, it is important to understand the difference between total potential demand for transit service, and the actual ridership that uses a specific service. Transit **demand** represents the “upper bound” for an idealized transit service that could serve all of the needs of the community. Transit **ridership** reflects the number of one-way passenger-trips that can actually be served, given the specific characteristics of a transit system. It is a function of both the potential demand, as well as the limitations of the transit system regarding factors such as service area, frequency, and span of service (days and hours of service). As discussed below, ridership figures reflect only a percentage of total demand that can be reasonably met. These ridership forecasts will be used for analysis of future transit services.

The analysis presented below segments the potential demand for transit services into four categories:

- Commuters,
- Elderly/disabled trips not associated with a social service program,
- Trips associated with social service programs in Amador County, and
- Intercity transit services (service between two or more cities).

The existing demand information will be used as a basis for the long-range demand estimations to 2030, as well as forecasts of actual achievable ridership levels.

EXISTING TRANSIT DEMAND

General Public Employee Transit Demand (Commuters)

An important element of the total demand for transit services in the region is commuter services. This element has become an important “market” for other transit systems. One quantitative source on which to base an analysis of commuter demand is provided by the 2000 Census Transportation Planning Package from the Bureau of Transportation Statistics, U.S. Department of Transportation. Table 23 presents the commuter demand for Amador County.

In evaluating a reasonable maximum commuter mode split for Amador Transit services, it is necessary to consider those factors that impact the feasibility of transit service in the regional commuter market. In light of observed transit commuter mode split in other similar areas, a maximum feasible mode split of 2.0 percent of all commuter travel is appropriate. Typically, each employee makes two trips approximately 250 days per year; thus, the 14,318 commuters in 2010 would have made a total of approximately 7,159,000 commuter trips per year. Applying the 2.0 percent mode split suggests a total commuter demand for transit trips on the order of 143,180 one-way transit passenger-trips per year:

$$\begin{aligned}
 14,318 \times 2 \times 250 &= 7,159,000 \text{ total annual one-way person trips} \\
 7,159,000 \times 2.0\% &= 143,180 \text{ annual one-way transit trips}
 \end{aligned}$$

TABLE 23: Estimated General Public Employee Transit Demand

Area Description	Employees ⁽¹⁾	Annual One-Way Trips	
		Total	Transit
Amador City	47	23,500	470
Buckhorn CDP	1,111	555,500	11,110
Buena Vista CDP	308	154,000	3,080
Camanche North Shore CDP	336	168,000	3,360
Camanche Village CDP	246	123,000	2,460
Drytown CDP	93	46,500	930
Fiddletown CDP	69	34,500	690
Ione city	1,628	814,000	16,280
Jackson city	2,105	1,052,500	21,050
Kirkwood CDP	49	24,500	490
Martell CDP	90	45,000	900
Pine Grove CDP	1,024	512,000	10,240
Pioneer CDP	380	190,000	3,800
Plymouth city	359	179,500	3,590
Red Corral CDP	452	226,000	4,520
Sutter Creek city	1,242	621,000	12,420
Volcano CDP	37	18,500	370
Balance of County	4,742	2,371,000	47,420
Total Amador County	14,318	7,159,000	143,180
Note 1: Employees Working outside the home, w ithin the County. Sources: US Census Bureau and LSC, Inc.			

Rural Non-Program-Related Transit Demand (elderly/disabled, non-program)

The demographic data summarized in earlier Chapters was applied to a series of analytical techniques to provide estimates of the various types of transit demand. These estimates were then considered as a whole to develop overall estimates of total transit demand.

An important source of information regarding demand generated by programs is the *Transit Cooperative Research Program (TCRP) Project A-3: Rural Transit Demand Estimation Techniques*. This study, completed by SG Associates, Inc. and LSC Transportation Consultants, Inc. represents the first substantial research into demand for transit service in rural areas and small communities since the early 1980s. Study documents present a series of formulae relating the number of participants in various types of programs with the observed actual demand for service, based upon a database of 185 transit agencies across the country. The TCRP analytical technique uses a “logit model” approach to the estimation of transit demand, similar to that commonly used in urban transportation models. This model incorporates an exponential equation that relates the quantity of service and the demographics of the area.

As with any other product or service, the demand for transit services is a function of the level of supply provided. To use the TCRP methodology to identify a feasible maximum demand, it is necessary to assume a high supply level, as measured in vehicle-miles of annual transit service per square mile of service area. For rural areas such as Amador County, a reasonable maximum level of service would be to serve every portion of the county with four round-trips of transit service daily, Monday through Friday. This equates to approximately 2,400 vehicle-miles of transit service per square mile per year. However, due to the dispersed nature of the population in Amador County, this level of service is not feasible. As a point of comparison, the current services in the Amador Transit service area are equivalent to approximately 400 vehicle miles per square mile (based on Fiscal Year 2010-11 data).

Employing this service density to the population of Amador County yields the estimated elderly/disabled non-program transit demand presented in Table 24. As indicated, a total of 53,820 one-way passenger-trips would be generated by elderly persons, and 4,390 one-way passenger-trips by non-elderly persons with mobility limitations. Combined, this equates to 58,210 annual one-way passenger-trips for elderly/mobility limited persons if a very high level of service could be provided. The TCRP methodology can also be applied to general public non-work trips for the county. As also indicated in Table 24, a total demand of 14,160 annual passenger-trips is estimated for the study area if a very high level of service could be provided.

Social Service Program-Related Transit Demand

In rural areas such as Amador County, the transit trips made by residents to and from specific social programs (such as for job training or sheltered workshops) typically comprise a large part of the total transit demand. This demand differs from other types of demand, in that clients in each program specifically generate this need for service.

Annual program demand was estimated by using the *TCRP Project A-3: Rural Transit Demand Estimation Techniques*, based on the number of participants in each program, factored by typical transportation demand rates for similar programs around the country served by relatively

TABLE 24: Amador County Rural Non-Program Transit Demand

Census Tract Number & Area Description	Estimated Annual Passenger-Trip Demand				Estimated Daily Transit Demand
	Elderly	Mobility-Limited	General Public	TOTAL	
Amador City	170	30	100	300	1
Buckhorn CDP	4,820	--	1,350	6,170	25
Buena Vista CDP	200	--	250	450	2
Camanche North Shore CDP	920	--	770	1,690	7
Camanche Village CDP	630	--	350	980	4
Drytown CDP	200	--	0	200	1
Fiddletown CDP	380	--	0	380	2
lone city	5,360	450	1,260	7,070	28
Jackson city	8,070	860	2,790	11,720	47
Kirkwood CDP	170	--	130	300	1
Martell CDP	180	--	180	360	1
Pine Grove CDP	3,780	--	480	4,260	17
Pioneer CDP	2,490	--	200	2,690	11
Plymouth city	1,070	130	670	1,870	7
Red Corral CDP	2,040	--	530	2,570	10
Sutter Creek city	3,160	150	1,130	4,440	18
Volcano CDP	190	--	0	190	1
Balance of County	19,970	2,770	3,970	23,940	96
Total Amador County	53,820	4,390	14,160	72,370	289
Note: Demand estimated based on the methodology presented in "TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation."					

high level of transit services. As presented in Table 25, total countywide demand of annual program trips is 128,450 one-way passenger-trips. This figure largely consists of potential demand for travel to and from senior nutrition, mental health, Head Start, and sheltered workshops (job training and developmental services day programs), and many of these trips are likely already being directly provided by social service programs. Again, the reader is cautioned that this number reflects the demand if a very high level of service was possible to every portion of the County.

TABLE 25: Amador County Rural Program-Related Transit Demand

Program Type	Criteria	2000		2010		Feasible Number of Participants	Feasible Number of Rides
		Total	Total	Total	Total		
Development Services:	Participants	--			65		27,950
Development Services: Case Management	Mobility Limited, all ages	855		861	23		900
Development Services: Pre-school	Mobility Limited, aged 16 to 64	35,100		35,346	20		4,430
Group Home	Number of Residents	--			10		2,910
Headstart	Persons age 3 & 4	35,100		35,346	117		30,680
Headstart: Homebase	Families in Poverty	35,100		35,346	40		1,210
Headstart: Other	Total Population	1,478		1,488	183		340
Job Training	Age 18 to 59	21,548		21,699	122		16,650
Mental Health	Mental Disability Population	855		861	24		8,250
Mental Health: Case Mgt.	Age 18 to 59	21,548		21,699	182		1,160
Nursing Home: Large Facility	Number of Residents	--			128		1,600
Senior Nutrition	Number of Participants	6,329		6,373	50		12,400
Sheltered Workshop: ARC	Number of Participants	--			52		19,970
Total Potential Ridership					1,084		128,450
Note: Demand estimates based on the methodology presented in "TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation."							

Intercity Transit Demand

As Amador Transit provides a connection to intercity bus, rail and air services in Sacramento, another potential source of transit demand is persons using the local transit program as part of their longer intercity trip. In order to estimate demand for intercity bus service, a model was used from the report "*Planning Techniques for Intercity Transportation Services*." In general, the model considers the following input factors: the number of passengers traveling one-way on a given route is a function of the frequency of service, the population served, the cost to the rider, and the distance for the trip. The model that proved to be appropriate is of the following format:

$$\text{PASS/MO} = \text{CONST} \times \text{RTFREQ}^a \times \text{SERVPOP}^b \times \text{FARE/MI}^c \times \text{DIST}^d$$

where:

PASS/MO = the number of one-way passengers boarding per month for the route segment specified.

CONST = a constant specifically derived for this equation.

RTFREQ = scheduled round-trips per week on the route.

SERVPOP = the population served: defined as the sum of the populations of villages, towns, and cities directly along the route, divided by 100.

FARE/MI = fare per mile in cents, found by dividing the cost of a one-way fare between the end points of each route by the one-way distance between the end points of the route.

DIST = one-way distance between the endpoints on the route.

^a = the exponent for round trip frequency

^b = the exponent for service population

^c = the exponent for fare per mile

^d = the exponent for one-way distance

The specific model that was used for the estimation of demand in this study was chosen based on the route distance of the study area. The final equation used for this study was designed for route distances of between 20 and 200 miles:

$$\text{PASS/MO} = 6.871 \times \text{RTFREQ}^{1.093} \times \text{SERVPOP}^{0.409} \times \text{FARE/MI}^{-0.352}$$

Distance was left out of the final equation because this formula was designed specifically for distances of between 20 and 120 miles one way. Intercity trips of different lengths are quite different in terms of trip purpose and frequency.

This equation can be applied to estimate the potential demand for services between Amador County and a large urban area such as Sacramento, with a 2010 population of 466,488. Assuming one round-trip per day throughout the year (365 days per year), and a fare equivalent to \$0.10 per mile (an industry standard), the total demand for intercity service can be calculated to equal 13,970 one-way passenger-trips per year, or approximately 38 passengers per one-way trip. Again, this figure represents an upper bound, as discussed above.

ADA Paratransit Demand

According to the Americans with Disabilities Act of 1990, any public entity which operates a fixed route must provide paratransit or other special service to individuals with disabilities that is comparable to the level of service provided to individuals without disabilities who use the fixed route system. Paratransit service may include a separate Dial-A-Ride type service or route deviation service within three-quarters of a mile of the fixed route. This type of service is currently provided for areas within three-quarters of a mile of the Shuttle Route, while paratransit service is effectively provided on the remainder of the local routes via deviations.

Demand estimation techniques for ADA paratransit ridership are outlined in Transit Cooperative Research Program (TCRP) Report 119 (2007). A demand estimation tool was developed to forecast passenger trips made by ADA eligible individuals when a system operates without capacity constraints as defined by ADA regulations. A strong statistical correlation was found between the following six factors and demand for paratransit service:

- Population for the actual ADA service area, usually the area within a three-quarter mile radius of the fixed route
- The base ADA paratransit fare
- The proportion of applicants for ADA eligibility who are found to be “conditionally” eligible
- Whether or not conditional trip eligibility is determined on a trip by trip basis
- The proportion of the population below the poverty level
- The effective on-time window policy. For example if a vehicle is considered late beginning 20 minutes after the scheduled pick up time and the passenger is expected to be ready 10 minutes early, then the “effective on-time window” is 30 minutes.

A paratransit demand tool was developed in the TCRP report using the factors listed above. This analysis applied the estimated population within three-quarter miles of a fixed route system, the existing \$2.00 ADA fare, the effective on-time window of 15 minutes, and no trip-by-trip eligibility requirements.

The model indicates that there is potential ADA paratransit demand of 16,652 annual passenger trips. It should be noted that adding conditional trip screening would significantly reduce ADA demand. As ADA paratransit trips are included in the non-program, program or employee

demand discussed above, ADA paratransit demand calculations are not included in the demand summary table below.

Existing Transit Demand Summary

A summary of the various elements of transit demand in Amador County is presented in Table 26. As indicated, total transit demand for all trip purposes within the county is estimated to equal 357,970 annual one-way passenger-trips *if a very high level of service could be provided*. The largest portion of estimated demand is generated by commute-related transit demand (40.0 percent), followed by Social Service program demand (35.9 percent), non-program-related elderly and disabled demand (16.3 percent), non-program-related general public demand (4.0 percent) and intercity demand (3.9 percent). Compared with current Amador Transit ridership, this demand estimate indicates that Amador Transit currently serves roughly 20 percent of potential demand, based on Fiscal Year 2010 – 2011 data. It should be emphasized, however, that these numbers represent a maximum potential under optimal service conditions throughout Amador County. It is not financially feasible to expect that the transit systems that serve Amador County could ever approach this level of service.

TABLE 26: Transit Demand Summary for Amador County			
Type of Demand	One-Way Passenger-Trips		
	Average Daily	Annual	Percent of Total
Commuter	573	143,180	40.0%
Rural Non-Program Elderly/Disabled	233	58,210	16.3%
Rural Non-Program General Public	57	14,160	4.0%
Social Service Program	514	128,450	35.9%
Intercity	38	13,970	3.9%
Total	1,414	357,970	100%
Note: Annual figures assume maximum level of transit service is provided.			

REQUESTS FOR ADDITIONAL SERVICES

The latest public hearing with the ACTC was held in March 2012. The following is a summary of the requests for additional services:

- Request for additional runs on the #2 Upcountry and #7 Lone Routes, request for later #7 Lone run, and request for additional mid-morning #2 Upcountry run
- Request for weekend service
- Request for one day a week routes to outlying areas such as Camanche, Fiddletown, and River Pines.

- Request for expanded Dial-A-Ride to Ione and Upcountry
- Request for seed money to start a volunteer driver program

FORECAST OF FUTURE TRANSIT DEMAND

The analysis of existing transit demand can be combined with the various forecasts of future population, development and traffic flows presented in previous chapters in order to estimate future levels of transit demand. Using the same categories of demand discussed above, these forecasts were made by reviewing forecast growth in the parameter most closely associated with each demand category:

- Growth in transit demand for commuting within Amador County was forecast based upon an estimate of future employment within the County, which in turn was based on the forecast of future development multiplied by standard factors for the number of employees per unit of commercial / institutional development.
- Growth in transit demand for commuting outside the County and for intercity transportation was forecast based on the growth in average daily traffic volumes on all major roadways crossing the County line.
- Growth in non-program general public and social service program transit demand was forecast based on growth in total population.
- Growth in non-program elderly/disabled transit demand was based on the average growth rate of elderly (age 75 and above) population and the general public.
- Table 27 presents the resulting forecasts of transit demand. A review of this table yields some useful insights into future demands:
- Overall transit demand is forecast to increase by 150,630 one-way passenger-trips from 2010 demand levels by 2030. In the short-range transit planning horizon, demand will increase by 10.5 percent in 2015.
 - The increase is expected to accelerate slightly over the long-range planning period, with the greatest increase (37,900) occurring between 2015 and 2020 compared to an increase of 20,700 between 2010 and 2015.
 - In the long range plan period, Social Service program demand will constitute the largest single source of growth in transit demand (31 percent of total growth).
 - Compared with 2012 demand levels, the largest growth will occur in the non-program elderly / disabled sector, increasing 48 percent in 2030. Commute demand within Amador County will also increase substantially, with a 43 percent increase over 2012 demand levels.

TABLE 27: Forecast of Future Amador County Transit Demand

Demand Category		2010	2012	2015	2020	2025	2030	2010-2015 Growth		2010-2030 Growth	
								#	%	#	%
Total Annual Transit Demand: 1-Way Passenger-Trips											
Commuter											
In Amador County	Intracounty	75,658	79,500	85,200	94,700	104,300	113,800	9,542	25.2%	38,142	25.3%
Out of County	Intercounty	67,522	69,700	73,100	78,600	84,200	89,700	5,578	14.7%	22,178	14.7%
Non-Program Elderly/Disabled		58,210	62,600	67,100	75,900	84,400	92,800	8,890	23.4%	34,590	23.0%
Non-Program General Public		14,160	14,800	15,400	16,700	18,000	19,200	1,240	3.3%	5,040	3.3%
Social Service Program		128,450	134,200	140,000	151,600	163,000	174,500	11,550	30.5%	46,050	30.6%
Intercity		13,970	14,400	15,100	16,300	17,400	18,600	1,130	3.0%	4,630	3.1%
Total		357,970	375,200	395,900	433,800	471,300	508,600	37,930		150,630	
Percent Change From 2012											
Commuter											
In Amador County	Intracounty		5.1%	7.2%	19.1%	31.2%	43.1%				
Out of County	Intercounty		3.2%	4.9%	12.8%	20.8%	28.7%				
Non-Program Elderly/Disabled			7.5%	7.2%	21.2%	34.8%	48.2%				
Non-Program General Public			4.5%	4.1%	12.8%	21.6%	29.7%				
Social Service Program			4.5%	4.3%	13.0%	21.5%	30.0%				
Intercity			3.1%	4.9%	13.2%	20.8%	29.2%				
Total			4.8%	5.5%	15.6%	25.6%	35.6%				

Source: LSC Transportation Consultants, Inc.

Ridership Forecasts

Due to the many unknowns associated with 20-year projections, it is appropriate to consider long-range future conditions from a more general level (focusing on general services rather than specific route details), than is considered for short-range alternatives. Using the forecasts in the transit demand presented above as a basis, transit ridership forecasts can be established.

Specifically, demand forecasts are applied to existing Amador Transit ridership levels to estimate future ridership estimates. These estimates are then factored to consider potential increases in fuel costs, as well as future planned land use scenarios.

As part of this LRTP study, LSC reviewed the potential for factors to change the proportion of total transit demand that would be actually realized as ridership, beyond the demographic factors are reflected in the demand forecasts discussed above. Two additional factors were identified, as discussed below: the impact of rising fuel prices, and the impact of future development patterns.

Fuel Costs

As fuel costs increase, the relative attractiveness of public transit rises in comparison with the private automobile. Fuel costs in the United States have been rising over the past 10 years, with fluctuations in pricing throughout each year. In general, as shown in Table 28, gas prices on the West Coast have increased 129 percent (or a 7 percent average annual change) between 2000 and 2011, according to the U.S. Energy Information Administration. These rising fuel costs have resulted in declines in vehicle miles traveled and increases in public transit ridership across the United States. The Federal Highway Administration noted that in 2008, overall transit ridership in the United States increase by about 4 percent, and that 86 percent of transit agencies reported ridership increases.

TABLE 28: Historical Gas Prices, West Coast 2000 - 2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Average Price per Gallon	\$1.64	\$1.58	\$1.46	\$1.77	\$2.06	\$2.43	\$2.76	\$3.01	\$3.47	\$2.61	\$3.03	\$3.75
Annual Price Change		-\$0.05	-\$0.13	\$0.31	\$0.29	\$0.38	\$0.33	\$0.25	\$0.46	-\$0.86	\$0.42	\$0.71
Annual Percent Change		-3%	-8%	21%	17%	18%	13%	9%	15%	-25%	16%	24%
Percent Change 2000 - 2011				129%								
Average Annual Change, 2000 - 2011				7%								

Source: US Energy Information Administration, <http://www.eia.gov/>

The Small Urban and Rural Transit Center / Upper Great Plains Transportation Institute at North Dakota State University prepared an extensive study on the relationship between gas prices and transit ridership in rural areas (*Effects of Rising Gas Prices on Bus Ridership for Small Urban and Rural Transit Systems*, June 2008). The study found that, not surprisingly, transit programs operating longer routes (such as those in rural areas) tend to be more impacted by gas price changes than those associated with shorter routes. Further, based on their study period between 1999 and 2007, ridership in small urban areas (populations with fewer than 100,000 persons) experienced the highest growth in ridership as a result in increasing gas prices. Lastly, the study also suggests that trips for commuting purposes tend to be impacted more by gas prices, and that higher rates of ridership increases can be applied.

For Amador County, moderate increases were factored for the ridership forecasts with relation to fuel price. In general, the Federal Highway Administration cites that for every 10 percent increase in gas prices, transit demand in the United States increases roughly 1.2 percent. Based on the historical gas price data on the West Coast, we assume that fuel prices will continue in the same trend, growing at roughly 7 percent annually. Knowing this, our study applied modest growth rates comparable to those used for similar size areas (small urban areas). For ridership on the commute service, a 1.3 percent annual increase in ridership, which accounts for a higher potential for growth due to longer travel distances, was applied. For both general public and demand response services, a 0.8 percent annual increase in ridership was applied; the lower factor reflecting a more rural, less populated area with a greater proportion of existing transit dependent passengers.

Resulting Ridership Forecasts

As shown in Table 29 and Figure 8, long range ridership is forecast to total 108,000 passenger trips per year, representing a 93 percent growth between 2012 and 2030. The greatest growth in ridership is expected in the commuter segment, with a 116 percent increase between 2012 and 2030. As fuel prices increase, there is the potential for more persons using transit for out of county commute trips (both from and to Amador County). The elderly and disabled segment, most likely demand response service users, is anticipated to grown 97 percent between 2012 and 2030. General public ridership is expected to grow by 87 percent over estimated 2012 ridership levels.

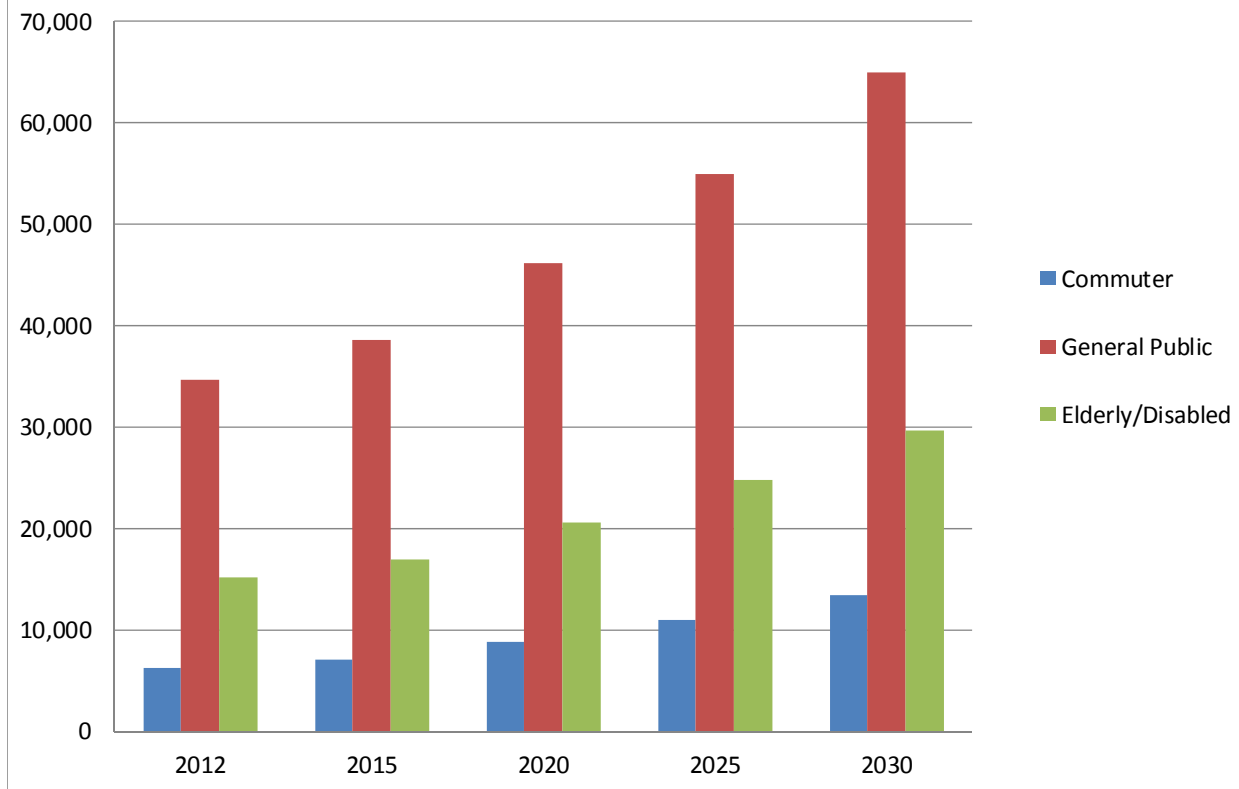
It is important to note that these ridership forecasts assume no changes in service quality (routes, frequency, span of service) or fares (excluding the impacts of inflation). Future changes in service levels or fares could change actual future ridership significantly. Future tasks in this planning study will assess impacts of these changes.

TABLE 29: Long-Range Ridership Forecast for Amador Transit*Assuming No Change in Current Service Characteristics*

	Fixed Route		DAR		Total
	Commuter	General Public	Elderly & Disabled		
2012	6,200	34,700	15,100	(1)	56,000
2015	7,100	38,500	16,900		62,500
2020	8,800	46,200	20,600		75,600
2025	10,900	54,900	24,800		90,600
2030	13,400	64,900	29,700		108,000
<i>Change</i>					
2010 - 2030	116%	87%	97%		93%

Note: Adjusted to reflect long term ridership potential after new DAR service has stabilized

Source: LSC Transportation Consultants, Inc., 2012

FIGURE 8: Amador Transit Annual Ridership Forecasts*Assuming No Change in Current Services or Fares*

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LONG RANGE FINANCIAL RESOURCES AND ALTERNATIVES

EXISTING FINANCIAL CHARACTERISTICS

The information presented below reflects the data for the current fiscal year, which will be used as a basis for understanding the current costs and expenses, and for developing a cost allocation model to apply to the alternative scenarios.

Existing Cost Information

Operating Costs

The most recent operating cost data is from Fiscal Year 2011-2012, as presented below. In total, Amador Transit's operating costs amounted to nearly \$1.25 million for the last fiscal year, which included \$427,336 in fixed costs (such as administrative salaries and facility maintenance costs). On a per route basis, the Shuttle requires the greatest operating cost (\$326,186), while the Plymouth route has the least (\$23,691). These figures are consistent with the miles and hours required to operate the route.

Capital Costs

In Fiscal Year 2011-2012, Amador Transit had a total of \$457,952 in capital costs. Of this, \$235,500 is included for FTA 5310 bus replacement and is slated to be spent in the following Fiscal Year. Other expenses include \$133,852 for shop equipment, \$50,000 for repainting / rebranding of buses, \$1,600 for bus stop signage, and \$37,000 for bus shelters and other stop amenities. All of these funds (excluding the bus replacements) are from PTMISEA, or Public Transportation Modernization, Improvement, and Service Enhancement Account Program.

Existing Revenues

Federal and State Grant Revenues

Transit agencies obtain funding from both State and Federal programs that can be used for both operating and capital needs, depending on the grant requirements. State programs include State Transit Assistance (STA) and the Local Transportation Fund (LTF), among others. Amador Transit obtained a total of \$797,680 in State grant monies in Fiscal Year 2011-2012, which included \$741,250 from LTF and \$54,400 from STA; the remaining \$2,030 was from the Rural Transit Assistance Program (RTAP). In total, this figure represents approximately 63 percent of Amador Transit revenues. This information is provided in Table 30.

Federal grants available to Amador Transit include FTA 5310 and FTA 5311. In Fiscal Year 2011-2012, Amador Transit received a total of \$277,506 from Federal grant programs. Of this total, \$199,124 was through FTA 5310 / 5311 programs. The remaining \$78,382 was obtained through FTA 5317 (\$66,500) and through other Federal programs. The Federal grant monies total roughly 22 percent of Amador Transit Revenues.

TABLE 30: Amador County Historical Operating Revenues

	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12
<u>Revenues</u>									
Passenger Fares	\$211,961	\$229,276	\$230,253	\$269,313	\$269,517	\$310,611	\$191,968	\$161,497	\$170,600
Charter Service Revenue	\$5,034	--	--	--	--	--	--	--	--
Non-Transportation Revenue	\$7,548	\$17,027	\$8,852	\$19,615	\$29,305	\$20,862	\$13,525	\$8,360	\$24,500
<i>Subtotal: Revenues</i>	<i>\$224,543</i>	<i>\$246,303</i>	<i>\$239,105</i>	<i>\$288,928</i>	<i>\$298,822</i>	<i>\$331,473</i>	<i>\$205,493</i>	<i>\$169,857</i>	<i>\$195,100</i>
<i>% of Total Revenues</i>	<i>22.5%</i>	<i>27.2%</i>	<i>22.2%</i>	<i>17.8%</i>	<i>19.0%</i>	<i>23.1%</i>	<i>17.7%</i>	<i>12.8%</i>	<i>15.4%</i>
<u>State Cash Grants</u>									
LTF	\$307,112	\$600,000	\$838,000	\$998,970	\$952,398	\$734,047	\$657,000	\$724,365	\$741,250
STA	--	--	--	--	\$323,817	--	\$76,000	\$218,092	\$54,400
Other State Cash Grants	--	--	--	--	--	\$80,000	\$159,809	--	\$2,030
<i>Subtotal: State Cash Grants</i>	<i>\$307,112</i>	<i>\$600,000</i>	<i>\$838,000</i>	<i>\$998,970</i>	<i>\$1,276,215</i>	<i>\$814,047</i>	<i>\$892,809</i>	<i>\$942,457</i>	<i>\$797,680</i>
<i>% of Total Revenues</i>	<i>30.8%</i>	<i>66.2%</i>	<i>77.8%</i>	<i>61.6%</i>	<i>81.0%</i>	<i>56.8%</i>	<i>77.0%</i>	<i>70.9%</i>	<i>62.8%</i>
<u>Federal Cash Grants</u>									
FTA 5310 / 5311	\$465,873	\$60,622	--	\$215,956	--	\$286,903	--	\$213,382	\$199,124
Other Financial Assistance	--	--	--	\$117,813	--	--	\$60,713	\$3,812	\$78,382
<i>Subtotal: Federal Cash Grants</i>	<i>\$465,873</i>	<i>\$60,622</i>	<i>\$0</i>	<i>\$333,769</i>	<i>\$0</i>	<i>\$286,903</i>	<i>\$60,713</i>	<i>\$217,194</i>	<i>\$277,506</i>
<i>% of Total Revenues</i>	<i>46.7%</i>	<i>6.7%</i>	<i>0.0%</i>	<i>20.6%</i>	<i>0.0%</i>	<i>20.0%</i>	<i>5.2%</i>	<i>16.3%</i>	<i>21.8%</i>
TOTAL REVENUES	\$997,528	\$906,925	\$1,077,105	\$1,621,667	\$1,575,037	\$1,432,423	\$1,159,015	\$1,329,508	\$1,270,286

Source: California State Controllers Office, 2012; Amador Transit, 2012

Fare and Other Revenue

Amador Transit generated a total of \$170,600 in passenger revenues in the last fiscal year. Roughly \$85,700 was from fixed route fares, \$9,500 from Dial-A-Ride fares, and \$75,400 from the Sacramento service contract. Other non-operating revenues for Amador Transit included \$21,500 from advertising contracts and \$3,000 from ACTC expense sharing. Fares represent about 15 percent of the total revenue received by Amador Transit.

Capital Revenue

Capital revenues are projected to total just over \$1.1 million in Fiscal Year 2011-2012. The largest portion is from PTMISEA, at approximately \$980,670. These funds are slated to be utilized in the following fiscal year. Amador Transit also received \$39,000 in capital reserve, \$51,592 from STA to the capital reserve, and \$33,136 from Proposition 1B – CalEMA funds.

Historical Operating Revenue Trends

An important component of forecasting potential revenues for future alternative scenarios is a review of historical revenue trends. Operating revenues received by Amador County Transit from Fiscal Year 2003-2004 through Fiscal Year 2011-2012 are shown in Table 30 and Figure 9.

As shown, operating revenues for Amador Transit have been rather volatile over the last eight years. Consistent with the economic boom, revenues jumped significantly in Fiscal Years 2005-2006 (19 percent) and 2006-2007 (51 percent). The recession generally started in 2007, which is reflected in the table and figure, showing revenues declining three consecutive years starting in Fiscal Year 2007-2008 by 3 percent, 9 percent and 19 percent, respectively. As the economy began to stabilize and see some recovery, revenues have continued to waver, however there have been more gains than losses; revenues increased 15 percent in Fiscal Year 2010-2011, but fell by 4 percent in Fiscal Year 2011-2012.

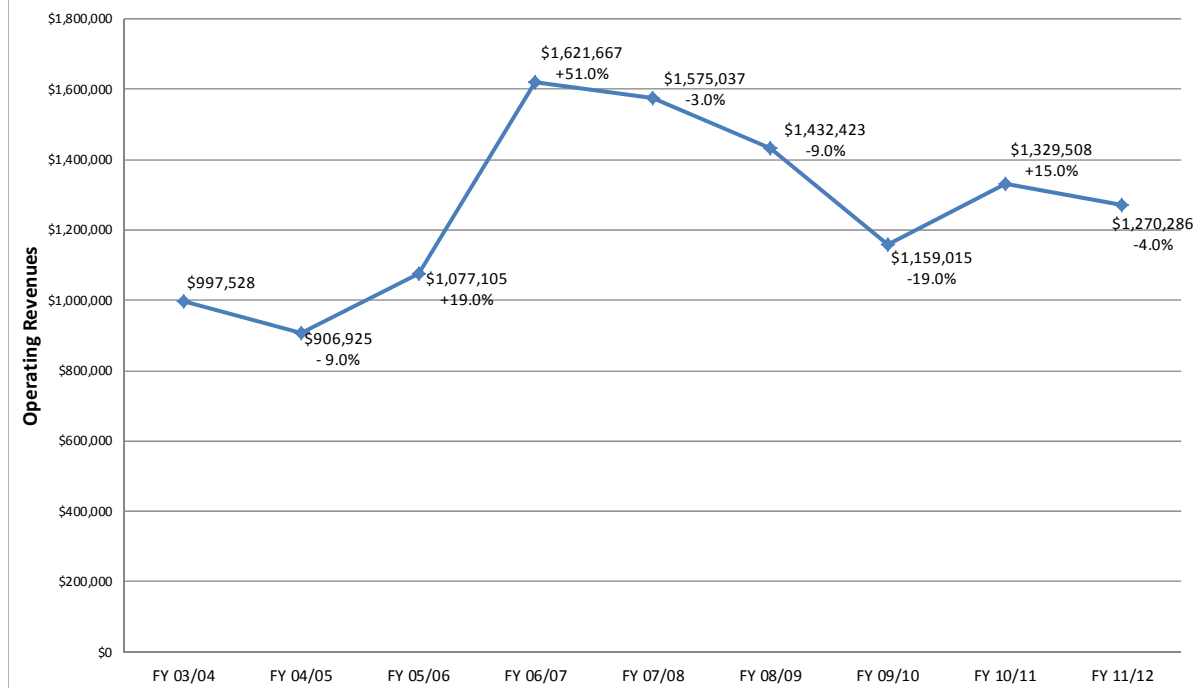
State Program Trends

Historically, state cash grants have provided Amador Transit with the greatest operating revenues. These have ranged from a low of \$307,112 in Fiscal year 2003-2004 to a high of \$1.27 million in Fiscal Year 2007-2008. On average, state grants equate to roughly 65 percent of the total revenue generated. As shown in Table 30, one of the most unpredictable revenue sources on a state level is the State Transit Assistance (STA), which was not available to Amador Transit between Fiscal Year 2003-2004 and 2006-2007, and again in Fiscal Year 2008-2009. Comparatively, Local Transportation Fund (LTF) monies have remained relatively consistent over the last eight years, however annual fluctuations do occur.

Federal Program Trends

Federal programs vary from year to year, with FTA 5310 and 5311 providing the most revenue to Amador County. Table 30 provides the historical federal grant revenues obtained by Amador Transit since Fiscal Year 2003-2004. There were three years where funding was not received – Fiscal Years 2005-2006, 2007-2008 and 2009-2010; while no funding was received within the

Figure 9: Historical Operating Revenues



actual fiscal years, they were awarded the grant money, which was added on to the following year. As shown, federal grant funding has been received fairly regularly throughout the years.

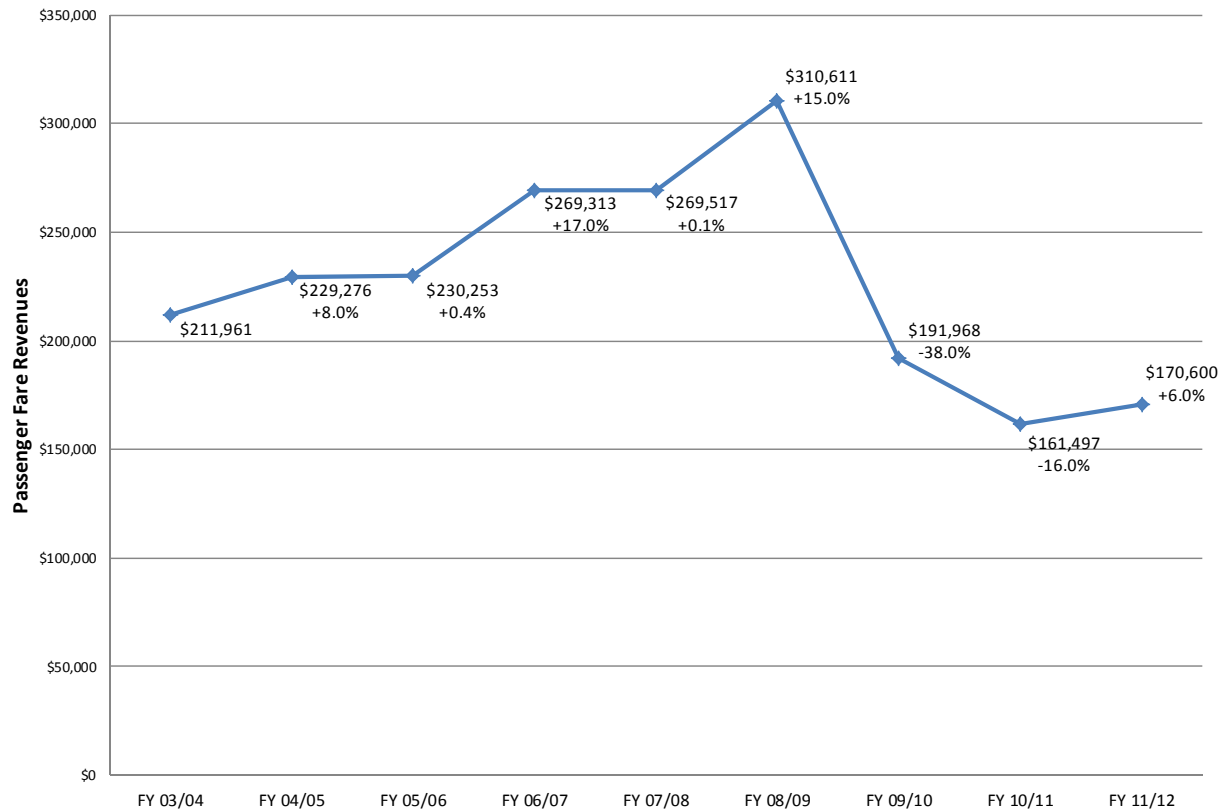
Fares and Other Operating Revenues

Passenger fares are the greatest revenue generator for Amador Transit outside state and federal grant programs. As ridership decreased in recent years, the resulting fare revenues decrease as well. As depicted in Table 30 and Figure 10, passenger revenues fell significantly between Fiscal Year 2008-2009 and Fiscal Year 2010-2011 (a total of 54 percent for the two years). Fares began an upswing in the most recent year, with a 6 percent increase in revenues.

Funding Source Overview

On July 6, 2012, Moving Ahead for Progress in the 21st Century (MAP-21), a new two-year transportation authorization, was signed into law. This law expands on Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) provisions, and is designed to strengthen and improve the safety of public transportation programs. MAP-21 resulted in four major change categories: creation of new programs, consolidation of existing programs, repealed programs, and modified programs. Not all of the programs were changed, and not all changes apply to the Amador County Transit Program.

Figure 10: Historical Passenger Fare Revenues



As discussed above, transit funding is obtained from multiple sources, with the most prominent being from Federal and State grant programs. Transit funding (not including passenger revenues), particularly in California, can be complicated due to the many available sources. The following is a summary of the available funding sources to Amador Transit, and includes discussion (where applicable) regarding the new changes from MAP-21. Additionally, for each source available to Amador Transit for operating costs, projections over the long-range plan period have been estimated, as shown in Table 31. It should be emphasized that there is a high degree of uncertainty regarding many of the transit funding programs over the long-term, as these depend on future decisions regarding public funding priorities. With the changes recently in place through MAP-21, coupled with the potential for future changes to FTA grant program structures, funding can only be roughly estimated based on historical amounts received and cannot be guaranteed for such a long time frame. Further, the operating revenues presented are those that are considered to be reliable, in that historically Amador Transit has received funding from these sources. While programs such as impact fee or air pollution fees are not considered to be reliable and are not included here, they should not be discounted as potential funding sources in a general sense. More detailed funding projections can be made during more short-term studies, like an update of a short range Transit Development Plan, which will provide more accurate assumptions and can be used for the implementation of near-term capital and operational changes.

TABLE 31: Amador County Transit Operating Revenue Funding Projections

	Projected					
	Estimated 2012-2013	Estimated 2013 - 2014	2015	2020	2025	2030
State Revenues						
LTF	\$746,760	\$769,200	\$799,600	\$978,800	\$1,171,800	\$1,389,500
STA	\$98,000	\$100,900	\$103,900	\$124,100	\$143,900	\$166,800
Transportation Development Credits	\$102,871	\$100,000	\$100,000	--	--	--
PTMISEA	\$200,000	--	--	--	--	--
Prop 1B CalEMA	\$33,136	--	--	--	--	--
Federal Revenues						
FTA 5310 ¹	--	--	\$115,700	\$134,100	\$155,500	\$180,300
FTA 5311 ²	\$144,224	\$148,551	\$410,500	\$490,200	\$568,200	\$658,700
FTA 5316	\$55,900	\$250,000	--	--	--	--
FTA 5317	\$96,000	\$112,370	--	--	--	--
Local Revenues						
Advertising	\$42,000	\$43,260	\$45,900	\$53,200	\$61,700	\$71,500
TOTAL REVENUES (Excluding Fares)	\$1,518,891	\$1,524,281	\$1,575,600	\$1,780,400	\$2,101,100	\$2,466,800
Note 1: Includes projected FTA 5317 revenues for 2015 and beyond; Assumes no FTA 5310 for operating or capital						
Note 2: Includes projected FTA 5316 revenues for 2015 and beyond						
Source: LSC Transportation Consultants, Inc., 2012; Amador Transit, 2012						

Federal Funding Sources

The Federal Transportation Administration has numerous grant programs available to transit agencies for both operating and capital assistance. Eligibility in many programs are dependent upon population, distinguishing between "urban" and "nonurbanized" areas for funding allocations. Those applicable to Amador County are FTA 5309, 5310, 5311, 5313(b), 5337 and 5339; each of these is discussed in detail below.

FTA Section 5309 Capital Investment Grants

Prior to the signing of MAP-21, FTA Section 5309 grants were split into three categories: New Starts, Fixed Guideway Modernization, and Bus and Bus Facilities. As of 2012, under new provisions of MAP-21, this section will only include New Starts; Fixed Guideway projects are covered under FTA 5337, and Bus and Bus Facilities under FTA 5339. In general, grants will be awarded for major investments for new or expanded rail, bus rapid transit (BRT) and ferry systems. Other major modifications to this program include:

- New eligibility for projects that expand capacity by a minimum of 10 percent in existing transit corridors that are at or above capacity, or are expected to be at capacity within 5 years

- Streamlined project development process, eliminating the alternatives analysis requirement and relying on alternatives developed in metropolitan planning and environmental review processes
- Streamlined project evaluation and rating systems

The “Small Starts” component of the New Starts program, which provides funding and oversight for projects seeking less than \$75 million dollars in New Starts funds, was authorized for separate funding beginning in FY 2007 under SAFETEA-LU. The Small Starts component funds projects through a single year grant or expedited grant agreement.

In Fiscal Years 2013 and 2014, the FTA has funded this program for a nationwide total \$1.9 billion. However, no money has been allocated to Amador Transit, as projects eligible for this funding are unknown at this time. In short-range studies, this funding may be looked at in more detail as projects are developed and come to fruition.

FTA Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities

FTA funds are also potentially available through the Section 5310 Elderly and Persons with Disabilities Program (largely vehicles), which is administered by Caltrans. This program is designed to improve the mobility of seniors and disabled persons, and are apportioned based on population. Under MAP-21, this program now includes the New Freedom program (previously FTA 5317), further extending grant opportunities for serves geared towards disabled persons that exceed ADA requirements. Funding is split on a 55 / 45 basis:

- A minimum of 55 percent of funds are required to be spent on capital projects that were eligible under the old FTA 5310 provisions. This includes projects associated with services that are designed to improve access to public transportation for seniors and disabled persons, such as demand response programs.
- The remaining 45 percent can be used for projects that would have fallen under FTA 5317 (projects that exceed requirements of the ADA), projects that improve access to fixed-route service for disabled persons on complementary paratransit, or alternatives to public transit that assist seniors and disabled persons (i.e. taxi voucher program or volunteer driver programs).

Consistent with previous requirements, projects that are funded under this program must be part of a coordinated public transit – human services transportation plan. However, under the new law, the previous competitive selection process under New Freedom is now optional.

FTA 5310 requires a 50 percent local match for operating expenses, and a 20 percent match for capital expenses. In Fiscal Years 2013 and 2014, the FTA has allotted roughly \$255 million and \$258 million for projects, respectively.

Most of the FTA 5310 funding that AT has received has been for capital projects, such as new vehicles purchases. As such, funding related to the capital aspects of the source is not included in Table 2. However, previous FTA 5317 funding has been included every year, providing

consistent operating revenues for Amador Transit. Table 2 shows the totals for each of the plan year periods. By 2030, it is estimated that Amador Transit will receive \$180,300 in FTA 5310 for operating purposes (which does not include potential capital funding).

FTA Section 5311 Rural Area Formula Grants

Federal transit funding for rural areas (as defined by a population with less than 50,000), such as Amador County, is currently provided through the FTA Section 5311. These funds, administered by Caltrans, are segmented into “apportioned” and “discretionary” programs. The bulk of the funds are apportioned directly to rural counties based on population levels. The remaining funds are distributed by Caltrans on a discretionary basis and are typically used for capital purposes. As part of the new MAP-21 changes, the “set-aside” for state administration is reduced to 10 percent.

Under the new MAP-21 provisions, this section now includes activities previously covered under FTA 5316, Job Access and Reverse Commute (JARC). Services provided to low income persons to access jobs are now eligible under FTA 5311, and the formula now includes the number of low income persons in the area as a factor. Further, there is now no minimum or maximum on the funding amounts that can be spent on JARC activities. Job access projects are targeted at developing new or expanded transportation services such as shuttles, vanpools, new bus routes, connector services to mass transit, and guaranteed ride home programs for welfare recipients and low-income persons. Reverse commute projects provide transportation services to suburban employment centers from urban, rural, and other suburban locations for all populations.

The FTA has allocated roughly \$600 million in funding for Fiscal Year 2013 and approximately \$608 million in Fiscal Year 2014 these grants. Of these totals, approximately \$12 million is available for the Rural Transportation Assistance Program and another \$1.8 million for Projects of National Scope (both under 5311(b)(3)). The remaining funds are reserved for tribal transportation and transit in the Appalachian region of the Country.

As shown in Table 31, FTA 5311 funding is assumed to be a reliable funding source for Amador Transit (including the JARC activities previously part of 5316). These funds are anticipated to be received every year, with funding totaling over \$650,000 by year 2030.

State Funding Sources

Transportation Development Act Local Transportation Funding (LTF)

A mainstay of funding for transit programs in California is provided by the Transportation Development Act (TDA). The major portion of TDA funds are provided through the Local Transportation Fund (LTF). These funds are generated by a one-fourth cent statewide sales tax, returned to the county of origin. The returned funds may be spent for the following purposes:

- Two percent must be provided for bicycle facilities (barring certain findings)
- The remaining funds must be spent for transit and paratransit purposes, unless the Transportation Commission finds that no unmet transit needs exist that can be reasonably met.
- If a finding of no unmet needs that are reasonable to meet is made, remaining funds can be spent on roadway construction and maintenance purposes.

Nearly all of the available funds are utilized for transit, with the remainder going to fund administration, bicycle programs and regional planning in Amador County. No LTF funds have been spent on street and roads in the County since Fiscal Year 2007 – 2008.

LTF funding was projected out over the course of the plan period, to 2030. The estimates reflect growth consistent with inflation, as well as projected population growth, per the California State Demographer's Office. This reflects that population growth will generate a comparable growth in sales tax revenues. As shown in Table 31, LTF funding results in as much as \$1.3 million per year by the end of the long-range plan period.

State Transit Assistance (STA) Funds

In addition to LTF funding, the TDA includes a State Transit Assistance (STA) funding mechanism. The sales tax on gasoline is used to reimburse the state coffers for the impacts of the 1/4 cent sales tax used for LTF. Any remaining funds (or "spillover") are available to the counties for local transportation purposes. Between Fiscal Years 2003-2004 and 2006-2007, as well as in Fiscal Year 2008-2009, there were no STA funds available to Amador Transit; in recent years, STA has been awarded to the County.

As shown in Table 31, STA funding is anticipated to remain consistent throughout the long-range plan period, growing with inflation (consistent with historical trends). By 2030, STA funding is estimated to total roughly \$166,000.

Proposition 1B (PTMISEA)

On November 7, 2006, California voters approved Proposition 1B, the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, which authorized the issuance of \$19.925 billion in general obligation bonds to invest in high-priority improvements to the state's surface transportation system and to finance strategies to improve air quality. Among the programs contained in Proposition 1B is the \$3.6 billion Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA). When appropriated by the Legislature, funds in the PTMISEA are to be used to fund various mass transportation projects, including rehabilitation, safety or modernization improvements, capital enhancements or expansion, rail transit improvement, bus rapid transit improvements, the acquisition of rolling stock, and other similar investments. The funds in the PTMISEA are to be dispersed according to the formula used to distribute funds in the State Transit Assistance Fund (STA).

As this funding source was a bond measure, it is not expected to continue through the plan period. This is not to say, however, that another similar measure may not arise in the future. But because this is an unknown, forecasted revenues are not included in the long-range forecast. Future short-range plans can address new bond-related transit funding as it becomes available.

Transportation Development Credits (Toll Credits)

In 2010, the Federal Highway Administration (FHWA) allowed Caltrans to use \$5.7 billion in toll credits collected throughout the state for state and local matching funds for projects using Federal grant money. For projects granted the matching funding, the FTA essentially provides 100 percent of the total net project cost – the initial grant funding (i.e. FTA 5310) plus the required local match. Projects eligible for the toll credits include transportation construction projects and operating projects. Specific to transit, Transportation Development Credits are available to projects utilizing FTA 5310 and 5311 grant programs (prior to MAP-21, FTA 5316 and 5317 activities also qualified). The credits were initially approved for two years, however because the funding was not exhausted, the program has been extended. While the length of time over the long term is not known, it is likely that the credits will be available for at least four additional years.

In Fiscal Year 2011-2012, Amador County received a total of \$102,871 in credits for FTA grant funded projects:

- \$30,397 in toll credits was used for matching funds on a \$265,000 FTA 5310 project
- \$50,000 in toll credits was used as local match for a \$250,000 FTA 5316 project
- \$22,474 in toll credits went towards local match for a \$112,370 FTA 5317 project

As mentioned above, toll credits are expected for at least another four years. As a result, Table 31 has included a conservative figure of \$100,000 for year 2015 only. Whether or not the program will continue, or a similar one will arise, is unknown and therefore we cannot reliably project or assume funding for this source past 2015. A short-range planning document will allow revenues to be estimated more accurately as they become available.

Local Funding Sources

AB 2766 Vehicle Air Pollution Fees

California Assembly Bill 2766 allows local air quality management districts to level a \$2 to \$4 per year fee on vehicles registered in their district. These funds are to be applied to programs designed to reduce motor vehicle air pollution, as well as the planning, monitoring, enforcement, and technical study of these programs. Across the state, these funds have been used for local transit capital and operating programs.

While Amador County has not received funding from these sources for transit in recent years, it does not mean that they cannot in the future. However, there is no way to predict a funding amount from this source that may be available, and as a result, they are not included in Table 31 for long-range funding assumptions.

Sales Tax

A sales tax election could be held with funds to go to transit service. Sales tax is the financial base for many transit services in the West. The required level of sales tax would depend upon the service alternative chosen. One advantage is that sales tax revenues are relatively stable

and can be forecast with a high degree of confidence. In addition, sales tax can be collected efficiently and it allows the community to generate revenues from visitors to the area. This source would require a vote of the people to implement. In addition, a sales tax increase could be seen as inequitable to residents not served by transit. This disadvantage could be offset by the fact that sales taxes could be rebated to incorporated areas not served by transit. Transit services, moreover, would face competition from other services which may seek to gain financial support through sales tax.

In Amador County, a previous measure was proposed by the ACTC which was defeated. As such, it is not likely a reasonably foreseeable revenue source for Amador County in the long term.

Traffic Impact Fees

With the growing limitations on state and federal transportation funding, local jurisdictions in California as well as other states have been implementing traffic impact fee programs on new developments. Amador County first instituted such an "AB 1600" fee program in 1999, with funds directed to roadway projects. Other jurisdictions have been increasingly including transit capital needs in such fee programs. For example, programs in both El Dorado County as well as Placer County include funding for transit bus fleet expansion and transit passenger improvements in their fee programs, justifying their inclusion in the program on the basis of the fact that public transportation reduces the overall need for other transportation improvements.

As with the air pollution fees, Amador County has not utilized traffic impact fees for transit activities, making future projections of this source unreliable. Should they become available or applicable to transit projects, funding projections should be updated to reflect the additional revenues from this source.

Advertising

Many transit systems typically use advertising on their vehicles and at passenger facilities to raise additional revenue. Advertising on the outside of buses raises the most revenue, followed by advertising at shelters or on benches. Interior advertisement on buses may bring in significant revenue in urban areas, but usually is not effective in rural areas. One reason advertising on buses is so attractive to advertisers is that buses are highly visible and provide a "traveling" advertisement. However this valuable resource can also be used by the transit system to "brand" itself.

Amador Transit currently has an advertising program that is contracted out. The contracting firm completes all the necessary work to obtain advertising on the exterior of the buses, and Amador Transit receives 50 percent of the revenues generated. In Fiscal Year 2011-2012, the transit agency received approximately \$20,341 in revenue; for the current year (2012-2013), the revenues are expected to increase to roughly \$42,000. In the long range, this revenue is expected to continue, growing at a rate consistent with inflation. By the end of the plan period, in 2030, Amador Transit can expect advertising revenues on the order of over \$71,000.

Fare Alternatives

One option to increase funding would be to increase the passenger fares. Determining an appropriate fare structure not only satisfies the need to meet the minimum required farebox return ratio, but can also encourage passengers to use the service most appropriate to their needs. Setting fares too low creates the risk of not meeting mandated farebox ratios and bypassing an important support for transit, while setting fares too high can discourage transit use, particularly for low-income passengers who may be the most dependent on transit.

A discussion of potential transit funding sources must include a look at fares. As fares make transit funding more equitable (those who directly benefit from the service pay at least part of the costs), a fare system has the advantage of increasing the political acceptability of transit. This advantage, however, does not consider the substantial benefits provided to others in the community such as commercial property owners who do not ride the system. In addition, by reducing the attractiveness of transit service, a fare policy works at cross purposes to many of the stated goals for transit with regard to increase in mobility and reduction of traffic and parking demand. Nonetheless, fare increases and changes to the existing fare structure over the long-term should be considered appropriate – particularly in the long-term – to account for the increasing costs of providing service.

Zone Fares on Rural Routes

Amador Transit already has, in effect, a zone system in that the fares for the Shuttle Route are lower than the fares for the longer rural routes. On the rural routes, however, a passenger's fare does not vary depending on the length of their individual trip. Implementing zone fares may be an alternative for Amador Transit in order to increase revenues while having less impact on ridership than across the board fare increases. Zone fares are applied to passengers that travel a longer distance. Typically, a set boundary is established and outside this area, additional fares are added onto the existing base fare. This additional revenue is intended to help offset the extra costs to operate the route.

Two scenarios for zone fares are discussed for Amador Transit's rural routes – a two zone system and a three zone system. Because the Sacramento Express route is already priced for a longer trip, this would be excluded from the zone policy.

Two Zone Fare System

A two zone fare system would separate a "core transit area" from more distant areas, where the core area pays a base fare. The core transit area, or Zone 1, would include the Jackson – Sutter Hill corridor, as well as Plymouth, Lone / Buena Vista and up to Pine Grove. The latter three are roughly equidistant (11 miles) from the center of the Jackson – Sutter Hill corridor. Anything above Pine Grove on the Upcountry route, Zone 2, would be subject to increased fares.

Passengers boarding or getting off the bus in a Zone 2 area would pay a \$4.00 one-way fare (\$8.00 roundtrip) instead of the current \$2.00 one-way fares. This means that for the Lone, Plymouth and portions of the Upcountry route, fares stay as they are currently. The senior, youth and disabled discounts would still apply. This model is similar to the Gold Country Stage

zone fare system in Nevada County. Routes that are considered local are within Zone 1, which is the regular base fare. The two routes that travel outside the County are Zone 2, and the boundary is where the “urbanized” portion of Nevada County ends; passengers pay twice the base fare to travel in Zone 2.

Currently, Amador Transit does not offer free transfers for passengers. If a passenger rides the Upcountry bus from Pioneer to the Petkovich Park and transfers to the Shuttle route, their total fare between the two routes is \$3.00 one-way, or \$6.00 roundtrip. As such, Amador Transit is already operating under a zone fare model in some respects – there is a base fare of \$1.00 for the core transit area that the Shuttle route serves, while routes traveling elsewhere have a higher fare. If the current transfer policy remained in place, passengers would be paying \$5.00 per one-way trip, or \$10.00 for a roundtrip on portions of the Upcountry routes (passengers boarding beyond Pine Grove). This represents a 67 percent increase in fare price.

Increasing fares generally results in roughly a one-third loss in existing ridership. While the Upcountry route provides stops within the core transit area, it is unlikely that many passengers are using this route for a trip from Jackson to Sutter Hill – the Shuttle route would provide more frequent service. Consequently, for the purposes of evaluating ridership impacts, it is assumed that three-quarters of the Upcountry ridership boards within the Zone 2 boundary, or beyond Pine Grove.

Applying the above logic to the “status quo” for the plan period (discussed in the following chapter) shows that total systemwide ridership would decrease by roughly 1.3 percent over the 20 year plan period. While a 33 percent ridership loss is assumed for the route with the fare increase, since not all of the Upcountry route is impacted, this results in a 22 percent loss for the route as a whole. Despite the loss in ridership, the higher zone fare would increase farebox revenue on the Upcountry route by roughly 40 percent over the 20 year period. As a whole, the systemwide farebox revenue would increase by about 4.3 percent. Since operating costs would not change, farebox revenue would increase as well. For the Upcountry route, this is very important, as it is not currently meeting the minimum 10 percent requirement set by the TDA. By implementing the two zone system, the Upcountry route could achieve a 10 percent farebox return ratio by 2015 and over a 12 percent return ratio by 2030.

Three Zone Fare System

Another option for Amador Transit’s rural routes would be to implement a three zone fare system. Under this scenario, the first zone would be the base fare area, where passengers would pay the current one-way fare. This would encompass the Amador Transit service areas within the boundaries of Sutter Creek / Sutter Hill, Martell and Jackson. Zone 2 would extend to the areas within Plymouth, Lone, Buena Vista and Pine Grove (each of these areas are equidistant – approximately 6.5 miles – to the boundaries of Zone 1). Lastly, Zone 3 would encompass the stops along the Upcountry route past Pine Grove, including Pioneer and Amador Station.

Fares for Zone 1 would remain at the current \$2.00, Zone 2 would \$3.00 (a 50 percent increase) and Zone 3 would be \$4.00. In addition to ridership impacts on the Lone and Plymouth routes, the Upcountry would be affected more than the two zone fare system, thus resulting in greater ridership losses. In this scenario, it is assumed that all Lone and Plymouth passengers will be traveling with the 2 zones, as there are no other stops within the core transit area.

The analysis showed that overall, ridership would decrease just over 7 percent over the 20 year period. It is assumed that each route would see a 33 percent reduction in ridership, as nearly all of the passengers would be impacted. As with the 2 zone scenario, fare revenues would increase. The Lone route would see a 20-year increase of just about 0.5 percent, while the Upcountry route and the Plymouth route would have more significant increases (23 percent and 34 percent, respectively). Systemwide, the zone fares would result in a 7.5 percent increase in passenger fares. Farebox return ratios would increase, however in the case of the Upcountry route, not as significantly as the other fare alternative. By the year 2030, the analysis suggests that the Upcountry route could only achieve a maximum farebox return ratio of 9.5 percent, just under the TDA minimum. However, combined with minimum service reductions, the TDA requirement could be met.

LONG RANGE SERVICE ALTERNATIVES ANALYSIS

INTRODUCTION

This section presents an evaluation of three general alternatives for the future of public transit services in Amador County. To provide information on a reasonable range of potential options available to decision makers, the following alternative scenarios have been developed:

- **Maintain Service Quality Alternative** – This scenario continues current services, increasing only to accommodate expansion in transit demands.
- **Reduce Service Alternative** – This alternative considers the minimum level of transit services that can be provided, given the requirements of the California Transportation Development Act and the Americans with Disabilities Act.
- **Increase Service Alternative** – In the opposite direction, this alternative provides a scenario that would enhance transit services, focusing on improvements that are relatively effective.

For each of the alternatives, the impact on the following is evaluated:

- | | |
|---|--|
| • Overall annual ridership | • Farebox revenues |
| • Mobility of specific ridership groups | • Subsidy requirements |
| • Fleet size | • Passengers per vehicle-hour of service |
| • Vehicle-miles of service | • Passengers per vehicle-mile of service |
| • Vehicle-hours of service | • Cost per passenger-trip |
| • Operating costs | • Subsidy per passenger-trip |
| • Facility needs | • Systemwide farebox return ratio |
| • Vehicle size requirements | |

The impacts are assessed on a series of five-year planning horizons for the following system alternatives.

As a basis for this evaluation, updated forecasts of future development have been analyzed. Table 32 presents a summary of these forecasts, drawn from the countywide UPLAN model. This table also indicates those communities currently served by the Amador Transit program.¹ A review of this table indicates the following:

- Between 2010 and 2030, the number of single family dwelling units countywide is forecast to increase by 4,989 houses, or 46 percent over current totals. The number of multifamily units is forecast to increase by 61 percent, by 2,536 units.

¹ Some portions of the “Remainder of the County” areas may also be served by the existing routes.

	2010 (Existing)							2030 (Future + Existing)							Change 2010 - 2030							
	Multi-Family DU	Single-Family DU	Commercial High ¹ KSF	Commercial Low ² KSF	Industrial KSF	Multi-Family DU	Single-Family DU	Commercial High ¹ KSF	Commercial Low ² KSF	Industrial KSF	Single-Family DU		Commercial High ¹ KSF		Commercial Low ² KSF		Industrial KSF					
											#	%	#	%	#	%	#	%	#	%		
Fiddletown	0	47	17	0	0	0	50	17	0	0	0	0%	3	7%	0	0%	0	0%	0	0%		
Pioneer	72	658	45	38	12	72	658	45	38	12	0	0%	0	0%	0	0%	0	0%	0	0%		
Red Corral	0	237	49	0	9	0	238	49	0	9	0	0%	1	1%	0	0%	0	0%	0	0%		
Volcano	25	49	15	5	0	25	49	15	5	0	0	0%	0	0%	0	0%	0	0%	0	0%		
River Pines	0	82	8	1	0	0	85	8	1	0	0	0%	3	4%	0	0%	0	0%	0	0%		
Buckhorn	45	62	39	8	10	45	65	39	8	10	0	0%	3	5%	0	0%	0	0%	0	0%		
Plymouth	126	341	54	52	11	329	619	156	71	11	203	161%	278	81%	102	190%	19	36%	0	0%		
Amador City	13	90	50	0	0	13	100	50	0	0	0	0%	10	11%	0	0%	0	0%	0	0%		
Ione	295	1,254	156	115	21	295	2,059	188	162	21	0	0%	805	64%	32	21%	47	41%	0	0%		
Sutter Creek	417	880	270	236	116	1,011	916	555	377	489	594	143%	37	4%	285	106%	141	60%	373	320%		
Jackson	1,024	1,340	692	888	47	2,763	1,392	1,036	963	82	1,739	170%	53	4%	344	50%	75	8%	36	76%		
Martell	71	16	994	70	49	71	16	1,339	324	173	0	0%	0	0%	344	35%	254	364%	124	255%		
Camanche	0	338	0	0	0	0	438	0	0	0	0	0%	100	29%	0	0%	0	0%	0	0%		
Remainder of County	2,088	5,393	2,386	1,412	276	2,088	9,088	2,386	1,412	276	0	0%	3,695	69%	0	0%	0	0%	0	0%		
Total	4,176	10,786	4,772	2,825	552	6,712	15,775	5,881	3,361	1,084	2,536	61%	4,989	46%	1,109	23%	537	19%	533	97%		
In Communities Served by Current Transit Routes	2,050	5,125	2,298	1,407	276	4,586	6,402	3,407	1,944	809	2,536	100%	1,277	26%	1,109	537	100%	533	100%			
Note 1: "Commercial High" includes Central Business District, Shopping Center and General Commercial uses																						
Note 2: "Commercial Low" includes Office and Medical uses																						
Source: ACTC, 2012 based on UPlan Model.																						

- The total extent of high-intensity commercial land uses (such as retail) is forecast to increase by 23 percent, low-intensity commercial land uses (such as office) by 19 percent, and industrial uses by 97 percent.
- Future development (particularly among the higher intensity land uses) is forecast to occur largely within communities. Focusing on those communities currently served by Amador Transit, the following proportions of future development will be in these communities:
 - Multifamily dwelling units – 100 percent
 - Commercial High – 100 percent
 - Commercial Low – 92 percent
 - Industrial – 100 percent
 - Single Family Dwelling Units – 26 percent

These land use forecasts can be used to estimate the location in future growth of transit demand, as measured at the residential end of passenger's trips. First, estimates of future population growth were made. Based upon US Census American Community Survey data for Amador County, the average number of persons per dwelling unit was identified to be 1.97 per multifamily unit, and 2.42 per single family dwelling unit. These factors were multiplied by the forecast number of future growth in dwelling units, and adjusted slightly to equal the total population forecast estimated by the California State Demographers office. The resulting population forecasts by community are shown in Table 34.

Population growth by dwelling unit type is then used to estimate the relative growth in the demand for transit service. This reflects the fact that population living in multifamily dwelling units has a higher propensity to use public transit that does population living in single family dwelling units. As a measure of this effect, the proportion of population in each dwelling unit type that are in households without a private vehicle was identified. The basis for this evaluation was the "Public Use Microdata Sample" (PUMS) dataset for rural areas of northern California (including Amador County). This dataset provides a sample of approximately 27,900 persons in 16,100 households, excluding those persons living in group quarters. Table 33 presents the cross-tabulation of the dwelling unit type versus the number of vehicles in the household. As indicated, 1.9 percent of rural Northern Californians living in single-family dwelling units are in households without a private vehicle, compared with 14.2 percent living in multifamily dwelling units. Put another way, an individual living in a multifamily dwelling unit is roughly 7.3 times as likely to be a member of a household without a private vehicle as is an individual living in a single family dwelling unit.

This factor can be used to weight the population in each Amador County community that will be living in future single family versus multifamily dwelling units. The results are shown in the right column of Table 33. As shown, future growth in the demand for transit service (as measured at the residential trip end) is very much concentrated in Jackson (52 percent) and Sutter Creek (18 percent). Moderate proportions of demand are expected to occur in Plymouth (7 percent) and Ione (4 percent). Roughly 18 percent of growth is expected to occur in the "Remainder of County", however approximately 36 percent is concentrated directly adjacent to existing communities. At the other extreme, very little growth in demand for transit services is expected in the Upcountry communities, or in the Shenandoah Valley area.

TABLE 33: Future Population and Transit Demand by Community

	Estimated Population Growth			Percent of future growth in transit demand
	In Multi Family Units	In Single Family Units	Total	
Fiddletown	0	7	7	0.0%
Pioneer	0	1	1	0.0%
Red Corral	0	3	3	0.0%
Volcano	0	0	0	0.0%
River Pines	0	6	6	0.0%
Buckhorn	0	6	6	0.0%
Plymouth	338	569	908	7.4%
Amador City	0	21	21	0.1%
Ione	0	1651	1651	4.0%
Sutter Creek	990	75	1066	17.8%
Jackson	2897	108	3005	51.8%
Martell	0	0	0	0.0%
Camanche	0	204	204	0.5%
Remainder of County	0	7573	7573	18.4%
Total	4225	10224	14,451	100.0%
In Communities Served by Current Transit	4,225	2,617	6,844	
	100%	26%	47%	81.5%
Subtotal by Route				
Ione				6.0%
Upcountry (1)				1.9%
Plymouth				10.3%
Shuttle				71.0%
Not in Community Served by Route				10.8%
Note 1: 25 percent of "Remainder of County" estimated to be served by this route.				

Finally, this data can be summarized by the areas served by each of the existing Amador Transit routes. A detailed review of the "Remainder of County" area was conducted to identify those concentrations of future development that could be served (potentially with minor modifications) by the existing routes. Of the total future growth in demand outside the community areas, the following proportion is forecast to be within each existing route service area:

- Ione Route – 8 percent
- Plymouth Route – 16 percent
- Shuttle Route – 8 percent
- Upcountry Route – 10 percent

SCENARIO ONE: EXISTING SERVICE QUALITY ALTERNATIVE

This alternative considers the services necessary to maintain current service quality and availability, given forecast growth in Amador County. The intention would be to only expand services as necessary to (1) provide newly-developing areas that warrant service with a level of service comparable to that of currently developed areas or (2) address vehicle overcrowding generated by growth in ridership demand.

Ridership and Operating Characteristics / Impacts

Table 33 indicates that fully 81 percent of the future growth in transit demand throughout Amador County will be in areas already served by Amador Transit Routes. The remaining 19 percent will largely be dispersed around rural areas of the county outside of communities, generated in large part by lower density single family residential developments. Considering both this geographic pattern as well as the productivity of existing transit services, it can be concluded that there are no new areas in Amador County that will generate the need for new transit routes.

Growth in demand for transit services within existing transit route serves areas, however, will increase ridership (and associated passenger loads) on existing routes. Ridership estimates for each Amador Transit service, assuming no changes in service levels, were developed as follows:

- Overall growth in the fixed routes within Amador County was identified from Table 31 of *Technical Memorandum One*. This total was allocated to the existing local routes² based upon the proportion of future growth in demand in each service area, as shown in Table 33.
- Dial-a-ride ridership is drawn from the forecast presented in Table 31 of *Technical Memorandum One*.
- Sacramento County Express Route ridership growth is based on the forecasts of intercounty commute transit demand as shown in Table 28 of *Technical Memorandum One*.

The resulting forecasts of ridership on each of the services, barring changes in service levels, is shown in Table 35. As indicated, under this scenario, total annual ridership would grow by roughly 40,400 passenger-trips per year (or 63 percent), to 103,900. The largest proportions of the growth will occur on the Shuttle service (19,100 trips per year) and the Dial-A-Ride program (14,600 trips per year).

It is worth putting this forecast into perspective by comparing it with past ridership on Amador Transit. As recently as 2007 total boardings on the transit program (as ARTS) were 104,113 passenger-trips. The forecast growth through 2030 under this alternative, therefore, would simply return transit figures close to where they were in 2007.

² Note that the Mokelumne Hill Route was discontinued on September 3, 2012, replaced by service provided by Calaveras Transit.

TABLE 34: Tabulation of Population by Housing Type vs. # of Vehicles in Household

# of Vehicles in Household	Population by Dwelling Unit Type		
	Single Family Dwelling Unit	Multifamily Dwelling Unit	Total
0	501	284	785
1	3,551	922	4,473
2 or More	21,835	793	22,628
Total in Sample	25,887	1,999	27,886
<u>Percentage of All Population</u>			
0	1.9%	14.2%	2.8%
1	13.7%	46.1%	16.0%
2 or More	84.3%	39.7%	81.1%
Source: US Census Bureau American Community Survey 2005-2009 Public Use Microdata Sample for rural Northern California areas. Excludes population living in group homes.			

TABLE 35: Annual Ridership -- Maintain Service Quality Alternative

Route	2012	2015	2020	2025	2030
Ione	6,757	6,800	7,200	7,800	8,400
Upcountry	5,007	5,000	5,200	5,300	5,500
Mokelumne Hill	1,554	--	--	--	--
Plymouth	3,548	3,600	4,400	5,300	6,300
Shuttle	21,144	21,500	27,000	33,100	40,200
Sacramento County Express	10,419	11,300	12,100	13,000	13,800
Dial-A-Ride	15,102	16,900	20,600	24,800	29,700
Total	63,531	65,100	76,500	89,300	103,900

A key factor in forecasting services under this scenario is the ability of the existing runs to accommodate increasing passenger loads. The current capacity of the various transit vehicles used on each service was then identified, reflecting that there is some flexibility in the existing fleet to assign vehicles to accommodate expected peak loads, as shown in Table 36. The peak passenger loads for evaluation of the transit routes were identified as follow:

TABLE 36: Estimate of Peak Load and Associated Need for Capacity Expansion

Assuming No Change in Service Plan

Route	Seating Capacity - Current Fleet(1)	Peak Design Load				
		2012	2015	2020	2025	2030
Ione	20	15	15	16	17	19
Upcountry	20	13	13	14	14	14
Plymouth	30	12	12	15	18	21
Shuttle	30	10	10	13	16	19
Sacramento County Express	32	31	34	36	39	41
Larger Buses Required to Accommodate Peak Loads?						
Ione		No	No	No	No	No
Upcountry		No	No	No	No	No
Plymouth		No	No	No	No	No
Shuttle		No	No	No	No	No
Sacramento County Express		Yes	Yes	Yes	Yes	Yes
Maximum Potential Seating Capacity Additional Runs Required to Accommodate Peak Loads?						
Ione	20	No	No	No	No	No
Upcountry	20	No	No	No	No	No
Plymouth	30	No	No	No	No	No
Shuttle	30	No	No	No	No	No
Sacramento County Express	45	No	No	No	No	No

Note 1: Varies depending on vehicle assignments. Larger available size shown.

- A review was conducted of ridership by run for every day of service over a three month period (July through September, 2012), in order to evaluate total passenger activity as well as the variation in activity. The results, shown in Table 8, provide the average, minimum and maximum passengers on each route over this period. In addition, the data was evaluated to identify the 95th percentile passenger loads. This is the passenger load that is only exceeded on 5 percent of the runs. While it would be best from the passenger's perspective to always provide a seat for each passenger, this is not a cost-effective strategy given the relatively few runs with particularly high ridership and the additional cost of providing a larger bus. On the other hand, given the long travel distances, the proportion of runs with standees should be kept small. Overall, this 95th percentile level is recommended as a reasonable balance between passenger comfort and the cost of service. As shown, this 95th percentile value for total passengers per run is 31 for the Sacramento service, and ranging from 12 to 17 for the other services.

TABLE 37: Review of Daily AT Ridership and Peak Load by Route*Based on Review of All Days of Service in July, August & September 2012*

Route	Passengers Per Run (2)				Percent of Load at Peak Point in Route	Design Load: Peak Load at 95th Percent Level
	Minimum	Average	95th %	Maximum		
Sacramento (1)	7	22	31	36	100%	31
Upcountry	0	7	13	17	100%	13
Plymouth	0	9	12	17	100%	12
Shuttle	0	7	17	83	55%	10
Ione	0	9	15	20	100%	15

SOURCE: Daily AT driver logs, as entered by AT staff.

Note 1: Includes ridership in both Amador and Sacramento Counties

Note 2: As an example, the 90th % figure is that at which 90 % of runs carried no more than the figure shown, and 10% carried more.

- Not all passengers boarding a run, however, are necessarily onboard at any one time. Discussions with AT drivers and administrative staff confirm that 100 percent of passengers are on board at any one point along the run for at least the majority of runs, for the Sacramento, Upcountry, Ione and Plymouth Routes. For instance, virtually all of the ridership on a Sacramento Route run is onboard as the bus arrives or departs Sacramento. However, on the Shuttle Route with a variety of destinations, the peak load on the bus is substantially lower than the total passengers. To quantify this, drivers recorded the maximum passengers on board for each run over November 1st and 2nd, 2012. These peak loads were then compared against total boardings. Overall, it was found that peak load was 55 percent of boardings by run, on average.
- Multiplying the 95th percentile load by the proportion onboard at the peak point in the route yields the existing "design load" for the individual routes as also shown in Table 36.

In future years, peak loads are assumed to increase based on the proportion of growth in overall ridership.

A review of Table 36 indicates the following:

- Forecasted ridership on the all but the Sacramento Express Route will be able to be accommodated with the existing vehicles, without additional runs.
- The current 32-passenger seating capacity of the Sacramento Route can be expected to exceeded by 2015. The capacity of a 40-foot bus will not be exceeded until 2030, indicating no need within this scenario to add additional runs.

The annual operating characteristics of the transit program under this scenario are shown in Table 38. As indicated, the only growth would consist with additional Dial-A-Ride service, as

TABLE 38: Annual Service Quantities -- Maintain Service Quality Alternative					
Route	2012	2015	2020	2025	2030
<u>In-Service Vehicle-Hours</u>					
Ione	807	807	807	807	807
Upcountry	1,641	1,641	1,641	1,641	1,641
Mokelumne Hill	393	--	--	--	--
Plymouth	199	199	199	199	199
Shuttle	4,862	4,862	4,862	4,862	4,862
Sacramento County Express	1,384	1,384	1,384	1,384	1,384
Dial-A-Ride	2,504	2,802	3,416	4,112	4,924
Total	11,790	11,695	12,309	13,005	13,817
<u>Total Vehicle-Miles</u>					
Ione	22,745	22,745	22,745	22,745	22,745
Upcountry	41,817	41,817	41,817	41,817	41,817
Mokelumne Hill	10,157	--	--	--	--
Plymouth	10,599	10,599	10,599	10,599	10,599
Shuttle	92,711	92,711	92,711	92,711	92,711
Sacramento County Express	45,781	45,781	45,781	45,781	45,781
Dial-A-Ride	19,404	21,713	26,471	31,864	38,156
Total	243,214	235,366	240,124	245,517	251,809

this increases to accommodate growth in demands for service. Annual vehicle-hours of service would increase by 17 percent, while the annual vehicle-miles would increase by 4 percent.

Capital Requirements

Under this alternative, capital needs of Amador Transit would be as follows

- The size of the Amador Transit fleet would not need to be increased over the plan period.
- Some of the vehicles in the existing fleet would need to be replaced with larger buses over time. A total of 2 buses (including a spare) would need to be full-sized 45-foot buses by 2030 to accommodate ridership on the Sacramento Express route. Smaller buses (such as a 40-foot bus) could be used for roughly the next 15 years.
- The transit operations center would need to have at least one bay sized to accommodate maintenance on a 40-foot bus.
- Bus stops along the Sacramento Route would need to be sized to accommodate 40-foot buses or larger.

Between 2013 and 2035 under this alternative, Amador Transit would need to purchase 9 larger

buses (30 passenger or above) as well as 35 smaller vehicles (less than 30 passengers). This is based upon a recommended replacement schedule of 7 years for larger vehicles and 5 years for smaller vehicles, and excludes staff vehicles as well as the bus owned by Regional Transit and used for the Sacramento Route.

Staffing Requirements

As is, Amador Transit is understaffed for current service levels. The Transit Manager has stated that current positions cover multiple tasks, leaving some crucial elements (such as dispatch) unattended to at times. It is standard operating practice for a dispatcher to always be available while the buses are in operation, in order to address any safety/emergency issues in a timely fashion and to best coordinate between services. A new Clerk / Reception position will likely need to be filled in the near future. This position will perform general office duties, serve as the front desk receptionist, sell transit passes and provide general customer service. Additionally, the position will be cross-trained as a dispatcher, ensuring there is always an available dispatcher during after office hours (currently, the only dispatcher available once the office closes is a bus driver).

It is estimated that this position will be full-time, working 40 hours per week, Monday through Friday. The pay salary range will be between \$10-14 per hour, or \$20,800 to \$29,120 annually. Including benefits, this new position will cost on the order of \$34,000 per year.

Operating Costs

Using the current Amador Transit cost model, Table 39 presents operating cost estimates for this scenario. This includes the need for future staffing, as discussed above. An average annual inflation rate of 3 percent is applied to all costs.

TABLE 39: Annual Operating/Administrative Costs -- Maintain Service Quality Alternative					
Route	2012	2015	2020	2025	2030
Ione	\$65,317	\$71,374	\$82,742	\$95,920	\$111,198
Upcountry	\$126,082	\$137,773	\$159,717	\$185,156	\$214,646
Mokelumne Hill	\$30,428	--	--	--	--
Plymouth	\$23,691	\$25,888	\$30,012	\$34,792	\$40,333
Shuttle	\$326,195	\$356,442	\$413,214	\$479,028	\$555,325
Sacramento County Express	\$122,320	\$133,662	\$154,951	\$179,631	\$208,241
Dial-A-Ride	\$124,954	\$152,790	\$215,939	\$301,337	\$418,315
Fixed	\$427,336	\$504,307	\$584,630	\$677,747	\$785,694
Total	\$1,246,323	\$1,382,236	\$1,641,204	\$1,953,610	\$2,333,752
<i>Note: Assumes 3 percent average annual rate of inflation.</i>					

Subsidy Requirements

Farebox revenue forecasts under this scenario are shown in Table 40. Reflecting that inflation is included in the analysis, these figures assume a parallel 3 percent average increase in current fare structure. Specific timing and level of fare increases are best addressed in a short-range transit plan, considering specific short-term cost trends. Compounded, by 2030 this reflects a 70.2 percent increase in fare revenues solely for inflation. Fare revenues also increase proportionate with the increase in ridership, as well as inflation.

TABLE 40: Annual Farebox Revenue -- Maintain Service Quality Alternative

Route	2012	2015	2020	2025	2030
Ione	\$13,528	\$14,877	\$18,261	\$22,933	\$28,631
Upcountry	\$7,991	\$8,719	\$10,513	\$12,421	\$14,943
Mokelumne Hill	\$2,872	--	--	--	--
Plymouth	\$8,235	\$9,131	\$12,938	\$18,066	\$24,895
Shuttle	\$35,770	\$39,745	\$57,862	\$82,233	\$115,779
Sacramento County Express	\$19,399	\$22,990	\$28,538	\$35,544	\$43,741
Dial-A-Ride	\$23,138	\$28,294	\$39,981	\$55,799	\$77,467
Total	\$110,933	\$123,756	\$168,093	\$226,997	\$305,457

Note: Assumes fare increases to keep pace with 3 percent average annual rate of inflation.

Subtracting fare revenue from operating costs yields the subsidy requirements, as shown in Table 41. Overall subsidy requirements would increase by 79 percent under this scenario. Table 42 provides a forecast of income provided by Sacramento County for the proportion of

TABLE 41: Annual Operating Subsidy -- Maintain Service Quality Alternative

Route	2012	2015	2020	2025	2030
Ione	\$51,789	\$56,497	\$64,481	\$72,987	\$82,567
Upcountry	\$118,091	\$129,054	\$149,204	\$172,734	\$199,703
Mokelumne Hill	\$27,556	--	--	--	--
Plymouth	\$15,456	\$16,757	\$17,074	\$16,726	\$15,438
Shuttle	\$290,424	\$316,697	\$355,351	\$396,795	\$439,545
Sacramento County Express	\$102,921	\$110,672	\$126,413	\$144,086	\$164,500
Dial-A-Ride	\$101,816	\$124,496	\$175,958	\$245,538	\$340,848
Fixed	\$427,336	\$504,307	\$584,630	\$677,747	\$785,694
Total	\$1,135,389	\$1,258,480	\$1,473,111	\$1,726,613	\$2,028,295
<i>Sacramento County Revenues</i>	<i>\$75,400</i>	<i>\$78,900</i>	<i>\$85,200</i>	<i>\$89,700</i>	<i>\$91,600</i>
Total Net Operating Subsidy	\$1,059,989	\$1,179,580	\$1,387,911	\$1,636,913	\$1,936,695

Note: Assumes 3 percent average annual rate of inflation, and fare increases to keep pace.

the Sacramento Route operated within Sacramento County. Reflecting inflation, these revenues would increase over time. Subtracting these revenues (as shown in Table 41), the remaining subsidy (funded through local Amador County and state/federal sources) would increase by 83 percent.

The local operating subsidy forecasts shown in Table 41 can be compared against the operating subsidy revenue forecasts shown in Table 31. For 2030, the cost forecast of \$1,936,695 is approximately \$510,000 less than the revenue forecast of \$2,466,800.

TABLE 42: Sacramento County Revenue For Sacramento Route Service in Sacramento County

	2012	2015	2020	2025	2030
<u>No Change in Service</u>					
Annual Operating Costs in Sacramento County	\$92,600	\$101,200	\$117,300	\$136,000	\$157,600
Annual Fare Revenues in Sacramento County	\$17,200	\$22,300	\$32,100	\$46,300	\$66,000
Net Sacramento County Operating Revenue	\$75,400	\$78,900	\$85,200	\$89,700	\$91,600
<u>1 Additional AM and PM run</u>					
Annual Operating Costs in Sacramento County	\$92,600	\$101,200	\$234,600	\$272,000	\$315,200
Annual Fare Revenues in Sacramento County	\$17,200	\$22,300	\$47,800	\$67,300	\$94,300
Net Sacramento County Operating Revenue	\$75,400	\$78,900	\$186,800	\$204,700	\$220,900
<i>Note: Assumes 3 percent average annual rate of inflation, and fare increases to keep pace.</i>					

Performance Measures

Table 43 presents the resulting measurements of transit operating/financial performance under this alternative. As indicated, under this alternative the growth in demand for transit services would improve the overall performance of Amador Transit. Specifically, the productivity would increase from 5.4 to 7.5 passenger-trips per vehicle-hour while the passenger-trips per vehicle-mile would increase from 0.26 to 0.41. The overall cost per passenger-trip (including the impacts of inflation) would increase from \$19.62 to \$22.46, while the subsidy per passenger-trips would increase from \$17.87 to \$19.52. The overall marginal farebox return ratio³ would increase from the current estimate of 13.5 percent to 19.7 percent in 2030.

SCENARIO TWO: REDUCED SERVICE ALTERNATIVE

This alternative evaluates the minimum level of transit service that could be provided consistent with the State of California's Transportation Development Act (TDA) as well as the Americans with Disabilities Act (ADA). Specifically, the criteria regarding "transit need that is reasonable to meet" as defined in the TDA (a 10 percent marginal farebox return ratio) is applied to assess to

³ Note that this is calculated on a marginal basis, differing from the farebox return ratio reported as part of the Transportation Development Act. Marginal farebox return does not consider administrative costs.

TABLE 43: Key Performance Measures -- Maintain Service Quality Alternative

Route	2012	2015	2020	2025	2030
<u>Passenger-Trips per Vehicle-Hour of Service</u>					
Ione	8.4	8.4	8.9	9.7	10.4
Upcountry	3.1	3.0	3.2	3.2	3.4
Mokelumne Hill	4.0	--	--	--	--
Plymouth	17.8	18.1	22.1	26.6	31.7
Shuttle	4.3	4.4	5.6	6.8	8.3
Sacramento County Express	7.5	8.2	8.7	9.4	10.0
Dial-A-Ride	6.0	6.0	6.0	6.0	6.0
Total	5.4	5.6	6.2	6.9	7.5
<u>Passenger-Trips per Total Vehicle-Mile</u>					
Ione	0.30	0.30	0.32	0.34	0.37
Upcountry	0.12	0.12	0.12	0.13	0.13
Mokelumne Hill	0.15	--	--	--	--
Plymouth	0.33	0.34	0.42	0.50	0.59
Shuttle	0.23	0.23	0.29	0.36	0.43
Sacramento County Express	0.23	0.25	0.26	0.28	0.30
Dial-A-Ride	0.78	0.78	0.78	0.78	0.78
Total	0.26	0.28	0.32	0.36	0.41
<u>Operating Cost per Passenger-Trip</u>					
Ione	\$9.67	\$10.50	\$11.49	\$12.30	\$13.24
Upcountry	\$25.18	\$27.55	\$30.71	\$34.94	\$39.03
Mokelumne Hill	\$19.58	--	--	--	--
Plymouth	\$6.68	\$7.19	\$6.82	\$6.56	\$6.40
Shuttle	\$15.43	\$16.58	\$15.30	\$14.47	\$13.81
Sacramento County Express	\$11.74	\$11.83	\$12.81	\$13.82	\$15.09
Dial-A-Ride	\$8.27	\$9.04	\$10.48	\$12.15	\$14.08
Total	\$19.62	\$21.23	\$21.45	\$21.88	\$22.46
<u>Operating Subsidy per Passenger-Trip</u>					
Ione	\$7.66	\$8.31	\$8.96	\$9.36	\$9.83
Upcountry	\$23.59	\$25.81	\$28.69	\$32.59	\$36.31
Mokelumne Hill	\$17.73	--	--	--	--
Plymouth	\$4.36	\$4.65	\$3.88	\$3.16	\$2.45
Shuttle	\$13.74	\$14.73	\$13.16	\$11.99	\$10.93
Sacramento County Express	\$9.88	\$9.79	\$10.45	\$11.08	\$11.92
Dial-A-Ride	\$6.74	\$7.37	\$8.54	\$9.90	\$11.48
Total	\$17.87	\$19.33	\$19.26	\$19.33	\$19.52
<u>Marginal Farebox Return Ratio</u>					
Ione	20.7%	20.8%	22.1%	23.9%	25.7%
Upcountry	6.3%	6.3%	6.6%	6.7%	7.0%
Mokelumne Hill	9.4%	--	--	--	--
Plymouth	34.8%	35.3%	43.1%	51.9%	61.7%
Shuttle	11.0%	11.2%	14.0%	17.2%	20.8%
Sacramento County Express	15.9%	17.2%	18.4%	19.8%	21.0%
Dial-A-Ride	18.5%	18.5%	18.5%	18.5%	18.5%
Total	13.5%	14.1%	15.9%	17.8%	19.7%

identify those services that must be provided. This criteria has been used in previous court cases to define those individual routes/services that a jurisdiction must provide to be consistent with the TDA.

The single routes forecast to have a marginal farebox return ratio below 10 percent (now that the Mokelumne Hill Route has been replaced by Calaveras Transit operations) is the Upcountry Route-Ride route. Furthermore, it is forecast to continue to do so through 2030. It is therefore in the discretionary powers of the Amador Transit Board to reduce services on this route, to the point where the resulting marginal farebox return ratio equals or exceeds 10 percent.

Ridership and Operating Characteristics / Impacts

As shown in Table 44, ridership estimates for the Upcountry route alternatives were developed using the following information:

- Amador Transit conducted ridership surveys of the Upcountry route in August 2012. The results showed that 22 percent of passengers ride one or two times per week, over 50 percent ride every day of operation, and 6 percent were first time riders. When determining the ridership impacts of reducing Upcountry service, these percentages were factored into existing passenger totals.
- Persons riding the midday run were assumed to have used either the morning or late afternoon run to begin or end their trip. As such, ridership from the midday run was allocated to the other runs, in addition to a reduction. It was assumed that 10 percent of the midday ridership would travel on either of the two remaining runs, and that there would be a 90 percent reduction in passenger-trips.
- Eliminating the entire Upcountry route assumed that all ridership would be lost, as there would be no alternate travel options for these passengers within the existing Amador Transit service.
- The "Maintain Service Quality" numbers were used as base case quantities for each of the plan years, thus reflecting growth in other routes not affected by reductions in service. This would accurately reflect the impacts of only reducing service on Upcountry, while continuing the status quo on the remaining routes.

Table 44 shows the results of the ridership forecasts. As shown, outside of entirely eliminating the Upcountry route, the option to eliminate the midday run would result in the greatest ridership reduction, losing approximately 3,388 passenger-trips annually, which equates to roughly two-thirds of the existing ridership. Reducing service days had less impact on ridership (however not minimal), with offering service two days per week resulting in a loss of 2,350 passenger-trips annually, and offering service one day per week losing 2,980 annual passenger-trips.

Table 44 also presents the resulting marginal farebox return ratio for the Upcountry Route, under each option. As shown, reducing service to one day per week would result in a ratio exceeding the 10 percent criteria, while the other would not. Therefore, the Amador Transit Board of Directors has the authority (remaining consistent with the TDA) to reduce service to

	Annual							Resulting Total Route							
	In-Service Hrs per Run	Total Miles per Run	Daily Round Trips	Daily In-Service Veh-Hrs	Daily Total Miles	Days per Year	Annual In-Service Veh-Hrs	Annual Total Miles	Marginal Operating Cost	Change in Fare Revenue	Change in Operating Subsidy	Operating Cost	Farebox Revenue	Marginal Farebox Return Ratio	
UPCOUNTRY ROUTE ALTERNATIVES															
Eliminate Mid-Day Run, 5 Days a Week	2.07	56.6	-1	-2.1	-57	249	-515	-14,093	-\$41,000	-3,388	-\$5,400	-\$35,600	\$85,082	\$2,591	3.04%
Reduce Service to 2 Days per Week, 3 Runs per Day	1.91	56.6	3	5.7	170	-149	-852	-25,300	-\$70,900	-2,353	-\$3,800	-\$67,100	\$55,182	\$4,191	7.59%
Reduce Service to 1 Day per Week, 3 Runs per Day	1.91	56.6	3	5.7	170	-199	-1,139	-33,824	-\$94,800	-2,979	-\$4,800	-\$90,000	\$31,282	\$3,191	10.20%
Eliminate Upcountry Route	1.91	56.6	-3	5.7	170	-249	-1,419	-42,280	-\$118,300	-5,007	-\$8,000	-\$110,300	--	--	--

one day per week “lifeline” service, but not to eliminate it altogether. The remainder of the discussion regarding this overall alternative reflects this reduction to one day per week. The resulting systemwide ridership forecasts are shown in Table 27.

Capital Requirements

Because this alternative looks at reduction in service, there are no capital requirements associated with this analysis beyond those discussed under Scenario One – only the Sacramento Express route would require a larger vehicle, which would subsequently require upgrades to the maintenance facility to accommodate the larger vehicle.

Operating Costs

Annual service quantities under this alternative are presented in Table 46, and reflect both the reduction in Upcountry service as well as the required increase in Dial-A-Ride service to accommodate growth in demand. Applying the existing Amador Transit cost model to this scenario, operating cost impacts were evaluated, as presented in Table 17. Reducing service to one day per week would reduce Upcountry Route operating costs by roughly 69 percent. Once implemented, operating costs would total roughly \$38,588, rather than the current \$126,082 per year. Systemwide, operating costs would still increase over the plan period due to inflation and the impacts of future demographic / population growth and resulting service changes required to accommodate these increases.

Subsidy Requirements

Operating subsidy is calculated by subtracting farebox revenues from operating costs. Overall systemwide farebox revenues under this alternative are shown in Table 47, while resulting systemwide subsidy requirements are shown in Table 48. Total operating subsidy requirements would increase by 35 percent, while subsidy requirements excluding Sacramento County subsidy would increase by 36 percent. Comparing Amador County operating subsidy requirements in 2030 (\$1,737,732) with forecast available operating revenues (\$2,446,800, as shown in Table 31), indicates that roughly \$709,000 in funding could be available either for transit capital match or for other TDA funding priorities under this alternative.

Performance Measures

Table 49 presents the resulting measurements of transit operating/financial performance under this alternative. As indicated, this alternative would yield improvements in all measures:

- Passenger-trips per vehicle hour of service would increase from 5.4 to 8.0
- Passenger-trips per vehicle mile would increase from 0.26 to 0.40
- Operating cost per passenger-trip would increase from \$19.62 to \$21.08.
- Operating subsidy per passenger-trip would increase from \$17.87 to \$18.13
- Marginal farebox return ratio would increase from 13 percent to 21 percent.

TABLE 45: Annual Service Quantities -- Reduced Service Alternative

Route	2012	2015	2020	2025	2030
In-Service Vehicle-Hours					
lone	807	807	807	807	807
Upcountry	1,641	502	502	502	502
Mokelumne Hill	393	--	--	--	--
Plymouth	199	199	199	199	199
Shuttle	4,862	4,862	4,862	4,862	4,862
Sacramento County Express	1,384	1,384	1,384	1,384	1,384
Dial-A-Ride	2,504	2,802	3,416	4,112	4,924
Total	11,790	10,556	11,170	11,866	12,678
Total Vehicle-Miles					
lone	22,745	22,745	22,745	22,745	22,745
Upcountry	41,817	12,798	12,798	12,798	12,798
Mokelumne Hill	10,157	--	--	--	--
Plymouth	10,599	10,599	10,599	10,599	10,599
Shuttle	92,711	92,711	92,711	92,711	92,711
Sacramento County Express	45,781	45,781	45,781	45,781	45,781
Dial-A-Ride	19,404	21,713	26,471	31,864	38,156
Total	243,214	206,347	211,105	216,498	222,790

TABLE 46: Annual Operating/Administrative Costs -- Reduced Service Alternative

Route	2012	2015	2020	2025	2030
lone	\$65,317	\$71,374	\$82,742	\$95,920	\$111,198
Upcountry	\$126,082	\$42,166	\$48,882	\$56,668	\$65,694
Mokelumne Hill	\$30,428	--	--	--	--
Plymouth	\$23,691	\$25,888	\$30,012	\$34,792	\$40,333
Shuttle	\$326,195	\$356,442	\$413,214	\$479,028	\$555,325
Sacramento County Express	\$122,320	\$133,662	\$154,951	\$179,631	\$208,241
Dial-A-Ride	\$124,954	\$152,790	\$215,939	\$301,337	\$418,315
Fixed	\$427,336	\$466,962	\$541,337	\$627,557	\$727,511
Total	\$1,246,323	\$1,249,284	\$1,487,076	\$1,774,933	\$2,126,617

Note: Assumes 3 percent average annual rate of inflation.

TABLE 47: Annual Farebox Revenue -- Reduced Service Alternative

Route	2012	2015	2020	2025	2030
Ione	\$13,528	\$14,877	\$18,261	\$22,933	\$28,631
Upcountry	\$7,991	\$3,474	\$4,432	\$5,372	\$6,771
Mokelumne Hill	\$2,872	--	--	--	--
Plymouth	\$8,235	\$9,131	\$12,938	\$18,066	\$24,895
Shuttle	\$35,770	\$39,745	\$57,862	\$82,233	\$115,779
Sacramento County Express	\$19,399	\$22,990	\$28,538	\$35,544	\$43,741
Dial-A-Ride	\$23,138	\$28,294	\$39,981	\$55,799	\$77,467
Total	\$110,933	\$118,511	\$162,012	\$219,948	\$297,285

Note: Assumes fare increases to keep pace with 3 percent average annual rate of inflation.

TABLE 48: Annual Operating Subsidy -- Reduced Service Alternative

Route	2012	2015	2020	2025	2030
Ione	\$51,789	\$56,497	\$64,481	\$72,987	\$82,567
Upcountry	\$118,091	\$38,692	\$44,450	\$51,296	\$58,923
Mokelumne Hill	\$27,556	--	--	--	--
Plymouth	\$15,456	\$16,757	\$17,074	\$16,726	\$15,438
Shuttle	\$290,424	\$316,697	\$355,351	\$396,795	\$439,545
Sacramento County Express	\$102,921	\$110,672	\$126,413	\$144,086	\$164,500
Dial-A-Ride	\$101,816	\$124,496	\$175,958	\$245,538	\$340,848
Fixed	\$427,336	\$466,962	\$541,337	\$627,557	\$727,511
Total	\$1,135,389	\$1,130,773	\$1,325,064	\$1,554,985	\$1,829,332
Sacramento County Revenues	\$75,400	\$78,900	\$85,200	\$89,700	\$91,600
Total Net Operating Subsidy	\$1,059,989	\$1,051,873	\$1,239,864	\$1,465,285	\$1,737,732

Note: Assumes 3 percent average annual rate of inflation, and fare increases to keep pace.

TABLE 49: Key Performance Measures -- Reduced Service Alternative

Route	2012	2015	2020	2025	2030
<u>Passenger-Trips per Vehicle-Hour of Service</u>					
Ione	8.4	8.4	8.9	9.7	10.4
Upcountry	3.1	4.0	4.4	4.6	5.0
Mokelumne Hill	4.0	--	--	--	--
Plymouth	17.8	18.1	22.1	26.6	31.7
Shuttle	4.3	4.4	5.6	6.8	8.3
Sacramento County Express	7.5	8.2	8.7	9.4	10.0
Dial-A-Ride	6.0	6.0	6.0	6.0	6.0
Total	5.4	5.9	6.6	7.3	8.0
<u>Passenger-Trips per Total Vehicle-Mile</u>					
Ione	0.30	0.30	0.32	0.34	0.37
Upcountry	0.12	0.05	0.05	0.06	0.06
Mokelumne Hill	0.15	--	--	--	--
Plymouth	0.33	0.34	0.42	0.50	0.59
Shuttle	0.23	0.23	0.29	0.36	0.43
Sacramento County Express	0.23	0.25	0.26	0.28	0.30
Dial-A-Ride	0.78	0.78	0.78	0.78	0.78
Total	0.26	0.26	0.31	0.35	0.40
<u>Operating Cost per Passenger-Trip</u>					
Ione	\$9.67	\$10.50	\$11.49	\$12.30	\$13.24
Upcountry	\$25.18	\$21.08	\$22.22	\$24.64	\$26.28
Mokelumne Hill	\$19.58	--	--	--	--
Plymouth	\$6.68	\$7.19	\$6.82	\$6.56	\$6.40
Shuttle	\$15.43	\$16.58	\$15.30	\$14.47	\$13.81
Sacramento County Express	\$11.74	\$11.83	\$12.81	\$13.82	\$15.09
Dial-A-Ride	\$8.27	\$9.04	\$10.48	\$12.15	\$14.08
Total	\$19.62	\$20.12	\$20.23	\$20.57	\$21.08
<u>Operating Subsidy per Passenger-Trip</u>					
Ione	\$7.66	\$8.31	\$8.96	\$9.36	\$9.83
Upcountry	\$23.59	\$19.35	\$20.20	\$22.30	\$23.57
Mokelumne Hill	\$17.73	--	--	--	--
Plymouth	\$4.36	\$4.65	\$3.88	\$3.16	\$2.45
Shuttle	\$13.74	\$14.73	\$13.16	\$11.99	\$10.93
Sacramento County Express	\$9.88	\$9.79	\$10.45	\$11.08	\$11.92
Dial-A-Ride	\$6.74	\$7.37	\$8.54	\$9.90	\$11.48
Total	\$17.87	\$18.21	\$18.03	\$18.02	\$18.13
<u>Marginal Farebox Return Ratio</u>					
Ione	20.7%	20.8%	22.1%	23.9%	25.7%
Upcountry	6.3%	8.2%	9.1%	9.5%	10.3%
Mokelumne Hill	9.4%	--	--	--	--
Plymouth	34.8%	35.3%	43.1%	51.9%	61.7%
Shuttle	11.0%	11.2%	14.0%	17.2%	20.8%
Sacramento County Express	15.9%	17.2%	18.4%	19.8%	21.0%
Dial-A-Ride	18.5%	18.5%	18.5%	18.5%	18.5%
Total	13.5%	15.1%	17.1%	19.2%	21.2%

SCENARIO THREE: INCREASED SERVICE ALTERNATIVE

This scenario considers a reasonable future operating plan for transit services in Amador County, if the policy decision is made to pro-actively expand transit services. As discussed above, the forecasts of future development and transit demand do not indicate that there is a potential for viable new transit routes that would significantly expand the area served by traditional scheduled public transit.⁴ This scenario therefore focuses on increases in service levels along existing routes, beyond those identified in the “Maintain Existing Service Quality” alternative.

Based on a review of forecast route performance, forecast growth in transit demand, and public comments regarding desired service enhancement, the following expansions in service are included in this scenario:

- **Saturday Service** – Providing public transit service on Saturday is a common request among Amador Transit passengers. Saturday service is important in allowing transit users to access shopping, recreation and other activities outside of the work week. Typically, transit services operate a shorter span of service on Saturdays. A reasonable operating plan to provide Saturday service in Amador County is as follows:
 - Operation of one bus on the Shuttle Route over an eight-hour span of service (such as 9 AM to 5 PM).
 - Operation of Dial-A-Ride over the same eight-hour span of service.
 - Operation of two runs each on the Lone Route, Plymouth Route, and Upcountry Route.
- **Provision of a Third Bus on the Shuttle Route** – The current Shuttle Route consists of two buses operating in two different directions (on portions of the route), each of which operate on varying headways. Provision of a third bus on the route each weekday would allow more consistent “clock headways” to be provided on all or portions of the route, which is more convenient for passengers, and would also provide more frequent service.
- **Additional Runs on the Sacramento County Express** – With only one AM and one PM run per weekday, the current service plan does not provide any flexibility in transit passenger’s travel, and is inconvenient for many work shifts. Provision of second AM and PM runs (such as an hour off of the current schedule) would substantially increase the convenience of the service to potential passengers, and could allow the service to be operated using smaller vehicles. Implementation of this element would require agreement to fund the increase in costs outside Amador County by Sacramento County.
- **Additional Runs on the Lone Route** – Expanding the daily number of round-trips from three to five.

⁴ This does not preclude minor modifications to existing routes, and specific future developments occur near these routes.

- **Additional Runs on the Plymouth Route** – Expanding the daily number of round-trips from two to four.
- **Additional Run on the Upcountry Route** – Expanding the daily number of round-trips from three to four. With only three runs per day, the current schedule cannot accommodate both commuters as well as students, given their different desired afternoon travel times. The current schedule, with a last run departing eastbound at 3:50 PM, does not serve typical commute times or after school sports programs. Adding a later departure timed to accommodate commuters could also increase ridership on the morning run, and would better serve school children that participate in after school sports that do not have alternate transportation.
- **Mobility Management Program** – There will always be demands for transit service that cannot be accommodated by traditional scheduled or deviation transit service, due to factors such as low population density or the need for mobility outside of efficient hours of service. To address these needs a, a “Mobility Management Program” is included as part of this alternative. This would encompass a transportation reimbursement program, a limited taxicab subsidy program, as well as additional part-time staff time to administer these programs and provide enhanced information on mobility options. Additional discussion of this program is provided in Appendix A.

For purposes of analyzing this alternative, Saturday service, the additional Upcountry run, the Mobility Management Program and expansion of the Sacramento County Express service is assumed to be implemented by 2020, and expansion of the Shuttle Route, Ione Route, Plymouth Route and Upcountry Route is assumed to be implemented by 2025.

Ridership and Operating Characteristics / Impacts

Table 50 presents an analysis of the operating characteristics, ridership impacts and incremental costs associated with these service enhancements. Ridership impacts are estimated by applying an elasticity analysis, which considers the percent change in ridership (over base-case levels) as a function of the percent change in service levels. As shown, as a whole this scenario would increase ridership by 24,900 passenger-trips per year, consisting of 6,500 passenger-trips generated by the new Sacramento County Express runs, 6,200 passenger-trips generated by additional Shuttle Route service, 5,000 passenger-trips generated by Saturday service, 2,800 trips generated by the Mobility Management Program, 2,000 passenger-trips associated with the additional Upcountry run, 1,700 passenger-trips generated by the additional Ione Route runs, 1,300 passenger-trips associated with the additional runs to Plymouth. As shown in Table 56, overall systemwide ridership under this alternative would reach 128,800 by 2030.

Capital Requirements

This expansion would require a total of four additional vehicles: one for the Sacramento Route expansion, one for the expansion of the Shuttle Route, one to provide the additional runs on the Ione Route and Plymouth Route, and one additional spare vehicle. The other capital improvement discussed above under the Maintain Existing Service Quality alternative would also apply.

TABLE 50: Analysis of Increased Service Alternative Service Improvements

All Figures in Current Dollars

	In-Service Hrs per Run	Total Miles per Run	Daily Round Trip Runs	Daily In- Service Veh-Hrs	Daily Total Miles	Days per Year	Annual In- Service Veh- Hrs	Annual Total Miles	Marginal Operating Cost	Change in Ridership	Change in Fare Revenue	Change in Operating Subsidy
Operate a Third Shuttle Route Bus Weekdays	1.67	31.8	7	11.7	223	249	2,911	55,505	\$195,300	5,800	\$9,800	\$185,500
Operate a Second AM and PM Sacramento Run	2.95	92.0	2	5.9	184	249	1,469	45,816	\$125,600	6,500	\$11,000	\$114,600
Saturday Service												
Shuttle service: 1 vehicle 8 hours a day	1.67	31.8	5	8.0	159	52	416	8,280	\$28,400	1,400	\$2,400	\$26,000
2 Runs/Day on Other Local Routes												
- Plymouth	0.67	19.9	2	1.3	40	52	69	2,073	\$5,800	900	\$2,100	\$3,700
- Ione	1.17	29.2	2	2.3	58	52	121	3,033	\$9,200	600	\$1,200	\$8,000
- Upcountry	2.07	56.6	2	4.1	113	52	215	5,886	\$17,100	400	\$600	\$16,500
1 DAR bus, operating 8 hours a day	--	--	--	8.0	62	52	416	3,224	\$20,800	1,500	\$2,300	\$18,500
Additional Dispatch Costs (1)	--	--	--	8.0	--	52	416	--	\$9,100	--	--	\$9,100
Total: Saturday Service				19.7	319		1,238	22,496	\$81,300	4,800	\$8,600	\$72,700
Increase Plymouth Route to 4 Runs per Weekday	0.58	18.1	2	1.2	36	249	291	9,025	\$24,800	1,300	\$3,000	\$21,800
Increase Upcountry Route to 4 Runs per Weekday	1.91	56.6	1	1.9	57	249	474	14,093	\$39,500	2,000	\$3,200	\$36,300
Increase Ione Route to 5 Runs per Weekday	1.15	32.4	2	2.3	65	249	573	16,141	\$46,400	1,700	\$3,400	\$43,000
Mobility Management Program	--	--	--	--	--	--	--	--	\$30,000	2,800	--	\$30,000
TOTAL							6,955	163,076	\$542,900	24,900	\$39,000	\$503,900

Note 1: At \$21.81 per hour salary and benefit rate.

Operating Costs

Total annual service quantities under this alternative are shown in Table 51, and the resulting annual operating costs are shown in Table 52. Note that fixed costs are included for additional Dispatcher hours on Saturday.

Subsidy Requirements

Subtracting the annual farebox revenues shown in Table 53 from the operating costs presented in Table 23, the resulting operating subsidy requirements are shown in Table 54. As shown, the annual operating subsidy in 2030 under this alternative for Amador sources (excluding Sacramento funding for the Sacramento Route) would total \$2,651,598. Comparing with the forecast operating revenues shown for 2030 in Table 31 of \$2,466,800, this alternative would require roughly \$184,798 per year in additional subsidy revenues to fully fund. With the available forecast funding, therefore, a majority (but not all) of the various service enhancements included in this alternative could be funded. If this alternative is selected, additional analysis as part of the final plan can be conducted to identify those elements that can be funded within the forecast available revenues.

Performance Measures

Table 55 presents the measures of transit operating/financial performance under this alternative. As indicated, considering the expansion of services and the growth in long-term demand, this alternative would yield improvements the following measures:

- Passenger-trips per vehicle hour of service would increase from 5.4 to 6.2
- Passenger-trips per vehicle mile would increase from 0.26 to 0.31
- Marginal farebox return ratio would increase modestly from 13.5 percent to 15.2 percent.

The operating cost per passenger-trip would increase from \$19.62 to \$25.19, while the operating subsidy per passenger-trip would increase from \$17.87 to \$22.18. However, as these values include the impacts of inflation (roughly a 70 percent increase over the plan period), these figures reflect an improvement in financial effectiveness in constant dollar terms.

Significantly, this analysis indicates that Amador Transit services can be expanded over the long term, while still yielding an improvement in marginal farebox return ratio.

For service expansion options, it is recommended that should an element be implemented, that monitoring take place. Amador Transit should review ridership after a minimum of six months of the new service to evaluate the performance of the route. If the route is not on track to meeting performance standards put in place by Amador Transit and the ACTC, then consideration should be given to not continuing the increased service components.

TABLE 51: Annual Service Quantities -- Increased Service Alternative

Route	2012	2015	2020	2025	2030
<u>In-Service Vehicle-Hours</u>					
lone	807	807	928	1,501	1,501
Upcountry	1,641	1,641	2,330	2,330	2,330
Mokelumne Hill	393	--	--	--	--
Plymouth	199	199	268	559	559
Shuttle	4,862	4,862	5,278	8,189	8,189
Sacramento County Express	1,384	1,384	2,853	2,853	2,853
Dial-A-Ride	2,504	2,802	3,832	4,528	5,340
Total	11,790	11,695	15,490	19,960	20,772
<u>Total Vehicle-Miles</u>					
lone	22,745	22,745	25,778	41,920	41,920
Upcountry	41,817	41,817	61,797	61,797	61,797
Mokelumne Hill	10,157	--	--	--	--
Plymouth	10,599	10,599	12,672	21,697	21,697
Shuttle	92,711	92,711	100,991	156,495	156,495
Sacramento County Express	45,781	45,781	91,597	91,597	91,597
Dial-A-Ride	19,404	21,713	26,472	31,865	38,157
Total	243,214	235,366	319,306	405,370	411,662

TABLE 52: Annual Operating/Administrative Costs -- Increased Service Alternative

Route	2012	2015	2020	2025	2030
lone	\$65,317	\$71,374	\$95,182	\$178,413	\$206,830
Upcountry	\$126,082	\$137,773	\$226,817	\$262,943	\$304,823
Mokelumne Hill	\$30,428	--	--	--	--
Plymouth	\$23,691	\$25,888	\$40,468	\$97,703	\$113,264
Shuttle	\$326,195	\$356,442	\$448,569	\$806,802	\$935,304
Sacramento County Express	\$122,320	\$133,662	\$319,429	\$370,306	\$429,286
Dial-A-Ride	\$124,954	\$152,790	\$242,236	\$331,822	\$453,656
Fixed	\$427,336	\$504,307	\$596,158	\$691,110	\$801,186
Total	\$1,246,323	\$1,382,236	\$1,968,860	\$2,739,100	\$3,244,350

Note: Assumes 3 percent average annual rate of inflation.

TABLE 53: Annual Farebox Revenue -- Increased Service Alternative

Route	2012	2015	2020	2025	2030
Ione	\$13,528	\$14,877	\$19,781	\$29,689	\$36,462
Upcountry	\$7,991	\$8,719	\$15,326	\$18,002	\$21,412
Mokelumne Hill	\$2,872	--	--	--	--
Plymouth	\$8,235	\$9,131	\$15,598	\$25,556	\$33,577
Shuttle	\$35,770	\$39,745	\$60,903	\$100,149	\$136,549
Sacramento County Express	\$19,399	\$22,990	\$42,473	\$51,698	\$62,468
Dial-A-Ride	\$23,138	\$28,294	\$42,895	\$59,177	\$81,383
Total	\$110,933	\$123,756	\$196,975	\$284,270	\$371,852

Note: Assumes fare increases to keep pace with 3 percent average annual rate of inflation.

TABLE 54: Annual Operating Subsidy -- Increased Service Alternative

Route	2012	2015	2020	2025	2030
Ione	\$51,789	\$56,497	\$75,401	\$148,725	\$170,368
Upcountry	\$118,091	\$129,054	\$211,491	\$244,941	\$283,411
Mokelumne Hill	\$27,556	--	--	--	--
Plymouth	\$15,456	\$16,757	\$24,871	\$72,147	\$79,687
Shuttle	\$290,424	\$316,697	\$387,666	\$706,652	\$798,755
Sacramento County Express	\$102,921	\$110,672	\$276,957	\$318,608	\$366,818
Dial-A-Ride	\$101,816	\$124,496	\$199,341	\$272,646	\$372,273
Fixed	\$427,336	\$504,307	\$596,158	\$691,110	\$801,186
Total	\$1,135,389	\$1,258,480	\$1,771,885	\$2,454,830	\$2,872,498
Sacramento County Revenues	\$75,400	\$78,900	\$186,800	\$204,700	\$220,900
Total Net Operating Subsidy	\$1,059,989	\$1,179,580	\$1,585,085	\$2,250,130	\$2,651,598

Note: Assumes 3 percent average annual rate of inflation, and fare increases to keep pace.

TABLE 55: Key Performance Measures -- Increased Service Alternative

Route	2012	2015	2020	2025	2030
<u>Passenger-Trips per Vehicle-Hour of Service</u>					
lone	8.4	8.4	8.4	6.7	7.1
Upcountry	3.1	3.0	3.3	3.3	3.4
Mokelumne Hill	4.0	--	--	--	--
Plymouth	17.8	18.1	19.8	13.4	15.2
Shuttle	4.3	4.4	5.4	4.9	5.8
Sacramento County Express	7.5	8.2	6.5	6.8	7.1
Dial-A-Ride	6.0	6.0	5.8	5.8	5.8
Total	5.4	5.6	6.0	5.7	6.2
<u>Passenger-Trips per Total Vehicle-Mile</u>					
lone	0.30	0.30	0.30	0.24	0.26
Upcountry	0.12	0.12	0.12	0.12	0.13
Mokelumne Hill	0.15	--	--	--	--
Plymouth	0.33	0.34	0.42	0.35	0.39
Shuttle	0.23	0.23	0.28	0.26	0.30
Sacramento County Express	0.23	0.25	0.20	0.21	0.22
Dial-A-Ride	0.78	0.78	0.83	0.83	0.82
Total	0.26	0.28	0.29	0.28	0.31
<u>Operating Cost per Passenger-Trip</u>					
lone	\$9.67	\$10.50	\$12.20	\$17.66	\$19.33
Upcountry	\$25.18	\$27.55	\$29.84	\$34.15	\$38.59
Mokelumne Hill	\$19.58	--	--	--	--
Plymouth	\$6.68	\$7.19	\$7.64	\$13.03	\$13.33
Shuttle	\$15.43	\$16.58	\$15.79	\$20.02	\$19.73
Sacramento County Express	\$11.74	\$11.83	\$17.17	\$18.99	\$21.15
Dial-A-Ride	\$8.27	\$9.04	\$10.96	\$12.62	\$14.54
Total	\$19.62	\$21.23	\$21.26	\$23.99	\$25.19
<u>Operating Subsidy per Passenger-Trip</u>					
lone	\$7.66	\$8.31	\$9.67	\$14.73	\$15.92
Upcountry	\$23.59	\$25.81	\$27.83	\$31.81	\$35.87
Mokelumne Hill	\$17.73	--	--	--	--
Plymouth	\$4.36	\$4.65	\$4.69	\$9.62	\$9.37
Shuttle	\$13.74	\$14.73	\$13.65	\$17.53	\$16.85
Sacramento County Express	\$9.88	\$9.79	\$14.89	\$16.34	\$18.07
Dial-A-Ride	\$6.74	\$7.37	\$9.02	\$10.37	\$11.93
Total	\$17.87	\$19.33	\$19.13	\$21.50	\$22.30
<u>Marginal Farebox Return Ratio</u>					
lone	20.7%	20.8%	20.8%	16.6%	17.6%
Upcountry	6.3%	6.3%	6.8%	6.8%	7.0%
Mokelumne Hill	9.4%	--	--	--	--
Plymouth	34.8%	35.3%	38.5%	26.2%	29.6%
Shuttle	11.0%	11.2%	13.6%	12.4%	14.6%
Sacramento County Express	15.9%	17.2%	13.3%	14.0%	14.6%
Dial-A-Ride	18.5%	18.5%	17.7%	17.8%	17.9%
Total	13.5%	14.1%	14.3%	13.9%	15.2%

SUMMARY OF SERVICE ALTERNATIVE SCENARIOS

A summary of the systemwide totals under the three long-range alternatives is presented as Table 56 and Figure 11. A review of this table indicates the following:

- Under any of the alternatives, transit ridership will increase over the long term, due in large part to growth in Amador County (particularly within the existing transit service area) and associated increases in ridership demand. This increase equals a 59 percent growth in ridership under the Reduce Service Alternative, up to a full 103 percent growth under the Increase Service Alternative.
- Annual operating costs are forecast to increase between 2012 and 2030, under any alternative, largely due to inflation. An \$880,294 annual increase in costs would occur even under the Reduce Service Alternative, due to inflation as well as that the cost savings associated with the reduction in Upcountry Route service would be more than offset by the required increase in Dial-A-Ride service to conform with ADA requirements.
- Total annual operating subsidy requirements (excluding Sacramento County revenues) range from \$1,059,989 under the Reduce Service Alternative to \$3,244,350 under the Increase Service Alternative.
- The required subsidy per passenger-trip would increase under all alternatives. However, simply applying the assumed 3 percent annual rate of inflation to the existing value (\$17.87) yields a 2030 equivalent value of \$29.54. Compared with this figure, all alternatives would result in a substantially lower (i.e., improved) value, with the greatest reduction under the Reduce Service Alternative.
- The marginal farebox return ratio would increase (i.e., improve) under all alternatives, resulting in values ranging from 15.2 percent under the Increase Service Alternative to 19.7.2 percent under the Reduce Service Alternative.

VEHICLE-MILES OF TRAVEL / GREENHOUSE GAS IMPACTS ANALYSIS

With the establishment of statewide goals to reduce greenhouse gas emissions, transit services are playing an important role in helping local jurisdiction's contribute to these goals. This analysis first evaluates the impact of transit service on the corresponding reduction in Vehicle-Miles of Travel (VMT). In turn, the VMT estimates are used to estimate the associated reduction in Greenhouse Gas emissions.

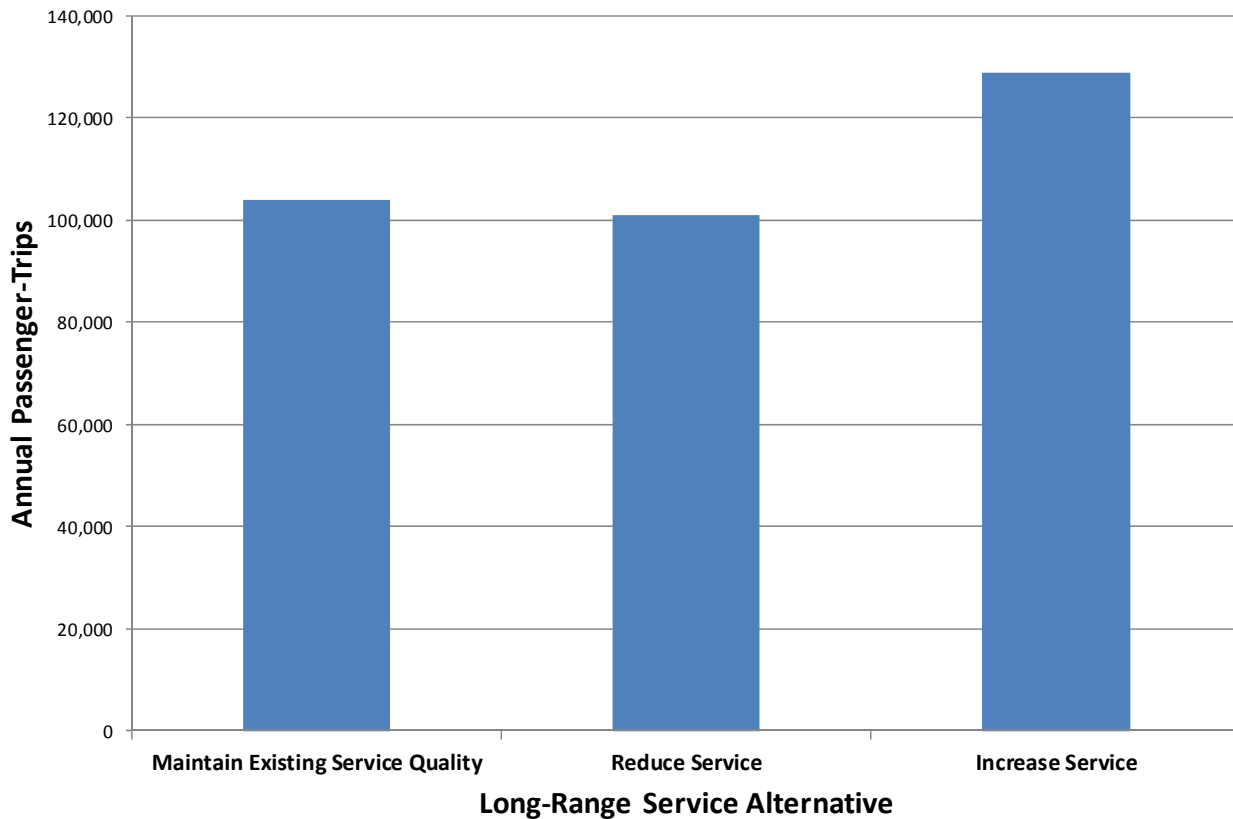
Impact of Service Alternatives on VMT

Table 57 presents the analysis of the reduction in VMT associated with the AT transit program in 2030, under the three service alternatives. Reductions in auto traffic associated with the transit program were calculated as follows:

TABLE 56: Summary of Alternatives -- 2030 Systemwide Totals

	2012	Maintain Existing Service Quality	Reduce Service	Increase Service
Annual Ridership	63,531	103,900	100,900	128,800
Annual Operating Costs	\$1,246,323	\$2,333,752	\$2,126,617	\$3,244,350
Annual Operating Subsidy				
Total	\$1,135,389	\$2,028,295	\$1,829,332	\$2,872,498
Excluding Sacramento County	\$1,059,989	\$1,936,695	\$1,737,732	\$2,651,598
Passenger-Trips per Vehicle-Hour of Service	5.4	7.5	8.0	6.2
Subsidy per Passenger-Trip	\$17.87	\$19.52	\$18.13	\$22.30
Marginal Farebox Return Ratio	13.5%	19.7%	21.2%	15.2%

Note: Assumes 3 percent average annual rate of inflation, and fare increases to keep pace.

Figure 11: Annual AT 2030 Ridership by Service Alternative

1. The annual passenger-trips were identified from the tables discussed above. Note that no trips associated with the Mobility Management Program are included, as these volunteer and taxi trips would still generate auto travel.
2. Not all of transit trips would replace auto trips. For short trips where bicycling and walking are an alternative, some transit riders would otherwise walk or bicycle. It is estimated that 10 percent of Shuttle Route passengers would otherwise walk or bicycle, while for other routes this factor is expected to be effectively zero.
3. Average vehicle occupancy represents the number of passengers per auto vehicle-trip. The *National Household Travel Survey (2010)* was referenced to identify an average vehicle occupancy in rural areas of 1.16 for work trips, and 1.63 for all trip purposes. The work trip occupancy was applied to the Sacramento Express Route (reflecting that essentially all passengers are commuters), while the average occupancy over all trip purposes was applied to the other routes.
4. An average passenger-trip length was estimated, based upon the length of each route and the typical boarding/alighting pattern along the route.
5. The number of passenger-trips was multiplied by the percent shifting from the auto mode, multiplied by the average trip length, and divided by the average vehicle occupancy to identify the auto trip VMT eliminated. As shown, this figure ranges from a low of 607,380 VMT per year for the Reduce Service Alternative to a high of 840,950 for the Increase Service Alternative.
6. The transit vehicles themselves, however, also generate new VMT. Considering the net change associated with operating transit vehicles minus, the overall Amador Transit program in 2030 will reduce VMT by 355,571 under the Maintain Existing Service Quality Alternative, by 363,690 under the Reduce Service Alternative, and by 429,288 under the Increase Service Alternative.

Impact of Service Alternatives on Greenhouse Gas Emissions

The amount of greenhouse gas emissions eliminated due to Amador Transit in 2030 can then be calculated by applying a fleet-wide average of 22.4 miles per gallon and an average rate of 9.24 kilograms of greenhouse gases emitted per gallon of fuel. As shown in the right-most column of Table 57, the reduction in emissions of greenhouse gases ranges from a low of 146.7 metric tons for the Reduce Service Alternative to a high of 177.1 metric tons for the Increase Service Alternative.

TABLE 57: Analysis of VMT and Greenhouse Gas Reductions

Alternative/Route	Annual Passenger-Trips (2030)	Percent Shifting From Auto Mode	Average Vehicle Occupancy(1)	Avoided Auto Trips	Average Trip Length (Miles)	Avoided Auto VMT	Transit Vehicle VMT	Net Change in VMT	Net Change in GHG (Metric Tons per Year)(2)
Maintain Service Quality									
Ione	8,400	100%	1.63	5,200	9.0	-46,800	22,745	-24,055	-9.9
Upcountry	5,500	100%	1.63	3,400	11.0	-37,400	41,817	4,417	1.8
Plymouth	6,300	100%	1.63	3,900	10.0	-39,000	10,599	-28,401	-11.7
Shuttle	40,200	90%	1.63	22,200	2.5	-65,500	92,711	37,211	15.3
Sacramento County Express	13,800	100%	1.16	11,900	32.2	-383,180	45,781	-337,399	-139.2
Dial-A-Ride	29,700	100%	1.63	18,200	2.5	-45,500	38,156	-7,344	-3.0
Total	103,900			64,800		-607,380	251,809	-355,571	-146.7
Reduced Service									
Ione	8,400	100%	1.63	5,200	9.0	-46,800	22,745	-24,055	-9.9
Upcountry	2,500	100%	1.63	1,500	11.0	-16,500	12,798	-3,702	-1.5
Plymouth	6,300	100%	1.63	3,900	10.0	-39,000	10,599	-28,401	-11.7
Shuttle	40,200	90%	1.63	22,200	2.5	-65,500	92,711	37,211	15.3
Sacramento County Express	13,800	100%	1.16	11,900	32.2	-383,180	45,781	-337,399	-139.2
Dial-A-Ride	29,700	100%	1.63	18,200	2.5	-45,500	38,156	-7,344	-3.0
Total	100,900			62,900		-586,480	222,790	-363,690	-150.0
Increased Service									
Ione	10,700	100%	1.63	6,600	9.0	-59,400	41,920	-17,480	-7.2
Upcountry	7,900	100%	1.63	4,800	11.0	-52,800	61,797	8,997	3.7
Plymouth	8,500	100%	1.63	5,200	10.0	-52,000	21,697	-30,303	-12.5
Shuttle	47,400	90%	1.63	26,200	2.5	-65,500	156,495	90,995	37.5
Sacramento County Express	20,300	100%	1.16	17,500	32.2	-563,500	91,597	-471,903	-194.7
Dial-A-Ride	31,200	100%	1.63	19,100	2.5	-47,750	38,157	-9,593	-4.0
Total	128,800			79,400		-840,950	411,662	-429,288	-177.1

Note 1: Per National Household Travel Survey, for rural areas.

Note 2: At an average of 8.8 kg of greenhouse gases per gallon of fuel, and average fuel economy of 22.2 miles per gallon, per Environmental Protection Agency.

This chapter first presents an evaluation of the potential for alternatives to gas and diesel fuels for Amador Transit. Next, long-term fleet requirements, operations facility requirements, and passenger facility requirements are discussed.

ALTERNATIVE FUELS

Global climate change is a major environmental issue which needs to be acknowledged in planning documents, particularly long range studies. Climate change has been linked to the release of greenhouse gases (GHG's) such as carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride into the atmosphere, which traps heat and increases temperatures near the earth's surface. Vehicles, including buses, release various emissions that may not only play a role in climate change, but result in reduced air quality. It is suggested that transportation in California is responsible for more than 40 percent of the GHG emissions in the state, and that automobiles and light trucks contribute almost 30 percent. As such, reducing the number of automobile vehicle miles traveled by private autos, as well as the use of alternative fuels with fewer emissions on transit vehicles, are critical to reducing transportation-related environmental degradation. Forecasted, long-term consequences of climate change range from a rise in the sea-level to a significant loss of the Sierra snowpack.

To reduce pollution from mobile sources, both the federal government and the State of California have developed regulations for transit vehicles:

1. The United States Environmental Protection Agency (EPA) has adopted a variety of regulations as required by the Clean Air Act Amendments (CAAA) of 1990. Standards for transit vehicles state that Particulate Matter emissions (PM, or "dust") must be cut by more than 90 percent or no more than 0.05 grams per brake-horsepower per hour (g/bhp-hr). Other standards include: nitrous oxide (NO_x), no more than 4.0 g/bhp-hr; hydrocarbons (HC), no more than 1.3 g/bhp-hr; and carbon monoxide (CO), no more than 15.5 g/bhp-hr.
2. The State of California signed Assembly Bill 32 (AB 32) into effect in 2006, which requires that GHG emissions reduce to 1990 levels by the year 2020. This bill does not include specific strategies, but rather provides guidelines and goals for transit operators to follow, including recommendations that State employees use public transit in order to reduce vehicle miles traveled (VMT).
3. In addition to AB 32, California lawmakers also signed SB 375, which lays out additional GHG reductions from regional MPOs. This bill addresses the concern that GHG reductions from improvements to vehicles, such as more efficient and cleaner fuels, would be lessened by increased VMT. This bill seeks to integrate transportation planning, land use and housing to reduce VMT and subsequent GHG emissions from cars and light trucks. Additionally, SB 375 also requires CARB to develop regional reduction strategies through the development of a "Sustainable Communities Strategy" that

relates the Regional Transportation Plan (RTP) to the housing needs allocation. Specifically, SB 375 states that every transportation planning agency must prepare and adopt a RTP with a goal of achieving a “coordinated and balanced regional transportation system”, which includes public transit among other modes. The bill also requires that public transit agencies supply transit data so as to be able to measure equity, accessibility, and to determine what percentage of the population the transit system serves. Further, a balanced household growth target must be included in the RTP so that public transportation and existing infrastructure can be utilized to its best capacity; this would include Transit Oriented Development.

With AB 32 requiring emissions be reduced to 1990 levels by 2020, it is important to address the topic of alternative fuels in the study, as discussed in the following section.

FUEL OPTIONS

With the need to replace aging vehicle and expand the fleet to meet increased service demand, it is important to discuss the options regarding fuel. Alternative fuels can not only provide cost effective options, but they also work towards clean air and other environmental goals set forth by local, state and federal programs. The following discussion presents the different alternative fuels, their advantages and disadvantages, their “global” affect, and their potential application for the Amador Transit fleet.

In recent years, there have been more studies regarding alternative fuel use in transit vehicles. The desire to reduce dependence on foreign oil, as well as comply with air quality requirements set forth by local, state and federal governments, have been the main driving force. Other reasons transit agencies have made the switch to alternative fuels over diesel include improved public perception of the transit system and to attract new riders, higher levels of grant programs for alternative fuel bus purchases, and to achieve local environmental goals and priorities. Along with the positives are also negatives or deterrents to using alternative fuels. These range from higher capital costs, higher operating costs, reliability concerns, limited availability of alternative fuels, and potential interruptions of fuel delivery. For each of the potential fuel types for Amador County, these issues are discussed in more detail in the following section.

Compressed Natural Gas (CNG)

Natural gas is a domestically produced alternative fuel and is readily available to end users through the utility infrastructure. The strength of CNG as an alternative fuel for transit buses is that it is generally less expensive per unit of energy than gasoline or diesel fuels. Per the Clean Cities Alternative Fuel Price Report in July 2012, the average price of CNG in the West Coast region was \$2.24, compared to an average of \$3.71 for gasoline and \$3.92 for diesel. On a nationwide scale, CNG costs averaged \$2.05 per gallon. Additionally, the nationwide average price in gasoline gallon equivalents (GGE) in July 2012 was \$2.05 and in diesel gallon equivalents (DGE) was \$2.28.

The fuel also has the potential to reduce NOx emissions and PM when compared to diesel, although low sulfur diesel fuel used in conjunction with particulate matter traps can reduce PM emissions by a similar amount. Greenhouse gas emissions from CNG vehicles are approximately

15 percent to 20 percent lower than from gasoline vehicles, since natural gas has a lower carbon content per unit of energy than gasoline. However, CNG generally vehicles have about the same greenhouse gas emissions as diesel fuel vehicles, with lower CO₂ emissions offset by higher hydrocarbon emissions.

Many people – both inside and outside the transit industry – perceive CNG as the future fuel of choice. Others see CNG as a stop-gap measure that can be used to reduce vehicle emissions until other technologies (hydrogen fuel-cell or combustion-electric hybrid) are developed further. Indeed, the decision to pursue CNG comes down to the underlying goals of the agency considering alternative fuels, the local politics, the financial resources of the agency, and the commitment of decision-makers.

Historically, the weakness of CNG is its difficult storage requirements. CNG is stored in high pressure cylinders at pressures up to 3,000 pounds per square inch. The high weight, volume, and cost of the storage tanks for CNG have been a barrier to its commercialization as an alternative fuel. Tanks also have a useful life that can be less than that of the bus as a whole, resulting in expensive replacement of on-vehicle tanks. The recent development of lighter aluminum tanks, however, has reduced this disadvantage to some degree.

The advantages of a CNG bus are the lack of visible pollution and quieter operation. The problems encountered with CNG include the inconsistent quality of local CNG supplies, limited range of CNG vehicles, and continued industry concerns regarding reliability. Specialized maintenance training and equipment, along with modifications to facilities to safely accommodate CNG, also add to costs.

According to the 2011 APTA Public Transportation Vehicle Database, a 35-foot CNG bus in 2011 cost on the order of \$340,000, substantially less than a hybrid bus (\$550,000) and slightly more than a diesel engine bus (\$250,000). The higher cost relative to diesel engine vehicles is due to the higher cost of the engine itself and the higher cost of the fuel tanks. The useful life of a CNG engine is roughly equivalent to that of a traditional diesel engine, depending on the level of maintenance as well as level of contaminants in the fuel. The CNG tanks, however, are typically certified for 15 years; if careful maintenance on the remainder of the bus allows its life to exceed this period, a transit agency can be faced with expensive replacement of the tanks.

In a 1996 Department of Energy report, Pierce Transit (Tacoma, Washington) estimated that CNG engines are about 20 percent less efficient than diesel engines on a per gallon equivalency, which reduces the range of CNG buses. CNG buses are described as having a driving range of about 300 miles (depending upon the capacity of the gas cylinders) compared to a little more than 400 miles for diesel buses. Typically, buses smaller than 35-feet in length are unable to accommodate enough fuel tanks to operate a full urban cycle service day without refueling.

CNG fuel is dispensed in either a slow or fast fill station. While capital costs for slow fill facilities are less expensive, they can take over 12 hours to refuel vehicles, compared to 3 to 10 minutes for fast fill facilities. However, slow fill stations require less area for the set-up, making them more appealing to smaller systems that may have less space available for modifications or facility components. Another drawback to fast fill stations is that the completeness of the fill is less, in that temperature increases with gas compressions, thus reducing the amount of gas that is transferred into the tank.

One of the major drawbacks for CNG use in Amador County is the lack of an adequate fueling station. As such, Amador Transit would need to provide a dedicated fueling station. Such a task would increase start-up costs dramatically and would present additional problems should the CNG option prove to be a poor long term solution. In general, a CNG refueling station for an urban transit fleet can cost between \$320,000 and \$7,400,000. The *TCRP Report 132* identified a general base cost of \$1 million plus \$15,000 per CNG bus. The lower end of this range is for “slow fill” facilities with a very limited capacity in the number of vehicles that can be fueled per day, while the high end is for “fast fill” facilities with large (and expensive) compressors. Further, it is estimated that facility maintenance costs can equal 6 percent of CNG infrastructure costs. One option to lower Amador County’s costs would be to share the facility with other transit providers in nearby counties, or with other Amador County government agencies that use (or are interested in using) CNG fueled vehicles.

Another important consideration is that the power provided by CNG engines, while it has improved over recent years, is still 25 to 30 percent lower than the power provided by a similar diesel engine. This can result in substantial operational problems on steeper grades present on some of the Amador County routes. In addition to delaying routes, this increases the traffic congestion caused by bus operations.

Overall, based on research and case studies in similar rural areas, CNG is not the ideal fuel for Amador County to pursue in the long run. The capital costs, including both vehicles and facilities, outweigh the potential benefits of CNG as an alternative fuel.

Hybrid Electric

A vehicle technology gaining popularity among transit systems nationwide is hybrid electric propulsion. Under this arrangement, battery-powered electric motors drive the wheels; the batteries are charged using a small internal combustion engine (diesel-, gasoline- or alternative-fueled) to power an electric generator. This arrangement provides dramatically lower emissions, as the engine operates within a very narrow and efficient operating range. Hybrid buses which use ultra-low sulfur diesel and particulate matter filters have 90 percent lower emissions than a conventional diesel bus, and tend to have less greenhouse gas emissions than both conventional diesel and CNG buses.

Hybrid electric propulsion systems have been tested at several large transit programs, most notably at New York City Transit. The National Renewable Energy Laboratory prepared an evaluation of the benefits of 10 new CNG Orion VII buses and 10 new Orion VII hybrids used for New York City Transit. According to the report, hybrid maintenance costs were lower than the CNG buses, battery replacement rate for the hybrid vehicles was about 4.5 percent per year, brake repair costs were 79 percent lower on the hybrid buses than the CNG buses and the hybrids had fewer road calls. New York City Transit has since placed an order for an additional 500 hybrid buses. Other agencies which have tested hybrid technologies include Sunline Transit in Thousand Palms (California), the Roaring Fork Transit Authority (Colorado), the Los Angeles County Metropolitan Transportation Authority, the Orange County Transportation Authority, Omnitrans in San Bernardino, TriMet in Portland (Oregon), King County Metro Transit in Seattle, the Southeastern Pennsylvania Transportation Authority in Philadelphia, and New Jersey Transit.

The National Renewable Energy Laboratory (NREL) has conducted several studies comparing fuel economy and maintenance cost per mile between hybrid electric and diesel transit vehicles for urban fleets. According to a NREL study for Long Beach Transit, fuel economy (miles per gallon) on a gasoline powered hybrid electric vehicles was 4.3 percent lower than on a diesel fueled vehicle but maintenance per mile costs were 42 percent less on the hybrid. Similar comparisons made for King County Metro Transit in Seattle show that fuel economy in miles per gallon was 27 percent greater on a diesel hybrid vehicle in comparison to an Ultra-Low Sulfur Diesel (ULSD) vehicle. In this case study, total maintenance cost per mile was only 4 percent lower for the hybrid vehicles.

Little research has been performed regarding the cost effectiveness of hybrid vehicles for rural transit fleets. The frequent stops and starts of typical urban and suburban routes get the most out of the hybrid system. Routes with extended distances between stops would not have as much improvement in fuel economy but would still realize benefits in reduced maintenance from the regenerative braking. Switching to a hybrid vehicle fleet would be largely dependent upon the level of grant funding available. The life expectancy of a hybrid electric vehicle is similar to a diesel vehicle.

Operating costs for a hybrid electric system are typically lower in comparison to conventional diesel- or CNG powered arrangements due to greater fuel economy and reduced brake wear (the batteries are also charged through regenerative breaking, which tends to slow the vehicle while it recoups energy). In addition, hybrid electric buses provide better acceleration and quieter operation than conventional internal combustion engine propulsion systems. Another benefit of hybrid electric technologies is that it does not require the large infrastructure investment that is required for CNG technologies. However, the average price of a hybrid bus is quite dramatic, costing roughly \$550,000 for a 35-foot bus when compared to \$280,000 for a conventional diesel bus (2011 APTA Public Transportation Vehicle Database). In addition, conventional sealed-gel lead acid battery systems typically last only two to three years, and replacement units cost on the order of \$25,000. Better battery technology currently exists that could extend battery life (i.e., nickel metal hydride), but this technology currently costs \$35,000 to \$45,000 per bus.

Hybrid technology may be a viable fuel choice for Amador County for the commuter route, however many of the routes will not require 35-foot buses that are readily available as hybrid electric. Additionally, many of the street and developments currently served by AT are not designed for larger buses. Lastly, the costs of electric and hybrid electric buses are prohibitive for Amador County. As such, this is not a fuel technology that should likely be pursued by Amador Transit.

Propane Fuel (LPG)

Propane (or liquefied natural gas – LPG) is a by-product of natural gas processing and petroleum refinement, and is another alternative that has been used in the transportation sector for decades, and is the world's third most common fuel source for engines. In the United States, LPG accounts for roughly 2 percent of energy used, of which less than 2 percent of that is used for transportation fuel. According to the Propane Education and Research Council, there are more than 270,000 propane vehicles on the road in the United States, many of which are used as fleet vehicles. For transportation applications, LPG is appealing due to its wide

availability (particularly in rural areas, where LPG is used to heat homes when natural gas is unavailable) and low cost, as well as the clean burning qualities. As of July 2012, LPG's average price in the West Coast region was \$2.97, roughly 20 percent less expensive than gasoline and 24 percent less than diesel, while nationwide it averaged \$2.64 per gallon. Nationally, LPG averaged \$3.64 in GGE and \$4.06 in DGE.

Surprisingly, propane buses are less fuel efficient than diesel buses. Studies have shown that on a gallon-to-gallon basis, the energy content of propane is 73 percent of gasoline; as such, more fuel is needed to travel the same distance. According to a 2006 United States General Accounting Office report, *Mass Transit: Use of Alternative Fuels in Transit Buses*, buses fueled with LPG at a California transit agency were 26 percent less fuel efficient than the equivalent diesel bus, while other studies have shown that this can range from 15 to 30 percent.

The environmental benefits of propane make this an attractive fuel. LPG is nontoxic and insoluble in water, thus presenting no threat to soil, surface water or groundwater supplies. Additionally, propane fueled vehicles generally produce lower amounts of pollutants and GHGs when compared to diesel and gasoline powered vehicles due to a lower carbon content. However, due to more stringent emissions regulations for light- and heavy-duty vehicles, such as those put in place by CARB, emissions from propane vehicles are generally equivalent to gasoline and diesel vehicles with the up-to-date modifications and retrofits.

Propane powered vehicles tend to cost more than diesel and gasoline vehicles, however existing gasoline or diesel vehicles are able to be retrofitted or converted to propane use. New propane vehicles cost on the order of \$380,000 for a 35-foot transit vehicle, falling roughly in the midrange for the various fuel types. Vehicles using propane have a low-pressure tank where the fuel is stored, and on some vehicles, extra storage tanks can be added to increase range (however this displaces payload capacity). According to the North Dakota State University Study, *Use of Alternative Fuels and Hybrid Vehicles by Small Urban and Rural Transit Systems* (April 2012), one problem for propane vehicles in smaller urban and rural areas is that of significant mechanical down time, as well as access to technical and mechanical expertise for repairs.

Fueling stations for propane cost more than diesel stations, but significantly less than those for CNG fuel. However, in order to accommodate for needed improvements for maintenance, facility improvements are required, which for a larger fleet cost on the order of \$300,000 for one maintenance garage. Propane stations require onsite storage with tanks installed above ground. Storing these outside provides greater safety benefits, however in colder winter climates, this is not ideal – in these cases, extra safety measures must be taken, such as extra ventilation, flammable gas detectors and special explosion-proof wiring, to name a few. The Department of Energy's Alternative Fuels Data Center estimates that it would cost roughly \$37,000 to \$175,000 to purchase and install the equipment required to dispense propane, but that this varies based on situation and need. For a wholly new fueling facility, TRB's *TCRP Report 146* estimates that one new propane fueling facility can cost up to \$700,000. Additional annual maintenance costs similar to those of diesel, at \$5,800 to \$8,200 per year.

Costs can be kept down in some instances by leasing the equipment rather than purchasing it, in return for a multi-year fuel supply contract. According to the Alternative Fuels Data Center, a propane fueling facility is present in Pioneer. However, it is likely that the facility, as is, would

not be able to accommodate the fueling needs of a transit fleet. With that said, there could be the opportunity to upgrade the facility and create a joint use, which would reduce the start-up costs and ongoing maintenance costs for Amador Transit.

While propane does present some benefits, it is not recommended that Amador County pursue this option. The costs associated with converting to this fuel type are likely to outweigh the benefits, and thus it is not financially favorable for Amador County.

Ultra Low Sulfur Diesel

Diesel-fueled engines have traditionally dominated the transit vehicle marketplace with their fuel efficiency and durability. From an air quality perspective, diesel engines have very low tailpipe emissions of CO and other organic gases. The concern from an air quality perspective, however, has been the emission rates of NOx and PM. The July 2012 Clean Cities Alternative Fuel Price Reports shows that the current cost of diesel fuel is \$3.92 per gallon on the West Coast, and \$3.52 nationwide; the GGE equivalent was \$3.36 for the nationwide average.

Due to increasing environmental pressure to reduce the above emissions, the Environmental Protection Agency has developed stringent NOx and PM regulations, as referenced above. The final Clean Air Amendments permit the use of clean diesel in urban buses, provided that the clean diesel engines meet the PM standards. In partial response to the 1990 CAA amendments for cleaner burning fuels and the continued development of the previously mentioned alternative fuels, the traditional diesel fuel engine has made great strides toward evolving with a cleaner burning particulate trap and catalytic converter technology.

Ultra-low sulfur diesel (ULSD) is diesel fuel with 15 parts per million (ppm) or lower sulfur content. In 2010, the U.S. Environmental Protection Agency required 100% of the highway diesel fuel refined in or imported into the United States to be ULSD. This ultra-low sulfur content enables use of advanced emission control technologies such as particulate traps and catalytic converters on light-duty and heavy-duty diesel vehicles. When combined with advanced emission control technologies, reductions from use of clean diesel can be equivalent to removing the pollution from more than 90 percent of today's trucks and buses⁵.

While ULSD typically does not impact vehicle performance, fuel economy can be compromised since the process that produces ULSD can also reduce the fuel's energy content. Additionally, lubricity is reduced as a result of removing the sulfur. This can be resolved by adding various additives to the fuel before retail sale or by the addition of biodiesel.

Diesel facilities are some of the least expensive to maintain, with an estimated yearly cost of \$5,800 to \$8,200 per year. This, in addition to the improvements to diesel engines and the current wide availability of the fuel, make diesel an attractive choice for many agencies.

As technology with diesel engines improves, this fuel type becomes a much more favorable option for Amador Transit. The costs associated with it are very minimal, if there are any at all, and air quality goals can still be obtained.

⁵ United States Department of Energy Alternative Fuels and Advanced Vehicle Data Center, 2011

Biodiesel Fuel

Biodiesel can be legally blended with petroleum diesel in any percentage. The percentages are designated as B20 for a blend containing 20% biodiesel and 80% petroleum diesel, B100 for 100% biodiesel, and so forth. Per the Energy Policy Act of 1992, alternative fuel credits are available for B100 and blends of B20 and higher.

Biodiesel, in general, contains roughly 8 percent less energy per gallon than standard petroleum-based diesel. Benefits related to greenhouse gases and air quality correspond with the blend used, whereby B20 generates roughly 20 percent of the benefit of B100.

B20 is the most common biodiesel blend in the United States and provides the benefits of biodiesel but avoids many of the cold-weather performance and material compatibility concerns associated with B100. B20 can be used in nearly all diesel equipment, is compatible with most storage and distribution equipment, and generally does not require engine modifications. According to the United States Department of Energy, B20 can reduce PM (particulate matter) emissions by 10 percent, CO (carbon monoxide) by 11 percent, and unburned HC (hydrocarbons) by 21 percent. Further, carbon dioxide emissions can be reduced by 15 percent.

B100 and other higher level blends cannot be used in all engines, though they are typically compatible with diesel engines built after 1994 with biodiesel-compatible material for parts such as hoses and gaskets. Since biodiesel blend levels increase quite substantially beyond B20, there are concerns that should be considered. These concerns include lower energy content per gallon, potential engine warranty issues and microbial contamination. Of particular concern to Amador County would be the potential for gelling in low temperatures during the colder winter months. Emission reductions are greater with the use of B100 biodiesel – reducing PM and CO by nearly 50 percent and unburned HC by nearly 70 percent. Likewise, carbon dioxide emissions can be reduced by more than 75 percent. It is important to note that despite these potential reductions, use of B100 biodiesel can actually increase NOx emissions.

Low-level biodiesel blends are also available, and are the result of blending biodiesel with petroleum diesel. Such fuel is compatible with diesel engines and aids in reducing harmful emissions. Blends include B2 (2 percent biodiesel, 98 percent diesel) and B5 (5 percent biodiesel, 95 percent diesel), both of which are suitable for light-duty and heavy-duty vehicles such as transit buses. As mentioned in the low-sulfur diesel discussion, low-level biodiesel, such as B2 or B5, is a common additive to increase lubricity. In addition to the lubricity benefit, these biofuels also provide air quality benefits. The United States Department of Energy states that “using 100 gallons of B5 brings roughly the same air quality and alternative fuel use benefits as using 25 gallons of B20 or 5 gallons of B100”.

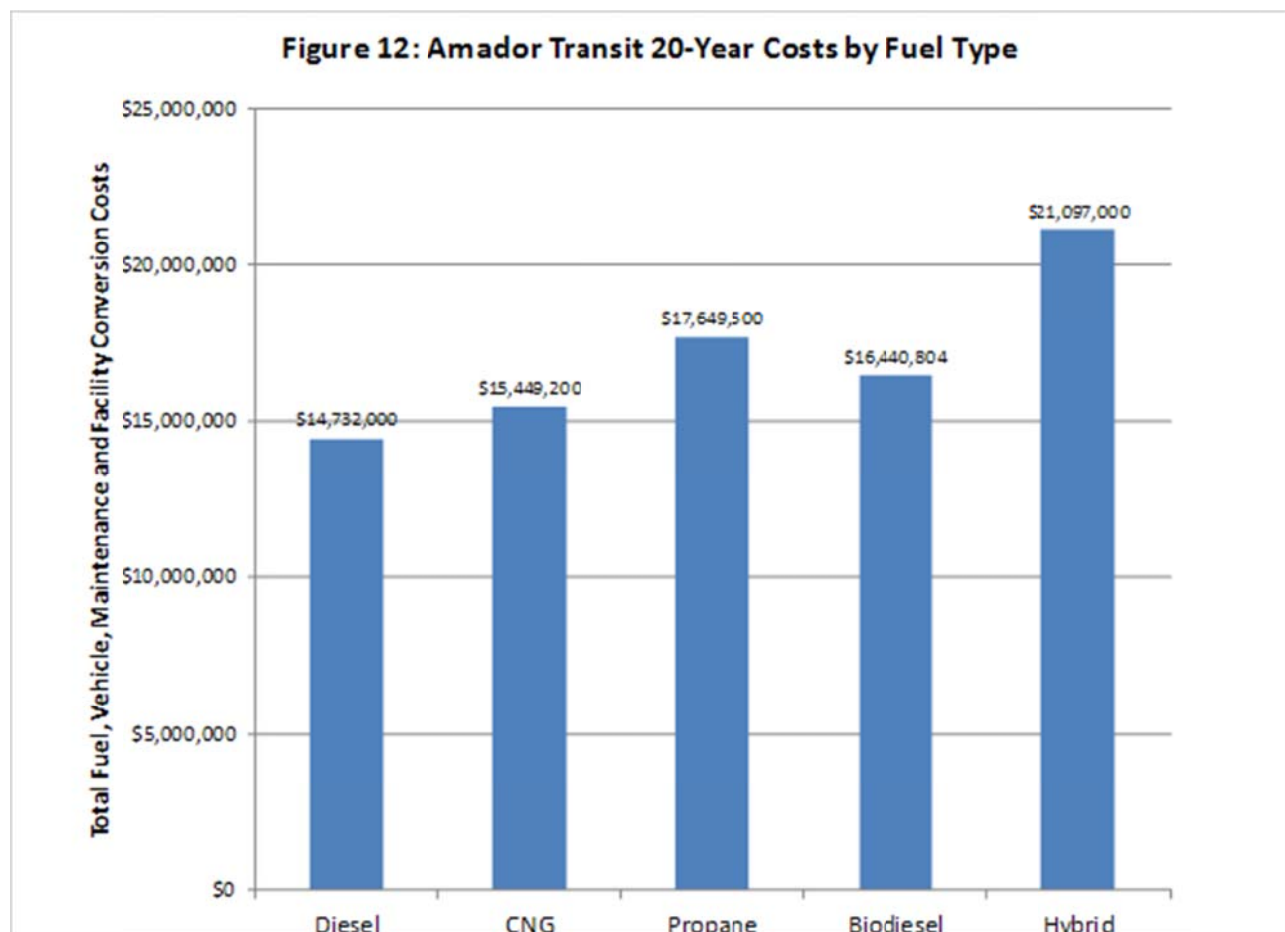
In terms of pricing, biodiesel tends to cost slightly more than traditional diesel fuel. As of July 2012, the Clean Cities Initiative cited the cost of B20 biodiesel in the West Coast region at \$4.04 and of B99 to B100 at \$4.28 per gallon, compared to \$3.92 per gallon for standard diesel. For Amador Transit, one significant drawback to biodiesel is the lack of a dedicated biodiesel fueling station.

While biodiesel has many benefits, they are not superior to those of regular diesel fuel, which is more readily available and tends to have better fuel economy. As such, unless a biodiesel

fueling facility was to be planned through a partnership with another agency, this fuel type is not the ideal alternative for Amador County's long term plan.

Alternative Fuel Summary

Each fuel type described above presents its own pros and cons. Figure 12 graphically shows total costs for Amador Transit by fuel type. Generally, capital costs tend to be the major disadvantage to a number of fuels, including propane and CNG. Compressed Natural Gas is used by many transit agencies across the country, including systems in nearby Placer County (TART), the Tahoe Basin (BlueGO), City of Roseville Transit, Sacramento County and Yolo County, to name a few. The major benefits of CNG are the availability of buses, parts and fuel, as well as the reduced emissions that are generated. However, safety and capital costs are the greatest concerns when contemplating the possibility of using CNG. Discussions with Nevada County's Gold Country Stage system revealed that after converting to CNG for a portion to their fleet, they have since converted back to diesel. Major problems experienced by the system included not enough power due to topography, no local maintenance available (they had to conduct major repairs in Sacramento), vehicles required fueling twice per day, only one local fueling station provided by PG&E (and fueling had to be done around PG&E's schedule), and the very high maintenance costs.



Hybrid electric buses are a popular choice for larger transit agencies across the country. By

using the widely availability of diesel fuel, coupled with electric technology, these engines produce fewer emissions and have lower fuel costs than other options. Additionally, any fuel type can be used (gasoline, diesel, etc), making this a flexible option. Unfortunately, hybrid electric buses cost significantly more than other alternative fuel vehicles, making this a major deterrent for smaller transit agencies.

Propane has been used as a domestic fuel for decades, as well as to power lighter duty fleet vehicles, including school buses. Lower emissions and fuel costs, as well as relatively minimal maintenance costs, make this an attractive option for transit fleets; however this may be offset by the lower fuel economy, high costs for facility conversion and construction of a fueling facility, and low availability of propane engines for larger transit vehicles.

Diesel is by far the most popular transit fuel used in the United States. Recent regulations put in place by the EPA have created more efficient and clean burning engines, bringing diesel fuel up to par emissions-wise with other alternative fuels. While it has many benefits, economic and environmental concerns are present regarding the refining of crude oil, leading to the interest alternative fuel types.

The allure of biodiesel is the result of minimal modifications required to existing diesel engines, as well as the clean burning aspects and low emissions. Unfortunately, fuel economy with biodiesel is worse than regular diesel, and the fuel is not widely available.

Table 58 shows a summary of the operating and capital characteristics / costs of each of the above fuel types. As shown, when fuels costs are converted to the Diesel Gallon Equivalent (the amount of alternative fuel it takes to equal the energy content of one gallon of diesel fuel, thereby allowing a direct comparison), only CNG would offer lower fuel costs to Amador County, while moving to hybrid electric buses would essentially have the same costs (although less fuel is used due to the engine technology). Despite the low fuel costs, CNG allows for lower fuel efficiency than all other engine types, including diesel, while hybrid electric offers the best fuel efficiency. Vehicle purchase prices for 35-foot transit buses range from \$280,000 for diesel buses to \$550,000 for hybrid buses; CNG, propane and biodiesel cost between \$340,000 and \$350,000. Converting existing facilities to propane or CNG use would be greatly expensive, averaging \$1.75 million for CNG and \$875,000 for propane. These costs were created for a 50 bus fleet, and therefore would be slightly lower for a more rural transit system such as that in Amador County. As shown, minimal modifications are needed for biodiesel and hybrid applications.

Table 58 also provides information for facility and maintenance operation costs, as well as propulsion system (or, engine) maintenance costs. As shown, CNG maintenance costs are, on average, greater than the other fuel types, while the propulsion system costs are in the mid-range. Hybrid electric buses have the highest propulsion system maintenance costs, however only minimally.

The bottom portion of Table 58 presents an analysis of total costs for Amador Transit over a 20-year period. Fuel costs would range from \$3.91 million for CNG to \$5.48 million for biodiesel. Diesel fuel, should Amador County choose to maintain these types of vehicles would cost on the

TABLE 58: Alternative Fuel Cost Comparison

Maintain Existing Service Quality Alternative

Input Cost Factors		Operating Costs		Capital Costs		
		Fuel Cost		Vehicle Purchase Price (for 35-ft)	Facility Conversion (\$/50 buses)	Facility and Maintenance Operation (\$/mi)
		Price per Gallon ¹	DGE Equivalent ²			
Diesel		\$3.92	\$3.75	\$280,000	\$0	\$0.18
CNG		\$2.24	\$2.28	\$340,000	\$1,750,000	\$0.23
Propane		\$2.97	\$4.06	\$380,000	\$875,000	\$0.18
Biodiesel		\$4.04	\$3.90	\$350,000	\$400	\$0.18
Hybrid		\$3.92	\$3.75	\$550,000	\$5,000	\$0.18
						\$0.16
						\$0.18
						\$0.18
						\$0.16
						\$0.19

Amador Transit Input Variables

Estimated Total Vehicles Purchased Over 20 Years 44
Total Fleet Mileage over 20 Years 4,364,012

Total Costs over 20 Years

	Fuel Cost	Bus Replacement	Facility Conversion	Facility and Maintenance Operation	Propulsion System Maintenance	Total Cost	Net Cost Over Diesel
Diesel	\$5,114,000	\$7,840,000	\$0	\$785,500	\$698,200	\$14,437,700	
CNG	\$3,685,000	\$9,520,000	\$455,000	\$1,003,700	\$785,500	\$15,449,200	\$1,011,500
Propane	\$5,211,000	\$10,640,000	\$227,500	\$785,500	\$785,500	\$17,649,500	\$3,211,800
Biodiesel	\$5,157,000	\$9,800,000	\$104	\$785,500	\$698,200	\$16,440,804	\$2,003,104
Hybrid	\$4,081,000	\$15,400,000	\$1,300	\$785,500	\$829,200	\$21,097,000	\$6,659,300

Note 1: Prices are for West Coast Region and are GGE price per gallon

Note 2: DGE is for nationwide average

Source: Use of Alternative Fuels and Hybrid Vehicles by Small Urban and Rural Transit Systems, North Dakota State University, 2012; TCRP Report 146: Guidebook for Evaluating Fuel Choices for Post-2010 Transit Bus Procurement, TRB 2011

order of \$5.43 million over the next 20 years, while propane would cost roughly \$5.53 million (calculated in Diesel Gallon Equivalents). Vehicle purchase costs would range from \$7.28 million for diesel vehicles to over \$14 million for hybrids. CNG vehicles would cost \$8.84 million, biodiesel \$9.98 million and propane \$9.88 million.

Facility conversions (not including fueling facilities) would be greatest for CNG and propane vehicles, costing roughly \$455,000 and \$227,500, respectively. There would be no costs associated with maintaining diesel vehicles, while biodiesel would cost just over \$100 and hybrid vehicles would require approximately \$1,300 in facility modifications. Facility maintenance costs would cost on the order of \$834,600 for all fuel types excluding CNG, which could total roughly \$1.06 million. Additional population maintenance would cost \$742,000 for diesel and biodiesel, \$834,600 for CNG and propane, and \$881,000 for hybrid vehicles. These figures are all representative of a 20-year time period.

The analysis presented in Table 58 can also be used to identify the cost per gallon of diesel fuel at which each of the alternative fuels would become cost-equivalent.

Assuming that the diesel costs would remain at these levels over the long term, the per-gallon cost of diesel would need to reach the following levels to yield \$0 net cost over diesel costs for each alternative:

CNG	\$4.49 per gallon
Propane	\$6.39 per gallon
Biodiesel	\$5.45 per gallon
Hybrid	\$9.02 per gallon

In summary, maintaining diesel buses with more efficient and clean burning engines would yield the most economical option for Amador County, as any future buses purchased would be at the lower spectrum and no major facility improvements would be required. CNG would offer lower fuel costs and moderately priced vehicles for future procurement, however because of the high facility costs, higher maintenance costs and lower fuel efficiency compared to diesel, this may not be an ideal option. Fuels with higher fuel efficiency – propane, biodiesel and hybrid electric – also come with higher costs, particularly for vehicles and facility conversion.

Potential Partners

As mentioned previously, some capital costs associated with new fueling facilities can be offset by partnering with other agencies. In 2010, Amador County started investigating the potential to build a CNG fueling facility, which would include converting the transit fleet to CNG. Beyond preliminary research, nothing was decided and no costs were thoroughly evaluated. At the time, PG&E was a potential partner for the facility. PG&E currently has numerous CNG facilities across the state, including fueling locations in nearby Grass Valley, Auburn and Sacramento. The regional waste service provider, Aces Waste, has also conducted research on CNG vehicles and facilities, and has expressed interest should the financial components prove viable. The agency has stated the need to conduct more in depth research regarding the financial aspects prior to moving forward or making commitments.

Generally, concerns are present regarding the stability of whether or not fuels would be available. As mentioned previous, the US Department of Energy has identified two propane fueling facilities in Amador County, both in Pioneer. Depending on the willingness of the facility operators / owners to partner, as well as the capacity constraints, more in depth discussion regarding joint use of these facilities should be explored. Outside of this, there are no other alternative fuel facilities currently in Amador County. The nearest CNG and biodiesel facilities are in the greater Sacramento area, including Placerville, Roseville and the City of Sacramento. Without incurring the substantial costs associated with constructing a new fueling facility, the operating costs associating with fueling outside the county would be extensive.

FLEET REQUIREMENTS

The replacement of vehicles is typically dependent upon the “useful life” of the vehicle, which is defined by Caltrans as 7 years or 200,000 miles (medium-sized, medium-duty transit buses, approximately 30 feet) or 5 years or 150,000 miles (medium-sized, light duty transit buses approximately 25 to 35 feet). A review of Amador County’s buses and planned replacement schedule for the near term shows that the average life of buses used in the system is 7 years. Not counting the planned replacement for the current fleet, buses will need to be replaced approximately twice over the next 20 years. If Amador Transit maintained the current level of service, this would equate to a total of 44 buses over the plan period. Future bus purchases would include at least two 45-foot buses to allow for increased capacity on the Sacramento Route by 2030.

In addition to vehicle replacement, Amador Transit will need to expand the fleet to meet the requirements of future transit growth. For the expanded service alternative, Amador Transit would need to purchase four new vehicles, in addition to the other vehicle replacement needs. Additionally, at least two new Dial-A-Ride buses will be required to keep up with projected ridership growth, even under the Maintain Service Scenario.

TRANSIT MAINTENANCE/OPERATIONS FACILITY

As the Amador County fleet expands, and possible vehicles with different engine types / fuel types are introduced, the maintenance facility will need to be modified and expanded. The current facility is not equipped to service an expanded fleet, and as is, could be considered deficient due to space restraints. Upgrading the maintenance facility would need to include upgrades to the transit administrative offices as well, so as to allow more space for maintenance operations and to accommodate future staff expansion (such as drivers, maintenance and administrative personnel).

The current facility can be upgraded to meet the needs of the transit program for at least 10 years at the existing location. To make the facility adequate for this timeframe, the following improvements would be required:

- Installation of an oil / water separator device
- Installation of a wash station
- New 30-foot bus bay with a lift

Despite these upgrades, the facility will need to be improved for the longer term with the capacity for larger sized transit vehicles, as well as an expanded transit fleet. By 2030, Amador Transit should plan modify their maintenance facility to include one bay capable of housing a 40 to 45-foot bus, as well as bus parking for the other larger fleet vehicles. At present, only four small vehicles can be accommodated at the facility, which is inadequate as-is. Further, should Amador County transition to different fuel types, modifications will be required to allow for the necessary maintenance equipment, as well as to comply with safety precautions and code requirements. As discussed previously, the modifications vary depending on fuel type, and can cost anywhere between \$100 for biodiesel facilities to over \$450,000 for a facility used for CNG buses.

PASSENGER FACILITIES

The Amador County Transportation Commission has recently completed the construction of a new transit center in Sutter Hill, along with new administrative offices. The alternative scenarios do not result in a significant increase in transit service that would warrant expansion of this facility.

As Amador County's land use planning models are focusing on transit oriented development, there may be a need for additional passenger facilities in communities where high density residential and commercial uses are concentrated. As discussed previously, the majority of high density residential development is planned for the Sutter Creek, Jackson and Plymouth areas, while commercial is concentrated in Plymouth, Sutter Creek, Jackson, Martell and Lone. Future amenities, such as transfer facilities and / or larger scaled passenger facilities should be planned for these communities. Ideally, these would be located within ¼-mile of the residential developments; doing so would promote transit use by nearby residents through accessibility and generally make transit a more attractive mode of transportation. Amenities would provide for larger covered waiting areas that would accommodate more passengers than current shelters or benches allow for, along with seating areas. This would be particularly important on the Shuttle route, which is expected to experience a 70 percent growth in transit demand by 2030. Further, as ridership increases and larger buses are needed, a number of stops along the Lone and Shuttle routes would need to be redesigned to accommodate these vehicles.

Where large passenger waiting facilities are not warranted, Amador Transit should install bus shelters along routes where boardings exceed 10 passengers, and bus benches where boardings exceed 5 passengers. The routes served should be posted at each stop, along with current bus schedules. The Short Range Transit Development Plan for Amador County presented an updated bus stop improvement plan. This included locations for four bus shelters and three bus benches, almost all of which are served by the Shuttle route. Considering the potential transit growth on this route, these improvements are imperative. Shelter locations were as follows: Wal-Mart in Martell (served by the Shuttle), Jackson Hills Apartments (served by the Shuttle), Sutter Creek Auditorium (served by Shuttle Plymouth), and the Sierra House Restaurant (served by Upcountry). Bench locations were at SaveMart (Shuttle route), Highway 16 and Carbondale Road (Sacramento Express route) and the Jackson Gate Apartments (Shuttle route).

In addition to expanded passenger facilities near increased development, Amador Transit should also consider installation of "real time" bus information at major transit stops. At

locations such as the Sutter Hill Transit Center and larger passenger facilities in key transit locations, electronic signs should be installed that provide the passenger with up to date information regarding bus location and wait times, as well as any important route information (i.e. delays).

Increased future development in the Lone area (both within city limits and directly adjacent to) and the residential area nearby along SR 124 may lead to a need for improved Park and Ride facilities in Lone. Currently, the Lone route uses the Park and Ride as a stop, which generates a decent amount of ridership. With future development occurring outside the Lone city limits, but within a very reasonable distance from this Park and Ride location, future transit demand may warrant improved facilities. This could include the provision of bus shelters or benches, depending on actual ridership at the stop, as well as improved parking facilities for passengers. Further, as mentioned in other Amador County transit planning documents, a potential park and ride facility should be constructed along the Sacramento Express route to accommodate the future ridership. A specific site had been identified in the *ARTS Capital Improvement Program*, prepared by Dokken Engineering in 2001, at the intersection of SR 16 and SR 124, that would adequately serve this route.

An additional consideration for Amador Transit over the long term is to ensure future developments are designed appropriately for transit vehicles. Current practice of transit buses entering / exiting parking lots is not an ideal situation for operations and overall safety. Any future large-scale developments (commercial and multi-family residential) that will be transit generators should include transit stops that can accommodate larger transit vehicles. Design guidelines for such facilities are outlined in the *Transit Design Guidelines* study, prepared by LSC Transportation Consultants in 2009.

ADVANCED PUBLIC TRANSIT SYSTEM TECHNOLOGIES

Recent advances in communication and communication technologies have impacted all segments of modern society and have found new applications in the transit industry. These technologies have come to be known as Advanced Public Transportation Systems (APTS). For purposes of Amador County's transit environment, there are two promising technologies within the APTS umbrella that have been developed over recent years: Mobile Data Terminals (MDTs) and Electronic Fare Management Systems. Amador Transit currently utilizes an Automatic Vehicle Location system (AVL). True to the experiences of many other rural transit systems, AVL has proved to have some issues that do not outweigh the benefits. In addition to passenger counting problems (i.e. passengers loading groceries are counted more than once), AT does not have on-time performance issues; tracking on-time performance is one of the main components / benefits of AVL, and is therefore not applicable to AT. As such, the actual usefulness of the program may not have been comparable to the costs incurred to purchase, install and implement the AVL technology in Amador County.

Mobile Data Terminals

Mobile Data Terminals (MDTs) are a form of on-board communication technology between transit drivers and operations staff. Using a text format transmitted via radio/cell phone, dispatch messages, vehicle location, passenger counts, engine performance, mileage, and other information is directly communicated to the transit agency office. MDTs can effectively replace

paper manifests and allow for easier and more thorough analysis of route performance. Additionally, MDTs limit frustration and time when radio messages between dispatchers and drivers become inaudible and require repeating.

This form of technology can be particularly efficient when paired with other ITS systems such as electronic fare payment, CAD and scheduling, automatic passenger counters, and AVL. An MDT/CAD combination allows dispatchers to make optimal changes to itineraries when necessary and to automatically communicate updated information to drivers. Communication systems can also be integrated with AVL systems to provide real-time location data with every communication exchange. This information can be transmitted in voice or text form.

MDTs can also be used to assist with the efficiency of systems planning and fleet management. A MDT-AVL system combination can gather data and link the operations data to the transit agency's Geographic Information System (GIS) to be analyzed for long-term planning and service adjustments. This data could include real-time ridership figures generated by another technology, Automatic Passenger Counters (APC) that can be used by for long-range service planning or in the short-term by operations supervisors to add vehicles when demand outpaces the current in-transit capacity. Transit vehicles and their communications systems can be installed with a dedicated channel for emergency response. MDTs can include a pre-programmed emergency message that when integrated with AVL technologies can help provide location and pertinent information about a distressed vehicle. In addition, a silent alarm or CCTV camera video feed from a transit vehicle or transit facility to the operations or security center can be employed.

According to TCRP Synthesis Report 70 (2007), which documents a survey of transit agencies who employ MDT technologies, 39 percent of respondents use MDT to monitor on-time performance. The exact cost of an MDT is difficult to determine without going through the procurement process, and the price is very dependent on the number of units ordered the features available. According to the TCRP survey, MDTs cost on the order of \$1,000 to \$4,000 per unit. Installation of the MDT units cost roughly \$500-\$1,000 per unit. Transit agencies reported that annual maintenance is on average \$200 per unit. In addition to the initial capital costs, MDT manufacturers may charge monthly or annual fees for technical support. Each driver will need to be trained on the MDT, which can take up to 8 hours per driver.

Pros and Cons for Amador Transit – MDT

The primary purpose of the MDT technology is to facilitate communication between drivers and dispatchers. When interfaced with CAD software, MDTs would increase communications efficiency, particularly for the Amador Transit DAR vans. Additionally, with MDTs, AT would be able to more effectively and efficiently compile standard transit performance measures such as passengers per vehicle service mile, passengers per vehicle service hour and on-time performance. In particular, determining the performance of the individual routes could be facilitated through the combination of MDTs and AVL. Case studies with MDTs in rural transit systems have shown that some regions attempting to implement MDTs were unable to do so due to an inadequate radio communications networks. More in-depth research would be required to confirm that a good data communications network could be established encompassing all of the AT service area.

Electronic Fare Management System

A transit systems fare management system encompasses the receptacle for depositing passenger fares and fare media. Currently AT uses standard manual fareboxes. As for fare media, AT uses photocopied cardstock monthly passes and color coded paper day passes and paper tickets. Advanced fare systems are currently available that can make change, accept credit/debit cards, track passenger boarding activity by route, run and stop, speed the passenger boarding process, and greatly reduce the time and cost associated with collection of fares, tracking of fare data, and accounting.

There are three types of electronic fare media:

- **Bar Coded Cards** – Similar to technology employed in the retail industry, each bar coded ticket is labeled with specific data about the rider and fare. A bar code reader/scanner for each vehicle and costs on the order of \$1,000 each. The base system which includes a computer and printer costs around \$4,500. This is a relatively low cost method for transit systems to implement electronic fare media, automatically record trips, and generate operations and billing invoices.
- **Magnetic Stripe Cards** - These cards are paper or plastic tickets with a magnetic stripe for storing information. As an example, the BART system in the Bay Area uses paper magnetic farecards. There are two basic types: read-only swipe cards and read-write stored value cards. Read-only cards allow for automatic determination of the validity of an unlimited-ride pass. Read-write cards used in conjunction with a Ticket Processing Unit (TPU) can determine the validity of a multi-ride card or stored value card and deduct the necessary ride or value. Some units are able to print the remaining value on the card. Read-write cards can also be encoded with the information needed to serve as an “electronic transfer slip.” An “electronic purse” is another function of the magnetic stripe, where the stored value on the card can also be used to make small purchases from cooperating merchants.
- **Smart Cards** - A smart card is a type of fare medium that resembles a credit card with an embedded computer chip. Two types of smart cards exist: contact and contactless “proximity” cards. Contact cards must be physically swiped or fed through a card reader, whereas, contactless cards only need to be held within an inch or two of the card reader allowing for a speedier processing time. In fact, contactless cards do not even need to be removed from a wallet or purse to function properly. A contactless smart card system potentially has lower maintenance costs because there are no moving parts needed to push the card through. In addition to the capabilities of the magnetic farecards, smart cards offer greater data processing capabilities and there is a move toward potential joint arrangements between the transit and banking industries using smart cards.

The farebox is the center of a fare management system. An electronic farebox generally includes the following features:

- Magnetic swipe pass reader
- Passenger display

- Integration with passenger processing
- Interface with smart cards
- A ticket processing unit which can read and re-encode magnetic tickets or smart cards, or issue a magnetic transfer, day pass, or other agreed-upon document from an internal supply of blank un-encoded stock
- Electronic cashbox door lock
- Silent alarm

More advanced electronic fareboxes include some or all of these additional features:

- Validate coins and bills and return those that are not acceptable to the system
- Accept, validate and, if necessary, re-encode magnetic thin card fare documents
- Optionally accept and process credit cards and Employer ID cards
- Print, encode, and issue a magnetic transfer, day pass, or other agreed-upon documents from an internal supply of blank un-encoded stock
- Provide change (or an electronic "change card" for future use) for fare overpayment
- Optional interface to destination/next stop electronic signs/audio enunciator system, GPS, passenger counters, and CAD/AVL systems
- Driver control unit
- High security dual port cashbox with built-in electronic identification system

Pros and Cons for Amador Transit – Farebox Management

The primary advantage of an electronic farebox for AT would be the data management possibilities. An electronic farebox can record the number of boarding passengers by type, total passes, stored value cards, etc. Route/Run summary reports can be initiated by the driver using the driver keypad to create a record that summarizes all fare transactions since the last route/run request. Stored ride/stored value cards could be an alternative to multiple ticket booklets. Passengers could purchase 10-ride, 20-ride, or 40-ride passes, or a specified dollar amount worth of rides. These passes would be magnetic-striped farecards or smart cards, originally encoded by a ticket printing and encoding machine and typically sold off the bus. Electronic fareboxes can also issue and process transfers automatically. Another benefit of electronic fareboxes is that they could streamline the ticket purchase process for social service agencies. Some electronic fareboxes have the capability to accept "post billing period passes" for different programs. Using a ticket printing encoding machine, a batch of pre-encoded tickets valid for a specified period of time (say, one year) could be delivered to the various social service agencies and distributed to the clients. When the ticket is inserted into the magnetic card reader, the farebox reads the ticket and records the serial number, time of use, bus, and route. This data is then uploaded to the data system so an invoice report for the Social Service agencies can be generated.

Drawbacks of the electronic farebox include delays associated with difficulty feeding magnetic fare cards through the machine, particularly if the card is wet, additional maintenance required and, of course, the cost. Depending on the type of unit, an electronic farebox (without the capability to interface with smart cards) may cost around \$14,000 per unit. If magnetic fare media is used, an additional \$17,000 would be required for each ticket printing/encoding machine purchased. Implementation of an electronic fare management system may also require

modification of the cash counting office to accommodate larger cashboxes and the installation and maintenance of fareboxes.

Summary of APTS Options for Amador Transit

- Electronic Fareboxes provide the opportunity to improve the cash-handling process in the office, yielding more efficient and accurate tracking of revenue by route and by passenger type.
- Future procurement of GIS systems to assist Amador Transit with planning and operations management of DAR system could be beneficial in the long-term, particularly as AVL becomes more widely used in rural transit systems and costs are reduced.

As the system grows in response to growth in the community, or as the cost and dependability of these technologies improves, AT should carefully consider further investment in APTS systems as a means of improving service quality while also increasing service effectiveness.

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AMADOR COUNTY LONG RANGE TRANSIT PLAN

This long-range transit plan is intended to guide the improvements of public transit services in Amador County through the year 2030. Much of the analysis used as a basis for the plan is presented in previous chapters; the reader is encouraged to refer to previous chapters for additional information and discussion regarding the various plan elements presented below.

Included in this chapter are the service and capital elements of the Long-Range Transit Plan, as well as related financial components. This plan has been developed with a focus on future land use development patterns, projected population growth, and associated growth in transit ridership demand. Further, emphasis has been placed on developing a plan that is financially feasible for Amador County and that meets the minimum requirements of the Americans with Disabilities Act.

It is important to note that the plan is based on assumptions that have been identified throughout the document, including demographic, land use and traffic model projections. These assumptions will likely change over time as forecasts are refined by the County. Consequently, the ACTC directs that the long range plan be updated every five years, in an effort to maintain consistency with the schedule for short-range transit plan updates.

SERVICE PLAN

The “Maintain Service Quality” strategy (Scenario One) is selected as the basis of the long-range service plan. As discussed in Chapter 7, this strategy ensures that Dial-A-Ride services expand to address needs as they grow and addresses vehicle overcrowding due to ridership growth. Beyond this, there are no planned expansions for new services. This scenario is considered “financially constrained”, in that all planned elements are feasible given realistically foreseeable funding projections. In addition, the recommended service plan leaves open the option for future transit expansions, should adequate funding be available and future needs be determined to be reasonable to meet.

Under this service plan, ridership will grow based upon forecasted population growth and growth in transit demand within existing transit route service areas. It is estimated that ridership under this plan would grow by roughly 40,400 passenger-trips per year by 2030. The largest increases will occur on the Shuttle service and Dial-A-Ride program. It is not currently expected that new daily routes will be warranted to serve new development areas.

Based on existing peak load data on current transit routes and expected ridership growth, no growth in the number of peak buses in operation will be required on any services except the Dial-A-Ride program. It is recommended that a new Dial-A-Ride bus be purchased in 2020 and 2030 to accommodate expansion in ridership demand. Additionally, while an expanded fleet is not required for fixed routes, the Sacramento Express route will require larger buses in the future. This should be done according to the planned vehicle replacement strategy for the fleet.

Because this scenario does not increase service levels, vehicle-hours and vehicle-miles will not increase on the fixed route services. However, due to greater demand for paratransit services,

Dial-A-Ride service will be expanded. In total, vehicle-hours will increase by roughly 17 percent and vehicle-miles by 4 percent.

While the focus of this plan is to maintain existing levels of service based on funding projections, flexibility for expansion should be included. The funding projections made for this study are estimated using *known* funding sources. As transit funding changes continually, it is likely that new grant programs may become available over coming years. Likewise, economic conditions may lead to increased funding amounts through existing programs. Should Amador County receive revenues beyond those projected, service expansions to enhance the transit program should be considered. A number of expansion options were presented in Chapter 7. Decisions regarding future service enhancements should be made as funding becomes available, based upon the needs identified at that time. It should be noted that this is not an all-inclusive list; as Amador County's transit program continues to mature, there may be new expansion opportunities not presented in this plan.

Under current transit operating levels, Amador Transit is understaffed. As such, it is recommended that one additional administrative staff position be created. This position will provide a number of services. The primary duties will include those related to reception, performing general office tasks, selling transit passes and serving as the front desk receptionist. The position will also be cross-trained as a dispatcher – this will ensure that there is always an available dispatcher on duty during operating hours.

Fares

Transit fares should increase over time as needed to address any future increase in transit operating costs, and to ensure that systemwide minimum farebox return ratio and individual service performance measures can be attained. At present, there is not the need for a systemwide fare increase. One option that should be further evaluated as part of a short-range transit plan, however, is a possible two-zone system for the Upcountry Route. Under this option, longer passenger trips on this route (such as those between Jackson and points east of Pine Grove) would require an additional fare. This option should be considered as one potential means of ensuring that the Upcountry Route can continue to be operated while attaining minimum performance standards. It should be noted that implementation of an automated farebox system (as discussed below) would greatly aid the implementation of a zone fare.

CAPITAL PLAN

Vehicle Purchases and Replacement

Future Amador Transit vehicle purchases will be primarily due to the need to replace the fleet as it ages. Following Caltrans guidelines, the entire existing fleet will need to be replaced twice, for a total of 44 buses. Of these, 9 buses will need to have a minimum capacity of 30 passengers, and another 35 buses with a capacity of less than 30 passengers. In addition, two full-size buses will need to be purchased as replacements to those currently being used for the Sacramento routes. Forty-passenger capacity buses are acceptable until 2025; beyond that timeframe, 45-passenger buses will be needed. Purchase of these vehicles will need to be coordinated with Regional Transit. Note that these totals do not include replacement of the existing bus owned by Regional Transit.

Additionally, as mentioned in the previous section, two additional Dial-A-Ride vehicles will be needed in order to accommodate the increased ridership. One additional bus should be purchased roughly in 2020, which would also be replaced within the plan period twice, while a second is expected to be required by 2030.

Chapter 8 presented an in-depth discussion of fuel options for Amador Transit. A detailed cost-benefit analysis indicates that maintaining the current clean diesel fuel type is the most cost effective option moving forward for AT. Alternative fuels, including vehicle costs, fuel costs and needed facility improvements, cost between \$1 million and over \$6 million more than diesel fuel. It is recommended that, barring significant changes in costs or fuel availability, future bus vehicle purchases should be clean-diesel engine vehicles.

Table 59 shows the costs over the 20-year period for vehicle purchases. As shown, including new vehicles and all required replacements, a total of 48 vehicles will be required. Costs are estimated to total just over \$8 million by the end of the plan period.

Facility Improvements and Upgrades

Maintenance Facility

Amador Transit's current maintenance facility site should be improved to better serve the long-term needs of the transit program. As this site can be modified to adequately serve the transit program through 2030, there is no need to consider relocation to a new facility. Needed improvements to the existing facility consist of the following:

- Installation of an oil / water separator device
- New wash station
- Construction of a new bus bay with lift, adequate to service a 40-foot bus.
- Expanded bus parking, requiring redesign of the entire existing site including redesign of the islands / medians in the parking area to gain space and improve circulation and retention walls along the eastern side of the site.

It would also be beneficial to fence the facility for better security.

Costs of improvements will depend in part on specific site design and the resulting need for retaining walls and potential soil stabilization. Based upon typical existing unit costs, a planning-level cost estimate for these improvements (in current dollars) is \$1,050,000 (the figures in Table 59 reflect inflation). This includes design, contractor overhead and profit, and a 15 percent contingency. These improvements should optimally be pursued over the next several years. For purposes of this plan, design costs are assumed by 2015, with construction costs (adjusted for inflation) taking place in the 2016-2020 period. Based on what is known about the site, there is adequate room from a physical standpoint for the needed improvements.

TABLE 59: Capital Requirements						
Item	2012 Unit Cost	2013 - 2015	2016-2020	2021-2025	2026-2030	Total 2013-2030
Transit Buses		\$1,652,000	\$1,368,000	\$2,044,000	\$2,983,000	\$8,047,000
Number of 20 passenger vehicles	\$80,000	8	10	10	11	39
Number of 35 passenger vehicles	\$280,000	2	1	1	2	6
Number of 40 to 45 passenger vehicles	\$312,000	1	0	1	1	3
Bus Stop Improvements		\$62,000	\$72,000	\$44,000	\$97,000	\$275,000
Number of Benches	\$3,000	3	3	2	3	11
Number of Shelters	\$12,000	4	4	2	4	14
AT Maintenance Facility Improvements	N/A	\$140,000	\$1,020,000	\$0	\$0	\$0
Park and Ride Facilities	N/A	--	\$400,000	\$30,000	--	\$430,000
Transit Technology	\$1,000	\$17,000	\$14,000	\$18,000	\$24,000	\$73,000
TOTAL		\$1,871,000	\$2,874,000	\$2,136,000	\$3,104,000	\$8,825,000
Note: Does not include replacement of existing Sacramento Commuter bus owned by Sacramento County.						

However, substantial engineering work will need to be conducted in order to confirm the suitability of the site.

Passenger Facilities

Passenger facilities will need to be improved as new developments arise and ridership increases. Amador Transit should track boarding data periodically, so as to ensure passenger facilities are adequately sized based on passenger activity. Any stops that see a minimum of 10 boardings per day should have shelters installed, while stops with 5 to 10 boardings should have benches. Other general passenger facility improvements include:

- Signs posted showing which routes serve each stop
- Bus schedules at each stop
- Ideally, at major stops, provide “real time” bus information through electronic signage

A review of recent boarding by stop data, and considering anticipated growth on the AT routes, shows that approximately 10 shelters and 8 benches will need to be installed over the plan period. These will mostly be situated along the Lone and Shuttle routes, which will have the highest ridership growth.

In addition to the above, Amador Transit should complete the improvements that were discussed in the updated bus stop improvement plan as part of the 2008 *Short Range Transit Development Plan*. This included shelter locations at the Wal-Mart in Martell, Jackson Hills Apartments, Sutter Creek Auditorium, and the Sierra House Restaurants. Additionally, needed bench locations are at the SaveMart, Highway 16 and Carbondale Road, and the Jackson Gate Apartments.

In total, over the next 20 years Amador Transit should plan on installing at least 14 shelters and 11 benches (includes those that are recommended to be installed now). As shown in Table 59, this would total approximately \$275,000. Of this total, \$45,000 is estimated for benches and \$230,000 for shelters. These figures include the cost of installation and reflect inflation.

Another important passenger facility component is that of Park and Rides. With the anticipated growth generated from the Lone area, Amador Transit should consider upgrading and improving Park and Ride facilities along SR 124; this may include bus shelters or benches (depending on ridership) and improved parking facilities. Further, a Park and Ride facility should be construed along the Sacramento Express route, such as at the intersection of SR 16 and SR 124 (as identified in the *ARTS Capital Improvement Program*). The facility should include parking, a bus pullout, and a passenger shelter with bench. Previous estimates for the Park and Ride facility along the Sacramento Express Route totaled \$265,000 in 2001; this equates to roughly \$400,800 in 2015 dollars with inflation. In total, the new Park and Ride facility plus improvements to the existing facility along SR 124 is estimated to require roughly \$430,000 for amenities and site work, as reflected in Table 59.

Lastly, as large-scale developments are constructed in key areas along transit routes in Amador County, Amador Transit should ensure that larger transit vehicles can be accommodated safely and efficiently. This would require coordination during the planning process and utilizing the *Transit Design Guidelines* study (prepared by LSC Transportation Consultants in 2009) during the project review phase.

Advanced Technology

Amador Transit should purchase and install an electronic fare management system on their vehicles, including electronic fare collection boxes. This will provide Amador Transit with improved tracking of passengers by fare type, will simplify fare revenue data entry, and will improve the efficiency of the administrative staff. Overall, a fare management system will reduce administrative time associated with recordkeeping, allowing staff to focus on other important tasks. Additionally, the technology will allow the system to upgrade fare media, particularly the monthly passes.

Costs for this technology depend on the system used. For Amador Transit, the most cost effective current option is bar coded cards which do not use magnetic strips. Scanners for each vehicle cost on the order of \$1,000 each, while the base system (including computer and printer) runs approximately \$4,500. A system capable of reading magnetic fare media (however, not with smart cards) may cost upwards of \$14,000 per unit, and would require another \$17,000 for each machine that prints and encodes tickets. For the purposes of this report, it is recommended that AT utilize the more cost effective option, as shown in Table 59. To purchase and install the bar code fare system, Amador Transit can expect to pay on the order of \$73,000 over the 20-year period for all vehicles. Note that final choices regarding technology options may result in differing costs.

PLAN FUNDING SUMMARY

Table 60 provides a summary of the costs associated with the recommended service plan, compared against the projected revenues through 2030. As shown, the operating/administrative costs under this plan are fully fundable through the projected funding and farebox revenues. Note that the farebox revenues shown do not include the potential zone fare scenario; if that was implemented, revenues would be higher. In each of the five-year annual “snapshots” – 2015, 2020, 2025 and 2030 – projected revenues exceed the anticipated operating costs for the service plan.

Considering all annual budgets through 2030, total Amador Transit operating/ administrative costs under this plan are estimate to equal \$31.2 million. Fare revenues are forecast to total \$3.4 million, Sacramento County revenues for the Sacramento County Express service within Sacramento County will total \$1.5 million, state and federal operating grants (as detailed in Table 31 of Chapter 6) will total \$33.2 million and advertising revenues will total \$1.0 million. Total revenues are forecast to equal \$39.1 million, exceeding operating/administrative costs by an estimated \$7.9 million. These funds are potentially available for capital improvements (including “local match” for state and federal transit capital grants) or for service enhancements as identified in future years based upon the unmet needs determination process. Total capital costs through 2030, as presented in Table 59, are estimated to be approximately \$8.8 million.

TABLE 60: Amador Transit Long-Range Plan Cost and Revenue Summary

	2015	2020	2025	2030
Annual Operating Costs	\$1,382,236	\$1,641,204	\$1,953,610	\$2,333,752
Projected Operating Revenue				
State and Federal Grant Revenue	\$1,529,700	\$1,727,200	\$2,039,400	\$2,395,300
Advertising Revenues	\$45,900	\$53,200	\$61,700	\$71,500
Sacramento County Revenues	\$78,900	\$85,200	\$89,700	\$91,600
Farebox Revenue	\$123,756	\$168,093	\$226,997	\$305,457
Total	\$1,778,256	\$2,033,693	\$2,417,797	\$2,863,857
Remainder: Potentially Available for Capital Funding	\$396,020	\$392,489	\$464,187	\$530,105

Given the availability of transit capital funding programs (beyond the operating funding programs shown in Table 31) and given that these programs typically require only a 20 percent local match, there will be more than adequate local funds to address future capital funding opportunities. In total, financial resources through 2030 will be more than adequate to fund capital improvements and ongoing operating costs over the plan period.

In sum, this long-range transit plan will ensure that Amador Transit can continue to serve its important role in providing mobility services to Amador County residents. This plan:

- Includes service improvements (such as expansion of Dial-A-Ride and provision of larger vehicles on Sacramento County Express) to maintain the quality of existing services.
- Provides for capital enhancements that will improve the efficiency of Amador Transit.
- Improves the overall productivity and cost effectiveness of the transit program. As shown in Table 43 in Chapter 7, the passenger-trips per vehicle-hour of service will increase from 5.4 to 7.5, while overall marginal farebox return ratio will increase from 13.5 percent to 19.7 percent.
- Leaves available future opportunities to address additional transit needs, as determined through the ongoing unmet needs determination process.
- Provides a financially sustainable transit funding program.

APPENDIX A:
TransCAD Origin –Destination Model Data Tables

Total of all trip types

	Amador City	Comanche	Lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	1	2	33	97	280	2	-6	99	-1	111	39	58	27	94	6	34	35	47	957
Comanche	2	24	91	149	313	1	3	14	1	44	85	5	37	9	5	6	65	208	1062
Lone	33	91	1049	336	1070	91	-14	112	8	79	21	12	201	21	3	9	26	239	3386
Jackson	97	149	336	2687	1957	88	294	196	80	598	195	13	34	24	86	5	629	105	7572
Martell	280	313	1070	1957	2003	195	212	663	150	953	130	88	114	136	55	64	372	304	9059
NW County	2	1	91	88	195	1	2	112	1	47	33	80	60	101	2	21	10	47	894
Pine Grove/Pioneer	-6	3	-14	294	212	2	323	-18	-5	56	34	-12	-13	-19	176	-11	-8	-22	971
Plymouth	99	14	112	196	663	112	-18	1354	98	272	15	107	24	139	2	192	15	33	3430
Shenandoah	-1	1	8	80	150	1	-5	98	54	38	27	2	1	5	3	31	2	2	499
Sutter Creek	111	44	79	598	953	47	56	272	38	353	50	42	30	70	22	33	117	85	2999
Up County	39	85	21	195	130	33	34	15	27	50	800	-8	-11	-14	-1	-10	-5	26	1405
Latrobe Road	58	5	12	13	88	80	-12	107	2	42	-8	0	0	0	0	0	0	30	418
104 West	27	37	201	34	114	60	-13	24	1	30	-11	0	0	0	0	0	16	0	520
16 West	94	9	21	24	136	101	-19	139	5	70	-14	0	0	0	0	104	88	0	758
26 South	6	5	3	86	55	2	176	2	3	22	-1	0	0	0	0	0	0	30	388
49 North	34	6	9	5	64	21	-11	192	31	33	-10	0	0	104	0	0	65	8	551
49 South/PDR	35	65	26	629	372	10	-8	15	2	117	-5	0	16	88	0	65	0	148	1576
88 West	47	208	239	105	304	47	-22	33	2	85	26	30	0	0	30	8	148	0	1290
Total	957	1062	3386	7572	9059	894	971	3430	499	2999	1405	418	520	758	388	551	1576	1290	37734

Home Based Work Trips

	Amador City	Comanche	lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	4	2	12	50	160	2	-1	30	0	30	0	0	0	0	0	0	0	0	290
Comanche	2	11	26	75	172	1	1	10	0	20	-1	0	0	0	0	0	0	0	317
lone	12	26	169	153	438	29	-11	40	1	37	-3	0	0	0	0	0	0	0	891
Jackson	50	75	153	624	662	52	28	95	30	154	11	0	0	0	0	0	0	0	1935
Martell	160	172	438	662	499	125	239	271	89	318	47	0	0	0	0	0	0	0	3021
NW County	2	1	29	52	125	2	0	39	0	20	-1	0	0	0	0	0	0	0	269
Pine Grove/Pioneer	-1	1	-11	28	239	0	19	-24	1	-12	5	0	0	0	0	0	0	0	245
Plymouth	30	10	40	95	271	39	-24	323	4	69	-8	0	0	0	0	0	0	0	850
Shenandoah	0	0	1	30	89	0	1	4	1	9	0	0	0	0	0	0	0	0	135
Sutter Creek	30	20	37	154	318	20	-12	69	9	58	-1	0	0	0	0	0	0	0	703
Up County	0	-1	-3	11	47	-1	5	-8	0	-1	20	0	0	0	0	0	0	0	71
Latrobe Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 South/PDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	290	317	891	1935	3021	269	245	850	135	703	71	0	0	0	0	0	0	0	8726

Home Based Shopping Trips

	Amador City	Comanche	Lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	1	0	2	13	37	0	-2	20	1	17	-1	0	0	0	0	0	0	0	88
Comanche	0	6	3	27	53	0	0	1	1	6	0	0	0	0	0	0	0	0	99
Lone	2	3	57	38	107	10	0	6	0	8	0	0	0	0	0	0	0	0	232
Jackson	13	27	38	195	79	14	45	13	4	54	4	0	0	0	0	0	0	0	487
Martell	37	53	107	79	73	26	-18	57	5	53	0	0	0	0	0	0	0	0	471
NW County	0	0	10	14	26	0	0	24	1	6	0	0	0	0	0	0	0	0	81
Pine Grove/Pioneer	-2	0	0	45	-18	0	69	0	-7	7	1	0	0	0	0	0	0	0	97
Plymouth	20	1	6	13	57	24	0	90	37	25	0	0	0	0	0	0	0	0	273
Shenandoah	1	1	0	4	5	1	-7	37	46	2	-5	0	0	0	0	0	0	0	84
Sutter Creek	17	6	8	54	53	6	7	25	2	26	1	0	0	0	0	0	0	0	205
Up County	-1	0	0	4	0	0	1	0	-5	1	38	0	0	0	0	0	0	0	38
Latrobe Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 South/PDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	88	99	232	487	471	81	97	273	84	205	38	0	0	0	0	0	0	0	2155

Home Based Other Trips

	Amador City	Comanche	Lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	0	0	4	26	75	0	-5	39	-1	25	-3	0	0	0	0	0	0	0	162
Comanche	0	8	7	38	86	0	0	2	0	8	0	0	0	0	0	0	0	0	151
Lone	4	7	364	131	461	20	-1	30	1	28	-1	0	0	0	0	0	0	0	1045
Jackson	26	38	131	1090	638	17	160	68	41	235	22	0	0	0	0	0	0	0	2466
Martell	75	86	461	638	616	41	-23	289	55	335	21	0	0	0	0	0	0	0	2594
NW County	0	0	20	17	41	0	0	39	0	7	0	0	0	0	0	0	0	0	125
Pine Grove/Pioneer	-5	0	-1	160	-23	0	219	1	1	25	5	0	0	0	0	0	0	0	383
Plymouth	39	2	30	68	289	39	1	643	48	99	-2	0	0	0	0	0	0	0	1254
Shenandoah	-1	0	1	41	55	0	1	48	9	15	-1	0	0	0	0	0	0	0	166
Sutter Creek	25	8	28	235	335	7	25	99	15	103	4	0	0	0	0	0	0	0	883
Up County	-3	0	-1	22	21	0	5	-2	-1	4	72	0	0	0	0	0	0	0	117
Latrobe Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 South/PDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	162	151	1045	2466	2594	125	383	1254	166	883	117	0	0	0	0	0	0	0	9346

Home Based School Trips

	Amador City	Comanche	Lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	0	0	13	5	3	0	0	4	0	35	0	0	0	0	0	0	0	0	59
Comanche	0	0	51	7	1	0	0	0	0	8	0	0	0	0	0	0	0	0	68
Lone	13	51	306	14	5	30	0	21	8	5	2	0	0	0	0	0	0	0	456
Jackson	5	7	14	299	61	4	56	7	6	70	17	0	0	0	0	0	0	0	547
Martell	3	1	5	61	7	1	6	6	1	35	1	0	0	0	0	0	0	0	126
NW County	0	0	30	4	1	0	0	10	0	14	0	0	0	0	0	0	0	0	59
Pine Grove/Pioneer	0	0	0	56	6	0	22	0	0	33	0	0	0	0	0	0	0	0	117
Plymouth	4	0	21	7	6	10	0	74	8	57	0	0	0	0	0	0	0	0	186
Shenandoah	0	0	8	6	1	0	0	8	0	13	0	0	0	0	0	0	0	0	37
Sutter Creek	35	8	5	70	35	14	33	57	13	100	8	0	0	0	0	0	0	0	378
Up County	0	0	2	17	1	0	0	0	0	8	0	0	0	0	0	0	0	0	28
Latrobe Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49 South/PDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	59	68	456	547	126	59	117	186	37	378	28	0	0	0	0	0	0	0	2061

Internal External plus External Internal (Trips with one end outside the model area and one end inside the model area)

	Amador City	Comanche	lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	0	0	0	0	0	0	0	0	0	0	39	58	27	94	6	34	35	47	341
Comanche	0	0	0	0	0	0	0	0	0	0	81	5	37	9	5	6	65	208	416
lone	0	0	0	0	0	0	0	0	0	0	21	12	201	21	3	9	26	239	530
Jackson	0	0	0	0	0	0	0	0	0	0	135	13	34	24	86	5	629	105	1030
Martell	0	0	0	0	0	0	0	0	0	0	54	88	114	136	55	64	372	304	1188
NW County	0	0	0	0	0	0	0	0	0	0	31	80	60	101	2	21	10	47	353
Pine Grove/Pioneer	0	0	0	0	0	0	0	0	0	0	45	-12	-13	-19	176	-11	-8	-22	136
Plymouth	0	0	0	0	0	0	0	0	0	0	16	107	24	139	2	192	15	33	530
Shenandoah	0	0	0	0	0	0	0	0	0	0	34	2	1	5	3	31	2	2	80
Sutter Creek	0	0	0	0	0	0	0	0	0	0	34	42	30	70	22	33	117	85	433
Up County	39	81	21	135	54	31	45	16	34	34	230	-8	-11	-14	-1	-10	-5	-16	657
Latrobe Road	58	5	12	13	88	80	-12	107	2	42	-8	0	0	0	0	0	0	0	388
104 West	27	37	201	34	114	60	-13	24	1	30	-11	0	0	0	0	0	0	0	504
16 West	94	9	21	24	136	101	-19	139	5	70	-14	0	0	0	0	0	0	0	566
26 South	6	5	3	86	55	2	176	2	3	22	-1	0	0	0	0	0	0	0	358
49 North	34	6	9	5	64	21	-11	192	31	33	-10	0	0	0	0	0	0	0	374
49 South/PDR	35	65	26	629	372	10	-8	15	2	117	-5	0	0	0	0	0	0	0	1259
88 West	47	208	239	105	304	47	-22	33	2	85	-16	0	0	0	0	0	0	0	1032
Total	341	416	530	1030	1188	353	136	530	80	433	657	388	504	566	358	374	1259	1032	10175

Internal External Trips

	Amador City	Comanche	lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	0	0	0	0	0	0	0	0	0	0	39	57	26	92	5	34	33	46	332
Comanche	0	0	0	0	0	0	0	0	0	0	81	5	37	9	5	6	65	209	416
lone	0	0	0	0	0	0	0	0	0	0	20	9	163	16	2	7	21	191	429
Jackson	0	0	0	0	0	0	0	0	0	0	62	6	14	12	35	5	427	61	623
Martell	0	0	0	0	0	0	0	0	0	0	38	20	20	34	23	17	185	83	420
NW County	0	0	0	0	0	0	0	0	0	0	31	80	60	101	2	21	10	47	353
Pine Grove/Pioneer	0	0	0	0	0	0	0	0	0	0	25	-10	-11	-17	144	-9	-4	-18	99
Plymouth	0	0	0	0	0	0	0	0	0	0	15	71	13	92	1	120	11	21	344
Shenandoah	0	0	0	0	0	0	0	0	0	0	32	3	1	5	3	32	2	2	80
Sutter Creek	0	0	0	0	0	0	0	0	0	0	28	17	12	30	14	15	84	44	244
Up County	39	81	20	62	38	31	25	15	32	28	62	-1	-1	-1	3	-1	0	-1	430
Latrobe Road	57	5	9	6	20	80	-10	71	3	17	-1	0	0	0	0	0	0	0	257
104 West	26	37	163	14	20	60	-11	13	1	12	-1	0	0	0	0	0	0	0	334
16 West	92	9	16	12	34	101	-17	92	5	30	-1	0	0	0	0	0	0	0	375
26 South	5	5	2	35	23	2	144	1	3	14	3	0	0	0	0	0	0	0	237
49 North	34	6	7	5	17	21	-9	120	32	15	-1	0	0	0	0	0	0	0	248
49 South/PDR	33	65	21	427	185	10	-4	11	2	84	0	0	0	0	0	0	0	0	834
88 West	46	209	191	61	83	47	-18	21	2	44	-1	0	0	0	0	0	0	0	683
Total	332	416	429	623	420	353	99	344	80	244	430	257	334	375	237	248	834	683	6741

External Internal Trips

	Amador City	Comanche	lone	Jackson	Martell	NW County	Pine Grove/Pioneer	Plymouth	Shenandoah	Sutter Creek	Up County	Latrobe Road	104 West	16 West	26 South	49 North	49 South/PDR	88 West	Total
Amador City	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	0	1	1	9
Comanche	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-1	0
lone	0	0	0	0	0	0	0	0	0	0	0	3	38	4	0	1	6	48	102
Jackson	0	0	0	0	0	0	0	0	0	0	74	7	20	11	51	-1	202	44	407
Martell	0	0	0	0	0	0	0	0	0	0	16	67	94	102	32	47	187	222	767
NW County	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pine Grove/Pioneer	0	0	0	0	0	0	0	0	0	0	20	-2	-2	-2	32	-2	-4	-4	37
Plymouth	0	0	0	0	0	0	0	0	0	0	2	36	11	47	1	72	4	12	186
Shenandoah	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	-1	0	0	0
Sutter Creek	0	0	0	0	0	0	0	0	0	0	6	25	18	39	8	18	33	41	189
Up County	1	0	0	74	16	0	20	2	2	6	168	-7	-10	-13	-4	-9	-5	-15	226
Latrobe Road	1	0	3	7	67	0	-2	36	0	25	-7	0	0	0	0	0	0	0	131
104 West	1	0	38	20	94	0	-2	11	0	18	-10	0	0	0	0	0	0	0	170
16 West	2	0	4	11	102	0	-2	47	0	39	-13	0	0	0	0	0	0	0	191
26 South	1	0	0	51	32	0	32	1	0	8	-4	0	0	0	0	0	0	0	121
49 North	0	0	1	-1	47	0	-2	72	-1	18	-9	0	0	0	0	0	0	0	126
49 South/PDR	1	1	6	202	187	0	-4	4	0	33	-5	0	0	0	0	0	0	0	425
88 West	1	-1	48	44	222	0	-4	12	0	41	-15	0	0	0	0	0	0	0	348
Total	9	0	102	407	767	0	37	186	0	189	226	131	170	191	121	126	425	348	3434

APPENDIX B:

Potential Mobility Manager Program Options

Volunteer Driver / Trip Reimbursement Program

Amador County's fixed route services do not cover many of the very rural portions. As such, some communities are left unserved. The ability to provide transportation for social services and medical purposes is crucial to improving some of the resident's mobility.

In order to have a well-rounded transportation system that provides options to residents in rural Amador County, the community should look into developing a volunteer driver program that serves qualified residents. A volunteer driver program can be useful in serving rural areas and smaller communities where budgets will not allow all areas to be served, or demand is so low and infrequent that regular service is not warranted.

Some characteristics of existing programs in similar settings include:

- Volunteer driver programs typically start out from a grass roots effort based on an identified need.
- Overseeing the volunteers requires a dedicated individual, likely a paid employee. In some cases, the program is overseen by a board with the rotating chairman overseeing day-to-day operations.
- Some volunteer programs provide reimbursements, while some do not.
- The biggest challenge is to recruit and maintain volunteers, as they need to be motivated by feeling they are providing a worthwhile service. Turnover can be high due to burnout or declining driver ability.
- As gas prices and auto insurance costs increase, volunteers can be more difficult to recruit.
- Grant funding can be obtained to offset costs of reimbursed driver volunteer programs. Using such grants may limit trip purpose and client eligibility.

There are many models from existing programs that can be used as guidance. Tehama County, Trinity County, Gualala (town) and Riverside County, in California, may serve as useful models for service in Amador County, as discussed below.

Example: Tehama County, California

Tehama County has a volunteer driver program to provide medical transportation. The 23 year-old program is under direction of the Transit Manager (Department of Public Works), with a supervisor working part time Monday through Wednesday to oversee daily operations. The supervisor is paid \$9.34 hourly without benefits and has an annual maximum of 1,000 hours.

Tehama County Medical Transportation Services (METS) currently has 12 volunteer drivers. Drivers use their personal vehicles and are reimbursed at the federal IRS rate (currently \$0.485 per mile). Drivers are recruited by word-of-mouth. Ten-year DMV records are required, but fingerprinting is not. As of this year, drivers are covered by Workman's Compensation Insurance.

The Supervisor coordinates appointments and assigns trips to drivers. This employee is also responsible for recruiting volunteers, record-keeping and reimbursing drivers. Efforts are made to assign drivers who live closest to the passenger in need for greatest efficiency.

Clients are asked for a \$5.00 round trip donation within Tehama County or \$10.00 round trip donation to Butte, Glenn, or Shasta Counties. An estimated 80 to 90 percent of clients pay this donation. METS receives \$0.14 per mile reimbursement from the American Cancer Society for passengers seeking cancer treatment. There are 150 regular clients. The program provides between 60,000 to 90,000 reimbursed vehicle miles each year. While the program is for medical trips only, clients may do shopping in conjunction with picking up prescriptions at the driver's discretion. Clients must be ambulatory to use the service. Spouses or attendants may accompany the passenger if desired. Most of the clients are elderly, though some children and other adults use the service as well.

Example: Trinity County, California

In response to the need for increased transit services in rural Trinity County, the Trinity County Planning/Transit Department implemented a transportation assistance program. Human Resource Network (HRN), a private non-profit organization, is contracted to administer the program. The HRN program serves residents in the northern portion of the county and a similar program is administered through Southern Trinity Health Services serving the southern portion of the County. Unlike the previous example, Trinity County's program does not have a list of volunteers. Persons needing transportation to medical or social service appointments may recruit their own volunteer who will then be reimbursed for mileage at the rate of \$0.25 per mile. A person is eligible for the program if they are:

- A Trinity County resident
- Unable to transport themselves because of no transportation, unable to drive because of medical reasons or advanced age
- Are in a low-income category (income no more than 200 percent of the poverty level) and have no money for gas

HRN has developed a process to ensure that the program is not being abused. First, the volunteer and the applicant are required to meet with HRN staff to discuss the arrangement. HRN staff confirms that the driver holds a valid California Driver's License, valid insurance and vehicle registration. The medical or social service provider is also contacted to verify the appointment. The volunteer driver records the mileage of the trip and submits a receipt for transportation funds to HRN. Staff compares the mileage to actual distance between major destinations before paying the driver.

Trinity County will also reimburse residents needing transportation to a medical or social service appointment who are able to drive themselves but cannot afford to pay for gas. Again, the medical or social service provider is contacted before a fuel voucher is provided. The fuel voucher is valid for seven days. Volunteers / applicants are not limited as to where they can travel for medical and social service appointments, but will only be reimbursed for up to the equivalent of one tank of gas.

As HRN was an established non-profit agency in Trinity County before the transportation assistance program was implemented, actual staff time and set up costs for the program were minimal. For example, HRN already had a database system in place to record volunteer trips as well as existing relationships with vendors such as the Mini-Mart (HRN reimburses persons in need of propane).

Each quarter, HRN bills Trinity County for the cost of the vouchers. Trinity County also paid HRN an administrative fee of 10 percent of contract costs at the beginning of the contract. The original contract in Fiscal Year 2006-2007 to operate the Transportation Assistance Program with HRN was \$15,000 per year. The program was so popular that an additional \$10,000 was added within the first year of operation. Currently, Trinity County spends about \$30,000 annually on the Transportation Assistance Program. HRN staff feels that the administrative fee they are paid does not completely cover actual administrative time spent on the program. Between meeting with the program participant, contacting providers and accounting for the trip, HRN staff estimate it takes about 1.5 to 2 hours of staff time for each new program participant. This equates to roughly a quarter-time administrative position.

Example: Community Resources Connection, Gualala, California

Located along the remote Sonoma/Mendocino Coast, Community Resources Connection (CRC) started in 1999 as a telephone referral service for South Coast Seniors, Incorporated. CRC gave referrals to individuals seeking services in the community, and offered a handy-person service wherein volunteers would go to callers' homes to do minor repairs. The majority of phone calls were inquiries regarding transportation services, primarily for medical appointments. Responding to this need, CRC organized a volunteer transportation program offering free transportation to anyone in the region with an "essential need."

Approximately 35 volunteer drivers provide the transportation, using their own private vehicles and gasoline. Drivers do have the option of receiving gas cards as partial reimbursement for their mileage, but 90 percent of drivers opt out of reimbursement. In addition, the regional transit provider (Mendocino Transit Authority) leases a Dodge Caravan to CRC for \$1.00 per year. The van goes to Fort Bragg on the first Wednesday of each month, and to Santa Rosa on the first Friday of each month, then on each Thursday for the remainder of the month. The van also uses volunteer drivers. There are currently four volunteers who are qualified to drive the van, while there have been as many as eight volunteers who could drive the van in the past. Van drivers must be fingerprinted and trained. Passengers are not charged a fare, but are encouraged to make a donation to the CRC; most donate a nominal amount.

The CRC subsequently shifted from being part of the South Coast Seniors to receiving administrative oversight from Redwood Coast Medical Services. In 2004, however, CRC became a 501(c)(3) nonprofit corporation. CRC has a Board consisting of 11 volunteers who meet on a monthly basis to handle normal Board matters as well as manage the organization's administrative functions. In addition to Board members, CRC has volunteer committee chairs and members who are not on the Board.

The Redwood Coast Medical Services (RCMS), the only local medical clinic in the region, provides for the operating cost of the van (insurance, gasoline, and maintenance). The in-kind service by RCMS includes office space, office expenses including a toll-free phone number and insurance, maintenance and gasoline for the van. Approximately 60 RCMS clients use the van service annually.

In addition to costs covered by the RCMS, the CMC provides cash outlay of approximately \$5,000 per year. This covers the cost for the Directors and Officers and General Liability Insurance, as well as office supplies and an annual volunteer appreciation dinner. Cash contributions are received from clients, the general public and board members.

CRC provides approximately 500 one-way passenger trips annually: 410 of these are local trips (less than 20 miles round trip) while 90 are to Fort Bragg or Santa Rosa (110

to 170 miles round trip). Passengers call CRC Monday through Friday between Noon and 4:00 PM to schedule trips, with 48-hour advance notice required. Most of the trips are for medical or dental appointments, or for other errands for daily living including grocery shopping. Phone volunteers who arrange the trips encourage the passenger to make efficient use of the service by completing several errands in one trip, rather than scheduling trips on multiple days. In total, CRC services travel approximately 18,000 miles per year: 12,200 in private vehicles and 5,800 in personal vehicles.

Example: Riverside County, California

Riverside County provides the "TRIP" volunteer reimbursement program, which has proven to be successful in providing low cost transportation to seniors and disabled persons. It is organized as a trip reimbursement program, with volunteer drivers. Since its establishment in 1993, the program has provided over 1 million free trips for over 5,000 passengers. The program has completed 14.5 million miles of assisted travel through the help of nearly 1,000 volunteer drivers since 1993.

The Beverly Foundation has been promoting the Riverside County program as a model for new programs nationwide. Part of this effort has been the establishment of the triptrans.org website, which provides information regarding the benefits of this approach, and the start-up requirements for a new program. By using an existing organization, many costs may be eliminated, such as office space, utilities and computers. Further, a full-time administrator may not be necessary given the anticipated size of the participant group. The actual computer software is the only fixed costs regardless of how the program is administered, and is approximately \$600.

Establishing a Volunteer Program

To establish a volunteer driver program, the first step would be to determine who would oversee the program. As the transit service agency, Amador Transit would be the most likely candidate. Tehama County's METS program provides a good model for this set up. Operating under Amador Transit would require a half-time administrative position to recruit and train volunteers, market the program, oversee volunteer dispatching efforts, and for record-keeping. Without benefits, this position is likely to cost approximately \$10,000 to \$12,000 annually. Another option would be to incorporate a project coordinator into the budget for Amador Transit that, among other projects, would coordinate the volunteer program by providing the above mentioned duties.

Another potential candidate to initiate the program is the Amador County Senior Center. Senior citizens are often both the volunteers and clients of volunteer driver programs, and association with the Senior Center might increase recruiting efforts. However, seniors may experience declining health and physical limitations that make turnover high and retaining volunteers difficult. Despite this, experience has shown that it is not

a problem for volunteers to see the need for their services (even when a paid program is available), so long as it is focused on trips that the public transit program is not also serving. The volunteers typically understand that the public sector cannot afford to provide traditional transit service to all portions of the community at all times, and therefore volunteers are willing to step in to provide service beyond the area served by public transit.

Funding for Volunteer and Voucher Programs

Funding for “voucher based” or reimbursement programs is available from federal funding programs. The FTA Section 5316 Jobs Access Reverse Commute (JARC) and Section 5317 New Freedom are two programs that previously could be used for such programs; however, with the new MAP-21 changes, FTA 5310 and 5311 would be available for these activities.

- JARC funding requires that the trips be made for employment by individuals with limited income and can be used to access rides through volunteer driver programs, taxis, or trips provided by human service agencies. There is also a 50 percent match required, which can be met through the use of non-DOT federal funds.
- New Freedom funding can be used to support the administration and expenses related to new voucher programs for transportation service offered by human service providers; only new voucher programs or expansion of existing programs are eligible. The funding program provides vouchers to qualified persons (persons with disabilities) for transportation through volunteer driver programs, taxis, or trips provided by human service agencies. A 50 percent match is required, which can be covered by use of non-DOT funding sources.

Federal Section 5311 funding (activities not covered by JARC activities) can be used to establish voucher-based programs; however, these typically involve taxi voucher programs rather than volunteer driver or transportation reimbursement programs.

River Pines Pilot Program

Amador Transit is in the planning stages for a pilot program for service to the River Pines area. The service would operate between the Sutter Hill Transit Center and River Pines one day per week, essentially providing “lifeline” service. While the service has not yet been finalized, it is estimated to cost Amador Transit \$11,000 per year, and is expected to generate roughly 8 to 15 passenger-trips per day, or 415 to 780 passenger-trips annually. To achieve this operating cost, Amador Transit is looking to “attach” the service to an existing route so as to minimize the actual costs to travel to River Pines.

The transit agency should monitor this program closely. Once performance measures have been decided upon and the service has been evaluated thoroughly, Amador

Transit should determine whether or not the service continues. If the program is successful, the program could be implemented in other rural areas not served by transit, should the demand arise. Because no new demand has been identified, and that the River Pines program has yet to be started, there are no ridership estimates available for this service. More evaluation for this and future similar services should be considered in the short-range planning studies.